

Cold In-Place Recycling In Sonoma County

Climate Initiatives Innovative Grant Program
Partnership for Sustainable Community Networks

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Benefits of Cold-In Place Recycling

- Reduces the Consumption of Natural Resources
- Reduces Energy Consumption
- Reduces GHG Emissions
- Reduces Truck Traffic
- Reduces User Delays
- Mitigates Reflective Cracking



When to Recycle

- Fatigue Cracking
- Large Thermal Cracking
- Surface Maintenance Not Effective
- Raveling and Potholes

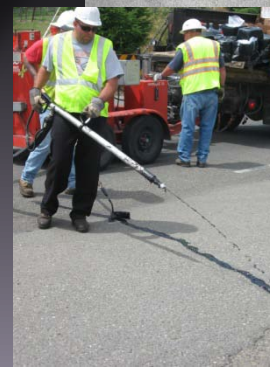
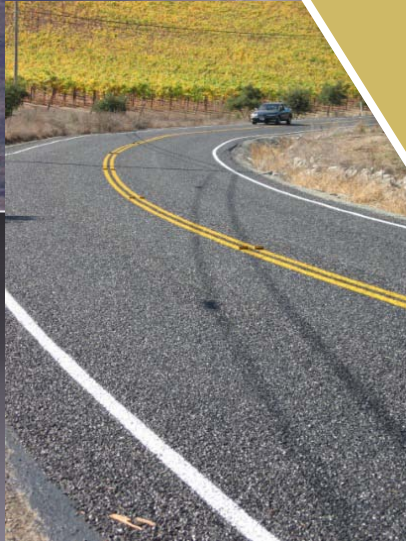


Pavement Preservation

PMS Recommendations

Field Assessment

Right Road,
Right time,
Right
Treatment



Adobe Road Existing Road Conditions

ADT 12,000

3"-6" of Existing AC

Average PCI = 45

Alligator Cracking

Grader Patch

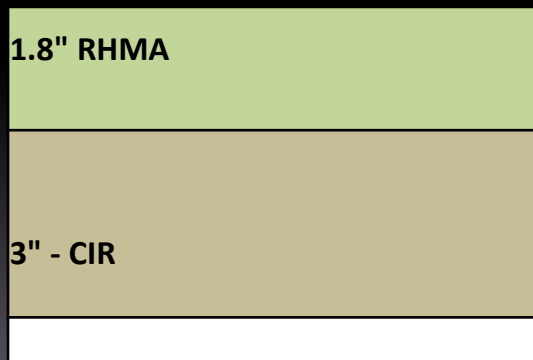
Pothole Mix

Minor Hydraulic Issues

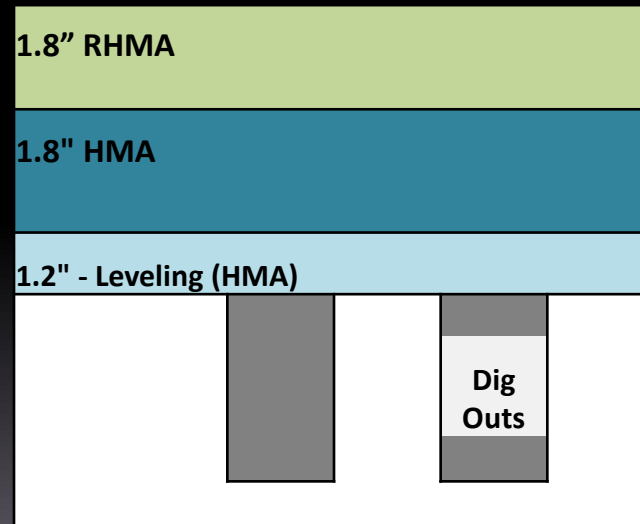


Project Alternatives

CIR Section



Traditional HMA Section



Project Costs Analysis

Cold In Place Recycling Costs (as bid)

Item	Unit	Quant.	Unit Price	Total
CIR Mix Design	LS	1	\$ 10,000.00	\$ 10,000
CIR	SF	342,025	\$ 0.33	\$ 112,868
Quality Control	LS	1	\$ 13,000.00	\$ 13,000
Emulsified Recycling Agent	Ton	184	\$ 700.00	\$ 128,800
Cement Additive	Ton	57	\$ 260.00	\$ 14,820
Total				\$ 279,488
Cost per Sq. Ft.				\$ 0.82
Cost per Sq. Yd.				\$ 7.35

Project Cost Savings using CIR is approximately \$118,000 per lane mile over traditional HMA approach

Traditional HMA Project Alternative (estimated)

Item	Unit	Quant.	Unit Price	Total
Remove and Replace	CY	325	\$ 425.00	\$ 138,125
3/8 Leveling Course (.10 ft.)	Ton	2,565	\$ 108.00	\$ 277,020
1/2" HMA (.15 ft.)	Ton	3,848	\$ 100.00	\$ 384,800
Total				\$ 799,945
Cost per Sq. Ft.				\$ 2.34
Cost per Sq. Yd.				\$ 21.05

Adobe Road GHG Reduction

- Adobe Road - 4.4 Lane Miles
- CIR replaced approximately 6,500 Tons of new AC
- Adobe Road GHG reduction

88 lbs CO₂ reduction per Ton of AC replaced

= 572,000 lbs CO₂ or the equivalent of about 47 passenger cars removed from Sonoma County roads

Two Unit CIR Train



Typical Pickup Machine



Placement and Laydown



Paver equipped with grade control can smooth out profile and reestablish cross slope



Compaction 25 Ton Pneumatic

Break down and
Finish Roller with
Steel Vibratory



Construction Issues

Trees



Trains !

Intersections



Construction Issues



Enthusiastic equipment operators

Dealing with Thin Section

Add RAP!



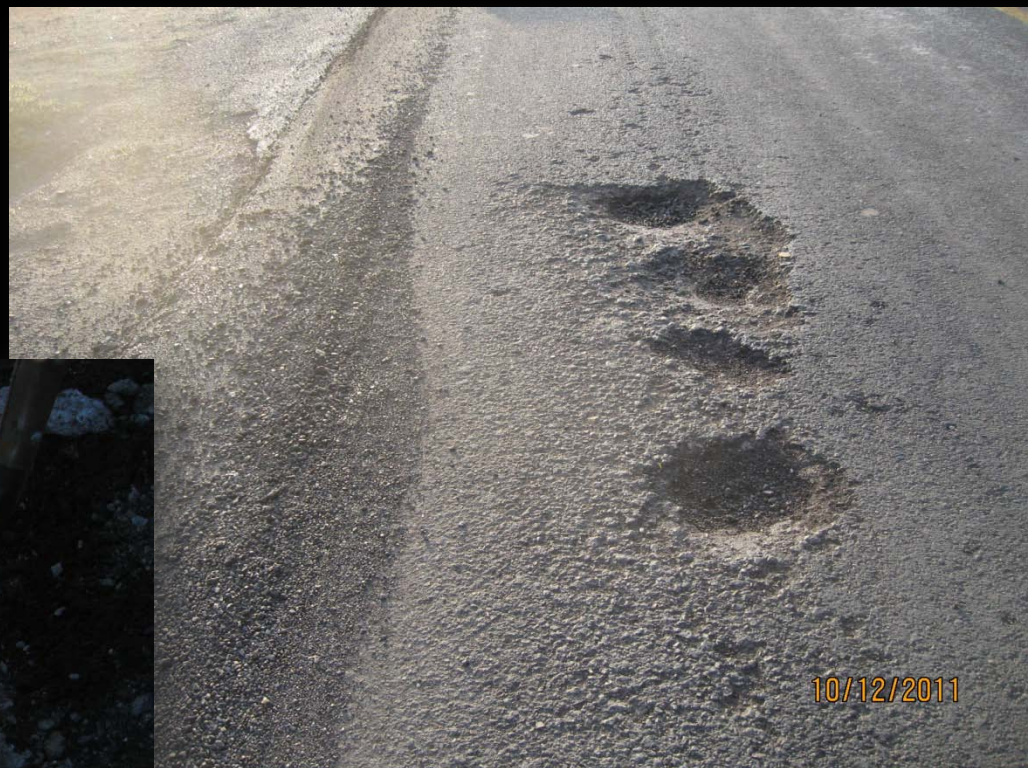
Construction Issues

It never rains
in California!



Construction Issues

CIR will find your
lost valve boxes!



Construction Issues

Make sure to provide for soft spots in bid items



Construction Issues

The CIR mat is tender until it cures

But tougher than you might think!



Wearing Course



- 0.15 ft. of RHMA-G (Gap Graded)

Challenges

- Organizational
 - Internal resistance
 - Not invented here
 - Departmental Silos
- Public
 - Fix the worst first
 - That road's not broken!
 - Managing expectations
- Contractors
 - Contractor Experience
 - CIR as Sub vs. as CIR Prime



Going Forward...

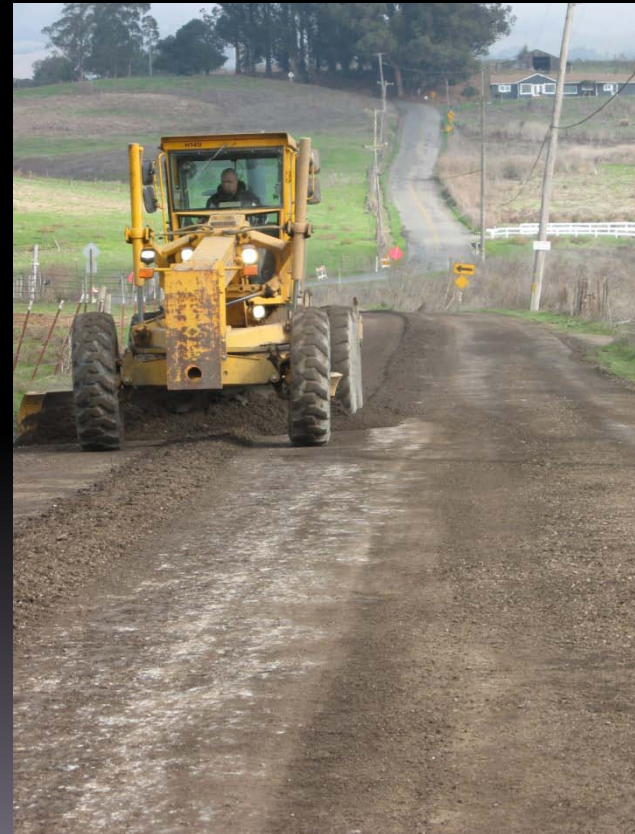
- Patience
- Talk with folks who have had a success or two
- Honest Dialog – what worked, what did not
- Continue to try new technologies
- Material testing and inspection critical to success!

Tough Choices...

Status Quo ?



Alternative Surfaces?



Managing Less with Less

- New financial reality
- Need to respond by using cost effective processes to maintain our transportation systems
- Pavement Preservation - Surface Treatments (fog & chip seals, slurry & micro seals, BWC) and CIR
- Reconstruct - FDR





True sustainability means not only seeking new ideas, but searching for innovative alternatives to existing methods.

Thank you!