



Caltrans Division of Research,  
Innovation and System Information

# Research

# Notes

Design

MARCH 2021

Project Title:  
Safety of Earthen Stormwater  
Infiltration Best Management  
Practices (BMP) Adjacent to  
Highway

Task Number: 2896

Start Date: February 1, 2018

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## Safety of Earthen Stormwater Infiltration Best Management Practices (BMP) Adjacent to Highways

Caltrans aims to update its design guidance, tools, and specifications for the stormwater BMPs to comply with both the new permit and traffic safety goal.

### WHAT IS THE NEED?

California of Department of Transportation (Caltrans) is required to comply with the National Pollution Discharge Elimination (NPDES) permit, including the infiltration of stormwater runoff from the highway and implementing soil-based best management practices (BMPs).

This study will determine the impact of these stormwater BMP strategies in highway right of way areas on the safety of the resulting roadside and deliver a tool to aid Caltrans' engineers in selecting appropriate designs. The purpose of this study is to update Caltrans design guidance, tools, and specifications for the stormwater BMPs to comply with both the new NPDES permit and highway design manual goals of traffic safety.

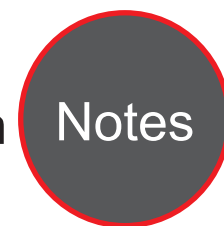
### WHAT ARE WE DOING?

The research team will develop a set of scientific-based parameters, protocols, and/or tool(s) that can be applied to design or analyze different scenarios for the clear recovery zone (CRZ) to meet stormwater BMPs and provide for acceptable traffic safety.

The design methodology will be applicable to the range of cross-sections employed by Caltrans, as well as the soils that exist in California. The resulting guide will allow engineers to determine if the BMPs currently cause soft shoulders, CRZ issues, traversability issues, or rutting to a degree that there exist traffic safety issues which calls for an appropriate BMP design that does not compromise traffic safety.



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This study will determine if there is an acceptable setback from the edge of pavement to which this type of soil modification can be implemented. The computer simulations will be used to quantify the current safety of Caltrans roadside soil procedures; and compare it with the safety of roadsides that incorporate BMP strategies. This comparison will include both material and geometrical factors. The results from the computer simulations will be articulated around an Excel (or other equivalent form convenient for Caltrans deployment) design and analysis tool.

## WHAT IS OUR GOAL?

The goal of the research team is to integrate soil deformation models into simulations of vehicle dynamic response with site specific cross-sectional details and predictions of infiltration rates for various best management strategies.

The research team will simulate a systematic series of scenarios with different cross-sections and BMPs, and then evaluate to develop a user-friendly design guide in the form of an Excel spreadsheet or other compatible form.

## WHAT IS THE BENEFIT?

The ultimate benefit from this research and the resulting design guidance tool will be substantial. Providing a guide that allows engineers to ensure appropriate safety conditions exist in the right of way for a given amendment strategy will benefit engineers and Caltrans as a whole, by ensuring that the roadside design strategy maximizes infiltration rate and provides a safe and easy way for maintenance.

## WHAT IS THE PROGRESS TO DATE?

Received final report. Project close-out is in progress.