

MOVING TOWARD A SUSTAINABLE CALIFORNIA

exploring livability, accessibility & prosperity

W O R K S H O P S Y N O P S I S



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ABOUT THE TRANSPORTATION SUSTAINABILITY RESEARCH CENTER

The Transportation Sustainability Research Center (TSRC) was formed in 2006. Since its formation, TSRC has been a leading center in conducting timely research on real-world solutions for a more sustainable transportation future. In addition to performing research informed by a diverse array of perspectives, TSRC also engages in education and outreach to promote its core values of sustainability and equity to ensure that we are able to meet the transportation needs of the present without compromising future generations.

TSRC conducts research on a wide array of transportation-related issues, addressing the needs of individuals, as well as the public. Research efforts are primarily concentrated in six main areas:

1. Advanced vehicles and fuels,
2. Energy and infrastructure,
3. Goods movement,
4. Innovative mobility,
5. Mobility for special populations, and
6. Transportation and energy systems analysis.

TSRC uses a wide range of analysis and evaluation tools including: questionnaires, interviews, focus groups, automated data collection systems, and simulation models to collect data and perform analysis and interpretation of the data. The Center then develops impartial findings and recommendations for key issues of interest to aid policymakers in decision-making. TSRC has assisted in developing and implementing major California and federal regulations and initiatives regarding sustainable transportation.

TSRC is managed by the Institute of Transportation Studies of the University of California, Berkeley.

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS..... i

ABOUT THE TRANSPORTATION SUSTAINABILITY RESEARCH CENTER.....ii

EXECUTIVE SUMMARYiv

PANEL SUMMARIES 1

 Welcome and Program Overview 1

 Caltrans’ Drive Toward Organizational Excellence 2

 Expert Panel 1: Livability 2

 Expert Panel 2: Prosperity and Accessibility 4

BREAK-OUT DISCUSSION SUMMARIES 6

 Topic 1: Prosperity 6

 Topic 2: Accessibility 8

 Topic 3: Livability 10

CONCLUSION..... 11

RECOMMENDATIONS AND NEXT STEPS 13

APPENDICIES A-1

 Appendix A: Glossary of Terms A-1

 Appendix B: Moving Toward a Sustainable California Workshop Agenda B-1

EXECUTIVE SUMMARY

Increasingly, transportation planners and managers, at all levels of government, are recognizing the profound impact that transportation systems, availability, and access have on quality of life, economic well-being, and social equity. For many Departments of Transportation (DOTs), shifting their planning, evaluation, and procurement criteria to better reflect social and economic goals is a significant departure from decades of planning and management for vehicle throughput, with indicators such as level of service (LOS) and congestion. The California Department of Transportation (Caltrans) has embraced this broader understanding of transportation in their 2015-2020 Strategic Management Plan (SMP). Goal 3 of the Plan, “Sustainability, Livability and Economy,” tasks Caltrans to better align State decisions with sustainability goals and objectives. Specifically, Caltrans is to develop separate prosperity, accessibility, and livability scores that will be integrated into the decision-making process for priorities and project development. While there is no set definition for prosperity, accessibility, and livability, the following are provided in the context of the SMP¹:

- Prosperity includes a focus on promoting economic development that improves State and local economies through investments in transportation projects that support local businesses and increase the competitiveness through a resilient and integrated transportation system.
- Accessibility improves quality of life by providing mobility choice, increasing access to all modes, and creating transportation corridors for the conveyance of people, goods, and services but also as livable public spaces.
- Livability is the promotion of efficient land use and investments in transportation facilities that improve local economies of a community and quality of life. Transportation-related outcomes can be considered with community outcomes (such as accessibility to public and active transportation travel options, proximity of affordable housing to employment and civic centers, and a high-quality public realm) support natural systems, local businesses, and community vitality.

The SMP calls for the development of the initial scores by December 2016 and Caltrans has a current goal to implement these scores for corridor planning in close association with local government partners. Caltrans staff expect the scores to progress over time, as understanding of applicability and data availability evolve.

On August 9, 2016, the Transportation Sustainability Research Center (TSRC) at the University of California, Berkeley hosted a workshop called “Moving Toward a Sustainable California: exploring livability, accessibility, and prosperity” in partnership with Caltrans at the David Brower Center in the heart of Downtown Berkeley. In total, there were fifty-five (55)

¹ California Department of Transportation (Caltrans); March 2015; ‘*Caltrans Strategic Management Plan 2015-2020*’.

participants, two plenary moderators, three break-out moderators, score team leads, and six panelists for a total of sixty-nine (69) persons in attendance at the conference. A total of thirty-nine (39) persons participated from Caltrans with twenty-eight (28) from Headquarters and eleven (11) participants representing five districts from across the State. Employees from Caltrans came from a variety of disciplines including researchers, planners, coordinators, analysts, engineers, architects, and program managers. In addition, twenty-one (21) participants were from other public agencies (San Diego Association of Governments, Association of Monterey Bay Area Governments, Fresno Council of Governments, Sacramento Area Council of Governments, San Francisco County Transportation Authority, Governor's Office of Planning and Research, California Department of Water Resources, California Public Health Association, and the California Air Resources Board) or universities. Nine (9) participants were affiliated with private companies.

Intended outcomes for the workshop included:

- Create collaborative partnerships and dialogue among California's transportation stakeholders to move toward greater sustainability in California.
- Increase understanding of the types of metrics available today to measure the most pivotal components of accessibility, prosperity, and livability at the corridor level.
- Explore the challenges and benefits of adopting a scoring tool methodology to evaluate policy implementation strategies, scenario planning efforts, and the identification of high-value investment opportunities during planning, design, maintenance and operational phases.
- Determine which metrics could initially be used to develop the scoring tools, the data collection strategies, and the methods of refining the scoring tools over time.

The morning plenary started with speakers Steven Cliff of the California Air Resources Board and Marlon Flournoy from Caltrans to set the context and present Caltrans' motivation for developing prosperity, accessibility, and livability metrics. The first panel focused on livability metrics with experts sharing their perspective and suggestions. This was followed by a second panel that included experts in both prosperity and accessibility metrics. All of the speakers focused on defining the respective performance of each metric, noting their importance for planning and presenting innovative tools that have been developed for other DOTs.

In the afternoon, the workshop participants convened in break-out sessions in order to provide feedback on the draft scores developed by Caltrans, explore their applicability to local governments in California, expose the pros and cons of each metric, understand how metrics vary by context, and discuss concerns with data availability. Each topic of discussion (prosperity, accessibility, livability) was led by a facilitator, the respective Caltrans lead and panel subject matter expert(s) for that topic. The break-out discussions tended to focus more on constructive feedback on metric development methods rather than suggestions on actual metrics for use at the corridor level. Some of the more prominent challenges and themes that appeared throughout the day included:

- Caltrans must determine how to best identify needs along a corridor.

- Metrics are often most effective when based on simple measurements.
- Input and interests from stakeholders can increase the complexity of metrics at the design phase.
- Design flexibility that supports clear goals may help.
- Values differ by context (rural, urban, suburban) needs, and management of these concerns is essential for an equal distribution of benefits across the State.
- Incentives, regulation, and funding must all resonate with local and regional values for positive change that can be accomplished with limited external incentives or funding for local and regional partners.
- Regulations can be implemented with sensitive processes that avoid redundant regulation already imposed on local and regional jurisdictions.
- Including people from a variety of disciplines, jurisdictions, organizations, and partners in the planning, design, and evaluation phase allows for more perspectives to contribute to the metric development phase.
- There can be a degree of general anxiety and impatience that comes with making a change and the expectation to provide results.

This summary serves as a compilation of the important themes, concerns, and topics discussed or otherwise conveyed throughout the workshop. This paper begins by revisiting the opening story and statements made by Steven Cliff of the California Air Resources Board (filling in for Kate White, Deputy Secretary for Environmental Policy and Housing Coordination, of the California State Transportation Agency) and remarks from Marlon Fournoy of Caltrans on the Department's sustainability initiatives. The topic for the first panel was livability with three panel experts (Bruce Appleyard of San Diego State University, Todd Litman from the Victoria Transport Policy Institute, and Jeffrey Tumlin of Nelson\Nygaard Consulting Associates). A joint second panel focused on prosperity and accessibility included two prosperity experts (Ray Major from the San Diego Association of Governments and Glen Weisbrod from the Economic Development Research Group) and one accessibility expert (Chris McCahill of the State Smart Transportation Initiative at the University of Wisconsin-Madison). Both panels were moderated by Susan Shaheen, Co-Director of TSRC. This report also provides the key findings from the break-out sessions for each performance metric. Finally, an overview of the day was presented during the closing plenary session, moderated by Kate Meis from the Local Government Commission. A question and answer discussion allowed Coco Briseño and Marlon Fournoy from Caltrans to share Caltrans' next steps in developing the scores. Caltrans expects this workshop to represent a beginning with continued dialogue on the future of the performance metrics in cooperation with Caltrans' districts and local governments.

PANEL SUMMARIES

A total of sixty-nine (69) persons attended the one-day workshop at the Brower Center in Berkeley, CA. There were fifty-five (55) participants, two plenary moderators, three break-out moderators, three score leads, and six subject expert panelists. Eleven (11) staff from the University of California, Berkeley assisted in hosting the conference, including two (2) from the Institute for Transportation Studies and nine (9) from the Transportation Sustainability Research Center (TSRC) at UC Berkeley. Thirty-nine (39) participants represented Caltrans, with twenty-eight (28) from Headquarters and eleven (11) representing Districts 1, 4, 5, 6, and 12 from across California. Employees from Caltrans came from a variety of disciplines including researchers, planners, coordinators, analysts, engineers, architects, and program managers. Twenty-one (21) participants were from other public agencies (San Diego Association of Governments, Association of Monterey Bay Area Governments, Fresno Council of Governments, Sacramento Area Council of Governments, San Francisco County Transportation Authority, Governor's Office of Planning and Research, California Department of Water Resources, California Public Health Association, and the California Air Resources Board) or universities. Nine (9) participants were affiliated with private companies.

Welcome and Program Overview

The workshop program opened with a presentation from Steven Cliff, Senior Advisor to the Chair, Mary Nichols, of the California Air Resources Board. Steven served as Assistant Director of Sustainability at Caltrans from 2014-2015. In his presentation, Steven emphasized the need to develop metrics to measure sustainability—based on initiatives from Caltrans' 2015-2020 Strategic Management Plan (SMP). He shared the narrative of an adolescent named Michael to illustrate the connection between transportation and opportunities that enable a better quality of life. Michael depends on the public transit network and may miss out on opportunities that are poorly served by transit systems. Michael must come to the realization that the best opportunities for improved quality of life may provide no benefit to him if they cannot be accessed. The example humanized the need for a well-developed and diverse transportation system. Based on Michael's story, Steven called on the need for organizations to work collaboratively to achieve goals, mitigate challenges and obstacles to a diverse transportation network, and protect the interests of users who rely on the public transportation system. Metric development is ongoing and Goal 3 of the SMP outlines out a variety of performance metrics that prioritize prosperity, accessibility, and livability criterion.

- Prosperity: Enhancing public and private economic vitality. Commute transportation burden lowers prosperity. Land use can undermine prosperity.
- Accessibility is defined as the degree of access that connects vital destinations with multiple options for efficient and comfortable travel. Accessibility measures proximity to work and non-work destinations and reflects transportation system connectivity.
- Livability improves the quality of life and the quality of public places. Livability is a good way to wrap up the "3 E's" of sustainability (economy, environment, equity) to provide transport to people.

Steven's presentation motivated participants to think about metrics that can work with other social, environmental, and equity outcomes that can improve quality of life for everyone.

Caltrans' Drive Toward Organizational Excellence

Marlon Flournoy, the Acting Assistant Director of Sustainability at Caltrans, set the tone for applying scores at a corridor level, while continuously looking for opportunities to imbed accessibility, prosperity, and livability principles into everyday tasks and long term projects. He supported this initiative by citing Caltrans' new mission statement from the 2015-2020 SMP and revisiting the three sustainability principles (people, planet, and prosperity). Cooperative partnerships will be needed at all levels of jurisdiction and industry to achieve sustainable corridors.

Marlon provided examples of the obstacles created by highway interchanges, the need for increased bike and pedestrian access, and the need for that access to be integrated with local concerns. In addition to this approach, Marlon identified particular areas where Caltrans could improve:

- Policy goals and targets: Increased integration between transportation planning and project development provides for more transparency in making decisions that ultimately achieve Caltrans' strategic goals and State targets.
- Asset management: Limited transportation funding requires heightened stewardship of existing infrastructure and strategic prioritization of investments.
- Partner Engagement: Achieving organizational excellence with partners that are engaged throughout the planning and delivery of a project. The local vision is emphasized.
- Transparency and communication.
- System Performance: Integrated planning and shared investment priorities yield a sustainable outcome. Consider modal options and think in terms of people moved. Evaluate existing asset performance based on data and needs.

Marlon concluded with potential outcomes for the workshop, including a reminder to collaborate, reformulate concepts and principles based on the needs of people, and prioritize metrics based on attainable goals. Prosperity, accessibility, and livability principles are a mindset that should be implemented into day-to-day tasks.

Expert Panel 1: Livability

During the first panel session, three well-regarded experts spoke about their experiences in measuring and designing livability metrics. Many of the panelists shared their opinions on strategies for data availability, integration, and land use. Jeffery Tumlin, of Nelson\Nygaard Consulting Associates and Acting Director for the Oakland Department of Transportation, characterized performance metrics as a way to quantify a set of values. Policy and performance metrics are inherently separate because policies must seek approval through public domains. He noted that the conventional level of service (LOS) measurement is a flawed system that fails

to prioritize prosperity, accessibility, and livability outcomes by location. He provided an example in Palo Alto where a vibrant and popular street would be rated poorly using conventional LOS measurements because vehicle delay can be an indicator of a successful roadway populated by people, retail revenue, and community engagement. Prioritizing metrics requires decision makers to synchronize their values with local concerns. The shortest list of practical metrics with readily available data results in performance metrics that are easy to implement. Jeff also noted that the right metrics will vary by context and land use. Jeff suggested a quantitative approach that measures livability in hard numbers, similar to LOS indicators, is preferable to a qualitative advocacy approach.

Todd Litman, founder and director of the Victoria Transport Policy Institute, stressed the importance of an efficient and equitable transportation system while incorporating the need for livability and sustainability at the local level. He led his presentation with a series of questions that drew attention to affordability as an important yet seldom considered concern of transportation system users.

Since the cost of owning a motor vehicle is high and most expenses are fixed, true affordability depends on helping lower-income households reduce their vehicle ownership by improving affordable modes and housing options in walkable and transit-rich neighborhoods. New evaluation tools can help identify how specific policies and planning decisions affect transportation costs, especially for lower-income populations. A gap analysis is a useful tool to identify the obstacles that households face in reducing their vehicle costs, for example, where pedestrian and cycling improvements, carsharing, or targeted public transit services can significantly improve low-income residents' access to essential services and activities. Information on mode options could be improved and performance metrics can measure system connectivity. A paradigm shift was recommended to improve problem solving and the resulting outcomes. Todd concluded by analyzing the changing transportation landscape, calling for a need to better understand the roles and benefits of each transportation mode. At the state DOT level, Caltrans faces a challenge facilitating discussions between goals, potential benefits, and technical information with its partners.

Bruce Appleyard, an Assistant Professor at San Diego State University and Principal at CFA Consultants, demonstrated a state-of-the-art livability calculator that identifies a corridor, applies the desired principles, provides a gauge for progress, and results in a list of possible metrics. This calculator and a corresponding handbook on livable transit corridors was developed as part of a Transit Cooperative Research Program in conjunction with the U.S. Department of Housing and Urban Development, U.S. DOT, and the U.S. Environmental Protection Agency livability principles. By using the livability performance calculator, Bruce showed the imbalance between livability principles from a safety and ethics point of view. Possible metrics include housing affordability, social equity, density by Twitter feeds, internal capture rate, safety, mode split, household costs, participation, health, job travel, and VMT; a multidisciplinary approach is needed. A particular emphasis was placed on incorporating land use into metric design.

To close the panel, Susan Shaheen, Co-Director of the Transportation Sustainability Research Center, briefly summarized points from each speaker and led a question and answer session for the livability panel. Jeffery encouraged Caltrans to facilitate the discussion and implementation of metrics at the state and local level. Local jurisdictions may not always have the tools and resources to take advantage of these new metrics, so it is important that state DOTs provide grants, specify benefits at the local level, and provide any additional tools that would be helpful. Todd focused on more of an advocacy and public participation discussion theme. He supported ideas for formal planning, targeting specific populations with GIS, drawing support for common goals (welfare to work, health, non-motorized transit), and improving data reliability. Bruce recommended that cross-collaboration with other DOTs, such as Maryland, Virginia, and other states could be the first step in developing new metrics. He referenced back to his handbook and strongly encouraged cooperation among disciplines. All responses addressed the need for metrics that prioritize equity and ethics concerns.

Expert Panel 2: Prosperity and Accessibility

After a brief break, the second panel session of the morning focused on prosperity and accessibility. There were two experts in prosperity and one expert with experience in accessibility. Ray Major, the Chief Economist at the San Diego Association of Governments (SANDAG), focused on best practices and his experience in the private sector as a benefit to understanding prosperity metrics. Data provide information to metrics, which can then support goals. Prosperity metrics can be quantitative or qualitative including: measurements of economic and social performance (population, employment, or cost of living), business vitality (Gross Domestic Product (GDP), job quality, goods movement, diversity), and resources/education (regional infrastructure capacity). He also stressed that prosperity outcomes should be clear and transparent before performance metrics are implemented, so that jurisdictions know what to measure. Ray noted that discussion and development should be regularly updated to ensure needs are reflected in metric design. He also identified a variety of critical success factors for metrics design at the planning phase:

- Business processes: things have to change for a better reflection of data.
- Distinguish between key performance indicators (KPI) and key result indicators (KRI).
- Departmental Metrics: Customer return data, better service.

In closing, Ray supported the use of a Genuine Progress Indicator (GPI) as a model to reflect the positive and negative outcomes of social, economic, and environmental goals.

Glen Weisbrod, President of the Economic Development Research Group, elaborated on the economic component of prosperity. The prosperity dimension should be seen as one aspect of a multifaceted effort to make transportation systems and their outcomes socially desirable, equitable, economically viable, and sustainable. He defined prosperity in terms of economic vitality--the ability to purchase what we want, which contributes to improving the creation of quality jobs and generation of income for residents. That is enabled by having a robust economy that exports goods and services to outside the region, thus generating a flow of income back into the region. GDP is a relatively comprehensive measure, but it does not reflect

land use, time (path dependency of freight), and economical distribution (social equity). Glen extended this interpretation to a relationship between businesses and transportation planning organizations: businesses should support sustainability goals while transportation jurisdictions provide a safe, connected, and efficient transportation system for goods and services. Productivity connects to the competitiveness of an area and reflects transportation network connectivity as well as economic impacts. He recommended using both benefit-cost analysis and economic impact analysis to help with future transportation infrastructure investment strategies. Glen concluded by suggesting that DOTs distinguish key drivers of prosperity from side effects of prosperity, such as rising housing value.

Chris McCahill, a Senior Associate from the State Smart Transportation Initiative (STII) at the University of Wisconsin-Madison, provided an overview of accessibility and introduced current research models that look at accessibility from a regional perspective. Destinations include both work and non-work related trips. He emphasized the use of a “decay” concept that relates the utility of a destination to its travel time. He recommended the following for implementing accessibility metrics:

- Scan existing conditions,
- Track performance on an ongoing basis,
- Track the performance of solutions,
- Diagnose problems,
- Assess solutions, and
- Engage the public.

Chris also used a model developed for Virginia’s House Bill 2 (HB2) as an exemplary model that uses principles of accessibility. The Sugar Access program was introduced as an effective GIS application that maps potential accessibility outcomes. He concluded by warning that data may be problematic for some accessibility metrics, particularly those related to walking and biking.

Susan Shaheen concluded the morning plenary with a follow-up question and answer session, including inquiries from the audience. A majority of the questions were targeted toward the accessibility model that Chris revealed at the end of his presentation. In his responses, Chris explained that Virginia was required to create an accessibility score under legislative constraints. More than 300 projects were ranked using a measure of access to jobs by automobile and public transit, which incorporated a decay function accounting for the utility of a job based on its travel time. The sample map that Chris presented is more of a regional level indicator that identifies areas for possible accessibility improvements.

One participant from the audience suggested to Glen that current investment strategies may favor urban highway development over more diverse land use contexts (suburban and rural). Glen responded by validating the issue and suggested that a state DOT address this issue by having a mix of projects that balance investment needs and vary with context.

BREAK-OUT DISCUSSION SUMMARIES

After a break for lunch, workshop participants divided into three break-out groups to further discuss prosperity, accessibility, and livability metric development. Break-out groups were comprised of a variety of perspectives from local, regional, and state partners, as well as from Caltrans. Participants remained in their allocated meeting room while a facilitator, subject matter expert(s), Caltrans lead, and two TSRC staff rotated among the groups for each discussion.

- Prosperity
 - Facilitator: Mike Cappelluti
 - Caltrans Lead: Barry Padilla
 - SME: Ray Major and Glen Weisbrod

- Accessibility
 - Facilitator: Eric Norton
 - Caltrans Lead: Rahul Srivastava
 - SME: Chris McCahill

- Livability
 - Facilitator: Will Cuper
 - Caltrans Lead: Keith Robinson
 - SME: Bruce Appleyard and Todd Litman

Topic 1: Prosperity

Caltrans wants to improve economic prosperity of the State and local communities through a resilient and integrated transportation system, with prosperity scores that can be measured or applied at the corridor level. Each rotation began with an introduction by the Caltrans lead and facilitator, followed by a general definition of prosperity.

Workshop participants repeatedly mentioned the importance of scale when considering impacts. Prosperity at the macro- (such as an increase in Gross State Product) and micro-economic levels (corridor level travel-time savings) require different metrics. Some participants stressed the importance of distinguishing between project and system-wide analyses in measuring prosperity impacts. A transportation planner from the San Francisco County Transit Authority (SFCTA) referred to Jeffrey Tumlin's presentation earlier in the day on underutilized capacity outside of peak travel times as an example of temporal scale. Participants stressed the importance of finding ways to make more efficient use of existing roadway capacity. At the smallest scale, participants focused on end users of the transportation system, and how infrastructure investments might impact travel choices and household budget. Some projects could have positive benefits for the regional or state transportation system while negatively impacting individuals.

Throughout the discussion, prosperity was interpreted The idea of externalities was noted as a holistic assessment of the measures and factors needed to improve the standard of living. A

public health expert suggested looking beyond the quantity of opportunities accessible to communities and instead incorporate some measure of quality in underserved communities with a special emphasis on education and food. Others mentioned that existing benefit-cost analyses tend to leave out distribution and accessibility of impacts; it is often easier to measure and quantify physical rather than social factors. The idea of specifically measuring costs and benefits for low-income populations was noted by several participants. Participants mentioned designing a non-linear weighted metric for lower-income communities (non-linear so that indicators weigh impacts to low-income communities higher than impacts to high-income communities). EnviroScreen was suggested as a model that could be referred to for assessing environmental impacts to low-income communities. However, this tool may be criticized, if it were to be used out of context, since different metrics are appropriate for different conditions.

Participants proposed more traditional mobility measures that improve the efficiency of transportation networks. If daily or total hours of delay and travel time are mitigated, transportation system reliability can support a larger capability to produce goods and services necessary to enhance prosperity. The idea of measuring freight flows and assessing where bottlenecks exist also attracted interest from the group. Some participants called for a switch to an accessibility framework, criticizing a traditional focus on mobility that encourages capacity expansion and induced auto demand. Some participants called for a more nuanced approach to accessibility that fits between a community's needs and the opportunities accessible within a certain distance. An example metric may ensure that low auto-owning communities have access to appropriate jobs near transit.

Several uncertainties were discussed that could make planning for the future of transportation in California difficult. A planner from the Governor's Office of Planning and Research (OPR) stressed that the climate change impacts of a project should be included in a prosperity score. A modeler from SFCTA was surprised by the lack of discussion around the role of shared mobility and automation in changing the future of both freight and passenger transportation. The general group consensus was that scores should be flexible and able to account for unforeseen changes.

Many participants expressed reservations about how new performance metrics would function in practice. There were concerns about the potential for contradicting other requirements and redundancy with existing federal, state, and regional policies. At the project level, some participants stated a need to improve partnerships with adjacent jurisdictions to achieve goals (i.e., where state and local infrastructure meets). This could be achieved by asking Caltrans and communities surrounding existing state infrastructure projects to assess project success. Caltrans can use the feedback to help evaluate and develop criteria. One Caltrans employee mentioned that assessing the economic benefits of transportation projects could justify tax increments and alternative funding options in a fiscally constrained climate. Others postulated that an increased reliance on diverse funding sources could have an effect on project prioritization. Given the ease of quantifying economic measures, there were also concerns that prosperity metrics could overshadow livability and accessibility performance metrics.

Topic 2: Accessibility

The second break-out session topic began with an introduction by the facilitator and a short explanation by the Caltrans lead on why Caltrans is interested in using accessibility metrics in the planning and project prioritization phase. Once participants understood this motive, the facilitator began moderating the discussion. In general, participants agreed with Caltrans' definition of accessibility: a measure that reflects the connectivity of two points by mode. A broad, multimodal transportation system should be designed for all users with any physical ability at any time of the day. Participants continued to support accessibility as a regional level set of metrics that measure the connectivity and efficiency of a transportation system. At the same time, accessibility must account for other factors including, but not limited to, planning factors and land use considerations.

Participants were more than willing to share their experiences in working with accessibility metrics at the local and regional level. Participants from SFCTA use a data set that looks at the availability of the motorized and non-motorized transit network accessibility. Other organizations such as the Metropolitan Transportation Commission (MTC) use a measure that looks at the number of destinations that can be reached within a certain travel time, but would prefer a measure that is more percentage based (similar to SANDAG's accessibility metric). One participant thought that travel times should vary with each mode, since people value their time differently (i.e., when walking vs. in transit). Attention was especially given to the "decay" function (as seen in Chris McCahill's presentation) as a solution that considers income equity and which groups are exposed to what accessibility. This type of model can accurately measure real access to destinations, which may be important to transportation planning geographically.

The need for a connected transportation system for non-motorized modal options came up in several break-out sessions as an essential component for accessibility. A regional transportation planning agency (RTPA) uses long range public transit, bike, and pedestrian connectivity and other community considerations to minimize travel time (as a cost of service). The Sacramento Area Council of Governments (SACOG) measures travel time to common destinations, such as parks, medical facilities, higher education, and other places of interest to indicate access to jobs and modal share. SACOG also warned that it is often difficult to collect data on active transportation.

Responses from participants were split between a qualitative and quantitative approach toward integrating accessibility into the planning phase. Regional partners may have preferred a qualitative approach, since weighting individual indicators is a much more intensive and involved exercise. However, they were able to designate potential outcomes from low- to high-priority. One participant appreciated the lack of weight in qualitative measures because there are often multiple factors that have an effect on transportation decisions. SANDAG and SACOG supported the use of quantitative indicators, since numbers can be effective for use in policy decisions. Other regional jurisdictions supported the use of analyses that measure the improvement in transportation efficiency before and after project implementation. Access to grocery stores and bike lanes were noted as good measures of accessibility. Regional partner jurisdictions tend to look at proximity to jobs as a measure of accessibility based on scale.

Participants also mentioned several factors that could affect the accuracy of a model that measures accessibility to work-based destinations, including: the aging workforce, diversity and land use density (land use sensitivities), reliability of travel times, affordability, and other system-wide interests. A gap analysis can be used to identify needs of the transportation system and participants encouraged the development of a model similar the one SSTI procured for the State of Virginia. With limited funds, one participant thought that Caltrans should focus on prioritizing equity in metrics and use a cost benefit analysis to list time as a potential cost. Participants noted that Caltrans should focus on accessibility as a collaborative effort by working with partners to learn, justify weighted indicators, and recognize stakeholder/partner interests.

Data availability largely depends on the level of jurisdiction and scale of an indicator. Regional organizations used a combination of a cost benefit analysis and a quantitative process for equity concerns. SANDAG invested in an active transportation system, but sidewalk data had to be pulled from local jurisdictions. A Caltrans employee considered the number and diversity of modal options as important to accessibility. The participants also focused on the need for infrastructure to facilitate and provide access for particular heavy industries, people, or both. Participants were especially reluctant to talk about data issues, largely because conflicts vary by mode. A Caltrans employee suggested that more breakdowns would be helpful in identifying needs at the local and regional level. Ensuring the safety and lack of barriers for motorized and non-motorized travel modes is also important. The idea of repurposing data for accessibility was not favored by participants, while determining measurement methods that are compatible with accessibility goals is encouraged. The SFCTA tracks individual populations for how changes in the transportation network change accessibility. SANDAG targets metrics that break down accessibility by population. Travel times and pattern data are paramount to maximizing the availability of travel options.

The concept of varying accessibility metrics by urban, rural, and suburban context resulted in some differences in opinion. A Caltrans District employee opined that regional benefit programs require a population density that may not be met in rural areas, so development is often concentrated in dense, populated areas. Some participants encouraged Caltrans to separate metrics by context and focus on income equity concerns. Regional participants thought resources could be better allocated to urban or rural areas based on weighting goals, finding more efficient means of transit, or focusing on decisions that increase connectivity and cooperation between regions.

Much of the discussion focused on considerations for using accessibility in the planning or post project phase, rather than naming specific metrics that might be used to measure accessibility. The participants noted that prioritizing metrics or weighting indicators inherently comes with tradeoffs that should align with goals and objectives at all levels of jurisdiction. However, quantitative and qualitative data collection methods vary by mode, metric, and purpose. At the same time, partner jurisdictions want to be included in the design, planning, and evaluation processes to ensure that their accessibility goals and concerns are represented in State decisions.

Models that analyze accessibility are in their infancy, and it is difficult to gather reliable data on infrastructure. Regional and local partners have instead targeted the travel patterns of the users to measure accessibility. Indicators may be most appropriate at the programmatic or project level, as well as implemented at large- or small-scale transportation systems. Accessibility is a measure of the efficiency of a transportation system and a gap analysis serves as a good tool to investigate how improved connectivity can benefit affordability.

Topic 3: Livability

The Caltrans Strategic Management Plan 2015-2020 has a particular interest in improving livability at the corridor level to create livable spaces and environments, provide for increased mobility choice and accessibility to all modes of transportation, as well as improve overall quality of life across California. Each livability discussion began with an introduction by identifying participants who have had experience with implementing livability metrics through their work with agency partners. The facilitated discussion that followed focused on determining how local jurisdictions measure livability at the project level or otherwise incorporate livability into their planning processes within their respective domains.

A variety of factors that contribute to an overall understanding of livability were all noted, including as livability indicators: safety and perceptions of safety, public health and stress, vehicle speeds, and visual aesthetics. Outcomes of safety measures consisted of looking at ways to reduce vehicle collisions while assessing differences in safety across each modal option. Bicycle safety was specifically mentioned by participants, as poor bicycle infrastructure connectivity may place riders at a greater safety risk when traveling alongside vehicle traffic. Additionally, how individuals perceive the safety of an area is negatively affected by poor lighting in neighborhoods, high crime rates, and a lack of safety prioritization for high risk populations. Discussion about public health measures was concerned with using active transportation (human-powered transportation, such as walking, cycling, in-line skating, or skateboarding) to reduce personal stress levels. Vehicle speeds were addressed as a primary measure to cover a broader spectrum of other livability indicators, such as safety, vehicle throughput, perceptions of safety, as well as noise and stress levels. The value of visual aesthetics in enhancing livability was also mentioned. An example with the City of Fresno was noted where an area with poor lighting and frequent trash dumping emphasized the relationship between street visual aesthetics and the user experience. Participants focused on the Integrated Transport and Health Impact Model (ITHIM) for planning applications, which measures public health impacts of transportation and land-use scenarios in terms of changes in pollution exposure, accident rates, and physical activity. One participant noted that the University of California, Davis and the Metropolitan Transportation Commission are currently testing potential applications for the ITHIM.

The discussion groups often considered livability from the user's perspective as a person travels through a transportation system. While also noting that livability is commonly observed and planned for using a system-level approach. While sidewalks, bicycle infrastructure, and public transit may all contribute to transportation system connectivity for all users, the environment experienced by each person can often be less than ideal. Thus, assessing problems from a user

perspective can contribute to a better understanding of how various livability factors affect the populace as a whole.

The discussion progressed often toward metrics that measure the comfort levels of non-motorized transportation users. The perceived comfort level of users that walk or use a bicycle was especially of concern, as poorly maintained or nonexistent bicycle lanes, deteriorating road quality, and other less than optimal infrastructure problems can affect livability. Vehicle speeds were also a significant factor that may contribute to cyclist and pedestrian level of comfort. Participants believed that a crash at low speed can result in an improved chance of survival in a collision. Thus, reducing vehicle speeds can ultimately contribute to improved cyclist and pedestrian safety along a street or corridor. Comfort levels were also mentioned to have a significant impact on modal shift and mode choice; if the surrounding environment is known to have heightened rates of crime, poor lighting, or any other immediate safety risk, users may refrain from using non-motorized travel modes like walking and biking. Livability was mentioned in connection with accessibility. However, livability metric design may depend on how accessible homes are to points of interest, such as jobs, schools, parks, and entertainment for improved quality of life.

Discussion about measuring non-motorized user comfort, highlighted concern with the lack of data availability for existing cyclist and pedestrian infrastructure networks and traveler counts. The livability subject matter expert brought up the “Barrier Effect,” which refers to delays, discomfort, and a lack of access that vehicle traffic imposes on pedestrians and cyclists. Discussion centered around the importance of implementing planning procedures that take into account non-motorized user metrics instead of only considering vehicle throughput centered metrics. Participants indicated other possible measures of non-motorized user comfort that include a level of stress measurement that could possibly be recorded by a new technology application. Attendees mentioned that some cities have developed Active Transportation Plans (ATP) that are aiding planners with efforts to prioritize bicycle and pedestrian projects. Measures of non-motorized user comfort could potentially be included in the ATP planning process in the future.

CONCLUSION

This day-long workshop focusing on prosperity, accessibility, and livability metrics included a variety of perspectives and expertise from both Caltrans and outside agencies. The morning plenary sessions were designed to engage the participants in a lively discussion and provided an expert back-drop for the afternoon break-out sessions. It is important to recognize that some DOTs are already changing their approach to transportation planning by developing criteria and scores that better reflect diverse interests across social, economic, and quality of life issues at all levels of jurisdiction. Caltrans can learn from these efforts while providing leadership for the State of California. Local and regional partners are interested in a new approach that measures the properties of transportation systems while integrating, these new concepts into a state level framework. The workshop set the stage for further dialogue on metrics between Caltrans and local governments in a unified goal to meet the needs of their communities.

The workshop started with an opening speaker who encouraged participants to think about transportation's essential role in serving the needs of people and its effect on providing opportunities for improved quality of life. During the panel sessions, experts provided substance along with presentations that included helpful tools and criterion needed for successful metric design. Each panel session concluded with questions or inquiries from the audience, followed by answers from the experts. After lunch, three rounds of break-out discussion rotations (prosperity, accessibility, and livability) provided an open forum to explore suggestions for metrics, metric development, and metric applicability to partner jurisdictions. The conference concluded with a closing plenary session where the Caltrans leads for each score presented the highlights of their respective break-out discussions to all workshop participants. A closing discussion moderated by Kate Meis of the Local Government Commission with Marlon Flournoy and Coco Briseño of Caltrans, shared a prospective outlook on the next steps for developing performance metrics for the California Department of Transportation.

Ms. Meis began by encouraging the state to provide the vision, tools, and incentives for projects that increase sustainability, livability, and economic development. She pointed out that comprehensive projects that achieve these metrics are challenging to fund due to the separation between state funding sources. For example, there are over 10 state agencies in the Greenhouse Gas Reduction Fund with different guidelines, metrics, timelines. Spread out over 482 cities and 58 counties, this creates administrative burden for state and local agencies. Ms. Meis noted that Caltrans' work on metrics is a positive step in the right direction that should be followed by upstream changes to incentivize projects that meet these metrics.

From a more internal department perspective, Mr. Flournoy and Ms. Briseño then reflected on the major challenges, initiatives, and methods Caltrans can use to continue the development of prosperity, accessibility, and livability metrics in the present and on into the future. Topics that surfaced in the discussion include:

- The Strategic Management Plan 2015-2020 identifies values for corridor development projects and provides a framework for the three performance metrics.
- Integration of values across jurisdictions may call for more inclusive discussions that involve partner jurisdictions and stakeholders.
- Livability, accessibility, and prosperity metrics are still in development, but principles can be integrated into small and realistic applications as proof of concept tests.
- A continuous dialogue on the applicability of metrics, roles of partner involvement, and the importance of design flexibility that can benefit the development of performance metrics.
- Caltrans may be able to provide technical resources to partner jurisdictions to help facilitate metric development.
- Maximizing incentive opportunities means integrating values from federal to local levels of jurisdiction.

Transportation development has been evolving to better reflect a broader range of criteria and interests than that captured in traditional LOS and congestion measurements. This workshop engaged and challenged participants from both Caltrans and local jurisdictions to continue the conversation about how to best develop prosperity, accessibility, and livability metrics that can improve both State-wide corridor level planning.

RECOMMENDATIONS AND NEXT STEPS

Some of the overarching themes that were highlighted during the workshop include:

- Metrics are often most effective when based on simple measurements.
- Input from stakeholders is necessary and can also increase the complexity of metrics during the design phase.
- Design flexibility in scoring metrics that support clear goals.
- Values may differ by context (rural, urban, suburban) and all should be considered for an equal distribution of benefits across the State.
- Incentives, regulation, and funding must resonate with local and regional values to accomplish goals with limited external incentives or funding.
- New regulations and requirements should avoid redundant/similar requirements that are already imposed on local and regional jurisdictions.
- Including people from a variety of disciplines, jurisdictions, organizations, and partners in the planning, design, and evaluation phase enables more perspectives to contribute to the metric development phase.

Specific recommendations for Caltrans for developing and implementing the scores include:

- 1) Establish a plan and systems for communication to continue the dialogue with the workshop participants.
- 2) Continue outreach to expand input from local governments and communities for both development and implementation of the scores.
- 3) Develop an initial set of metrics for prosperity, accessibility, and livability and test them in the context of a specific corridor plan that is being developed.
- 4) Remain flexible to evolving metrics based on lessons learned during early implementation, input from local partners, improved data accessibility over time, and changing measurement tools.

APPENDICIES

Appendix A: Glossary of Terms

Term	Definition
Accessibility (from Caltrans SMP)	A property of transportation systems and subset of mobility that focuses on the ability for users to reach destinations and points of interest. Accessibility also reflects the degree to which people, goods, and services can travel through a transportation system. Accessibility measurements are usually destination based on time or destination proximity to opportunities.
Active Transportation (from San Diego Association of Governments)	Human-powered transportation, such as walking, cycling, using a wheelchair, in-line skating, or skateboarding, and their effect on people's health and the environment for a better quality of life.
Livability (from Caltrans SMP)	A sustainability strategy that supports quality of life improvements, efficient land use, livable public spaces, social engagement, natural systems, local businesses, and opportunities for improved environmental conditions. Livability is oriented toward long-term community outcomes.
Prosperity (from Caltrans SMP)	A focus on promoting economic development that improves State and local economies through investments in transportation projects that support local businesses and increase competitiveness through a resilient and integrated transportation system.

MOVING TOWARD A SUSTAINABLE CALIFORNIA

exploring livability, accessibility & prosperity

A W O R K S H O P O N A U G U S T 9, 2 0 1 6



AGENDA

Brower Conference Center, Berkeley, CA

Working Paper can be accessed at

<http://innovativemobility.org/wp-content/uploads/2016/08/>

Caltrans-Livability-Accessibility-Prosperity-Workshop-Draft-Working-Paper.pdf

Intended Outcomes:

- Create collaborative partnerships and dialogue among California's transportation stakeholders to move towards greater sustainability in California.
- Increase understanding of the types of metrics available today to measure the most pivotal components of livability, accessibility and prosperity at the corridor level.
- Explore the challenges and benefits of adopting a scoring tool methodology to evaluate policy implementation strategies, scenario planning efforts, and the identification of high-value investment opportunities during planning, design, maintenance and operational phases.
- Determine which metrics could initially be used to develop the scoring tools, the data collection strategies, and the methods of refining the scoring tools over time.

8:30-9:00	Sign-in and coffee
9:00-9:15	Welcome and Purpose (Steven Cliff, California Air Resources Board)
9:15-9:35	Caltrans Sustainable Corridor Framework Presentation (Marlon Flournoy, Caltrans Sustainability)



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9:35-10:40 Livability Metrics – Presentation and Brief Q&A
(Moderator: Susan Shaheen, TSRC)

Panelists

Todd Litman, Victoria Transport Policy Institute
Jeffrey Tumlin, Nelson Nygaard, Acting Director Oakland DOT
Bruce Appleyard, San Diego State University

10:40-10:55 Break

10:55-12:15 Prosperity and Accessibility Metrics – Presentation and Brief Q&A
(Moderator: Susan Shaheen, TSRC)

Panelists

Ray Major, San Diego Association of Governments (Prosperity)
Glen Weisbrod, Economic Development Group (Prosperity)
Chris McCahill, University of Wisconsin (Accessibility)

12:15-1:30 Lunch – *The outdoor terrace of the Brower Center is available to use*

Break-out Sessions:

- Discuss the draft scores with the Caltrans Livability, Accessibility and Prosperity Team Leads.
- Are these scores and metrics of value to local governments, Caltrans, and other agencies?
- What are the challenges and benefits of these scores for transportation in California?
- What context is most appropriate for applying these scores?
- What data would be needed for these scores to be successful and beneficial?

1:30-2:10 Break-Out Discussion Session 1

2:15-2:55 Break-Out Discussion Session 2

3:00-3:40 Break-Out Discussion Session 3

3:45-4:00 Break

4:00-5:00 Closing Plenary Session (Moderator: Kate Meis, Local Government Commission)

- Presentation of the key themes from the break-out sessions for prosperity, accessibility, and livability
- Q&A with Coco Briseño and Marlon Flournoy, Caltrans

5:00 Adjourn