



Tamarron Pkwy – Katy, TX

SELECTING THE RIGHT CONCRETE PAVEMENT FOR THE RIGHT SITUATION

Concrete Pavements and Cement Stabilization Workshop



Corey J. Zollinger, P.E. 



Hickory Street— Roseville, CA

KEY TOPICS

- **Long Term Performance of Local Roads with Concrete**
- **Existing Challenges and Solutions for the Urban Environment**

HOW ARE ROADS FUNDED, BUILT, & MAINTAINED IN LOCAL AGENCIES?

- **Residential Developers**

- **Built to City / County standards** by Private Developer Funding
- Developer may be reimbursed by MUD District for certain roads
- Usually owned by Developer / Mud District for 1 year period
- Accepted by the City into their “network” for **maintenance**

- **New Construction or Re-Construction Arterials / Collectors**

- Use Capital funds for construction.....Usually based on bond programs
- Designed “in – house” or “Consultant”
- Typically follow standards tables or designs

ARE CURRENT ROAD BUILDING STRATEGIES FINANCIALLY SUSTAINABLE?

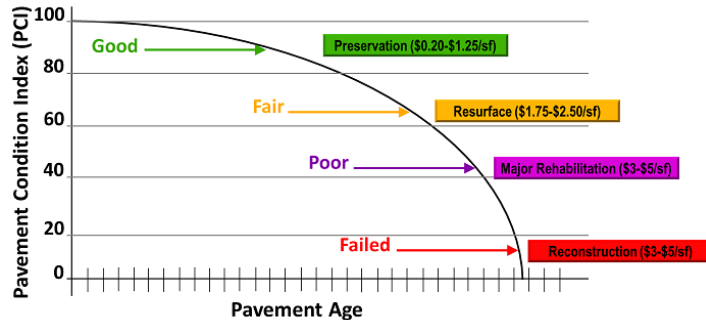
How many years does each lane mile need to last before you will come back to it again?

1. How many lane miles are in your city?
2. How many lane miles can you afford to maintain in a given year on average?

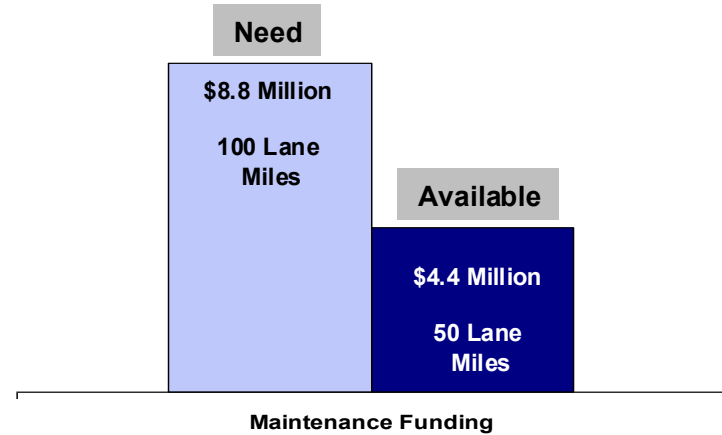
$$\# \text{ of Year between treatments} = \frac{\#1}{\#2}$$



Pavement Conditions Decline



Typical Local Agency Road Budget



In some local agencies: The current funding levels require roadways to last >50 years before the next maintenance treatment

Public Agencies cannot afford to continue to build roads that require routine maintenance at short intervals less than 20 years.

COLLEGE STATION, TX HAS ADOPTED CONCRETE PAVEMENTS FOR ALL RESIDENTIAL AND COLLECTOR STREETS



Bryan / College Station Unified Design Guidelines

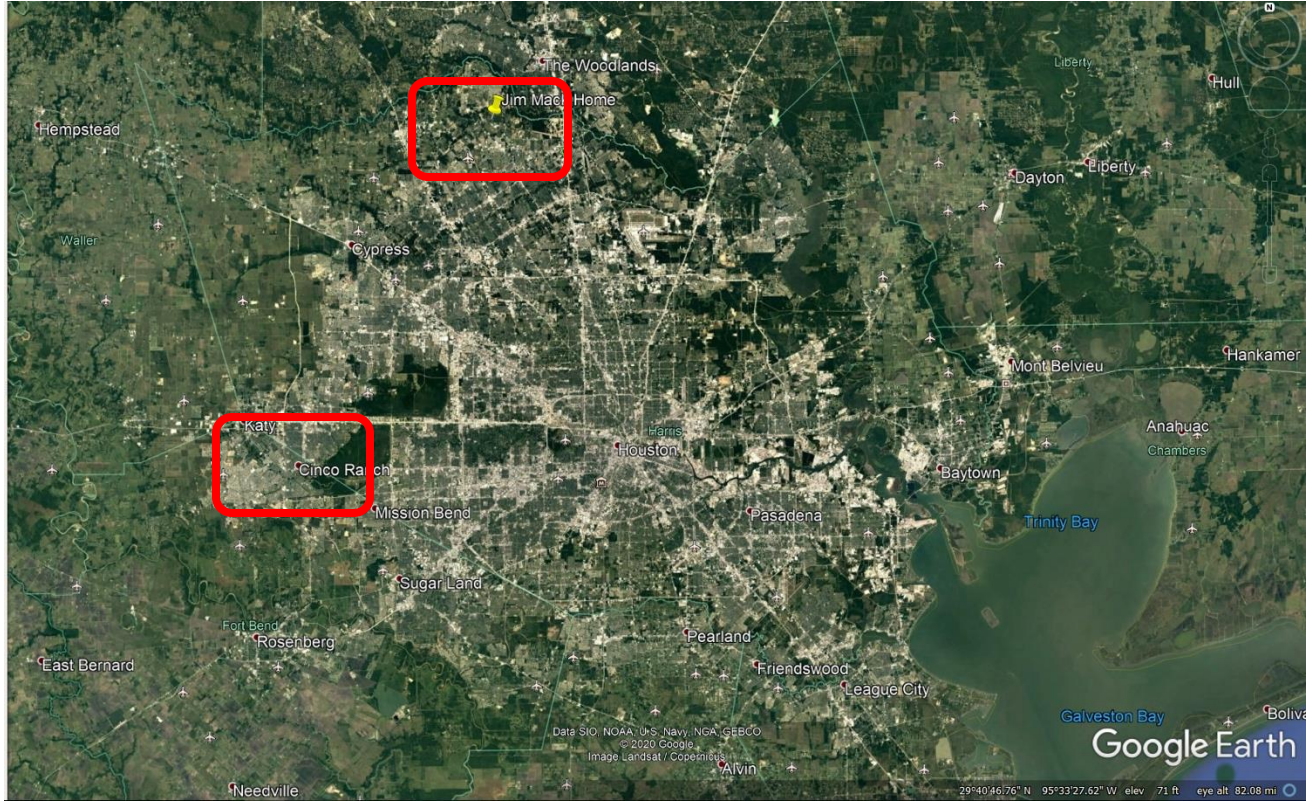
Manuals, Technical Specifications and Standard Construction Details

Last Updated: Oct. 25, 2016

Notice: February 1, 2017

Effective for all Final Plat Applications Submitted on or after May 1, 2017 in the City of College Station, all street pavements shall meet the "Rigid Pavements" (Concrete) criteria as shown in BCS United Streets and Alley Design Guidelines Table VIII -- Minimum Pavement Thickness Criteria.

HOUSTON, TEXAS



North Houston – Northampton Neighborhood 1977



RESIDENTIAL ROAD (Craigway) (25 - 60 YRS OLD)



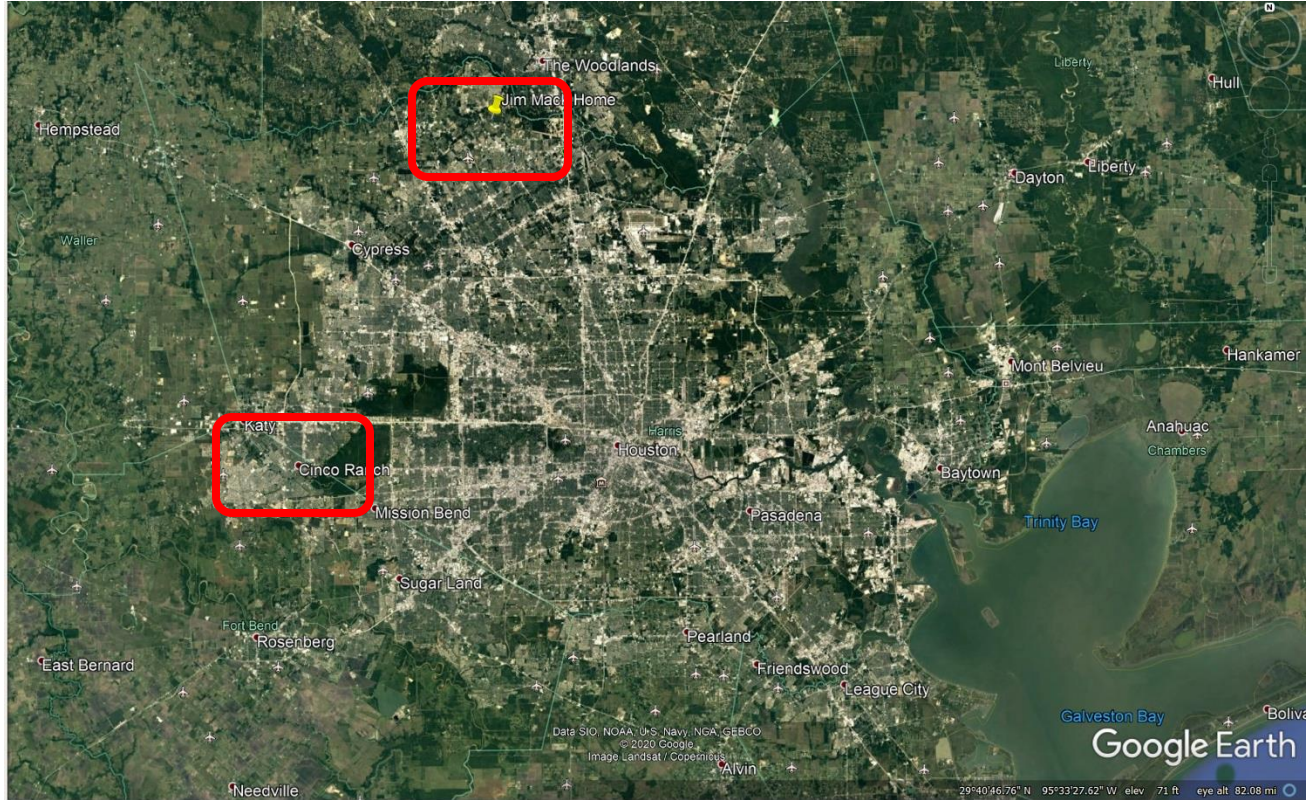
COLLECTOR ROAD (Northcrest Dr) (53 YRS OLD) Street view



COLLECTOR ROAD (Northcrest Dr) (55-60 YRS OLD) Top view



HOUSTON, TEXAS



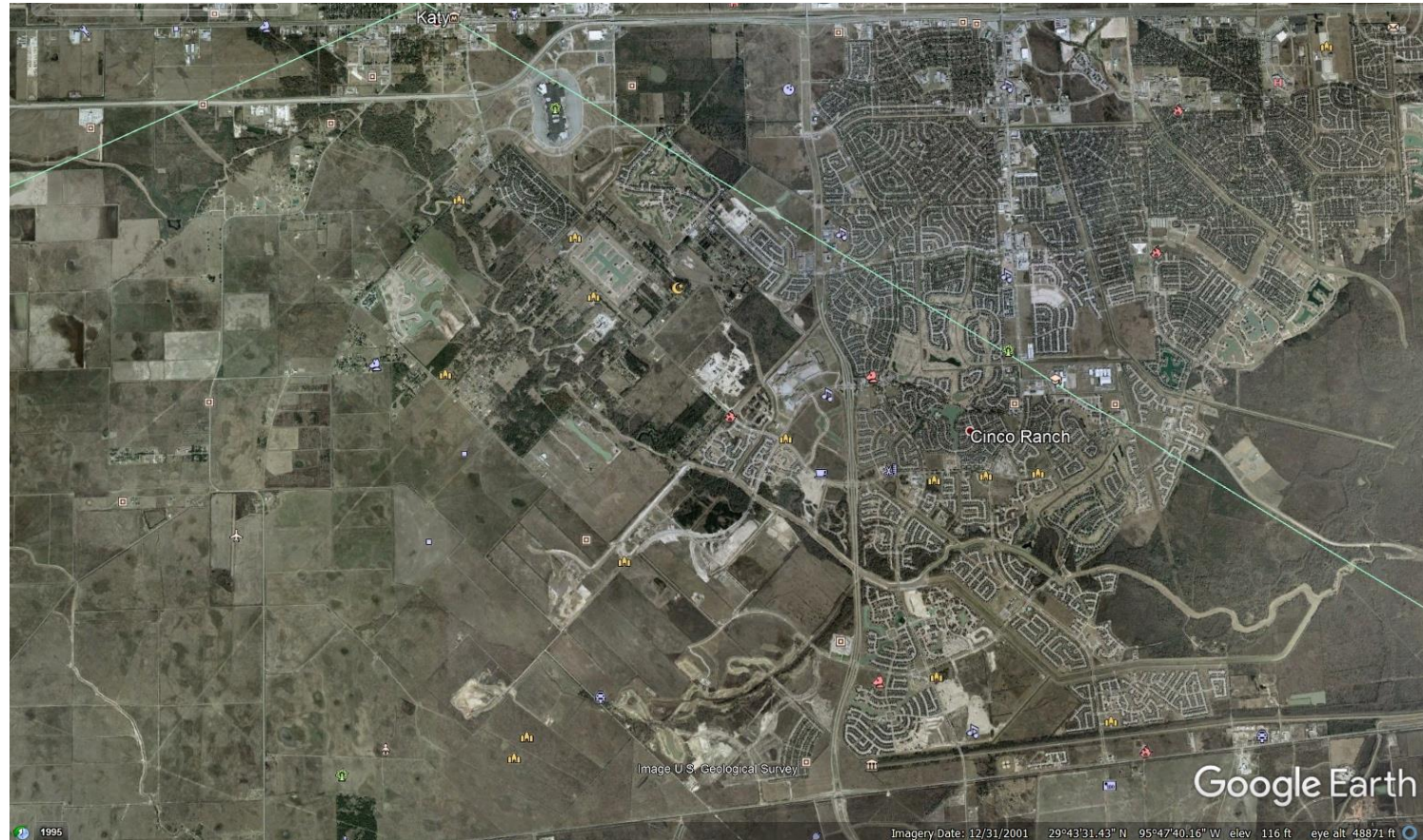
West Houston - Cinco Ranch, TX (1978)



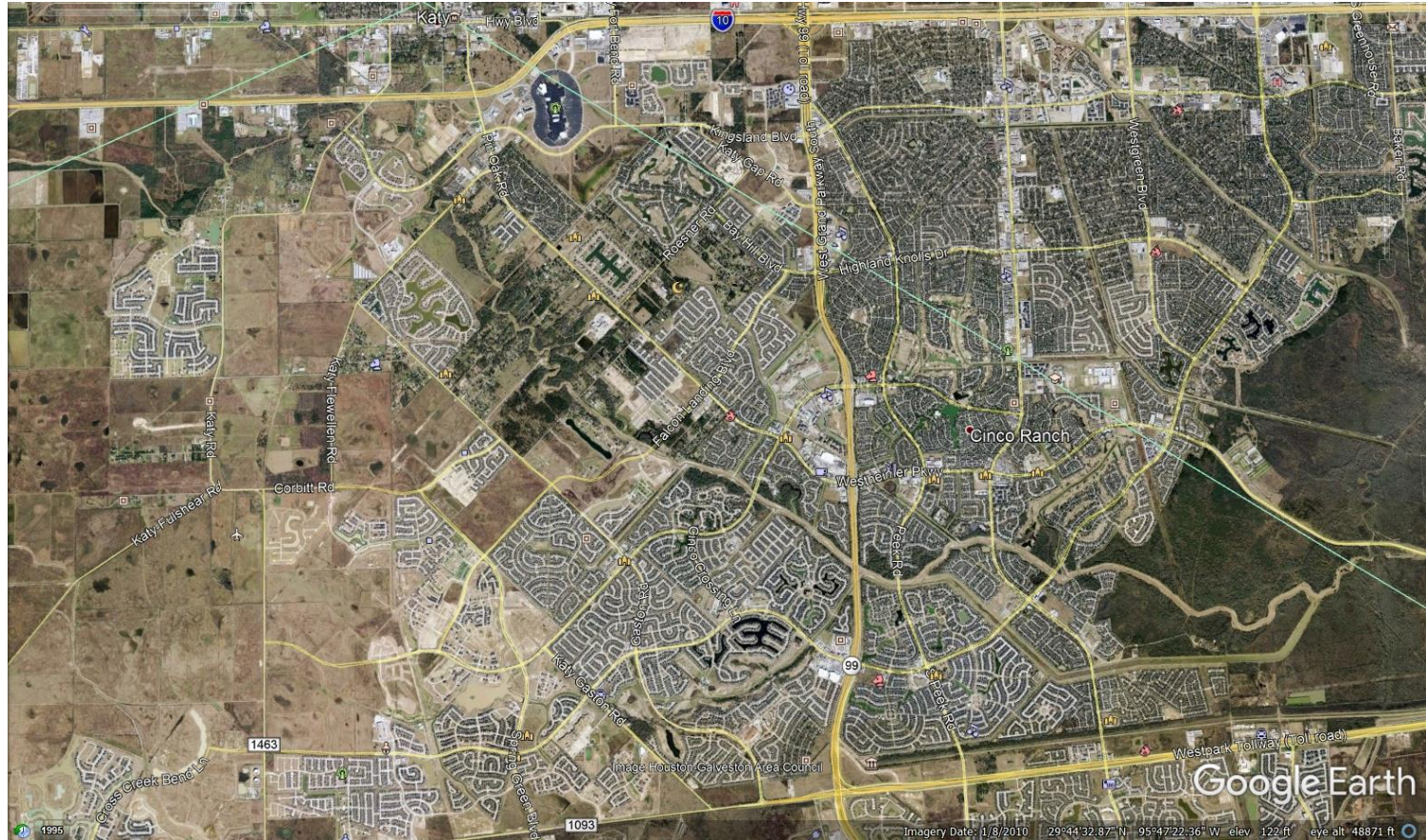
Cinco Ranch, TX (1995)



Cinco Ranch, TX (2001)



Cinco Ranch, TX (2010)

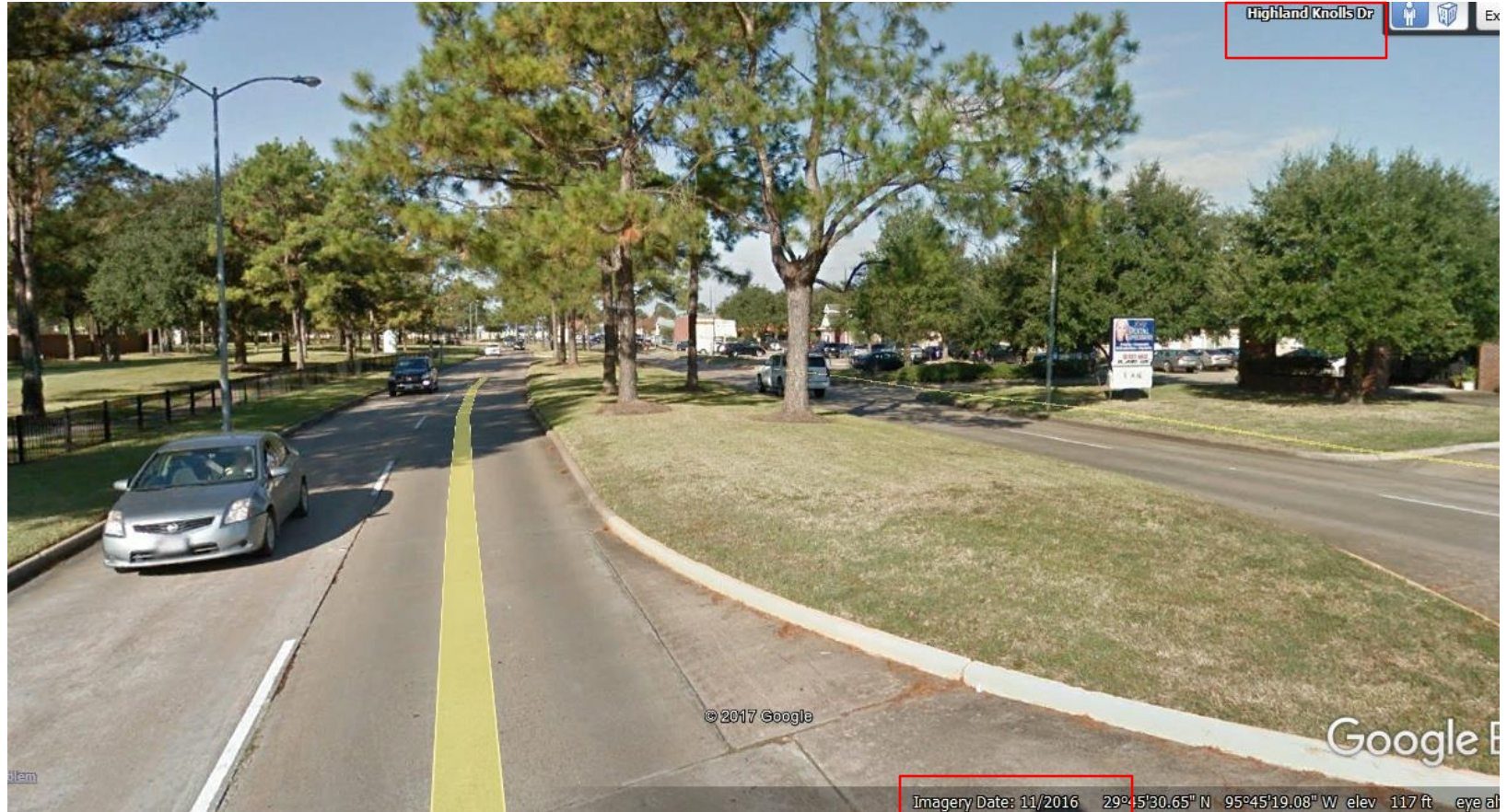


This satellite map shows a suburban area with a complex road network. The map is labeled with various street names and landmarks. Key roads include Katy Hwy Blvd, Westpark Tollway, and Westpark Parkway. Landmarks include Cinco Ranch and Westpark Tollway (Toll road). The map is part of a Google Earth interface, with the Google Earth logo and navigation controls visible at the bottom.

BEGINNING OF A MAJOR DEVELOPMENT / MINI CITY 1989



ARTERIAL ROAD (HIGHLAND KNOLLS) 30 – 35 YRS OLD



Cinco Ranch Residential Street



ARTERIAL ROAD (Westheimer) (30-35 YRS OLD)



ARTERIAL ROAD (Westheimer) (Hurricane Harvey Flooding - 2017)



ARE CURRENT ROAD BUILDING STRATEGIES FINANCIALLY SUSTAINABLE?

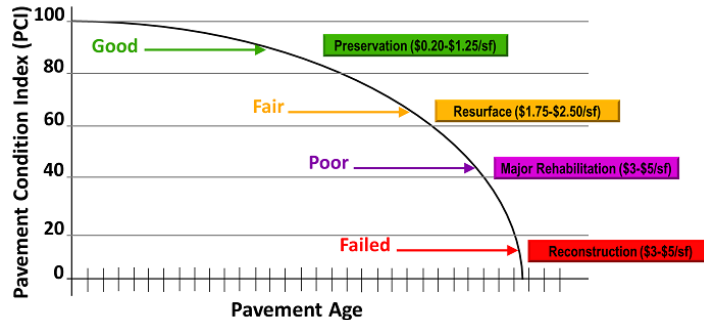
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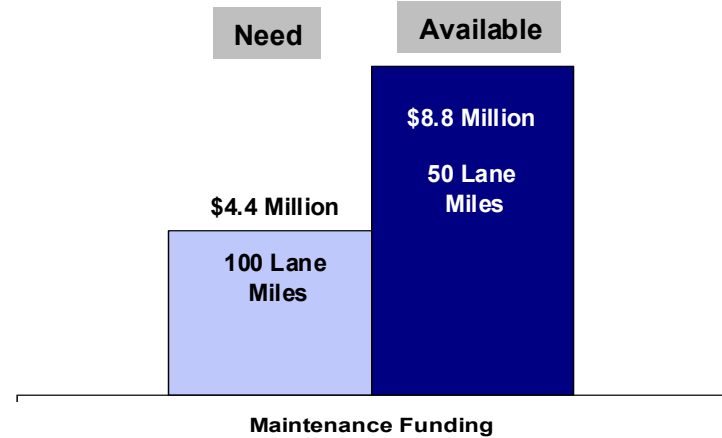
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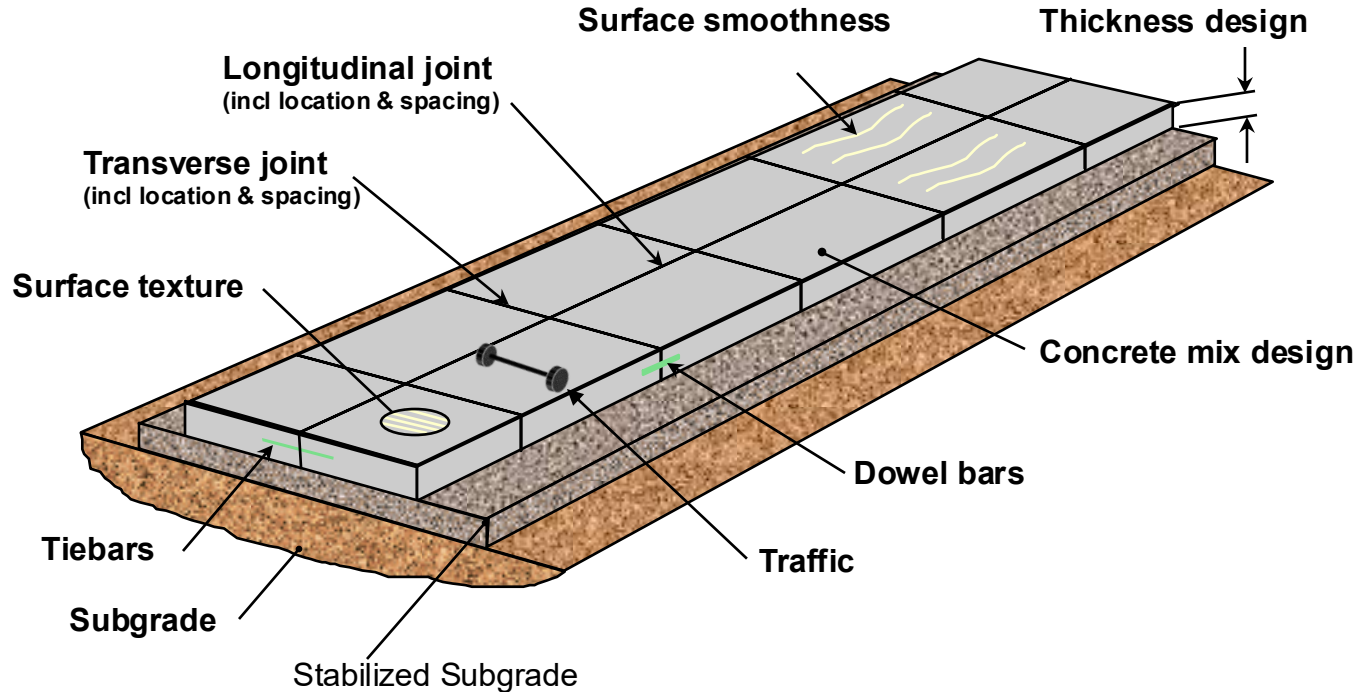
URBAN PAVING CONDITIONS & CHALLENGES



TYPICAL EXISTING PAVEMENT CONDITIONS

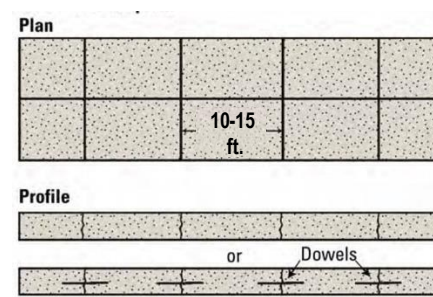
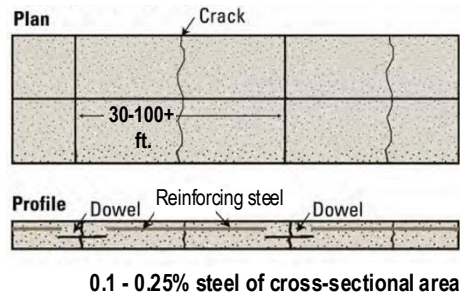
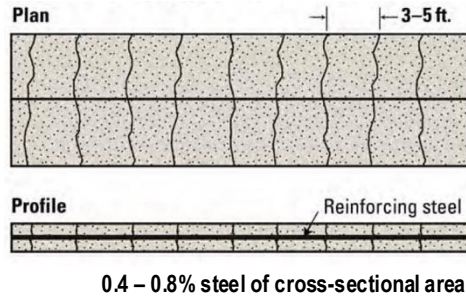


THERE ARE MANY COMPONENTS OF A CONCRETE PAVEMENT THAT IMPACT PERFORMANCE AND COST



Proper thickness design & use of design features ensures that concrete pavements are more competitive

THERE ARE 3 CONCRETE PAVEMENT TYPES FOUND IN THE USA



Continuously Reinforced
Concrete Pavement
(CRCP)



Jointed Reinforced
Concrete Pavement
(JRCP)



Jointed Plain
Concrete Pavement
(JPCP) OR (CPCD)

Miller Road #2
Harris County, TX (2025)
PILOT JPCP



Miller Road #2
Harris County, TX (2025)
PILOT JPCP



DURABLE PAVEMENT SOLUTIONS FOR URBAN ENVIRONMENT

Concrete Mill / Fill



Exist Pavement Elevation remains

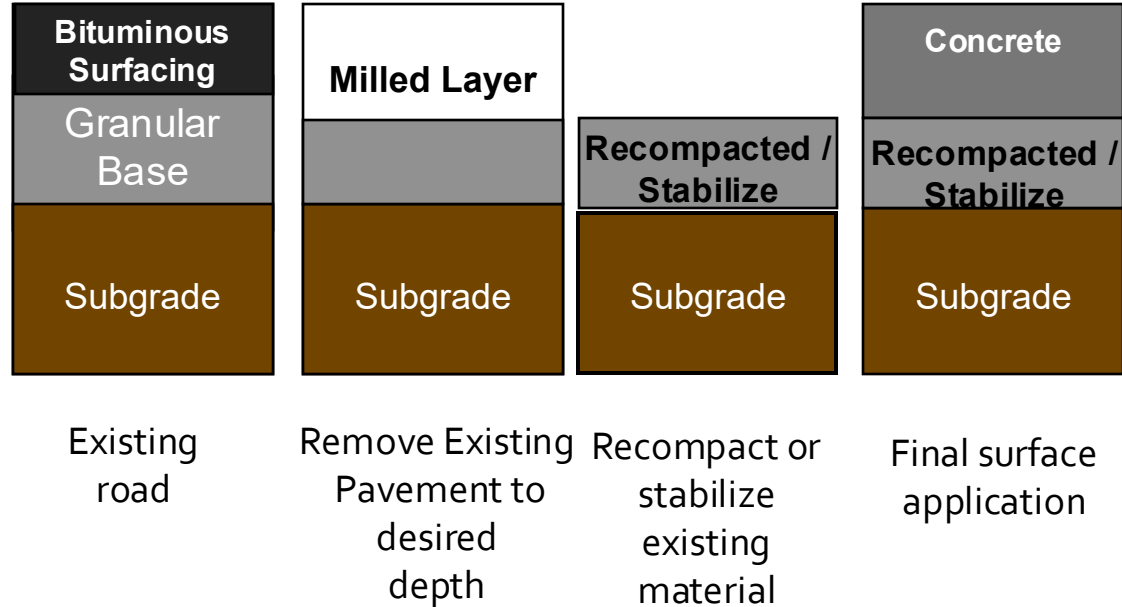
Concrete Overlay



Increase Pavement Elevation

CONCRETE MILL / FILL OPTION

- ✓ Mill & Remove material
- ✓ Shape & Grade
- ✓ Recompact remaining material
- ✓ Surface



Understanding the remaining subgrade / base material properties that will remain in place after milling and what to do with them is a critical factor to success

CONCRETE MILL / FILL OPTION



CONCRETE MILL / FILL OPTION - PCC



Glendale, Ave – Glendale, AZ

Fulton Road – 2023
Santa Rosa, CA
Roller Compacted Concrete Mill / Fill



**Fulton Road – 2023
Santa Rosa, CA
Roller Compacted Concrete Mill / Fill**



CONCLUSIONS

1. Houston area Cities, Counties nor developers are required to use concrete. They choose to.
2. Worldwide, Pavement Material selection for roadways is based on culture & prior experience and not an engineering or economic analysis.
3. It is reasonable to expect roads to last >30 years before any maintenance at all.
4. Concrete is a viable pavement type for local streets and roads
5. Public Agencies should consider requiring all newly developed roads to be built out of concrete. They usually handle the maintenance of the roads and shouldn't be expected to begin maintenance within 10 years of building it.
6. There are great durable concrete-based solutions for existing asphalt pavements that work in the urban environment and overcome those challenges



“Your proposal is innovative. Unfortunately, we won’t be able to use it because we’ve never tried something like that before.”



Q&A

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