



Overview

Results of survey

Goals & deliverables

Structure of the

workshop

# Goal, outcome, approach

- The workshop goal is to identify knowledge, information, and communication barriers to adoption of permeable pavement of all types.

# Outcome of workshop and final deliverable

- We expect the workshop outcome to be gap identification and ideas for filling the gaps
- The final deliverable is a comprehensive plan (road map) for overcoming barriers and filling information gaps.
  - Plan will be written by organizers based on results of these two days, and distributed to participants and other stakeholders for comment before publication

# Caltrans sponsored research survey regarding obstacles to implementation 2017

- Survey respondents

California with experience	California without experience	Non-California with experience	Total
26	31	7	64

UCPRC/Caltrans tech memo under review

Paper presented at ASCE T&DI pavements conference, Philadelphia, August 2017

# What are the three most significant issues affecting implementation of FPP?

- Californians with perm pave experience:
  - Maintenance 18.9 %
  - None so far 13.5 %
  - Higher cost 10.8 %
  - Installation 10.8 %
  - Quality of construction 8.1 %
  - Conflict with utilities 8.1 %
  - Water ponding 8.1 %
  - Less than 5 %: Unfamiliarity with design, Not strong enough to withstand traffic, Non-compliance with current codes, Poor mix design, Public perception, Maintaining native soil stability

# Additional questions

## Californians with perm pave experience

Did you think the project(s) a success?					
Yes	Both yes and no	No	Too soon to tell		
65.4%	19.2%	11.5%	3.8%		
Did stakeholders think the project(s) a success?					
Yes	Too soon to tell	No	Mostly	Unaware of the problems during construction	Both yes and no
62.5%	12.5%	8.3%	8.3%	4.2%	4.2%
Would you consider FPP again?					
Yes	Depends on application	No	Maybe		
72.0%	20.0%	4.0%	4.0%		

# Californians with experience; similar answers for non-Californians

- Four main reasons for choosing perm pavement
  - Environmental benefits 45.5%
  - Owner's preference 18.2%
  - Long-term cost savings 9.1%
  - Helping meet requirements 9.1%
- Four main reasons why not more widely implemented
  - High initial cost 26.1%
  - Cost, frequency, method of maintenance 21.7%
  - Conservatism in industry 19.6%
  - Lack of guidance/specs 17.4%

# Californians without experience

- First impressions
  - Unconvinced of applicability 35.1 %
  - Happy to evaluate it 18.9 %
  - Other 18.9 %
  - Waiting for the right project 16.2 %
- Speculated obstacles to implementation
  - Maintenance 29.5 %
  - May not work as a pavement 26.9 %
  - Greater initial cost 15.4 %
  - May not work as a catchment 10.3 %
  - < 5% Lack of design guidelines, Conflicts w/ utilities, Industry resistance, Other, Contractors' lack of knowledge



# Californians without experience

- Current storm runoff treatment
  - Detention pond 30.4 %
  - Retention pond 30.4 %
  - Straight to receiving water 19.6 %
  - Treatment plant 8.7 %
  - Other 8.7 %
  - Permeable pavement 2.2 %
- Pollutant and peak flow reduction known;  
Only 11.1 % had no knowledge of benefits
- Expectations of life cycle cost
  - More 53.8 %
  - Do not know enough about overall cost 30.8 %
  - Lower 7.7 %

# Conclusions

- Experienced designers and their stakeholders generally perceive it to be successful
- Many remain unconvinced that perm pavement can work
  - But they have low knowledge about it
- Concerns remain about maintenance and life cycle cost
- Knowledge gaps remain: initial costs, maintenance frequency and methods, design guidelines, project selection
- Inherent risk-averseness

# Recommendations

- Develop and communicate better information regarding:
  - Initial and life cycle cost comparisons with conventional alternatives
  - Better documentation of benefits and disbenefits relative to alternatives in different design contexts
  - Functional lives, both structural and permeability
  - New design information, including for heavy vehicles
  - Best practices, costs for maintenance practices, frequency
- More field, accelerated pavement testing validation
- Improvement of porous asphalt and pervious concrete mix designs, paver bedding layers

# Structure of the workshop

- 1 to 5 today
  - Insights from different perspectives regarding use of permeable pavement and gaps, problems, issues
  - Write down questions that you would like to see discussed in the breakout sessions; we will collect at 4.35 today
- 5 to 6.30
  - Social 90 minutes, appetizers, drinks

# Structure of the workshop

- 7.15 to 8.15 tomorrow
  - Breakfast here
- 8.15 to 12
  - Small group breakout sessions to address questions
- 12 to 1
  - Lunch
- 1 to 2.30
  - Reports back from groups
- 2.50 to 4.45
  - Discuss road map: outline, participants, funding, schedule