DRISI

Caltrans Division of Research, Innovation and System Information

Research Notes

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.

Environmental

AUGUST 2020

Project Title:
Soil Amendment Guidance for Infiltration and Stormwater Treatment

Task Number: 3237

Start Date: January 02, 2019

Completion Date: December 31, 2024

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WHAT IS THE NEED?

California Department of Transportation (Caltrans) Office of Stormwater Program Development is developing guidance to comply with the new National Pollutant Discharge Elimination System (NPDES) permit requirements for post-construction stormwater treatment controls. The permit does not only require Caltrans to prioritize soil-based Best Management Practices (BMPs), but also give consideration to installing BMPs that can infiltrate 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). Amended soils that are less than 90% compaction is preferred to enhance infiltration/retention of stormwater runoff. The research team 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.

Besides, using biochar as soil amendments would also help with productive reuse of this waste byproduct generated during energy production or wildfires. NCHRP and several other department of transportations have evaluated biochar in laboratory settings, but evaluation of implementation in roadside applications is insufficient.

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WHAT ARE WE DOING?

The researcher will develop and define various soil amendment infiltrations, treatment capacity for different compaction levels, and optimum depth of incorporation, compaction, and ratio of soil to amendment for selected soil hydrologic groups, with the ultimate objective of enhancing infiltration and treatment.

This study is divided into two distinct phases. In phase I, the research team will select a site, conduct sampling and field analyses, laboratory testing of engineered and amended soils, and developing interim guidance document. In phase II, the researchers will perform field pilot testing and develop a final guidance document.

WHAT IS OUR GOAL?

The goal of this research is to maximize stormwater treatment of various soil amendments under different conditions of placement, and ultimately optimizing stormwater runoff infiltration and treatment while sustaining desirable vegetation.

WHAT IS THE BENEFIT?

This research will bring new BMPs for soil-based stormwater treatment options. To ensure the deployment potential, the Stormwater Management Program at Caltrans Division of Environmental Analysis will collaborate closely with engineers from the Division of Design, Division of Maintenance, and Division of Construction, who will serve as members on the research panel.

WHAT IS THE PROGRESS TO DATE?

This research was part of the Division of Research, Innovation, and System Information's (DRISI's) call for submissions in 2018-19 funding cycle following the completion of a 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 work being completed before the field testing phase starts.