

2019 UDOT RESEARCH PROBLEM STATEMENT

*** Problem statement deadline is Feb. 6, 2019. Submit statements to UTRAC@utah.gov. ***

Title: Analysis of Express Lanes in Utah

No. (Office Use): 19.03.09

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Select **ONE** Subject Area Materials/Pavements Maintenance Traffic Mgmt/Safety Structures/Geotech
 Planning Perf Mgmt/Data Analytics Public Transportation Other

1. Describe the problem to be addressed:

In September 2006 the Utah Department of Transportation (UDOT) developed a system of managed lanes when the existing High Occupancy Vehicle (HOV) lanes along the Wasatch Front were converted to Express Lanes or High Occupancy Toll (HOT) lanes, providing an opportunity for Single Occupancy Vehicles (SOVs) to travel in the HOV lanes for a fee. From the opening of these managed, or “Express Lanes,” in September 2006 until August 2010 SOVs paid a flat monthly fee to use the lanes. UDOT allowed up to 2,200 vehicles to purchase a monthly pass for \$50 per month. This pass allowed unlimited usage of the Express Lanes by the SOVs. Beginning in August 2010 the Express Lanes began to charge SOVs for each trip taken on the lanes. In addition, the price per trip varied based on the amount of congestion experienced in the Express Lanes at that time. This new pricing system 1) opened up the potential user base to many more travelers as it was no longer limited to 2,200 users and 2) better aligned the cost of travel on the lanes to the true societal costs. Initially the maximum toll per zone was limited to \$1.00 for each of the seven zones along the corridor. In 2018 the Utah legislature increased the Express Lanes to as much as \$4.00 per zone, though UDOT has only implemented a \$2.00 per zone maximum toll thus far to see if that would achieve the desired results of increasing speeds in the Express Lanes. Today there are 72 miles of Express Lanes in seven different zones along the Wasatch Front extending from Spanish Fork in the south to Layton in the north.

To evaluate the initial changes made to the Express Lanes in Utah, Brigham Young University (BYU) researchers conducted an evaluation of the system in June 2014 (1). The results of this research indicated that the majority of the Express Lane corridor in the state of Utah was operating within the 10th percentile speed goal of 55 mph set by UDOT and the 45 mph requirement set by the Federal Highway Administration (FHWA). There were some zones, however, where the speeds were below the thresholds. This research was followed up in February 2015 with a Phase II report on recommendations for the system as well as research on the vehicle occupancies along the corridor (2). The primary objectives of the February 2015 research were to recommend actions that will improve average speeds in the Express Lanes, to examine violation data to determine ways to reduce violator rates, to recommend ways to control Express Traffic and to evaluate changes to toll rates, and to analyze “C” decal use in the state.

With the changes that have occurred on the Express Lanes since the research conducted in 2015, there is a need to once again evaluate the current use of the system and identify what the effect of the increase in the toll per zone has been in terms of vehicle occupancy as well as speed and density in the lanes under a limited number of congestion and pricing scenarios. This will allow UDOT to identify the benefits of the Express Lanes, to evaluate the impact that the increased toll per zone has had on the use of the lanes, and help predict the effect future toll increases will have.

References:

1. Schultz, G. G., Mitchell, D. K., Pulver, Z., Mineer, S., and Burriss, M. W. “I-15 Express Lanes Study Phase I: System Evaluation.” Report UT-14.05, Utah Department of Transportation Research Division, Salt Lake City, UT.
2. Schultz, G. G., Mineer, S. T., Hamblin, C. A., Halliday, D. B., Groberg, C. C., and Burriss, M. W. “I-15 Express Lanes Study Phase II: Recommendations.” Report UT-15.03, Utah Department of Transportation Research Division, Salt Lake City, UT.

2011 UDOT RESEARCH PROBLEM STATEMENT

2. Write the project objective (25 words or less):

Identify the effect of the toll increase in terms of vehicle occupancy as well as speed and density under a limited number of scenarios.

3. Explain why this research is important:

(In response, consider addressing specific UDOT goals, applicability in Utah or other states, etc.)

This research is critical to UDOT as they work to maintain the current status of the Express Lanes in the state. The research will allow UDOT to better understand the impact of the recent maximum toll increase to the Express Lanes and to better understand the optimal toll rate to improve performance.

4. List the major tasks:

1. Kickoff meeting to develop a project scope of work and final cost estimate
2. Conduct a literature review
3. Develop a design of experiment to collect data necessary to quantify the current usage of the lanes including the potential to utilize surveys of users to see how choices have been made
4. Collect data related to Express Lane use including transponder use, "C" decal use, speed and volume data for both Express Lanes and General Purpose lanes, violator data, and vehicle occupancy data (using the Carousel method developed by BYU researchers during the Phase II research)
5. Analyze data collected to perform a sensitivity analysis of speeds, toll rates, violators, etc.
6. Develop recommendations and conclusions
7. Report results to UDOT in the form of a written report

5. List the expected deliverables (reports, manual, specification, design method, training, etc.):

1. Engineering report documenting literature review and research results
2. Journal publication(s) of research results
3. Results of the research will provide UDOT with a better understanding of the use of the Express Lanes that can then be used to determine next steps in the continued monitoring and improvements of the lanes

6. Describe how the research results will be implemented:

(In response, consider addressing UDOT leader support, process or standard improvement, etc.)

This research will be implemented by the UDOT Traffic Management Division to provide recommendations on ways to assess maximum toll rate increases and better understand the impact on the toll rate with respect to performance.

7. Requested from UDOT: \$70,000
(or UTA for Public Transportation)

Other/Matching Funds: \$

Total Cost: \$70,000

8. Outline the proposed schedule, including start and major event dates:

It is recommended that this project begin in late summer or early Fall 2019 with the initial tasks of the project scope of work and detailed cost estimate, followed with the literature review and design of experiment. It is anticipated that the project would take 16 months, including a 2-month time period to review and finalize the report.