

RESEARCH PROBLEM STATEMENT #EV-501

I – Problem Title

Quiet Pavement Pilot Project Study (EV13)

II – Research Problem Statement

The public is demanding ‘quiet pavement’ be constructed to abate traffic noise levels. The long-term acoustic benefits of quieter pavements are not well understood.

III – Objective

Monitor traffic noise levels on ten⁺ different ‘quiet pavement’ projects for an extended period of time - ten (or more) years. Determine long-term performance and cost effectiveness of various quiet pavement strategies.

IV – Background

At more than \$1,300,000 per mile, sound walls are the only approved FHWA solution for addressing traffic noise impacts. The public is demanding other alternatives and quieter pavement surfaces may be part of the solution. Tire/pavement noise is a principle component of overall traffic noise levels. Recently, the FHWA approved a Quiet Pavement Pilot Project for both California and Arizona. In California, it is envisioned that ten projects that utilized ‘quiet’ pavement would be examined pre-construction and post construction to quantify long and short-term benefits of quieter pavement surfaces.

Each project will have a pre-determined monitoring regime. There will be three levels of data collection for gathering information about the acoustical performance of various pavement surfaces and assessing the benefits of Quiet Pavement – pavement measurements, backyard measurements, and research level measurements. At a pavement measurement (Level 1), the principle method of characterizing pavement acoustics will be sound intensity on board a vehicle operating at freeway speeds. Additional pavement data will be obtained from the Caltrans Pavement Survey and standardized pavement tests as necessary. A backyard measurement (Level 2) will gauge the public’s perception of the quiet pavement project. Both short term and long term measuring of ambient noise levels will be monitored in residences’ yards before and after the quiet pavement is constructed. A research measurement (Level 3) will capture a higher quality of data to be used to cross correlate with the Level 1 and 2 data. The research or Level 3 data would include meteorological, traffic, and roadside acoustical data. Engineering judgment will be used to simplify data collection by utilizing acoustic equivalents and ‘pavement’ equivalents. Knowledge from on-going acoustical studies will be used to supplement this work.

V – Statement of Urgency and Benefits

Due to public pressure in California and Arizona, the FHWA recently approved a Quiet Pavement Pilot Project that allows Caltrans to use quiet pavement as noise mitigation on ten selected projects. Funding from this project would be used to monitor and measure the long-term acoustical properties of the quieter pavement surfacing. Implementing a

statewide Quiet Pavement design strategy would potentially save millions in Capital Outlay funds enhancing Project Delivery.

VI – Related Research

This is directly related to on going pavement studies that are being conducted with USDOT Volpe researchers.

VII – Deployment Potential

Information learned from this study would be immediately implemented in pavement design and project development.

Level of Acoustic Measurement – Table 1

	Preconstruction	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Project 1	1, 2	1, 2	1	1, 2	1	1, 2	1	1	1	1	1
Project 2	1, 2	1, 2	1	1, 2	1	1, 2	1	1	1	1	1
Project 3	1, 2	1, 2	1	1, 2	1	1, 2	1	1	1	1	1
Project 4	1, 2	1, 2	1	1, 2	1	1, 2	1	1	1	1	1
Project 5	1, 2	1, 2	1	1, 2	1	1, 2	1	1	1	1	1
Project 6	1, 2	1, 2	1	1, 2	1	1, 2	1	1	1	1	1
Project 7	1, 2	1, 2	1	1, 2	1	1, 2	1	1	1	1	1
Project 8	1, 2	1, 2	1	1, 2	1	1, 2	1	1	1	1	1
Project 9	1, 2	1, 2	1	1, 2	1	1, 2	1	1	1	1	1
Project 10	1, 2	1, 2	1	1, 2	1	1, 2	1	1	1	1	1

Research Grade Measurement Locations

IH 80 at Davis	3	3	3	3	1, 3	1, 3	1, 3	1, 3	1, 3	1, 3	1, 3
LA 138	1, 3	1, 3	1, 3	1, 3	1, 3	1, 3					
Mojave By Pass	1, 3	1, 3	1, 3								
Other locations											
TBD	1, 3	1, 3	1, 3	1, 3	1, 3	1, 3	1, 3	1, 3	1, 3	1, 3	1, 3

Notes:

- Level 1 On Board Sound Intensity Measurement, Caltrans Pavement Survey
- Level 2 Short/Long term measurements on private property, out of ROW
- Level 3 Research Grade data collection

Annual measurements taken at all Projects.

Quarterly or semi annual measurements taken at Research Locations.

Data collection, reduction, and documentation included in cost estimate.

* LA 138 costs already covered under EA 65-680427 Contribution of thin lift surface treatments to the abatement of traffic noise
Require 0.5 PY contract manager to manage task orders for on-call contracts