Examination of Paid Travel on the I-85 Express Lanes

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ABSTRACT
The implementation of the I-85 Express Lanes in Atlanta, Georgia, was the first conversion of a high-occupancy vehicle lane to high-occupancy toll lane that simultaneously increased the occupancy requirement (from two or more persons to three or more persons) and implemented tolls without the creation of additional lanes. This paper presents the findings of an analysis of tolling data collected during the first year of operation as part of the National Evaluation of Urban Partnership Agreement and Congestion Reduction Demonstration programs sponsored by the U.S. Department of Transportation. This analysis found the median willingness to pay for Express Lane travel time savings to be $19.45 per hour across all time periods and $33.17 per hour for southbound a.m. peak travel. There was little difference in the willingness to pay between frequent and infrequent travelers of the Express Lanes. This analysis was based on actual tolls paid by travelers and represents the minimum these travelers were willing to pay.
INTRODUCTION

In 2007 and 2008, the U.S. Department of Transportation (USDOT) awarded $1.3 billion to six regions as part of the Urban Partnership Agreement (UPA) and Congestion Reduction Demonstration (CRD) programs. The main goal of the programs was to incorporate four key strategies (referred to as the 4Ts) to relieve urban congestion. These key strategies were tolling, transit, telecommuting, and technology. Four of the six urban areas (Miami, Florida; Atlanta, Georgia; Minneapolis, Minnesota; and Los Angeles, California) converted or expanded existing high-occupancy vehicle (HOV) lanes into high-occupancy/toll (HOT) lanes. Tolls on all four HOT lanes used congestion pricing to dynamically adjust rates, permitting either an increase or decrease in toll rate to better manage demand. Ridesharing, telecommuting, and transit programs were primary components of all UPA/CRD sites that provided users with a non-tolled alternative.

The Atlanta region was one of the sites selected by USDOT under the CRD program, with a total of $110 million being awarded to the Georgia Department of Transportation (GDOT), State Road and Tollway Authority (SRTA), and Georgia Regional Transportation Authority. The main elements of the Atlanta CRD program were a HOV-to-HOT lane conversion and expanded express bus service on the I-85 corridor in DeKalb and Gwinnett Counties. The total expenditure for the program was $182 million, including local contributions, with roughly two-thirds of the cost going to support transit-related improvements. This research examines the use of the new tolled Express Lanes (HOT lanes) on I-85 in Atlanta based on data collected as part of the UPA/CRD National Evaluation sponsored by USDOT.

The use of Atlanta’s I-85 Express Lanes was examined during a six-month period to better understand travelers’ value of time (VOT) and their willingness to pay (WTP) for travel time savings. Specifically, researchers:

- determined an empirical WTP based on real-world traveler choices between a tolled, faster trip and an untolled, slower trip;
- examined if the WTP varied based on time of day or direction of travel; and
- examined if the WTP varied by frequency of Express Lane use (it was hypothesized that travelers who rarely used the ELs were using them only when they desperately needed a faster trip or reliable trip time, and were willing to pay a higher amount than those travelers who used the lanes frequently).

LITERATURE REVIEW

Transportation agencies may consider implementing HOT lanes (often called express lanes) on their freeways as a way to optimize performance of existing HOV facilities. With operating HOV facilities, agencies can control demand by adjusting occupancy requirements (e.g., from two- to three-person carpool). However, any adjustment in the occupancy requirement can cause a large change in usage, causing the facility to be either under- or overused. Tolling an HOV lane provides much more control, so agencies can better adjust for demand by altering the toll rate to encourage or discourage users from traveling on the facility.

However, a number of limitations are associated with congestion pricing that can cause a facility to perform poorly. Prior literature has cited that congestion pricing was developed as a second-best solution because the optimal toll rate cannot be precisely known due to a lack of knowledge about demand (1). Specifically, exogenous factors such as fuel prices, weather conditions, media stories, and local school schedules can all influence demand. In Atlanta, it was found that a local traffic reporter had impacted demand on the I-85 Express Lanes by giving
real-time information on the radio (2). Given these complexities, most operators of HOT lanes constantly monitor traffic on the lanes and adjust the toll rate accordingly.

Negative public perceptions also present a challenge when implementing congestion pricing projects. A study conducted by the Metropolitan Washington Council of Governments found that people are often skeptical about how pricing would work and want to see how it would specifically impact them (3). Other surveys have concluded that the public is receptive to real and specific examples; people generally care about the use of toll revenues and want simplicity in a pricing structure (4). Research also suggests that congestion pricing can be more acceptable to the public if they have used and experienced similar facilities. However, implementing the first congestion pricing project within a region can be a challenge because the public cannot readily refer to a similar local project.

The VOT is defined in this paper as the amount of money that a traveler is willing to pay for travel time savings. Specifically, the VOT is the marginal rate of substitution between cost and travel time in behavior-choice models (5, 6). Agencies use VOT as empirical evidence of how travelers value time. Agencies also use VOT to help them understand travel behavior decisions, which in turn are used to plan and implement improvements to the transportation system and optimize the use of limited resources. The value of travel time reliability (VOR) is the value that travelers place on the ability to reach a destination on time with a reasonable expectation of certainty, matched with the WTP to reduce travel time variability (5).

Estimates of VOT and VOR can vary widely depending upon how data are collected and analyzed. Prior studies have shown that VOR can have a considerable range among travelers, from as low as 55 percent of VOT (7) to 322 percent of VOT (8). Surveys are often used to ask travelers how much they are willing to pay for travel time savings. Revealed-preference surveys use actual trip and price information to help discern VOT, as opposed to stated-preference surveys that ask what drivers would pay under hypothetical situations. VOT often varies widely across travelers because some groups of users have a higher VOT than others. One hypothesis is that infrequent express and HOT lane users tend to have a higher VOT for the limited number of trips they make on the tolled lanes.

Various factors appear to influence how individual users select to travel in a HOT lane as opposed to using the general-purpose lanes (GPLs). Common reasons cited by HOT lane travelers include saving travel time, having reliable trip times, and making important trips on time. A stated-preference survey of users on the Katy Freeway (I-10) Managed Lanes in Houston, Texas, found that travelers who have an important appointment or are worried they will be late have the highest WTP to use the lanes. A study of real-world data collected on the Katy Freeway Managed Lanes calculated the average WTP to be $51 per hour of travel time savings (9). Attitudinal surveys of I-15 Express Lane users in San Diego, California, expressed that travel time savings and reliability, especially during morning commutes, were important characteristics of usage after the facility first opened in 1998 (10). Travel time savings were also important for users of the SR-91 Express Lanes in Orange County, California. A revealed-preference survey using trip data from SR-91 Express Lanes and I-15 HOT lane travelers in Southern California estimated the VOR to be 95 to 140 percent of the median travel time (5).

However, one-third of SR-91 Express Lanes users had indicated in a survey that driver safety and comfort were primary factors in their choosing the ELs (11).
THE ATLANTA CRD PROJECT

The existing HOV lanes on I-85 in DeKalb and Gwinnett Counties were considered by some to be congested and poorly performing. A study of data obtained during 2007 and 2008 from the Georgia NaviGAtor, Georgia’s Advanced Transportation Management System, showed the I-85 HOV lane to be operating under constrained conditions during most of the morning and afternoon peak periods. To improve operations, the region considered an increase in the occupancy requirement from two or more persons (HOV2+) to three or more persons (HOV3+). However, there was a consensus that demand in the HOV lane would drop so severely that congestion in the GPLs would increase (12). A conversion from an HOV2+ lane to a HOT3+ lane would, in theory, still allow carpools to use the managed lane while metering access for others through the use of tolling. The operation of a HOT lane was believed to optimize flow and carry more vehicles overall, causing the GPLs to improve because the HOT lane remained in free-flow conditions, carrying more vehicles than when it became congested.

The Atlanta CRD project converted 15.5 miles of HOV2+ lanes into dynamically priced HOT3+ lanes on I-85 from Chamblee-Tucker Road in DeKalb County, just south of I-285, to just north of Old Peachtree Road in Gwinnett County. The HOT lanes from the Atlanta CRD project were officially branded as the I-85 Express Lanes. GDOT was responsible for the construction component of the lane conversion, while SRTA was responsible for the operation of the tolling system. The tolling system operated for 24 hours per day, 7 days per week, in both the northbound and southbound directions. SRTA publically stated that toll rates could vary between $0.01 and $0.90 per mile during the first year of operation (13).

The I-85 Express Lanes were notable because the project was the first HOV-to-HOT lane conversion project that simultaneously introduced tolling and increased the occupancy requirement without adding additional lanes. The project opened for full operation on October 1, 2011, and tolling occurred on all segments in both the northbound and southbound directions. Carpools of three or more people, motorcycles, alternatively fueled vehicles (AFVs) with Georgia AFV license plates, transit services, and emergency vehicles were all exempt from paying tolls. Under the operating rules for the I-85 Express Lanes, HOVs and other exempt vehicles had to register for a transponder. This was not required when the lane operated as an HOV lane. The transponder was a sticker-based unit that could be affixed to windshields, based on the ISO 18006-C standard. Users had to self-declare their occupancy status to qualify for toll-exempt trips by calling the SRTA customer service center or declaring themselves on the mobile phone application. A self-declaration had to occur at least 15 minutes before a trip was made to be properly entered into the system.

The ELs used the footprint of the double-white striped buffer from the existing HOV lanes and kept most of the access points where vehicles could enter and exit. There were four intermediate access points in each direction, ranging from roughly 0.50 to 0.82 miles in length, interspersed between five main tolling segments. Users could also access the ELs at the termini at both ends of the corridor and at a separate access ramp off GA 316. Each tolling segment was about 1.5 to 3.5 miles in length. Users were not permitted to cross the double-white buffer, or else they would be given a citation or violation for illegal movement. Alterations in striping were only made in the southbound direction near GA 316, where an additional access point was created because that toll segment was originally 7 miles. Users had expressed a desire to access the ELs at GA 316 after the first few months of operation.

A unique element of the I-85 Express Lanes was the introduction of an automated enforcement system that aided officers with visual occupancy checks and identified users who...
crossed the double-white line. The system incorporated the use of 34 overhead gantries equipped with radio frequency identification (RFID) readers and mobile automatic license plate reader (ALPR) cameras placed in enforcement vehicles. The gantries were installed at roughly 0.5-mile intervals along the corridor. Officers who enforced the ELs had the capability of using the ALPR to identify the occupancy status of users in real time. The automated system also identified users who crossed the double-white line by checking the sequence of transponder reads across all gantries to determine where a vehicle first entered and exited a lane. If either the first or last read from a transponder was not near an access point, a toll violation was posted to the user’s account. In theory, ensuring a reduction in the number of weaving movements between the ELs and the GPLs would improve vehicle flow and the performance of the managed lane. The frequently placed RFID readers and the fact that many travelers had transponders also provided a wealth of data on travel choices and travel times on the I-85 facility. These data are the foundation of this research and are discussed in more detail in the next section of this paper.

DATA SOURCES
The WTP for travel time savings on the I-85 Express Lanes was determined using archived data that noted when users traveled on the GPLs versus the ELs. The analysis used automatic vehicle identification (AVI) data to represent non-tolled trip activity from the GPL, and toll transactions were used to define tolled activity and toll status (e.g., HOV versus non-HOV) from the ELs. Data for the analysis from both the AVI readers and the toll systems represented the period from February 25, 2012, to August 24, 2012. The timeframe was limited due to the AVI sensors being deactivated during the first few months of operation and concerns about data quality.

There were 73 AVI readers in the northbound direction and 65 AVI readers in the southbound direction. The AVI readers provided extremely accurate location and time data for over 207,000 unique transponder IDs. From the unique transponder IDs from the AVI records, the travel times and distances for all trips of transponder-equipped vehicles were obtained along the GPLs. Toll transaction data provided similar information on paid EL trips, along with specific data on the trip starting point, ending point, and amount of toll paid. The two datasets included over 5.6 million total trips spanning the six-month period. At the onset of the analysis, 3.45 million trips came from the GPLs, and 2.15 million trips came from the ELs. An approximately even number of trips were from the northbound and southbound directions.

RESULTS AND ANALYSIS
The WTP values were only determined for EL trips that could be matched to corresponding GPL trips that occurred at the same time, in the same direction, and between the same locations. This reduced the total number of trips used for analysis from 2.15 million EL trips to 1.28 million EL trips. Next, each of the 1.28 million EL trips was compared to equivalent GPL trips. The toll paid by the EL traveler was divided by the amount of time saved on the EL as compared to the GPL. Some trips were toll free and paid zero tolls (e.g., registered transit vehicles, HOV3+ carpools). The percentage of trips that were removed due to having a toll-exempt status did not represent the proportion of all toll-exempt trips made on the ELs.

In some cases the traveler paid a toll for very small, zero, or even negative travel time savings—in the case when the ELs were slower than the GPLs. These distinctions are interesting to note but were excluded from further analysis, leaving 1.15 million trips to analyze. Table 1 shows the number of outlier trips that were removed from the analysis. Including this additional
6 percent of trips would have only changed the WTP a small amount but added considerable confusion in the diagrams and interpretation of results.

**TABLE 1 Data Outliers**

<table>
<thead>
<tr>
<th>Type of Trip Data</th>
<th>Northbound Trips Removed</th>
<th>Southbound Trips Removed</th>
</tr>
</thead>
<tbody>
<tr>
<td>No travel time savings</td>
<td>3,237 (0.5%)</td>
<td>3,612 (0.6%)</td>
</tr>
<tr>
<td>WTP &gt; $400/hour</td>
<td>7,579 (1.1%)</td>
<td>10,415 (1.7%)</td>
</tr>
<tr>
<td>WTP &lt; $0/hour</td>
<td>35,472 (5.4%)</td>
<td>32,854 (5.3%)</td>
</tr>
<tr>
<td>WTP = $0/hour (toll-free vehicles)(^a)</td>
<td>23,477 (3.6%)</td>
<td>17,642 (2.8%)</td>
</tr>
<tr>
<td>Total trips remaining</td>
<td>591,273 (89.4%)</td>
<td>560,015 (89.7%)</td>
</tr>
</tbody>
</table>

\(^a\) This does not mean there were a total of 3.6 percent and 2.8 percent toll-exempt trips on the ELs; trips were eliminated due to not having a corresponding trip in the other lanes.

The distribution of WTP values for travelers who used the EL is shown in Figures 1 and 2 and is summarized in Table 2. The solid line in both WTP graphs specifically represents the cumulative distribution frequency. The long tail of the distribution toward the right of the figures is a result of travelers paying a toll for a very small amount of travel time savings. For example, a $0.50 toll for a five-second travel time savings equates to a $360 per hour WTP value. The WTP graphs had an arbitrary cutoff at $400 per hour. However, a much lower cutoff point would result in only a small percentage of trips removed, such as using a cutoff at $100 per hour. Due to the long-tailed distribution, the median WTP was believed to better reflect what most EL travelers were willing to pay. The median WTP value was $19.45 per hour for all EL trips on the CRD corridor. The median a.m. peak-period WTP value was $33.17 per hour for southbound traffic, the highest WTP for all the time periods. This represents the morning trip to work for many travelers, and thus it is not surprising that it had a higher WTP. However, other HOT lanes had mixed results, with some having their highest demand on the morning trip to work (I-394) and some on the afternoon trip home (SR-91).
FIGURE 1  Cost of travel time savings for all southbound trips.

FIGURE 2  Cost of travel time savings for AM peak southbound trips.
A closer assessment of the WTP was made by looking at how frequently users took the I-85 Express Lanes as opposed to the GPLs and the toll they paid. This analysis was done to investigate if infrequent EL users paid a toll only when they observed unusual congestion on the GPLs. At the same time, frequent tolled EL users were investigated to determine if they used the EL regardless of congestion in the GPLs. If correct, these hypotheses would improve understanding of traveler behavior. The information could also lead to improved traffic and revenue forecasts for managed lanes.

The frequency of EL usage was grouped according to the percent of total trips taken in the EL. No users were counted if they did not take any EL trips during the six-month period. The specific bins were defined as Rare (0.01 to 15.00 percent of all trips taken in the ELs), Occasional (15.01 to 30.00 percent), Irregular (30.01 to 50.00 percent), and Frequent (50.01 to 100.00 percent). The number of trips and transponders associated with this part of the analysis is shown in Table 3, with 100,000 travelers represented. Roughly half of the users from the sample, defined as the number of active transponders, took the EL less than 30 percent of the time.

The day of the week and time of day that travelers used the ELs was investigated for both the northbound and southbound directions (Tables 4 and 5, respectively). Very little difference was found in the travel patterns of EL use based on the percentage of trips made in the ELs. However, travelers who took more frequent tolled trips (more than half of their trips were in the ELs) were more likely to travel during peak periods.
TABLE 4 Northbound EL Trips Based on Frequency of EL Use

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequent Traveler Group</th>
<th>Irregular Traveler Group</th>
<th>Occasional Traveler Group</th>
<th>Rare Traveler Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of transponders</td>
<td>12,533</td>
<td>14,797</td>
<td>12,622</td>
<td>14,662</td>
</tr>
<tr>
<td>Percentage of transponders</td>
<td>22.9</td>
<td>27.1</td>
<td>23.1</td>
<td>26.8</td>
</tr>
<tr>
<td>Number of trips</td>
<td>325,974</td>
<td>112,400</td>
<td>69,912</td>
<td>41,254</td>
</tr>
<tr>
<td>Percentage of trips</td>
<td>59.3</td>
<td>20.5</td>
<td>12.7</td>
<td>7.5</td>
</tr>
<tr>
<td>Sunday (percentage)</td>
<td>2.2</td>
<td>4.0</td>
<td>4.4</td>
<td>4.8</td>
</tr>
<tr>
<td>Monday (percentage)</td>
<td>18.8</td>
<td>15.7</td>
<td>14.8</td>
<td>14.2</td>
</tr>
<tr>
<td>Tuesday (percentage)</td>
<td>19.0</td>
<td>16.6</td>
<td>16.0</td>
<td>15.0</td>
</tr>
<tr>
<td>Wednesday (percentage)</td>
<td>18.6</td>
<td>16.7</td>
<td>15.7</td>
<td>14.9</td>
</tr>
<tr>
<td>Thursday (percentage)</td>
<td>19.7</td>
<td>19.9</td>
<td>19.7</td>
<td>19.7</td>
</tr>
<tr>
<td>Friday (percentage)</td>
<td>18.6</td>
<td>21.9</td>
<td>23.8</td>
<td>25.6</td>
</tr>
<tr>
<td>Saturday (percentage)</td>
<td>3.2</td>
<td>5.3</td>
<td>5.6</td>
<td>5.9</td>
</tr>
<tr>
<td>Peak (3–7 p.m.)&lt;sup&gt;a&lt;/sup&gt; (percentage)</td>
<td>80.4</td>
<td>71.1</td>
<td>70.0</td>
<td>66.5</td>
</tr>
<tr>
<td>Off-peak (all other times)&lt;sup&gt;a&lt;/sup&gt; (percentage)</td>
<td>19.6</td>
<td>28.9</td>
<td>30.0</td>
<td>33.5</td>
</tr>
</tbody>
</table>

<sup>a</sup> Weekdays only

TABLE 5 Southbound EL Trips Based on Frequency of EL Use

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequent Traveler Group</th>
<th>Irregular Traveler Group</th>
<th>Occasional Traveler Group</th>
<th>Rare Traveler Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of transponders</td>
<td>12,784</td>
<td>12,285</td>
<td>10,035</td>
<td>12,332</td>
</tr>
<tr>
<td>Percentage of transponders</td>
<td>26.9</td>
<td>25.9</td>
<td>21.2</td>
<td>26</td>
</tr>
<tr>
<td>Number of trips</td>
<td>332,124</td>
<td>90,174</td>
<td>52,420</td>
<td>33,561</td>
</tr>
<tr>
<td>Percentage of trips</td>
<td>65.34</td>
<td>17.74</td>
<td>10.31</td>
<td>6.6</td>
</tr>
<tr>
<td>Sunday (percentage)</td>
<td>2.9</td>
<td>5.3</td>
<td>4.9</td>
<td>5.3</td>
</tr>
<tr>
<td>Monday (percentage)</td>
<td>19.1</td>
<td>17.3</td>
<td>16.8</td>
<td>15.3</td>
</tr>
<tr>
<td>Tuesday (percentage)</td>
<td>19.0</td>
<td>18.3</td>
<td>18.2</td>
<td>19.1</td>
</tr>
<tr>
<td>Wednesday (percentage)</td>
<td>19.0</td>
<td>18.3</td>
<td>17.9</td>
<td>17.5</td>
</tr>
<tr>
<td>Thursday (percentage)</td>
<td>19.3</td>
<td>18.8</td>
<td>19.1</td>
<td>19.7</td>
</tr>
<tr>
<td>Friday (percentage)</td>
<td>16.9</td>
<td>16.3</td>
<td>16.9</td>
<td>17.1</td>
</tr>
<tr>
<td>Saturday (percentage)</td>
<td>3.7</td>
<td>5.6</td>
<td>6.2</td>
<td>6.0</td>
</tr>
<tr>
<td>Peak (6–10 a.m.)&lt;sup&gt;a&lt;/sup&gt; (percentage)</td>
<td>81.3</td>
<td>71.1</td>
<td>66.0</td>
<td>60.9</td>
</tr>
<tr>
<td>Off-peak (all other times)&lt;sup&gt;a&lt;/sup&gt; (percentage)</td>
<td>18.7</td>
<td>29.0</td>
<td>34.0</td>
<td>39.1</td>
</tr>
</tbody>
</table>

<sup>a</sup> Weekdays only

The travel time savings and the amount of tolls paid were examined for each group, and the results are graphically displayed in Figures 3 and 4, respectively. The southbound and northbound results were similar in shape, but the toll paid and travel time savings were slightly lower on average for the northbound direction. As shown, frequent users tended to save a little less travel time and pay slightly lower tolls on average. A very small difference was found to exist between the rare, occasional, and irregular paying EL traveler groups. Any difference is a true difference because the entire sample was analyzed. Based on these data, it is not surprising that when considering the toll paid divided by travel time saved, all four groups had a nearly identical WTP for EL travel time savings (see Figure 5).
FIGURE 3  Travel time savings by frequency of use (southbound direction).

FIGURE 4  Toll paid by frequency of use (southbound direction).
This WTP analysis had a few limitations. The largest was that the tolls paid for each transaction give an indication of the minimum amount that travelers would pay to access the ELs. Individuals who had a higher demand, and would potentially pay more for travel, could not be discerned from the data. Drivers with transponders who drove in the GPLs may have had a lower VOT, and that VOT may have been anything between $0 per hour and anything just below the toll at that time divided by the travel time savings at that time. To summarize, the values from the WTP analysis indicate the minimum WTP values of only the EL users, but their possible VOT is likely higher.

A further examination was done using trips that were originally excluded from the analysis. The inclusion of trips with a VOT that was either negative or greater than $400 per hour increased the median across-the-board VOT by approximately 5 percent and the average across-the-board VOT to an even lesser degree. Therefore, excluding these outliers had little impact on overall results.

Based on the empirical results, the median WTP was $19.45 per hour (as noted previously, this is the minimum the EL travelers were willing to pay). The WTP changed according to the direction traveled, and it was found to be higher during the a.m. peak period. Surprisingly, WTP did not vary based on how often that traveler used the ELs. Regardless of whether travelers used the ELs for most, some, or almost none of their trips, all of them had a similar WTP. A similar set of data from the Minnesota I-394 HOT lanes (within the Minneapolis-St. Paul metropolitan region) were compared to the WTP values for the Atlanta I-85 Express Lanes, and the findings were also very similar (see Figure 6). Details of the data used for the I-394 analysis can be found in Burris et al. (14).
Results from Atlanta and Minnesota show the amount that travelers pay to use the ELs has little to do with the percentage of trips that are EL trips. Suggestions for additional research include a deeper investigation into why the frequency of EL use is not a major factor in the WTP for travel time savings. A potential reason may be that travelers value each trip differently, irrespective of traffic conditions. Further research is needed to fully understand the WTP for EL travel.

CONCLUSIONS

Several findings regarding the use of the I-85 Express Lanes were obtained through the assessment of toll data collected from the first year of operation. The median WTP for travel time savings was estimated to be $33.17 per hour for southbound travelers during the a.m. peak period. These values were considerably higher than the median WTP of $17.76 per hour in the northbound direction during the peak period. The median WTP value across all time periods and directions was estimated to be $19.45 per hour. All of the WTP values are the minimum that EL travelers would pay—many would have likely paid more for use of the EL, but the precise amount was unknown.

The research also examined how WTP might change based on the percentage of trips made in the ELs. Surprisingly, the WTP changes very little regardless of the frequency of EL use. This finding may be the result of travelers using the ELs based on the perceived importance of each trip (related to trip purpose), regardless of traffic on the GPLs and ELs. For example, a traveler may have an important meeting to attend and will pay for the use of the ELs to ensure on-time arrival. If this were the case, then the WTP for infrequent EL travelers would be similar to the WTP of frequent EL travelers. Currently, the lack of a direct relationship between frequency of use and WTP is only a theory, and additional research is needed to examine how pricing influences travel behavior.
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