

DRISI

CALTRANS DIVISION OF RESEARCH,
INNOVATION AND SYSTEM INFORMATION

Research

Notes

Environmental

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Project Title:
Soil Amendment Guidance
for Infiltration and Stormwater
Treatment

Task Number: 3237

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Completion Date: June 30, 2025

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Soil Amendment Guidance for Infiltration and Stormwater Treatment

A study on investigating the properties of various soil amendments under different conditions of placement to maximize stormwater treatment.

WHAT IS THE NEED?

Caltrans Office of Stormwater Program Development is developing guidance to comply with new National Pollutant Discharge Elimination System (NPDES) permit requirements for post-construction stormwater treatment controls. The permit requires Caltrans not only to prioritize soil-based Best Management Practices (BMPs) but also to give first consideration to installing BMPs that are capable of infiltrating the amount of water from the 85th percentile 24-hour storm. This requirement must be implemented where feasible, based on other Caltrans safety and design requirements. Installing soil amendments adjacent to roadsides is a challenge because of vehicle traversability issues. Caltrans Standard Specifications require 90% relative-compaction within the Clear Recovery Zone (CRZ). For amended soils less than 90% compaction is preferred in order to enhance infiltration/retention of stormwater runoff. This project will develop the information needed for estimating stormwater runoff infiltration volumes and flow rates that would enable Caltrans practitioners to design, install, and maintain soil amendments (e.g. compost and biochar) in the CRZ when viable, while addressing the NPDES permit requirements. Using biochar as soil amendments would also help with productive reuse of this waste byproduct generated during energy production or because of wildfires. NCHRP and several other DOTs have evaluated biochar in laboratory settings but evaluation of implementation in roadside applications is lacking.

WHAT ARE WE DOING?

A variation of soil amendment infiltration and treatment capacity for different compaction levels will be developed and optimum depth of incorporation, compaction, and ratio of soil to amendment for select soil hydrologic groups will be defined with



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the ultimate objective of enhancing infiltration and treatment. The Task will be completed under two distinct phases. Phase I will cover site selection, sampling and field analyses; laboratory testing of engineered and amended soils; and developing interim guidance document. Phase II will cover field pilot testing and developing a final guidance document.

WHAT IS OUR GOAL?

The goal of this Task is to maximize stormwater treatment of various soil amendments under different conditions of placement.

WHAT IS THE BENEFIT?

This Task will develop new BMPs for soil based stormwater treatment options. To ensure the deployment potential, this Task is developed by Stormwater Management Program at Caltrans Division of Environmental Analysis in close collaboration with Caltrans staff from Division of Design, Division of Maintenance, and Division of Construction serving as members of the research panel.

WHAT IS THE PROGRESS TO DATE?

This research Task was part of DRISI's call for submissions in 2018-19 funding cycle following the completion of Preliminary Investigation on February 2018. A contract for the research was developed and a UCLA research group led by Dr. Sanjay Mohanty was selected. The research project is progressing well as scheduled with most of the laboratory are completed before the field-testing phase starts. The team has been working on executing the field studies for the last few months. All the required permits and agreements by District 7 has been obtained. However, there were some design issues with the biofilter and there was no adequate time to gather the data during the last rainy season. For this season, the studies will be conducted using simulated artificial rainfall system to collect a one-year data. To capture a second-year data, I requested a no-cost and time-only contract extension and DPAC and DGS has already approved it. The amended contract's new end date is now June 30, 2025.