

Project Title:

First and Last Mile Strategies for Transit Systems

University:

University of Utah

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Research Needs:

The growth of economic development and opportunities necessitated mobility improvements in the State of Utah in recent decades. According to Congress for New Urbanism, Salt Lake City area has the fastest growth of rail transit comparing with any American city (Eckerson, 2013). The ambitious program of transit construction spans across light rail, Bus Rapid Transit (BRT), streetcars and commuter rail simultaneously since 1990s. The Utah Transit Authority (UTA) is the primary public transit provider in Salt Lake, Utah, Davis, Weber, Box Elder and Tooele Counties. UTA has one of the largest geographic areas served by a single transit agency in the

nation with over 1,500 square miles of service area. Currently more than 80 percent of the state's population live and work in UTA's service area. As the area grows and changes, UTA must respond by meeting the new demands for service while maintaining the same levels and quality of service that the public expects. Responding appropriately requires in-depth planning and actions based on market characteristics, long-term economic and demographic trends, analysis of alternatives and financial capacity. An essential part of the response to population growth and service changes is ensuring that adequate facilities exist to support the ongoing provision of high quality transit service to their service areas.

One of the problems that faces many aspects of transportation infrastructure is called First and Last Mile. That is, how do agencies efficiently connect homes, offices, or other individual end/start points to the larger transportation grid? The term "Last Mile problem" can be used to describe the difficulty in getting people from a transport hub, such as a railway station or bus depot, to their final destination and back again. When users have difficulty getting from their starting location to a transport network, this can be described as the "First Mile problem."

In the United States, where land-use patterns have moved more jobs and people to lower-density suburbs that are often not within walking distance to existing public transportation option, First-Last Mile problems are more apparent. This promotes a reliance on cars, which results in more traffic congestion, pollution, and urban sprawl. Traditional solutions to the first-last mile problem in public transit have included the use of feeder buses, bicycling infrastructure, pedestrian amenities and urban planning reform. Other methods of alleviating the problem such as bicycle sharing systems, car sharing programs, van pools, folding bike, taxi cab services, wayfinding, and other strategies have been proposed with varying degrees of adoption. Bicycle sharing programs, however, have been widely successful in Europe and Asia, and are now being implemented on a larger scale in North America.

Research Objectives:

The objectives of this project is to develop recommendations for a comprehensive first and last mile strategy around major transit stations and fixed route stops including existing BRT (including Provo/Orem), light rail and commuter rail stations within the UTA system in an effort to reduce auto usage and increase ridership as a means of improving air quality and reducing congestion.

Research Methods:

The project will start with gathering and preparing all of the resources required for summary and analysis of existing conditions and general study area characteristics and the applicability of specific first-last mile strategies to the study area. It includes a comprehensive review and summary of recent studies specific to UTA's system. This is followed by research and review of first-last mile strategies currently implemented within UTA's service and at other national/international transit systems (including way-finding, sidewalk connections, trail options, potential street connections, etc.) With this information gathered, data analysis will be conducted in the following aspects:

- Existing conditions for all existing fixed route stops for BRT, light rail and commuter rail within the UTA service area;
- Market research on the latent demand for first-last mile strategies; and

- Analysis of the impact of reduced auto uses related to personal and environmental health

The end result of the data analysis will be used to make recommendations specific to the fixed routes stops on BRT, light rail and commuter rail. Specific items to be addressed include:

- How do these strategies work in tandem? How can they best be integrated?
- Where are current first-last mile strategies located?
- What are the characteristics of the areas where these strategies exist and how do those characteristics relate to their financial or economic success or struggles? These characteristics may include:
 - Population densities in areas served by the strategies.
 - Growth in population in those areas.
 - Economic growth in those areas.
 - Levels of taxation in those economies, especially taxes on other forms of transportation that might affect demand (e.g., fuel taxes).
 - Diversity of transportation options in those regions, including highway capacities and air travel availability.
 - How do regulatory and legal structures differ in places served by these strategies?

A methodology framework will then be developed to look at system characteristics and categorize/rank the strategies and their applicability to the UTA system. 6-8 most viable first-last mile solutions will be proposed on the basis of Wasatch Front geography, climate, demographics, income levels, preferences, etc. Specific recommendation for each transit station location will be made.

Expected Outcomes:

This project will provide recommendations on the first-last mile strategies that will be most successful in increasing transit ridership, benefitting the regional system and maximizing mobility options within the UTA system and reducing auto usage. Detailed justification on the choices, with highlights on their benefits and how they are best suited to the region and each station will be provided. Specific implementation strategies at each existing stop for BRT (including Provo/Orem), light rail and commuter rail for each technology, including who should implement, manage and operate each program and where each should be implemented, will be provided in this study as well. For each technology associated with the first-last mile strategies, cost/benefit analysis will be conducted and the expected ridership increases/mode share shifts, positive health and environmental impacts will be quantified.

Relevance to Strategic Goals:

This project is most relevant to the USDOT strategic goals of “Economic Competitiveness” and “Livable Communities”.

Economic Competitiveness

The purpose of transportation network development is to efficiently move people and goods. As one of the critical components, public transportation system in the state of Utah strives to increase the ridership as an effective countermeasure to help relieve the traffic congestion. This project identifies the first-last mile strategies that help increase the ridership and improve the

accessibility of transit grid. Meanwhile, the multi-modal transportation system, coupled with ridesharing programs that the project is looking at has significant benefits on the economic health of the region.

Livable Communities

The expected outcomes will support explicit considerations of mobility and accessibility of the existing transit system to provide users efficient travel experience. The end result of this research would inspire a series of research, including regional accessibility analysis, bike share and car-sharing programs, etc. The research result will provide thorough analysis and recommendations on building a livable community enabling multi-modal transportation that are environmentally sustainable.

Educational Benefits:

Two graduate students and one undergraduate student will be heavily involved in this research. They will lead the preparation of journal publications resulting from the work, and in most cases, deliver conference presentations. The project will serve as a basis for his/her dissertation work. The undergraduate level course CVEEN 3520: Transportation Engineering and the undergraduate/graduate level course CVEEN 5560/6560: Transportation Planning are the ideal platform to introduce the concept of transit-oriented development. The policy inferences, along with the procedure for performing literature review, collecting socio-economic and built environment data, and analyzing the data to recommend first-last mile strategies will lead to new material and possibly group project to teach the students practical skills on transportation planning. This project will also engage community, stakeholders, MPOs and municipal governments via web-based methods and workshops in order to educate and get feedback on potential solutions.

Work Plan:

PHASE I

Task 1: Project Management and Study Initiation

The task is mainly to establish management tasks to ensure clear communication and coordination among UTA and the University of Utah in performing subsequent tasks. A Project Management Plan will be developed including a refined work scope, schedule, budget, quality control, invoicing protocol, and communications plan.

Task 2: Data Collection/Problem Evaluation

The objective of the Data Collection/Problem Evaluation task is to gather and prepare all of the resources required for summary and analysis of existing conditions and general study area characteristics and the applicability of specific first-last mile strategies to the study area. This task includes data gathering on the recent studies of the UTA system, first-last mile strategies currently implemented within UTA's service area and other transit systems, personal and environmental health benefits of the implementation of each strategy, etc.

Task 3: Analysis and Recommendation

The task includes analyzing the information and data gathered from Task 2 and make recommendations for the transit stations on the first/last mile strategies. Specifically, the following issues will be addressed:

- How do the identified strategies work in tandem? How can they best be integrated?

- Where are current first-last mile strategies located?
- What are the characteristic of the areas where these strategies exist and how do those characteristics relate to their financial or economic success or struggles?

Task 4: Report Document

The findings from Task 3 including approach and methodology will be summarized in a formal report.

PHASE II

Task 5: Outreach and Implementation

The strategies put forward in Phase I will need to be proposed and marketed to potential partners in order to move forward into implementation.

Technology Transfer Plan

The potential audiences for this research are individuals and public agencies involved in transit-oriented development and regional planning. The following agencies, offices, and committees are those most likely to take a leadership role in implementing the research results:

- Utah Transit Authority
- Utah Department of Transportation
- Federal Transit Administration
- TRB Transit Management and Performance Committee
- TRB Rail Transit Systems Committee

The proposed PI and co-PIs routinely interacts with UTA, UDOT, FHWA, FTA, and the listed TRB Committees. The 2015 TRB Annual Meeting will be an opportunity to share early results and future directions of the research project. The proposed PI and co-PIs will work with the committee chairs to possibly get a presentation on the project added to the agenda. At least one TRB paper on this work will be submitted for presentation and publication.

Schedule of Research Activities

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Month 13	Month 14	Month 15
Task 1 Project Management and Study Initiation	■	■													
Task 2 Data Collection/Problem Evaluation		■	■	■	■	■	■								
Task 3 Analysis and Recommendation						■	■	■	■	■	■				
Task 4 Report Document											■	■	■	■	
Task 5 Outreach and Implementation													■	■	■

■ Research Task
■ Peer Review

Project Cost:

Total Project Costs: \$ 148,478

MPC Funds Requested: \$ 74,239

Matching Funds: \$ 74,239

Source of Matching Funds: Utah Transit Authority

TRB Keywords: Transit; first mile last mile; light rail; multi-modal.

References:

Eckerson, C. (2013). Salt Lake City: A Red State Capital Builds Ambitious Transit.

<http://www.streetfilms.org/salt-lake-city-utah-a-conservative-state-builds-progressive-transit/>