Correlating Transit and Parallel Corridor Congestion: Interviews to Ascertain Current Practice

Requested by
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The Caltrans Division of Research and Innovation (DRI) receives and evaluates numerous research problem statements for funding every year. DRI conducts Preliminary Investigations on these problem statements to better scope and prioritize the proposed research in light of existing credible work on the topics nationally and internationally. Online and print sources for Preliminary Investigations include the National Cooperative Highway Research Program (NCHRP) and other Transportation Research Board (TRB) programs, the American Association of State Highway and Transportation Officials (AASHTO), the research and practices of other transportation agencies, and related academic and industry research. The views and conclusions in cited works, while generally peer reviewed or published by authoritative sources, may not be accepted without qualification by all experts in the field.

Executive Summary

Background

A chief function of transit is to relieve pressure on highway corridors running parallel to the transit line. There is a common expectation that introducing a transit option will ease pressure to some extent on an at- or near-capacity parallel highway corridor, as at least some transit riders will be those who would otherwise be driving. However, forecasting traffic mitigation for a given transit investment is not currently a standard practice in Caltrans' transit planning policies.

Caltrans is interested in the feasibility of such a calculation: What investment in new transit services would be sufficient to obtain a desired level of service improvement on a parallel highway? While research from an earlier Preliminary Investigation (Best Practices for Measuring the Influence of Various Transit Options on Highway Travel Demand) could not locate a formal tool to support this forecasting, Caltrans was still interested in determining whether any informal methods linking specific transit investments with traffic levels were used by agencies responsible for major transit systems in California and elsewhere.

This Preliminary Investigation presents the results of email and phone interviews with six California transit agencies as well as transportation agencies outside the state to determine current practices.

Summary of Findings

Integration between transit and highway groups to establish and manage the type of correlation necessary for forecasting is not a common practice. Only the San Francisco Bay Area Rapid Transit District (BART), the San Francisco Metropolitan Transportation Commission and the Colorado Department of Transportation indicated an integrated decision-making process between transit and highway groups. A more typical case was the California High-Speed Rail Project, which used traffic figures to justify the project but did not integrate these figures into the engineering decisions that led to particular ridership forecasts and other parameters like the number of cars to use.

Some studies have analyzed traffic levels on highway corridors before and after a transit offering was introduced, and BART has a methodology for conducting a corridor impact analysis. We have included some studies that were recommended by interviewees or queried by Caltrans in the course of scoping this investigation, but have not attempted a general literature search for this kind of correlational study.

Gaps in Findings

Our research indicates that DOTs and other transportation agencies have not developed an easy-to-apply heuristic or tool for correlating traffic reduction amounts with transit ridership for forecasting purposes. Some of the representatives contacted for this research expressed skepticism about the feasibility of using such a correlation to make the case for new transportation investments. For example, David Ory of the Metropolitan Transportation Commission said that since the effect of transit on congestion is typically very small and hard to disentangle from other effects on congestion, it might not be a feasible performance measure for a transit implementation. Instead, many agencies rely on performance measures for a transit system such as accessibility, mobility choices and ridership.

Next Steps

To develop a tool to link transit investments to specific traffic reduction goals, Caltrans might consider the following:

- Contacting the California agencies and other state transportation agencies included in this Preliminary Investigation to learn more about each agency's informal methods and processes.
- Contacting the agency representatives listed in **Additional Resources** who did not provide feedback for this Preliminary Investigation.
- Proposing this issue for further study under an NCHRP or multi-state pooled fund project since some interviewees showed an interest in this area.

Contacts

During the course of this Preliminary Investigation, we spoke to or corresponded with the following individuals:

California Agencies

BART
Val Joseph Menotti
Planning Department Manager
San Francisco Bay Area Rapid Transit District
(510) 287-4794, vmenott@bart.gov

California High-Speed Rail Authority
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California High-Speed Rail Authority
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Metropolitan Transportation Commission
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Sacramento Area Council of Governments
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San Diego Association of Governments
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Other Agencies

Atlanta Regional Commission
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Colorado Department of Transportation
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Massachusetts Bay Transportation Authority
Joe Cosgrove
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Southwestern Pennsylvania Commission
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Interview Results

This section presents a summary of discussions with representatives from six California agencies and four out-of-state agencies as well as related resources recommended by these representatives. Interviews were often very brief, and significant efforts were made to determine the appropriate contact within an agency. Since establishing such a correlation would, in many agencies, involve coordination between multiple offices (for example, transit and highway), there was often simply no person in a position to bring these efforts together.

Information for agency representatives who were contacted but did not provide a material contribution to the findings of this Preliminary Investigation is included at the end of this section.

California Agencies

BART (San Francisco)

Contact: Val Joseph Menotti, Planning Department Manager, San Francisco Bay Area Rapid Transit District, (510) 287-4794, vmenott@bart.gov.

BART performs transit corridor studies concurrent with the Environmental Impact Report phase of a transit project. The transit corridor studies consider impacts on auto travel, both in terms of net reduction of vehicle miles traveled and congestion during peak periods, and also any localized impacts due to increased traffic access resulting from the introduction of a new station. Typically the impact on congestion is to reduce the duration of the overall peak freeway congestion period, not the degree of congestion. The actual level of congestion during this period is not reduced substantially because there is a demand for use of the at-capacity roadway that is released when transit removes some of the burden.

Also, core transit networks are facing their own significant capacity and congestion challenges during the peak hour/direction. This, too, would have to be considered when computing how added ridership might mitigate auto congestion (whether additional ridership is even feasible given current facilities).

Related Resources

East Contra Costa BART Extension (eBART) Draft Environmental Impact Report, San Francisco Bay Area Rapid Transit District, September 2008.
http://www.bart.gov/about/projects/ecc/environmental.aspx
For an example of this kind of Environmental Impact Report, Val Menotti referred us to eBART, the Diesel Multiple Unit (non-BART) rail technology currently under construction in the Contra Costa State Route 4 east corridor.

Victoria Transport Policy Institute, Victoria, British Columbia, Canada, undated.
http://www.vtpi.org/
This web site is a general resource for gauging the impact of transit on congestion.

Draft Plan Bay Area: Strategy for a Sustainable Region, One Bay Area, Association of Bay Area Governments, Metropolitan Transportation Commission, 2013.
http://www.onebayarea.org/related-materials/Document-Archive.html
This web site provides various resources related to the Plan Bay Area initiative, including a draft plan, supplemental reports and an Environmental Impact Report. Some California metropolitan planning organizations are moving away from using a regional measure of congestion to evaluate their transportation plan investment portfolios as a result of Senate Bill 375, which requires metro

areas to integrate transportation, land use and housing components into a Sustainable Communities Strategy (SCS) to reduce greenhouse gas emissions from cars and light-duty trucks. Plan Bay Area, which lacks a regional measure of congestion, is an SCS in the nine-county San Francisco Bay Area that is administered by the Metropolitan Transportation Commission and the Association of Bay Area Governments, in partnership with the Bay Area Air Quality Management District and the San Francisco Bay Conservation and Development Commission.

California High-Speed Rail Authority

Contact: Annie Parker, Information Officer, Office of Communications, California High-Speed Rail Authority, (916) 403-6931, annie.parker@hsr.ca.gov.

Annie Parker recommended California High-Speed Rail Authority's Revised 2012 Business Plan, specifically Chapters 1 and 5, for information related to traffic congestion. Citations for the complete report as well as for Chapter 1 and Chapter 5 follow:

California High-Speed Rail Program Revised 2012 Business Plan, California High-Speed Rail Authority, April 2012.
http://www.hsr.ca.gov/About/Business_Plans/2012_Business_Plan.html
This report describes the ridership calculations involved in making the case for high-speed rail in California.

"High-Speed Rail's Place in California's Future," Chapter 1, California High-Speed Rail Program Revised 2012 Business Plan, California High-Speed Rail Authority, April 2012.
http://www.hsr.ca.gov/docs/about/business_plans/BPlan_2012Ch1_Future.pdf
Chapter 1 describes current issues and costs associated with additional infrastructure that would be required to address current congestion. Pie charts on page 1-12 of the report illustrate the use of various transportation systems in France and Spain before and after high-speed rail operations were introduced. According to report findings, car and bus modes as a percentage of total travel decreased after high-speed rail was installed—from 29 percent to 21 percent in France and from 44 percent to 36 percent in Spain. However, there is no reference in these justifications to specific levels of congestion on parallel highway corridors, and no specific predictions regarding the amount that congestion is expected to decrease.

"Ridership and Revenue," Chapter 5, California High-Speed Rail Program Revised 2012 Business Plan, California High-Speed Rail Authority, April 2012.
http://www.hsr.ca.gov/docs/about/business_plans/BPlan_2012Ch5_RidershipRev.pdf
Chapter 5 explains the methodology used to forecast ridership for this project. However, the factors used to predict and plan high-speed rail capacity did not include congestion. According to Parker, the state would have to provide that information.

Caltrans, District 7 (Los Angeles)

Contacts: Mike Valcho, Associate Right of Way Agent, Railroad Coordination, Caltrans, District 7, (213) 897-3479, mike_valcho@dot.ca.gov.

Shefa K. Bhuiyan, Branch Chief, Office of Advance Planning, Caltrans, District 7, (213) 897-0649, shefa.bhuiyan@dot.ca.gov.

Mike Valcho (transit) and Shefa Bhuiyan (highways) both indicated that they do not include highway corridor congestion information as a part of transit planning.

Related Resource

> **Metro's Bus Rapid Transit Orange Line: A Case Study in Weighing Regional Benefits and Local Costs**, Jackie Murdock, Heather Jones, fall 2012.
> http://jackimurdock.files.wordpress.com/2013/03/brt-paper.pdf
> This case study addresses how regional benefits (such as system connectivity, improved air quality and reduced congestion) must be weighed against local impacts (increased noise, community disruption) when deciding whether to pursue a project. The report refers to a 2005 study of the influence of Metro's Orange Line (a Bus Rapid Transit project) on US 101 in the Los Angeles area: Average speed during the morning peak hour increased 7 percent while congestion decreased 14 percent.

Metropolitan Transportation Commission (San Francisco)

Contact: David Ory, Principal Transportation Planner/Analyst, Metropolitan Transportation Commission, (510) 817-5755, dory@mtc.ca.gov.

The Metropolitan Transportation Commission maintains a travel model that forecasts the impact of congestion changes due to the introduction of new or improved transit service. This model is used to inform assessments of project performance and of Regional Transportation Plan scenarios. However, David Ory does not expect congestion relief to be a significant benefit of most transportation projects. Instead, transit systems serve to provide mobility that allows areas to thrive even in the presence of extreme congestion (such as on the San Francisco Bay Bridge, which is bypassed by the Transbay BART tunnel, or in Manhattan).

Related Resource

> **Before and After Study Qs and As**, Capital Investment Program: New Starts, Small Starts and Core Capacity Improvements, Federal Transit Administration, U.S. Department of Transportation, undated.
> http://www.fta.dot.gov/12304_2613.html
> Major capital transit projects funded through the Federal Transit Authority's New Starts program always require a before and after study, which focuses on ridership. This web site presents frequently asked questions about before and after studies. According to Ory, measuring the impact of congestion before and after the introduction of a transit investment may be a hopelessly difficult task because the effect is likely to be small, and it may prove impossible to disentangle the various factors that affect congestion.

Sacramento Area Council of Governments

Contact: Bruce Griesenbeck, Principal Transportation Analyst, Sacramento Area Council of Governments, (916) 340-6268, bgriesenbeck@sacog.org.

Bruce Griesenbeck is not aware of efforts to correlate traffic congestion and new transit services within this agency.

San Diego Association of Governments

Contact: Miriam Kirshner, Senior Regional Planner, San Diego Association of Governments, (619) 699-6995, mki@sandag.org.

San Diego Association of Governments does consider corridor congestion when determining which projects to enact in a proposed network; providing service to relieve congested corridors is one of the

evaluation criteria considered. These criteria are outlined in this agency's Regional Transportation Plan. (See Related Resource below.) However, no metric is used (formally or informally) to determine how much ridership capacity to build into the system based on the specific traffic level of the parallel corridor, and Kirshner was not aware of any post-implementation studies to establish a quantitative link between the specific characteristics of the line installed and the reduction of traffic levels (if any) on the highway.

Related Resource

Technical Appendix 4, 2050 Regional Transportation Plan, San Diego Association of Governments, October 2011.
http://www.sandag.org/uploads/2050RTP/F2050RTPTA4.pdf
This appendix describes evaluation criteria that were developed to prioritize highway, high occupancy vehicle and freeway connectors, transit and goods movement projects in the area's transportation network. The criteria address specific goals and are organized in three categories: serves travel needs, develops network integration and addresses sustainability. A series of tables provide weighting and scoring details for these criteria. Evaluation criteria for transit services include:

- Mobility (Does the route serve the more congested highway corridors or arterials in the region?).
- Critical linkage (How many other high-frequency transit routes does the route connect to?).
- Cost-effectiveness (What is the annual public capital and operating/maintenance cost divided by passenger miles?).

Other Agencies

Atlanta Regional Commission

Contacts: Regan Hammond, Principal Planner, Atlanta Regional Commission, (404) 463-3269, rhammond@atlantaregional.com.

Guy Rousseau, Surveys and Transportation Modeling Manager, Atlanta Regional Commission, (404) 463-3274, grousseau@atlantaregional.com.

Currently the Atlanta Regional Commission does not use any tools other than its regional travel demand model to gauge the overall regional highway congestion benefits from implementing transit expansion projects. However, a Federal Transit Authority sponsored research project about the highway benefits of New Starts projects is underway. The focus is on appropriate methods for predicting changes in highway travel times (and, therefore, volumes) when a transit project takes some vehicle trips out of the tables loaded onto the highway network.

Colorado Department of Transportation

Contact: Tracey MacDonald, Senior Transit and Rail Planner, Division of Transit and Rail, Colorado Department of Transportation, (303) 757-9753, tracey.macdonald@state.co.us.

While Colorado DOT does not operate any transit, it administers Federal Transit Authority grants to local agencies and engages in planning activities. Performing environmental studies on congested corridors may result in transit as well as widening a highway or taking other steps. In this way, transit and highway divisions do work together to help determine when transit will be the most cost-effective solution to address congestion on a given highway. But a formal correlation between transit and congestion mitigation is not utilized. Examples of Environmental Impact studies that resulted in a multimodal solution follow:

North I-25, Colorado Department of Transportation, October 24, 2012.
http://www.coloradodot.info/projects/north-i-25-eis
This web site presents information about the Environmental Impact Statement (EIS) that identified and evaluated multimodal transportation improvements along Interstate 25 from Fort Collins/ Wellington, Colo., to Denver.

US 36 Environmental Impact Statement, Colorado Department of Transportation, March 17, 2011.
http://www.coloradodot.info/projects/us36eis
This web site presents information about the EIS that studied multimodal transportation improvements along US-36 between Denver and Boulder, Colo.

News and Announcements from the I-70 Mountain Corridor, Colorado Department of Transportation, September 20, 2013.
http://www.coloradodot.info/projects/i-70mountaincorridor
This web site provides information about various environmental studies as well as current and planned projects.

Related Resource

"Impact of Light Rail on Traffic Congestion in Denver," Sutapa Bhattacharjee, Andrew R. Goetz, *Journal of Transport Geography,* Vol. 22, May 2012: 262-270.
Citation at http://trid.trb.org/view.aspx?id=1140697
This study examined vehicles miles traveled data from 1992 to 2008 on Denver's highways. Researchers concluded that Denver's light rail system has reduced the level of traffic along some of the adjacent highways "for a short period of time."

Massachusetts Bay Transportation Authority

Contact: Joe Cosgrove, Director of Development, Strategic Business Initiatives & Innovation, Massachusetts Bay Transportation Authority, (617) 222-4400, jcosgrove@mbta.com.

According to Joe Cosgrove, making estimates about congestion reduction as the result of a particular transit investment was a strategy "designed to fail." It is unlikely that the implementation would fulfill the prediction, which could undermine future transportation investments. Instead of using a formal tool, the Massachusetts Bay Transportation Authority uses measures like on-time performance and travel time to evaluate and justify transit, without any reference to congestion on parallel highway corridors.

Southwestern Pennsylvania Commission

Contact: Chuck DiPietro, Transportation Planning Director, Southwestern Pennsylvania Commission, (412) 391-5590, ext. 310, dipietro@spcregion.org.

Southwestern Pennsylvania Commission does not use informal tools to predict the impact of new transit service on highway congestion or to measure the change in congestion after implementation. Instead the agency uses its travel demand model to simulate the impact of the investment and to estimate the changes in regional travel, mode shares and highway travel time, and the delay from major (and some not so major) increases and decreases in transit service. However, these estimates are not obtained quickly or cheaply. Key considerations include defining the study impact area and network upfront, deciding how far back to go in the modeling chain, and determining time and budget constraints. To save time and cost, the agency recommends performing these assessments in coordination with a Transportation Improvement Plan amendment or long-range transportation plan update.

Additional Resources

We also attempted to contact the following individuals and agencies who were located either through web searches related to specific transportation projects or through the AASHTO Standing Committee on Public Transportation. These attempts did not result in a material contribution to the findings presented in this Preliminary Investigation:

- **Baltimore City Department of Planning**
  Theo Ngongang, Assistant Director, (410) 396-6856, theo.ngongang@baltimorecity.gov

- **Chicago Metropolitan Agency for Planning**
  Randy Blankenhorn, Executive Director, (312) 386-8600, rblankenhorn@cmap.illinois.gov

- **District of Columbia Department of Transportation**
  Steve Strauss, Deputy Associate Director, Progressive Transportation Services Administration, (202) 671-1357, steve.strauss@dc.gov

- **Illinois Department of Transportation**
  David Spacek, Deputy Director, Transit, (312) 793-2154, david.spacek@illinois.gov

- **Los Angeles County Metropolitan Transportation Authority**
  Frank Quon, Executive Officer, Highway Programs, (213) 922-4715, quonf@metro.net

- **New Jersey Transportation Planning Authority**
  Sutapa Bhattacharjee, Principal Transportation Planner, Systems Planning, (973) 639-8428, sbhattacharjee@njtpa.org

- **Washington State Department of Transportation**
  Brian Lagerberg, Director of Public Transportation, (360) 705-7878, lagerbb@wsdot.wa.gov

  Linda Howell, Accountability Manager, (306) 705-7926, howell@wsdot.wa.gov

  Cathy Silins, Deputy Director of Public Transportation, (360) 705-7919, silinsc@wsdot.wa.gov