

# South Mountain Freeway

2018 Arizona Pavements / Materials  
Conference

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Pavement Design-Construction-Maintenance

November 16, 2018

# Today's Agenda



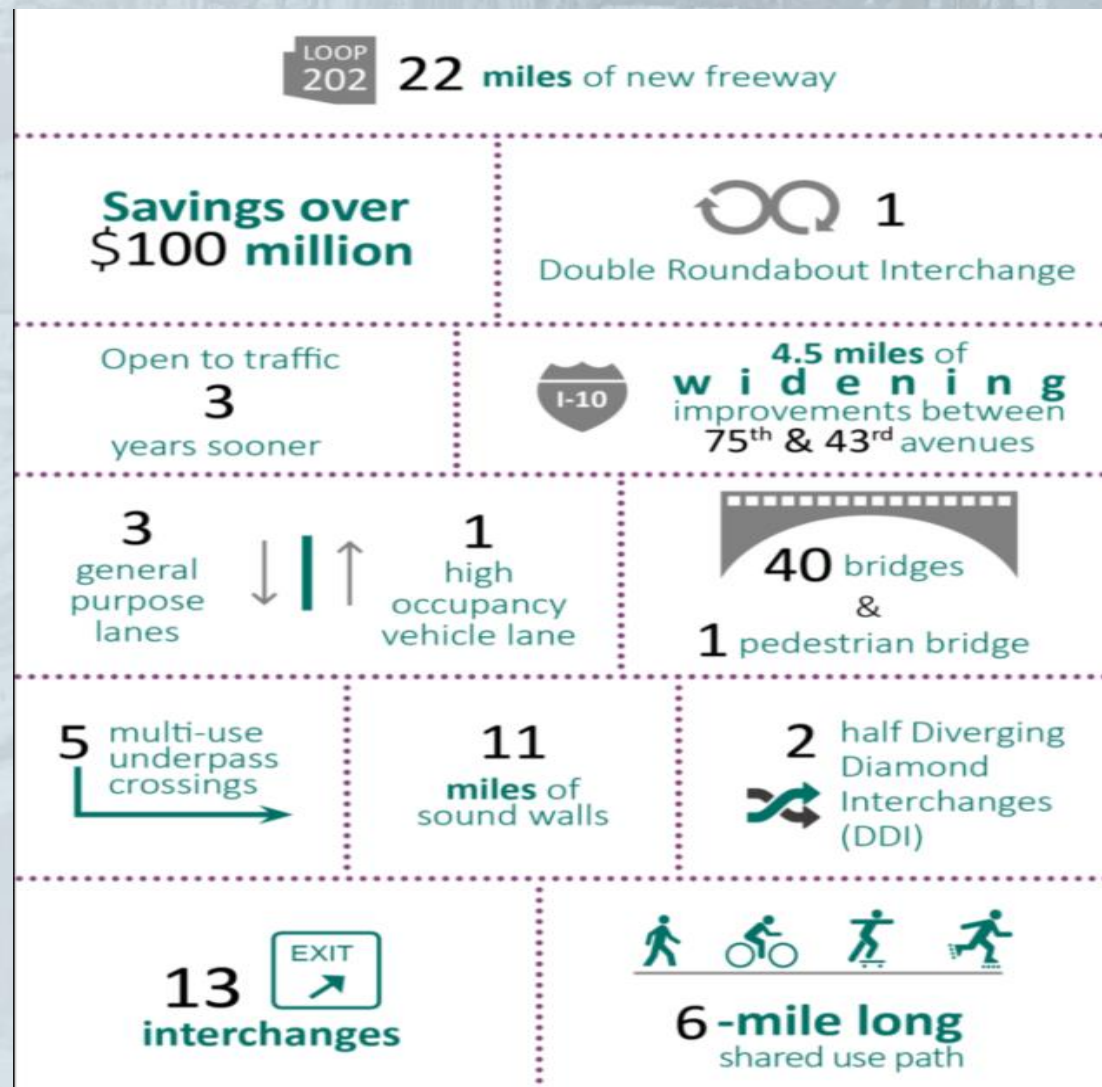
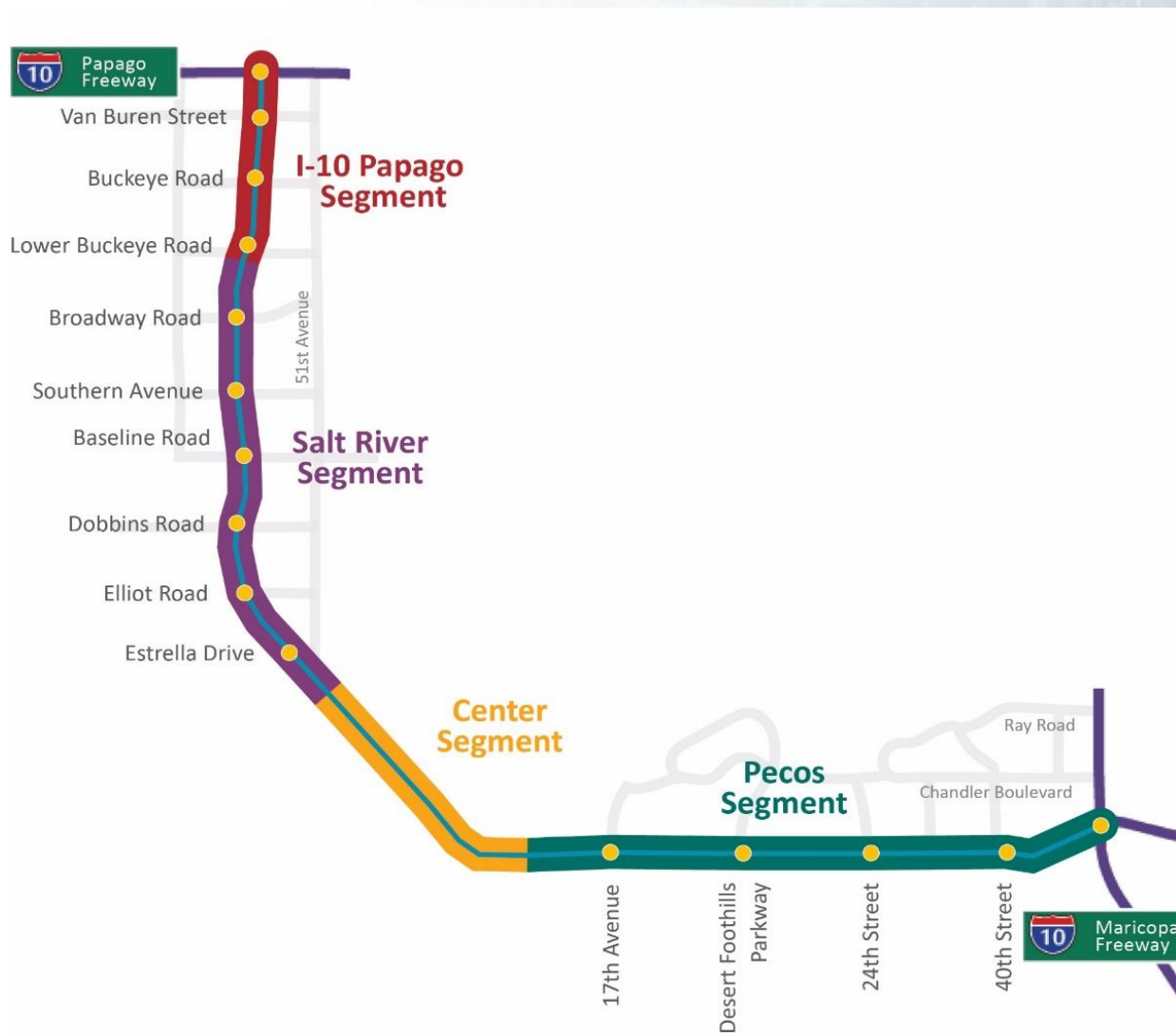
- Project Overview
- ADOT and Developer Teams
- Arizona Pavement History
- Subgrade
- Mix Designs
- Subbase and Binder Selection
- Pavement Maintenance
- Lessons Learned
- Q&A

# Overview



- Largest Project in Arizona History
- \$1.77 Billion Programmed
  - Publicly financed
  - 40% federal funding
  - 60% Proposition 400
- 4 Construction Segments
- 30 year Maintenance

# Project Features



# ADOT



- GEC: HDR & Subconsultants
- Co-location with C202P
- Reviews Pavement Designs
- Verify Pavement Placements
- Test Pavement Samples

# Connect 202 Partners



- Fluor-Granite-Ames Joint Venture
- Raba Kistner - Independent Quality Firm
- Granite - AC Pavement
- Coffman Specialties— PCCP

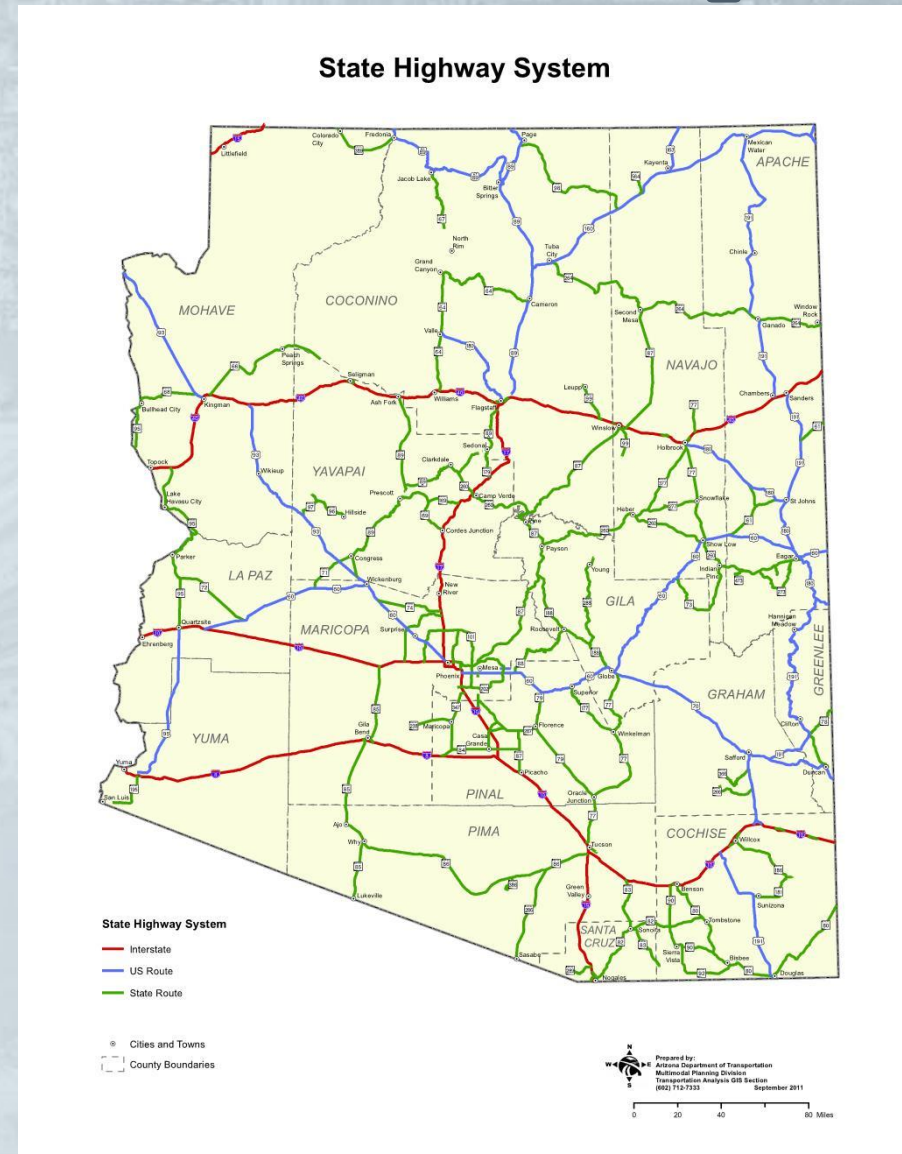
# Design Team



- 30 Design Subconsultants
- Pavement Design by Transtec
- Geotech by WSP/AMEC/Ethos
- AC and PCCP Pavements
- Pavement Design Reports

# ADOT Highway System Pavement History

- Asphalt Highways = 94%
- PCCP Highways = 6%
- Phoenix/Metro Area are PCCP
  - I-10, I-17, US60, SR51, SR101, SR202, SR303 and SR143
  - I-10 and I-19 Tucson and I-17 approaching Flagstaff
- Rural Highways are Asphalt





# AC Pavement History



- 1970's Stack Up Plants
- Boeing Construction/Shearer
  - Continuous Mix Plants
  - Asphalt Failures
- Oil Refineries
  - Oil Producers made other things

# AC Pavement History (Cont.)



- Oil Refineries
  - Oil Producers made other things
- ISSUE: Resulted in lesser quality Asphalt pavement
- Early 1990's – Oil Producers put plastics put back in
  - SHRP and TMR
  - Nationwide

# Why AC Instead of PCCP?



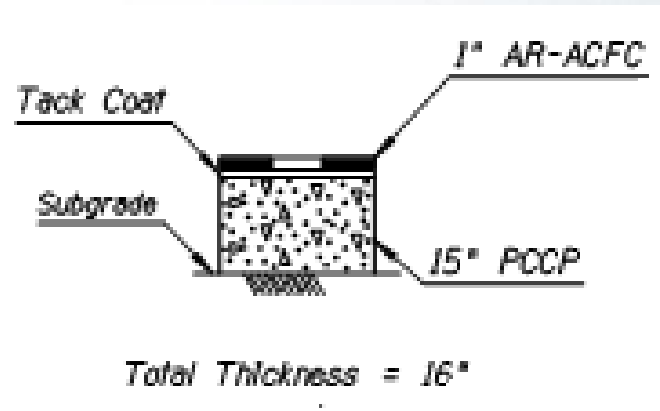
- Durable and Adaptable
- Expedites Construction
- Extended Pavement Life with SBS Binder (PG 76-22)
- More Efficient to Replace AR-ACFC

# Subgrade Soils

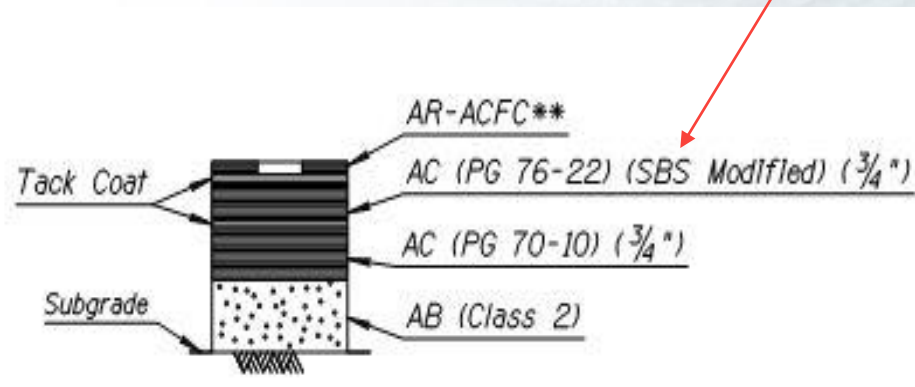


- 1.45 Million Tons of AB Required
- Develop based upon soil conditions
- Native vs. Borrow
- Farm Fields
- South Mountain Park area

# Mainline



New Approach  
3" of SBS



## ■ I-10 Mainline (Match Existing - Prescribed)

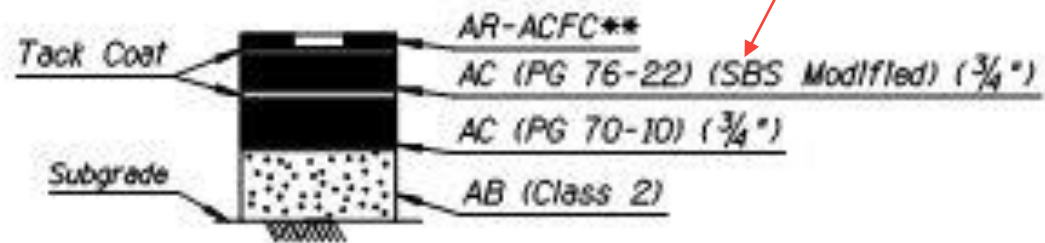
- 1" AR-ACFC
- 15" PCCP

## ■ SR 202 Mainline AC

- AR-ACFC – 1/2" Depth
- AC - Varies 8-9" Depth
- AB – Varies 13 1/2 – 14 1/2 "

# Ramps

New Approach  
3" of SBS



- SR 202 Ramps AC
  - AR-ACFC – 1/2" Depth
  - AC Varies 4-6" Depth
  - AB Varies 8-12" Depth

# Cross Roads



- Cross Roads
  - PCCP 8-11 1/2 " Depth
  - AC 2 1/2 " Depth
- Acceleration/Deceleration
- Truck Traffic





# Mix Designs



- AC Under PCCP – 416 Mix
- AC Widening – 409 Misc.
- 416 Base for Mainline w/15% Recycle
- 416 (PG 76-22) SBS Surface Mix

# Styrene-Butadiene-Styrene (SBS) Modified Binder



SBS Powder

- **Polymers**
  - Elastomers (Rubber/Elastics)
  - Plastomers (Plastics)
- **SBS is an Elastomer**
  - Most commonly used

# Styrene-Butadiene-Styrene (SBS) Modified Binder (Cont.)



- 2005 Asphalt Institute Study
  - Tested 84 sites across N. America
  - Reduced Rutting
  - Improved Fatigue
  - Thermal Cracking resistance
- PG 76-22 (SBS Modified) in Upper Lift
  - First time Used in Arizona

# 70-10 vs. 76-22 SBS Modified

- Binder – Holly PG 70-10
- Wash Sand 30%
- Crusher Fines 37%
- 1/2" Rock 13%
- 3/4" Rock 20%
- MF (Lime) 1%
- Oil Content 5.3%
- ***STABILITY 3,578 (@5.3%)***

- Binder – Holly PG 76-22 SBS Mod.
- Wash Sand 30%
- Crusher Fines 37%
- 1/2" Rock 13%
- 3/4" Rock 20%
- MF (Lime) 1%
- Oil Content 5.4%
- ***STABILITY 4,426 (@5.4%)***

# Pavement Maintenance / Life Cycle



- Pavement Maintenance = 30 years
- AR-ACFC
  - Years 10 and 30
- 2.5" Mill and Replace + AR-ACFC
  - Year 20
- Year 30 Requires a 10 yr. Handback Life

# Lessons Learned



# Lessons Learned



- Know the AB material source
- Mix Design Tracking
- Field training on material acceptance
- SAF (Subgrade Acceptance Factors)

# Q & A

## INFORMATION

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