

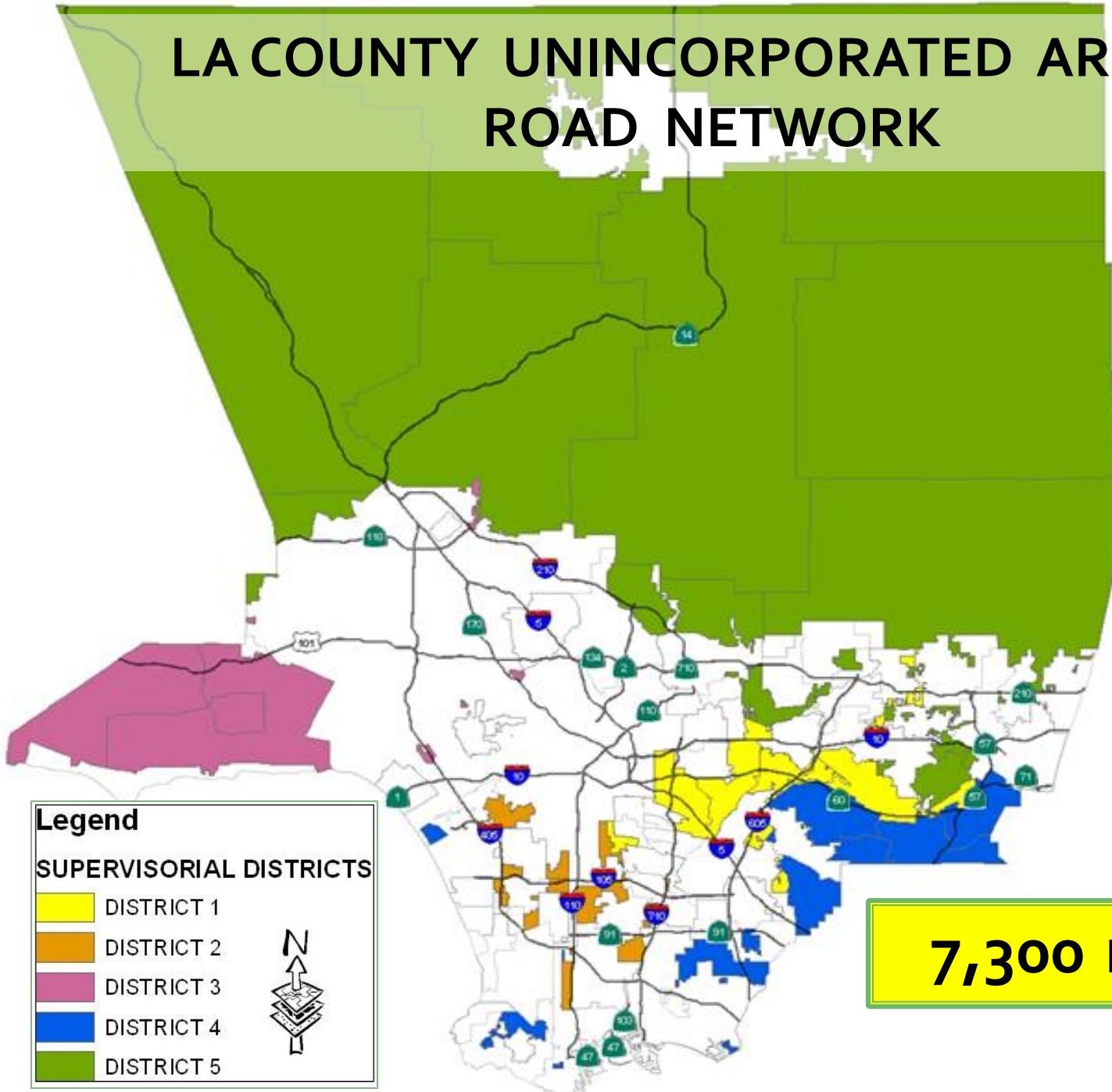
CLIMATE INITIATIVE COLD IN PLACE RECYCLING  
WORKSHOP

2012

**Cold-in-Place Recycling**  
**Los Angeles County's Experience**

Imelda Diaz, P.E.  
Los Angeles County Department of Public Works

# LA COUNTY UNINCORPORATED AREA ROAD NETWORK



## Legend

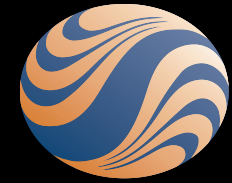
### SUPERVISORIAL DISTRICTS

- DISTRICT 1
- DISTRICT 2
- DISTRICT 3
- DISTRICT 4
- DISTRICT 5



**7,300 Lane Miles**

# ROADMATRIX Pavement Management System



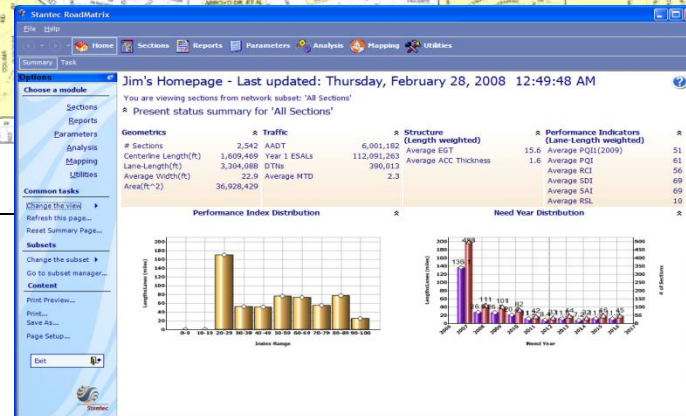
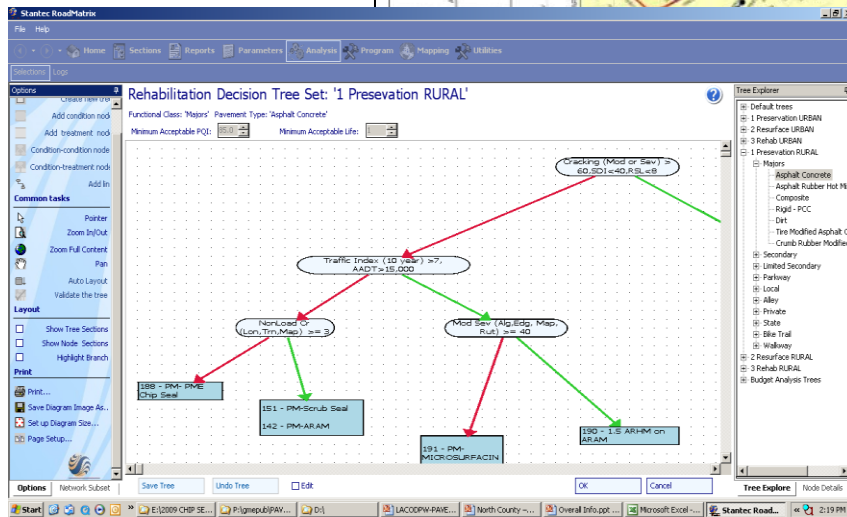
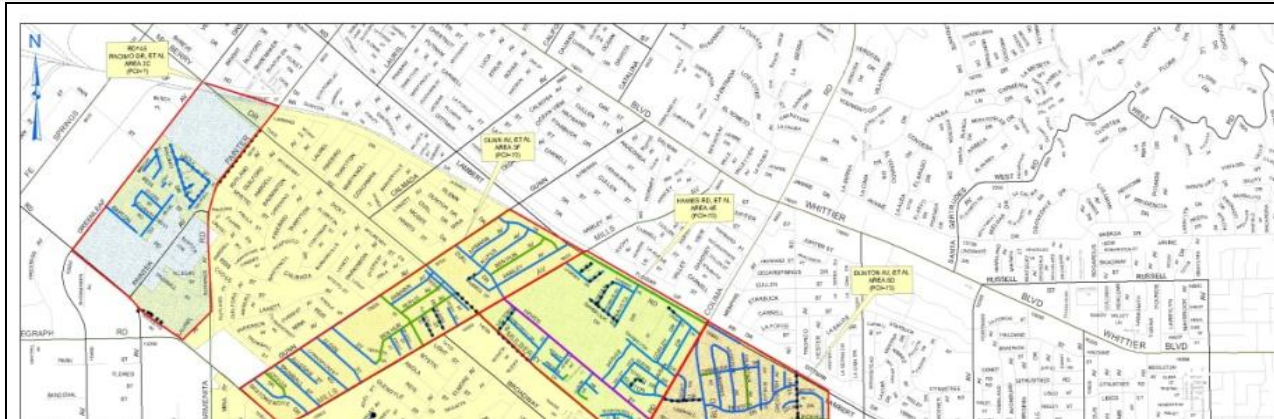
Stantec



Version 3.1

4th generation PMS

Oracle database  
platform



# The County's Green Approach

## Key Elements:

- 1) Pavement Preservation- "Good Roads first"
- 2) Use recycled materials
- 3) Utilize in-place materials

# Preservation Projects 2009-10

- Cape Seals : 140 lane miles
- Micro-surfacing : 13 lane miles
- Slurry Seals : 166 lane miles
- Chip Seals: 90 lane miles
- Bonded Wearing Course : 50 lane miles

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**460 lane miles**  
**of roads preserved**

(Contract Cost: \$20.4 million)

# Microsurfacing on Scrub Seal

Pioma Road, Et al

PCI = 100



## 2: Use Recycled Materials

- Rubberized Asphalt Concrete (RAC)
- Reclaimed Asphalt Pavement (RAP)
- Crushed Miscellaneous Base (CMB)

# Rubberized Asphalt Concrete (RAC)

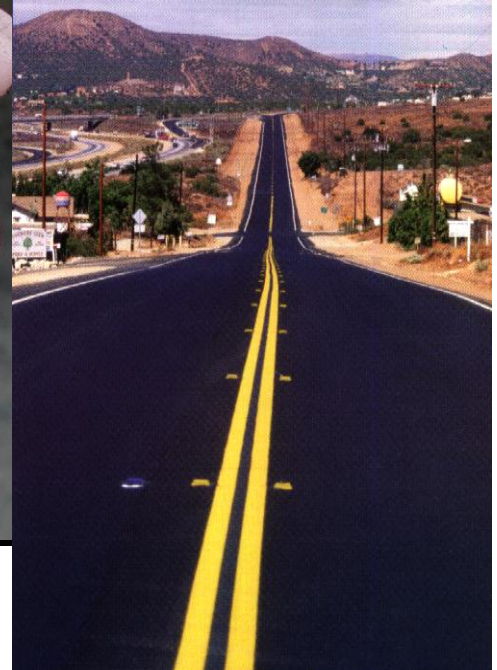
- Used in early 1990's
- County DPW placed over 700,000 tons of RAC
- Diverted into 1.5 million scrap tires from landfills (Recycles 2000 tires/lane mile)
- Long term performance ( 40-60% longer)
- Little or no maintenance
- High durability, skid, less rutting, and shoving
- Effective against reflective cracking
- Noise reduction





RUBBERIZED  
ASPHALT  
CONCRETE  
TECHNOLOGY  
CENTER

*“Asphalt Rubber uses approximately 2000 tires per lane mile on a 2 inch overlay”*



# RAC on ARAM

Map - S:50%

Map - M:0%



# RAP SLURRY

Direction: Westerly



UTC 2011-11-22 19:27:08

W: 118° 01' 08.05"

N: 033° 56' 21.22"

# 3: Utilize In-place Materials

- Cold In Place Recycling (CIR)
- Cold Central Plant Recycling (CCPR)
- Full Depth Reclamation
- Soil Stabilization

# Benefits of In-place Materials

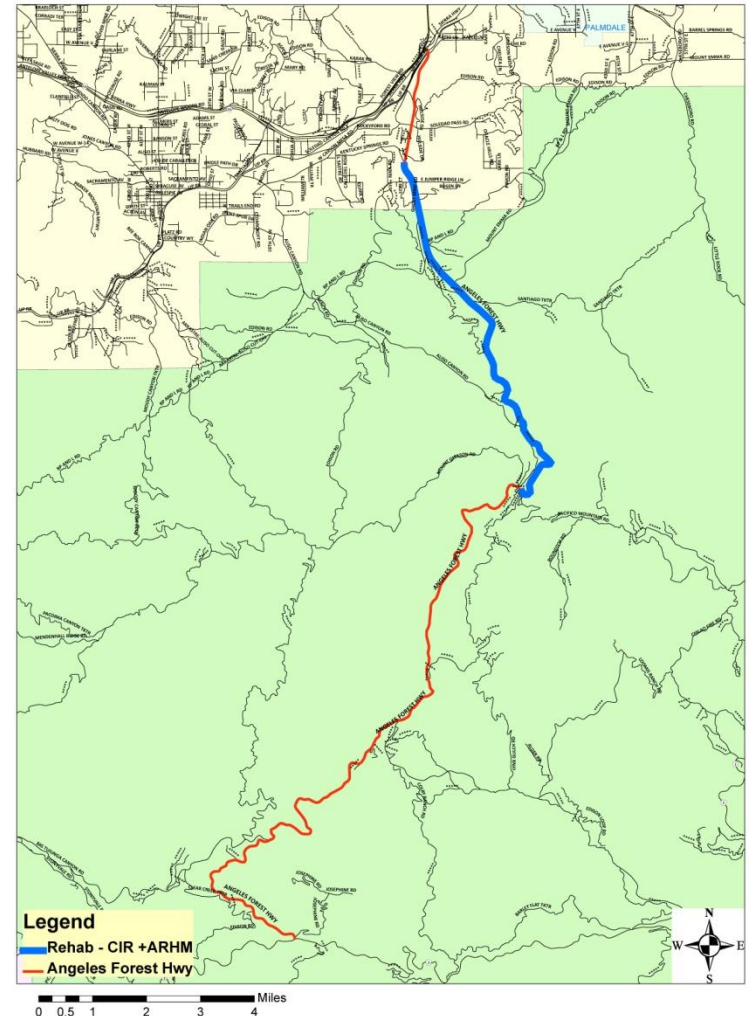
- Up to 50% less than traditional methods
- 90% reduction in construction truck traffic
- Shorter construction working days
- Reduced construction impacts to the public and environment

# Angeles Forest Highway

## 6 miles – Cold-In- Place Recycling (CIR)

- **Rural Major Collector:**  
Best described mountain rural road. Passing through the protected Angeles National Forest. Distance and environmental impacts must be carefully considered.
  - **Length:** 26 miles (6.0 miles of CIR)
  - **Width:** 26 - 48 feet
  - **Average Pavement Condition Index (PCI):** 47  
Minimum: 31 (64% of total area)  
Maximum: 69 (36% of total area)
- Predominant Distress:** severe to moderate alligator cracking (45-60%), moderate longitudinal and transverse cracking (30%-60%)

ANGELES FOREST HIGHWAY



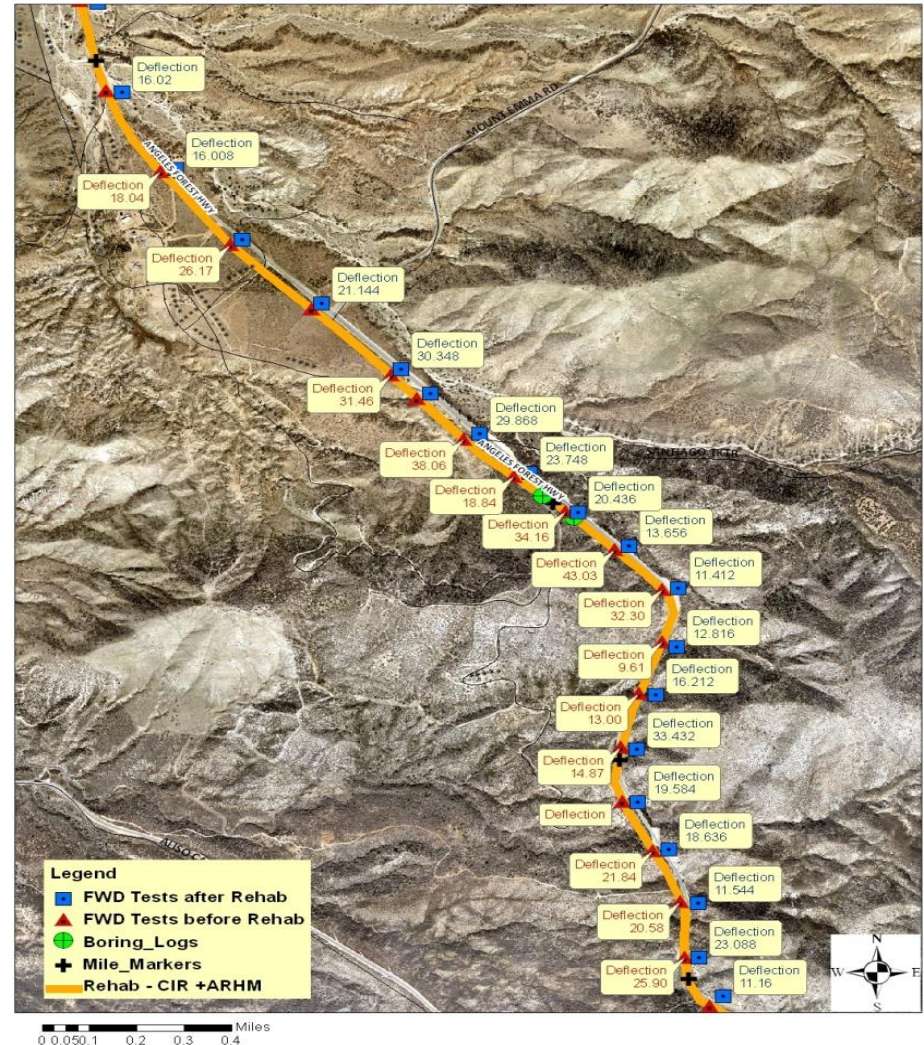
# Angeles Forest Highway

## 6 miles – Cold-In-Place Recycling (CIR)

- Traffic Index (10 yr): 8.0
- Existing AC Thickness: 3.5" – 5"
- Subgrade: Gravelly Sandy Soil (CBR: 50-70)
- FWD 80% Deflection (mils):  
Before: 34  
After: 25 (26% reduction)
- Contract Cost: \$1.9M  
3" CIR = \$6/sy (3" AC base is \$14/sy)

**43% Cost Savings!**

**ANGELES FOREST HIGHWAY**  
FWD Tests Comparison Before & After Rehab - CIR + ARHM



# Angeles Forest Highway – Before (Average PCI=47)





# Angeles Forest Highway 3" Cold-In- Place Recycling (CIR)



**Ave.PCI = 47**

# Angeles Forest Highway After PCI = 100

Direction: Easterly



# Angeles Forest Highway - After



UTC 2012:01:08 19:36:57

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# Upper Big Tujunga Canyon Road 4 miles – Cold-In-Place Recycling (CIR)

- **Rural Major Collector:**  
Rural Mountain Road. Passing through the protected Angeles National Forest, distance and environmental impacts must be carefully considered.
- **Length:** 9.1 miles (4.0 miles of CIR)
- **Width:** 24-36 feet
- **Average Pavement Condition Index (PCI) prior to chip seal:** 58
- **Predominant Distress:** severe to moderate moderate longitudinal and transverse cracking

UPPER BIG TUJUNGA CANYON ROAD



# Upper Big Tujunga Canyon Road 4 miles – Cold-In- Place Recycling (CIR)

- Traffic Index (10 yr): 5.5
- Existing AC Thickness: 3"
- Subgrade: Gravelly Sandy Soil (CBR: 50-70)
- Contract Cost:  
3" CIR = \$6/sy (3" AC base is \$14/sy)  
Microsurfacing = \$0.25/sf

UPPER BIG TUJUNGA CANYON ROAD  
Cold - In - Place Recycling



# Upper Big Tujunga Cyn Rd - After

Direction: Easterly



PCI = 100

UTC 2011:11:29 19:13:23

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# Conclusions

- Changing the philosophy from “worst first” to “pavement preservation” was foremost in modifying the way we managed our network and prioritized our road projects.
- Going Green is not only Good for the environment, but it is also Cost Effective:
  - Pavements preservation treatments cost 5 to 10 times less
  - RAC lasts 40-60% longer
  - 40% savings can be achieved by reusing in-place materials

Utilization of a robust and reliable pavement management system is a pre-requisite to a pavement preservation and sustainable program.

**Thank you!**

