



## System Performance Innovation FACT Sheet

### *Rectangular Flashing Beacon*

## Description of the Challenge or Opportunity

### Rectangular Flashing Beacon

#### Understanding the motivation.

- Describe the pre-existing product/process that is the subject of the innovation:

Prior to constructing our innovative improvements, at the intersection of State Highway 1 at Pine Hill/Pines Street in Marin County, neighborhood residents have voiced numerous complaints that motorists on State Highway 1 do not yield to pedestrians crossing the highway at the marked crosswalk. At this intersection, State highway 1 is a 2 lane conventional highway in with a rural setting appearance. The speed limit is 35 mph.

Overtime, many improvements on pedestrian warning signs and pavement markings have been done at this marked crosswalk such as

- \* Replacing the yellow school xing signs with the updated green signs
- \* Adding ladder striping to the marked crosswalk
- \* Installation of the “yield to pedestrian” paddle sign in the middle of the highway
- \* Installation of Speed Humps Advance Warning marking.

Still the problem persists. The neighborhood residents reported of “close call” incidents, and in 2013 there was a collision involved pedestrian crossing at this intersection.



Pine Hill / Pine St at CA 1 as of July 2011



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- Describe the innovation:

Traffic signals were considered, but a traffic signal study done in August 2013 showed that there was no warrant satisfied. Meanwhile the Rapid Rectangular Flashing Beacons (RRFB) had been approved for experimental use on State highway. As a result Caltrans, Transportation Agency of Marin County (TAM) and the County of Marin partnered on an encroachment permit project to install the RRFB at this intersection. In order to expedite the project, Caltrans provided the Design Plan and Marin County/TAM paid for the material and construction cost.



Typical Installation –Not Pine Hill / CA 1

- Was the innovation successful in improving the pre-existing product/process?

Since the installation of the “RRFB”, we are not aware of any accidents involving pedestrians at the intersection of State Highway/Pine Street. In addition, there is no more report of “close call” incident from the residents.

- Criteria for success?

There 2 factors will be used as the barometer to determine the success of the “RRFB” installation.

## Information Regarding the Innovation

### Defining the need.

- How does innovation support the Department’s mission, vision, and goals?

As Caltrans’ mission is to provide a safe, sustainable, integrated and efficient transportation system to enhance California’s economy and livability, and as Caltrans has a vision of creating a performance-driven, transparent and accountable organization that values its people, resources and partners, and meets new challenges through leadership, innovation and



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teamwork, and has, as one of its major goals, an objective of providing a safe transportation system for workers and users, by working in partnership with the Transportation Agency of Marin County (TAM) and the County of Marin to construct innovative improvements at the intersection of State Highway 1 at Pine Hill/Pine Street in Marin County, in particular, for the purpose of increasing pedestrian safety, our project is consistent with Caltrans' Mission, Vision, and Goals.

- How does the innovation improve safety and system performance?

As the innovative improvements that were constructed at the intersection of State Highway 1 and Pine Hill/Pine Street in Marin County will increase the safety of pedestrians, and as these improvements were constructed through projects developed, in partnership, between Caltrans, the Transportation Agency of Marin County (TAM) and the County of Marin, our project is consistent with Caltrans' safety and system performance goal of utilizing leadership, collaboration and strategic partnerships to develop an integrated transportation system that provides reliable and accessible mobility for travelers.

- Did the innovation have widespread interest in the originating district?

- Was there immediate acceptance of the innovation?
- To what extent is the innovation being used in the originating district?

The neighborhood residents in TAM Valley are please with the installations of the "RRFB". Since the installation of "RRFB" on State Highway 1 at the intersection with Pine Hill/Pine Street in Marin County, there has been another location in District 4 that the innovation is being considered. The location is at the intersection of State Highway 61/Broadway/Calhoun/Park in Alameda County.

- Have you been approached by other districts interested in implementing the candidate innovation?

We have not been contact by other districts regarding the installation of "RRFB" since the project completion earlier in spring 2014.



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#### Estimating the cost.

- Cost to implement the innovation in originating district?
  - All aspects including staff time; Offsetting factors?

This is a partnering project with Caltrans provide the Design plan and locals agencies paid for the equipments and construction cost. It is estimated that the State staff time is approximately 200 hour. The equipments and construction cost for the “RRFB” advanced warning systems, pedestrian crossing pads at the 2 ends of the crosswalk, and the pedestrian push buttons are estimated about \$110,000.

- Estimated lifecycle/maintenance costs?

There will be costs associated with maintaining the striping and signing placed at the intersection of State Highway 1 at Pine Hill/Pine Street in Marin County.

- Were you able to identified supporting resources?
  - Local partners?
- Federal funding?

As Caltrans with the Transportation Agency of Marin County (TAM) and the County of Marin partnered on the projects to construct innovative improvements at the intersection of State Highway 1 at Pine Hill/Pine Street in Marin County, both agencies shared in the cost for these improvements. To the best of our knowledge, the County of Marin contribution did not include federal funds.

- How long did it take to implement the innovation in your district?

It took approximately 6 months to construct our innovative improvements.

#### Quantifying the benefits.

- Estimated annualized benefits to the originating district?

As the innovative improvements that we’ve constructed on State Highway 1 at Pine Hill/Pine Street in Marin County will reduce pedestrian accidents, and as most pedestrian accidents involve injuries and/or fatalities, we estimate the annualized benefit of our innovative improvements to our district to be enormous.



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#### Understanding the risks.

- Barriers to implementation of the innovation?
- Risks associated with implementation?

We did not incur any barriers during the process of implementing our innovative improvements.

#### What lessons were learned?

- Lesson learned – What would you do differently?

This affords us a very good lesson that partnering with other agencies can help getting the works done much faster.

- Do you believe that the innovation is best propagated to other districts by staff or contractor?

We believe that it would be best if it were staff that propagated the innovative improvements that we implemented State Highway 1 at Pine Hill/Pines Street in Marin County to the other districts.

#### Other considerations.

- Are there any similar processes or products that you considered, but determined to be inappropriate?
- Did the innovation follow a System Engineering process?

The projects that Caltrans, TAM and the County of Marin partnered on to construct the innovative improvements on State Highway 1 at Pine Hill/Pine Street in Marin County adhered to the System Engineering Process guidelines.

#### About the Originating Author/Team

Caltrans' Office of Traffic, Office of Design North, Office of Electrical Design, Office of Maintenance Permits, the County of Marin Department of Public Works, Transportation Agency of Marin County all were involved with developing and implementing the projects that constructed the innovative improvements on State Highway 1 at Pine Hill/Pine Street in Marin County.