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CAPSTONE PROJECT REPORT

UCLA Institute of Transportation Studies

Slow Your Roll!

An Analysis of LADOT's Slow Streets Program

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Client: Los Angeles Department of Transportation

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16. Abstract

This report explores the effects of the Slow Streets L.A. program in a variety of neighborhoods in Los Angeles. Separating the 30 Slow Streets corridors into 5 neighborhood typologies based on urban form and socio-economic information, I then utilize surveys of community sponsors and traffic analysis through Streetlight to garner a comprehensive snapshot of the benefits (or lack thereof) of Slow Street installation. Analysis of the five Slow Street typologies showed varying success in the program's ability to shift mobility patterns. When compared with its respective Control corridor, one Slow Street corridor saw smaller increases in vehicle speeds over the first three months of development. Comparison to the Control showed the Slow Street neighborhood producing greater decreases in vehicle traffic along its corridors. While all Typologies saw similar traffic decreases, no typology was fully successful at slowing vehicle speeds. Survey responses confirm ongoing concerns of vehicle speeds along designated corridors in addition to issues related to maintenance and long-term effectiveness of Slow Street signage. Although a majority of respondents agreed that Slow Streets L.A. was successful in extending recreational opportunities while social distancing, all respondents agreed fast cars pose a significant safety concern for the program. For greater effectiveness of the Slow Streets L.A. Program, this report recommends more durable and visible signage, in addition to supplementing corridors with traffic calming interventions and improvements to infrastructure for a more pleasant user experience.

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Disclaimer

This report was prepared in partial fulfillment of the requirements for the degree of Master of Urban and Regional Planning in the Department of Urban Planning at the University of California, Los Angeles; the requirements for the University of California, and the Los Angeles Institute of Transportation Studies Fellowship; It was prepared at the direction of the Department of Urban Planning and of the Los Angeles Department of Transportation as a planning client. The views expressed herein are those of the author and not necessarily those of the Department; the University of California, Los Angeles Luskin School of Public Affairs; the University of California, Los Angeles as a whole; the Institute of Transportation Studies; or the client.

Awards

This capstone was awarded 3rd place for the ITS Capstone Prize, given in recognition of exceptional work on transportation-themed capstone projecst relevant to California and federal transportation policy and planning by the UCLA Institute of Transportation Studies.

Slow Your Roll!

An Analysis of LADOT's Slow Streets Program

UCLA Institute of Transportation Studies

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Executive Summary

In May 2020, Los Angeles launched the Slow Streets L.A. Program to create space for city residents to remain physically active and socially distant amidst the city's Covid-related closure of recreational facilities. Months after the City deployed over 50 miles of Slow Street corridors, Los Angeles City Council passed a motion to make some corridors permanent. While the program has been positively received, this motion comes at a time when little beyond anecdotal evidence is known about the effectiveness of the program it hopes to reinforce.

Methodology

This report explores the effects of the Slow Streets L.A. program in a variety of neighborhoods in Los Angeles. Separating the 30 Slow Streets corridors into 5 neighborhood typologies (labeled A through E) based on urban form and socio-economic information, I then use a combination of quantitative and qualitative approaches to garner a comprehensive snapshot of the benefits (or lack thereof) of Slow Street installation. For on the ground perspective, I sought detailed feedback via survey to all 30 Slow Street community sponsors on issues of Slow Street experience and maintenance. These responses were supplemented by comparative analyses within Streetlight, a web-based transportation data analytics platform. Using Streetlight, I studied bicycle and pedestrian activity, as well as average speeds for vehicle traffic before and after a corridor's Slow Street installation.

Findings

Analysis of the five Slow Street typologies showed varying success in the program's ability to shift mobility patterns. When compared with its respective Control corridor, Typology A's Slow Streets saw smaller increases in vehicle speeds over the first three months of development. This is notable because it comes at a time when much of Los Angeles saw higher vehicle speeds due to decreased traffic levels. Comparison to the Control showed the Slow Street neighborhood producing greater decreases in vehicle traffic along its corridors. All five typologies experienced such decreases in traffic - ranging from 6% to nearly 24% - compared to their 2019 traffic levels. While some Typologies saw similar decreases in speed at the weekday level, no typology was fully successful at slowing vehicle traffic.

Survey responses confirm ongoing concerns of vehicle speeds along designated corridors in addition to issues related to maintenance and long-term effectiveness of Slow Street signage. Although a majority of respondents agreed that Slow Streets L.A. was successful in extending recreational opportunities while social distancing, all respondents agreed fast cars pose a significant safety concern for the program.

Recommendations

For greater effectiveness of the Slow Streets L.A. Program, this report recommends three improvements:

- Neighborhood signage must be durable and legible for the benefit of all modes of travelers. Sign improvement could reduce maintenance needs and improve driver understanding of Slow Streets.
- Physical traffic calming along Slow Street corridors can bring vehicle speeds down to the suggested limit of 15 mph and reduce user stress while in the Street.
- Walkable infrastructure improvements, similar to tactical sidewalk dining of "Al Fresco" programs, can create more inviting pedestrian environments.

Figure 1: *A Slow Street user in North Hollywood enjoying a calm street.*

Source: Keith Birmingham, Pasadena Star-News

Introduction

Beginning in the spring of 2020, the Covid-19 pandemic brought about societal changes at a pace and scale rarely seen in American cities. Initial months featured significant reductions in vehicular traffic due to widespread telecommuting and mandated closures of entertainment and recreation spaces. Months of uncertainty around transmission rates in public spaces fostered innovation in daily life to prevent further spread. Some transit agencies sought reductions in vehicle capacity and even stopped collecting fare (Nelson, 2020), grocery stores created hours restricted to shoppers 65 and older, and cities created new public spaces for recreation outside gyms and parks that were closed during this time.

One of the most noteworthy innovations of the Covid-19 era is the deployment of new "Open Streets" programs across the United States. This new era, commonly referred to as "Slow Streets", describes temporary conversion of existing right of way for vehicles towards a more multi-modal space to promote outdoor activity while maintaining social distancing. Some cities deployed Slow Streets tailored to (potentially) crowded grocers and/or medical centers to extend safe access to essential goods (City of Oakland, 2020). Other cities excluded vehicles from streets surrounding public parks to expand recreational areas for runners and families (City of Seattle, 2020).

Slow Streets L.A.

In May 2020, Los Angeles Mayor Eric Garcetti launched the Slow Streets L.A. Program to create space for neighbors to remain physically active and socially distant amidst the city's then-closure of parks, gyms, trails and other exercise venues (Reynolds, 2020). The program targeted local streets for traffic calming measures, deploying temporary signage advising drivers to slow down when entering designated Slow Street corridors (Reynolds, 2020). In implementing the Slow Streets L.A. Program, the Los Angeles Department of Transportation (LADOT) sought community partnerships. An application for community groups to apply for Slow Streets designation opened in May, with at least 427 submissions received by October 2020. Applications were evaluated under four priority criteria (Reynolds, 2020):

- **Network Size***:* Slow Street networks should be between one and three miles in length.
- **Street Classification***:* To minimize impact on businesses and neighborhood congestion, only local and collector streets (as identified within LADOT's Mobility Plan 2035) that are primarily residential are eligible.

- **Connectivity**: Designated slow street segments should be contiguous and provide connections to neighborhood destinations.
- **Equity**: At least 20 slow streets were targeted for deployment in five or more communities with high residential density, significant non-white populations, lower median income, and limited access to traditional recreational opportunities. LADOT published 13 specific neighborhoods that meet such criteria.

By October 2020, LADOT implemented 50.2 miles of Slow Streets through partnerships with 30 neighborhood sponsors. Twelve of these corridors are located within the thirteen neighborhoods targeted for equity. Slow Streets are marked by a barricade at each intersection, with some streets featuring mid-block barricades. Signage and barricade maintenance are primarily under the purview of neighborhood sponsors, with LADOT replacing signage if needed.

A member of City Council presented a motion in June 2020 seeking to make some Slow Streets corridors permanent (Ryu, 2020). However, little is known about the effectiveness of Slow Street L.A. This knowledge gap is where this project comes in, seeking to answer these three questions:

- What are the mobility impacts of a Slow Street in Los Angeles?
- How do Angelenos in varying communities respond to Slow Streets L.A.?
- What makes a Slow Street in Los Angeles successful?

In answering these three questions, I turn to a variety of qualitative and quantitative methods, looking at changes in vehicular speeds, pedestrian/bicycle travel, and Slow Street compliance among a sample of neighborhoods with designated corridors.

Overview of Research Methods

- **Typology and Sample Construction**: I construct five neighborhood typologies to account for neighborhood variety in Los Angeles, grouping by demographic data including population density, area median income and % zero vehicle households. One sample neighborhood is selected from each of the five typologies for Streetlight analysis.
- **Community Sponsor Surveys***:* I deploy a comprehensive survey to all 30 community sponsors of Slow Streets corridors to assess their neighborhood corridor's performance. This survey queries impacts of existing street and neighborhood conditions, abidance of social distancing, and perceived safety while using a Slow Street, among other topics.
- **Streetlight Mobility Analysis***:* I perform a comparative analysis on the five sample neighborhood corridors, focusing on changes to vehicular, bicycle and pedestrian mobility between 2019 and 2020 (following Slow Streets deployment). Controlling for citywide changes to travel behavior, one control neighborhood is selected for comparison with Typology A's corridors in Koreatown.

My findings analyze the results of the survey and traffic analysis within the context of each typology. Within surveys I look towards potential relationships between neighborhood character and Slow Street performance. I too examine changes in traffic speed and non-auto mobility along Slow Street corridors to estimate whether Slow Street designations were effective in creating socially distant recreational spaces along quasi-vehicular right of way. This traffic analysis performed in StreetLight verifies survey responses and supplements them with data including most popular times of day for Slow Street use and changes in vehicular speed.

Literature Review

Background

The concept of "Open Streets" events - temporarily making roadways 'open' to foot and bicycle traffic where pedestrians and bicyclists would otherwise be prohibited or limited to narrow sidewalks and bike lanes - first entered the American consciousness in prominence in the 1960s and 1970s. Early open streets events focused on recreational opportunities in parks, such as Seattle's "Bike Sundays" which started in 1965 and closes scenic stretches of Lake Washington Boulevard to cars and opens it to walking and bicycling (McGrody, 2013). Still occurring more than 50 years later, this is considered to be one of the longest running open streets events in the United States. Another early adoption included making streets car-free in San Francisco's Golden Gate Park area, beginning in 1967 (Hipp et al., 2017). Also in the latter half of the 20th century, Bogota, Colombia began its now-celebrated Ciclovias. The now-weekly celebration of open streets for cyclists and pedestrians across the Colombian city inspired numerous other cities to explore car-free street events. In the United States, cities began adopting Ciclovia-style daylong events in 2006, with the next decade unveiling dozens of new open street events (Hipp et al., 2017). While recreation remains a key component of open street events, they also have encouraged city officials and residents to increasingly consider the economic, environmental, and transportation benefits that a less car-centric streetscape can provide. As of 2017, the United States saw 107 distinct open street programs, 66 of which occurred at least once per year (Hipp et al., 2017).

Open Streets programs in the United States are often characterized by daylong events that occur annually, quarterly or even monthly. Sunday is the most common day for programming, accounting for about 78% of American Open Street events (Hipp et al., 2017). Most programs occur for four to five hours, with distances ranging between a half-mile to ten miles of car free thoroughfares. Half of the programs have attendance between 5,000 and 25,000 individuals, with New York City and Los Angeles serving as outliers. These two programs can feature attendance in excess of 100,000 people (Hipp et al., 2017).

"Success" in Open Streets

In addition to the immense variety in the characteristics of Open Streets (OS) programming across the country, there are also differences in how OS events measure success. Some cities look to a street-fair style event, with shopping and cultural events to draw in people to a condensed area. Others look for recreation through lengthy bike routes and physical activities along the route. North Carolina State University researchers Hipp et al. (2017) discuss five measures of success commonly used, including:

- Attendance and Participation
- Enthusiasm
- Social Media
- Survey Metrics
- Sustainability

While "Attendance and Participation" is relatively straightforward to measure by simply counting or taking sample estimates, the other metrics require some level of interpretation. "Enthusiasm" is alluded to as an aggregate of on-the-ground energy and informal feedback received during the events. "Social Media" included comments on the sponsor's social media posts and private posts from attendees at or about the event. "Survey Metrics" is defined by formal evaluations from participants as demonstrated in surveys distributed by event organizers. In this context, "Sustainability" does not refer to environmental benefits but rather is measured by ability and capacity for future events to be held (Hipp et al.). For many programs, this last success metric was challenging to attain. Hipp et al. surveys of 32 programs revealed that 40% of programs faced significant barriers to making their respective Open Street events monthly, and 46.9% characterized the barriers as "too large to overcome". Per survey data, these barriers may include fundraising at least $10,000 for security and permits, and months of outreach to achieve community approval (Hipp et al., 2017). Some of the most well attended and most frequent OS programming in the United States has been accomplished with funding from localities (CicLAvia, 2020). Hipp et al. recommend that replicability of Open Street events is contingent upon models that expedite permitting requirements and decrease costs on the event, possibly with public or private partnerships (Hipp et al., 2017).

Other research has illustrated differing benefits from OS events, including physical activity and enhanced safety on streets. Public health experts Zieff et al. surveyed individuals across three countries to ascertain how an Open Street program might enhance various features of a corridor (2018). The team garnered reactions to walking down a street both before an event (an average day) and then during the OS event, measuring physical features of the neighborhood and perceptions of the environment. Environmental perceptions such as "Overall safety of the neighborhood" and "Overall impact on likelihood of walking" were enhanced in two out of the three cities. For

participants in San Francisco, USA and Bogota, Colombia, 70% and 74.2% responded that the neighborhood felt safer during the Open Streets event, respectively (Zieff et al., 2018). Similarly, 70% and 75% of respondents in San Francisco and Temuco, Chile, respectively, described the OS event as making them more likely to walk along the corridor (Zieff et al, 2018).

Redefining Park Space

Measuring safety in Open Streets contextualizes the events in an important and new frame of equity. The findings of enhanced perceptions of safety and likelihood of activity that Zieff et al. observe in their study, as happening during OS events, can serve as a crucial opportunity for communities lacking quality space for recreation (2018). Respondents of Bogota referred to Ciclovia street closures as a supplement for poor park quality, and counterparts in San Francisco framed Open Streets as opportunities outside of unsafe open space in the Bayview neighborhood (p. 908).

Reviewing park space in U.S. cities can illustrate disparity in recreational opportunities across racial and class divides. A 2013 mapping analysis of park space in Los Angeles detailed gaps in park space for poor neighborhoods and those dominated by non-white households. Specifically, neighborhoods that were at least 50% White featured an average of 65.7 acres parkland per 1,000 children, while neighborhoods that were over 50% Black featured an average of 2.4 acres per 1,000 children (Wolch et al., 2013, p. 16). While averages were slightly higher for majority Latino or Asian neighborhoods, neither category came close to the White neighborhood average. Looking at socioeconomic status revealed a similar disparity, with high poverty (40% in poverty) areas having 7.7 acres per 1,000 children compared to low poverty (under 10% in poverty) areas featuring 451 acres (p. 22). This analysis not only showcased existing discrepancies in park access, but how even government programs meant to enhance park access can further intensify inequity. This was the case of LA County's Prop K which is argued by scholars at the University of Southern California to have disproportionately funded neighborhoods with existing park access and denied a number of grants from marginalized neighborhoods in need of more park space (Wolch et al, 2013, p. 32).

Some scholarship has looked to reimagine recreation space in neighborhoods lacking traditional park space. In analyzing the Florence-Firestone community in Los Angeles, Urban Planner Clement Lau illustrated potential futures for activity outside of existing parks (2012). Noting that the neighborhood features relatively high rates of obesity and would require an incredible 238 acres of new parkland to meet county park standards for its population (Lau, 2012, p. 392), Lau proposed a variety of temporary opportunities for recreation. Proposals included joint use of school gyms and fields during non-school hours, pocket parks and even vouchers for private or nonprofit recreational facilities as solutions. Recognizing measures taken elsewhere in the City of Los Angeles, Lau too

mentioned temporary street closures like the popular CicLAvia. While he argues underserved communities rarely receive the 'monumental' parks that local officials enjoy creating (p. 389), his analysis details numerous options to create and advance the kind of recreational equity for which other scholars advocate.

Benefits of LA's "CicLAvia"

Los Angeles' bimonthly "CicLAvia" is one of the most popular Open Street events in the United States. Hipp ranked Los Angeles in a class of two with New York that frequently has attendance in excess of 100,000 people in a variety of neighborhoods across the county (Hipp 2017) (CicLAvia, 2020).

A recent evaluation of CicLAvia events in 2014 and 2015 showcased their effectiveness for promoting physical activity and changing travel patterns. Surveying over one thousand people in combination with detailed traffic camera footage at one 2014 event, a research team estimated the event drew between 37,700 and 53,950 participants (Cohen et al., 2016, p. 26). In surveying participants, 45% of respondents said they would not have been physically active that day if not for the CicLAvia event (p. 26). Additionally, while 68% of respondents stated they generally travel around Los Angeles by car, 81% planned to bike on the route that day (p. 31).

Beyond the activity benefits, CicLAvia has also demonstrated an ability to improve environmental conditions in its host neighborhoods. A 2015 report from UCLA found that the event substantially improves air quality both on its closed street, and the surrounding streets in close proximity. Comparing readings of air pollutants from a baseline, CicLAvia's street closures reduced ultrafine particles by 21% and PM 2.5 by 49% on closed streets (Shu et al., 2016, p. 175). Surrounding streets that continued allowing vehicular traffic too had 12% lower PM 2.5 on the day of the event. While one may expect such street closures to augment congestion on surrounding streets, the study found no clear increase in traffic across a section of surrounding neighborhood streets (Shu et al., 2016).

The event in the report featured the neighborhoods of Echo Park, Chinatown and Boyle Heights, all ranked in the top 10 worst census tracts by Cal EnviroScreen's rank of California census tracts disproportionately burdened by pollution (UCLA Health, 2015) (California OEHHA, 2018). Recognizing this, one researcher suggested that "LA residents, and especially CicLAvia participants, would benefit from more open-street events" (UCLA Health, 2015).

Finally, CicLAvia has been shown to bring tangible economic benefits to communities across Los Angeles. A 2013 study by the UCLA's Luskin School of Public Affairs found that businesses along a stretch of Wilshire Boulevard closed to traffic for a CicLAvia saw their sales increase by at least 10% on the day of the event (Boekelheide, 2013). While

this event was noteworthy for featuring some of the largest participation ever recorded for an American Open Street event (possibly 150,000 attendees), the study noted that businesses who more actively engaged with the event via signage, booths and music near their shop received greater profits. These "active participants" saw a 57% increase in sales during CicLAvia - $1,356 per establishment (Boekelheide).

Covid-19 and Street Modifications

In March of 2020, many American cities began closing down public spaces to discourage centralized gathering and prevent the spread of Covid-19. As "Stay At Home" orders permeated the urban landscape, cities innovated to provide residents recreational space near the comfort of their homes. April brought new "Slow Streets" designed to limit through traffic and open up space for play and exercise. Oakland signed onto 74 miles of new quasi-street closures (Bliss, 2020), with just days later San Francisco following suit with 12 similar partial street closures (Rudick, 2020). In the coming months, numerous other cities including Minneapolis, New York City, Washington, D.C., Seattle and Los Angeles too enacted their own street semi-closures (Bliss, 2020).

For a number of programs, these street modifications looked far different from the aforementioned Open Streets/Ciclovias. For Oakland, Los Angeles and others, Slow Streets did not entail a ban on vehicular traffic. In contrast to Open Streets, Slow Street closures in Oakland consisted of "a pair of traffic signs and a barricade blocking one lane" (Bliss 2020). In Pittsburgh, the city's signage does not close streets, but discourages "all non-local traffic" and advises reduced speeds (City of Pittsburgh, 2020). Warren Logan, Director of Mobility for the Oakland Mayor, described slow streets as "mostly a firm psychological nudge" for drivers to take selected streets more carefully (Bliss 2020). While few cities offered specific durations of service, most Slow Streets programs were meant to be much longer in duration than a single day Open Streets event. In this regard, Slow Streets were closer to dutch "woonerfs", permanent shared streets for pedestrians, cyclists and vehicles that became popular in the 1960s (Hockenos, 2013), than an 8-hour CicLAvia.

While many are similar, no two Slow Streets programs are the same. Some cities like Oakland and Los Angeles have focused on an equitable geographic distribution of slow streets across neighborhoods of differing incomes, while Seattle's "Stay Healthy Streets" program instead focused on street closures in and around popular parks to allow further social distancing (Wilson et al., 2020). Various street closures occurred alongside dining programs in many cities, where existing street space or parking lots were renovated to accommodate outdoor dining. In Los Angeles, the city's "Al Fresco" dining program launched in late May, only to be expanded in "Phase 2" in June. Whereas Phase 1 focused only on sidewalks and private parking lots, Phase 2 allowed reclamation of street parking spaces and even street closures for dining (City of Los Angeles, 2020). This second phase included a specific focus on BIPOC-owned businesses, and

increased the total of participating restaurants to about 2,000 as of October (ABC7.com Staff, 2020). After several months of operating both its Slow Streets and Al Fresco dining program, City Councilmembers have now called for Los Angeles's programs to be made permanent (Pinheiro, 2020). In the City Council motion for permanent Slow Streets, Councilmember David Ryu cited the "overwhelmingly positive" feedback from community groups and participating neighborhoods (City of Los Angeles, 2020).

***Figure 2**: Various Slow Street users in Del Rey, one of the first neighborhoods in Los Angeles to receive the program. Source: Office of City Councilmember Mike Bonin*

Slow Streets Criticisms and Early Findings

The "Slow Streets" phenomenon of the Covid era has also attracted some criticism regarding its equity in creating activity nodes. In the wake of the nationwide uprising around police violence against BIPOC individuals in 2020, some planning voices have suggested that Slow Streets programs are another flashy "tactical urbanism", where cities don't listen to communities they are supposed to serve. This brand of urbanism frequently involves quick-build projects that bypass traditionally lengthy review processes to deliver bike lanes, pocket-parks, etc. under budget and ahead of schedule. Planning scholar and community organizer Dr. Destiny Thomas argues that Slow Streets' bypassing of traditional community meetings undermines one of the few opportunities communities of color have to influence policy in their neighborhoods, and disregards the foundational inequities that fostered the need for Slow Streets in the first place (Thomas, 2020). Planning professionals like Mike Lydon recognize the danger of making such tactical urbanism the norm for transportation planning in already marginalized neighborhoods, but also acknowledge that there still can be benefits in quick projects that respond to immediate crises like Covid-19 (Wilson, 2020).

Now a year since the onset of Covid-19 restrictions, some early data is available on Slow Streets' efficacy across the country. A 2020 report by INRIX research detailed findings for vehicle traffic and non-vehicle use of Slow Streets from March to August 2020. While city programs varied slightly, recreation-focused programs in Seattle and Minneapolis saw greater pedestrian activity along designated Slow Streets compared to similar corridors without the designation (Pishue, 2020). This report alluded that the effects of Slow Street designation may be temporary in some cities, with activity along designated streets significantly falling after several months of the program (Pishue, 2020, p. 6).

The effects of Slow Streets on vehicle travel is of particular interest to residents and researchers alike. According to the INRIX report, all five cities studied showed significant declines in "pass through" vehicle trips along designated streets when compared to 2019 counts (Pishue, 2020, p. 3). This finding of vehicle trip reductions is affirmed by a Streetlight report on Nashville's "Walk Bike Nashville" program. But while this report found less vehicle traffic in East Nashville's designated corridor, the average speed of vehicles along the corridor *increased.* Data showed that while 13% of vehicles drove above 30 mph on Greenwood Avenue (designated Slow Street) in 2019, during its Slow Street designation in the summer of 2020, 22% of vehicles drove at a speed above 30 mph (Johnson, 2020).

Further Research Needed

The City of Los Angeles is a space of historic active transportation events, despite (or possibly because of) a strong car culture and lack of recreation space in many of its communities. As Clement Lau points to innovative programs to bring park space to disadvantaged Angelenos, these programs must be critically analyzed prior to their adoption as permanent policy. Many Angelenos get excited by the prospect of turning right of way for vehicles over to pedestrian and bicycle activity, as evidenced by CicLAvia's attendance by tens of thousands of Angelenos in recent events. But data from these events show that most of the cyclists in CicLAvia events are motorists in their daily life. It is unclear if quick-build tactics to shift the dominant mode of streets permanently will show success.

Early findings from Slow Streets programs across the United States show potential success, as evidenced by the documented activity along designated corridors in Oakland, Seattle and Minneapolis. But reports in Nashville of increased vehicle speeds along corridors asking drivers to slow down prompt the need for critical analysis of Slow Streets effects in our communities. With minimal existing data on Slow Streets L.A. at the moment, it is important that city officials understand the program's effects on traffic speed and non-vehicle activity prior to any of its Slow Streets corridors becoming permanent. This project's research aims to fill this knowledge gap, informing policymakers about Slow Streets LA and hopefully prompting thought about the future of non-traditional park space in our city.

Data and Methods

The key components of the study's methodology include:

- GIS - Using GIS mapping and American Community Survey (ACS) data analysis to develop Slow Street corridor neighborhood typologies.
- Streetlight Analysis - A quantitative review of local traffic speed and volumes of Slow Street corridors before and after program implementation to understand measurable changes in traffic patterns.
- Sponsor Survey - A qualitative survey answered by community-based organizations (CBOs) sponsoring their neighborhood's Slow Street programs to capture perceptive changes that do not have clear, measurable impacts.

Through mapping the Slow Street neighborhoods, I develop typologies of neighborhoods and extrapolate mobility-related data from similar neighborhoods seeking a Slow Street treatment. The surveys offer supplemental information about community responses to Slow Streets, how they may have changed over time, and their popularity amongst target populations. While the quantitative analysis focuses on specific periods just after the initial Slow Street designation, the surveys allow greater reflection on Slow Street usage, including adherence to social distancing policies.

Typology Construction

To account for immense variety among the 30 Slow Street neighborhoods, my research constructs distinct typologies within which I classify neighborhoods. These typologies account for geographic and demographic differences, including population density, race/ethnicity demographics, household income and geographic setting. In total, I created five typologies and selected one neighborhood from each category for further mobility analysis.

I used ArcMap to apply demographic data to each Slow Street corridor, then found commonalities amongst corridors. I began by constructing shapefiles for each corridor, utilizing "streets" shapefiles on LA City's Geohub, and then drawing corridors from LADOT data on placement of Slow Streets signage in each neighborhood.

To estimate demographic data for various neighborhoods, I applied existing American Community Survey data to the newly made shapefiles. Using SimplyAnalytics' shapefiles containing statistics on race, income, etc, I applied 2020 ACS shapefiles for the City of Los Angeles, aggregated at the census tract level. Within ArcMap, I then constructed quarter-mile buffers around each shapefile for a neighborhood's Slow Streets. Finally, I used spatial join by location to fuse the ACS data with my shapefiles. Since some quarter-mile buffers contained numerous census tracts, the spatial join averaged the demographic data of all intersecting tracts. This created 30 sets of demographic data from 7 variables (see **Table 1**) that inform the Slow Street neighborhood typologies.

Table 1: American Community Survey Data Utilized

	VARIABLE	SOURCE YEAR
1	Median Household Income	2020
2	Population Density (per square mile)	2020
3	% Households w/ No Vehicles	2020
4	% White Population, Alone	2020
5	% Hispanic Population	2020
6	% Population, 65 and Older	2020
7	% Families No Children	2020

Source: SimplyAnalytics.com

While no two neighborhoods are identical in characteristics, my analysis and categorization reflect commonalities in the key variables. In grouping neighborhoods, I paid particular attention to four variables: (1) median household income, (2) population density, (3) % zero vehicle households and (4) % white population (as a proxy for majority-nonwhite neighborhoods). Using filtering in Excel, I was able to create a narrative of five different neighborhood typologies. **Table 2** illustrates the characteristics of each typology, and their associated lettering that will be used further. See **Figure 2** for geographic distribution of the typologies. While most neighborhoods featured some commonality with others, Studio City's demographics were anomalous in nearly all categories. For this reason, Studio City is in a typology of its own.

Table 2: Description of Slow Street Typologies

	NEIGHBORHOODS INCLUDED	DESCRIPTION OF TYPOLOGY
A	MacArthur Park, Koreatown, East Hollywood, Hollywood	High density, historic urban core of the greater area of Hollywood and Koreatown. Over 25% zero-vehicle households, medium/low median income households.
B	Watts, Boyle Heights, Jefferson Park, South Central	Medium density areas of South and East Los Angeles with the lowest median household income and highest % non-white population. 15-25% zero-vehicle households.
C	Los Feliz, Palms, Eagle Rock, Mar Vista, Sawtelle, Del Rey	Medium/low density suburbs found on the Westside and north and northeast of Downtown Los Angeles. Medium/high median household income and medium/high % white population.
D	Highland Park, Canoga Park, North Hollywood, Wilmington, Leimert Park	Low density suburbs, including portions of the San Fernando Valley and South Los Angeles with medium median household income and medium % white population.
E	Studio City	Lowest density suburb with highest median income and highest % white population. Very low % zero-vehicle household.

From these five typologies, I selected a smaller sample for traffic analysis; one neighborhood from each typology to understand how neighborhood characteristics might influence the efficacy of Slow Streets. Per client guidance, two community programs were selected from Typology A due to their interconnected nature. The final five neighborhoods and their respective sponsors are featured in **Table 3.**

Table 3: Neighborhood Corridors within Sample

	COMMUNITY SPONSOR	NEIGHBORHOOD	MILES OF SLOW STREETS
A	Koreatown Immigrant Workers Association (KIWA)	Koreatown	1.7
A	Friends of Berendo	Koreatown	0.9
B	Bright Watts	Watts	1.1
C	The Eagle Rock Association (TERA)	Eagle Rock	1.1
D	Organization Voces del Cambio	Canoga Park	1.0
E	The River Project	Studio City	1.4

Community sponsors courtesy of LADOT. Although there are five neighborhoods, there are technically two separate community sponsors for the Koreatown area. In practice, the Slow Streets for Koreatown function as one.

Control Neighborhood

To clarify the effects of a Slow Street treatment in contrast to neighborhoods that did not receive the designation, I included a control neighborhood. With wide variety among Slow Streets prompting five typologies, I used a control modeled after one typology. Per faculty advisor guidance, the control was modeled after Typology A.

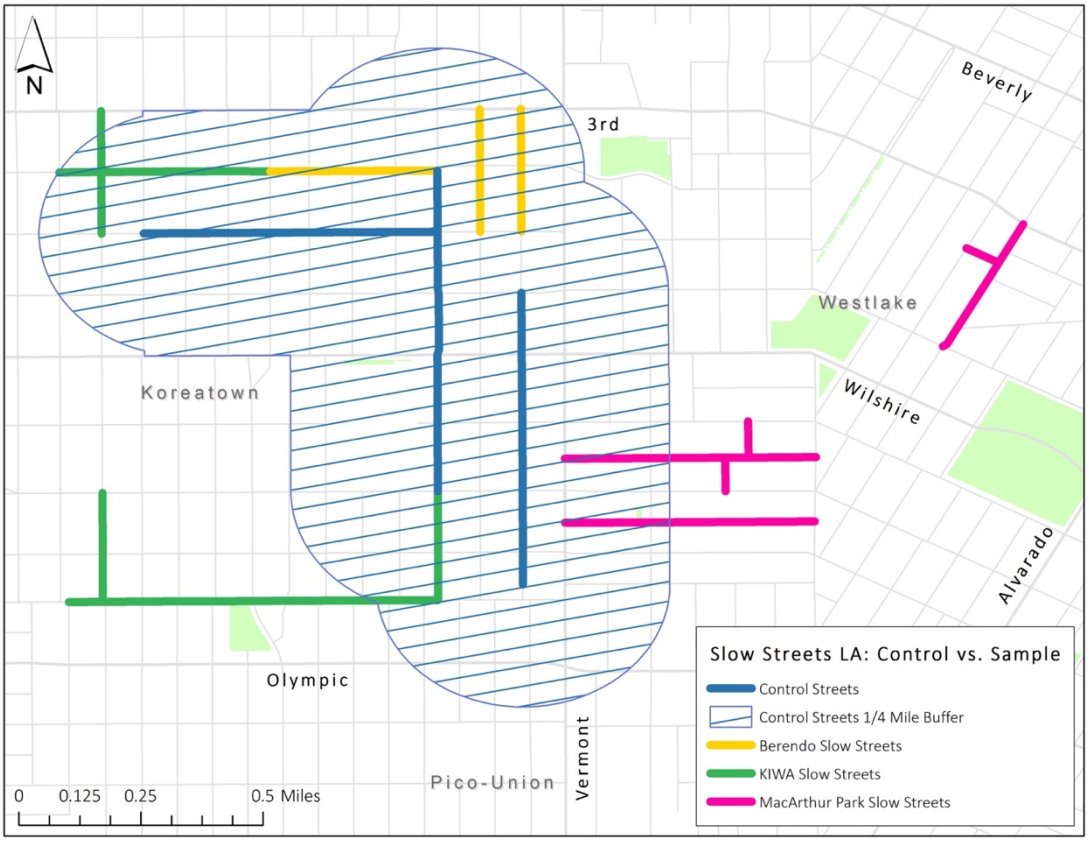
Like the designated Slow Streets, the control only consists of local residential streets. Specifically, the control corridor includes Catalina Street, New Hampshire Avenue and 5th Streets near the intersection of Wilshire and Vermont in Koreatown (see **Figure 1**). Using the previous demographic analysis methodology around a quarter-mile buffer of the control streets, the area proved comparable to nearby Typology A Slow Streets corridors in Koreatown and MacArthur Park. **Table 4** offers demographic details of this control in comparison to the Typology A average.

Table 4: Demographics of Control Neighborhood vs. Typology A Slow Streets

VARIABLE	TYPOLOGY A AVERAGE	CONTROL NEIGHBORHOOD
Area Median Income	$42,388	$39,686
Population Density/Square Mile	38,426	50,205
% Zero Vehicle	27%	31.%
% White Alone	32%	23%
Sum Corridor Length	1.42 miles	1.74 miles

.

Figure 3: Typology A vs. Control Streets in Koreatown



Slow Street Sponsor Survey

To complement the quantitative data produced from StreetLight, I sought qualitative feedback on Slow Street performance from the 30 current neighborhood sponsors. With input from both my faculty advisor and client, I constructed 24 questions with four sections to better understand the experience of users and sponsors of Slow Streets L.A. The four sections of the survey were divided as follows:

- Respondent Information – Gathering information about the organization that the respondent represents, as well as on how the respondent's organization first learned about the Slow Streets L.A. program.
- Safety and Neighborhood Environment – Inquiring about existing features of the neighborhood that might impact the Slow Streets' use, as well as potential enhancements to make Slow Street experience safer.
- Car Usage – Inquiring about perceived changes in the speed and volume of vehicular traffic since Slow Street deployment.
- Evaluation – Seeking sponsor's perspective on how Slow Streets have affected neighborhood levels of biking and/or walking since deployment. Also inquiring about the most common age demographics of Slow Streets users and if there have been changes in Slow Street use since initial deployment.

The wording of questions was carefully selected to minimize potential bias in survey response. To maximize accessibility, the survey was constructed as a Google Form, easily opened through a URL link. Due to concerns about bias produced by survey length, a test run of the survey was completed by a neighborhood volunteer three days prior to survey. The test respondent reported it took 9 minutes to complete the survey, less than the anticipated time frame of 10-15 minutes.

The Slow Street Sponsor Survey (see **Appendix A**) was distributed on Monday, February 1st to representatives of the 30 neighborhood sponsors. I sent the survey via a link embedded in an email which briefly summarized my project and partnership with LADOT. A list of email addresses for neighborhood sponsor representatives was provided by LADOT. As the Department provided multiple email addresses for some organizations, some neighborhood sponsors were provided more than one opportunity to complete the survey. The sponsor survey was open for two weeks, closing on Friday, February 12th at 5 PM. I received 20 responses, with at least one response from each of the five represented typologies.

Review of the survey was contextualized by typology, grouping responses from neighborhood sponsors classified together. As some questions asked about changes in street traffic and vehicular speeds, this data supplements findings from StreetLight data. Other question responses contextualize some of the quantitative traffic analysis.

Street Light Analysis

Zone Construction and Analysis

Quantitative analysis for the Slow Streets utilized Streetlight - an application that compiles trip data from cell phones, allowing mobility analysis along streets or between regions. Analysis can be performed per road (showing speed and traffic levels of users) and isolated by mode, including cars, buses, cyclists and pedestrians.

My analysis began with shapefiles previously made for construction of the 5 typologies and one control neighborhood. I uploaded all neighborhood shapefiles, separating those from different sponsors (Koreatown with two sponsors) and those corridors deployed at different times (Eagle Rock with two deployment dates) to StreetLight as "zones". Each shapefile required its own analyses, separated by travel mode (walk, bike, car) and year. In my traffic analysis, I hoped to answer two specific questions:

- How did deployment of Slow Streets affect the counts of pedestrians, cars and bicycles along designated Slow Streets?
- Did vehicular traffic slow down along designated Slow Street corridors?

In answering these questions, I used two methods of analysis in Streetlight. For active transportation, I turned to Streetlight's "Modular Analysis" feature. This focuses on counts of bicycles/pedestrians that pass-through midpoints of road segments in a neighborhood's shapefiles. For each shapefile, I conducted four modular analyses of this zone activity: two relating to the time before (2019) and after (2020) the Slow Street designation and two per mode (bicycle/pedestrian). In keeping my analysis true to the initial months following a Slow Street deployment, all analysis dates followed a three-month time frame beginning on the date of a sponsor's Slow Street installation. I included analysis at different times of day and portion of the week for more granular analysis and insights on which times of day are most popular.

For vehicular traffic I used the "Segment Analysis" feature. Similar to "Modular Analysis" this feature measures traffic via "pass-through gates," essentially an imaginary line midway through a selected segment and offers the ability to measure speed in intervals of ten miles per hour. Again, I studied three-month periods beginning on the date of Slow Street installation for a neighborhood sponsor. For each shapefile, I ran one modular analysis per year (2019/2020) for comparison.

Comparative Analysis and Visualization

Once the Street Light application completed compiling the multi-modal data aggregation for my selected time periods, I then refined the data for legibility. Each neighborhood's years and travel modes were downloaded as separate Excel files. **Table 5** details the variables used from the Streetlight spreadsheets and actions performed for each variable.

Table 5: Variables Analyzed in Streetlight Analysis

VARIABLE	EXAMPLE VALUE(S)	DESCRIPTION	ACTION PERFORMED
Zone Name	"KIWA Zone 001"	A name/number dependent on the name of the neighborhood sponsor and a number randomly assigned by Street Light.	Assigned each zone name a corresponding street with which it follows on the map, and the street portion's cross street boundaries
Average Daily Zone /Segment Traffic	(Number pertaining to daily traffic through designated midpoints of Slow Street portions)	The number of vehicles, pedestrians or bicyclists crossing through a midpoint of the given zone during an allotted time frame	Condensed the portions of each "zone name" into their corresponding streets, i.e. assigning the values of "KIWA Zones 001-16" all pertaining to San Marino Street in Koreatown. Then averaged the traffic of each, to then get the average pedestrians along San Marino Street during a prescribed day type and part.
Day Type	"0: All Days (M-Su)" "2: Weekend Day (Sa-Su)"	The portion of the week for which the traffic values are pertaining – either the entire 7-day week, only weekdays, or only weekends	For all traffic/speed values, this was a primary categorization to separate results between weekdays and weekends.
Day Part	"0: All Day (12am-12am)" "2: Peak AM (6am-10am)" "3: Mid-Day (10am-3pm)"	The portion of each day for which the traffic values are pertaining. These values are often in three- or four-hour increments, except for the "All Day" category which pertains to all 24 hours of the designated day.	For all traffic/speed values, this was a primary categorization to separate results between hours a Slow Street user is likely to be outside (designated 6 AM and 7 PM) and less common hours in the early morning and late evening.
Segment Speed X (Percent)	(Percent of vehicles driving within a designated speed interval)	The percent of vehicles driving through a zone within a designated speed interval, i.e. 0-10 mph.	Averaged this data by street to get a percent breakdown of drivers by speed deciles, up to 50 mph, and then broken up by "Day Type".

With established variables for review, I cleaned each neighborhood's spreadsheets by averaging values of traffic and vehicular speed by "Day Part", "Day Type" and Street Name (as compiled from the "Zone Name" variable). Using pivot tables to sort the data, I first organized values of traffic count and speed percentiles by zone name, i.e. KIWA Zone 001 for a section of street within the Slow Streets sponsored by KIWA. To then organize data by streets, I first matched each Zone Name to a street by referencing Streetlight's map of zone names, overlayed on OpenStreetMap. This allowed for a second pivot table, where I could average each value by street. An example of this would be in Koreatown, where I combined the numerous zone names that corresponded to San Marino Street into one average - effectively producing an average of pedestrian traffic for all of San Marino during my prescribed time periods. By cleaning all data into a manner that can be presented by street, I was finally left with four tabs for each neighborhood:

- Car Speed – Comparing the percent breakdown of vehicular speeds along designated Slow Streets between 2019 and 2020, separating weekdays and weekends.
- Car Traffic – Comparing the vehicular traffic counts along designated Slow Streets between 2019 and 2020, separating 6 different day segments during weekdays and weekends.
- Bicycle Traffic – Comparing the bicycle traffic counts along designated Slow Streets between 2019 and 2020, separating 6 different day segments during weekdays and weekends.
- Pedestrian Traffic – Comparing the pedestrian traffic counts along designated Slow Streets between 2019 and 2020, separating 6 different day segments during weekdays and weekends.

Comparing Traffic Volume

With legible and useful data now available, I examined changes in traffic and speed from 2019 to 2020. For the tables pertaining to traffic, I averaged the traffic counts of all streets by weekday and by weekend. I then compared each street's 2019 and 2020 averages (per weekday/weekend) and then found the percent difference between the two. Once the percent difference was calculated for each street by day type, I finally averaged those values to produce two final values for each mode – a percent difference between 2019 and 2020 on weekdays, and on weekends. For example, **Table 6** illustrates a nearly 24% reduction in car traffic between 2019 and 2020 on weekdays in the Slow Streets sponsored by Organization Voces Del Cambio. While LADOT listed no explicit goals for traffic increases or decreases in specific modes of travel along Slow Streets, percent changes in average traffic between years and day types were carefully noted in analysis.

Table 6: Example of Comparative Analysis – Vehicle Traffic

ORGANIZATION VOCES DEL CAMBIO: WEEKDAY					
	ALABAMA AVE	COHASSET ST	JORDAN AVE	REMMET AVE	AVERAGE
2019	1,543	955	1,451	1,325	1,318
2020	1,207	626	1,093	1,093	1,005
Percent Difference	*-21.8%*	*-34.4%*	*-24.7%*	*-17.5%*	*-23.8%*
ORGANIZATION VOCES DEL CAMBIO: WEEKEND					
	ALABAMA AVE	COHASSET ST	JORDAN AVE	REMMET AVE	AVERAGE
2019	1,306	769	1,279	1,035	1,097
2020	1,307	677	1,140	961	1,021
Percent Difference	*0.1%*	*-12.0%*	*-10.9%*	*-7.1%*	*-6.9%*

Comparing Vehicular Speed

The Slow Streets L.A. guidelines explicitly state "all vehicles are asked to maintain slow speeds on designated Slow Streets" (LADOT, 2020). Recognizing the importance of slow vehicular traffic, I paid close attention to speeds of travel along designated corridors. To clean the data, I utilized pivot tables to assign streets to StreetLight zone names but maintained a higher-level analysis at the "day type" level. This produced four tables for review: speed breakdowns for 2019 weekdays, 2019 weekends, 2020 weekdays and 2020 weekends of the 3 months following the neighborhood's Slow Street deployment.

After a review of Slow Streets L.A. signage in late 2020, signage in some neighborhoods changed to a message requesting speeds less than or equal to 15 mph. This speed served as a rough benchmark for analysis. StreetLight produces speed breakdowns at deciles, of which I looked at the 5 ranges of 0-10 mph, 10-20 mph, 20-30 mph, 30-40 mph, and 40-50 mph. Focusing on the prescribed effects of a Slow Street in L.A., I then modified the values to only look at the percent of cars within *two* ranges: 0-10 mph and 0-20 mph. Complementing this speed breakdown, I also examined the average speed along the corridors, paying attention to if this fell under the 15-mph mark. Similar to my method for traffic count, I found a percent difference within a sponsor's Slow Streets, contrasting 2019 from 2020 and controlling for type of day. For example, **Table 7** details a 5% reduction in average weekend speeds along designated Slow Streets in Koreatown, sponsored by Friends of Berendo.

Table 7: Example of Comparative Analysis – Vehicle Speed

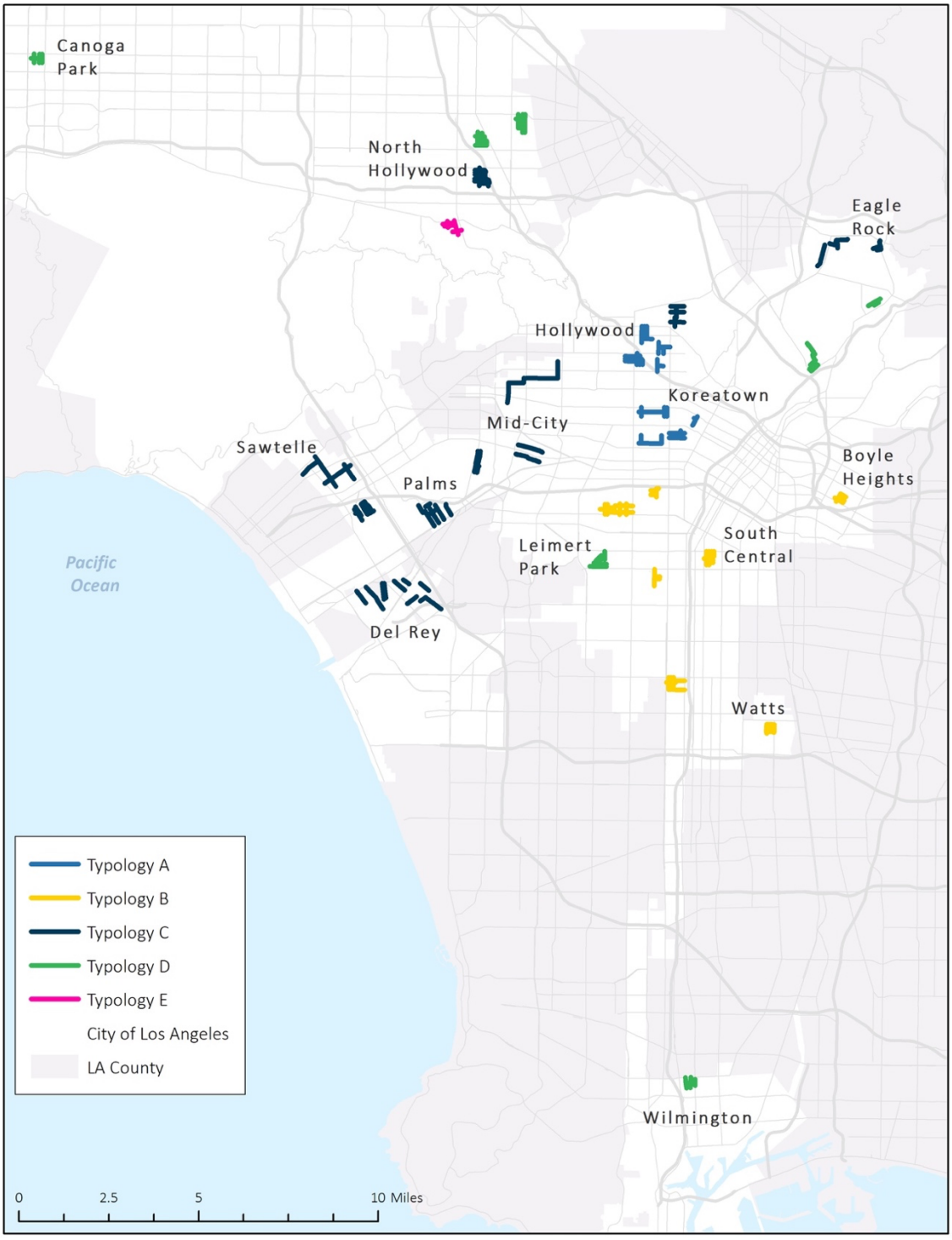
FRIENDS OF BERENDO: WEEKDAY			
	AVERAGE SPEED	UNDER 10 MPH (%)	UNDER 20 MPH (%)
2019	13.24	41.24%	89.07%
2020	13.08	36.19%	88.79%
% Difference	*-1.2%*	*-12.24%*	*-0.32%*
FRIENDS OF BERENDO: WEEKEND			
	AVERAGE SPEED	UNDER 10 MPH (%)	UNDER 20 MPH (%)
2019	13.60	38.65%	89.05%
2020	12.92	38.10%	88.78%
% Difference	*-5.0%*	*-1.42%*	*-0.30%*

Data Limitations

In compiling quantitative data from StreetLight it is important to note the potential limitations of its estimates. StreetLight uses cell phone data along corridors, meaning that each phone's ping along a street is collected by the application and then coded as a specific mode of travel (car, pedestrian, bicycle, bus, etc.) (StreetLight, 2021). Pedestrian and bicycle coding is estimated from the speed of travel, and expected percentages of a specific mode's share of travel. For example, if bikes generally travel along a street at a speed of 10 mph, for a distance of 1-3 miles, and 4% of travel along a street is via bike, then pings fitting this description will be coded as bikes. There is the possibility that cyclists going far faster than the expected speed may be miscounted as a car, or a very slow and short car trip could be miscounted as a pedestrian.

The survey of neighborhood sponsors may be regarded as the most accurate representation of a neighborhood's efficacy since it is informed by user experience, but it too can include biases. As sponsors were the initial advocates for a Slow Street installation, their judgement of the Slow Street designation may be overly optimistic in hopes the designation remains. Additionally, respondents can only offer their perspective on the street, and may not accurately remember changes in street behavior over time.

Figure 4: Geographic Distribution of Slow Street Corridor Typologies



Source: City of LA Geohub, SimplyAnalytics.com, LADOT.

Findings

Summary of Key Findings

Mobility Impacts

- **Typology A** saw a **smaller increase** in **vehicle speeds** than control neighborhood.
- All five typologies experienced significant **reductions** in **weekday vehicular traffic.**
- Slow Street samples saw **varied effects** on vehicle speed depending on the typology.
- Typologies with greater **population density** saw less **pedestrian activity** than lower density typologies.
- Only one out of the five typologies saw an **average speed under 15 mph** in 2020.

Recreation and Social Distancing

- **70%** of survey respondents believe a street is ***safer* for social distancing** following a Slow Street designation.
- **65%** of neighborhood sponsors requested local Slow Streets program for **purposes different** than **LADOT's stated program.**
- **55%** of respondents believe designation brought **new recreational opportunities** to their community.

Obstacles to Success

- **100%** of survey respondents noted **fast vehicle speeds** as a significant safety concern on Slow Street corridors.
- **Issues of signage durability** and **visibility** provide difficulty in maintaining Slow Streets.
- **Streetscape issues** relating to lighting, shade coverage and sidewalk maintenance dissuade some from using Slow Streets.

Mobility Impacts of Slow Streets

Slow Streets vs. Regular Streets

While Slow Streets L.A. was promoted as a mechanism to calm traffic for recreation, Streetlight analysis shows that the Slow Street designation did not lead to a uniform decrease in traffic volume or speeds along a corridor. **Table 8** details these differences seen in traffic between the two samples of Typology A (KIWA/Friends of Berendo) and their respective control corridor. The table details average differences between 2019 and 2020 in vehicle speeds and counts of three different modes of transportation. Values that outperformed the other are bolded, i.e. Typology A showing a greater decrease in Weekend average speed than the control. In this context, "outperform" was defined as producing a greater *increase* in pedestrian or bicycle traffic, or a greater *decrease* in car volumes or speeds than the control.

Slow Streets were more effective at reducing vehicular traffic than the control corridor. **Table 8** details that the average of the two Koreatown Slow Street samples saw a significantly greater reduction in weekday and weekend car traffic. While designated Slow Streets did not offer significant speed reductions, they were more effective at maintaining speeds from the "before" period amidst the citywide decrease in traffic. By contrast, the Control group saw a nearly 10% increase in vehicle speeds in 2020 (the respective Typology A corridors saw a change in vehicle speed of under 1%).

Similar reductions in vehicle traffic between sample and control groups raises questions about key factors to Slow Streets success. General reductions in vehicle travel during the height of the pandemic may have produced a citywide traffic calming effect in neighborhoods with and without the Slow Street designation. However, the significant difference in vehicle speed suggests there may be some success in changing driver behavior, at least for the initial three months after the program deployment.

Table 8: Slow Street Typology A vs. Control Neighborhood

	MODAL CATEGORY OF PERCENT DIFFERENCE	AVERAGE OF TYPOLOGY A SAMPLE	CONTROL AVERAGE
Pedestrian Count	Weekday Average	**-5.98%**	-21.88%
	Weekend Average	**-11.91%**	-14.98%
Bicycle Count	Weekday Average	-38.39%	**-32.52%**
	Weekend Average	-22.93%	**-9.56%**
Car Traffic	Weekday Average	**-20.27%**	-8.44%
	Weekend Average	**-22.59%**	-6.43%
Weekday Car Speed	Weekday Average	**0.87%**	13.06%
	Under 10 mph	**-11.66%**	-27.46%
	Under 20 mph	**-1.6%**	-5.47%
Weekend Car Speed	Weekend Average	**-0.30%**	9.92%
	Under 10 mph	**-5.02%**	-23.23%
	Under 20 mph	**-1.31%**	-4.92%

Differing Communities' Response to Slow Streets

As the construction of typologies sought to differentiate the effects of Slow Streets by neighborhood character, the findings see differences among the five typologies' performance. **Table 9** illustrates that all five typologies saw reductions in vehicular traffic regardless of day type (weekday/weekend). In contrast, not a single typology saw a uniform decrease in speeds for both day types. While **Table 10** shows three of the five typologies producing a greater percent of weekday cars traveling under 10 mph following designation in 2020; this is only seen in one typology for the recorded weekend trips. Concerning is the *decrease* in cars traveling under 20 mph for most typologies for weekdays and weekends. This meant that fewer cars on the weekend drove at slow speeds along the corridors after designation – particularly for Typology B (Watts).

The case of Typology A may offer insight as to how neighborhood character influenced the Slow Streets performance. Typology A's dense neighborhoods of Hollywood and Koreatown saw significant reductions in car traffic on both weekdays and weekends, yet also reductions in percentages of low-speed (<20 mph) travel. As many of these area's streets offer relatively dense development near major freeways and boulevards, this reduction in vehicle traffic may have opened up many streets clogged with congestion prior to the pandemic. For the studied neighborhood (Koreatown), this relative lack of traffic may have allowed greater traffic speeds for cars, which then produced a uniform percent reduction in cars traveling at low speeds.

The experience of Typology A slightly contrasts with the lower density Typologies D and E. These two typologies feature far less density, greater car ownership and higher median incomes. With more car-dependent neighborhood culture, specifically Typology D, the findings saw a jump in weekday speeds under 10 mph, from 20% of cars in 2019 to 38% in 2020. This confoundingly was not reflected in D's neighborhood's weekend speeds, but was seen in the isolated weekend speed reduction in Typology E. For areas with little thru traffic and high car ownership, these traditionally higher speed drivers might have shown greater attentiveness to Slow Street signage than those from other typologie

Table 9: Changes in Vehicle Count and Speed by Typology

	CAR TRAFFIC		**AVERAGE SPEED**	
TYPOLOGY	WEEKDAY AVERAGE PERCENT DIFFERENCE	WEEKEND AVERAGE PERCENT DIFFERENCE	WEEKDAY AVERAGE PERCENT DIFFERENCE	WEEKEND AVERAGE PERCENT DIFFERENCE
A	-20.27%	-22.59%	0.87%	-0.30%
B	-8.86%	-7.87%	-21.04%	17.03%
C	-14.92%	-11.87%	-19.97%	1.45%
D	-23.75%	-6.93%	1.88%	-1.03%
E	-13.26%	-9.40%	16.79%	-9.24%
All Typologies	-16.21%	-11.73%	-4.30%	1.58%

Table 10: Changes in Vehicle Speed by Typology

	WEEKDAY SPEEDS		WEEKEND SPEEDS	
TYPOLOGY	UNDER 10 MPH PERCENT DIFFERENCE	UNDER 20 MPH PERCENT DIFFERENCE	UNDER 10 MPH PERCENT DIFFERENCE	UNDER 20 MPH PERCENT DIFFERENCE
A	-11.66%	-1.60%	-5.02%	-1.31%
B	26.33%	-9.67%	-56.77%	-7.45%
C	7.16%	6.65%	-9.97%	-2.33%
D	89.00%	-3.62%	0.00%	0.00%
E	-24.12%	-6.22%	18.73%	7.37%
All Typologies	17.34%	-2.89%	-10.61%	-0.74%

Negative values indicate a smaller proportion of vehicles driving within a specified speed range. Increases of "Under 10 mph" alongside decreases of "Under 20 mph" reflect an increase in both very slow and very fast driving speeds along a corridor.

As traffic calming measures require driver compliance for success, the survey gathered feedback from community sponsors about how they observed drivers' understanding and interacting with Slow Streets signage. Of the 20 respondents, 45% believed that motorists were confused by Slow Streets designation. **Table 11** shows that only 30% could confidently state that signage was understood by local motorists, possibly contributing to this varied success in speed reductions between typologies.

Table 11: Driver Understanding of Slow Street Designation

10. Do you believe that local drivers have understood what the Slow Streets designation means?		
RESPONSE	NUMBER OF RESPONSES	PERCENT OF TOTAL RESPONSES
Yes	6	30%
No	9	45%
I Don't Know	5	25%

Recreation and Social Distancing

Slow Streets L.A. was promoted by Mayor Eric Garcetti with two goals: expanding recreational opportunities and easing one's ability to social distance while outside. Regarding the adoption of the Slow Streets designation, survey results of community sponsors detail a variety of motivations to bring the program to their neighborhood that extend beyond these two stated goals. **Table 12** details that 45% of respondents included recreation and social distancing as their organization's "primary goal" for bringing Slow Streets to their neighborhood. Recognizing ongoing issues of traffic speeds, some neighborhood groups saw Slow Streets LA as an opportunity to address needs for traffic calming measures rather than recreational needs.

Table 12: Goals of Community Sponsors in Adopting Slow Street Designation

11. As the neighborhood sponsor, what was your organization's primary goal in bringing Slow Streets to your neighborhood?		
RESPONSE	NUMBER OF RESPONSES	PERCENT OF TOTAL RESPONSES
Creating space for recreation while social distancing	7	35%
Providing new multi-modal space for cars, bikes and pedestrians	5	25%
Calming car traffic on local streets	6	30%
All of the Above	2	10%

Looking at the specific goals offered by LADOT, survey responses moderately affirm the program's two goals. On the topic of social distancing, most respondents described the Slow Street designation as expanding ability for residents to enjoy the neighborhood while following public health guidance. **Table 13** reports 70% of neighborhoods affirming this goal. The second goal of expanding recreation was found to be less successful among respondents. **Table 14** details that only 55% of sponsors believed Slow Streets L.A. brought new recreational opportunities to their community. This disparity in answers could reflect that community sponsors generally believe that Slow Streets made conditions more pleasant for those that already use the streets, but that Slow Streets did not consistently draw new users to the street, perhaps due to safety concerns related to driver behavior along the corridors.

Table 13: Slow Streets and Social Distancing

20. Do you believe it is easier for residents to social distance while walking or biking on your neighborhood's designated Slow Streets compared to nearby streets without the designation?		
RESPONSE	NUMBER OF RESPONSES	PERCENT OF TOTAL RESPONSES
Yes	14	70%
No	1	5%
I Don't Know	5	25%

Table 14: Slow Streets and Recreational Opportunities

13. Do you believe the Slow Streets designation has brought recreational opportunities to your community?		
RESPONSE	NUMBER OF RESPONSES	PERCENT OF TOTAL RESPONSES
Yes	11	55%
No	7	35%
I Don't Know	2	10%

While LADOT did not list greater pedestrian and bicycle activity as a goal for Slow Street corridors, such activity may be a proxy for local residents' feelings about safety for the program. **Table 15** indicates that four of the five typologies experienced increases in weekday pedestrian activity. Among the four, two of them (Typologies C and D) also saw increases in bicycle activity.

Typology A's anomalous decrease in pedestrian activity may be a product of multiple factors, as Koreatown offers the highest density and highest percentage of zero-car households of any five sample neighborhoods. This area also regularly features high pedestrian traffic for local businesses and transit stops, not a feature of most other sample corridors. This potential combination of Covid-related reduced transit ridership (SCAG, 2020), reduced shopping activity and closure of businesses may have, in turn, produced a sharp decrease in overall pedestrian activity.

Table 15: Pedestrian Impacts of Slow Street Sample

	PEDESTRIAN COUNTS	
TYPOLOGY	WEEKDAY AVERAGE PERCENT DIFFERENCE	WEEKEND AVERAGE PERCENT DIFFERENCE
A	-5.98%	-11.91%
B	12.13%	-38.57%
C	53.09%	38.89%
D	1.57%	48.19%
E	47.42%	57.59%
All Typologies	22.05%	18.84%

Table 16: Bicycle Impacts of Slow Street Sample

	BICYCLE COUNTS	
TYPOLOGY	WEEKDAY AVERAGE PERCENT DIFFERENCE	WEEKEND AVERAGE PERCENT DIFFERENCE
A	- 38.39%	- 22.93%
B	-42.86%	0.00%
C	9.34%	45.51%
D	13.04%	2.22%
E	-25.00%	-46.15%
All Typologies	-16.77%	- 4.27%

Obstacles to Success

With moderate success in the goals of Slow Streets L.A., it was important to examine potential barriers neighborhoods faced in creating environments friendly for outdoor recreation. Two factors were found to have significant influence on a program's success at the neighborhood level: existing neighborhood features and signage. **Table 17** details that 65% of respondents believed the Slow Street designation improved the safety of pedestrian and bicycle activity along the street. This section further examines contributing factors to user perception of a Slow Street's comfort.

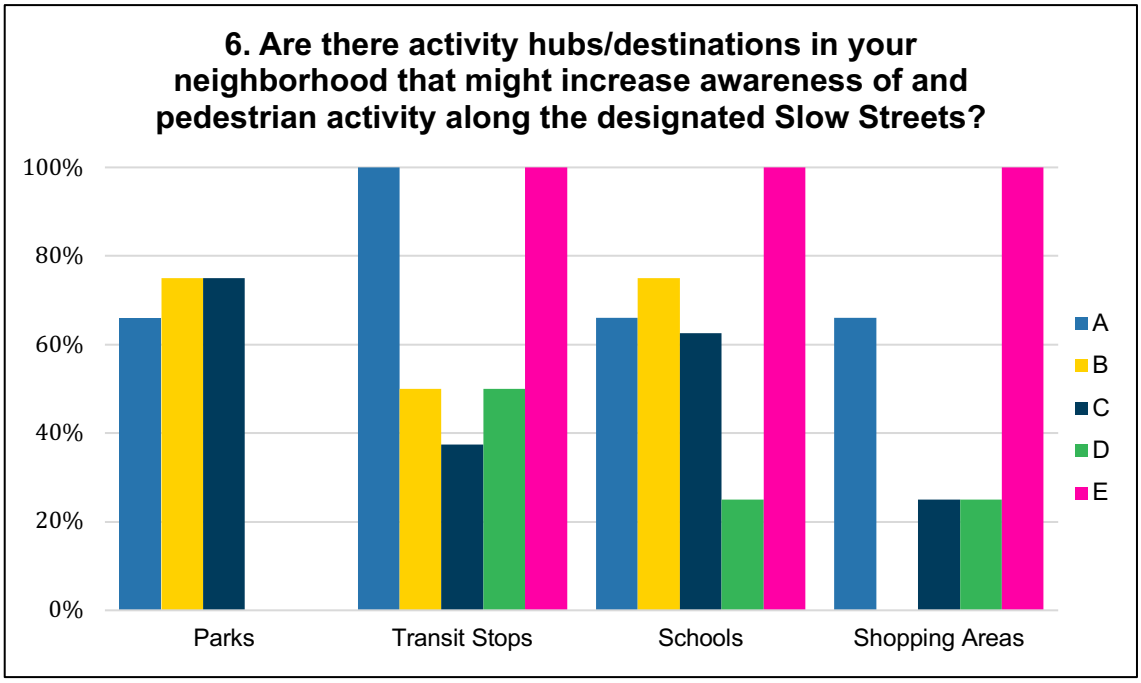
Table 17: General Perceptions of Safety on Slow Streets

3. When thinking about all the Slow Streets your organization has sponsored, do you think residents feel safer walking or biking on a street in your neighborhood AFTER it becomes a designated Slow Street?		
TYPOLOGY	NUMBER OF SPONSORS ANSWERING "YES"	"YES" PERCENT OF TOTAL RESPONSES
A	1	33%
B	2	50%
C	6	75%
D	3	75%
E	1	100%
All Typologies	13	65%

Neighborhood Amenities

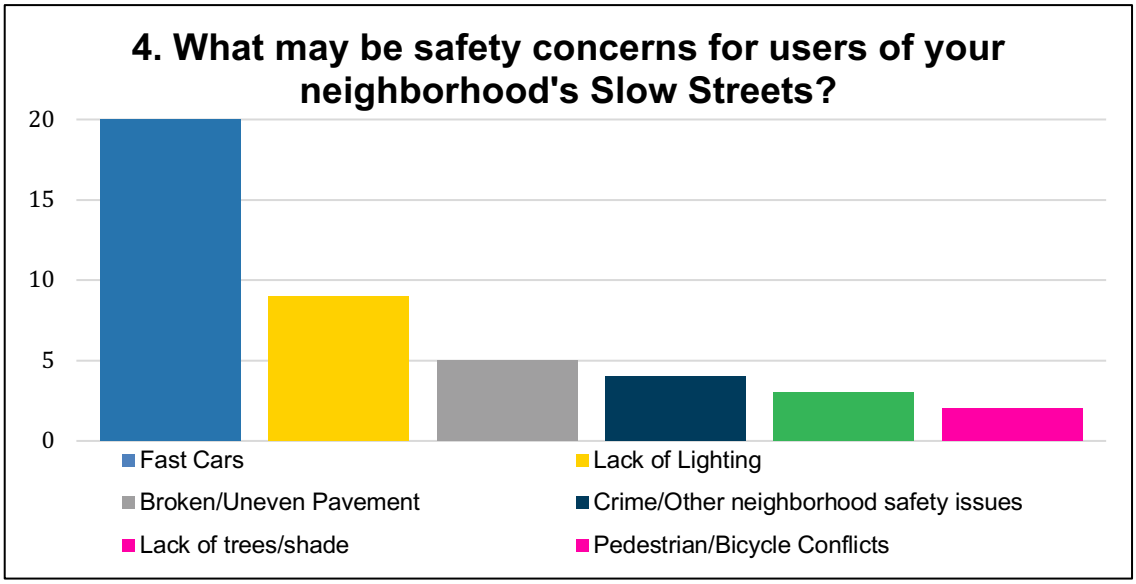
Existing features of a streetscape can influence residents' desire to walk or bike in their neighborhood. Prior to the Covid-19 pandemic, the distribution of amenities that contribute to a neighborhood's "walkability" was unequal, as shown in **Figure 3**. This inequity may be seen in plentiful tree coverage and lighting along streets in one neighborhood, while another neighborhood has broken pavement and little shade. Two questions of the sponsor survey illuminated these existing conditions in one's neighborhood.

Figure 5: Distribution of Activity Hubs by Slow Street Typology



Some of the primary concerns of Slow Street sponsors relate to existing neighborhood conditions. **Figure 4** illustrates several factors that may dissuade a resident from using a designated Slow Street, relating to perceived safety and comfort. 45% of respondents mentioned lack of lighting, possibly contributing to an uncomfortable environment at night. This lack of lighting may hinder use of designated streets during key hours of activity, including the period between 5 and 8 PM which is dark in the winter months. One respondent who noted that their neighborhood needed more lighting also commented that the visibility of Slow Street signage at night is a challenge. While it was not directly stated, this existing infrastructure issue may have contributed to the low visibility of signs. Summer months also bring concerns as high midday temperatures dissuade residents from using streets without adequate shade. 15% of respondents listed trees and shade as a concern in Slow Street usage.

Figure 6: Safety Concerns of Community Sponsors



Concerns about differing street amenities at the typology level are confirmed via spatial analysis. To test this potential inequity, I constructed 50-foot buffers around each Slow Street shapefile and performed spatial joins on point data of streetlights and street trees from the City of Los Angeles Geohub. Aggregated at the typology level, **Table 18** details that while most typologies feature around 12 trees on a standard 500-foot block, Typology E features about 50% more (19.1). Fewer trees can make a less attractive environment for recreation, particularly in warmer months when shade may be essential. **Table 19** offers similar disparities in streetlight coverage. While the five typologies show an average of nearly 3 streetlights per 500-foot block, Typology E again features about 60% more, at above 5 lights per block.

Table 18: Street Tree Coverage by Typology

TYPOLOGY	TOTAL TREES	TOTAL MILES	TREES PER MILE	TREES PER 500 FEET
A	1,193	8.5	140.4	13.3
B	1,197	9.2	130.1	12.3
C	2,952	21.2	139.2	13.2
D	1,193	10.1	118.1	11.2
E	283	1.4	202.1	19.1
All Typologies	6,818	50.4	135.3	12.8

Table 19: Streetlight Coverage by Typology

TYPOLOGY	TOTAL LIGHTS	TOTAL MILES	LIGHTS PER MILE	LIGHTS PER 500 FEET
A	331	8.5	38.9	3.7
B	412	9.2	44.8	4.2
C	632	21.2	29.8	2.8
D	257	10.1	25.4	2.4
E	75	1.4	53.6	5.1
All Typologies	1,707	50.4	33.9	3.2

The nature of Slow Streets too prompts discussion of a street's width alongside its lighting and shading. As Slow Streets invite residents to walk or play in the street itself in addition to the sidewalk, wide streets in certain neighborhoods may limit shade or lighting coverage to only portions of the Slow Street landscape.

Signage

Another obstacle faced by community sponsors in their Slow Street programs was maintenance of street infrastructure. As previously noted, all community sponsors were provided a number of A-frame signs by LADOT to place at the entrances of Slow Streets. The signs acted as both a notice to drivers to reduce their speed, and in some narrow streets, a physical obstacle around which cars may need to drive at intersections. Because these were the primary enforcement mechanisms of Slow Street programs, maintenance of signage is crucial to maintaining the program. If anything were to happen to a corridor's signs, community sponsors were tasked with preserving them. In the case a sign was stolen, disappeared, or destroyed, sponsors were tasked with requesting new signage from LADOT, sometimes waiting weeks for replacements.

Survey responses from Slow Street sponsors illustrate a near universal challenge in maintaining signs at intersections. Responding to the question of how a sponsor's program could be "more effective and well used," 70% or respondents included an improvement to signage or street barriers. Selected responses to this question illustrate the frustrations faced by sponsors from three differing typologies, all concerned about sign maintenance:

"Sturdier barriers that cannot be removed by random people." ***– Typology A respondent***

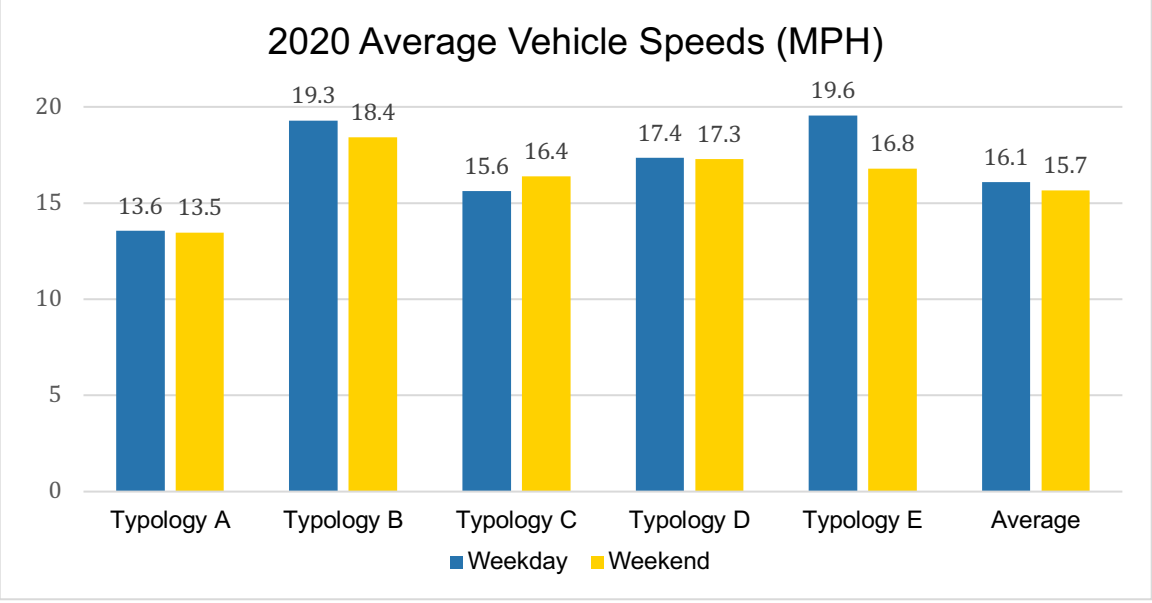
"The signs literally fall over in a medium breeze and let's not even talk about rain." ***– Typology C respondent***

"More signs, specific signage with big letters. Reminder of the speed limit in [residential] areas" – ***Typology B respondent***

Physical Traffic Calming

A final impediment to Slow Street usage is high speeds from local car traffic. **Figure 4** noted that among potential concerns of Slow Street users, "Fast Cars' was mentioned by all 20 survey respondents. Despite signage advising drivers to only use Slow Streets at reduced speeds, all sponsors believe car speeds are inhibiting more people from utilizing the new recreation space. This concurs with research showing enhanced pedestrian activity and neighborhood socialization associated with reduced vehicle traffic (Appleyard, 1981; Clarke, 1994). **Table 9** illustrates all five typologies showing an *increase* in average speed for one of its day types. While one typology featured average speeds below the prescribed 15 mph limit on Slow Streets (**Figure 5**), the 17% increase in weekend speed seen in Typology B and 16% increase in Typology E's weekday speed (**Table 9)** points towards other factors beyond the Slow Street designation. Slow Street signage alone proved insufficient to slow down drivers to the desired levels of 15 mph in four of the five typologies.

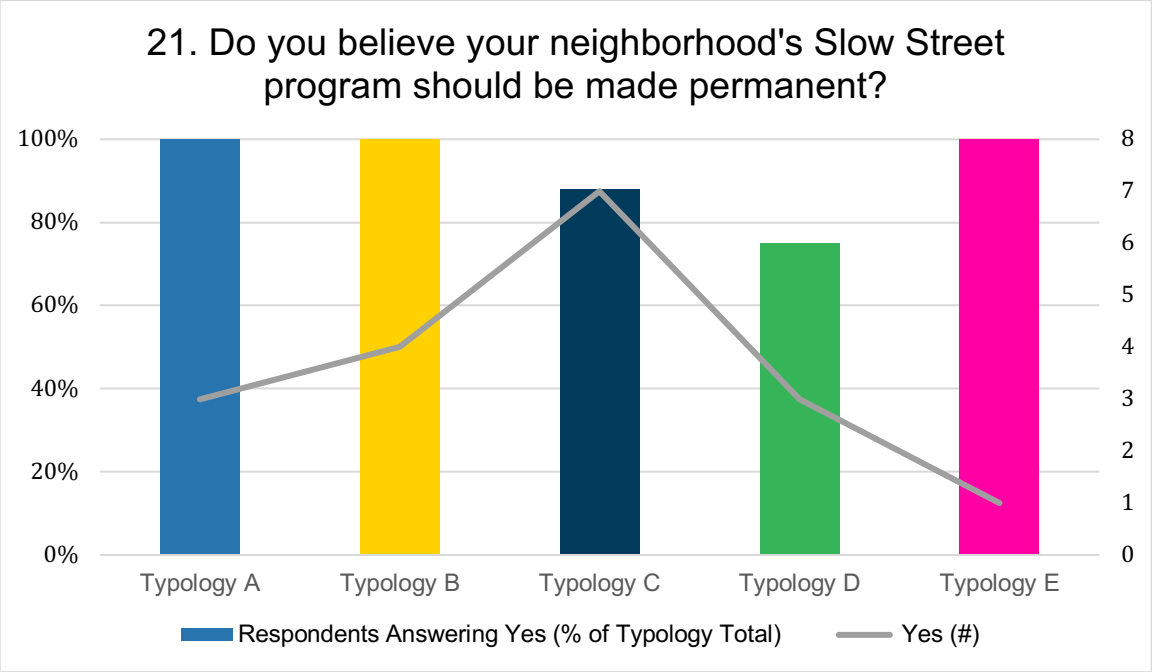
Figure 7: Average Speed by Typology



Community Support

Despite inconsistent effects of traffic calming and recreational opportunity, 18 of 20 respondents desire that their community's Slow Streets program be made permanent. Per **Figure 6**, only a select number of sponsors within Typologies C and D expressed hesitation in permanency.

Figure 8: Support for Program Permanency by Typology



Follow-up with the 18 respondents in favor of permanency was conducted in April 2020. While a small selection (6) of those responded, all expressed varying degrees of continued support for permanency. One respondent believed permanency was a mechanism for improving their neighborhoods program, stating "I think it's a good idea that it just [needs] to get stronger". Another respondent mentioned that community trust has weakened with time, mentioning: "the lack of support from the city has really damaged the program's reputation". These responses represent only 20% of the program's neighborhood participation but detail a potentially urgent desire for needed improvements across neighborhoods.

Conclusion

This report used a combination of quantitative and qualitative data to measure the effects of LADOT's "Slow Streets L.A." program. It looked at traffic circulation impacts such as changes in vehicle volume and speeds while also qualitatively assessing how the program may have affected opportunities for recreation and social distancing. My findings reveal that while the Slow Street designation did correspond with a decrease in vehicular traffic for most of the sample, there was not a similar uniform reduction in speeds. Four of the five samples failed to produce average speeds below the prescribed 15 mph speed limit. Additionally, traffic reductions seen in both the control and sample corridors point to a variety of influences to travel behavior beyond Slow Street designation, including general responses to Covid-related lockdowns.

Yet when compared to streets without the designation, Slow Streets were effective in both traffic calming and social distancing. Typology A showed relative success in reducing traffic levels while maintaining existing travel speeds. By contrast, the control corridor saw less reduction in vehicle traffic and greater increases in vehicle speed. Additionally, a clear majority (70%) of survey respondents believe that designated Slow Streets achieved their goal of advancing social distancing for residents. Despite desires from some sponsors to improve the program, nearly all survey respondents (90%) wanted their neighborhood's program to be made permanent.

These findings fill critical gaps in knowledge on Slow Streets in Los Angeles, where the Slow Streets L.A. program has operated for over 10 months with little data. With Los Angeles City Council pushing for permanency of some Slow Street corridors, data on their efficacy is crucial to advancing the right corridors, and appropriate measures necessary to ensure the program is successful, inviting, and maintainable.

Recommendations

This report includes the following considerations for improving the Slow Streets L.A. program, particularly for the corridors advanced for permanency. Despite the Slow Street's success in comparison to Typology A's control, the program's sponsors have concerns. These include concerns about vehicle speeds, pedestrian/cyclist safety and sign maintenance along the respective corridors.

Recommendation 1: Improve Slow Street Signage

Survey respondents note signage as a key issue in a variety of aspects for Slow Streets. Existing signage makes maintenance by neighborhood sponsors difficult. Respondents note that signs are flimsy, often falling due to wind, and easily moved by those who may not wish to follow Slow Street guidelines. Because of this, several corridors' signage is regularly piled on the side of the road (**Figure 7**). Future signage should be semi-permanent: fixed in location and durable, not unlike a regular stop sign or advisory signage (**Figure 8)**.

Figure 9: *Slow Street signage difficulties. Signs being moved to the sides of the road (left) and difficult to read for drivers (right)*

Signage too must be made more legible for those unfamiliar with the Slow Streets program. As only 30% of respondents confidently stated that drivers understood what the Slow Street designation means, part of the issue lies in unclear signage. Early signage included a mix of warnings, some stating "Road Closed: Local Traffic Only" while others offering specific guidelines in relatively small print (from a driver's perspective). Given that "local" traffic can be construed widely or narrowly depending on one's perspective, this creates ambiguity. In late 2020, many signs shifted to a simple message of "Slow Down - 15 mph" (**Figure 4**). Future signage should be both legible and clearly understood, with consistent messaging for both local and non-local traffic.

Figure 10*: Example of durable Slow Streets signage in Washington, D.C. Source: DDOT.*

Recommendation 2: Supplement Corridors with Physical Traffic Calming

Slow Streets should include more passive traffic calming to promote greater abidance of speed guidance. Despite an advised speed of 15 mph along corridors, only 1 of the 5 samples saw average speeds under this threshold following designation. If Slow Streets are to be safe for recreation, they should include traffic calming measures including, but not limited to speed humps, barriers at intersections, or mid-block crossings. Such traffic calming is not without precedent – in its own Slow Street program, SFMTA has tested barricades at intersections to force cars to change driving behavior when entering a Slow Street corridor (**Figure 6**). Such infrastructure need not be expensive. Sandbags, plastic bollards, or other "tactical urbanist" methods can be used to signal a Slow Street to nearby traffic while allowing the City to test potential changes to traffic circulation patterns.

Figure 11: *Slow Street signage that doubles as traffic calming, forcing cars entering and exiting to merge lanes before the intersection. Source: SFMTA.*

Figure 12: *Traffic diverter to support slow vehicle speeds along designated Slow Streets in Berkeley. Source: Berkeley Transportation Division*

Recommendation 3: Improve Neighborhood Walkability with Infrastructure

Existing neighborhoods issues can diminish the potential use of Slow Streets. Respondents noted that streets with broken pavement, a lack of tree shade, or lack of lighting create safety concerns when trying to enjoy a Slow Street corridor. While the act of closing streets for social distancing is a step in the right direction, some street corridors could benefit from a more inviting environment. For future Slow Street corridors, funds should be directed to create a safe environment for all users, regardless of age or ability. This may include improvements to sidewalk and street pavement, planting new street trees, and improving street visibility at night.

"Al Fresco" dining programs in the Los Angeles region have facilitated outdoor dining with funding for planters, umbrellas and barricades to create a welcoming dining atmosphere (**Figure 11**) (LADOT, 2020). A similar fund could offer street furniture, planters or lighting along designated Slow Streets to create a safer and more pedestrian/bike friendly atmosphere. Given the higher need for such improvements in lower-income, predominately nonwhite typologies, this fund should specifically target high-need neighborhoods that would enjoy the greatest benefit. In this model, "tactical" infrastructure improvements could create curb extensions or create traffic calming akin to pedestrian safety improvements popularized in cities such as Seattle (**Figure 12**).

Figure 13: *"Quick-build" infrastructure to support Al Fresco outdoor dining in Glendale. Source: staplesconnect.com*

Figure 14: *"Quick-build" curb bulbs in Seattle. Source: SDOT.*

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Appendix A – Slow Street Sponsor Survey

1. *With which neighborhood and Slow Streets Sponsor organization are you affiliated?*
    - (Short Answer)

2. *How did your organization first learn about LADOT's Slow Streets L.A. program?*
    - LA Times
    - Social Media
    - Government Official
    - Friends/Neighbors
    - Other News Source
    - Non-Profit Organization
    - Other: (Fill-In)

3. *When thinking about all the Slow Streets your organization has sponsored, do you think residents feel safer walking or biking on a street in your neighborhood AFTER it becomes a designated Slow Street?*
    - Yes
    - No
    - I Don't Know

4. *What may be safety concerns for users of your neighborhood's Slow Streets?* **(CHECK ALL THAT APPLY)**
    - Fast Cars
    - Lack of adequate social distancing on them
    - Pedestrian/Bicycle conflicts
    - Broken/Uneven pavement
    - Crime/Other neighborhood safety issues
    - Lack of lighting (at night)
    - Lack of trees/shade coverage (during warmer months)
    - No concerns
    - Other

5. *What could be done to make your neighborhood's Slow Street program safer for users?*
    - (Short Answer)

6. *Are there activity hubs/destinations in your neighborhood that might increase awareness of and pedestrian activity along the designated Slow Streets?* **(CHECK ALL THAT APPLY)**
    - Parks
    - Schools
    - Shopping Areas
    - Transit Stops
    - N/A

- Other

7. *Do you think the Slow Street designation has affected car traffic volumes along your neighborhood's Slow Streets?*
    - Yes, there is less thru traffic along Slow Streets
    - Not sure, there is about the same level of traffic along Slow Streets
    - No, there is more thru traffic along Slow Streets
    - I don't know

8. *Have you noticed lower speeds of car travel on your Slow Streets since their designation?*
    - Yes, car speeds have decreased along Slow Streets
    - Not sure, car speeds are about the same
    - No, car speeds have increased along Slow Streets

9. *Has car traffic changed on nearby streets in your neighborhood WITHOUT the Slow Streets designation?*
    - Yes, there has been LESS traffic on nearby streets
    - Yes, there has been MORE traffic on nearby streets
    - No, traffic levels have remained about the same between Slow Streets and those without the designation

10. *Do you believe that local drivers have understood what the Slow Streets designation means?*
    - Yes
    - No
    - I Don't Know

11. *As the neighborhood sponsor, what was your organization's primary goal in bringing Slow Streets to your neighborhood?*
    - Calming car traffic on local streets
    - Providing new multi-modal space for cars, bikes and pedestrians
    - Creating space for recreation while social distancing
    - Other

12. *Have residents of your neighborhood understood the intention in bringing Slow Streets?*
    - Yes
    - No
    - I Don't Know

13. *Do you believe the Slow Streets designation has brought recreational opportunities to your community?*
    - Yes
    - No
    - I Don't Know

14. *Are local residents more inclined to walk along the neighborhood's Slow Streets since their designation?*
    - Yes
    - No
    - I Don't Know

15. *Are local residents more inclined to bike along the neighborhood's Slow Streets since their designation?*
    - Yes
    - No
    - I Don't Know

16. *Do you feel that the community response to your Slow Streets program has changed in the months since its initial deployment?*
    - Yes
    - No (Skip Question 17)
    - I Don't Know (Skip Question 17)

17. *In what ways has the community response to Slow Streets changed since their initial deployment?*
    - (Long Answer)

18. *Have one or more corridors of your neighborhood's designated Slow Streets been more utilized by residents than others? If so, please list which corridors.*
    - (Long Answer)

19. *What age groups and users do you see most using your neighborhood's designated Slow Streets?* **(CHECK ALL THAT APPLY)**
    - Babies/Toddlers
    - Children
    - Teenagers
    - Adults
    - Senior Citizens

20. *Do you believe it is easier for residents to social distance while walking or biking on your neighborhood's designated Slow Streets compared to nearby streets without the designation?*
    - Yes
    - No
    - I Don't Know

21. *Do you believe your neighborhood's Slow Street program should be made permanent?*
    - Yes (Skip Question 22)
    - No

22. *If you do not believe your neighborhood's Slow Streets should be made permanent, why not?*

- (Long Answer)

23. *What would make your Slow Street more effective and well used?*
    - (Long Answer)

24. *Would you be willing to discuss your answers to this survey in greater detail?*
    - Yes
    - No