A Case Study of L.A. Metro's ExpressLanes as a Congestion Reduction Strategy

Aidan Holliday
Senior Comprehensive Project- UEP 411
Submitted for the Consideration of a BA in Urban and Environmental Policy
Occidental College
Professor Cha and Professor Shamasunder
Spring 2018

Table of Contents

Introduction

As the world becomes increasingly urbanized, the number of cars driven in these urban areas increases as a result. This clogging of roadways, called traffic congestion, leads to more time spent in cars and longer commute times for workers. Unfortunately, there is some discrepancy between experts and the general public over how to combat congestion. The literature review in this study explores strategies to decrease congestion, with a focus on two of the most promising: congestion pricing and Bus Rapid Transit (BRT). Congestion pricing is defined as "...shifting purely discretionary rush hour highway travel to other transportation modes or to off-peak periods. By removing a fraction of the vehicles from a congested roadway, pricing enables the system to flow...efficiently, allowing more cars to move through the same physical space" (Federal Highway Administration 2017). A dominant critique of congestion pricing is that it favors wealthier drivers who can afford these fees. Fortunately, low-income assistance programs exist, and the revenue generated often goes toward improving public transportation. Congestion pricing is generally seen as the most effective way to lower congestion, because it makes people think more carefully about when and where they drive.

Public transportation can also have an impact on lowering congestion. Bus Rapid Transit is gaining popularity due to its low cost compared to other transit systems. BRT is defined as a "transit system that delivers fast, comfortable, and cost-effective services at metro-level capacities...through the provision of dedicated lanes and...stations typically aligned to the center of the road, off-board fare collection, and fast and frequent operations" (Institute for Transit and Development Policy 2017). Because BRT has features similar to light rail, it is more reliable and quicker than a normal bus system. When people are offered reliable alternatives to driving, they are incentivized to switch travel modes. However, sometimes this

mode shift causes different drivers to take their place. While the impacts that public transit have on lowering congestion are somewhat inconclusive, it is still important to offer drivers a viable commuting alternative.

In recent years, the Los Angeles Metropolitan Transportation Authority (Metro) has worked on massive public transit expansion, partially funded via sales tax increases through the ballot initiatives Measure R and Measure M. Some of L.A.'s efforts to improve traffic congestion will be explored as a case study in this report. The primary focus will be on L.A.'s congestion pricing program, the Metro ExpressLanes, with some attention on the Silver Line busway that operates in the same corridors of the I-10 and I-110 freeways. Throughout this study, I will be asking the question: "How do perceptions of L.A. Metro's ExpressLanes on the I-110 and I-10 differ between Metro itself and the public as reported in the news media?" This case study will be assessed through a qualitative approach involving two content analyses- one of Metro reports, and one of news articles- as well as interviews with Metro employees. These methods will explore different perceptions of success of the ExpressLanes. Following this analysis, recommendations will be made for Metro to improve the ExpressLanes and further combat congestion in Los Angeles.

Literature Review

Summary

This literature review begins with an overview of congestion in Los Angeles. Next, an exploration of congestion pricing as a means to alleviate congestion is explored, as it is regarded as the most effective strategy, and is the main component of the case study. An overview of the system in Singapore is included because it is a model for other cities.

Following that is an examination of the barriers facing congestion pricing in L.A. The second strategy included is Bus Rapid Transit, because it is a promising way that public transportation can alleviate congestion. An evaluation of the BRT system in Ottawa is included because it is seen as a model system. BRT is not an explicit component of the case study because potential routes for BRT in L.A. are being studied but have not yet been implemented. Thus, the case study looks briefly at a busway in L.A. with BRT features. Ultimately, it is determined in the literature review that these strategies must work in conjunction with others in order to reduce congestion efficiently.

Overview of Congestion in Los Angeles

Los Angeles, California is an infamously sprawling city that "originally emerged as a series of decentralized and self-contained towns", and is often considered synonymous to L.A. County, which contains 88 separate cities (Dear 2001). In 2016, the estimated populations of the City and County of Los Angeles were nearly 4 million and over 10 million, respectively, and upward and outward growth is projected to continue (US Census 2016). Urban sprawl is defined as "the rapid expansion of the geographic extent of cities..., [with] low-density residential housing, single-use zoning, increased reliance on the private automobile…[and] increased congestion" (Rafferty 2009). While L.A. is sprawling, it is actually more dense on a regional scale than any other U.S. city because its suburbs have such high population density (Sorensen et al. 2008, xxxi). Higher density usually means residents drive less, but because this is not true in the L.A. region, congestion intensifies. Additionally, as housing in L.A. becomes increasingly unaffordable, people move further out, leading to longer commutes and higher congestion levels (Nagourney and Dougherty 2017). The Los Angeles metro area is unique for being so sprawling and yet dense at the same time.

This combination of sprawl and density in the Los Angeles area causes some of the worst congestion in the world. Angelenos who drive to work waste an average of 207 hours in the car annually, according to a study in the Institute of Travel Engineers (ITE) Journal (Guckert 2015, 39). When workers are stuck in traffic, their commutes lengthen. Although L.A. has a reputation as being more car-centric than other U.S. metro areas, researchers at the RAND Corporation found some of these conceptions to be inaccurate (Sorensen et al. 2008). For example, a similar percentage of people in other cities drive to work as in L.A., with the U.S. average being 86% (Sorensen et al. 2008, xxxi; McKenzie 2015, 1). However, due to the polycentricity of the region, congestion can be exacerbated for two main reasons. First, it is challenging to create a robust transit system in a decentralized region. Second, people often have to travel to multiple places to complete errands (Sorensen et al. 2008, xxxiii). The global traffic data company INRIX ranked L.A. as the most congested city in the world amongst 1,064 cities in 38 countries in their Global Traffic Scorecard, the largest ever study on traffic congestion (Cookson and Pishue 2017). They found that the average L.A. driver spent 104 hours in congestion during peak hours in 2016, compared to a U.S. average of 42 hours (Cookson and Pishue 2017). The TomTom Traffic index of 390 cities also found L.A. to be the most congested city in the U.S., with morning and evening peak hour congestion levels of 62% and 84% respectively, but it only ranked 12th globally (TomTom International BV 2016). According to their methodology, “the congestion level percentages represent the measured amount of extra travel time experienced by drivers across the entire year” (TTIBV 2016). High congestion levels were compared to uncongested conditions in order to report on overall congestion and congestion during peak hours. While various methodologies ranked L.A.’s

congestion levels differently, perhaps due to the geographic complexities of the region, it is clear that high congestion lengthens travel times in Los Angeles.

Many Americans rank commuting as one of their least favorite activities, making the costs of commuting quite large, and the problem of congestion an important economic question (Duranton and Turner 2011, 2617). These costs include loss of productivity and environmental degradation, as well as social, emotional, and physical costs like less time spent with friends and family, loss of sleep, and less time for exercise (Holguin-Veras et al. 2016, 274). American FactFinder of the U.S. Census Bureau reported the mean commute time in Los Angeles County to be 30 minutes in 2015 (American FactFinder 2015). Despite its similar average commute time to other major U.S. metro areas, L.A.'s high rates of peak hour congestion and sprawling geography- making public transit efficiency difficult- worsen L.A. commutes (Martucci 2017).In recent years, Metro has championed initiatives like congestion pricing and new transit lines to alleviate congestion and shorten commute times. If Los Angeles congestion is going to be reduced in a sustainable manner, Metro must look toward cities around the world that have implemented successful strategies and emulate them.

Combating Congestion: Congestion Pricing

The dominant congestion reduction strategy in the developed world through the 1970s was to expand transportation capacity by creating more roads (Holguin-Veras 2016, 274). A study by two economists assessing "the effect of road provision on traffic over entire areas", found that "the extension of interstate highways is met with a proportional increase in traffic for US MSAs [metropolitan statistical areas] (Duranton and Taylor 2011, 2645). Los Angeles has historically been a big proponent of adding freeway lanes in an attempt to lower congestion and commute times. As recently as 2013, the California Department of Transportation

(Caltrans) and Metro spent $1.6 billion to add a lane to the infamously congested Interstate 405 in West L.A., which INRIX found actually had a slightly adverse effect on peak hour travel times (Metro 2012; Watt/INRIX 2014). Adding new lanes is not likely to decrease congestion over time because it will lead to an increase of drivers on said roads.

A shift has occurred from supply-side interventions to strategies that manage demand, known as Transportation Demand Management (TMD). Through TMD, "car users are encouraged to switch to transit, to carpool, or to consolidate trips to reduce vehicular traffic and its externalities", with road pricing considered one of the most effective TMD techniques (Holguin-Veras et al. 2016, 274). The increasingly popular answer to the "pro-auto/pro-alternatives conundrum [to reducing congestion] is to make travelers pay their own way", because it can benefit both drivers and transit riders (Taylor 2006, 281). These two economists also conclude that "congestion pricing [should be] the main candidate tool to curb traffic congestion (Duranton and Turner 2011, 2646). One of the key findings of the RAND report was similar: "strategies that rely on pricing to manage the *demand* for driving-- e.g., by charging more for driving and parking during peak hours in the most congested locations-- are extremely effective in producing sustainable reductions in congestion" (Sorensen et al. 2008). When London introduced a congestion charge to enter the central city during peak hours in 2003, the number of private vehicles entering the city dropped between 27-33% during the first year, speeds rose by 17%, and congestion levels decreased by 30% (Leape 2006, 166). The theory behind road pricing can be attributed to the economist Arthur Pigou, who argued in 1920 that placing a tax on driving will help alleviate the negative externalities that go along with it (Lindsey 2006, 292). Most transportation experts and economists now agree that

congestion pricing is the most effective way to decrease congestion, but there is still political pushback to its implementation in places like Los Angeles (Lindsey 2006, 354).

Congestion Pricing Model: Singapore

In the 1970s, Singapore became the first city to create a robust congestion pricing system after a daily strain was noticed on the roads leading into the Central Business District (CBD) (Phang and Toh 2004). Restricted by geography from expanding the city outward, officials decided to combat the issue of congestion by implementing an Area Licensing Scheme (ALS), a system of tolls for multiple entries into the CBD. Congestion pricing usually involves a toll that rises and falls along with the demand of the road, so this was technically a cordon toll, a cost to enter a Restricted Zone (Manville and King 2013). Initially, the ALS consisted of 22 human-manned stations that charged $3 a day or $60 a month for cars with 3 or fewer people to enter the CBD between 7:30 and 9:30 A.M., Monday through Saturday. This system reduced traffic by slightly more than the targeted 25-30% during rush hour, but it simply shifted congestion to a different time and place, usually before or after the restricted time. While this first iteration of congestion pricing was successful at reducing congestion during peak hours, it was not as successful at reducing overall congestion, or at shifting modes of travel.

Updates to Singapore's Congestion Pricing

Updates were made to combat this congestion shift, and an evening congestion reduction of 44% was seen in 1989. In 1991 the average speed into the CBD was 35 kph, compared to just 18 kph in London and 10 kph in New York City. Shoulder pricing- reducing the toll before and after the peak period- and All-Day ALS helped smooth out extreme patterns. Public transit share went from 33% to 69%, which further decreased congestion. The

Electronic Road Pricing (ERP) system formulated in 1998 is the most advanced version of congestion pricing Singapore has tried. This combination of "radio frequency, optical detection, imaging, and smart car technologies" charges cars based on time, location, and type of car (Phang and Toh 2004, 21). ERP has proven to be more successful, convenient, and flexible than previous systems, and it also costs less. Singapore's congestion pricing has been a model that other cities have sought to emulate. While there are extreme geographical differences between Singapore and Los Angeles, if L.A. were to implement a congestion toll to enter a restricted area such as downtown L.A., much could be learned from Singapore's experience.

Barriers to Congestion Pricing in L.A. County

Some metro areas have had a difficult time implementing effective congestion reduction strategies due to geographical and political barriers. Studies done on congestion relief in L.A. County have found barriers that could prevent a robust congestion pricing system from receiving support. However, programs like the ExpressLanes have still been carried out through legislative pathways. According to a study in the journal *Transportation*, there is a credible commitment issue in places like L.A. This means that drivers will only support congestion pricing if they trust the highway agency to redistribute the money back to them somehow, for example through reduced fuel tax or public transit improvements (Manville and King 2013, 229). Credible commitment is a major obstacle that has played a role in causing cities like New York to abandon past plans for congestion pricing (Manville and King 2013, 235). Unfortunately, the money that is earmarked to return to drivers is often deposited into state general funds, and so these redistribution plans are not always seen as credible.

Survey on Congestion Relief in L.A. County

In a survey of L.A. County officials, one third said "that distrust of state or county agencies would prevent them from supporting congestion pricing" (Manville and King 2013, 243). The researchers concluded that policymakers should stress the beneficial aspects of congestion pricing rather than making empty promises about where the revenue will go. The survey found that "pricing had low levels of support relative to other policies. 47% of respondents expressed some support for freeway congestion pricing, but 65% supported expanding the freeway system, 90% supported more carpool lanes, 96% supported improvements to the bus system, and 96% supported increased investment in light rail" (Manville and King 2013, 239). Unfortunately, there is often a gap between what studies have found to be effective, and what the public supports. For example, while studies have shown that strategies such as expanding the freeway system are not effective, this strategy still has public support (Duranton and Turner 2011, 2616). When it comes to buses and light rail, people might not realize how expensive it is to build these systems. Furthermore, while congestion pricing has been proven as the most effective way to reduce overall congestion, many people still do not support it. One reason for this is the cost to individual travelers, and the concern that road pricing is elitist. Because of the dominant car culture in L.A., the inherent freedom of its roadway systems, and doubts surrounding revenue generation, there has been some pushback to the ExpressLanes. Essentially, there is a reason the roadway systems in Southern California are called freeways; they are supposed to be free and allow drivers to go anywhere at any time without any hindrances. There needs to be a way to reconcile this gap between scientific findings and public approval, perhaps through popular education tools and more accessible distribution of factual information.

Overall, uncertainty was expressed when it comes to congestion pricing. Additionally, a third of respondents worried about equity, and proposed a policy involving discounted passes. In such a socioeconomically diverse place like Los Angeles, the problem of who benefits from improved driving conditions is a crucial consideration. It is expensive to own a car to begin with, and having to pay an extra cost to get to work on time can be unfair to low-income drivers. The RAND report suggested that some of the revenue be used for non-automotive improvements in order to be equitable (Sorensen et al. 2008). Metro's ExpressLanes project does offer a Low Income Assistance Plan, as well as improvements to nearby transit systems (WSP and Parsons Brinckerhoff 2017, 41).

Congestion Pricing Stakeholders

In order for congestion pricing to be successful anywhere, especially a place like Los Angeles, the needs and opinions of all the stakeholders must be addressed and seriously taken into consideration. The most important ones in congestion relief are commuters, or anyone needing to get somewhere on time, whether it is by driving or taking public transportation. The opinions of these folks must be listened to, but they also need to be educated on the strategies that have been successful in similar metro areas. Commuters who are resistant to the idea of congestion pricing must be willing to give it a chance. The other crucial- and more powerful-stakeholder in this context is Metro, whose job it is to pursue the strategies they believe are the best at reducing congestion, while also attempting to gain public support. In turn, Metro must prove positive performance on projects like the ExpressLanes so as to continue receiving the federal funding that makes the program possible. While these various types of people and agencies have different reasons for wanting congestion pricing to be successful, they must be able to put these differences aside and collaborate effectively.

The Role of Public Transit in Reducing Congestion

Another important aspect of the congestion debate is the role of public transportation in its alleviation. Some studies have found that public transit has negligible impacts on congestion reduction, because even though new transit may free up road space, additional drivers will then be incentivized to use these roads (Duranton and Taylor 2011, 2616). This is not a universal conclusion, however, with other studies showing that some transit systems have successfully relieved congestion. One study looked at a 35 day period in 2003 when L.A. Metro workers went on strike, virtually shutting down all transit service, and found that average freeway delays increased by 47% (Anderson 2014, 2786). The study estimated that long-term impacts of transit reduction would still be significant, with increased delays at about half the short-term rate. The study concluded that "the net benefits of transit systems [on congestion] appear to be much larger than previously believed" (Anderson 2014, 2763). The more transit options a metro area has, the greater likelihood that transit will curtail congestion levels.

The Expansion of Bus Rapid Transit

The future of public transportation has become a debate between Bus Rapid Transit and light rail, with cities like Los Angeles currently investing in both. Many advocates of BRT stress its ability to combat congestion for drivers over normal bus systems, as well as its cost efficiency compared to light rail. However, there is still a stigma associated with riding a bus that must be overcome, especially in L.A. The first BRT systems were introduced in Latin America, including an extensive system in Bogota, Colombia called the TransMilenio, which is considered a "best practice" system (Hensher and Golob 2008, 502). In Bogota, much of the success of its BRT can be attributed to some existing road lanes being converted into BRT lanes, and its ability to carry 20,000 riders per hour per direction (Hensher and Golob 2008,

504). Imitating systems like TransMilenio, BRT is rapidly expanding around the world, with the system in Ottawa, Canada also being seen as a model (Al-Dubikhi and Mees 2010). While the Silver Line busway in the case study only has some features of BRT, it is still important to include BRT in the literature review as a mechanism for reducing congestion. In addition to its Orange Line and Silver Line 'Busways' and Metro Rapid buses currently in circulation, Los Angeles Metro is studying three corridors- Vermont, North Hollywood to Pasadena, and North San Fernando Valley- for potential full-scale BRT systems (Butler 2016).

Combating Congestion: Bus Rapid Transit

Two transportation experts assessed 44 BRT systems around the world, focusing mainly on the cost-effectiveness of BRT compared to light rail. They found that BRT systems can cost between 4 and 20 times less than light rail, and 10 to 100 times less than a metro system (Hensher and Golob 2008, 502). A spokesperson from The Traffic Group said that "BRT meets...the 80-20 Rule [because it] can often cost 20 percent of a light rail system but can capture 80 to 85 percent of light rail riders. BRT has the potential to save taxpayers millions of dollars while simultaneously reducing traffic congestion and providing great transit" (Guckert 2015, 39). Additionally, the best systems can carry as many people per hour as light rail, with some carrying between 20,000 and 35,000 passengers per hour (e.g. Bogota, Colombia), and the majority carrying between 2,000 and 8,000 per hour, per direction (Hensher and Golob 2008, 504). Because governments are mainly concerned with costs and ridership, they should be championing BRT over other public transit options when deciding how to reduce congestion.

Recommendations for BRT

Along with the Los Angeles region, the vast Baltimore-Washington D.C. metropolitan area has some of the worst traffic congestion in the country. In 2015, plans for new light rail in Baltimore were cancelled in favor of Bus Rapid Transit (Guckert 2015). BRT is not just cost-effective; it also has the ability to save commuters 25% of travel time if crucial elements are incorporated (Guckert 2015, 39). The Traffic Group's recommendations for successful BRT systems are as follows: "1. Transit stops in 1-2 mile intervals. 2. High density at transit stops. 3. Dedicated lanes in the median area of a road. 4. Transit Signal Priority (TSP). 5. Level boarding, with at least 2 entry doors/vehicle. 6. Off-vehicle payment systems" (Guckert 2015, 40). Arguably the most important component, TSP is "a combination of technologies employed by transit and traffic signal operating agencies to adjust signal timing in order to prioritize the movement of people" using public transit (Koonce 2012, 18). An evaluation of TSP and queue jumpers- roadway geometry that prioritizes buses- in the BRT system in Pleasanton, California "found that TSP and queue jumpers helped reduce bus travel time by 30 percent without adversely affecting automobile traffic in the corridor" (Lahon 2011, 22). L.A. first introduced TSP in its Metro Rapid bus service in 1998, but would benefit from implementing it throughout its entire network of buses (Koonce 2012, 20).

The more that recommendations like Transit Signal Priority and dedicated lanes are followed, the greater likelihood that BRT will be successful. According to the Climate Bond Standard Board, BRT has been linked to "the improvement of bus travel speeds and reliability and the smoothing of traffic flows, leading to greater mode shifting and reduced greenhouse gas emissions" (Guckert 2015, 40). Another study, focused on the public transit debate in Sydney, Australia, stated that the criteria for attracting drivers away from cars is transport that

is “reliable, frequent, efficient, safe and clean with affordable fares”, and found that BRT can meet all these criteria (Hensher 2005, 87). Essentially, BRT can get people out of their cars and onto public transit. If L.A. is to successfully lower congestion, driving needs to be disincentivized not only through congestion pricing, but also through a robust Bus Rapid Transit system.

Model BRT System: Ottawa

A Bus Rapid Transit system that serves as a model is the one in Ottawa, Canada. An analysis of the system from 1978-2008 looked at its success in terms of whether it was able to change people’s travel modes. The research found that much of its success can actually be attributed to policies passed in the 1970s that made driving less convenient. These policies included “a 'transit-first' policy that made public transport the priority for new infrastructure investment - and major new roads a last resort; restrictions on provision of CBD car parking; provision of operating subsidies to enable the expansion of high-quality public transport services into lower-density suburbs; and on-street priority for bus services, enabling public transport to bypass sites of major traffic congestion” (Al-Dubikhi and Mees 2010, 422). This implies that BRT systems cannot be successful on their own, but should be paired with other policies that prioritize transit and shift the dominant mindset away from driving. In general, Canadian cities are more transit friendly than many in the U.S., with stronger CBDs and smaller freeway networks, making it easier to implement extensive transit systems. As a result, 21.2% of commuters in Ottawa are transit riders, which is almost three times the 7.3 % of commuters in L.A. County that are (Deal 2013). The study concludes that “policies [from the 1970s], rather than the precise technology...of the public transport system, should be the focus of planning for reduced automobile dependence” (Al-Dubikhi and Mees 2010, 422).

Essentially, cities need to embrace comprehensive strategies to lower congestion and shift travel modes, and Bus Rapid Transit is one piece of the puzzle. While planners sometimes tend to focus on singular solutions, reducing congestion is an issue that needs to be addressed from multiple angles.

Takeaways

The literature showed how congestion pricing and Bus Rapid Transit are two of the main ways that cities and transit systems are working to lower congestion and improve commutes. While congestion pricing is proven to work, it is often met with political obstacles to its implementation. BRT is cost-effective and can attract new riders away from other transportation modes and increase overall transit ridership. However, there is always the risk that when mode shift occurs, and drivers become transit riders, other drivers will simply take their place. Furthermore, these two strategies cannot be fully effective on their own, but should be implemented in conjunction with other policies that disincentivize driving in general. The case study of Los Angeles' strategies analyzes perceptions of L.A.'s ExpressLanes that have attempted to reduce congestion despite wariness to the very idea of congestion pricing.

Background

In order to deal with issues of congestion in Los Angeles County, Metro obtained legislative authority in 2008 through Senate Bill 1422 to convert High Occupancy Vehicle (HOV) lanes, known as carpool lanes, to High Occupancy Toll (HOT) lanes on two freeway corridors (Metro and Caltrans 2013, 3). The bill included vague plans for public outreach to affected communities along the corridors, as well as calling for a low-income impact assessment of the project (Ridley-Thomas, 2008). With legislative authority, however, Metro could have implemented these ExpressLanes without gaining public support. This conversion

to HOT lanes gave solo drivers the chance to use the lanes if they pay a fee in the form of congestion pricing. Metro teamed up with Caltrans and was granted federal funding to implement this Congestion Reduction Demonstration (CRD) pilot program (WSP and Parsons Brinckerhoff 2017, 12). The first of these HOT lanes opened along an 11 mile stretch of the I-110 Harbor Freeway/Transitway in November 2012, and the second one opened along a 14 mile stretch of the I-10 El Monte Busway in February of 2013 (Metro and CalTrans 2013, 3).

The pricing depends on the time of day and the level of congestion in the corridor: the toll is higher when there is more traffic, and lower when there is less traffic. As of October 2017 the maximum toll rate was $1.90 per mile, and the minimum toll rate was $0.35 per hour during peak hours and $0.10 during off-peak hours (Metro 2017). The lanes can be used by carpool vehicles toll-free or by toll-paying solo riders when a FasTrak transponder is purchased and placed on the windshield of the car. These passes allow the entire process to be electronic; the toll price is deducted when the car drives through the entry point of the lane. If the average speed in one of the ExpressLanes falls below the intended 45 mph, the lane switches to HOV only, which is displayed on the overhead sign. FasTrak solo riders who entered before the switch may remain in the lane. After the demonstration period ended in February 2014, cars with California Clean Air stickers were also able to travel in the lanes toll-free (United States Department of Transportation 2015, 9).

L.A. Metro's Silver Line bus route began service in December 2009 as a connection between the San Gabriel Valley and the South Bay, utilizing both the El Monte Busway (I-10) and the Harbor Freeway Transitway (I-110) (Metro Board 2009, 1). The Silver Line consists of Line 910 and the Line 950, the latter of which operated as an express service until June 2017, when updates were made so that both lines could follow simpler routes (Metro 2017). This line

has some qualities of Bus Rapid Transit, such as all-door boarding, high frequency service, and its use of corridors that restrict general car traffic. When the United States Department of Transportation (USDOT) granted Metro and CalTrans funds to open the ExpressLanes project, a portion of the funding was earmarked for public transit improvements, particularly to the Silver Line (USDOT 2015, xv).

Methodology

The purpose of this study is to explore the theory identified through the literature review that congestion pricing is the best way to reduce congestion in large urban areas. More specifically, to analyze perceptions of the ExpressLanes from different stakeholders, namely Metro and the public through the news media angle. One of the main critiques of the congestion pricing technique is its potential disparate impact on low-income commuters, who may not be able to afford the pricing or who use public transportation. The case being explored- the Los Angeles Metro ExpressLanes- is an instance where congestion pricing and transit improvements have gone hand in hand.

Qualitative Case Study

This study involves a mostly qualitative approach. The primary approach is a qualitative case study of L.A. Metro's ExpressLanes project on the I-110 and I-10 freeways, along with some attention on the Silver Line busway that utilizes the same corridors. These two ExpressLanes were previously High Occupancy Vehicle lanes, but were converted to High Occupancy Toll lanes in 2012 and 2013. The federal funding for these ExpressLanes involved allocating money toward improving transit such as the Silver Line busway service. These transit improvements included updated stations and increased service. This study used mostly

qualitative methods to assess different views of the ExpressLanes project and whether it has been successful in terms of lowering freeway congestion in these corridors for both drivers and bus riders.

The purpose of these two content analyses is to compare and contrast Metro's perspective on the ExpressLanes project versus the views of the general public through the lens of the news media. The coding of the documents presented what is important to Metro in terms of evaluating the ExpressLanes, while the coding of the news articles revealed the priorities of the reporting on the ExpressLanes. This helped create a nuanced perspective of the project and an ability to evaluate the differences between how Metro and the media and users determine its success and effectiveness.

Content Analyses

This case study was examined through two qualitative content analyses of the ExpressLanes project. The first content analysis involves progress reports written on the ExpressLanes that were mostly published by Metro. The second analysis is a media content analysis of news articles written on the project. (See Appendix A for a list of the documents and news articles). The purpose of this is to incorporate public opinion into the analysis by providing an analysis of the media coverage of the implementation and first five or so years of the project. (Another point of interest could be how Metro's public relations and marketing is able to influence public perception, although this was not measured within the scope of this study.)

In January and February 2018 I finalized my selection of 27 news articles written about the ExpressLanes program in Los Angeles County. These articles came from a range of mostly local papers, including 14 from *The Los Angeles Times*, 4 from *The San Gabriel Tribune*, and 3

from *Curbed Los Angeles*. These articles were published between July 2012 and October 2017. Just under half of them are from 2012 and 2013, the first years that the ExpressLanes were in operation on the I-110 and I-10 freeways, respectively. When selecting news articles to analyze, I tried various searches on a wide range of databases, such as "Los Angeles ExpressLanes" and "LA Metro ExpressLanes" in the ProQuest newspaper search and *The Los Angeles Times* online archives database. Eventually, the news articles were selected by conducting searches for "Los Angeles" "Metro ExpressLanes" on Google News as well as the research database Nexis Uni and running the searches as terms and connectors. This search on these 2 databases gave the most on-topic results. The articles were narrowed down to the 27 determined to be most relevant using criteria related to the codes being used. For instance, I picked articles that discussed the background and roll-out of the program, ones that discussed how it had changed over the years, and others that focused on issues with the program. It was not too difficult to narrow them down because some of the initial results were not actually about the ExpressLanes, or only mentioned them very briefly.

During February and March of 2018 I finalized my selection of the documents I would be analyzing. Initially I had 16 documents, both from my own searching on Metro databases and the ones I received through the help of a librarian at the L.A. Metro Transportation Research Library after requesting yearly performance updates on the project. He also sent me two metro databases of board archives and board agendas that I used to find more recent board meeting minutes and reports. I narrowed them down to the 9 that were the most relevant for what I was studying. For example, I cut out most of the reports from before the ExpressLanes started, since I was focusing more on performance than background in my research. 8 of the documents are performance updates published by L.A. Metro and 1 of them is a national

evaluation released by the USDOT. Many of these reports were undertaken so as to evaluate whether the ExpressLanes are meeting certain criteria of their federal funding.

These content analyses were conducted using the software program Dedoose. The reports and articles were coded using similar metrics, and then compared and contrasted. A mixture of inductive and deductive coding was involved in order to account for new theories and concepts that were in the documents and articles while also testing existing ones from the literature review. I predicted what I thought would be in the different types of media, based upon what I knew about the purpose of both the documents and the news articles. For example, I anticipated that the progress reports would focus mostly on the performance of the ExpressLanes, and involve topics such as *Usage*, *Revenue*, and *Travel Times*. I had a feeling that the news articles would bring in new themes like *Public Acceptance* and discuss the *Penalty for Misuse* of the lanes. I coded the articles with 20 main codes (some had subsets, e.g. *Travel Times: Faster, Slower,* or *Negligible*). 11 of the codes were deductive, based on themes from my literature review and prior knowledge I had learned about the program. 9 were inductive codes that were concepts I may not have previously considered that came up repeatedly in the articles. For the documents, I used 22 deductive codes, 2 of which were new, and 4 inductive codes, for a total of 26 codes. These codes account for both material and tone. For example, discussion of *Usage* would account for material, while *Public Acceptance* (*Positive, Negative,* or *Neutral*) would be be an instance of tone. (See Appendix B for a complete list of codes for the documents, news articles, and interviews).

Interviews

In the same time frame, I conducted three interviews over email with employees at Metro who work as Planning Managers in the Congestion Reduction Department. These

interviews served to supplement these content analyses. I first reached out to UEP graduate and current Metro employee Samantha Delgadillo, who connected me with several employees who are Planning Managers in Metro's Congestion Reduction Department, giving me a snowball sampling method. I explained my project to each of them, and they were all willing and excited to answer my questions. The respondents offered resoundingly positive reviews of the ExpressLanes, although they acknowledged growing pains and operational issues that they have worked on improving. These interviews were conducted via email. (See Appendix C for the questions).

After the interviews were completed, I also coded them using Dedoose. I coded the interviews with 16 of the same codes as the news articles, and 7 new ones, for a total of 23 codes. 19 were deductive and 4 were inductive. Some of the codes that came up in the interviews that also appeared in the articles and documents were *Usage*, *Revenue*, and *Plans to Expand*. I had a feeling that these codes would come up based on the questions that I asked. The codes I was not expecting to appear were *Increased Congestion Overall, Economic Theory, Transponder Technology,* and *More Popular Than Expected*, the last of which was unique to the interviews. (See Appendix B for a list of codes applied). The purpose of these interviews was to gain a better understanding of the theories and decision making processes behind the ExpressLanes project, and to determine whether those on the inside deem it as being successful at lowering congestion and travel times.

Findings and Analysis

This project aims to determine whether the way Metro has evaluated their ExpressLanes program differs from news media reporting. Through reading and coding of

news articles, Metro documents, and interviews with Metro employees, I find that Metro has a tendency to focus on the more positive aspects of the program, while the media presents a more well-rounded view. Naturally, Metro has to frame their projects in a positive light in order to meet certain criteria for their funding, while the news seeks to approach issues from as many sides as possible. This is relevant because it showcases a discrepancy between how and why the different stakeholders view the project and its performance differently. Moving forward, both Metro and ExpressLanes users need to work to minimize these differences, so both sides can feel strongly about the success of the ExpressLanes.

News Articles: Emphasis on Personal Cost

Through coding of the news articles, it was found that the articles generally gave objective general information on the program, especially when it was first being implemented in November 2012 and February 2013. The codes that came up the most were *Personal Cost* (20x), *Metro Employee Feedback* (15x), *Penalty for Misuse* (15x), *General Information* (14x), and *Travel Times* (*Faster* (4x), *Slower* (3x), and *Negligible* (4x)). 20 out of 27 articles (74%) mentioned the cost of using the ExpressLanes, which means that that is something people are concerned about or interested in. It is almost surprising that this code did not appear in 100% of the articles, seeing as they were all reporting on congestion pricing, the main facet of which is that individual drivers have to pay to use certain sections of the road. While all of them did talk about the toll in some way, only those 20 actually mentioned how much the program cost, or emphasized that the cost was personal to each driver. The code that tied for appearing in the 2nd most number of articles, *Metro Employee Feedback*, which appeared 15x, demonstrates the importance of these reporters wanting to include perspectives straight from Metro so as to maintain balanced reporting. The *Penalty for Misuse* code also appeared in 15 articles, which

brings up the importance of using the program correctly. (Users who misuse the lanes have to pay a fine on top of the toll price). The next highest code, *General Information*, appeared 14x, or in 52% of the articles. This code showed up more in the earlier articles, as they were basically giving overviews of all the aspects of the ExpressLanes, versus the more recent articles that focused more on issues with the program.

Opinion Pieces

5 of the articles were opinion pieces, 2 of which leaned positive and 3 of which leaned negative.

Positive Op-Eds

The 2 positive ones, both appearing in the *Los Angeles Times*, one by the editorial board and the other by a transportation expert, were the most recent of the 5, and were published in 2017. This would indicate that perhaps the operation and reception of the ExpressLanes is improving, something that was also reflected in my interviews with Metro employees. The quotes below demonstrate the view that the ExpressLanes are operating as they were intended, according to economic theory, while also emphasizing the transit improvements aspect:

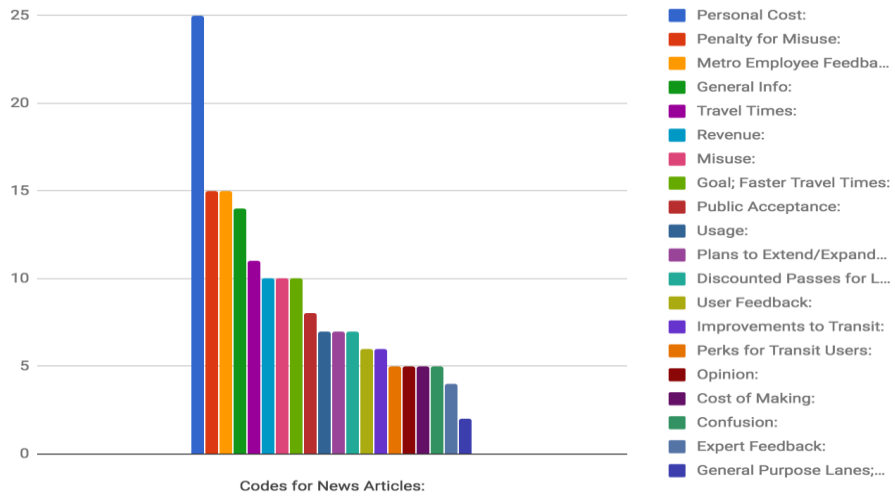
> People have more flexibility in their drive times than you might imagine. Roughly half of peak-hour trips are not commutes to work or school. With HOT lanes, when prices are high, people adjust accordingly. If it's worth it, they get in the lane and save time. If they don't want to pay, they have the most American of options- choice: They could use the unpriced lanes, go at a different time, carpool, or take transit to avoid the cost (Huff 2017, 3).
>
> Congestion pricing is a fast, efficient way to get people to change their behavior to help reduce traffic and air pollution....[] Southern California already has a serious and growing problem with income inequality, so any congestion pricing model has to be sensitive to the transportation needs and challenges of poorer residents. That could mean using the fee revenue to greatly improve transit, bike and walking options for faster, safer daily commutes, or to provide transportation rebates or allowances to subsidize low-wage workers in congestion pricing zones (The Times Editorial Board 2017, 4).

Negative Op-Eds

The 3 negative op-eds, written by the Long Beach Press Telegram editorial team, a former editorial writer for the *Los Angeles Times*, and the editorial board of the *San Gabriel Valley Tribune,* were published between late 2013 and early 2016. The one by the editorial writer included a debate between herself and 6 other editorial writers; 4 of them had negative views, 2 of them had a positive perspective, and 1 of them was neutral. So, overall, there was a majority negative view of the ExpressLanes. All 3 of these op-eds focused a lot on the monetary aspect of the lanes, both the personal cost to users and where the revenue that is collected is going:

> ...the toll lanes won't bring in much revenue unless smaller car pools are out. That consideration only legitimizes the claims that toll lanes are more about raising revenues for local government than about improving traffic flow (Long Beach Press Telegram 2013, 2).
>
> What is perhaps worse, in the sense that it's always worse when you feel you are the victim of a scam, is that in the wake of our report this month on how in many ways the three-year-old system is not working, a number of readers have written in to say that rampant cheating is at the heart of the problem (The Editorial Board of the *San Gabriel Valley Tribune* 2016, 2).
>
> The next move needs to be getting solo drivers out of the ExpressLanes altogether to see if the commute flows better. But the whole "Lexus lanes" experiment still reeks at its core, with class envy and the fact that sometimes we can't help but drive solo, forever undermining it in most drivers' minds (The Editorial Board of the *SGVT* 2016, 3).
>
> $18 a day (based on one published report) or so adds up to $90 a week, $360 a month, more than $4,000 a year. Not in the reach of most folks."
> "I agree...I am not in favor of fast lanes for those who pay more. Not everything should be sold on a market like a commodity (Klein 2014, 3).

Table I: Code Occurrence in News Articles



(See Appendix B for list of full news article codes).

Interviews: Focus on Positive Aspects

The codes that came up the most in the interviews were *Travel Times* (*Faster*: 3x), *Success* (*In General*: 3x), *Usage* (3x), *Congestion Management Role* (3x), and *More Popular Than Expected* (3x). These five codes were present in all 3 interviews, and besides the one involving each interviewees role at Metro, they were all positive codes. They all agreed that travel times had improved, although one of them did concede that sometimes the General Purpose Lanes become congested. Seeing as faster travel times is a major goal of the program, they essentially all agreed that the ExpressLanes have had *Success: In General*, which was a code that also showed up 3 times. They also all spoke encouragingly of *Usage*, and that the number of people that have been ordering transponders and using the lanes has been increasing. They did this without giving actual numbers, but one of them included a link to sites with raw data. (When the link was clicked on, it appeared to be broken). Because I asked

them their roles at Metro as one of my questions, the code *Congestion Management Rol*e also came up all 3 times; they all hold similar titles as managers in the Congestion Reduction Department. The final code that came up all 3 times was an inductive code, *More Popular Than Expected*. This was something that I had not thought to ask but which they all emphasized enthusiastically. For instance, they all said that more people had signed up and were using the lanes than they had anticipated. The following three quotes, each from a different interviewee, express similar sentiments on this idea:

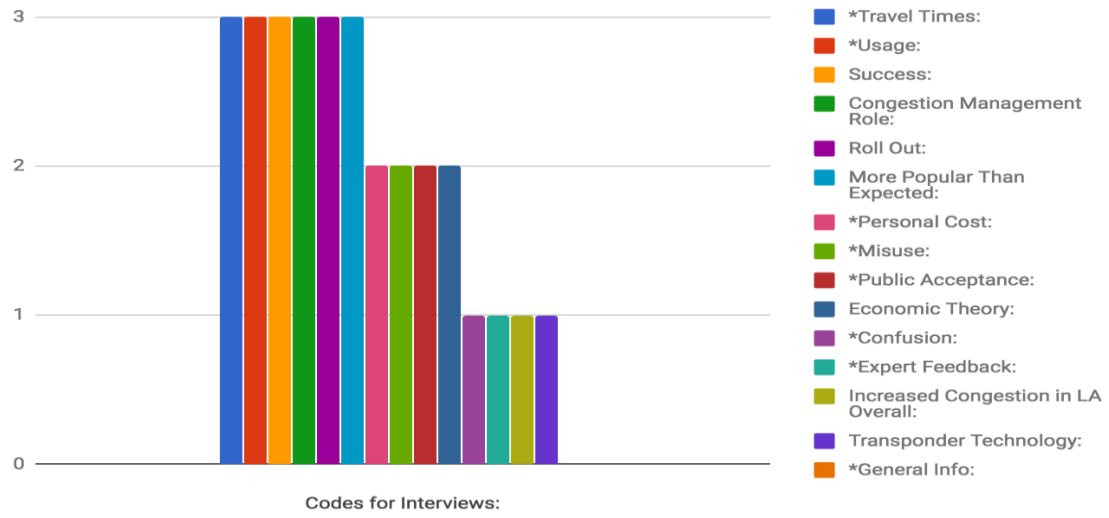
> When ExpressLanes were first being proposed in 2009-2011, there was a lot of opposition and skepticism. Since the ExpressLanes opened in November 2012 (110) and February 2013 (10), public acceptance has increased and the number of accounts opened continues to increase (2018).
>
> The program itself has been a major success. We have had a lot more trips on the ExpressLanes, customer account holders, and transponder sales than expected (2018).
>
> The program has proven to be much more popular than we had originally expected, as evidenced by the number of active accounts and transponders we have in circulation, as well as the sheer volume of traffic our lanes carry every day (2018).

Another important code had to do with *Roll Ou*t, which had two choices: whether it was *Solid* or *Could Have Been Better*. 1 of them said it had been solid, but the other 2 admitted there had definitely been issues when the program first started, mostly involving the fact that Metro had trusted people too much. They had thought drivers would only use the lanes if they had a transponder, and would be honest about the number of people in their cars when the lanes switched to HOV only. Because of this, Metro employees have had to work harder on advancing transponder technology and creating stronger enforcement strategies, as discussed below:

> When the ExpressLanes first opened, L.A. Metro as an agency made several design and operational decisions that placed a certain degree of trust in the users of the lanes. For example, we trusted our users not to illegally weave in and out of the lanes between designated access points, and we trusted our users to accurately represent their vehicle occupancies using the self-declared switch on each transponder. Unfortunately, both of these assumptions have

proven to be problematic since the lanes first opened, and ExpressLanes staff is now forced to seek and implement solutions to address both of those types of ExpressLanes misuse (2018).

Table II: Code Occurrence in Interviews



(See Appendix B for list of full interview codes).

Documents:

Importance of Economic Theory and Transit

Throughout the 9 documents, the codes that showed up the most were: *Economic Theory* (8x), *Improvements to Transit* (6x), *Increased Congestion Overall* (5x), *Usage* (5x), *Revenue* (5x), *Conditions for Funding* (5x), and *Travel Times* (5x total, *Faster*: 4x, *Negligible*: 1x). The *Economic Theory* code showed up in 8 out of 9 documents, making it the number one appearing code. This makes sense because most of the reports began with a description of the idea of dynamic pricing of roads, and how it works in terms of economics. Because congestion pricing is based upon an economic theory, it is important that this theory is explained in official reports on the ExpressLanes. *Improvements to Transit*, appearing in 6 documents, is clearly

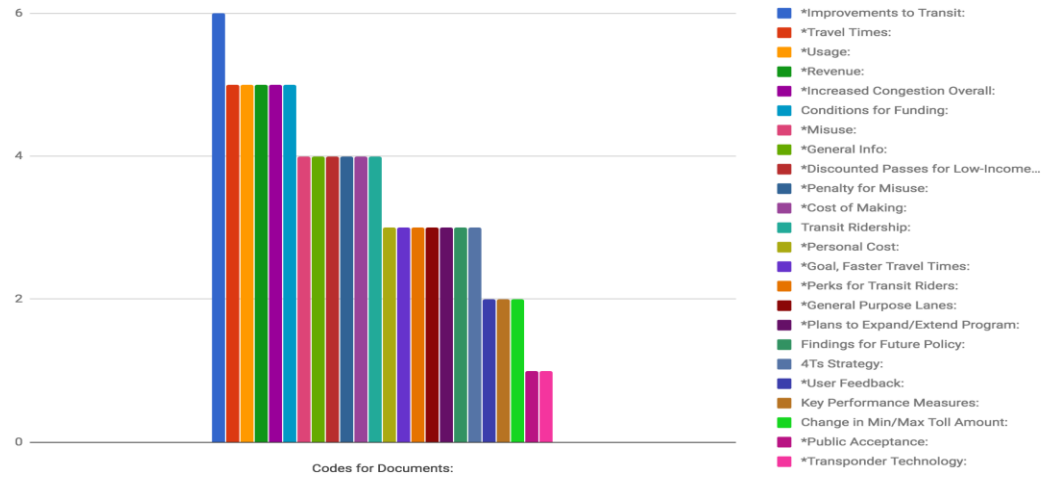
important for Metro to emphasize because they are in charge of public transportation. The fact that they are spending so much to ease commutes for drivers might be unpopular for transit advocates, which is why they chose to stress the benefits that this program is offering to transit riders. 5 of the documents were coded with *Increased Congestion Overall*, referring to the fact that the population of L.A. County has been rising. Naturally, there are more people on the roads as a result. *Usage* also appeared in 5 of the documents, with many of these 5 reports mentioning an increase in transponders issued from year to year, and therefore an increase in the number of drivers using the ExpressLanes. This can be seen as a win in terms of growing public support for the ExpressLanes.

Meeting Performance Standards

These documents- and the interviewees- also stressed the necessity of finding solutions to this growing number of users, so that they can continue to be faster than the General Purpose Lanes. Also appearing 5 times was the *Revenue* code, which included a lot of focus on where the revenue from the ExpressLanes would be going, and stressed the money that goes toward keeping the lanes running, as well as transit improvements within the corridors and beyond. (Ridership on the Silver Line was also reported as increasing since the opening of the ExpressLanes). Another 5 time code was *Conditions for Funding*, as the purpose of many of these reports was to evaluate if the ExpressLanes were performing up to a certain standard, which they need to do in order to retain their federal funding. Basically, "the agreement between MTA and the USDOT for the L.A. CRD Project requires performance monitoring for the Demonstration Project" (2010Eva1 2). The final code that showed up 5 times was *Travel Times*, with 4 of them being under *Faster* and 1 of them appearing as *Negligible*. Similar to the

interviews with Metro employees, the reports released by Metro almost all agreed that travel times in the ExpressLanes have been faster than in the General Purpose Lanes.

Table III: Code Occurrence in Documents



(See Appendix C for list of complete document codes).

Differences (and Similarities) Between News and Metro Perspectives

Through analyzing the 27 news articles, 3 interviews with Metro employees, and 9 performance evaluation documents of the ExpressLanes, it became clear that it is quite difficult to measure their objective "success". Instead, what stood out were the similarities and differences between how the different stakeholders view their performance. The main takeaway here are the differences between how Metro and the news media choose to discuss the ExpressLanes. Their perceptions vary based on what is at stake: the media tends to present an objective view of an issue, while Metro must attempt to prove their programs are successful so they can receive funding for said programs.

For instance, the top code from the news articles was *Personal Cost*, which appeared in 20 out of 27 articles, making it clear that the reporters felt it was crucial to let readers, who are potential users, know about the costs of the program. This is important because one of the main critiques of congestion pricing is that it favors wealthier drivers, and allows them to have a more reliable commute than those with less money. On the Metro side, the top code in the documents was *Improvements to Transit*, appearing in 6 out of the 9 documents, which emphasized how important it is for Metro to emphasize this benefit of the program. It is especially critical for Metro to try to remedy the critique that the ExpressLanes favor wealthier drivers by placing a lot of focus on the advantages that the program offers to transit riders, who are generally lower income. Because I only did three interviews, it is harder to discern the significance of the top codes, as 6 of them appeared in all three interviews. However, 4 out of 6 of these codes- *Travel Times: Faster*, *Usage*, *Success: In General*, and *More Popular than Expected*- were all positive, while the other 2 were general information.

There were definitely similarities across the platforms as well. Most notably, all the interviewees said that public acceptance has increased as the program has grown older and they have worked through initial operational issues. Similarly, as mentioned earlier, the op-eds written more recently were more likely to be positive than the ones written earlier, which demonstrates that people on the outside are warming up to the program. Furthermore, the articles and the Metro documents and interviews generally agreed on the *Economic Theory* behind the ExpressLanes, and that it has been proven to work in other contexts. Some of the resistance to congestion pricing in Los Angeles, both before and after the ExpressLanes have operated, is due to the strong freeway culture in Southern California that is suspicious of anything that would make these roads no longer free. However, if this upward trend in public

acceptance persists, and travel times continue to meet federal requirements, as showcased in the documents, then perhaps the differences between how the different stakeholders choose to discuss the ExpressLanes will become less noticeable.

Key Findings

In conclusion, the key findings were the variations between how the different stakeholders chose to create a narrative for the ExpressLanes. These variations were found via the difference between the codes that appeared the most in the articles, versus the ones that appeared most frequently in the documents and interviews, which were both mostly from a Metro perspective. The news media has to present all sides of an issue in order to be seen as credible, while Metro must prove the success of their programs in order to receive funding for them. The news coverage of the program placed extensive attention on the *Personal Cost* to ExpressLanes users. The progress reports were most likely to include an in depth look at the *Improvements to Transit* that have been made possible as part of the ExpressLanes funding and revenue generation. Lastly, the interviews did not include one concept that stood out over the rest, but instead involved a range of mostly positive codes that appeared in all 3 of them. Overall, Metro had a more positive view of the ExpressLane's performance, while the news media took a more balanced approach of both positive and negative aspects of the program.

Discussion and Recommendations

These findings reinforced the disparity between what the experts- like Metro employees- believe reduces congestion, and how the public feels about these same strategies. This could occur for several reasons. For instance, users might not be able to see the full picture of what is happening. Maybe they only drive to work a couple of days a week during

rush hour, and the ExpressLanes seem more congested when they are on them, when in reality, they are faster than the General Purpose Lanes overall. Another example could be that the average ExpressLanes user does not have the full breadth of knowledge that an expert or planner at Metro has, and if the ExpressLanes have been off to an uneven start, they do not have the data to see that the speeds will most likely improve with some additional updates. While Metro and the news media focused on some of the same aspects of the ExpressLanes, there were also marked differences in how they chose to evaluate and describe them.

Bridge the Gap Between Metro and the Public

This discrepancy between Metro and public perception should be further studied in order to bridge this gap between the opinion of experts and the experience of users. The literature review found that congestion pricing is the single most effective way for urban areas to reduce congestion, but in places like Los Angeles there is still uncertainty about its capability. It is possible that as time goes on and Metro works to improve the issues that they have come across, that users of the ExpressLanes will grow more fond of them. In the meantime, Metro could host town halls to engage with Angelenos about their own ideas to improve the ExpressLanes, and also offer popular education in the form of easy to understand diagrams and write ups on the program. Lessening this inconsistency in opinions is certainly doable, but it will take understanding and patience on all sides.

Focus on Improving Transponder Technology

The main recommendation that was brought up in my interviews was the importance of working on transponder technology and also creating stronger infrastructure to better catch the drivers who are cheating the system by not paying. As discussed in the literature review, the advanced technology of Singapore's congestion pricing system- which charges cars based on

the time, as well as their location and type of car- has allowed them to have one of the most successful and efficient congestion reduction programs in the world. Metro must continue to troubleshoot the issues they are having around cheaters, so that the lanes can be quick and efficient for those who are following the rules. Although these updates might be difficult, there is no doubt that Metro has the capabilities to improve their technology so that the program operates as efficiently as possible.

The report "Metro ExpressLanes Fiscal Year (FY) 2016 Performance Report", published in January 2016, explicitly lays out operational technological improvements for Metro to implement to reduce congestion in the ExpressLanes. Some of these 'next steps' are as follows:

- Beacon Lights will be upgraded to aid CHP [California Highway Patrol] in enforcement.
- New CCTV [closed-circuit television] cameras will be installed to improve real-time traffic monitoring.
- Occupancy Detection System to reduce customers incorrectly declaring occupancy.

Adjust Pricing Based on Congestion Levels

Some of the documents also laid out recommendations for how to combat increased congestion across all lanes, so that the ExpressLanes can remain the most reliable and quick choice of lane. For instance, the "Metro ExpressLanes Toll Policy" from January 2016 proposed an increase in toll cost during peak hours, and a decrease in cost during off-peak hours. This was designed in order to more effectively spread out traffic across different times of the day, something that Singapore also had to do during the early days of their own congestion pricing program. Adjusting the price of the ExpressLanes is an easy fix, but one that has to be done in a reasonable way so as not to upset users.

Rethink HOV Rules

The report "Metro ExpressLanes Fiscal Year (FY) 2017 Operations Performance Update" from September 2017 also gives guidelines to combatting the increase of HOV Only minutes due to increased congestion throughout L.A. These suggestions include:

- Offer a monetary incentive to customers to change their travel behavior and NOT travel during the peak hours called the "Peak of the Peak Incentive Program.
- Work with Caltrans to determine if it is necessary to raise the carpool minimum occupancy requirement.

The first suggestion would be a welcome one to drivers, while the second one would be less so, but potentially more effective at lowering any increased congestion in the ExpressLanes.

Implement Comprehensive Strategies

While these specific ExpressLanes recommendations- including transponder technology and toll cost- are important, it is also necessary for Metro to champion comprehensive congestion reduction strategies beyond the ExpressLanes themselves. For instance, the literature review discussed how the BRT system in Ottawa was so successful because of other strategies that had been previously implemented to discourage driving. If Los Angeles is to reduce congestion in a sustainable manner, Metro must look to the example of cities like Ottawa in order to tackle the issue more comprehensively. To this end, I recommend that Metro continues to focus on methods that disincentivize driving, especially at peak hours. The connection between the ExpressLanes and the improvements to transit in the same corridors is a solid beginning. When the ExpressLanes expand to other corridors, this connection between congestion pricing and improved transit services must continue, so that congestion can be reduced for as many people as possible. Based on the mixed reaction to the initial two corridors of the ExpressLanes, expanding them will also be met with some upset drivers. However, if Metro takes into account feedback from drivers and also strategies from

other cities, any new ExpressLanes will already be more successful and better received than the initial ones.

Limitations and Future Research

My study is somewhat limited because I did not include perspectives from any ExpressLanes users, besides those who work at Metro. This was because the aim of my study was to assess the difference between how Metro and the news media perceive the success of the ExpressLanes. However, future research should contain direct feedback from ExpressLanes users, because it is difficult to get a real sense of their thoughts on the program from the users' responses included in the news articles and from Metro. For example, news articles generally try to express different sides to an issue equally, even if the majority of people are on one side or the other. In the case of Metro, it is possible that they carefully curated the users' opinions that they chose to share in their reports. Additionally, further studies might want to look at raw data from Metro and CalTrans on the ExpressLanes if they would like to undertake a more objective quantitative analysis of the program's effectiveness in terms of reducing congestion.

Conclusion

Because the Los Angeles metro area is so sprawling yet densely populated, the lack of a comprehensive transit system has caused major congestion on its freeways. Fortunately, L.A. Metro has recently undertaken more comprehensive congestion reduction strategies, including the ExpressLanes on the I-110 and I-10 freeways. Exploring these lanes as a qualitative case study revealed that pursuing and implementing this strategy in L.A. County has been a long and complicated journey that was met with resistance from the public sphere. Because of L.A.'s dominant car culture and expansive freeway system, efforts to alter this mindset have

historically been fought against. However, with the overwhelming support for Measure R and Measure M, it is clear that Angelenos are beginning to rethink the ideas of mobility that they have relied on for so long. The way that the ExpressaLanes was able to combine efforts to relieve congestion for drivers with benefits for transit riders as well is an important step in the right direction toward a less automobile dependent region.

While study after study has proven that congestion pricing is the most effective way to lower congestion in metropolitan areas, the general public in places like L.A. are still apprehensive about it. This discrepancy must be remedied through well implemented and efficient systems that offer benefits like discounted passes for low-income drivers as well as transit improvements. Fortunately, despite increased congestion in Los Angeles overall due to population growth, the narrative around the ExpressLanes seems to be improving as more people use it and become familiar with its advantages. Moving forward, Metro must pursue the congestion reduction projects that have proven successful elsewhere, while also striving for public acceptance at the same time.

Appendix A: Documents and News Articles

Documents:

Los Angeles County Congestion Reduction Demonstration (L.A. CRD) Project National Evaluation Plan, L.A. Metro, January 20, 2010 (PDF: 2010Eval1)
Los Angeles County Congestion Reduction Demonstration (L.A. CRD) Project National Evaluation Plan, L.A. Metro, January 20, 2010 (PDF: 2010Eval2)
L.A. County Congestion Reduction Demonstration Program: Guidelines for Net Toll Revenue Allocation, L.A. Metro, October 16, 2013 (PDF: 2013AllocationGuide)
L.A. County Congestion Reduction Program (ExpressLanes): Quarterly Performance Update Report, L.A. Metro, February 18, 2015 (PDF: Feb2015Update)
ExpressLanes Performance Update-Preliminary Report, L.A. Metro, July 19, 2013 (PDF: July2013Update)
Metro ExpressLanes Fiscal Year (FY) 2017 Operations Performance Report, L.A. Metro, September 20, 2017 (PDF: 2017FiscalReport)
Metro ExpressLanes Toll Policy, L.A. Metro, January 20, 2016 (PDF: 2015PolicyRec)
Metro ExpressLanes Fiscal Year (FY) 2016 Performance Report, L.A. Metro (PDF: 2016FiscalReport)
Los Angeles Congestion Reduction Demonstration ExpressLanes Program: National Evaluation Report, U.S. Department of Transportation, August 31, 2015 (PDF: 2014NatlEval)

News Articles:

"Device unveiled to allow motorists to use freeway toll lanes", *Los Angeles Times: L.A. Now*, July 26, 2012
"More than 20,000 transponders pre-issued for 110 Freeway toll lanes", *Los Angeles Times: L.A. Now*, October 31, 2012
"Ready To Pay $1.40 A Mile For Faster Lanes On The 110 Freeway?", *L.A. Weekly*, November 5, 2012
"Everything You Need to Know About New 110 and 10 Toll Lanes", *Curbed Los Angeles*, November 6, 2012
"L.A.'s first toll lanes open; trips cost up to $15.40", *Los Angeles Times: L.A. Now*, November 11, 2012
"L.A. County toll lanes get smooth start, despite some grumbling", *Los Angeles Times: L.A. Now*, November 12, 2012
"12,297 Tickets Already For Improper Use of the 110 Toll Lanes", *Curbed Los Angeles*, November 28, 2012
"Pay car-pool lanes on 10 Freeway begin Saturday", *Whittier Daily News (California)*, February 22, 2013
"ExpressLanes to Bring "Congestion Pricing" to Harbor Freeway", *NBC Los Angeles*, February 22, 2013
"New toll lanes open after midnight on San Bernardino Freeway", *Los Angeles Times: L.A. Now*, February 22, 2013

"CBS2 Investigation: L.A. Agencies, Officials Get A Free Ride Through Toll Lanes On 10, 110 Freeways", *CBS Los Angeles*, April 30, 2013
"405 Freeway express lanes? Proceed with caution: Editorial", *Long Beach Press Telegram,* Published: November 6, 2013, Updated: September 1, 2017
"Metro backs extension of freeway toll lanes, adds $1 monthly fee", *Los Angeles Times: L.A. Now*, April 24, 2014
"Thousands diverted into 110 ExpressLanes, then fined by toll operator", *Los Angeles Times: L.A. Now*, September 17, 2014
"Are toll lanes elitist or progressive?", *Los Angeles Times: Opinion"*, September 23, 2014
"Congestion pricing on Los Angeles freeways proves 'time is money', *San Gabriel Valley Tribune*, November 16, 2014
"Does anyone get ticketed for cheating on freeway toll lanes?", *Los Angeles Times: Business*, November 19, 2014
"FasTrak express lanes turn 2, but traffic hasn't improved", *KPCC*, February 23, 2015
"MTA's toll-lane project may be a victim of its own success", *Los Angeles Times: California*, March 24, 2015
"110, 10 Freeway ExpressLanes are slowing down and officials aren't sure of the fix", *San Gabriel Valley Tribune*, February 9, 2016
"Cash flow is a problem for 'Lexus lanes' on Los Angeles-area freeways", *San Gabriel Valley Tribune: Opinion*, February 23, 2016
"Metro Response to Negative Op-Ed", *San Gabriel Valley Tribune*, March 6, 2016
"There's only one way to fix L.A.'s traffic, and it isn't Elon Musk's tunnels. We need tolls- lots of them", *Los Angeles Times: Opinion*, March 3, 2017
"L.A. County will consider tighter rules for carpool and toll lanes", *Los Angeles Times: L.A. Now*, March 27, 2017t
"Everyone hates tolls, but drastic times may call for drastic measures to fix L.A.'s traffic", *Los Angeles Times: Editorial*, September 23, 2017
"Bad traffic in L.A.'s toll lanes? Blame the 25% of drivers who don't pay to use them, officials say", *Los Angeles Times: L.A. Now*, October 13, 2017
"One in four drivers in L.A.'s express lanes aren't paying to use them", *Curbed Los Angeles*, October 16, 2017
"Carpool cheaters may face a crackdown in toll lanes", *KPCC*, October 26, 2017

Appendix B: Codes

	Documents (9)	News Articles (27)	Interviews (3)
Travel Times: Faster, Slower, Negligible:	Faster: **4 times** Slower: 0 Negligible: **1** (**5** total)	Faster: **4 times** Slower: **3** Negligible: **4** (**11** total)	Faster: **3 times** Slower: 0 Negligible: **1** (**4** total)
Personal Cost:	3	**20**	2
Misuse:	4	10	2
General Information:	4	**14**	N/A (Not Applicable)*
Usage:	5	7	**3**
Revenue:	5	10	2
Goal: Faster Travel Times:	3	**12**	0
Discounted Passes for Low-Income:	4	7	0
Improvements to Transit:	**6**	6	2
Penalty for Misuse:	4	**15**	0
Cost of Making:	4	5	N/A
Perks for Transit Riders:	3	5	0
General Purpose Lanes: Faster, Slower, Negligible:	Faster: 0 Slower: 1 Negligible: 2 (3 total)	Faster: 0 Slower: 2 Negligible: 0 (2 total)	Faster: 0 Slower: 1 Negligible: 0 (1 total)
Plans to Expand:	3	7	**3**
Conditions for	5	N/A	N/A

Funding:			
Transit Usage: Increase, Decrease, Negligible:	Increase: 4 Decrease: 0 Negligible: 0	N/A	N/A
Public Acceptance: Positive, Negative, Neutral:	Positive: 1 Negative: 0 Neutral: 0 (1 total)	Positive: 1 Negative: 5 Neutral: 2 (8 total)	Positive: 0 Negative: 0 Neutral: 2 (2 total)
Findings for Future Policy:	3	N/A	N/A
4Ts Strategy: Tollings, Transit, Travel Demand Management, Technology:	3	N/A	N/A
Key Performance Measures:	2	N/A	N/A
Economic Theory:	**8**	N/A	2
Transponder Technology:	1	N/A	1
Increased Congestion Overall:	**5**	N/A	1
User Feedback: Positive, Negative, Neutral	Positive: 2 Negative: 0 Neutral: 0 (2 total)	Positive: 0 Negative: 3 Neutral: 3 (6 total)	N/A
Opinion: Positive, Negative, Neutral:	N/A	Positive: 2 Negative: 3 Neutral: 0 (5 total)	N/A
Confusion:	N/A	5	1

Expert Feedback:	N/A	4	N/A
Metro Employee Feedback:	N/A	15	N/A (3)
Success: Mode Shift, Out of GP, In General:	N/A	N/A	Mode Shift: 1 Out of GP: 1 In General: **3** (5 total)
Congestion Management Role:	N/A	N/A	**3**
Roll Out: Solid, Could've Been Better:	N/A	N/A	Solid: 1 Could've Been Better: 2 (3 total)
More Popular Than Expected:	N/A	N/A	**3**

*Not Applicable: Code not applied to this type of media.

Appendix C: Interview Questions

1. How long have you been involved in transportation planning?
2. What is your role at Metro?
3. How have you been involved with the ExpressLanes project and/or the Silver Line?
4. What would you say are the biggest successes of the ExpressLanes?
5. Is there anything you would change about how the ExpressLanes project has run over the past 5 years?
6. What have been the biggest challenges with ExpressLanes:

a) From a logistical standpoint?

b) From a user and/or public satisfaction standpoint?

7. Do you think the ExpressLanes have been successful at reducing congestion- and therefore commute times?
8. Going forward, do you think the ExpressLanes project should expand to other corridors- why or why not?

References

"110, 10 Freeway ExpressLanes Are Slowing down and Officials Aren't Sure of the Fix." *San Gabriel Valley Tribune* (blog), February 7, 2016. http://www.sgvtribune.com/general-news/20160207/110-10-freeway-expresslanes-are-slowing-down-and-officials-arent-sure-of-the-fix.

"About | TomTom Traffic Index." Accessed November 1, 2017. https://www.tomtom.com/en_gb/trafficindex/about.

Albalate, Daniel, and Germa Bel. "What Local Policy Makers Should Know about Urban Road Charging: Lessons from Worldwide Experience - ProQuest." *Public Administration Review*, October 2009, 962–75.

Al-Dubikhi, Sami, and Paul Mees. "Bus Rapid Transit in Ottawa, 1978 to 2008: Assessing the Results - ProQuest." *The Town Planning Review*, 2010, 407–24.

Anderson, Michael L. "Subways, Strikes, and Slowdowns: The Impacts of Public Transit on Traffic Congestion." *The American Economic Review; Nashville* 104, no. 9 (September 2014): 2763–96. https://doi.org/http://dx.doi.org.oxy.idm.oclc.org/10.1257/aer.104.9.2763.

Asuncion, John, and Jonathan Nadler. "State of the Commute Report 2006." *Southern California Association of Governments*, 2006.

Bianco Darido, Georges. "Changing Commuters' Choices Helps São Paulo Reduce Traffic Congestion." Text/HTML. World Bank, May 1, 2014. http://www.worldbank.org/en/news/feature/2014/05/01/changing-commuter-choices-helps-sao-paulo-reduce-traffic-congestion.

Broverman, Neal. "Traffic Is Undermining the Success of Freeway ExpressLanes." *Los Angeles Magazine* (blog), February 10, 2016. http://www.lamag.com/driver/traffic-is-mucking-up-the-success-of-freeway-expresslanes/.

Bureau, U. S. Census. "American FactFinder - Results." Accessed November 1, 2017. https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF.

Butler, Martha. "Bus Rapid Transit Studies," August 2015. https://www.metro.net/projects/bus-rapid-transit-studies/.

Chatterjee, Kiron. "Modelling the Dynamics of Bus Use in a Changing Travel Environment Using Panel Data - ProQuest." *Transportation*, November 15, 2010, 487–509.

Colak, Serdar, Antonio LIma, and Marta C. Gonzalez. "Understanding Congested Travel in Urban Areas - ProQuest." *Nature Communications*, March 15, 2016. https://0-

search.proquest.com.oasys.lib.oxy.edu/docview/1773270675/fulltextPDF/D535E9DAE8D44654PQ/1?accountid=12935.

Cookson, Graham, and Bob Pishue. “INRIX Global Traffic Scorecard.” INRIX, February 2017.

Deal, Melanie. “471,000 Workers Commute into Los Angeles County, Calif., Each Day.” The United States Census Bureau. Accessed October 16, 2017. https://www.census.gov/newsroom/press-releases/2013/cb13-r13.html.

Dear, Michael. “Sprawl Hits the Wall: Confronting the Realities of Metropolitan Los Angeles.” USC and Brookings Center, November 30, 2001. https://www.brookings.edu/research/sprawl-hits-the-wall-confronting-the-realities-of-metropolitan-los-angeles/.

Duranton, Gilles, and Matthew A. Turner. “The Fundamental Law of Road Congestion: Evidence from US Cities - ProQuest.” *The American Economic Review*, October 2011, 2616–52.

Ewing, Reid, Guang Tian, Allison Spain, and J. Goates. “Effects of Light-Rail Transit on Traffic in a Travel Corridor.” *Journal of Public Transportation* 17, no. 4 (December 1, 2014). https://doi.org/http://dx.doi.org/10.5038/2375-0901.17.4.6.

“ExpressLanes Fiscal Year 2017 Report | Transport Economics | Road Infrastructure,” September 20, 2017. https://www.scribd.com/document/359254252/ExpressLanes-fiscal-year-2017-report.

Fisher, John. “ATSAC: 25 Years Later - ProQuest.” *Institute of Transportation Engineers*, July 2011, 48–53.

“Full Ranking | TomTom Traffic Index.” Accessed November 1, 2017. https://www.tomtom.com/en_gb/trafficindex/list?citySize=LARGE&continent=ALL&country=ALL.

Goel, Rahul, and Mark W. Burris. “Hot Lane Policies and Their Implications - ProQuest.” *Transportation*, November 13, 2011, 1019–33.

Grinberg, Andrew. “Exploring Bus Rapid Transit in Los Angeles.” Occidental College, 2006. https://nacto.org/docs/usdg/exploring_brt_in_la_grinberg.pdf.

Guckert, Wes. “Bus Rapid Transit Systems: A Viable Transit Solution - ProQuest.” *Institute of Transportation Engineers Journal*, November 2015, 38–41.

Hensher, David. “SYDNEY 2005 LIGHT RAIL DEBATE - ProQuest.” *Road and Transport Research*, March 2005, 86–88.

Hensher, David A., and Thomas F. Golob. “Bus Rapid Transit Systems: A Comparative Assessment - ProQuest.” *Transportation*, March 12, 2008, 501–18.

Holguín-veras, José, Iván Sánchez-díaz, and Benjamin Reim. "ETC Adoption, Time-of-Travel Choice, and Comprehensive Policies to Enhance Time-of-Day Pricing: A Stated Preference Investigation." *Transportation; New York* 43, no. 2 (March 2016): 273–99. https://doi.org/http://dx.doi.org.oxy.idm.oclc.org/10.1007/s11116-014-9575-9.

Hu, Winnie. "New York's Tilt Toward Congestion Pricing Was Years in the Making." *The New York Times*, November 28, 2017, sec. N.Y. / Region. https://www.nytimes.com/2017/11/28/nyregion/congestion-pricing-new-york.html.

Huff, Herbie. "There's Only One Way to Fix L.A.'s Traffic, and It Isn't Elon Musk's Tunnels. We Need Tolls — Lots of Them – L.A. Times." latimes.com, March 3, 2017. http://www.latimes.com/opinion/livable-city/la-ol-traffic-toll-lane-freeway-20170303-story.html.

Hymon, Steve. "ExpressLanes Use Continues to Rise on 10 and 110." *The Source* (blog), September 18, 2017. http://thesource.metro.net/2017/09/18/expresslanes-use-continues-to-rise/.

"Incorporated Cities - Los Angeles County." Accessed October 15, 2017. https://www.lacounty.gov/government/about-la-county/incorporated-cities.

INRIX. "Los Angeles Tops INRIX Global Congestion Ranking | INRIX." INRIX - INRIX. Accessed October 13, 2017. http://inrix.com/press-releases/los-angeles-tops-inrix-global-congestion-ranking/.

Kirby, Ronald F. "Managing Congestion Through Innovative Pricing and Financing." *Institute of Transportation Engineers. ITE Journal; Washington* 77, no. 7 (July 2007): 23–29.

Koonce, Peter. "Prioritizing Transit in a Connected Vehicle World - ProQuest." *Institute of Transportation Engineers*, December 2012, 18–22.

Lahon, Dhruva. "Modeling Transit Signal Priority and Queue Jumpers for BRT - ProQuest." *Institute of Transportation Engineers Journal*, December 2011, 20–24.

Leape, Jonathan. "The London Congestion Charge." *The Journal of Economic Perspectives; Nashville* 20, no. 4 (Fall 2006): 157–76. https://doi.org/http://dx.doi.org.oxy.idm.oclc.org/10.1257/jep.20.4.157.

Levinson, Herbert S., Transit Cooperative Research Program, and National Research Council (U.S.), eds. *Bus Rapid Transit*. TCRP Report 90. Washington, D.C: Transportation Research Board, 2003.

Lindsey, Robin. "Do Economists Reach A Conclusion on Road Pricing? The Intellectual History of an Idea." *Econ Journal Watch; Fairfax* 3, no. 2 (May 2006): 292.

"Los Angeles Population 2017 (Demographics, Maps, Graphs)." World Population Review, 2017. http://worldpopulationreview.com/us-cities/los-angeles-population/.

Manville, Michael, and David King. "Credible Commitment and Congestion Pricing - ProQuest." *Transportation*, July 1, 2012, 229–49.

Martucci, Brian. "15 U.S. Cities With the Worst Traffic & Longest Commute Times." Accessed October 13, 2017. https://www.moneycrashers.com/worst-us-cities-traffic-commute-time/.

McKenzie, Brian. "Who Drives to Work? Commuting by Automobile in the United States: 2013." *American Community Survey Reports*, 2015. http://large.stanford.edu/courses/2016/ph240/tran1/docs/acs-32.pdf.

Metro. "Metro ExpressLanes: Congestion Pricing," 2013.

Metro Board Operations Committee. "Line 910 Fare Structure," October 15, 2009. http://boardarchives.metro.net/Items/2009/10_October/20091015OPItem38.pdf.

Metro, and CalTrans. "Metro ExpressLanes Performance Update," April 30, 2013.

"Metro ExpressLanes." Accessed December 3, 2017. https://www.metroexpresslanes.net/en/home/index.shtml.

Metro Planning and Programming Committee. "Sepulveda Pass Corridor Systems Planning Study," June 20, 2012. https://media.metro.net/projects_studies/30-10_highway/images/20120620ppitem141.pdf.

"Metro Silver Line." Metro.net. Accessed December 3, 2017. https://www.metro.net/projects/silverline/.

Nagourney, Adam, and Conor Dougherty. "The Cost of a Hot Economy in California: A Severe Housing Crisis." *The New York Times*, July 17, 2017, sec. U.S. https://www.nytimes.com/2017/07/17/us/california-housing-crisis.html.

Nelson, Laura J. "Bad Traffic in L.A.'s Toll Lanes? Blame the 25% of Drivers Who Don't Pay to Use Them, Officials Say." latimes.com. Accessed October 17, 2017. http://www.latimes.com/local/lanow/la-me-ln-toll-lane-cheating-20170929-story.html.

———. "Los Angeles Area Can Claim the Worst Traffic in America. Again." *Los Angeles Times*, March 15, 2016. http://www.latimes.com/local/lanow/la-me-ln-la-worst-traffic-20160314-story.html.

Nelson, Laura J., and Dan Weikel. "Billions Spent, but Fewer People Are Using Public Transportation in Southern California." *Los Angeles Times*, January 27, 2016. http://www.latimes.com/local/california/la-me-ridership-slump-20160127-story.html.

Phang, Sock-Yong, and Rex S. Toh. “Road Congestion Pricing in Singapore: 1975 to 2003 - ProQuest.” *Transportation Journal*, Spring 2004, 16–25.

“Public Reports (ExpressLanes).” Metro. Accessed October 17, 2017. https://www.metro.net/projects/expresslanes/public-reports/.

Rafferty, John P. “Urban Sprawl.” Encyclopedia Britannica, September 1, 2009. https://www.britannica.com/topic/urban-sprawl.

Ridley-Thomas, Mark. “Senate Bill 1422,” August 25, 2008. ftp://www.leginfo.ca.gov/pub/07-08/bill/sen/sb_1401-1450/sb_1422_bill_20080825_amended_asm_v96.html.

Sorensen, Paul, Martin Wachs, Endy M. Daehner, Aaron Kofner, Liisa Ecola, Mark Hanson, Allison Yoh, Thomas Light, and James Griffin. *Moving Los Angeles: Short-Term Policy Options for Improving Transportation*. RAND Corporation, 2008. https://www.rand.org/pubs/monographs/MG748.html.

Taylor, Brian D. “Putting a Price on Mobility: Cars and Contradictions in Planning - ProQuest.” *Journal of the American Planning Association*, Summer 2006, 279–84.

Uh, Mark. “Best And Worst Cities For Commuting.” Trulia’s Blog. Accessed October 13, 2017. https://www.trulia.com/blog/trends/renter-owner-commute/.

“U.S. Census Bureau QuickFacts: Los Angeles County, California.” United States Census Bureau, July 1, 2016. https://www.census.gov/quickfacts/fact/table/losangelescitycalifornia,losangelescountycalifornia/PST045216.

USDOT. “Los Angeles Congestion Reduction Demonstration ExpressLane Program: National Evaluation Report,” August 31, 2015. https://ntl.bts.gov/lib/55000/55600/55669/FHWA-JPO-14-126-1.pdf.

Watt, Brian. “405 Traffic: A Little Slower after $1 Billion Upgrade.” Southern California Public Radio, 42:52 700. https://www.scpr.org/blogs/economy/2014/10/10/17413/405-traffic-a-little-slower-after-1-billion-upgrad/.

“What Is BRT?” Institute for Transportation and Development Policy- ITDP, July 24, 2014. https://www.itdp.org/library/standards-and-guides/the-bus-rapid-transit-standard/what-is-brt/.

“What Is Congestion Pricing? - Congestion Pricing: A Primer - FHWA Office of Operations.” Federal Highway Administration. Accessed October 13, 2017. https://ops.fhwa.dot.gov/publications/congestionpricing/sec2.htm.

WSP, and Parsons Brinckerhoff. “Countywide ExpressLanes Strategic Plan,” January 6, 2017.