

Quality and Productivity Commission
30th Annual Productivity and Quality Awards Program
“Heritage of Excellence”

2016 APPLICATION

Title of Project (Limited to 50 characters, including spaces, using Arial 12 point font):

NAME OF PROJECT: Kanan & Malibu Canyon Roads Tunnel Lining Project

DATE OF IMPLEMENTATION/ADOPTION: JUNE 2015
 (Must have been implemented at least one year - on or before July 1, 2015)

PROJECT STATUS: Ongoing One-time only

HAS YOUR DEPARTMENT PREVIOUSLY SUBMITTED THIS PROJECT? Yes No

EXECUTIVE SUMMARY: Describe the project in 15 lines or less using Arial 12 point font. State clearly and concisely what difference the project has made.

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This project rehabilitated seven tunnels located on two mountain roads within the County of Los Angeles that serve as vital links connecting the City of Malibu with the Cities of Agoura Hills and Calabasas. Visible cracks and spallings of the existing gunite lining inside the tunnels indicated the need for rehabilitation. The rehabilitation work consisted of installing new steel lining and repainting all existing steel lining. The construction phase of the project was completed in June 2015. The challenges included selecting a structurally sound and cost effective lining material and maintaining access for fire trucks during the construction phase.

BENEFITS TO THE COUNTY

(1) ACTUAL/ESTIMATED ANNUAL COST AVOIDANCE	(2) ACTUAL/ESTIMATED ANNUAL COST SAVINGS	(3) ACTUAL/ESTIMATED ANNUAL REVENUE	(1) + (2) + (3) = TOTAL ANNUAL ACTUAL/ESTIMATED BENEFIT	SERVICE ENHANCEMENT PROJECT
	\$1,440,000	\$	\$1,440,000	<input checked="" type="checkbox"/>

ANNUAL = 12 MONTHS ONLY

SUBMITTING DEPARTMENT NAME AND COMPLETE ADDRESS County of Los Angeles Department of Public Works 900 South Fremont Ave 6 th Floor Alhambra, CA 91802		TELEPHONE NUMBER 626-458-7829
PROGRAM MANAGER'S NAME KENNETH HO		TELEPHONE NUMBER (626) 458 7948 EMAIL kho@dpw.lacounty.gov
PRODUCTIVITY MANAGER'S NAME AND SIGNATURE (PLEASE CALL (213) 893-0322 IF YOU DO NOT KNOW YOUR PRODUCTIVITY MANAGER'S NAME) Kimberly Y. Lyman SIGNATURE ON FILE	DATE	TELEPHONE NUMBER 626-458-5975 EMAIL klyman@dpw.lacounty.gov
DEPARTMENT HEAD'S NAME AND SIGNATURE Gail Farber SIGNATURE ON FILE	DATE	TELEPHONE NUMBER (626) 458-4002

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1st FACT SHEET – LIMITED TO 3 PAGES ONLY: Describe the **Challenge, Solution, and Benefits** of the project. State clearly and concisely what difference the project has made. Use Arial 12 point font

Challenge

The seven tunnels are located in the Malibu community area and were constructed between 1952 and 1983 using a combination of steel and gunited linings. These tunnels provide a vital link between the City of Malibu and the City of Agoura Hills. The Average Daily Traffic (ADT) of these tunnels ranges from 3,000 to 20,000 vehicles. The combined length of the seven tunnels is approximately 4,000 feet. Based on inspection and maintenance records, the existing gunited tunnel lining showed signs of deterioration such as spalling, delamination, and water seepage with patches of efflorescence. Visible cracks, seepage, loose gunite, paint flaking, and section loss of the existing steel lining warranted rehabilitation of these tunnels.

During the design phase of the project, different tunnel lining alternatives such as precast concrete arch, cast-in-place concrete with lattice steel and anchorage, corrugated steel liner, and steel ribs with plates were considered. The challenge was to select a lining material that is structurally sound and cost effective. From a construction standpoint, it must also be flexible enough in order to be erected and fitted within the tight spacing inside the tunnels.

A team of Public Works engineers with background disciplines in structural engineering, geotechnical engineering, construction engineering, and traffic engineering collaborated to determine a final alternative for the project. Another challenge for the project was that it would require full and partial closures of the tunnels during construction. The closure of the tunnels poses a significant impact to fire truck access to nearby residential areas.

During the design phase, the County Public Works Department coordinated closely with the County Fire Department to ensure that emergency response times and fire truck access would not be compromised during construction.

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Solution

To mitigate safety risks of the tunnels, the major scope of work for the project was to strengthen tunnels by constructing a new galvanized steel lining system below the existing gunited lining. The galvanized steel lining system consisted of waterproofing membrane, drain pipes, galvanized steel ribs and plates. In order to prevent future corrosion of the new steel lining, the waterproofing membrane was installed at the gunited surface to intercept any water percolating from above the tunnel, and drain pipes were placed at both sides of the tunnels to collect the water and drain it down to the existing gutter. The structural portion of the new galvanized steel lining system includes the steel ribs and plates which provide adequate structural strength to support the earth load above the tunnels. The ribs and plates were packaged and shipped to the project site in individual pieces, therefore it was light and flexible enough to fit in the constrained space inside the tunnels. The contractor was able to erect and install the steel lining system at a very fast pace, and completed the task ahead of schedule.

In addition to the installation of new galvanized steel lining system, the existing steel lining was also rehabilitated by removing all existing paint coats and applying new paint coats. In order to allow access for emergency vehicles during the closure of the tunnel, a protective shield was provided at the project site at all time. Public outreach with local residents in the unincorporated County area, the City of Malibu, and the City of Agoura Hills were also carried out before the project was announced to the general public. Advanced notifications and detour signage were posted to divert traffic to alternate routes.

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LINKAGE TO THE COUNTY STRATEGIC PLAN (DETAIL IS REQUIRED FOR COUNTY DEPARTMENTS): Use Arial 12 point font

Results

The Kanan Road and Malibu Canyon Road Tunnel Lining Project is aligned with Goal 1 and the Can-Do-Attitude and Customer Orientation values of the 2014 Los Angeles County Strategic Plan.

Strategic Initiative 2 of Goal 1, Targeted Risk Management, is addressed by installing new steel lining system that will prevent any loose gunite materials from falling onto the roadway and eliminate a potential safety hazard to the public. The repainting rehabilitation work for the existing steel lining also aims to extend the lifespan of the tunnels and maintain the tunnels in a structurally safe and serviceable condition.

The project demonstrated the Can-Do-Attitude and Customer Orientation values by resolving challenges together with different engineering disciplines, promoting collaboration among local agencies, and by extending public outreach to local residents.

Overall, the project enhances public safety, extends the service life of our infrastructure, and improves the quality of the local roadway system within Los Angeles County.

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COST AVOIDANCE, COST SAVINGS, AND REVENUE GENERATED (ESTIMATED BENEFITS TO THE COUNTY): If you are claiming cost benefits, include a calculation on this page. You must include an explanation of the County cost savings, cost avoidance or new revenue that matches the numbers in the box. Remember to keep your supporting documentation. Use Arial 12 point font

Cost Avoidance: Costs that are eliminated or not incurred as a result of program outcomes.

Cost Savings: A reduction or lessening of expenditures as a result of program outcomes.

Revenue: Increases in existing revenue streams or new revenue sources to the County as a result of program outcomes.

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To enhance public safety and extend service life of our infrastructure, Public Works recently completed a rehabilitation project of seven tunnels along Kanan Road and Malibu Canyon Road. The project, which consisted of constructing new steel lining for portions of the tunnels and repainting existing steel lining for the remainder, had a total construction cost of \$12 million. Assuming a 75 year design life, the annual cost of the rehabilitation project is \$160,000 per year.

The tunnels could further deteriorate and approach its end of service life if they were not rehabilitated accordingly. The estimated replacement cost for all seven tunnels is \$120 million. Using the same 75 year design life, the annual cost to replace these tunnels is \$1.6 million. Therefore, the annual cost savings is \$1,440,000.