Application of Caltrans Smart Mobility Framework for the US101 Corridor Mobility Master Plan in San Luis Obispo County

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Abstract

Per the Moving Ahead for Progress in the 21st Century Act (MAP-21), State DOT's have encouraged agencies to embrace and incorporate performance based approaches for evaluating and/or prioritizing improvement projects on state facilities. The passage of SB 375 (Chapter 728, Statutes of 2008) in California also served to emphasize performance based sustainable outcomes within the transportation sector as a means for GHG reduction. In response, Caltrans developed the February 2010 publication *Smart Mobility 2010 Call to Action for the New Decade*. Caltrans developed the Smart Mobility Framework (SMF) in line with its goal of providing a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability. This paper presents a planning application of the SMF to the US101 Corridor Mobility Master Plan in San Luis Obispo County.

Introduction

The US 101 Corridor Mobility Master Plan was a collaborative effort led by San Luis Obispo Council of Governments (SLOCOG), funded jointly with Caltrans, and guided by a stakeholder committee including the Air Pollution Control District, the Regional Transit Authority, and member jurisdictions in the region. The Plan creates a unified vision of multimodal corridor improvements informed through extensive and innovative public outreach; strong interagency collaboration; and, a two phase performance based technical analysis. Applying the SMF, Phase I of the analysis used 12 multimodal performance measures to winnow the analysis from 70 miles of corridor into four focus segments approximately 25 miles in length. Per SMF and MAP-21 principles, a detailed benefit/cost analysis (including travel time reliability) was performed in Phase II to evaluate 140 improvement concepts facilitating stakeholder selection and prioritization of multimodal improvements for each focus segment.

Two primary objectives of the study were to: 1) directly inform the development of a capital improvement list for SLOCOG's Regional Transportation Plan and Sustainable Communities Strategy update; and, 2) establish a publically vetted multimodal package of regional improvements for inclusion in a half cent sales tax referendum to be pursued by SLOCOG in 2017. Both these objectives were achieved. A direct result of the study was the subsequent action by the SLOCOG Board to approve the development of project initiation documents (PID and PSR-PDS) for the most congested segments of US 101 (in the Five Cities area) with the goal that these projects be ready for programming in the 2016 State Transportation Improvement Program (STIP). Lastly, the study provided a framework and methodology for SLOCOG to begin implementing performance based planning and programming procedures consistent with MAP-21.

Smart Mobility Framework (SMF)

The SMF is based on six principles: 1) Location Efficiency; 2) Reliable Mobility; 3) Health and Safety; 4) Environmental Stewardship; 5) Social Equity; and 6) Robust Economy. These objectives are informed through the application of 17 performance metrics. The intent of the SMF is to facilitate performance based and transparent assessment of sustainable and cost-effective outcomes. It can be directly applied to alternatives analyses, project prioritization, and performance based transportation planning and programming.

The SMF also uses place types for classifying towns, cities, and larger areas as the basis for making transportation investments and directing transportation planning activities. Figure 1 shows a conceptual approach for how the SMF

goals of Location Efficiency, Reliable Mobility, and Health, Safety & Livability operate at the local/regional level to support the higher level, macro principles for a Robust Economy, Environmental Stewardship and Social Equity.

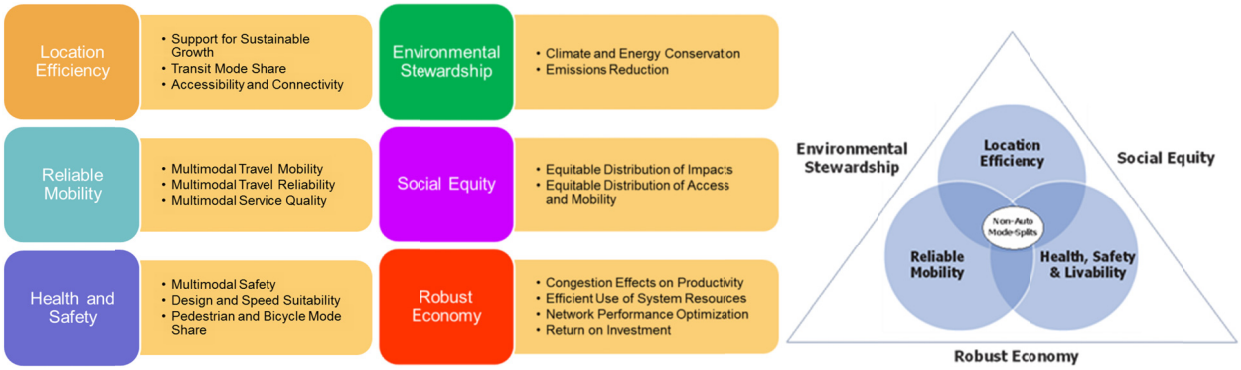


Figure 1. Smart Mobility Framework – Principles and Performance Metrics

Several publications and guidebooks on sustainable transportation planning have come out since the February 2010 publication of Caltrans Smart Mobility 2010 Call to Action for the New Decade. These include one major EPA publication, two major FHWA publications plus an FHWA workshop series:

- Guide to Sustainable Transportation Performance Measures, August 2011, by ICF Kaiser for the US Environmental Protection Agency.
- Transportation Planning for Sustainability Guidebook, January 2011, by Adjo Amekudzi of the Georgia Institute of Technology for FHWA.
- Transportation's Role in Reducing Greenhouse Gas Emissions, Volumes 1 and 2, April 2010, by Cambridge Systematics for FHWA.
- Summary Report: Workshops on Integrating Climate Change with Transportation Planning, October & November 2010, by Resource Systems Group for FHWA.

Local agencies and metropolitan transportation organizations (MPOs) in California have prepared climate action plans while all the MPOs have developed a Sustainable Community Strategy (SCS) as part of their transportation plans. Lastly, Kittelson & Associates under contract with Caltrans completed the Smart Mobility Framework Implementation Study (Kittelson & Associates, 2014) which presented case studies of SMF applications in California.

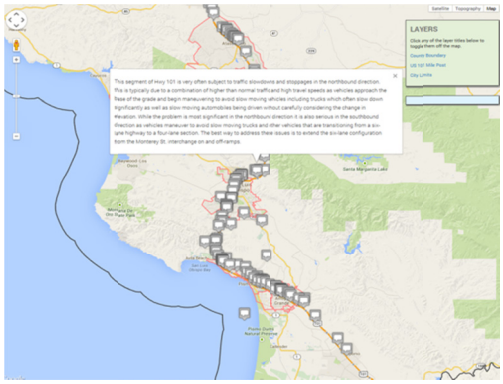
Study Area

The initial study area consisted of the full 70-mile US 101 corridor in San Luis Obispo County – from Monterey County Line to the north and Santa Barbara County Line to the south. The "corridor" consisted of US 101 mainline, ramps and ramp termini, frontage roads and parallel facilities including bicycle facilities that provide north-south capacity including transit lines, system management facilities (i.e., park and ride lots) and demand management programs. Given that US 101 acts as a barrier to east-west mobility in communities bisected by the US 101, east-west connectivity at interchanges and crossings were also considered.

Study Approach Phase I

Given the importance of receiving public buy-in and support - particular in light of an impending half cent sales tax pursuit, KAI developed web based tools that allowed the public's input to be directly recorded, documented and geo-reference. The tool utilizes an online map where users provide input directly by clicking the location of interest/concern along the corridor and provide a comment as to the nature of their concern in a dialogue box.

This information was conveyed as a "cartogram" to visually and geographically display public input results along the corridor (See Figure 2). Cartogram development was informed through the use of web based tool's geo-referenced public input where the magnitude of concern (expressed by the number of comments) by type of concern (e.g., safety, operational etc.) could be visually displayed (Figure 3).

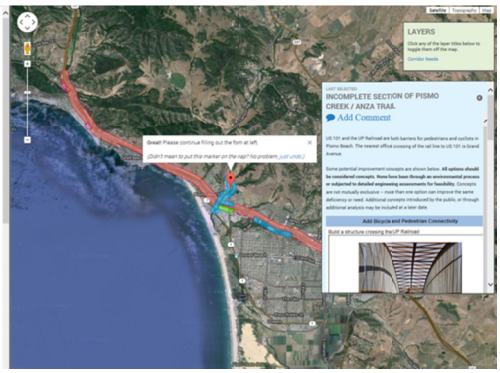


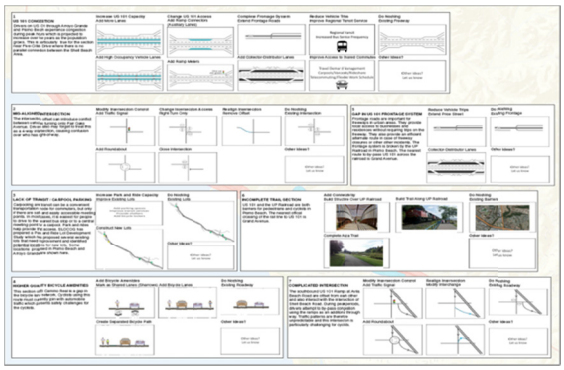
Concurrent with the public outreach, Phase I the study evaluated the full 70 miles of US 101 corridor in San Luis Obispo County using the following 12 performance metrics: mainline LOS, merge/diverge LOS, weave LOS, Safety (collisions), emissions (GHG), parallel roadway connectivity, parallel roadway LOS, parallel roadway safety, park & ride lot coverage, transit coverage, bicycle connectivity, and pedestrian connectivity. This analysis was based on existing and 2035 future conditions. Operational results of the 12 measures were normalized to a 0-10 scale. The normalized technical results were geo-referenced and overlaid on the public input cartogram to help confirm whether the public's perception of problem or need areas matched the technical analysis results (Figure 4 & Figure 5).

By using the cartogram to show the quantitative results relative to public input, the stakeholder group were successful in winnowing the analysis from 70 miles of corridor to approximately 25 miles split into four Focus Segments with little to no political controversy – even in light of the potential long-term funding equity implications of a future half cent sales tax referendum bid (Figure 6 & Figure 7).

Study Approach Phase II

A second web based interactive tool was developed as an improvement concept selection tool that enabled users to view specific need areas in the corridor with pull-down menus of potential improvement concepts designed to address those needs. The user could then provide input on concepts they support or not and why. The same information was provided in poster form at the second round of public outreach. Other outreach included presentations using TurningPoint interactive polling technology to gather real-time input from the public. In total, outreach included 129 attendees at seven public workshops throughout the County; presentations at 29 City Councils, Board of Supervisors, and County Advisory Councils; 259 comments provided through the interactive web tools; and 203 intercept interviews.

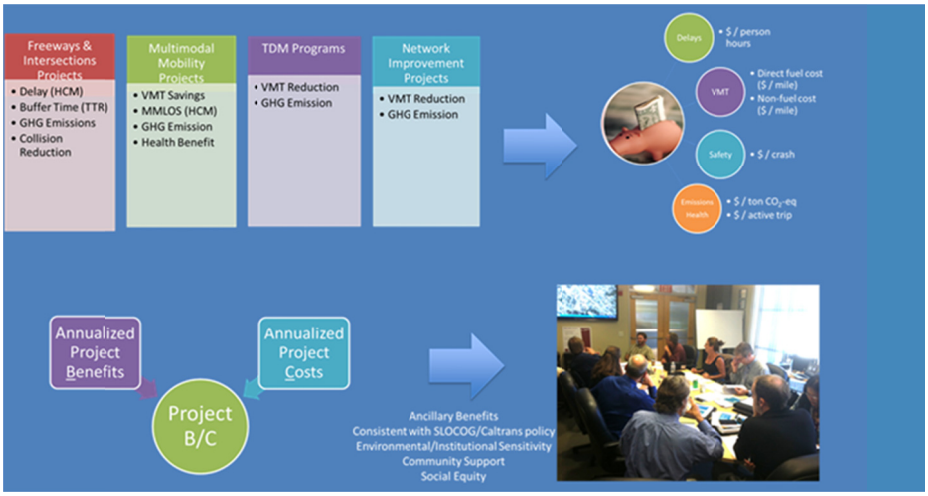




After successfully winnowing the analysis from 70 miles to approximately 25 miles, Phase II of the technical analysis focused on identifying and evaluating approximately 140 improvement concepts within each of the four Focus Segments. The source of the project concepts included past planning documents, the existing RTP, local agency's review of long range plans as well as new concepts suggested by the consultant team, stakeholders and the public. The 140 project concepts were quantitatively analyzed for delay reduction, buffer time reduction (i.e., travel time reliability via BlueMAC readers and FDOT procedure), multi-modal LOS (per the Highway Capacity Manual 2010), emission reductions (based on CARB's emissions model EMFAC), safety (i.e., collision reduction by type of collision

per Highway Safety Manual and FHWA crash modification factors), vehicle miles traveled reduction, and health improvement (NCHRP-522, Active Transportation Planning Grant methodologies). These measures were vetted by the stakeholder group including the methods and parameters used to monetize benefits. Monetization of benefits was primarily based on parameters gleaned from the Caltrans Benefit Cost model CalB-C. Consistent with MAP-21, this led to the development of a detailed Benefit/Cost (B/C) metric for each project under consideration.

Based on the SMF, the project B/C results were used to facilitate stakeholder selection and prioritization of multimodal improvement packages for each focus segment. Non-quantifiable considerations (e.g., ancillary benefits, policy consistency, community support etc.) were qualitatively addressed during stakeholder consultation but were not used to adjust the quantitative results. The process is illustrated below.



Timelines for the selected multi-modal improvement packages were established based on priority and on available funding and lead times required for project implementation. All were eventually incorporated into SLOCOG's 2014 RTP/SCS as either Tier I (financially constrained) or Tier II (financially unconstrained) project lists. All or portions of the multi-modal improvement packages selected by this study will be folded into the 1/2 cent sales tax referendum bid in 2017. If successful, many of the Tier II improvements will become eligible for programming (i.e., move to Tier I). Currently, project initiation documents for the most congested segments of US 101 (in the Five Cities area) are under development for programming in the 2016 State Transportation Improvement Program (STIP) cycle.

Conclusions and Recommendations

This paper presents an application of the SMF for corridor planning in San Luis Obispo County. Keys to successful application of the SMF include: use of appropriate multi-modal performance metrics; transparency of results; strong and meaningful public outreach; and, application of benefit/cost as a unifying metric for ultimate project selection and prioritization. The SMF can provide transportation planning agencies a sound basis for moving towards performance based planning and programming consistent with MAP-21 initiatives.

Acknowledgement

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Reference

San Luis Obispo Council of Governments (SLOCOG), US 101 Corridor Mobility Master Plan, San Luis Obispo County, California, December, 2014.

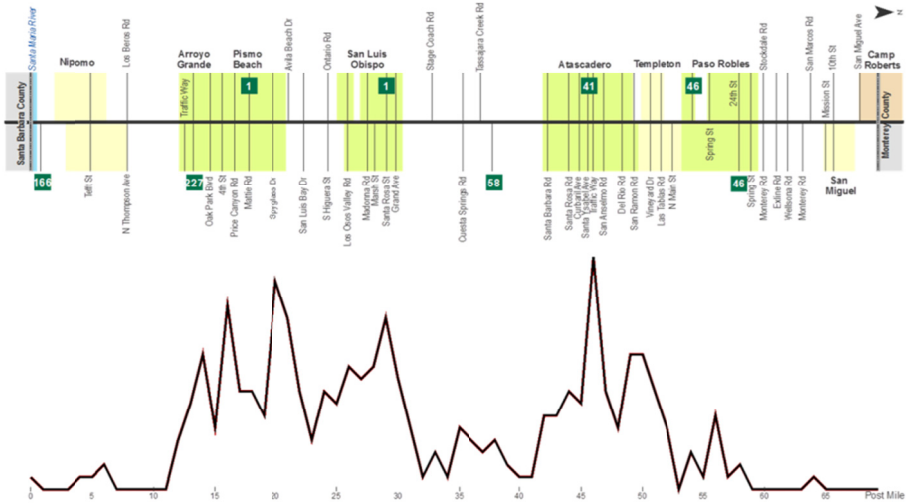

Figure 2. Public Input Cartogram

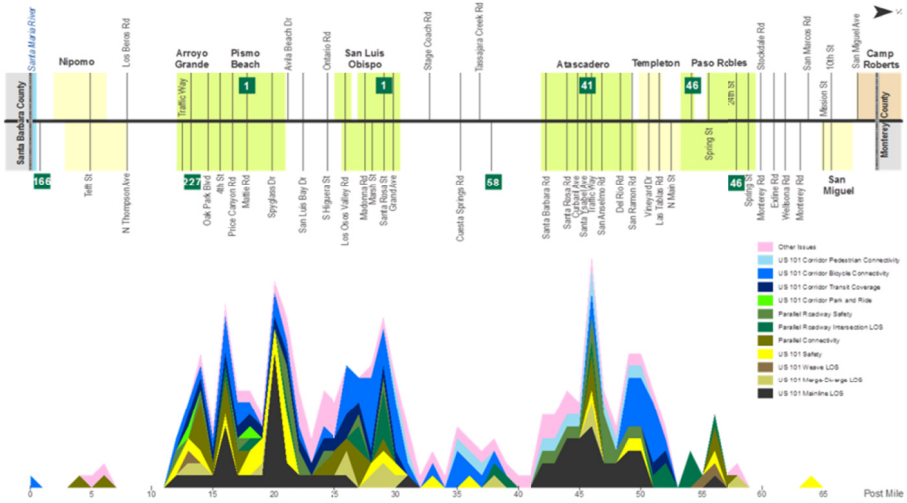

Figure 3. Public Input by Type of Concern Cartogram

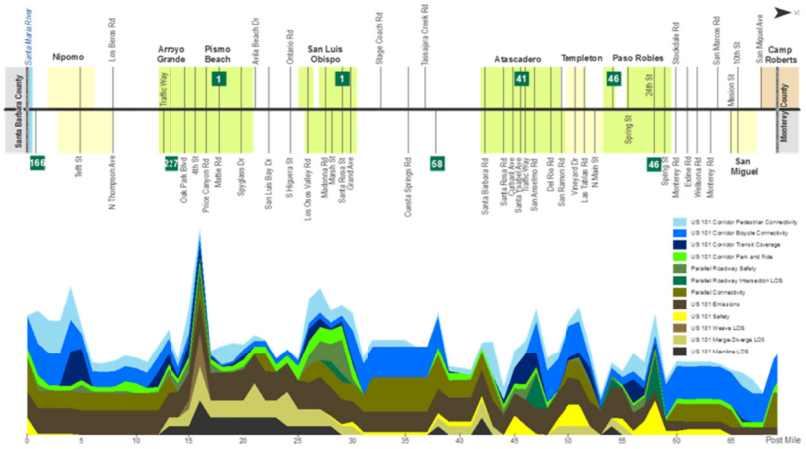

Figure 4. Performance Measure Results Cartogram

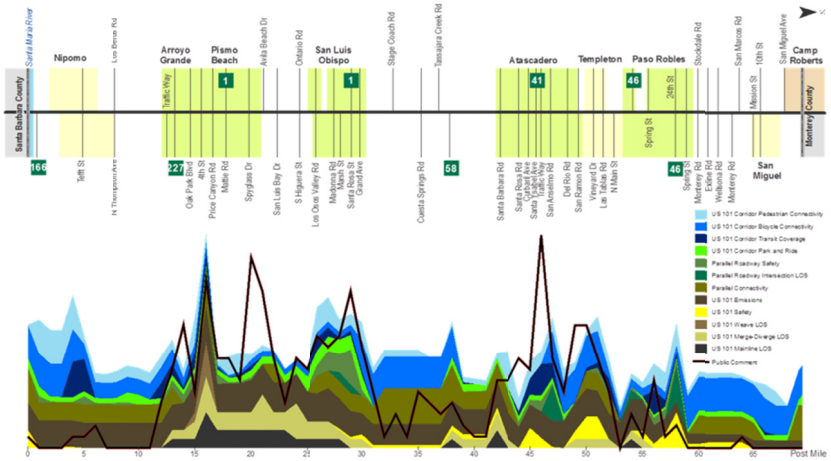

Figure 5. Performance Measure to Public Concern Cartogram

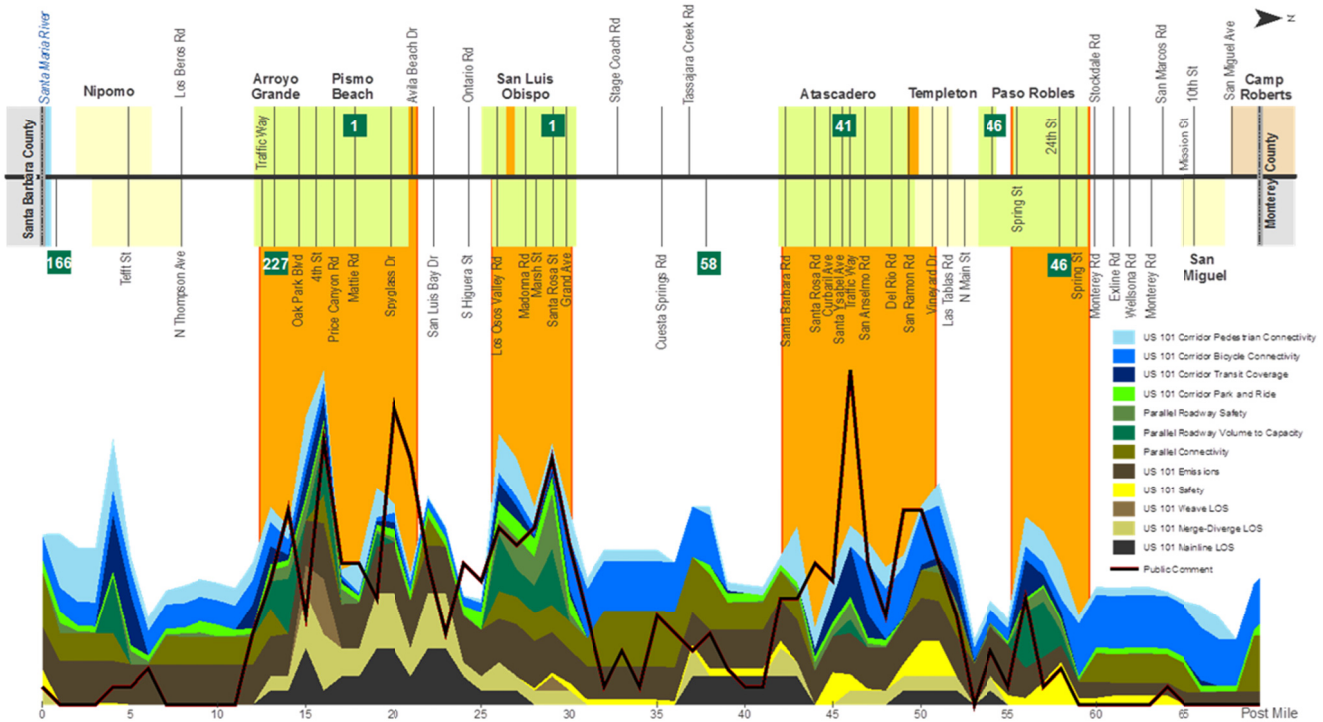

Figure 6. Selection of Focus Segments Cartogram

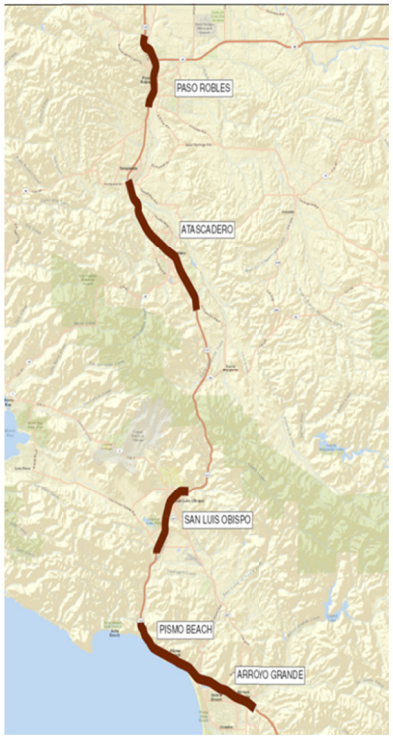

Figure 7. Focus Segments