

DIVISION OF RESEARCH, INNOVATION & SYSTEM INFORMATION
Research Initial Scope of Work
SUBMITTAL FORM - FY 2024/25

I. Task Title: Identify Quantified Safety and Traffic Calming Benefits of Trees

II. Task ID: 4570

III. Project Problem Statement:

Caltrans is seeking information on quantifiable safety and traffic calming benefits associated with trees in the roadside. Caltrans currently uses the Traffic Calming Guide and the Safety Performance Estimation Tool to evaluate the appropriateness of safety and traffic calming measures for inclusion in projects, which rely on quantifiable benefits, measured either in reduction in fatal and serious injuries, or reduction in speed, to evaluate the relative effectiveness of various countermeasures. The Traffic Calming Guide includes trees and landscape as a potential measure, but data is unavailable to provide a comparable quantifiable benefit. Trees are not included as a measure in the Safety Performance Estimation Tool. This investigation supports the development of quantifiable traffic calming and safety benefits in a format comparable to the metrics used in each of these tools.

IV. Objective:

The primary objective is to gather data to support the inclusion of quantifiable safety and traffic calming benefits of trees and landscape in the Traffic Calming Guide and Safety Performance Estimation Tool, and other manuals, policies, and guidance documents. Existing evidence and conventional wisdom support the proposition that landscaped and treelined streets can provide safety benefits. However, legitimate safety concerns exist regarding trees along a roadway acting as fixed objects and potentially contributing to negative crash outcomes. In understanding potential risks or benefits of tree-lined roadways, key differences in context must be considered. The type of roadway (i.e. functional classification as a freeway or expressway versus a conventional highway), the posted speed limit (Caltrans distinguishes "low speed" environments with posted speed limits of less than 45 miles per hour, and "high speed" environments above that speed), adjacent place type (rural, urban, suburban), and the presence of roadside features such as guardrail, barrier, curb and gutter, and/or sidewalk, and type of landscape should be considered.

V. Task Description of Work:

The research approach consists of literature search, a survey targeting state transportation DOTs current state of practice, and consultation with subject matter experts, worldwide.

VI. Expected Deliverables:

A report that documents and includes existing or newly defined nationwide/ worldwide quantifiable data on the safety and traffic calming benefits associated with trees and landscape in the roadside, to support the inclusion of this quantifiable data in the California Department of Transportation Traffic Calming Guide and Safety Performance Estimation Tool, and other manuals, policies, and guidance documents.

VII. Background:

This research addresses components of the climate crisis by enhancing the health and safety of all Californians. Identifying quantifiable safety benefits of trees along roadways in the highway system will enhance Caltrans' ability to reduce greenhouse gas emissions, strengthen resilience to climate change, and demonstrate leadership in climate actions. Specific benefits include, but are not limited to, enhancing carbon sequestration, reducing greenhouse gas emissions, reducing urban heat island effect, providing shade, preventing soil erosion and sedimentation into water bodies, providing wildlife habitat, improving mental health by reducing anxiety, and other benefits. This research is innovative by seeking current information regarding quantifiable safety and traffic calming benefits associated with trees in the roadside, that is not currently available, reconsidering safety-, community- and environmental benefits vs safety concerns. Research results may produce quantifiable data to evaluate the appropriateness of various safety and traffic calming measures that can be incorporated into Caltrans capital outlay projects, which could reduce fatal and serious injuries, reduce speeds, and increase relative effectiveness of various countermeasures. This research would support development of quantifiable traffic calming and safety benefits in a format that is comparable to Caltrans' existing Safety Performance Estimation Tool and aligns with current Caltrans Safety Goal strategies. Nature-based solutions (NBS) harness the power of nature to build California's resilience to future climate-driven extremes, support communities in the climate crisis, and remove carbon from our atmosphere. California State leaders recognize that expanding NBS is essential to meeting California's core climate goals. Trees and vegetation are a multi-benefit NBS, which include providing reduced urban heat island effect, improved air and water quality, wildlife habitat, sequestration of carbon, and reduction of human stress and anxiety. Recognition of these benefits counters existing Caltrans policies that identify trees as a discretionary fixed object. This research would assist Caltrans in meeting and accelerating priorities outlined in California's Climate Adaptation Strategy, while assisting in identifying the safety benefits of well-placed and well-spaced trees in the highway system. Research results will be used by HQ staff to implement updates to Caltrans' Traffic Calming Guide and Safety Performance Estimation Tool which are used to evaluate the appropriateness of safety and traffic calming measures for inclusion in projects. Data will provide a means to incorporate comparable and quantifiable benefits of trees and landscape into each, as well as information necessary to update existing manuals, policies, and guidance documents. Research results may provide information and data for use in incorporating trees and landscape as a potential measure with a comparable quantifiable benefit.

VIII. Related Research:

PI-0352 Identify Quantified Safety and Traffic Calming Benefits of Trees) is in progress and results are pending at this time. To gather data to support the inclusion of quantifiable safety and traffic calming benefits of trees and landscape in the Traffic Calming Guide and Safety Performance Estimation Tool, And other manuals and guidance documents. ☒ Literature search. A search of published or in-progress research gathers publicly available domestic and international resources. ☒ State-of-the-practice survey. Surveys that gather information about a specific area of interest may target specific state transportation agencies or expand to cover a national audience. Limited international contacts may supplement domestic findings. Surveys are delivered using an online survey tool or via email.

IX. Deployment Potential:

This is a standalone research topic that is not part of a larger research project, however, a preliminary investigation is currently in progress.

X. Estimate of Duration:

3 years