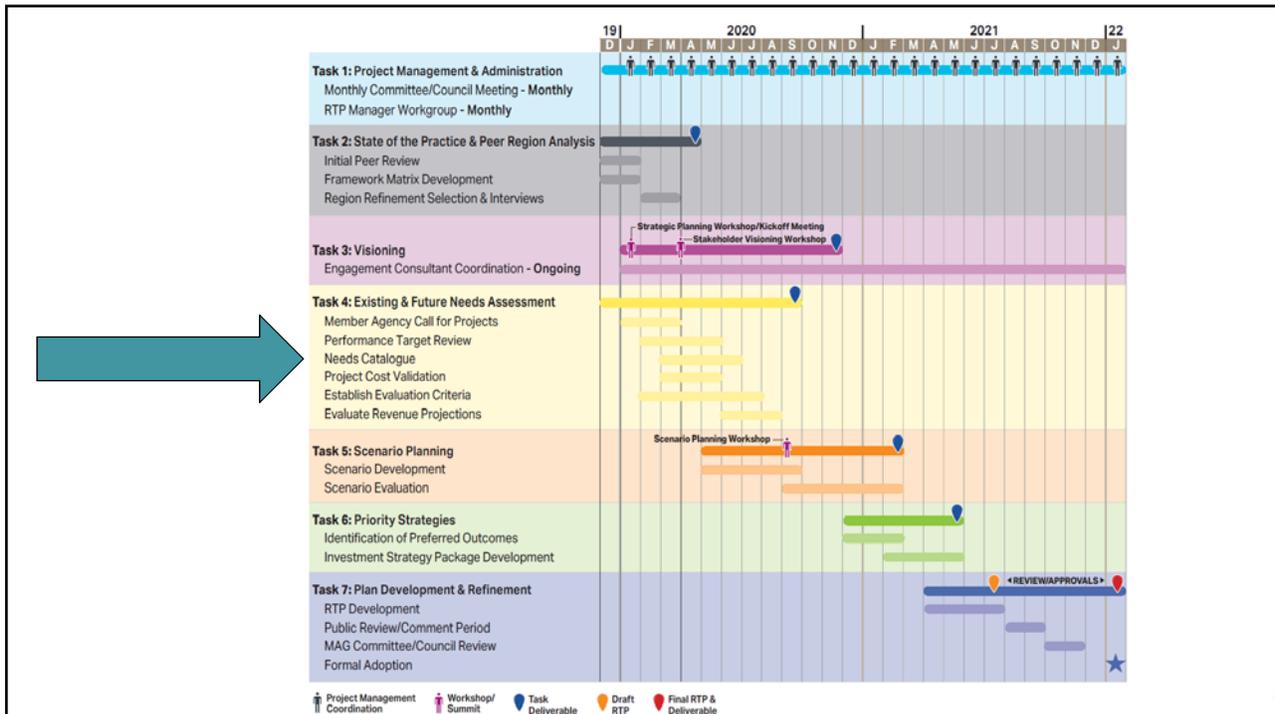




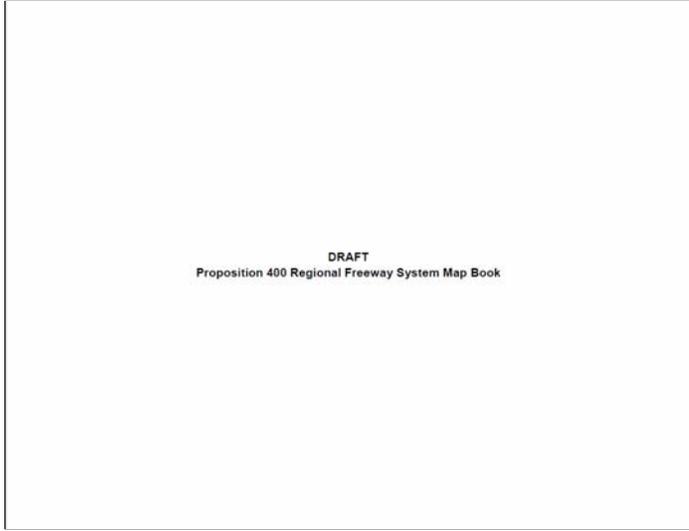
# Extension of Proposition 400: Regional Freeway System Review

Managers Working Group  
March 4, 2020



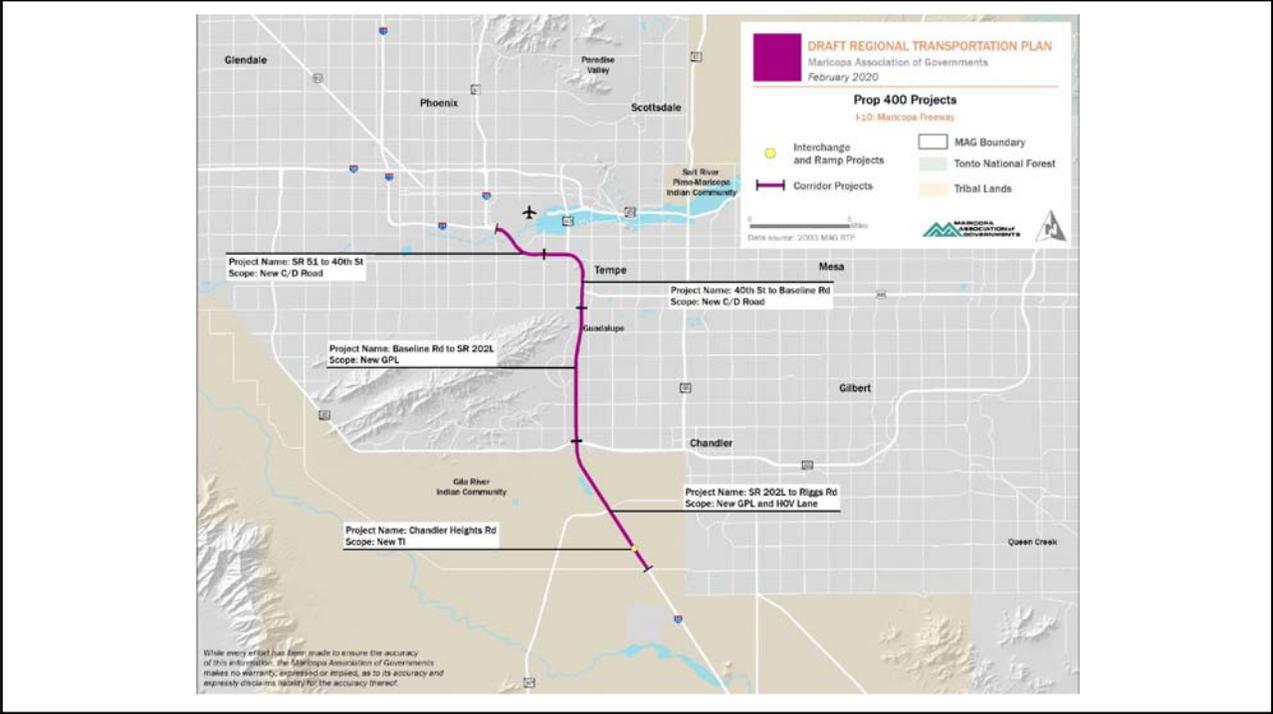
# Proposition 400 Regional Freeway System Map Book

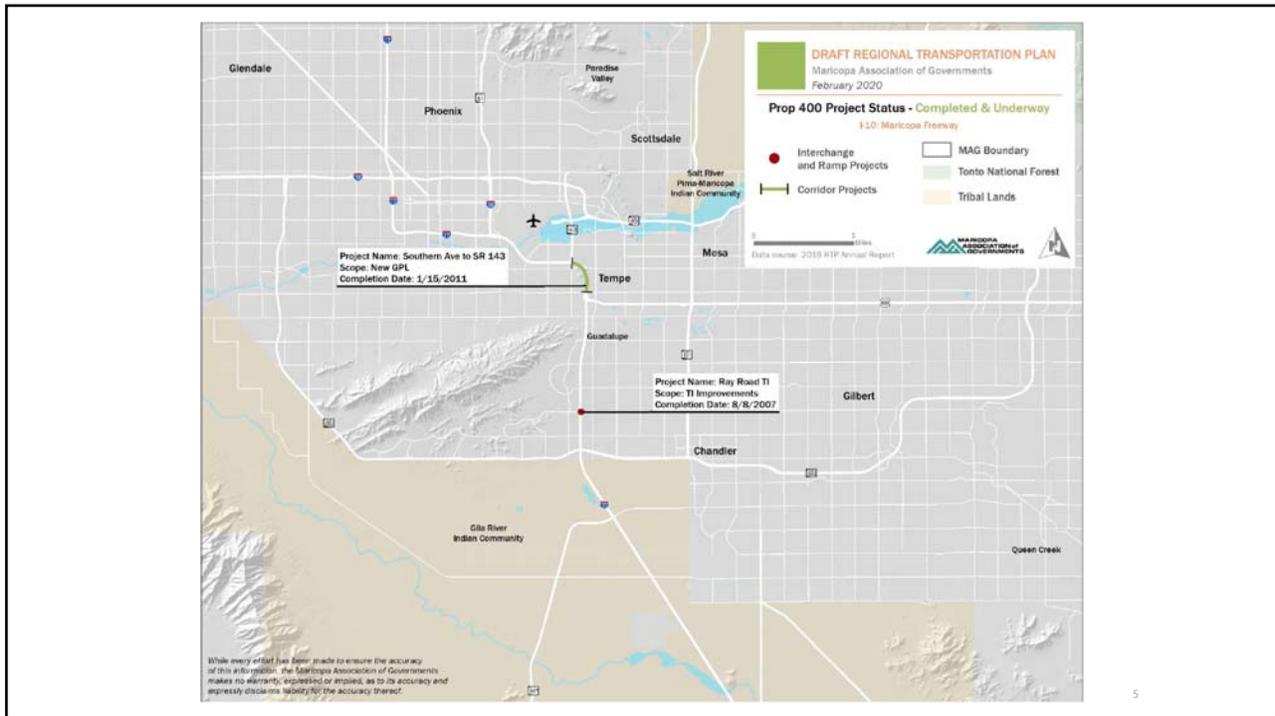
- The Regional Freeway System Map Book is intended to tell the Proposition 400 story
- Provides a corridor by corridor visualization of the program
- Broken out into distinct maps



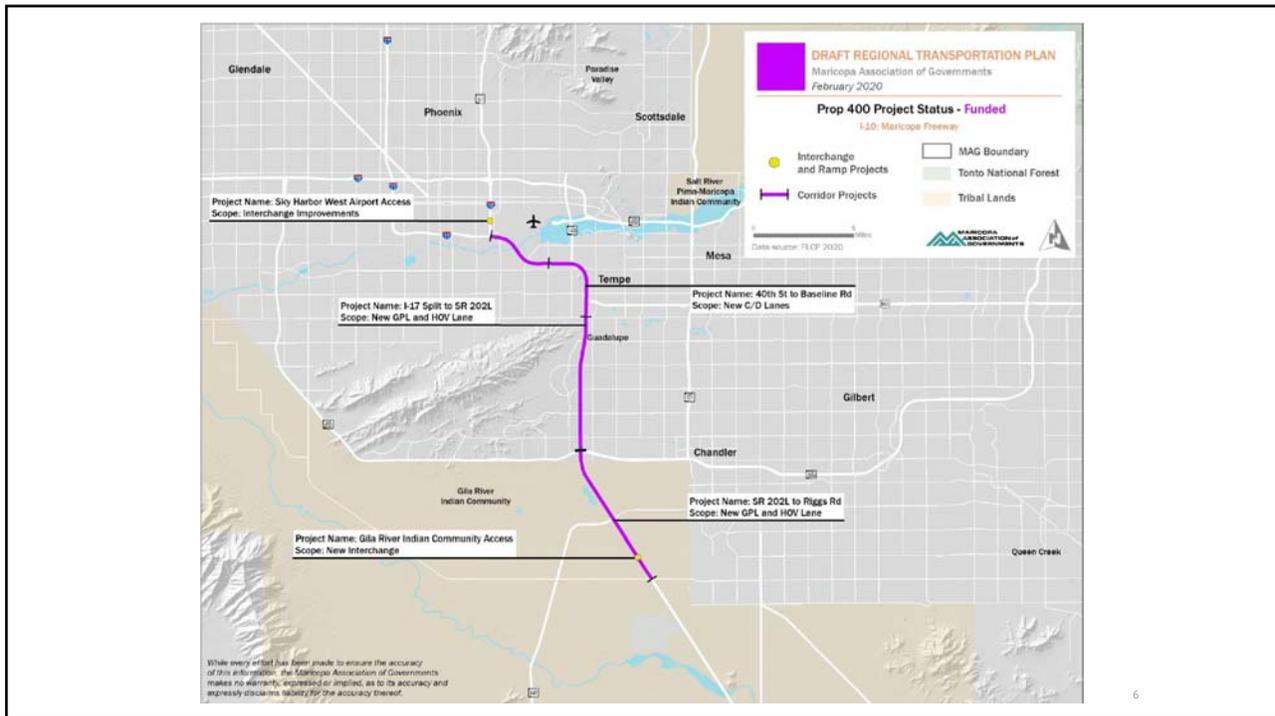
Extension of Proposition 400

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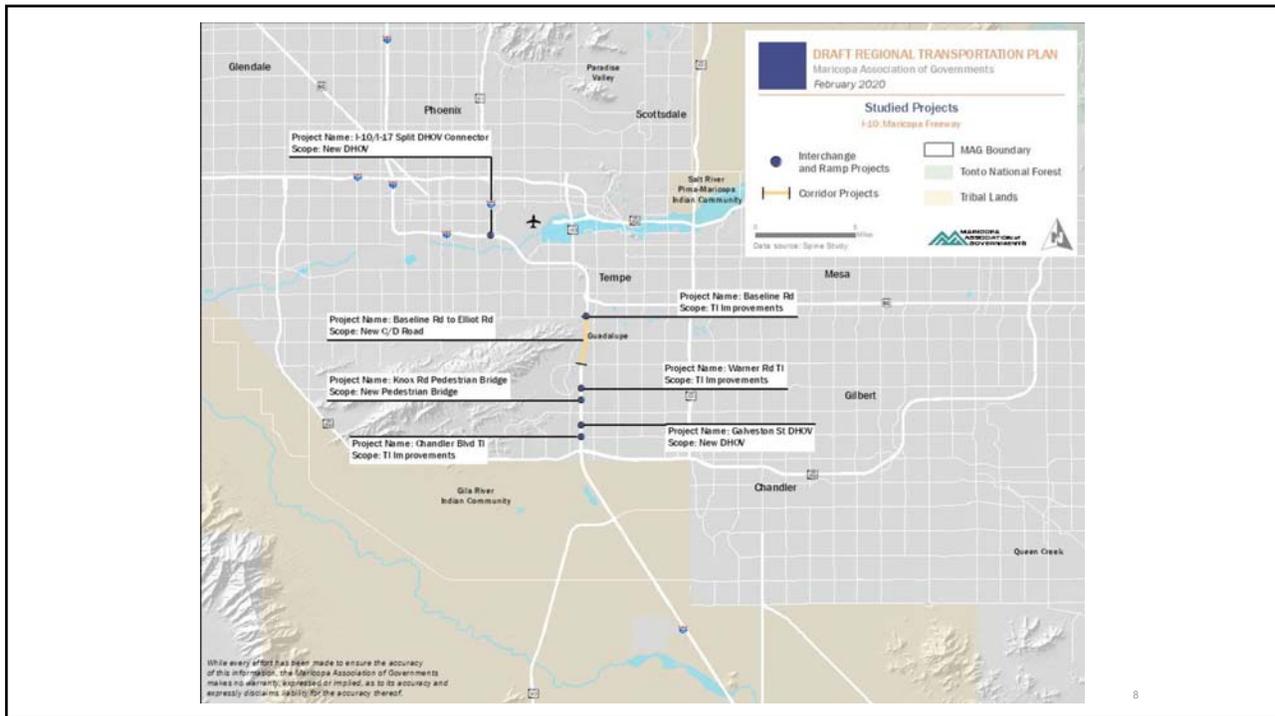
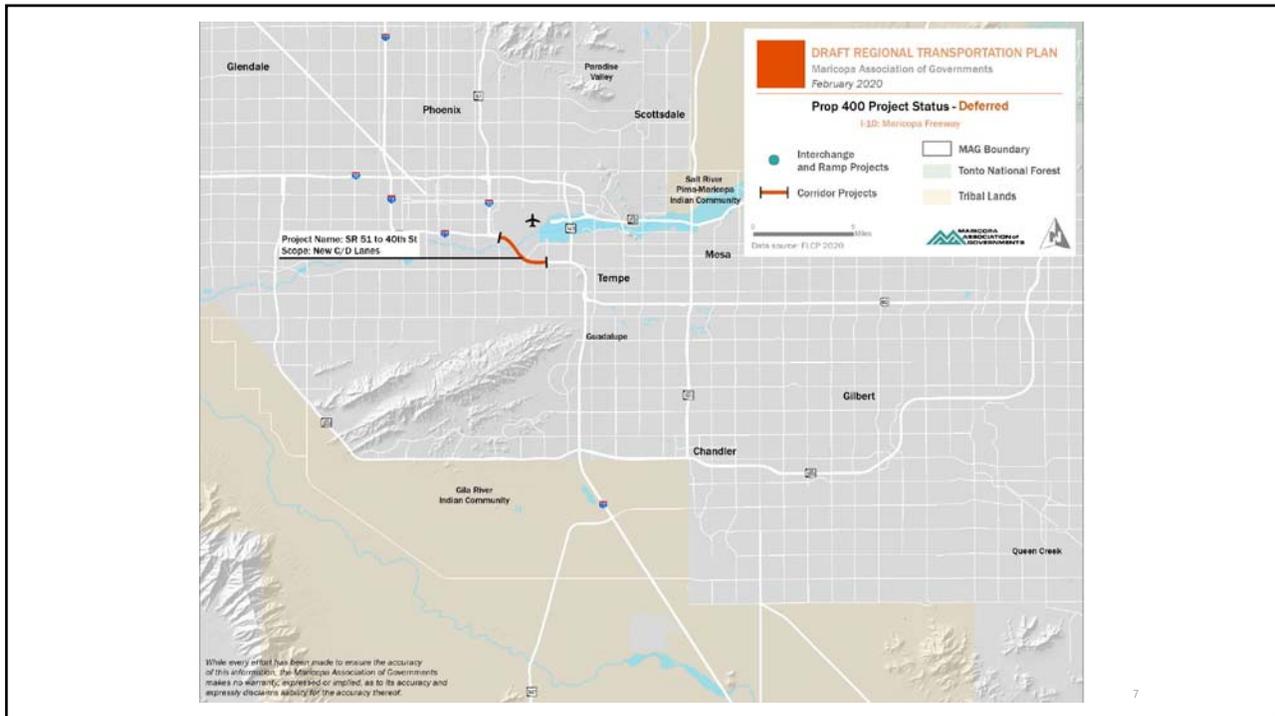




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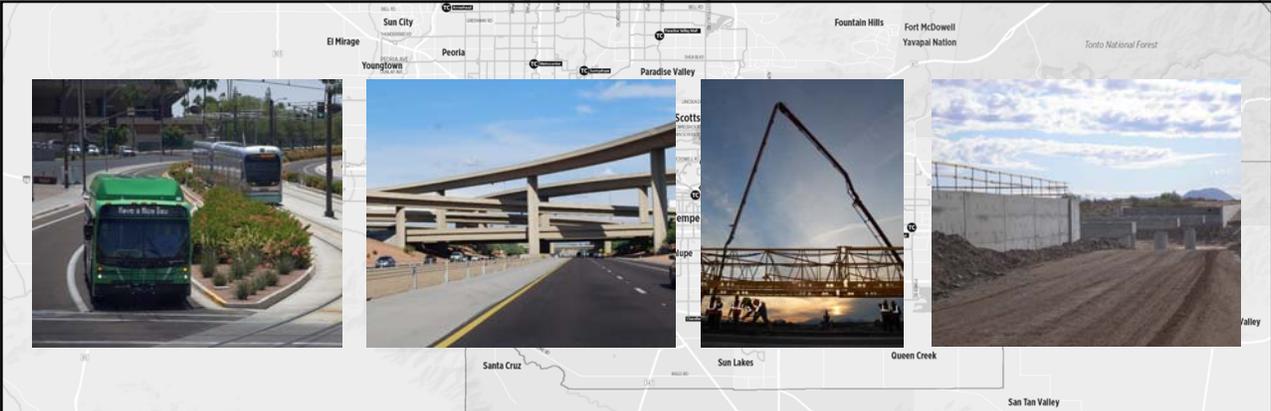


## Summary

- The Proposition 400 Regional Freeway System Map Book is still in draft format
- This item will go through the March committee cycle
  - Management Committee, Transportation Policy Committee, Regional Council, and Transportation Review Committee
- Anticipate finalizing the document in April



Extension of Proposition 400



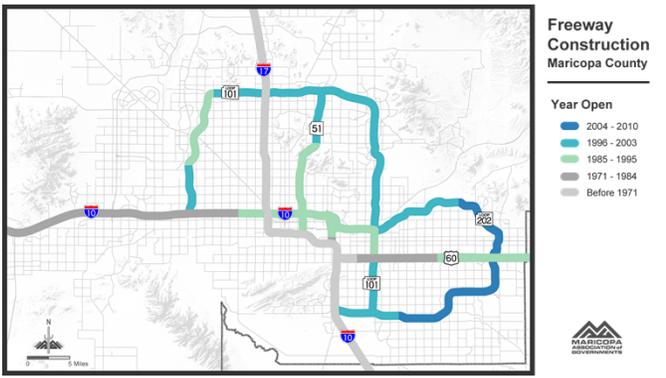
# Regional Freeway System: Rubberized Asphalt Overview and Alternatives

Managers Work Group  
March 4, 2020

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## Rubberized Asphalt: Overview and History

- Concerns in the early 2000s about freeway noise
- ADOT began investigating ways to mitigate noise
- Ultimately decided on a rubberized asphalt overlay
  - Asphalt Rubber Asphaltic Concrete Friction Course (AR-ACFC)
  - Quiet Pavement/Quiet Pave



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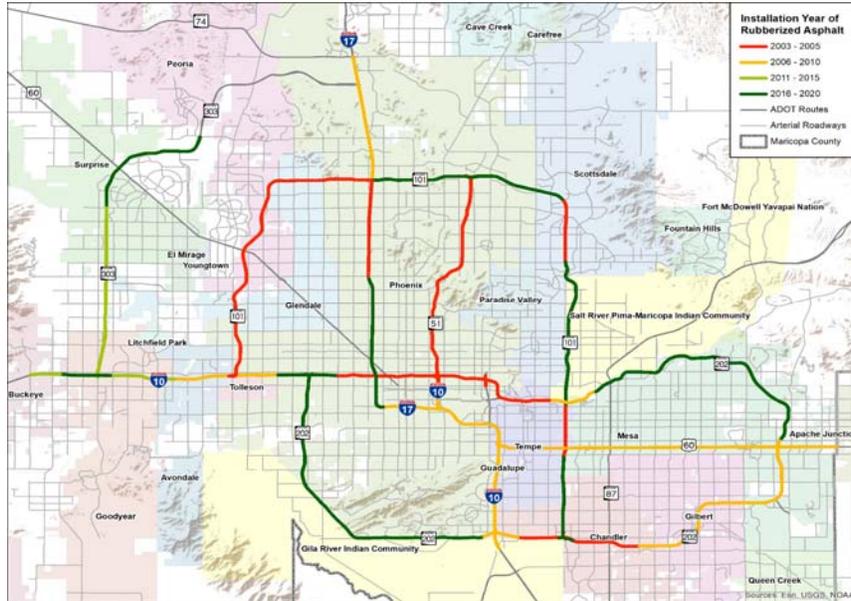
# Rubberized Asphalt: Benefits

Decibels (dBA)	Common Noise
60 dBA	Conversational speech
70 dBA	Vacuum cleaner
80 dBA	Garbage disposal
90 dBA	Motorcycle at 25 feet
100 dBA	Jackhammer
110 dBA	Live rock music
130 dBA	Military jet takeoff (50 ft)

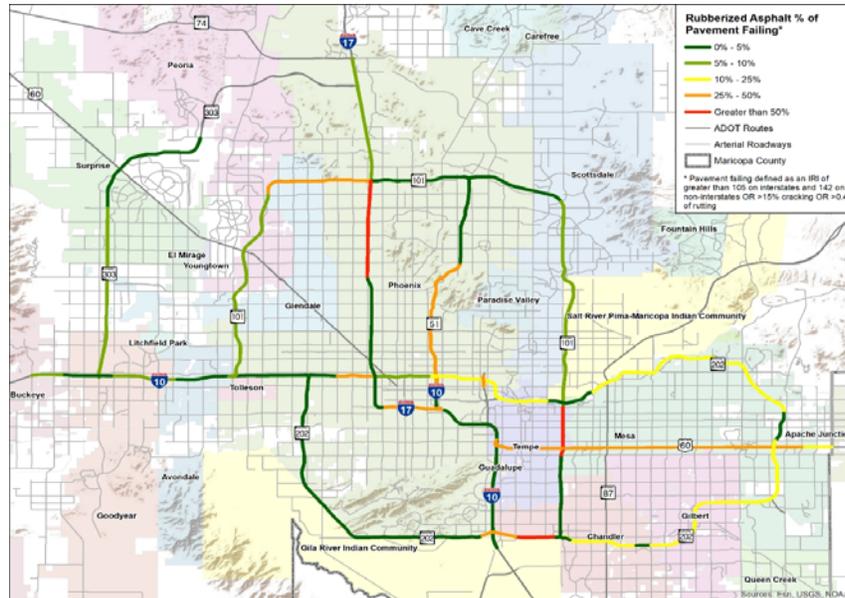
- Upon installation, reduces tire noise at 97 decibels (at tire-level)
  - Untreated concrete = 104 – 106 decibels
- Noise volumes double with every 10 decibel increase
- Most humans don't perceive a change in noise unless it is more than 3 decibels lower/higher

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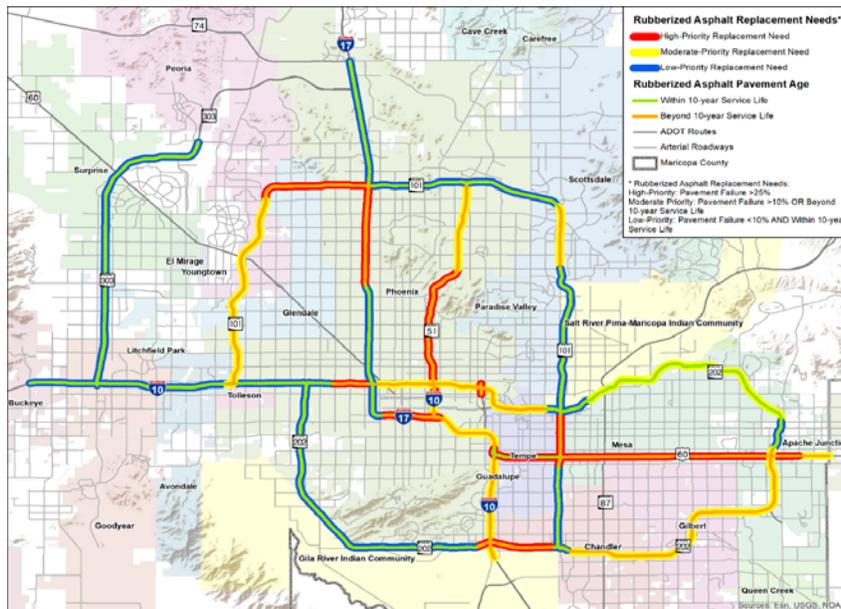
# Rubberized Asphalt: Installation Year



# Percentage of 'Failing' Rubberized Asphalt Pavement in 2018 by Segment



# Rubberized Asphalt Replacement Needs



# Pavement Surface Treatment Alternatives



*Diamond Grind Treatment*



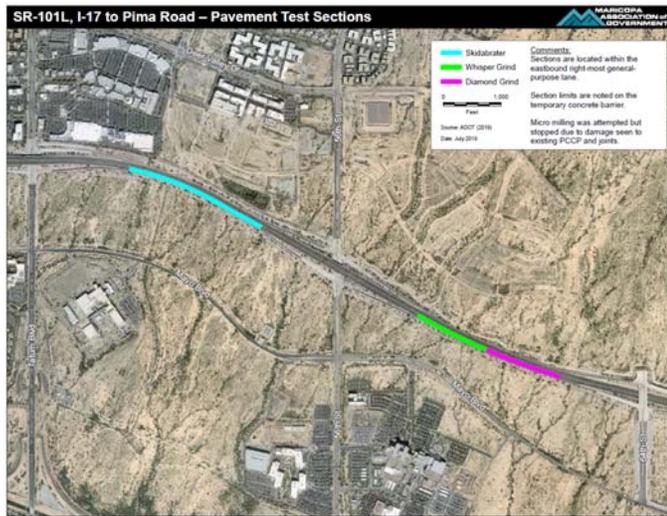
*Whisper Grind Treatment*



*Skidabrader Treatment*



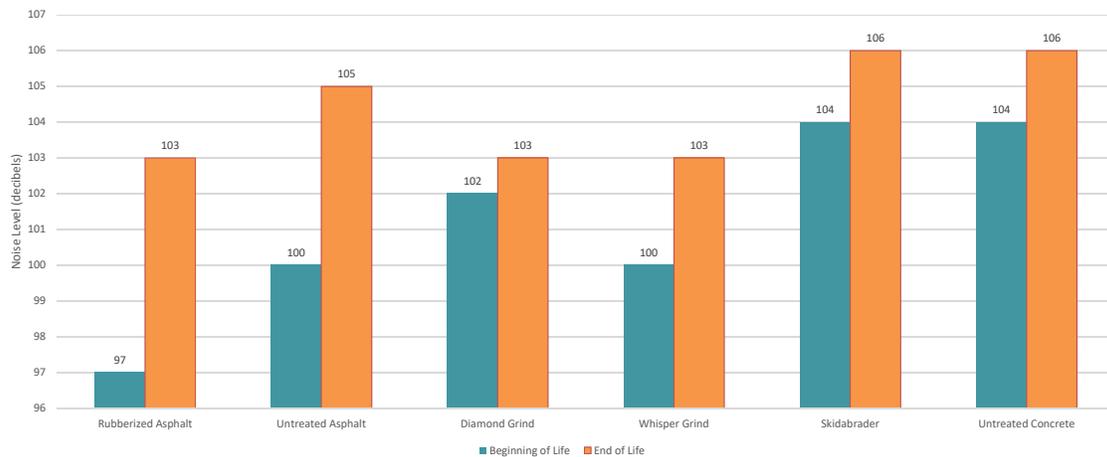
# Pavement Test Sections



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# Typical Pavement Surface Noise Level over Service Life



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## Advantages and Disadvantages of Surface Treatments

Surface Attribute	Concrete Surface	Asphalt Surface
 <b>NOISE LEVEL</b>	+ Little change over time - Typically higher than asphalt initially	+ Typically lower than concrete initially - Increases over time, ultimately being equal to or higher than concrete
 <b>LIFE-CYCLE COST</b>	+ Lower than asphalt over service life - Typically higher than asphalt initially	+ Typically lower than concrete initially - Higher than concrete over service life
 <b>ROAD SMOOTHNESS</b>	+ Little change over time - Has expansion cracks from heat/cold cycles	+ Has no expansion cracks - Raveling and cracking increase over time, especially when traffic volumes are high or there are many heavy vehicles (trucks)
 <b>AESTHETICS</b>	+ Little change over time - Hard to see white pavement markings unless black outline of markings on white concrete surface are provided	+ Easy to see white pavement markings on dark asphalt surface - Deteriorates over time
 <b>ENVIRONMENTAL IMPACTS</b>	+ Cooler than asphalt during the day - Hotter than asphalt at night; cannot easily be recycled	+ Cooler than concrete at night; can easily be recycled; provides slight reduction in PM-10 emissions compared to untreated concrete - Hotter than concrete during the day



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## Noise Levels, Life Span, and Costs

Pavement Noise Reduction Treatment	Typical Noise at Beginning of Service Life (dBA)	Typical Noise at End of Service Life (dBA)	Life Span (years)	Costs <sup>1</sup>			
				Per Lane Mile	Corridor <sup>2</sup>	Life-Cycle Corridor <sup>3</sup>	Life-Cycle System <sup>4</sup>
Rubberized Asphalt	97	103	10	\$116,000	\$9,280,000	\$41,760,000	\$1,239,901,000
Diamond Grind	102	103	15	\$123,000	\$9,840,000	\$29,520,000	\$912,784,000
Whisper Grind	100	103	15	\$150,000	\$12,000,000	\$36,000,000	\$1,098,290,000
Skidabrader	104	106	15	\$90,000	\$7,200,000	\$21,600,000	\$686,054,000

1. Bridge joint replacement work is included in the diamond grind, whisper grind, and Skidabrader cost estimates.
2. Corridor costs based on a new 10-mile, eight-lane section (four lanes in each direction) with auxiliary lanes and shoulders.
3. Life-cycle costs based on corridor costs over a period of 25 years.
4. System costs based on maintenance and construction cost of the treatment for the entirety of the freeway system that currently has rubberized asphalt over a period of 25 years.



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## What's next?

As the service life of the rubberized asphalt overlay comes to an end, a decision will need to be made whether to replace the rubberized asphalt overlay with a new overlay or utilize an alternative surface treatment.

- Potential impacts to the current Proposition 400 program.
- Potential impacts to the new Regional Transportation Plan/extension of Proposition 400.



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## Potential options:

1. Maintain the status quo.
2. Explore alternative noise reduction pavement surface treatment test sections.
3. Investigate the capacity to fund rubberized asphalt replacement as part of the Freeway Life Cycle Program (Proposition 400).
4. Consider noise reduction surface treatments as part of the planning efforts to the new Regional Transportation Plan (RTP) and extension of Proposition 400.



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