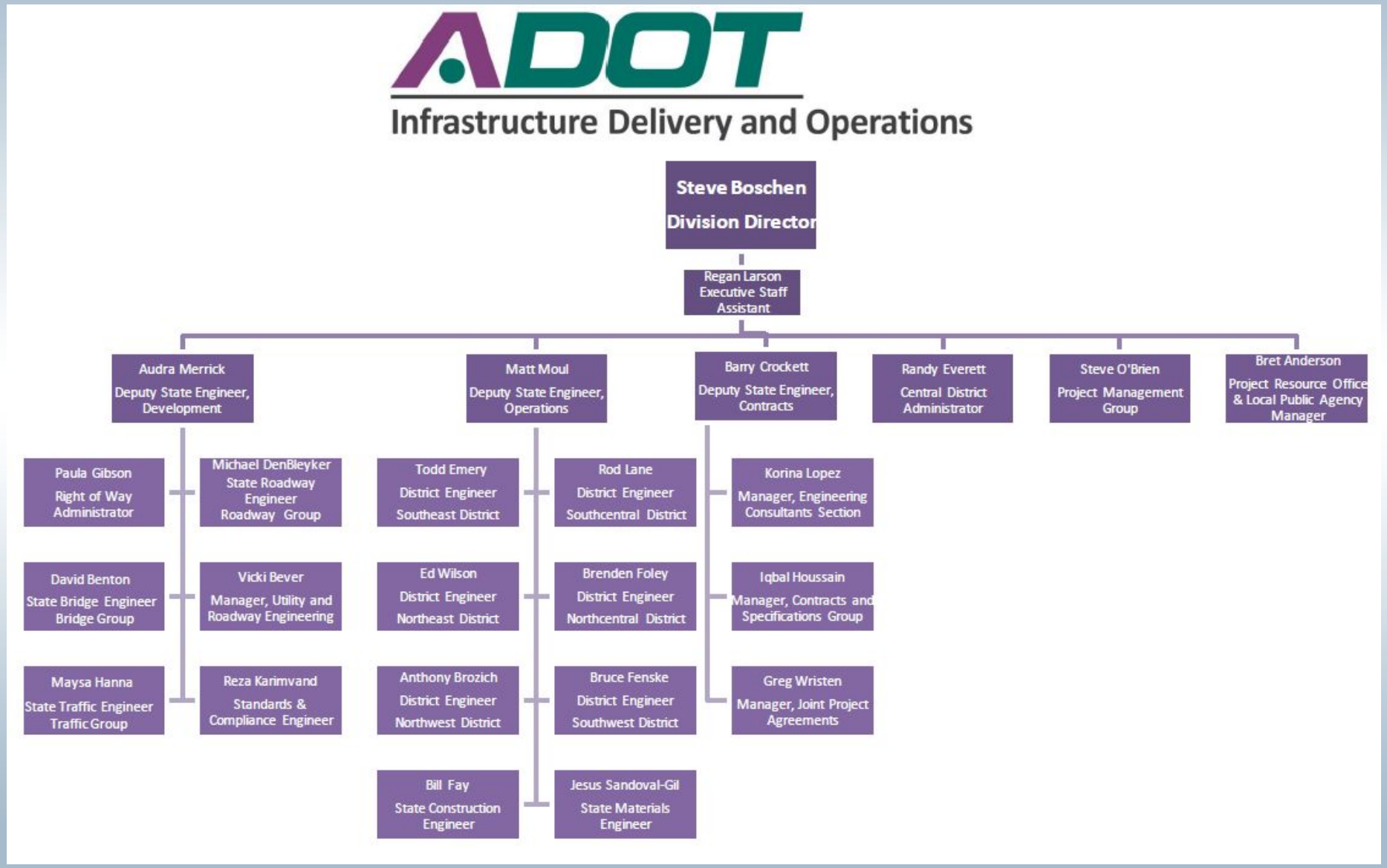
Project Delivery Process

Design & Delivery Technical Groups
Infrastructure Delivery & Operations

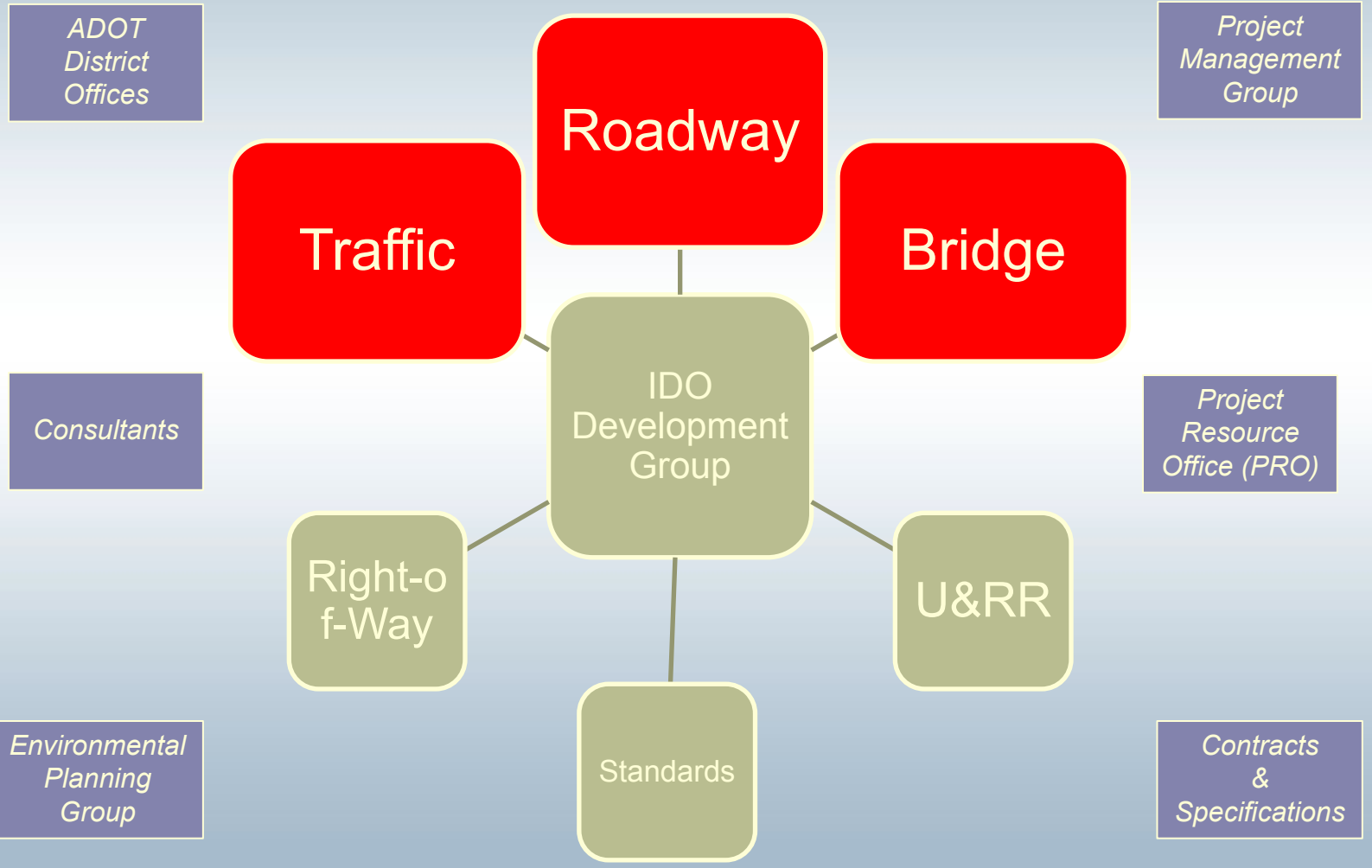
Roadway, Bridge & Traffic
Design Groups

Where Do We Fit In?



Where Do We Fit In?

IDO Development

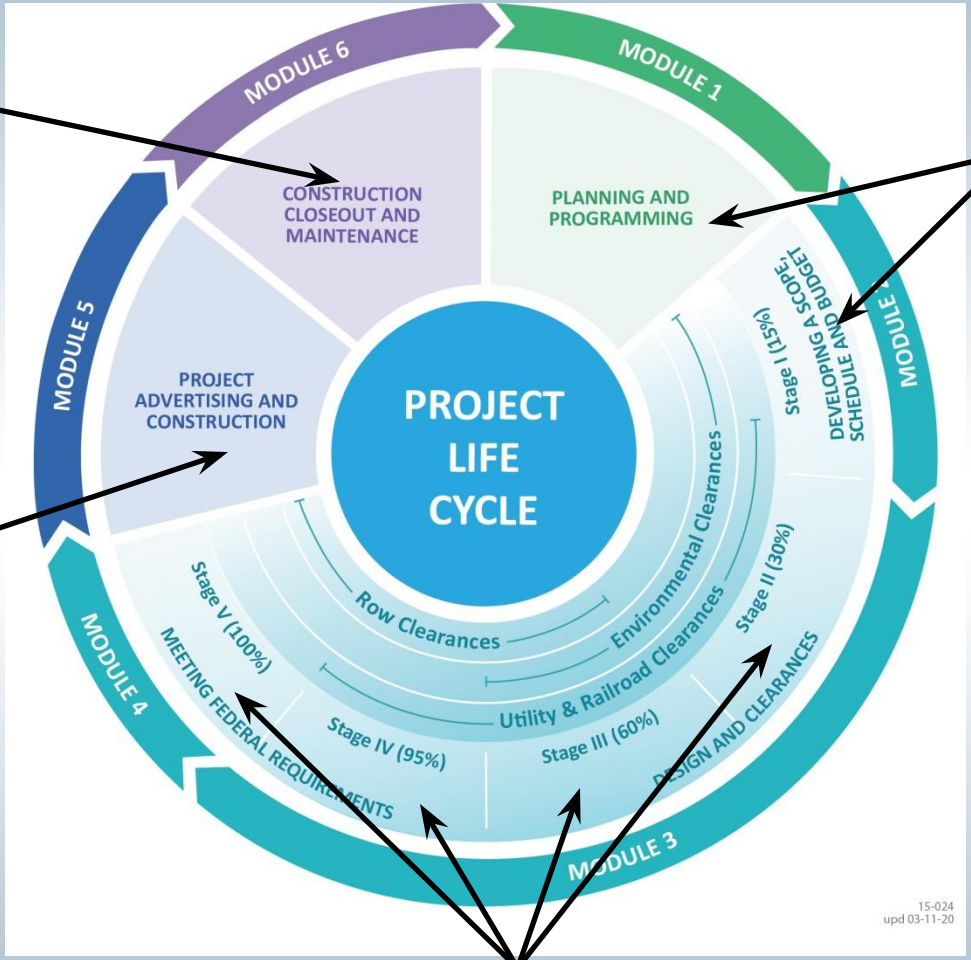


Where Do We Fit In?

Roadway, Bridge & Traffic Design Teams Assist in Addressing Construction Questions and Providing Technical Guidance for Construction Related Matters

Roadway, Bridge & Traffic Design Teams Provide Critical Input into Development of a Project's Scope, Schedule and Budget

Roadway, Bridge & Traffic Design Teams Assist in the Preparation of Bid Documents and Address Bid RFIs



Roadway, Bridge & Traffic Design Teams Coordinate to Deliver Technical Designs and Construction Documentation

Design – What is Needed & Where do we start??

What is the Project Need & Objective?

What are the Existing Conditions?

Survey

Environmental

Utilities

Road

Are there Safety Considerations?

What Design Parameters & Standards/Criteria Exist?

What Project Risk Factors Exist?

Structures/Bridges

What is the Schedule?

What is the Budget?

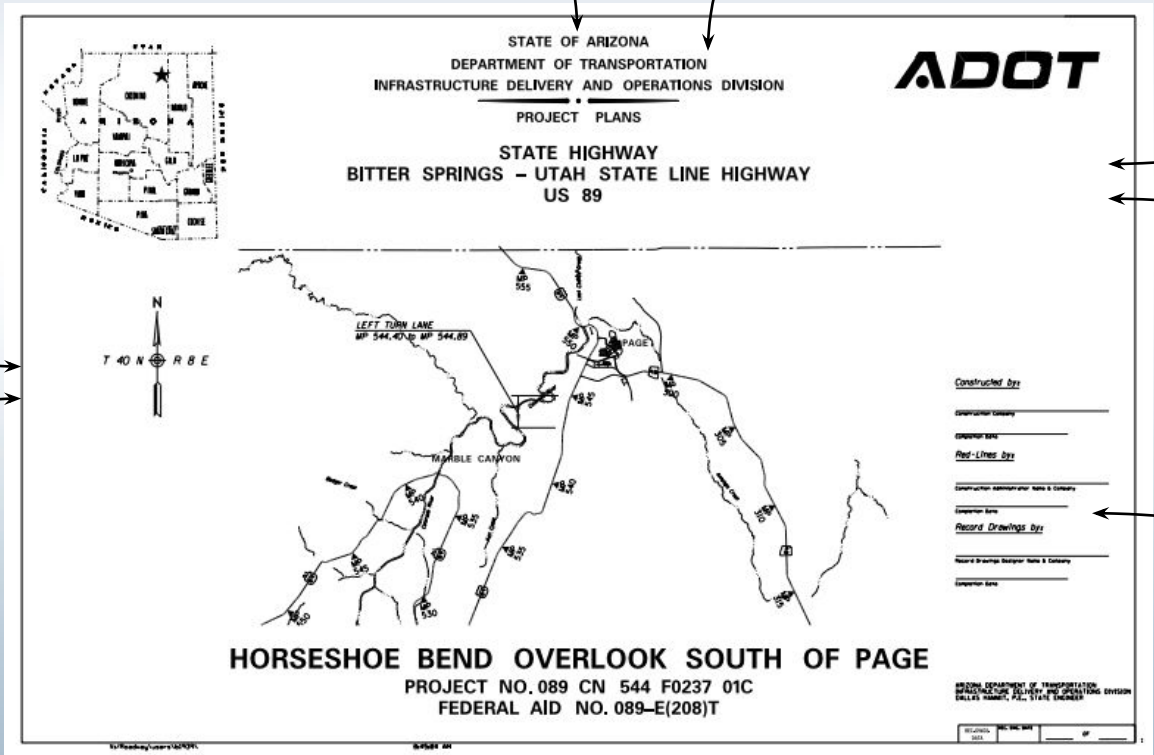
Construction

Drainage

Erosion Control/Landscape

Traffic

Right-of-Way



Roadway Engineering Group

Infrastructure Delivery and Operations Division

Designing, Supporting & Delivering ADOT's Roadway Projects

Michael DenBleyker, P.E.
Roadway Group Manager
State Roadway Engineer

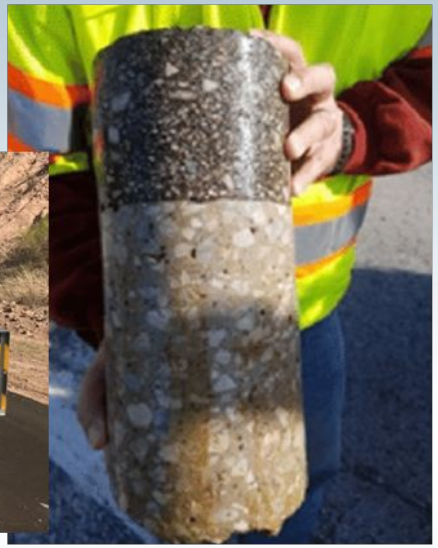
ADOT

What Do We Do?

We Design Roads!

We Design Key Features in Support of Safer Roads

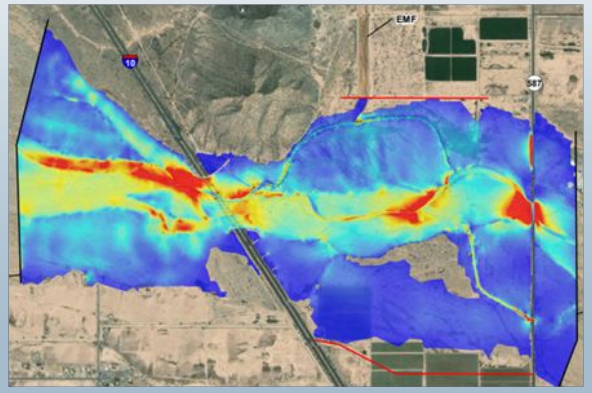
We Design What Our Roads are Built Out of!



We Design Landscape Features to Restore & Maintain our ROW!

We Survey What We Have & What We Need & What We Build!

We Study & Design Drainage Features Impacting Our Roads!



What Do We Do?

Roadway Survey

Section Manager: Virgil Coxon
Location Chief Surveyor: Mark Luond
Construction Chief Surveyor: Clifton Clark

Services/ Responsibilities
*Design/ Location Survey
*Construction Survey
*Survey Support

Roadway Pavement Design

Section Manager: Ali Zareh
Team Lead: Ashek Rana

Services/ Responsibilities
*Pavement Testing/ Cores/ Evaluation
*Material/Pavement Design Reports

Roadside Development

Section Manager: LeRoy Brady
Team Lead: John Hucko

Services/ Responsibilities
*Aesthetic Enhancements
*Seeding & Revegetation
*Landscape & Irrigation Design
*Stormwater Quality & Erosion/ Sedimentation Control Plans

ROADWAY ENGINEERING GROUP

Manager: Michael DenBleyker
Assistant State Engineer

Roadway Standards

Section Manager: Hiren Shah
Team Lead: Chris Cooper

Services/ Respnsibilites
*Roadway Design Guidelines
*AASHTO Standards & Criteria
*MASH Standards
*Roadway Construction Details
*Design Support

Roadway Drainage

Section Manager: Syed Alam

Services/ Responsibilities
*Hydraulic/Hydrology Design & Standards
*Drainage Permits
*Scour/ Erosion Protection Design

Roadway Design

Section Manager: Doug Smith
Team Leads: Jordan Kurlin, Hassan Eghbali, Erica Eggen

Services/ Responsibilities
*Roadway Design Documentation
*Earthwork/ Drainage Calculations
*Construction/ Maintenance Details
*Design Management and Coordination

Roadway Pre-Design

Section Manager: Hiren Shah
Team Lead: Shahid Bhuiyan

Services/ Responsibilities
*Project Scoping Documentation
*Design Exceptions/ Variances
*AASHTO Controlling Criteria
*Change of Access Reports

Contact Information

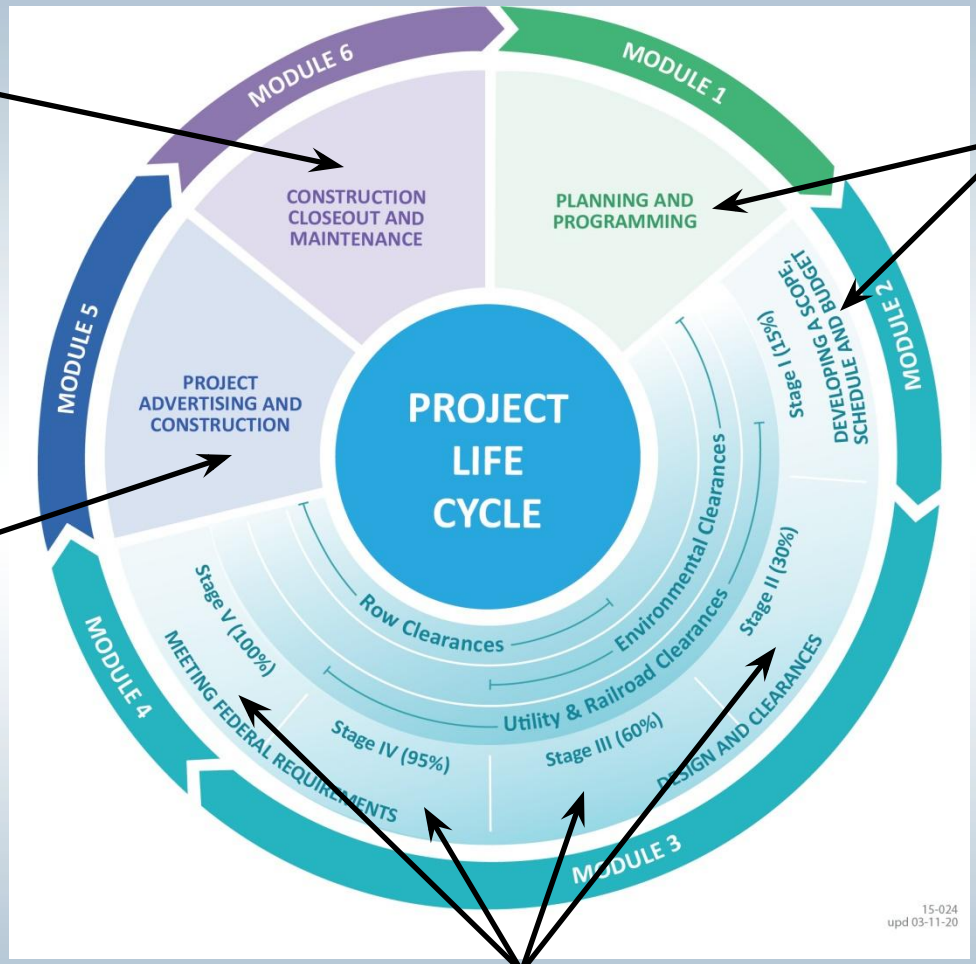
Manager:	***Michael DenBleyker*** mdenbleyker@azdot.gov 602.712.7808
Survey:	***Virgil Coxon*** vcoxon@azdot.gov 602.712.8580
Pre-Design, Standards:	***Hiren Shah*** hshah@azdot.gov 602.712.7794
Drainage:	***Syed Alam*** salam2@azdot.gov 602.712.8701
Roadside Development:	***LeRoy Brady*** lbrady@azdot.gov 602.712.4261
Design:	***Doug Smith*** dsmith2@azdot.gov 602.712.8482
Pavement Design:	***Ali Zareh*** azareh@azdot.gov 602.712.8082

Six Distinct Professional Services Teams With One Common Goal - Design, Support & Deliver

Where Do We Fit In?

Roadway Design Teams Assist in Addressing Construction Questions and Providing Technical Guidance for Construction Related Matters

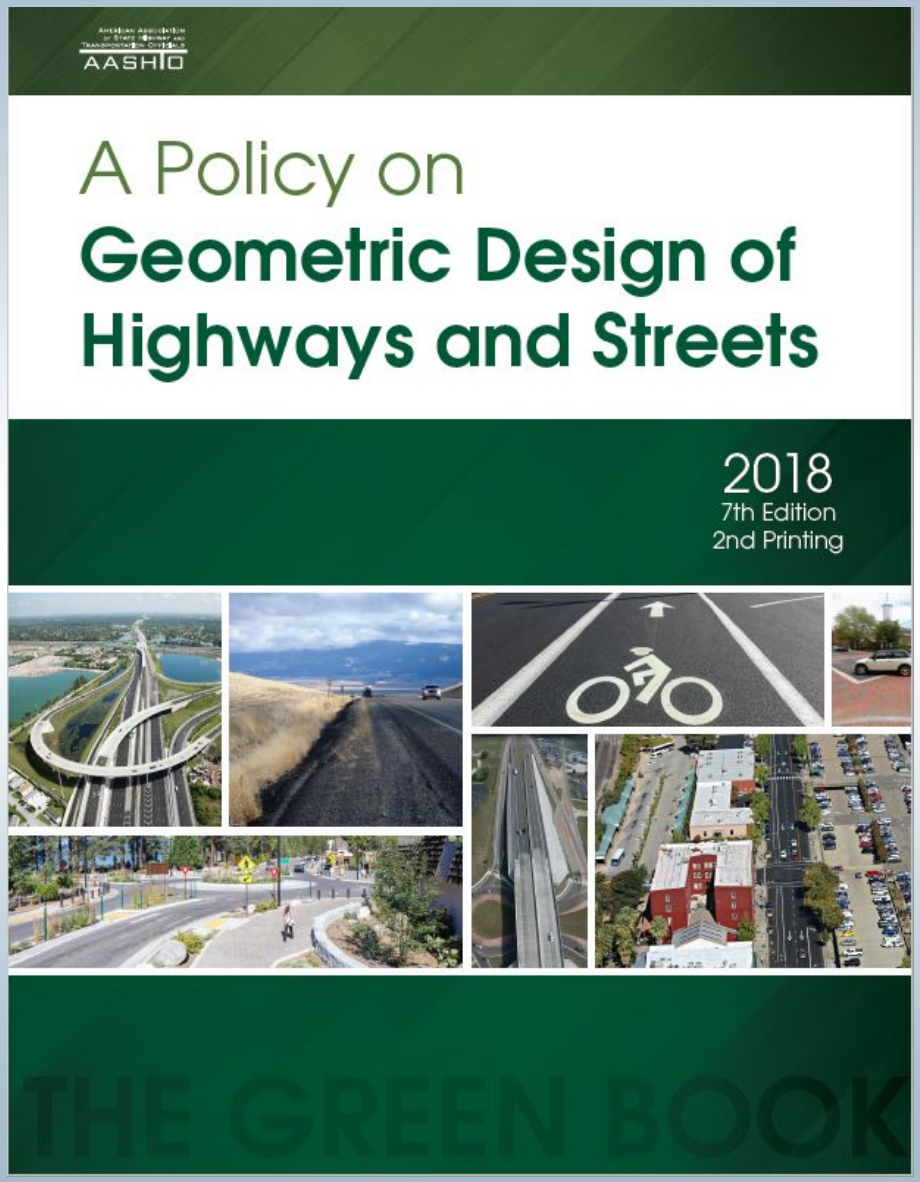
Roadway Design Teams Assist in the Preparation of Bid Documents and Address Bid RFIs



Roadway Design Teams Provide Critical Input into Development of a Project's Scope, Schedule and Budget

Roadway Design Teams Coordinate to Deliver Technical Designs and Construction Documentation

What Do We Use?



ARIZONA DEPARTMENT OF TRANSPORTATION

ROADWAY ENGINEERING GROUP

ROADWAY DESIGN GUIDELINES

JANUARY 2021

Visit the ADOT Roadway Engineering webpage for future updates

What Do We Use?

ARIZONA DEPARTMENT OF TRANSPORTATION

ADOT

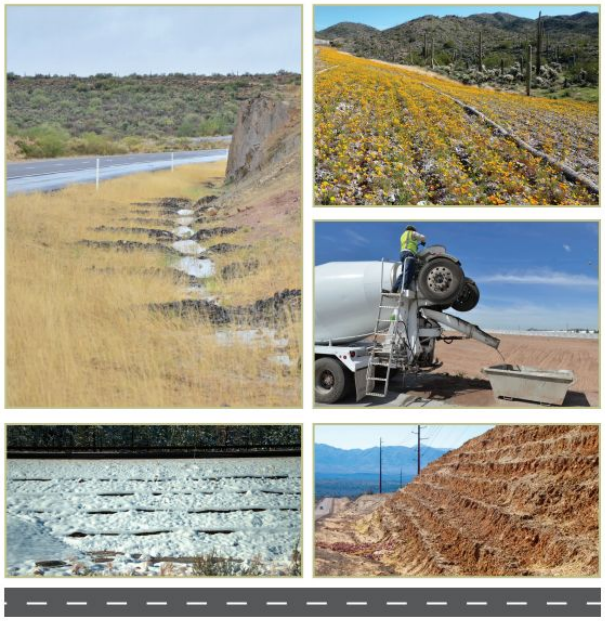
PAVEMENT DESIGN MANUAL

September 29, 2017

ROADWAY ENGINEERING GROUP
PAVEMENT DESIGN SECTION

ADOT
Arizona Department of Transportation

Erosion and Pollution Control Manual
For Highway Design and Construction



ARIZONA DEPARTMENT OF TRANSPORTATION

ADOT

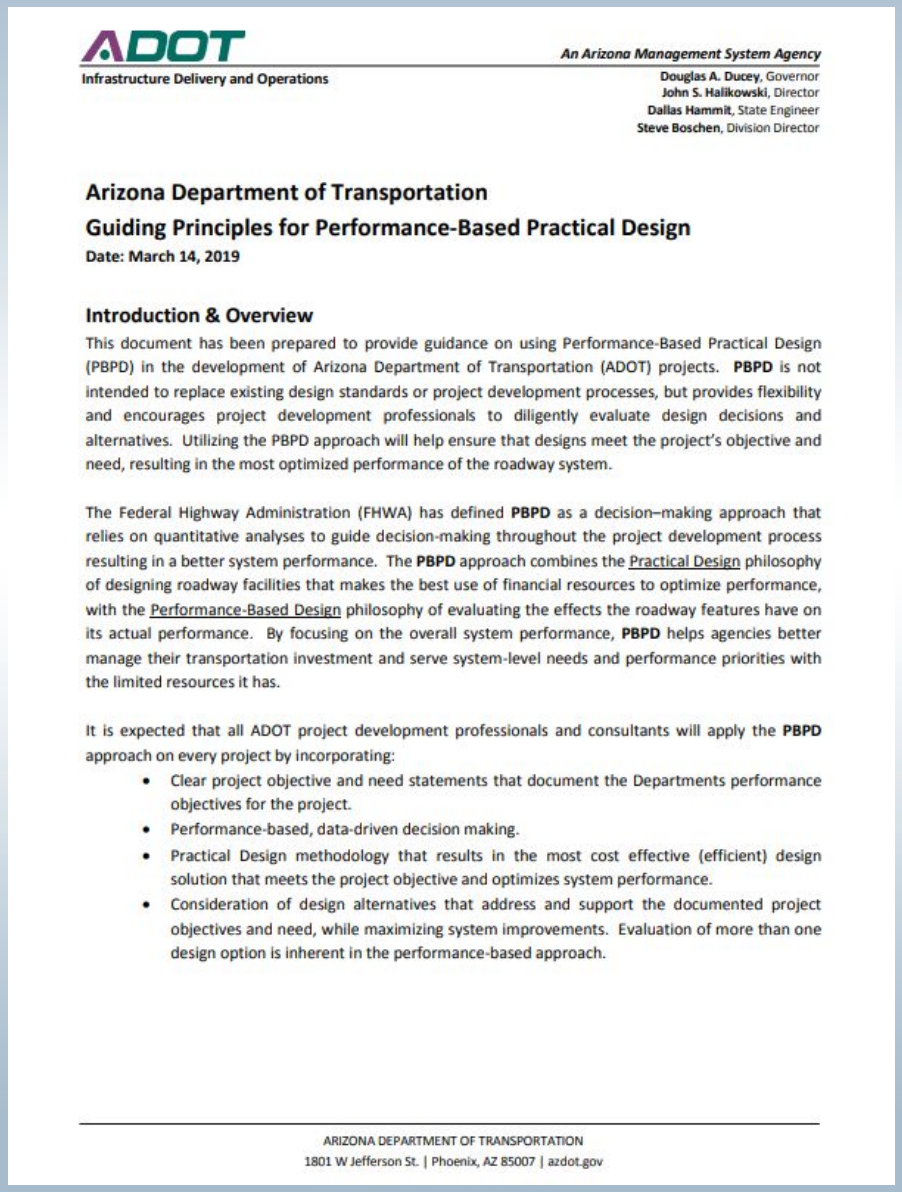
HIGHWAY DRAINAGE DESIGN MANUAL
HYDRAULICS

Final Report

January, 2007

Arizona Department of Transportation
206 South 17th Avenue
Phoenix, Arizona 85007

What Do We Use?



ADOT
Infrastructure Delivery and Operations

An Arizona Management System Agency

Douglas A. Ducey, Governor
John S. Halikowski, Director
Dallas Hammit, State Engineer
Steve Boschen, Division Director

Arizona Department of Transportation

Guiding Principles for Performance-Based Practical Design

Date: March 14, 2019

Introduction & Overview

This document has been prepared to provide guidance on using Performance-Based Practical Design (PBPD) in the development of Arizona Department of Transportation (ADOT) projects. **PBPD** is not intended to replace existing design standards or project development processes, but provides flexibility and encourages project development professionals to diligently evaluate design decisions and alternatives. Utilizing the PBPD approach will help ensure that designs meet the project's objective and need, resulting in the most optimized performance of the roadway system.

The Federal Highway Administration (FHWA) has defined **PBPD** as a decision–making approach that relies on quantitative analyses to guide decision-making throughout the project development process resulting in a better system performance. The **PBPD** approach combines the Practical Design philosophy of designing roadway facilities that makes the best use of financial resources to optimize performance, with the Performance-Based Design philosophy of evaluating the effects the roadway features have on its actual performance. By focusing on the overall system performance, **PBPD** helps agencies better manage their transportation investment and serve system-level needs and performance priorities with the limited resources it has.

It is expected that all ADOT project development professionals and consultants will apply the **PBPD** approach on every project by incorporating:

- Clear project objective and need statements that document the Departments performance objectives for the project.
- Performance-based, data-driven decision making.
- Practical Design methodology that results in the most cost effective (efficient) design solution that meets the project objective and optimizes system performance.
- Consideration of design alternatives that address and support the documented project objectives and need, while maximizing system improvements. Evaluation of more than one design option is inherent in the performance-based approach.

ARIZONA DEPARTMENT OF TRANSPORTATION
1801 W Jefferson St. | Phoenix, AZ 85007 | azdot.gov

Performance Based Practical Design (PBPD):

ADOT's Goal is to deliver projects that:

1. Maintain or improve the operational performance of the roadway system.
2. Are the most cost effective solution to meeting the Project Objective and Need.

- **PBPD** is a decision-making approach that relies on quantitative analysis to guide decision-making throughout the project development process resulting in a better system performance.
- **PBPD** combines "Practical Design" philosophy of designing roadway facilities that makes the best use of the financial resources to optimize performance, with the "Performance-Based Design" philosophy of evaluating the effects the roadway features have on its actual performance.
- **PBPD** helps agencies better manage their transportation investment and serve system-level needs and performance priorities with the limited resources it has.
- **PBPD** is not intended to replace existing design standards or project development processes. **PBPD** provides flexibility and encourages professionals to diligently evaluate design decisions and alternatives.

What We Do?

Pre-Design & Standards

089 CN 544 F0237 01C
NHPP-089-E(208)T
HORSESHOE BEND OVERLOOK SOUTH OF PAGE
BITTER SPRINGS – UTAH STATE LINE HIGHWAY
US 89

AASHTO CONTROLLING DESIGN CRITERIA REPORT

MAY 26, 2020

PREPARED BY
KATHRYN HAMMOND
ROADWAY PREDESIGN SECTION
ROADWAY ENGINEERING GROUP

ADOT
Infrastructure Delivery and Operations

ADOT

Project No. 089 CN 544 F0237 01C

ATTACHMENT 1 – VERTICAL CURVE INVENTORY

PROJECT NAME: HORSESHOE BEND OVERLOOK SOUTH OF PAGE
PROJECT NO: 089 CN 544 F0237 01C
ROADWAY TYPE: UNDIVIDED ROADWAY (BI-DIRECTIONAL)

VPI STATION	MILEPOST		GRADE (%)		CURVE	CURVE	STOPPING SIGHT DISTANCE (FT)		SPEED (MPH)	
(FT)	BEGIN	END	APPROACH	DEPARTURE	LENGTH (FT)	TYPE	EXISTING	REQUIRED	EXISTING	POSTED
1215+00.00	544.00	544.11	-1.4000	-2.5000	600.00	Crest	1281	675	95	65
1225+00.00	544.19	544.30	-2.5000	-1.1430	600.00	Sag	+9999	675	+100	65
1232+00.00	544.32	544.43	-1.1430	-2.2500	600.00	Crest				
1240+00.00	544.47	544.58	-2.2500	-1.2000	600.00	Sag				
1250+00.00	544.66	544.77	-1.2000	-2.5860	600.00	Crest				

VPI STATION	MILEPOST		GRADE (%)		CURVE	CURVE	ST
(FT)	BEGIN	END	APPROACH	DEPARTURE	LENGTH (FT)	TYPE	
1215+00.00	544.00	544.11	-1.4000	-2.5000	600.00	Crest	
1225+00.00	544.19	544.30	-2.5000	-1.1430	600.00	Sag	
1232+00.00	544.32	544.43	-1.1430	-2.2500	600.00	Crest	
1240+00.00	544.47	544.58	-2.2500	-1.2000	600.00	Sag	
1250+00.00	544.66	544.77	-1.2000	-2.5860	600.00	Crest	

VPI STATION	MILEPOST		GRADE (%)		CURVE	CURVE	ST
(FT)	BEGIN	END	APPROACH	DEPARTURE	LENGTH (FT)	TYPE	
1215+00.00	544.00	544.11	-1.4000	-2.5000	600.00	Crest	
1225+00.00	544.19	544.30	-2.5000	-1.1430	600.00	Sag	
1232+00.00	544.32	544.43	-1.1430	-2.2500	600.00	Crest	
1240+00.00	544.47	544.58	-2.2500	-1.2000	600.00	Sag	
1250+00.00	544.66	544.77	-1.2000	-2.5860	600.00	Crest	

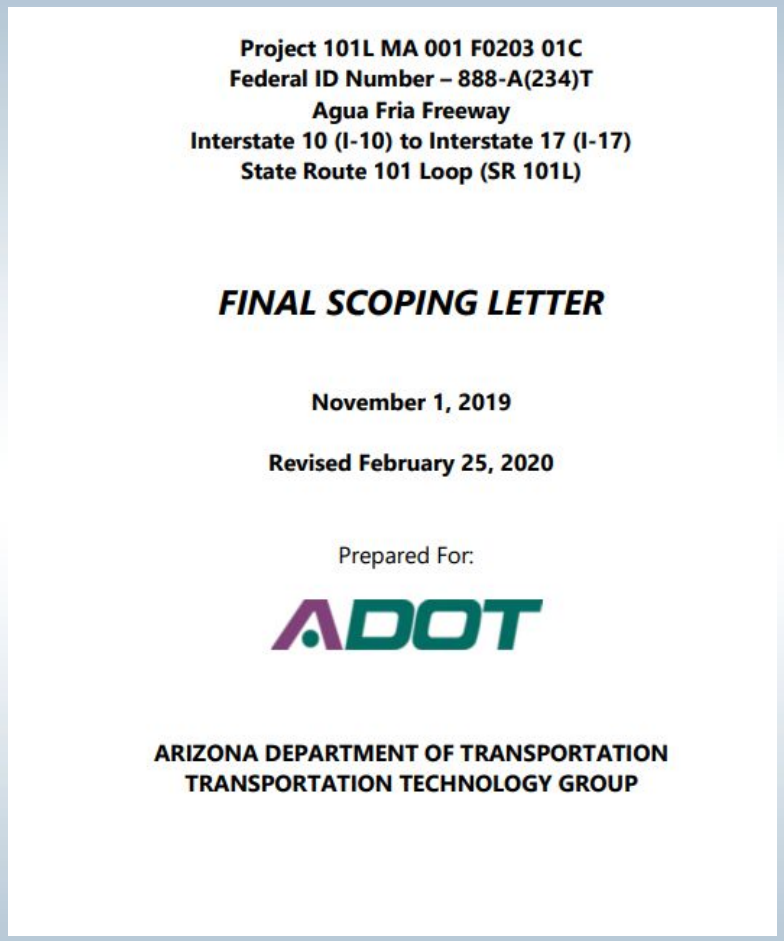
Meaning of Symbols:
GB = Grade Break – Stopping Sight Distance and Speed not calculated
* = Existing Stopping Sight Distance less than AASHTO required value
Note:
Input grade with direction of traffic for one-way traffic
Project Limits MP 544.00 – MP 545.00

Defining the Project's Scope, Schedule & Budget

- *-What Conditions Exist Today?*
- *-What are the Objectives & Needs to be addressed by this project?*
- *-Data Collection (Traffic, Safety, Geometric Features, etc.)*
- *-Field Analysis/Research*

What We Do?

Pre-Design & Standards



Project 101L MA 001 F0203 01C
Federal ID Number – 888-A(234)T
Agua Fria Freeway
Interstate 10 (I-10) to Interstate 17 (I-17)
State Route 101 Loop (SR 101L)

FINAL SCOPING LETTER

November 1, 2019

Revised February 25, 2020

Prepared For:

ADOT

ARIZONA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION TECHNOLOGY GROUP

Design Scoping Reports & Technical Memorandums

- *-What Are We Building?*
- *-What are our Objectives?*
- *-What Will it Cost?*
- *-What Risks Exist?*
- *-How Will it Perform?*

Design Compliance Reviews & Approvals

What We Do?

Pavement Design

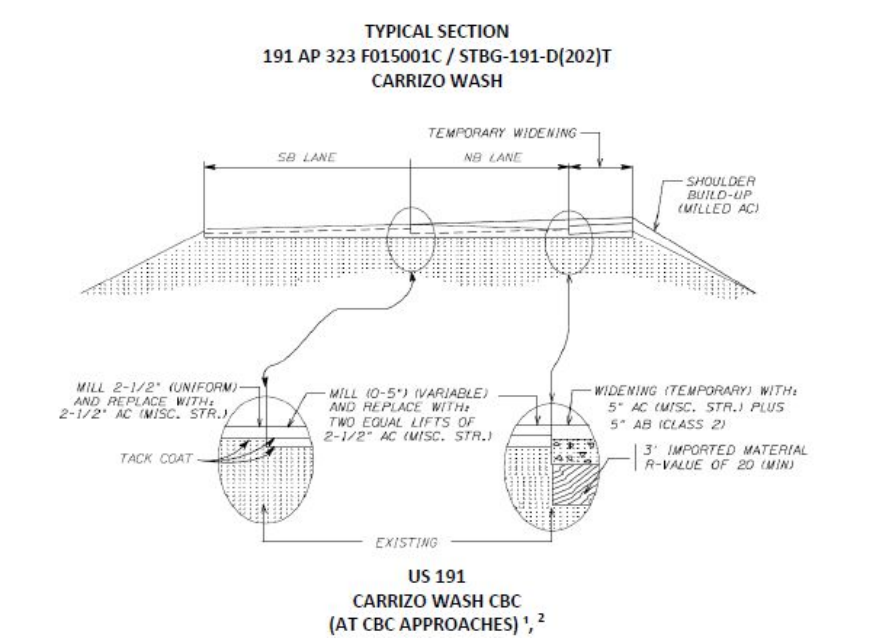
- *Data Collection & Field Analysis*

- *Developing Pavement Designs that return our pavement from Poor Condition to Good Condition*

Poor Pavement Conditions → Fair Pavement Conditions → Good Pavement Conditions

What We Do?

Pavement Design



ARIZONA DEPARTMENT OF TRANSPORTATION * ROADWAY ENGINEERING GROUP

205 SOUTH 17TH AVENUE * PHOENIX, AZ 85007 * PHONE: 602.712.7360

May 28, 2020

MATERIALS DESIGN REPORT

Report Type: Revised Final (Rev. 1) Report # 19-12-RF1

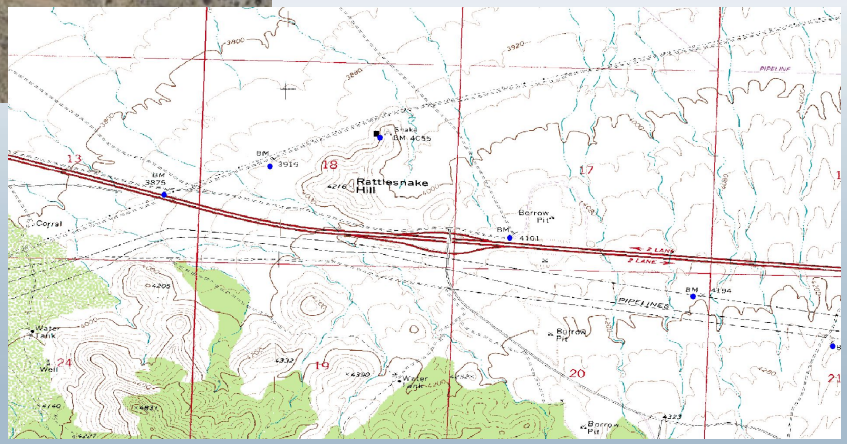
HIGHWAY NAME: ST JOHNS-SANDERS HWY (US 191)
PROJECT NAME: CARRIZO WASH
PROJECT NUMBER: 191 AP 323 F015001C / STBG-191-D(202)T
PROJECT SCOPE: DRAINAGE IMPROVEMENT
MILE POST LIMITS: MP 323.53 AND MP 324.03

Prepared by:
Pavement Design Section
Roadway Engineering Group
Arizona Department of Transportation

Design Reports & Documentation

What We Do?

Survey

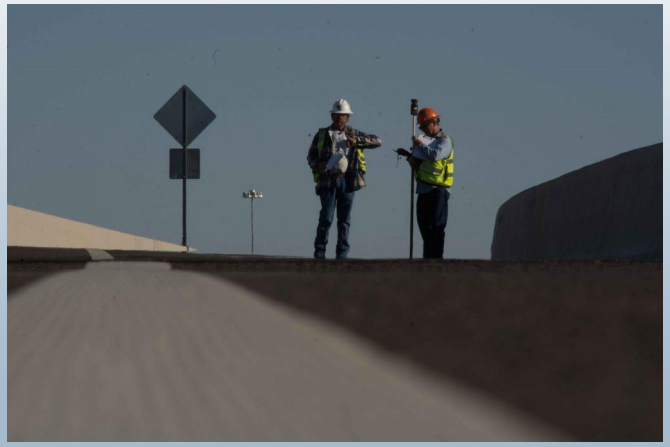


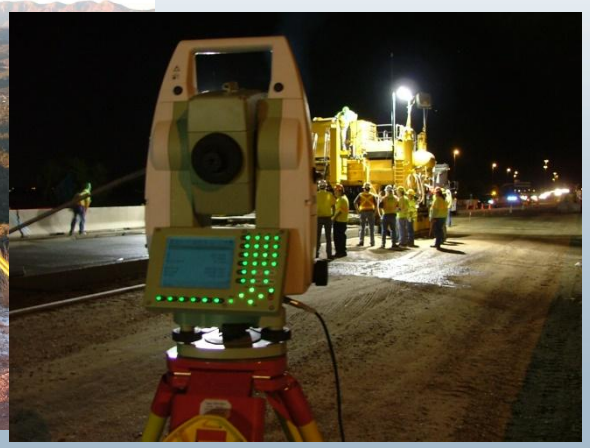
Mapping and Research

What We Do?

Survey

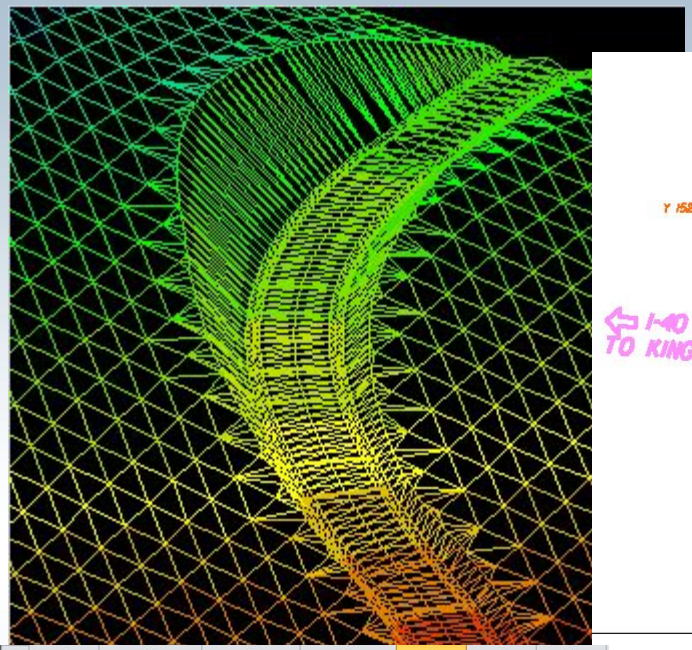
Field Data Collection

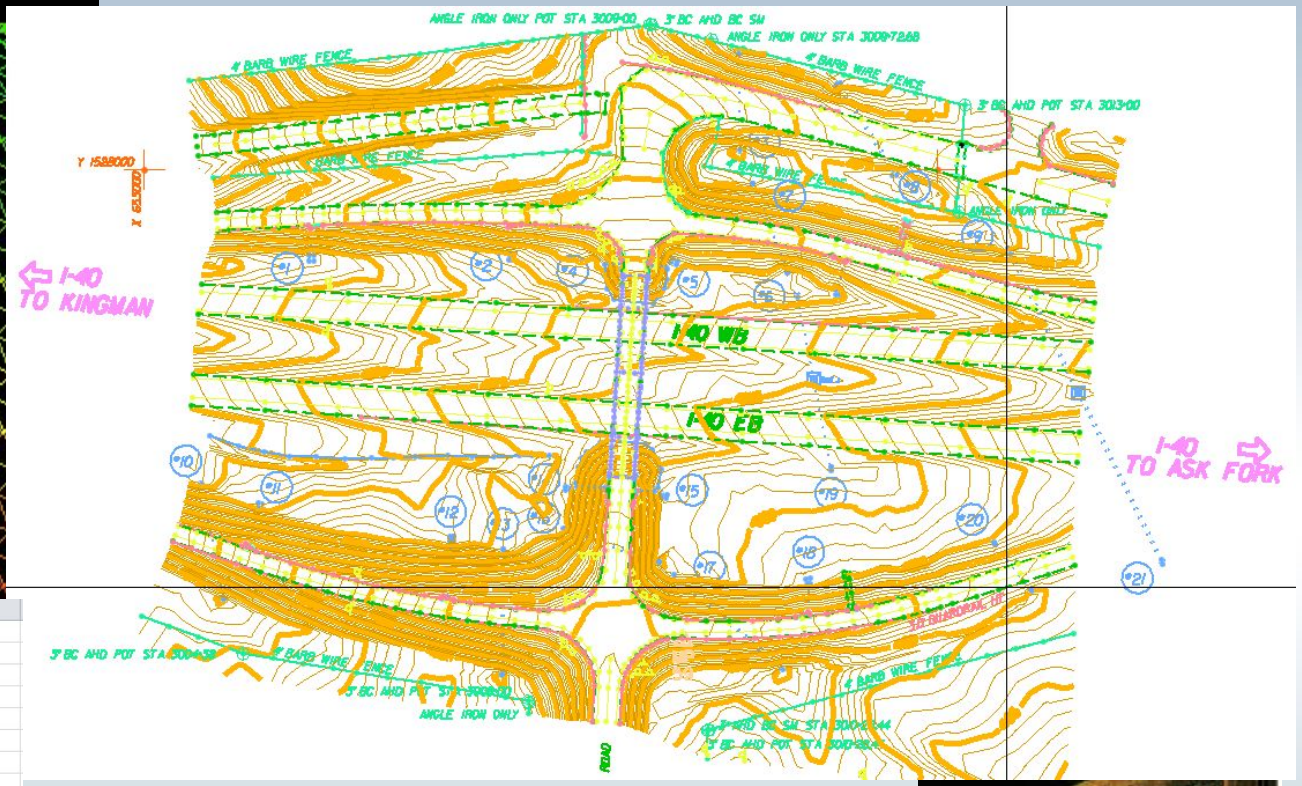




What We Do?

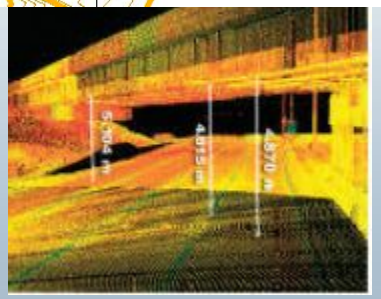
Survey





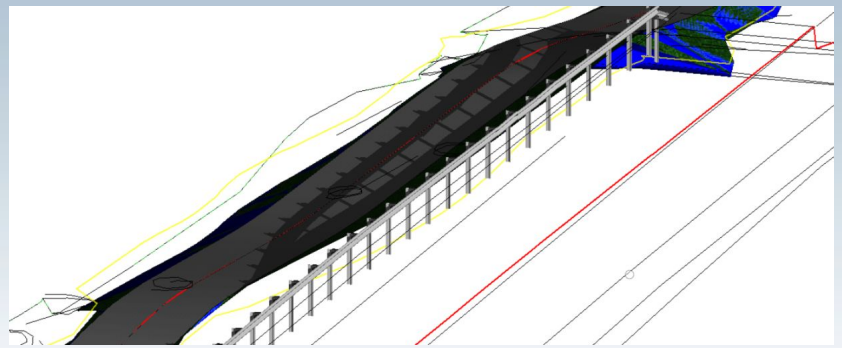
	A	B	C	D	E	F	G
1	FINAL GROUND COORDINATES WESTERN ZONE						
2	I-40 @ DW RANCH RD T.I. MP 59.71						
3	JOB LS1226, TRACS H8799O1D						
4	DTM						
5	VALUES OBTAINED BY STATIC GPS						
6	DATA COLLECTED BY McWHORTER CREW						
7	INTERNATIONAL FEET						
8	NAD83/92 HORIZONTAL & NAVD88 VERTICAL (GEOID 09AZ)						
9	GROUND ADJUSTMENT FACTOR = 1.00025						
10							
11	PT. NO.	GROUND (N)	GROUND (E)	ELEV.	DESC.		
12	1001	1527305.252	653582.303	4111.218	CLS ST		
13	1002	1527306.428	653564.973	4111.014	EP ST		
14	1003	1527306.290	653564.273	4111.275	GR ST * 2.9FT ON 6IN CURB		
15	1004	1527306.216	653564.278	4111.108	GB ST		
16	1005	1527305.650	653570.288	4111.171	DS ST * 6INCH		
17	1006	1527347.914	653584.892	4111.271	CLS		
18	1007	1527350.601	653567.816	4111.045	EP		
19	1008	1527350.563	653566.903	4111.307	GR		
20	1009	1527350.589	653566.857	4111.040	GB		
21	1010	1527350.098	653572.700	4111.155	DS		
22	1011	1527368.388	653573.414	4111.045	DS		
23	1012	1527367.877	653586.077	4111.198	CLS		
24	1013	1527384.167	653587.165	4111.128	CLS		
25	1014	1527383.104	653567.664	4110.771	DS		

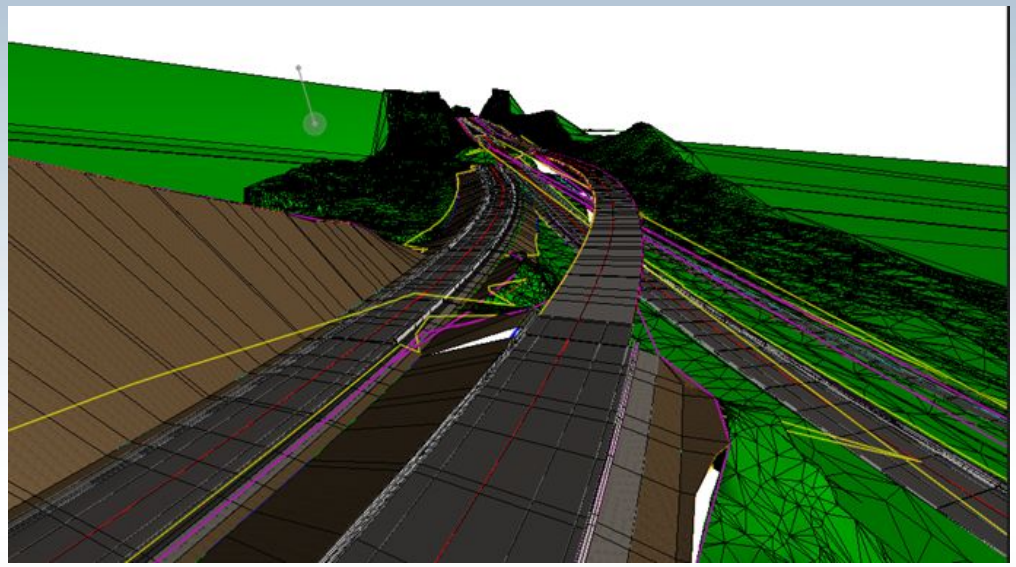
- *Digital Terrain Models*
- *3D Scans*
- *Topographic Maps*



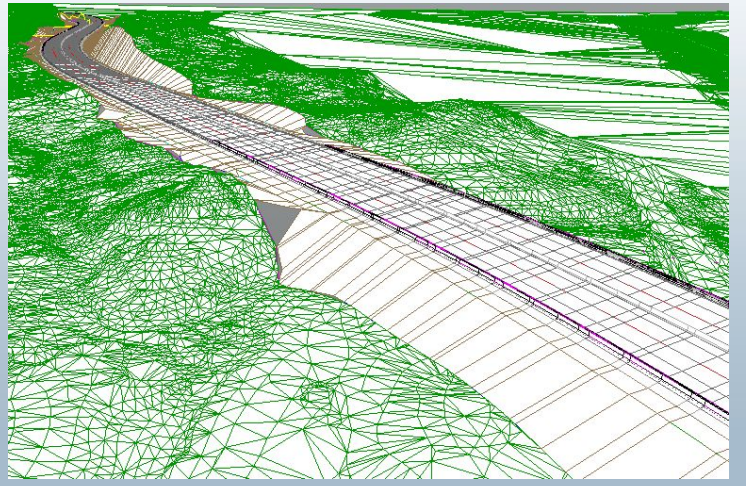
What We Do?

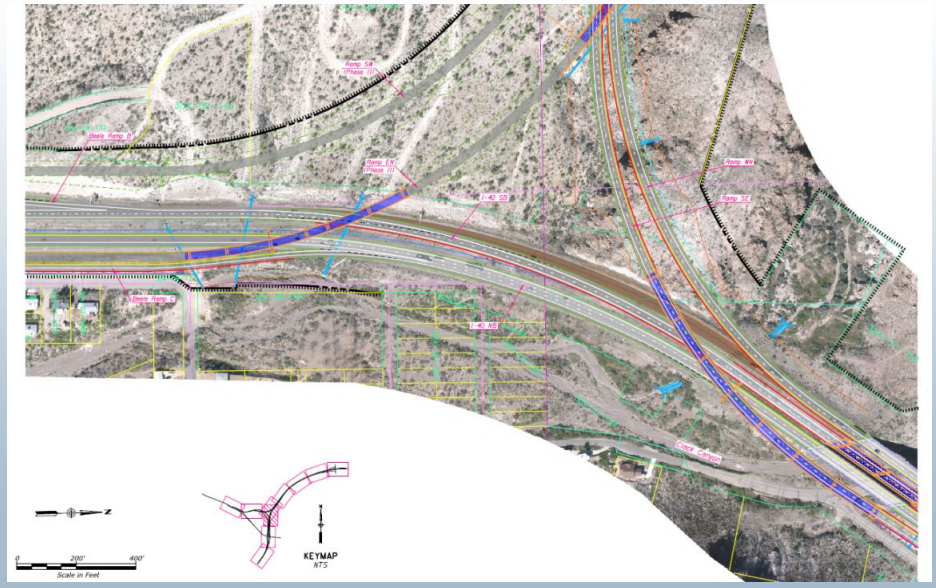
Roadway Design





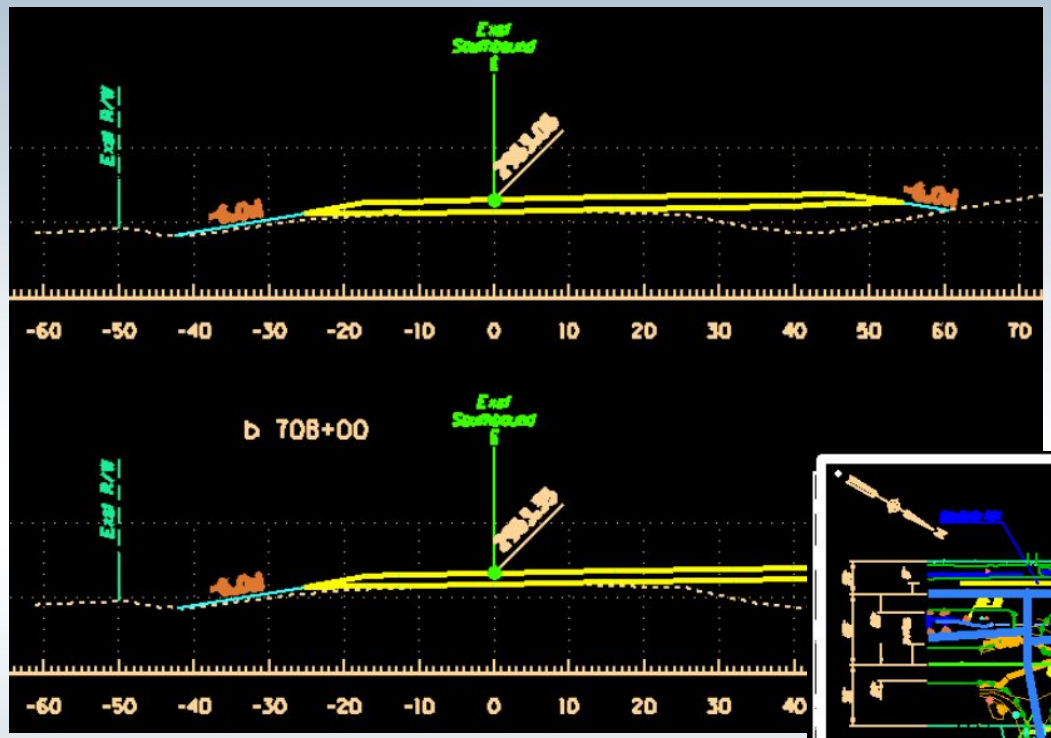
CADD Based Technologies for Modeling and Geometrics Design

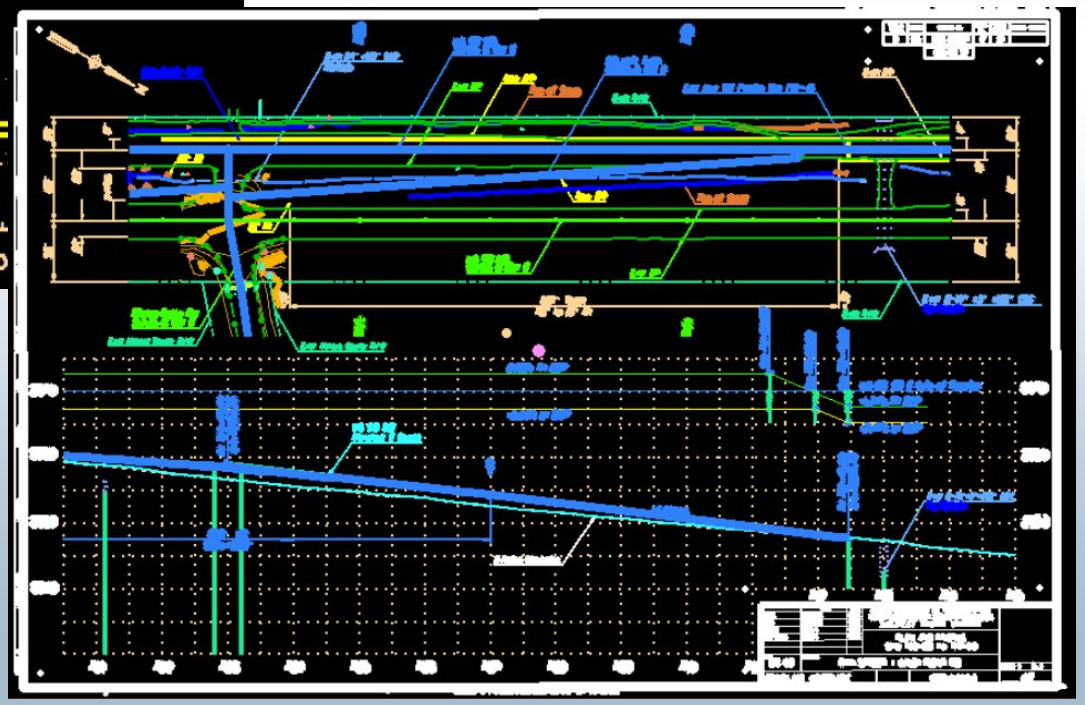




What We Do?

Roadway Design

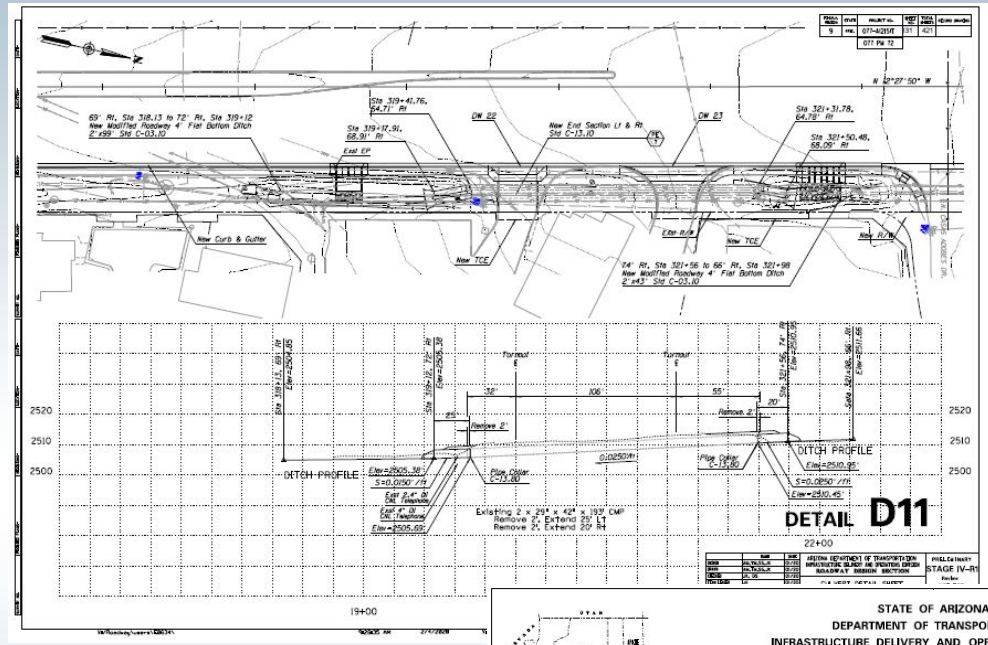


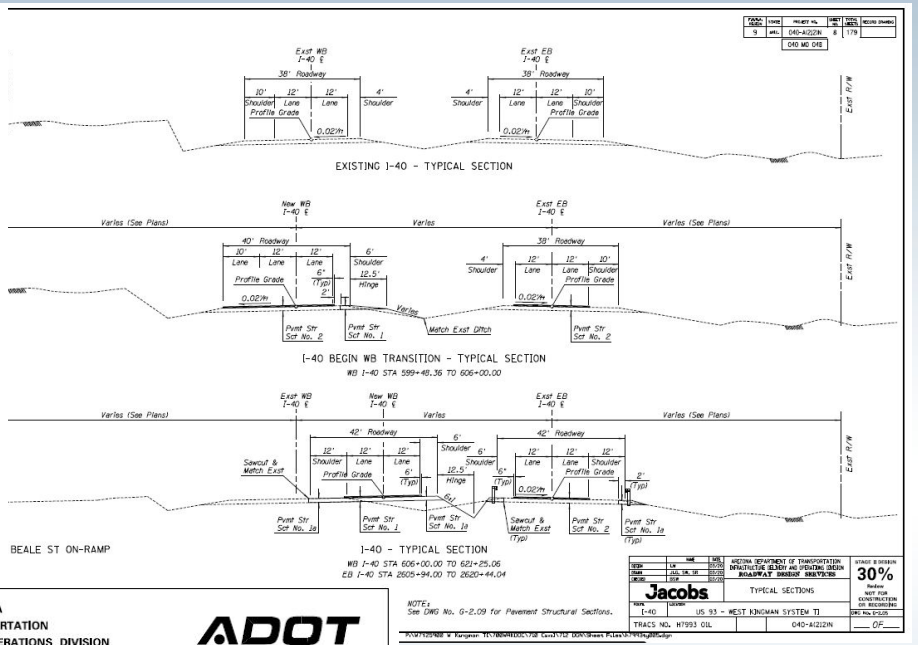


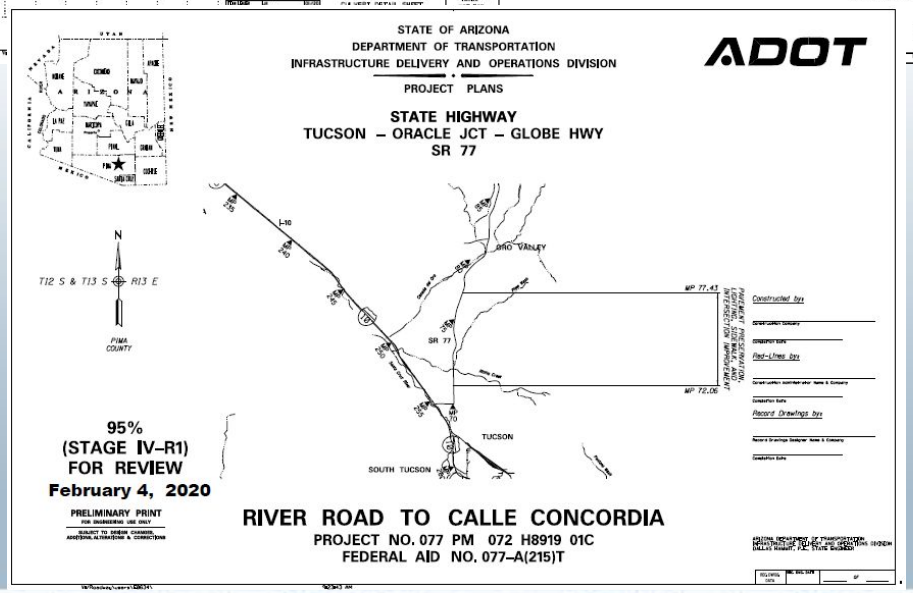
Design & Drafting

What We Do?

Roadway Design







Construction Plan Production & Delivery

What We Do?

Drainage

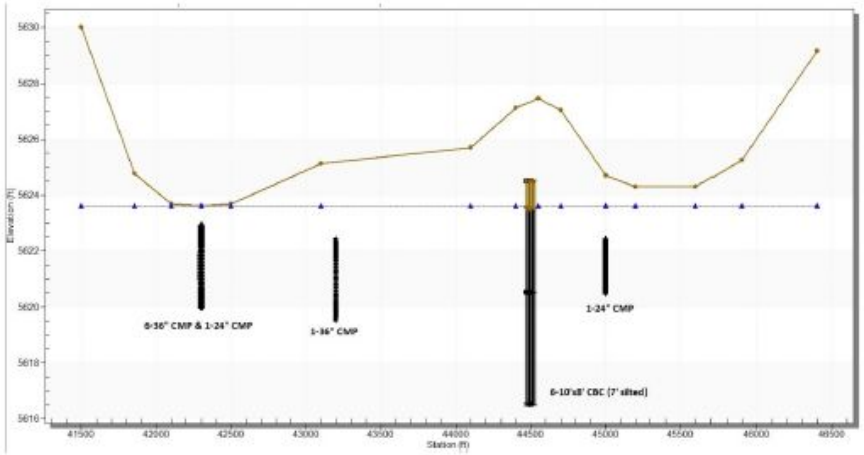
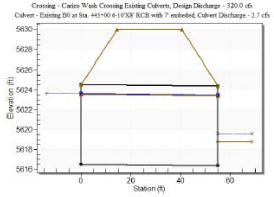


Figure 4. US 191 Roadway center line profile and existing culverts.

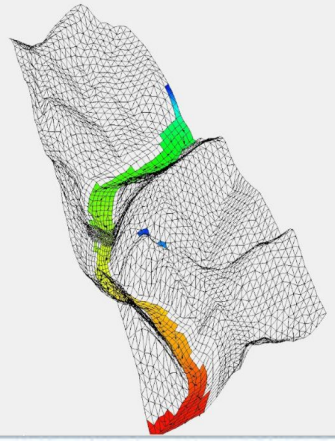
Photo 1: Siltation at Inlet of Existing 6 - 10'X8' CBC located at Carrizo Wash, MP 323.85

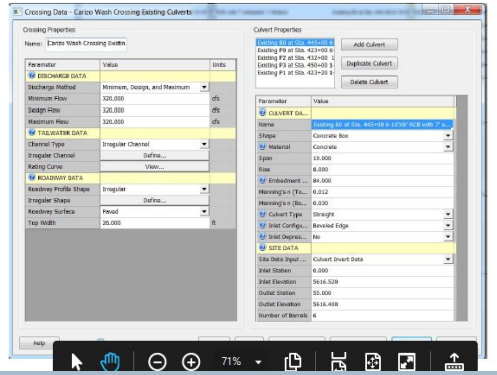
Roadway overtopping at around Sta. 432+00 South of Existing Box Culvert.

- *Data Collection*
- *Field Analysis*
- *Calculations & Modeling*



with 7"





What We Do?

Drainage

US 191 – Carrizo wash

Revised Final Drainage Report

TRACS NO. F015001D

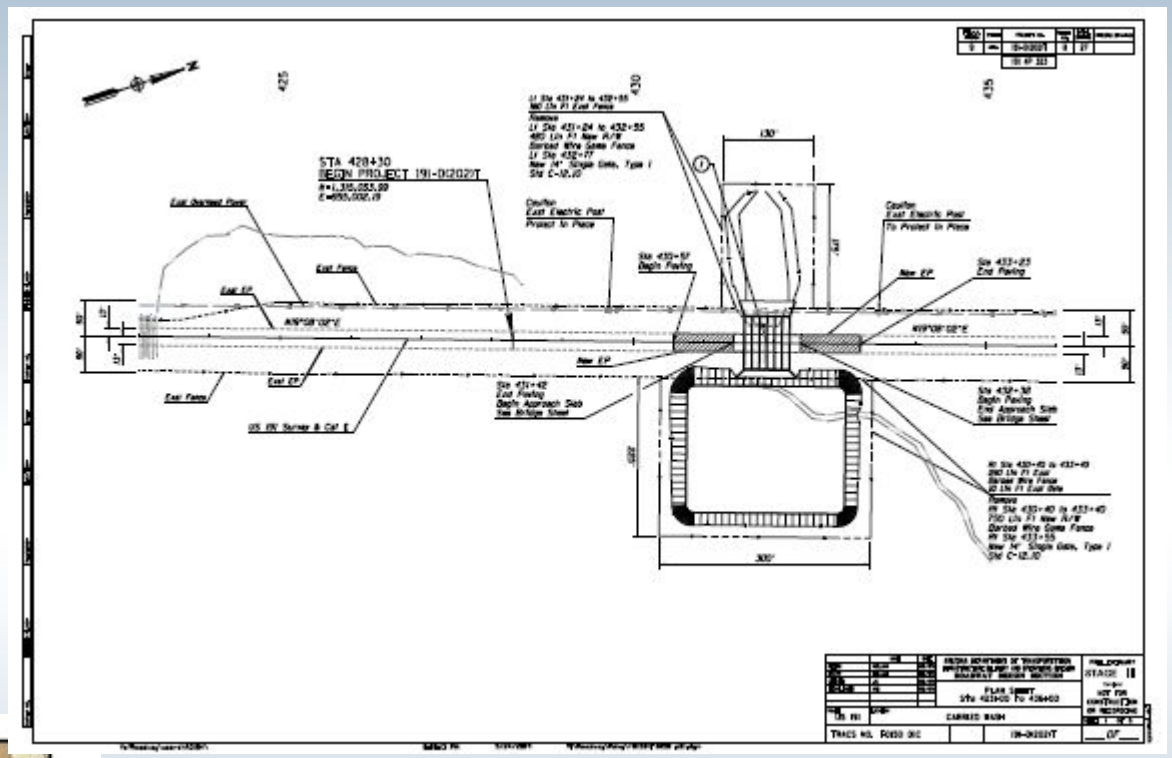
Prepared for:
Arizona Department of Transportation

November 2019

Prepared by
Arizona Department of Transportation

Khandaker Haque, PE

Abu S Mohsenin



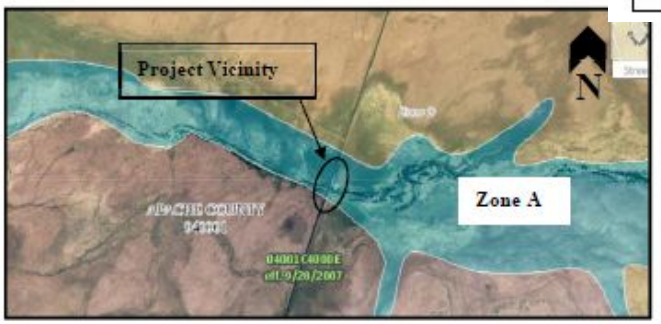
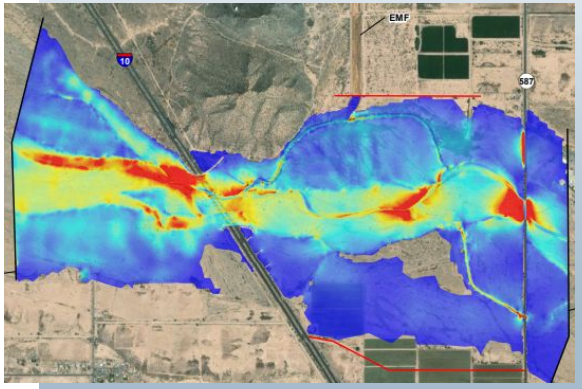


Figure 5: FEMA Flood Zone



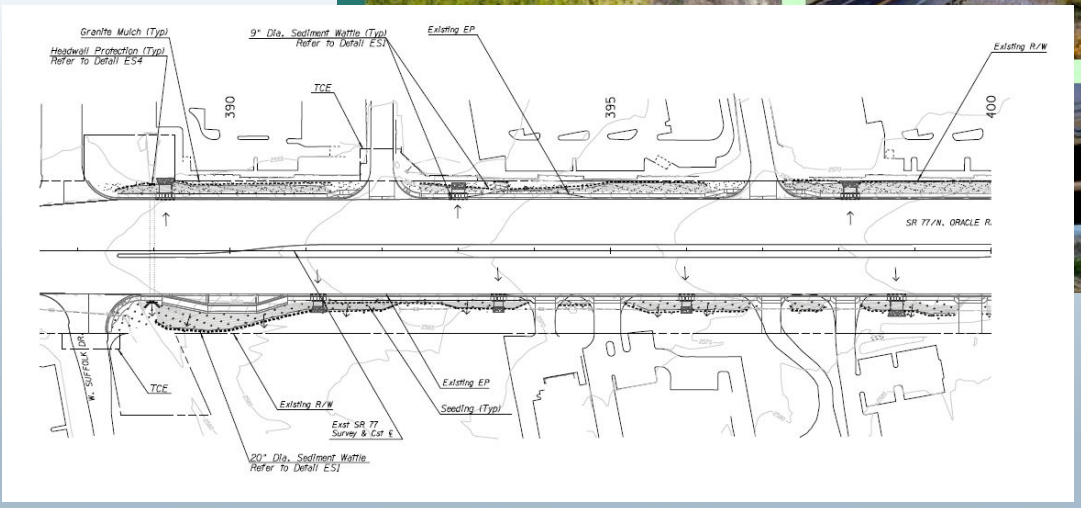
- *Design Reports & Documentation*
- *Construction Details & Plans*
- *Floodplain Modeling*

What We Do?

Roadside Development

Roadway Group

Roadside Development Section



- *Erosion Control*
- *Landscape Design*
- *Aesthetics*

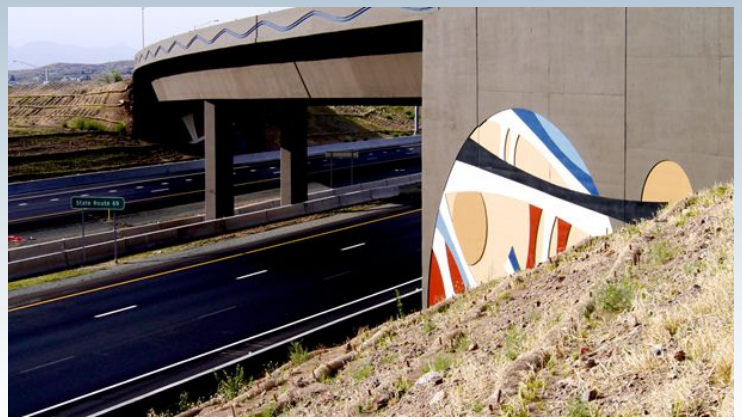
What We Do?

Roadside Development

- *Erosion Control*
- *Landscape Design*

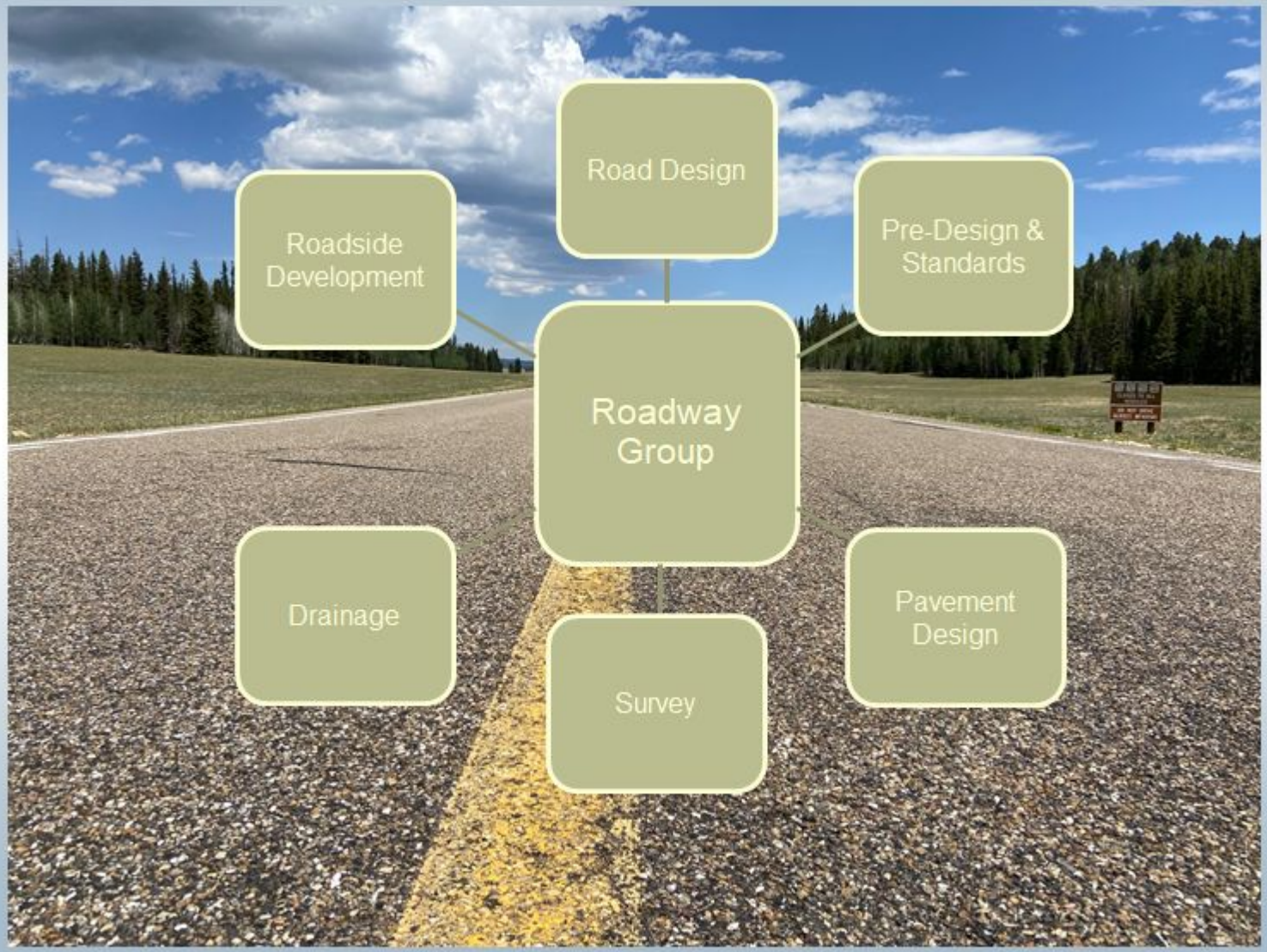
What We Do?

Roadside Development



- Aesthetics Design

ADOT's Roadway Group



Six Distinct Professional Services Teams – One Common Goal: Design, Support & Deliver

Questions