CALIFORNIA RURAL COUNTIES TASK FORCE

Rural Induced Demand Study

CEAC Infrastructure and Development Policy Committee

August 22, 2024

Mike Woodman, Executive Director, NCTC

Jim Damkowitch, Project Manager, DKS

Don Hubbard, GHD

Dr. Anurag Pande, Professor Cal Poly

Project Organization Chart

California Rural Counties Task Force
ruralcountiestaskforce.org

Nevada County Transportation Commission (NCTC)

Mike Woodman
RCTF Project Manager

Jim Damkowitch
Project Team Lead

DKS

Don Hubbard
CEQA
Technical Lead

GHD

Dr. Anurag Pande
Research
Technical Advisor

Learn by Doing
Cal Poly

Induced Demand: Rural Areas

- Many rural corridors lack significant congestion
- The focus of rural transportation improvements (purpose and need) is often on safety, reliability, goods movement, access and evacuation.
- Congestion in rural areas is often related to seasonal or holiday traffic
- Improvements usually do not significantly reduce travel times
- Rural motorists have more limited choices in destinations and routes
- Demand for land is typically lower in rural areas than urbanized areas
- Rural areas are typically not well served by transit (low potential for mode shifts)

ALPINE	INYO	NEVADA
AMADOR	LAKE	PLUMAS
CALAVERAS	LASSEN	SIERRA
COLUSA	MARIPOSA	SISKYOU
DEL NORTE	MENDOCINO	TEHAMA
GLENN	MODOC	TRINITY
HUMBOLDTH	MONO	TUOLUMNE

Work Scope:

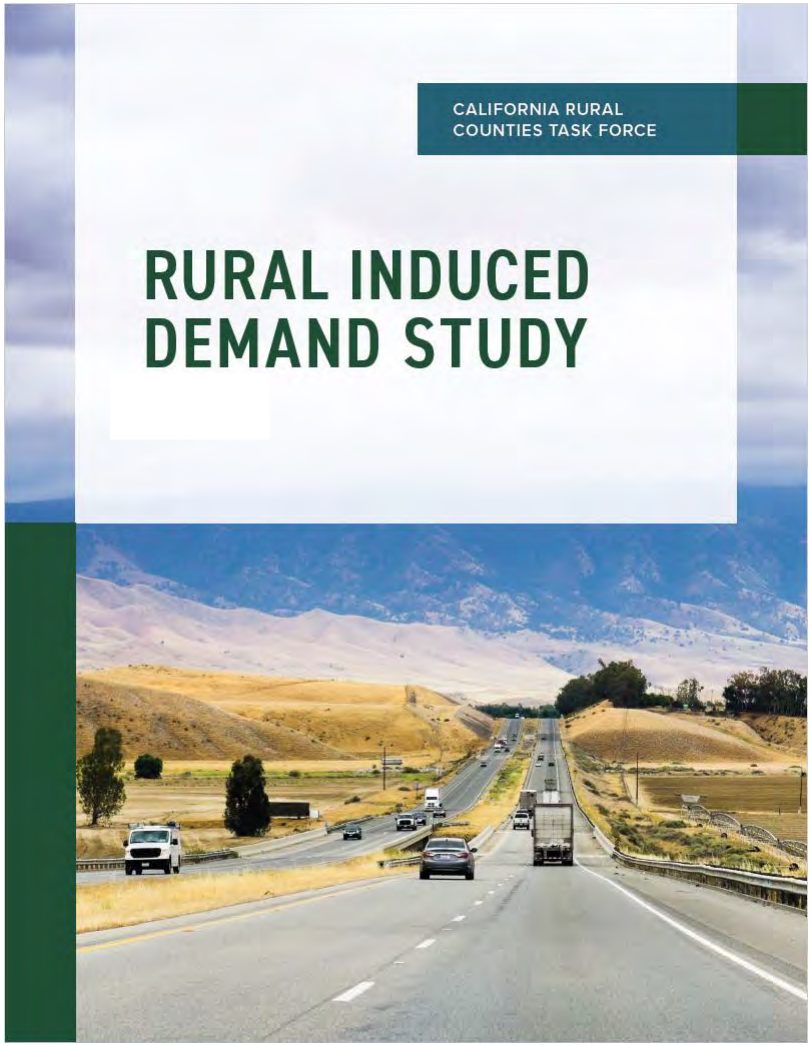
Literature Review: Applicability of Research to Rural Projects

NCST Calculator Sensitivity Testing

Recommendations to Address CEQA

Recommendations for State Planning and Programming Guidance

Recommendations for Future Technical Studies and Data Improvements

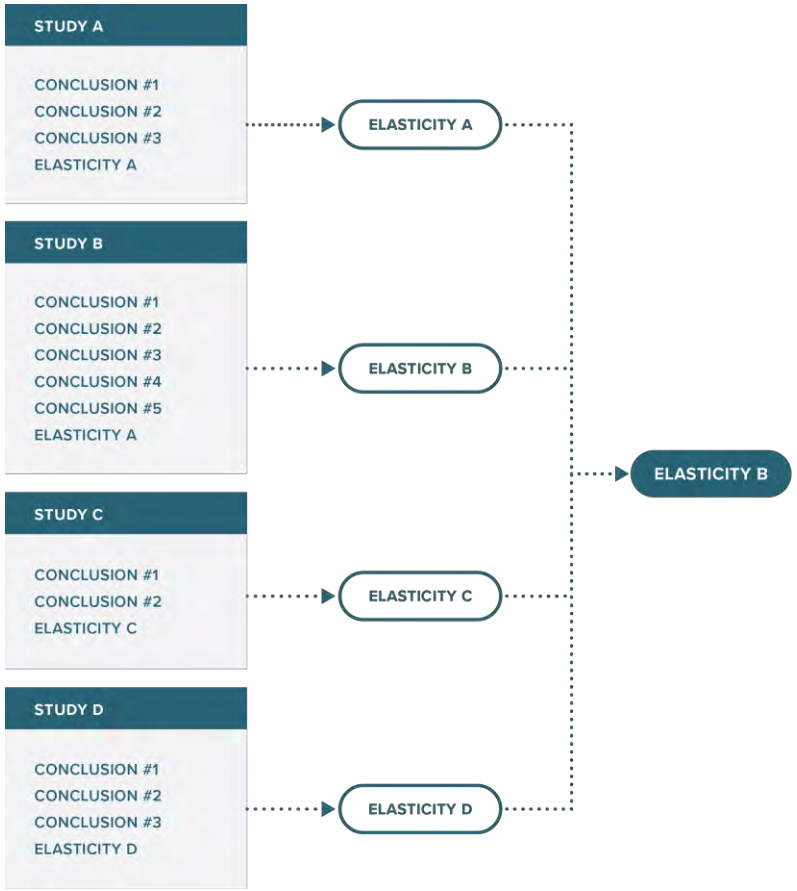


(Very Brief)
Findings from the Literature Review

Literature Review

Key Finding: Reliance on Review-Studies is Leaving Important Information Out of the Discussion

- Current guidance and policies are based on review-studies
- Review-studies, or studies-of-studies, summarize findings of original research studies
- This comes at the cost of filtering out other information found in the original study



Literature Review

So, What Was Filtered Out?

- **Lane-miles are an imperfect proxy for travel time savings** – The thing that drives induced travel is a reduction in travel times, not additional capacity per se. So in the absence of congestion, additional capacity does not induce demand.

- **Estimates of induced demand declined over time:** There is a downward trend in the estimated elasticities over time.
  - In the studies: The more other factors were controlled for, the less effect was attributable to induced demand
  - Land use more regulated than in 1950-70's.

- **Only *significant* reductions in travel times change travel behavior** – Travelers interview surveys found that travel times would have to be reduced by at least 15 minutes to have any appreciable effect on origin-destination choice.

- **All induced demand research and data used to inform the NCST Calculator is based on metropolitan areas**.

- Only one paper has explicitly addressed area type. National data 1998–2008.
  Rentziou, Gkritza, Souleeyrette, 2012, *VMT, energy consumption, and GHG emissions forecasting for passenger transportation,* Transportation Research Part A 487-500.
  - Rural Area 10-Year Elasticity: **0.083%**
  - Urban Area 10-Year Elasticity: **0.267%**

Literature Review

The Assumed Mechanisms are Not Borne Out by Interviews with the Actors Involved

The assumption in nearly all of the literature, often explicitly stated, is that developers base their decisions on good freeway access. However, interviews with developers seriously undermine this assumption:

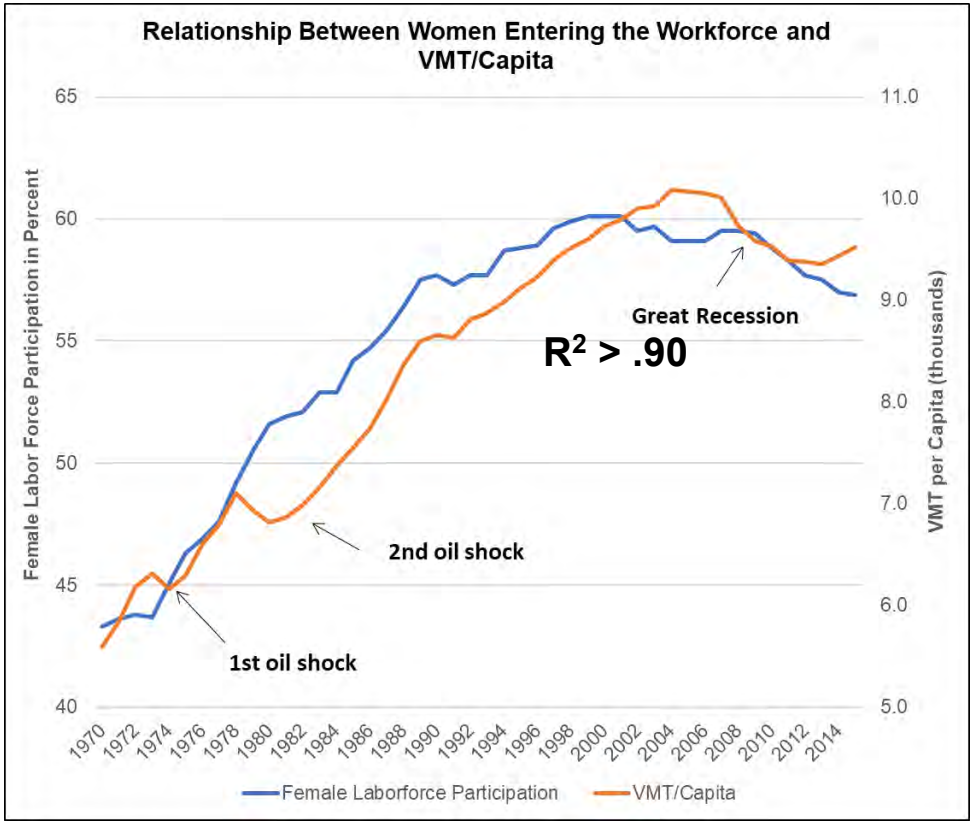
- Developers stated were looking for cheap land that had some access to the roadway system; they were indifferent to the quality of the access. Exurban land was developed because it was cheap. Years later, residents of these areas would apply political pressure to improve the quality of access (i.e demand was inducing roads, not the reverse)
- "*While the expansion of I-580 is seen as a bonus to developers in the area,* ***all indicate that their projects would still have been constructed in the absence of the freeway improvement***." (Hansen, Gillen, and Dobbins, 1993)

Access is important; capacity much less so.

Literature Review

Growth in Dual Income Households

- Sometimes, it isn't what is in a study that is important, but what is *not* in the study.
- Most of the studies controlled for population and income, but very few controlled for the number of workers
- There is a big difference in the VMT effect between a household's income going up because a worker got a raise, versus income rising because someone else in the HH started working
- The period of rapid increase in VMT/capita corresponded with the increase in dual income households



Literature Review

Did Not Find Support for a NCST-Style Forecasting Tool

Quite the contrary, several studies warned against using simplified tools based on aggregate elasticities. Some examples [emphases added]:

- "*Simple models of the kind presented here cannot supplant the detailed analyses needed to evaluate specific projects.* ***It should not be assumed that the aggregate elasticities obtained in our analysis apply equally to every urban region, let alone to any particular project***." (Hansen and Huang, 1997)

- "*The analysis presented here uses aggregate state level time-series data to determine relationships to VMT. The analysis in this paper does not imply that any specific project will generate additional traffic.* ***Obviously specific project level analysis is needed to assess impacts of specific transportation plans***." (Noland 1998)

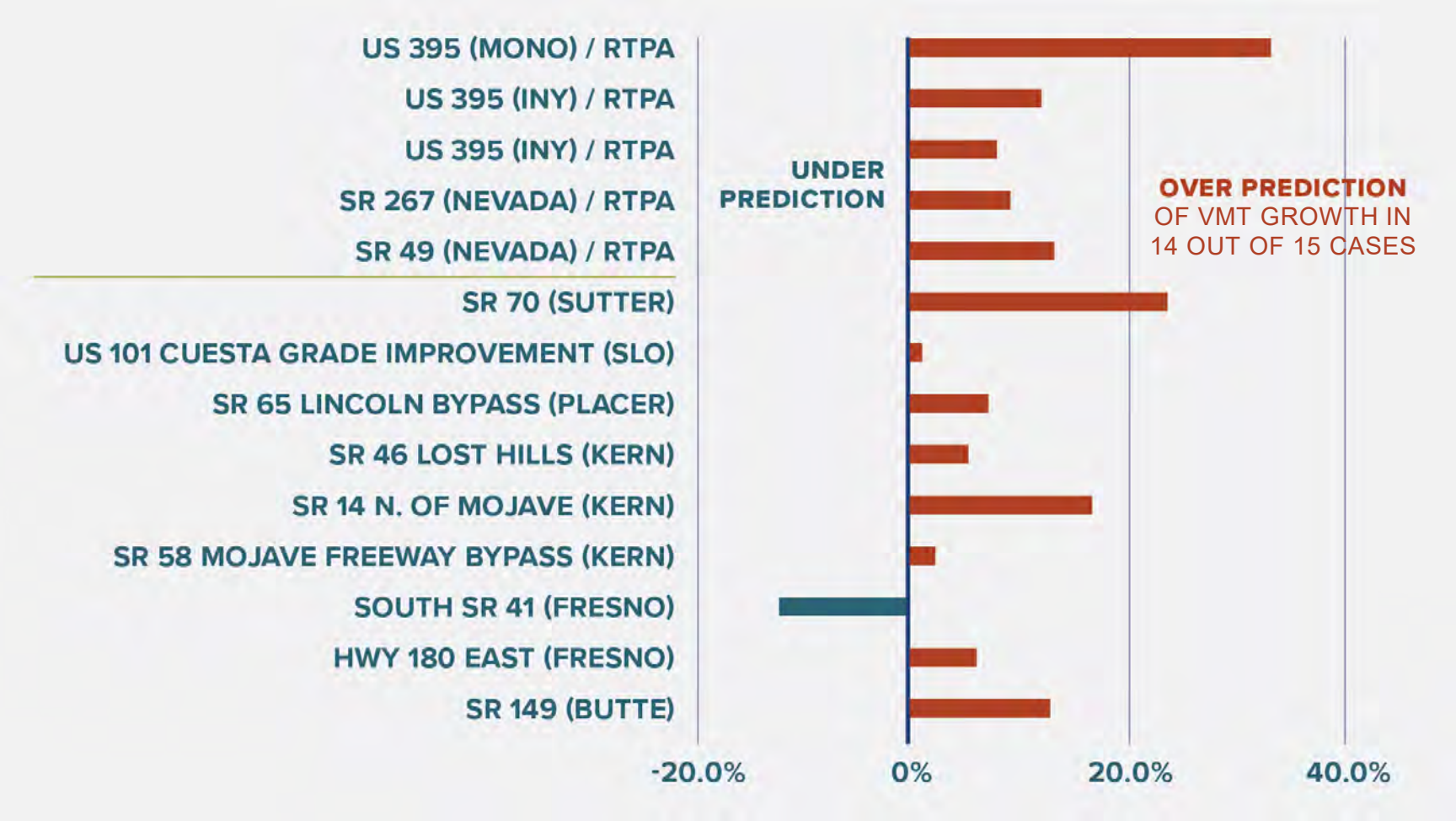
These quotes are from the authors cited in the documentation for the NCST Calculator.

(Very Brief)
Findings from the Testing of NCST Calculator for Rural Projects

NCST Calculator Sensitivity Analysis

- **Simple Comparison Method of Past Projects**
  - If the NCST Tool was applied then – how would it have performed?
  - Analyzed: post 3-years; post-10 years; and post-20 years
- **Applied to past projects implemented in rural area types**
  - Identified 15 Capacity Increasing Projects for Evaluation
    - Rural RTPA areas (no MSA): **5**
    - Rural MPO areas: **9**
  - Class II and III facilities (widening projects)
  - Regional Analysis (versus facility specific)
  - Data Sources: Caltrans Lanes Miles, HPMS VMT, DOF Population (1990 to 2021)
  - Applied against the 0.75 Elasticity

Rural Induced Demand Study – 3 Year Estimate Comparison



NCST Tool Rural Sensitivity Analysis

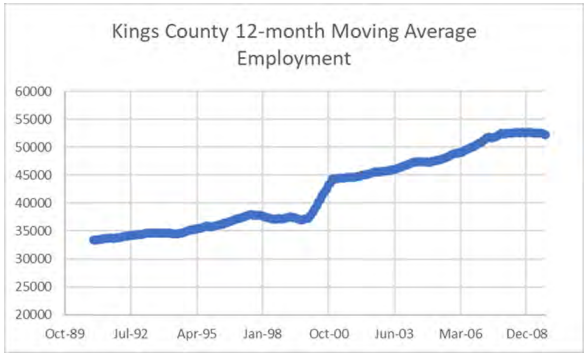
Findings

NCST Tool did not perform well in rural areas:

- Consistently overestimated regardless of whether the rural project is in an MPO region
  - Of the 5 Rural Non-MPO area projects – Overestimated in 100% of the time
  - Of the 9 Rural Area MPO projects – Overestimated 50-90% of the time (depending on horizon)
- Consistently overestimated regardless of forecast period (3, 10, and 20 years out)
- The more significant the project the greater the over-prediction – overly sensitive)

Examination causality factors – Before and After Assessments:

SR 41 Case Study – Expansion of the Naval Air Station in Lemoore in 1998. West Coast F/A-18E/F Super Hornet strike-fighter Site (added 1,850 additional active-duty personnel, and 3,000 Family members).



In 1994, Santa Rosa Rancheria Tachi Yokut Tribe added slot machines at the Palace Indian Gaming Center just outside of Lemoore, which grew to 385 slots by 1997. In 2005, a major expansion was opened, and it was renamed as Tachi Palace. The following year, a 7-story, 255-room hotel was opened on the property. Employment grew to approximately 5,000 employees with the expansion.

(Very Brief) Recommendations

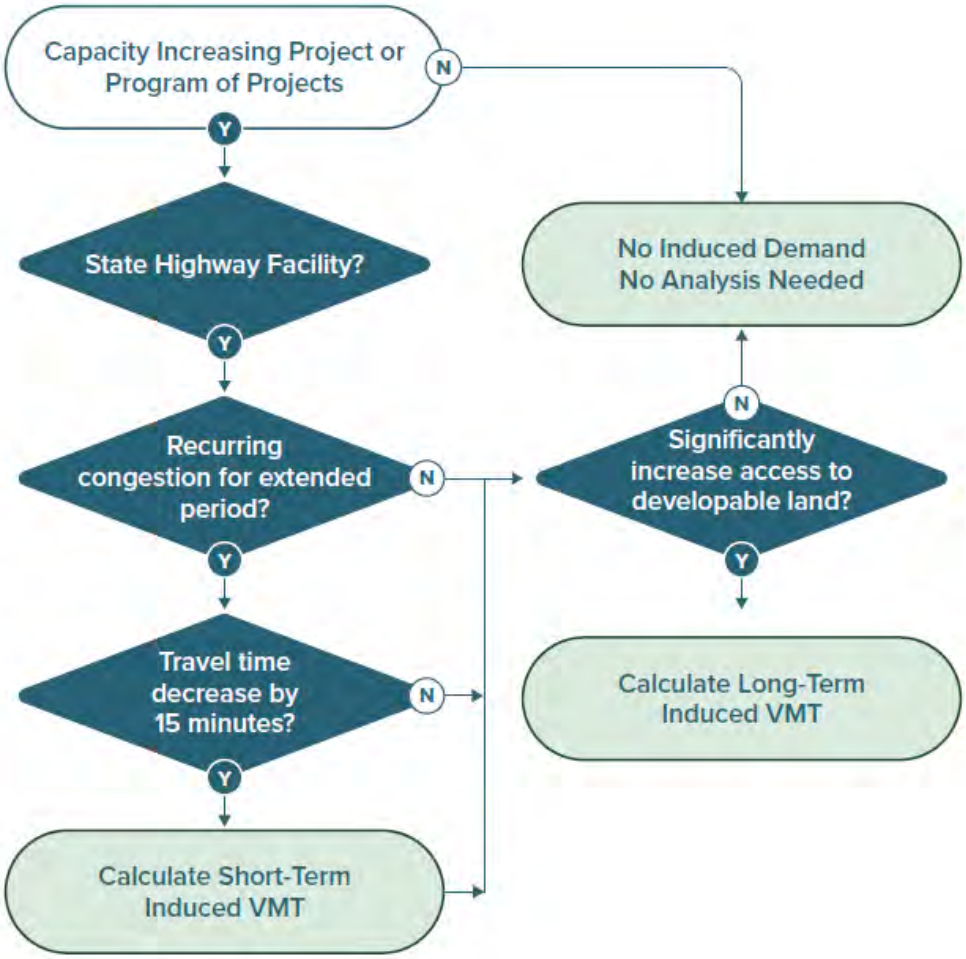
Recommendations

- **The NCST Calculator should not be used for CEQA Project Level Analysis (Rural or Urban). Lacks context and specificity required of CEQA project level analysis.**

- **Capacity increasing projects that do not exhibit the requisite conditions for an induced effect should not be penalized by grant funding scoring criteria, Caltrans CSIS criteria, or funding decisions by the CTC or other State agencies.**

- **For programmatic regional analyses application of the NCST Calculator should be predicated on whether the factors that cause induced demand resulting from capacity increases are present (per proposed screening) including the availability of a validated travel demand model.**

Screening Recommendations



Hybrid Analysis Recommendations

NCST Induced Travel Calculator, components of 1.0 elasticity for induced VMT are:

- Changes in commercial driving = 19 to 29%
  - Exempt under CEQA and SB 375
- Changes in individual or household driving = 9 to 39%
  - Short-Term Effect – Travel Demand Model Superior
- Diversion of traffic = 0 to 10%
  - Short-Term Effect – Travel Demand Model Superior
- Changes in Land Use Patterns (including migration) = 5 to 21%
  - Long-Term Effect – Travel Demand Models (in of themselves) do not explicitly address
- Elasticity Range: = .33 to 1.00

Duranton, G., & M. A. Turner (2011). The Fundamental Law of Road Congestion: Evidence from US Cities. American Economic Review, 101(6), 2616-2652. Retrieved from https://www.aeaweb.org/articles?id=10.1257/aer.101.6.2616.

Hybrid Analysis Recommendations

Induced Demand Hybrid Approach

a) Areas with validated 4-Step or Activity-Based Travel Demand Models (meets TAF Checklist)
   a) If short-term induced effect is applicable, **use travel demand model**
   b) If the long-term induced effect is applicable, a maximum induced elasticity is **0.21**
   c) If no long-term induced effect is anticipated, **no adjustment is needed**

b) Areas with validated 3-step Travel Demand Models (meets TAF Checklist)
   a) If short-term induced effect is applicable, **use travel demand model**
   b) If the long-term induced effect is applicable, a maximum induced elasticity is **0.30** (urban area)
   c) If the long-term induced effect is applicable, a maximum induced elasticity is **0.21** (rural area)
   d) If no long-term induced effect is anticipated, **no adjustment is needed**.

c) Areas with Land Use Allocation model with validated feedback mechanics.
   a) **No adjustments needed for short- or long-term induced effect, use modeling process**

d) Areas with an unvalidated or no travel demand model (statistical trends, statewide model, big data)
   b) **NCST Calculator (unless identified in TAF as being not required) or Qualitative Analysis**

Recommendations

- The CAPTI should consider expanding the list of appropriate improvement projects to include rural area projects that are not deemed likely to induce VMT. This includes roadway capacity-increasing projects with societal co-benefits (e.g., greater accessibility to needed services and facilities, evacuation, etc.).
- Guidance in the California Regional Transportation Plan Guidelines for validating and calibrating regional travel demand models should be updated to be more sensitive to addressing induced VMT. The RTP Guidelines should include guidance regarding if and how the NCST Calculator should be used in conjunction with a travel demand model. The guidelines should also provide guidance for performing dynamic validation of modeling processes that include a feedback mechanism between the travel demand model and a land use allocation model.
- NCST Calculator benchmarking should not be a recommended practice.
- Lastly, the OPR CEQA SB 743 Implementation Guidance and Caltrans' TAF and TAC should also be amended to incorporate the findings and recommendations from this study.

NCST Calculator Recommendations

RECOMMENDATIONS TO UPDATE NCST CALCULATOR

The following steps are recommended for improving the applicability of the NCST tool:

- **Flexible Interface:** Develop a more interactive user interface that allows the analyst to input which induced demand effects and elasticity values are appropriate for a given analysis context.
- **Context-Specific Elasticities:** Develop a more nuanced approach that incorporates context-specific elasticity values. To improve accuracy, recognize regional variations and project-specific conditions.
- **Incorporate Travel Time Changes:** Enhance the tool to factor in changes in travel time/cost more explicitly. Consider using analytical tools (demand or simulation models) that can capture the impact of travel time reductions or increases due to the project.
- **Account for Latent Demand:** Improve the estimation of latent demand by including more detailed data on potential users who are not currently traveling due to existing congestion (Origin-Destination analysis—big data or demand models).
- **Validation and Calibration:** Regularly validate and calibrate the tool against real-world data and outcomes from completed projects. This will help ensure that the tool remains accurate and reliable over time.

By implementing these recommendations, the NCST Calculator can provide more contextually relevant estimates of induced VMT, although the use of an elasticity-based approach should be limited to a program-level evaluation whenever possible.

Byett, A., Laird, J., Falconer, J., Roberts, P. (2024). Research Report 717 Assessing Induced Road Traffic Demand in New Zealand. https://www.nzta.govt.nz/resources/research/reports/717/

Next Steps

Support: Current UC Berkeley/Caltrans study

- **PI Name: Francois Dion, Ph.D., P.E. (Michigan)**
- **Project Title: Investigating Ability to Assess VMT Impacts of Rural Capacity-Enhancing Projects**

18-month project schedule, approved January 2024, and it just had its kick-off meeting.

Support: ITE SB 743 Committee Vehicle Miles Traveled (VMT) Analysis of Roadway Improvement Projects – White Paper