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Complete Streets for Culver City

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Complete Streets for Culver City

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UCLA Master's in Urban and Regional Planning

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16. Abstract
Researchers analyze Culver City streets by looking at a variety of factors, including collision rates and community feedback, to prioritize Complete Streets interventions. As part of this analysis, researchers collected quantitative data on average daily traffic (ADT) counts, citywide collision data, as well as transit boarding and alighting data within the city. Researchers then supplemented quantitative findings with qualitative data from Culver City's Bike and Pedestrian Action Plan community feedback. Researchers used both datasets to develop a Complete Streets street prioritization matrix. This matrix incorporates data as weighted criteria to highlight street segments in need of Complete Streets projects in the City. Selected criteria include the segments collision rates; corresponding community feedback; proximity to schools; proximity to existing and recommended bikeways; and proximity to high ridership transit lines. Collision rates and community feedback were given the most weight. The matrix results show that the Downtown Culver City and Southwest Sepulveda corridors are highest in need of Complete Streets interventions. Researchers developed design strategies, with cost estimates based on results of a Strengths, Weaknesses, Opportunities, and Threats (S.W.O.T.) analysis. Researchers also analyzed gaps in the City's Complete Streets policy and General Plan Update by comparing best practices from neighboring cities; chosen due to local applicability and Complete Streets focus. This report provides concrete design and policy recommendations to facilitate the implementation of Complete Streets projects in the city and to prioritize the travel needs of people of all modes, age, ability, and race.

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Executive Summary

The Complete Streets Movement is sweeping the United States. Governments, advocacy groups, and planners have recognized that the streets of our cities are incomplete – they facilitate the speedy movement of private vehicles at the expense of the safety and comfort of people using other modes. Incomplete streets also fail to take into account the experience and needs of people of all ages, income, race, and abilities. The Complete Streets movement seeks to reclaim public streets from automobiles and redistribute street space more equitably.

Culver City, compared to neighboring cities like Los Angeles and Santa Monica, has been slow to adapt to the Complete Streets. It adopted a Complete Streets policy in January 2020 whereas the City of Los Angeles and Santa Monica adopted policies in 2012 and 2011 respectively. Moreover, the City's policy is broad and requires additional depth. The City has been however, active in pursuing planning for bicycle and pedestrian related improvements through its Bicycle and Pedestrian Master Plan and Bicycle and Pedestrian Action Plan. Most of the projects in these plans have faced implementation hurdles ranging from funding to political opposition.

The General Plan update process provides an invaluable opportunity for the City to commit to Complete Streets as part of its Circulation Plan and to create understanding and buy-in among residents for more Complete Street changes. Our project aims to help the City through this process.

Complete Streets advocate for traffic safety, multi-modality and public participation as its core values. Using these values, we developed a prioritization matrix that combines spatial data on traffic collision rates, proximity to existing transit and bike

infrastructure, proximity to schools, and community feedback to identify streets that are most in need of Complete Streets interventions. The two segments that emerged from our prioritization matrix are in Downtown Culver City and Southwest Sepulveda.

We propose a three-phase, incremental approach for both segments. Phase I recommends the lowest cost and most politically feasible interventions and Phase II and III ramp up to more expensive, more infrastructurally intensive interventions, which will require greater political effort. For Phase I of the Downtown Culver City segment, we recommend high visibility crosswalks and the addition of new crosswalks and scramble crossings. In Phase II, we propose the addition of a Class IV vertically protected bike lane along Culver Boulevard and Washington Boulevard, and a bus-only lane in both directions of Culver Boulevard. Phase III recommends the conversion of all westbound vehicular lanes on Culver Boulevard and all eastbound vehicular lanes on Washington Boulevard into a linear pedestrian park with ample public seating for local businesses in the area.

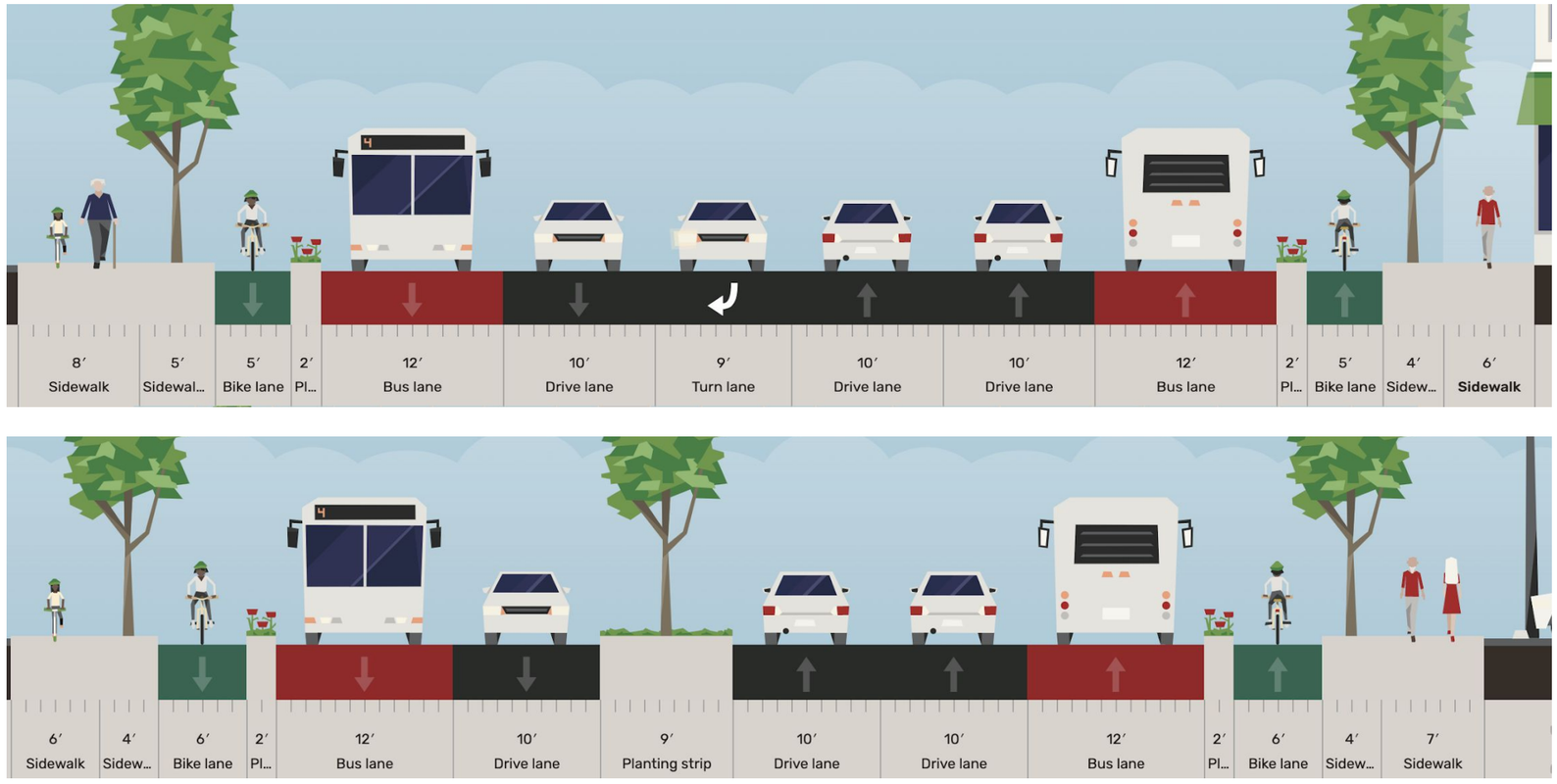
(Phase III intervention for Downtown Culver City)

"Complete Streets advocate for traffic safety, multi-modality and public participation as its core values."

Similar to Phase I of Downtown Culver City, the main recommendations for Southwest Sepulveda under Phase I include high visibility crosswalks and the addition of painted crosswalks. In addition, Phase I also recommends a low-cost version of a Class IV bike lane using plastic bollards along Sepulveda Boulevard. Phase II upgrades the Class IV bike lane with permanent bollards, tests a temporary closure of a slip lane, and activates a section of Westfield Culver City's parking lot. Phase III builds on Phase II interventions by making the slip road closure permanent, widens sidewalks, enhances the urban forest, and adds a bus-only lane to facilitate bus movement in and out of the Culver City Transit Center.

To encourage a comprehensive approach towards Complete Streets, we recommend several policy strategies that the City can pursue to achieve public buy-in as well as ways to integrate Complete Streets into the General Plan. Policies include the creation of a city-wide campaign for traffic safety as an umbrella for individual Complete Streets projects. This campaign includes efforts to make streets more inclusive for all residents, specifically Black residents who are disproportionately targeted by police. Policy recommendations also include the integration of the Circulation Element with the Land Use Element, and the formalization of Complete Streets language in the General Plan.

We recognize Complete Streets planning is just one part of the overall ecosystem of transportation and land use planning and requires collaboration across various City Departments. We hope that this report provides a guide for Culver City to commit to making streets safer for all users, regardless of age, race, income, and ability.



(Phase III intervention for different segments of Southwest Sepulveda, made on streetmix.net)

01 Introduction

Culver City is a small community within a huge metropolis. Residents value this small town feel in the midst of the city's current and forthcoming exponential job growth. Complete Streets improvements provide a way for the City to enhance mobility, keep residents safe, and transform streets from cut-through highways to community assets. This report provides an in-depth look at Complete Streets strategies and provides recommendations for incorporating policies into the General Plan Update and improving the quality of life for the people of Culver City.

Culver City is adjacent to the nation's second busiest airport, LAX, and the busiest interstate in the country, the I-405. The City cannot change its location, thus we propose they change the way the surrounding area interacts with them. The majority of traffic along the main arterials of the City is generated by "cut-through" vehicles — 60-70% of vehicles have an origin-destination outside of Culver City (M. Sahli-Wells, interview, May 10, 2020). We propose street designs that serve Culver City residents and prioritize their needs over those passing through. In practice, this means streets with lower speed limits to protect children from speeding vehicles. It means streets that allow for different modes of transportation to reduce noise, air pollution and fight climate change. It means residents from all racial backgrounds feel safe enough to move around freely regardless of mode. It means making streets and mobility networks more complete.

The goal of this report is to help the community reclaim streets and make them more inclusive and better suited for families, neighbors, and all residents of the City. It also provides policy guidance as it relates to implementation and the General Plan.

We primarily used the following questions to guide our work.

1) What is a Complete Streets policy and how have other cities pursued it?

2) Where are the critical areas of need for Complete Streets interventions in Culver City?

3) How can we integrate the principles of Complete Streets into the General Plan?

We first analyzed the roadways in Culver City to identify two high priority corridors that stand to benefit the most from Complete Street improvements. We created a prioritization matrix using existing traffic conditions, collisions data, street geometry, community feedback, community assets (like schools and bikeways), and transit ridership. From this analysis we chose two very different focus areas, one in Downtown Culver City and one on Southwest Sepulveda Boulevard and provided recommendations of Complete Street improvements the city could undertake.

We then provided a strategic framework for implementing Complete Streets projects in the City and recommendations for incorporating Complete Streets policy into the General Plan Update.

A majority of this report was researched and written in a pre-COVID-19 context. We do not directly address the crisis in our work, but we believe that some of the recommendations, such as widened sidewalks and repurposed parking lots, can help address the critical need of enhanced public space. Thus, the short- and long-term investments in Complete Streets will benefit the City of Culver City now and in the future.

(Snapshots from Overland Avenue)

02 Complete Streets: National, Regional & Local Contexts

This section provides an overview of Complete Streets policies in the United States, Southern California and Culver City. It begins with a broad investigation of Complete Streets policies across the United States and at the federal level, and moves to a discussion on the Complete Streets policy in Los Angeles County and the City of Los Angeles. It ends with an analysis of Culver City's current approach to Complete Streets and where there is room for improvement.

We find that Culver City recognizes the importance of traffic safety and the accommodation of other modes, specifically walking and biking. Through the revision of the Bike and Pedestrian Action Plan as well as the adoption of a Complete Streets Policy, Culver City is taking proactive steps toward making their streets more complete by diagnosing where their streets need improvement. The national and regional Complete Streets Programs establish precedents for Culver City in terms of scoping, funding and implementation of a Complete Streets policy.

Complete Streets Nationally

The National Complete Streets Coalition (NCSC) launched the Complete Streets movement in 2004. The NCSC establishes best practices in Complete Streets policy and implementation practices, provides training and technical assistance to transportation professionals, and develops Complete Streets leadership. According to NCSC's inventory, jurisdictions around the United States passed over 1,500 Complete Streets policies. Approximately 1,300 were adopted at a City level, and over 50 of these were adopted by state governments, the Commonwealth of Puerto Rico, and the District of

Columbia (NCSC, 2020). The total number of policies implemented is not publicly available. However, we believe that the number is significantly smaller than the 1,500 Complete Streets policies, considering the lack of political support and adequate funding that many jurisdictions face.

A core contribution of the NCSC is the Complete Streets policy framework, which identifies ten elements, 1) Vision and intent; 2) Diverse users; 3) Commitment in all projects and phases; 4) Clear, accountable expectations; 5) Jurisdiction; 6) Design; 7) Land use and context sensitivity; 8) Performance measures; 9) Project selection criteria; 10) Implementation steps (NCSC, 2018). Using this framework, the NCSC scores and ranks the top ten Complete Streets policies each year. The Complete Streets policy for each of these best practices is unique because they respond to the local context. Some interventions include road diets, roundabouts, pedestrian islands, pedestrian signals, accessible public transit stops, bus lanes, and bike lanes.

Many other jurisdictions have not adopted Complete Streets policies or plans because there is no federal mandate for a Complete Streets policy, nor is funding available at a state or federal level. However, in July 2019, Senator Edward J. Markey introduced the Complete Streets Act of 2019 in the Senate. This federal Complete Streets Act is modeled after Massachusetts' Complete Streets Funding Program, which rewards up to $50,000 for technical assistance or $400,000 of construction funding to municipalities that demonstrate a commitment to adopting Complete Streets policy and practice (MassDOT, 2016). Since the establishment of the Massachusetts' Complete Streets Funding Program, the number of communities with a Complete Streets plan jumped from 25 to 201. The demonstrated success of the Massachusetts program is the source of inspiration for the Federal 2019 Complete Streets Act.

Broadly, the bill directs each state to establish a similar competitive program to provide technical assistance and grants for the design and construction of Complete Streets. More specifically, the bill directs the Department of Transportation (DOT) to establish benchmarks and guidance by which states can implement Complete Streets programs and eligible entities can carry out Complete Streets policies and principles. The bill also directs eligible entities seeking technical assistance or funds for a Complete Streets program to adopt policies using Complete Streets principles that are approved by the state or metropolitan planning organizations (MPOs) with jurisdiction over such entities. States and MPOs must certify that their Complete Streets meet the minimum requirements set out by DOT. States must also set aside 5% of their federal highway money to implement a Complete Streets program. Finally, the bill directs states and MPOs to adopt design standards for federal surface transportation that provide for the safe and adequate accommodation of all users of the surface transportation network, including motorized and non-motorized users, in all phases of

project planning, development, and operation (Congress, 2019).

Thus far, the bill has been read twice and referred to the Committee on Environment and Public Works. The bill represents an important first step at the federal level to commit legally and financially to safe streets across all of the United States.

Complete Streets Regionally

Los Angeles County

Following state-level legislation, the Los Angeles County Metropolitan Transportation Authority (LA Metro) adopted its own countywide Complete Streets Policy in 2014. This policy provides design standards as well as high-level policy guidance for local jurisdictions within Los Angeles County to develop their individual Complete Streets policies. It initially mandated all cities in the County to adopt a Complete Streets policy in order to continue receiving funding by the beginning of 2017 (LA Metro, 2014b). As of October 2014, 31 jurisdictions (of the 88) within Los Angeles County either adopted or were working on adopting a Complete Streets policy. The County extended the mandatory deadline and is encouraging local jurisdictions to continue moving forward with implementing a comprehensive and safe transportation network for all users.

The policy does not include detailed cost estimates. Rather, it suggests that jurisdictions can achieve Complete Streets through small-scale interventions without necessarily imposing significant financial burdens. The policy includes case studies on various cities' Complete Streets projects. Precedents from these cities showed that an intersection enhancement project can cost as little as $4,500 and achieve goals of traffic calming and safety improvements. The policy also provides potential funding sources for implementing Complete Streets. In addition to the objective of mobility enhancement, this policy also aims to advance the visions of LA Metro's Countywide Sustainability Planning Policy and its Transportation Agenda.

City of Los Angeles

Prior to the county-wide policy established by LA Metro, the City of Los Angeles incorporated Complete Streets into its street design policies. Figure 1 (page 11) shows the timeline of Los Angeles County and the City of Los Angeles' Complete Streets policy implementation.

The City of Los Angeles released its Complete Street Design Guide in 2012. The design guide addresses the goal of providing safe and convenient access to all road users, and serves as a toolkit and the design standard for street enhancement projects (City of Los Angeles, 2012). The toolkit also provides high-level categories of financial costs and benefits of Complete Streets projects. Building upon the design guide, the LA Mayor's Office has worked collaboratively with city departments

Figure 1. Timeline of LA County and LA City's Complete Streets Policy Implementation.
Source: Authors

and council districts to roll out a series of programs centered around the Complete Streets agenda.

These programs work in conjunction with one another to provide safe and livable streets for all. The programs are:

Great Streets Initiative
The Los Angeles Mayor's Office announced the Great Streets Initiative in 2014, which identified 15 corridors across 15 council districts in the City of Los Angeles (Great Streets Initiative, n.d.)). The initiative aims to bring economic revitalization, connectivity, and safety improvements to the neighborhoods. The Great Streets Initiative focuses on transforming the selected corridors into community gathering spaces through introducing new bike infrastructure and pedestrian safety measures. Since its launch in 2014, the Great Streets Initiative has worked in collaboration with local residents and groups to place temporary installments to improve the 18 corridors (Great Streets Initiative, n.d.). Community input and funding resources from the LA Mayor's office made these interventions possible.

Vision Zero
In 2017, the Mayor's Office released the city's first Vision Zero Action Plan, addressing the high traffic fatality rate in the city. The Action Plan established strategies to reduce traffic fatalities, with a goal of eliminating all traffic deaths in the city by 2025 (LADOT, 2017). The Action Plan established the High Injury Network (HIN), consisting of 40 corridors that have the highest concentrations of fatal or severe traffic injuries. By introducing a series of safety enhancements for pedestrians and bicyclists, who are disproportionately affected by traffic collisions, the Vision Zero program seeks to create a safe street network for all travel modes (2017). Los Angeles County also released its Vision Zero Action Plan to enhance traffic safety for unincorporated communities within the county in 2019.

Complete Streets Program
The City of Los Angeles also launched a Complete Streets Program in 2018. The Complete Streets Program advances the safety enhancements through repair measures and new active transportation infrastructure on six corridors that have been previously identified on the High Injury Network. With a total budget of approximately 80 million dollars, the Complete Streets Program aims to deploy a series of safety enhancement and repair measures for over 125 miles of roads between 2018 and 2020 (City of LA, 2018). Although this Complete Street Program does not involve any segments within the City of Culver City, it still provides a regional context of implementing Complete Streets for Culver City.

Complete Streets in Culver City

Policy

Culver City lacked any substantial initiatives aimed at protecting bicyclists and pedestrians prior to 2010 (Newton, 2011). With funding from the Los Angeles County Policies for Livable, Active Communities and Environments Program (PLACE), Culver City began to develop its first Bicycle and Pedestrian Master Plan (BPMP) in 2010 (L.A. County Public Health, n.d.). With the BPMP, Culver City started to focus on Complete Streets and first introduced bike lanes in 2010 with interventions to improve safety for both cyclists and pedestrians (Alta Planning + Design, 2010).

As part of the visioning process for the BPMP, participants in the public advisory council identified the need for a Complete Streets policy, citing a shift away from motor vehicle use (Alta Planning + Design,, 2010). The BPMP, though not explicitly a Complete Streets plan, goes beyond the minimum requirements set forth by the California Complete Streets Act, which provides guidelines for Complete Streets projects in California. For example, the plan proposes to add 38 miles of bikeways to the bicycle network, which in 2010, consisted of only 4 miles. Some of the notable ongoing projects include Safe Routes to School, developing a travel demand forecast model, and the Ballona Creek Revitalization Project.

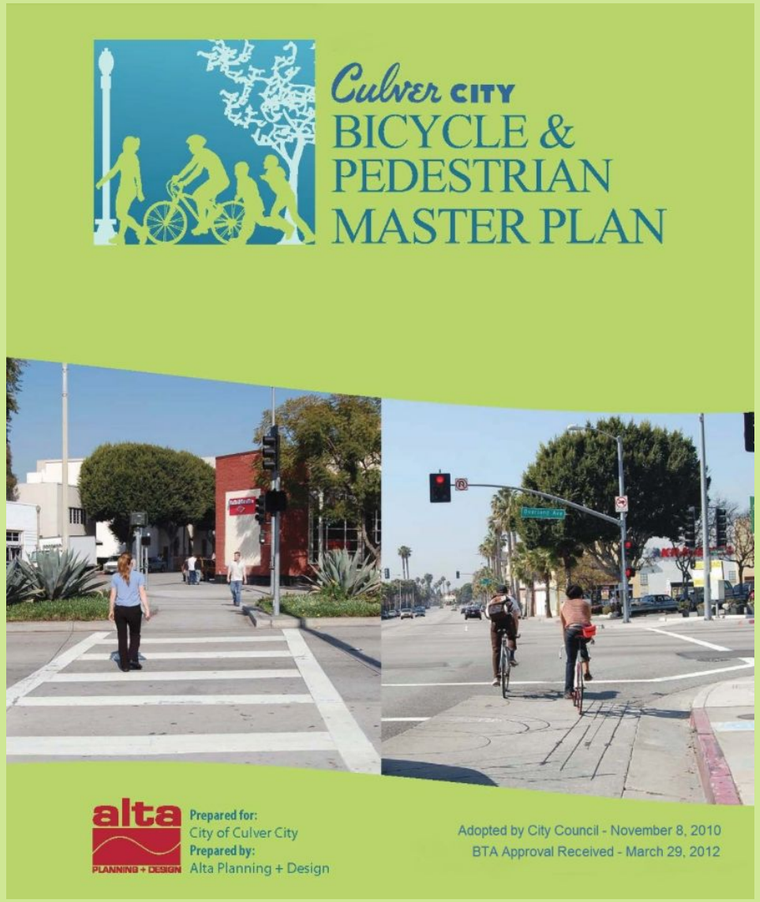
In 2017, Culver City decided to update this plan. The new Bicycle Pedestrian Action Plan (BPAP) will build upon the first BPMP to develop policies, projects and programs to achieve the Council's Strategic Goal 3, "Work Toward No Overall Growth in Average Daily Traffic Citywide while Enhancing Traffic Safety" (Culver City, n.d.). As part of the update to the BPMP, Culver City engaged the community on the future of walking and bicycling between 2017 and 2019. Culver City asked the public to provide feedback about walking, biking and driving, and mapped its results (Culver City, n.d.). Data from the public engagement process for this plan is public, and helps to inform where issue areas are for residents.

Based on the precedent set by the BPMP, as well as the California Complete Streets Act and LA Metro Complete Street measures, Culver

City moved forward and embraced a full Complete Streets policy. It adopted a Complete Streets Plan in January 2020 that outlined its purpose, vision, goals, guidelines, performance measures and implementation strategy for the City (Culver City, 2020). The plan, "aims to promote healthy and sustainable multimodal mobility for Culver City residents and visitors, by guiding the provision of a safe, convenient, and comfortable street system" (Culver City, 2020). The Complete Streets Plan goes further than the BPMP, and the forthcoming BPAP, as it stipulates that Complete Streets measures be at the center of planning, design, construction, and operation of the streets system (Culver City, 2020).

Performance measures provide a good snapshot of policy goals. They include increasing total miles of on-street bikeways, increasing total miles of streets with accessible pedestrian accommodations, increasing cycling, scooting and walking in the city, decreasing the number and severity of collisions, and increasing the number of streets with enhanced lighting, street furniture, bicycle parking, street trees, stormwater infiltration and traffic calming devices.

The plan takes into account the needs of various modes, however, it does not take address the needs of all people. Culver City, like many cities across America, grapples with issues related to racial profiling, specifically as it relates to the police. During the Culver City 2019 Speaker Series on Discriminatory Land Use Policies, UCLA Professor and Culver City resident Kelly Lytle Hernandez recounted her son's negative experience as a pedestrian who was profiled by the police in the City (K. Lytle Hernandez, personal communication, November 21, 2019). Additionally, as recently as the January 27, 2020 Culver City Council meeting, a woman used public comment to share her experience of being pulled over in Culver City simply for driving while black. There is precedent, as Culver City is a former sundown town — a place where people of color, black people especially, would not be safe after dark (Kent, 2019).



(Culver City Bicycle & Pedestrian Master Plan, Source: Alta Planning + Design (2010)

According to recent data, while black residents make up 8% of Culver City's population, they account for 37% of the city's arrests (Kent, 2020). Thus, there is a critical need to address these issues as part of a Complete Streets policy.

Culver City's Streets Today

As part of the BPAP, Culver City used an interactive online mapping tool to solicit comments on streets between Fall 2017 and Spring 2018. They received 598 comments and heard from over 236 people. Table 1 shows a broad summary of community feedback, grouped based by travel mode (Culver City, n.d.).

The majority of people who work and live in Culver City drive cars to get around. The most common mode of commuting for workers in Culver City is driving alone (78%). The two second-most popular modes are carpooling and working from home (7% and 6% respectively). Most residents in Culver City own cars – only 2% of households in Culver City do not

Mode	Input
Biking	• Unsafe vehicle speeds along bike routes • Bike lanes too narrow • Hard to merge or make left turns • Lack of bicycle parking • Want better bicycle connections through city and to greater LA routes • Bicycles go undetected at traffic signals / not given enough time to clear intersection • Blind corners when exiting Ballona Creek Bike path at Duquesne Ave. are dangerous • Concerns about pavement quality and lack of adequate street sweeping
Walking	• Lack of crosswalks, especially near parks and schools • Lack of shade and trees • Concerns about not having safe crossings for children near schools • Lack of ADA ramps • Concerns about vehicle speeds • Narrow sidewalks blocked by utilities
Driving	• Hard to make left turns • Confusing intersections • Concerns about through traffic • Concerns about inadequate parking • Visibility issues
Transit	• Lack of pedestrian connections to transit stops

Table 1. Summary of community feedback
Source: Culver City Bicycle and Pedestrian Action Plan Interactive Map

own a car (Data USA, n.d.). Decreasing the number of collisions while increasing pedestrian and bike modes are the major goals of Complete Streets. Using UC Berkeley's Transportation Injury Mapping System (TIMS), we examined reported crashes in Culver City from January 1, 2016 to December 31, 2018. We removed all crashes reported on the 405 freeway as it would obscure data on city streets and since the state owns this road it is outside the City's jurisdiction.

Our analysis finds that broadside collisions (or T-bone), where the side of a vehicle is impacted by the rear or front of another vehicle, were the most common crash type in Culver City in 2016 and 2017 (Figure 2 and 3). Broadsides are the most dangerous crash type and typically occur at intersections where people are making unprotected left turns across traffic or are experiencing poor sight lines (California State Transportation Agency, 2019). Transportation experts consider these crashes to be preventable by traffic control devices.

The State of California uses the number of broadside collisions to determine if a location warrants a stop or signal-controlled intervention (California State Transportation Agency, 2019). In 2018, overall traffic collisions in Culver City went up, but the percent of broadsides decreased by over 10 percentage points – indicating that perhaps the city has made some positive improvements

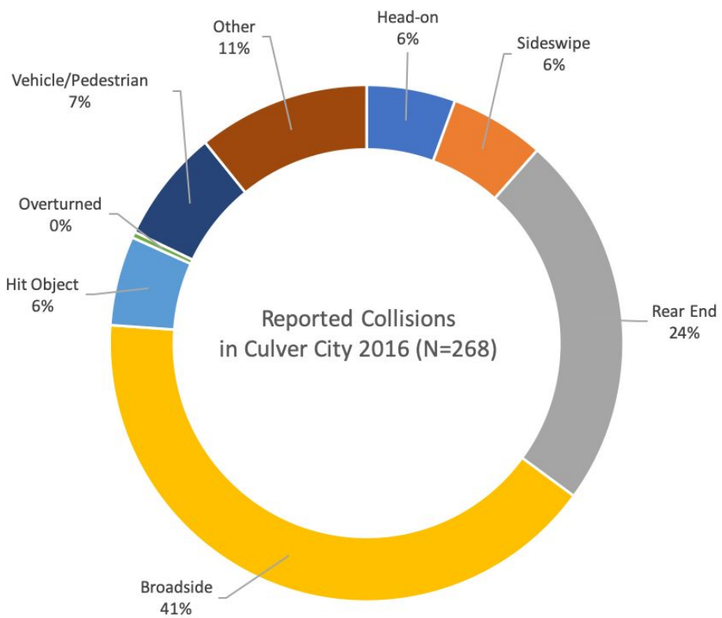


Figure 2. Reported collisions in Culver City 2016 (N=268)

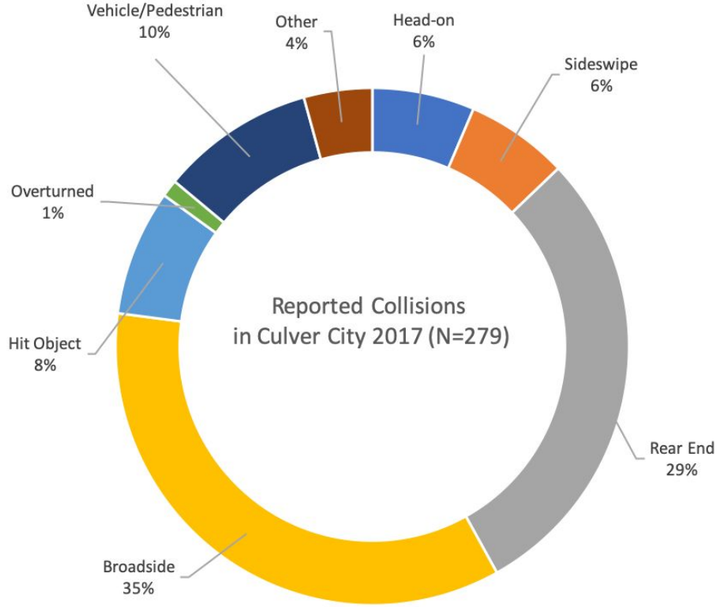


Figure 3 Reported collisions in Culver City 2017 (N=279)

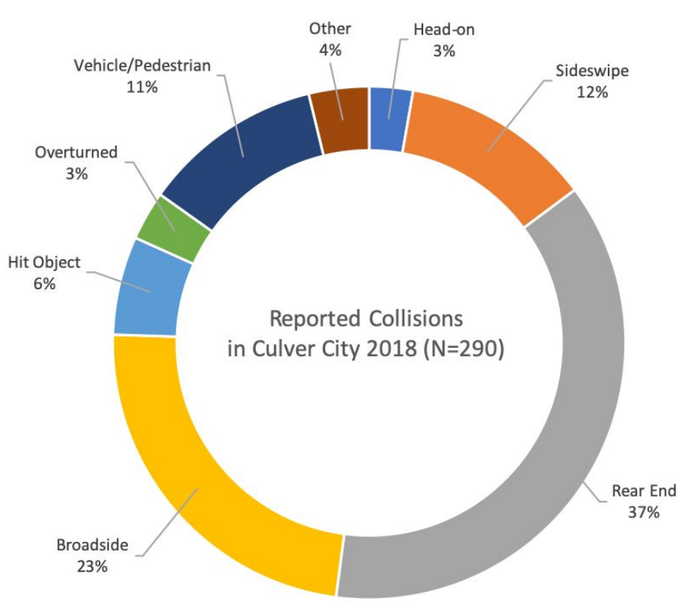


Figure 4. Reported collisions in Culver City 2018 (N=290)

to their streets (Figure 4). The types of crashes in Culver City are fairly similar to other small cities within Los Angeles County. Broadside and rear-ends were also the most common crashes in the cities of Santa Monica and Beverly Hills, based on data from the same timeframe (Appendix B). Some notable differences between these cities are that Beverly Hills had more vehicle-on-vehicle crash types while Santa Monica had slightly more pedestrian/vehicle crashes than Culver City. We do not feel this indicates that Beverly Hills is safer for pedestrians, but it is more likely showing that more people drive there. Additionally, people are more likely to file a police report when insurance is involved — so data for all cities may overlook small, non-life threatening crashes.

The City of Culver City tracks crashes that kill or severely injure people in order to pinpoint streets for safety improvements. Figure 5 shows the most recent analysis, showing that the main arterials in the city, like Washington Boulevard, Jefferson Boulevard and Overland Drive, are the most dangerous.

With its recent adoption of a Complete Streets policy, Culver City is catching up to other jurisdictions regionally and nationally, but gaps remain. The current version of this policy lacks sufficient actionable steps in order to overcome traffic incidents and fatalities on its streets. The policy also requires financial investments to ensure that Complete Streets projects can be implemented. The specific design guidelines and toolkits of Los Angeles County and City, as well as other cities nationally can provide Culver City with a starting point for its own Complete Streets guidelines.

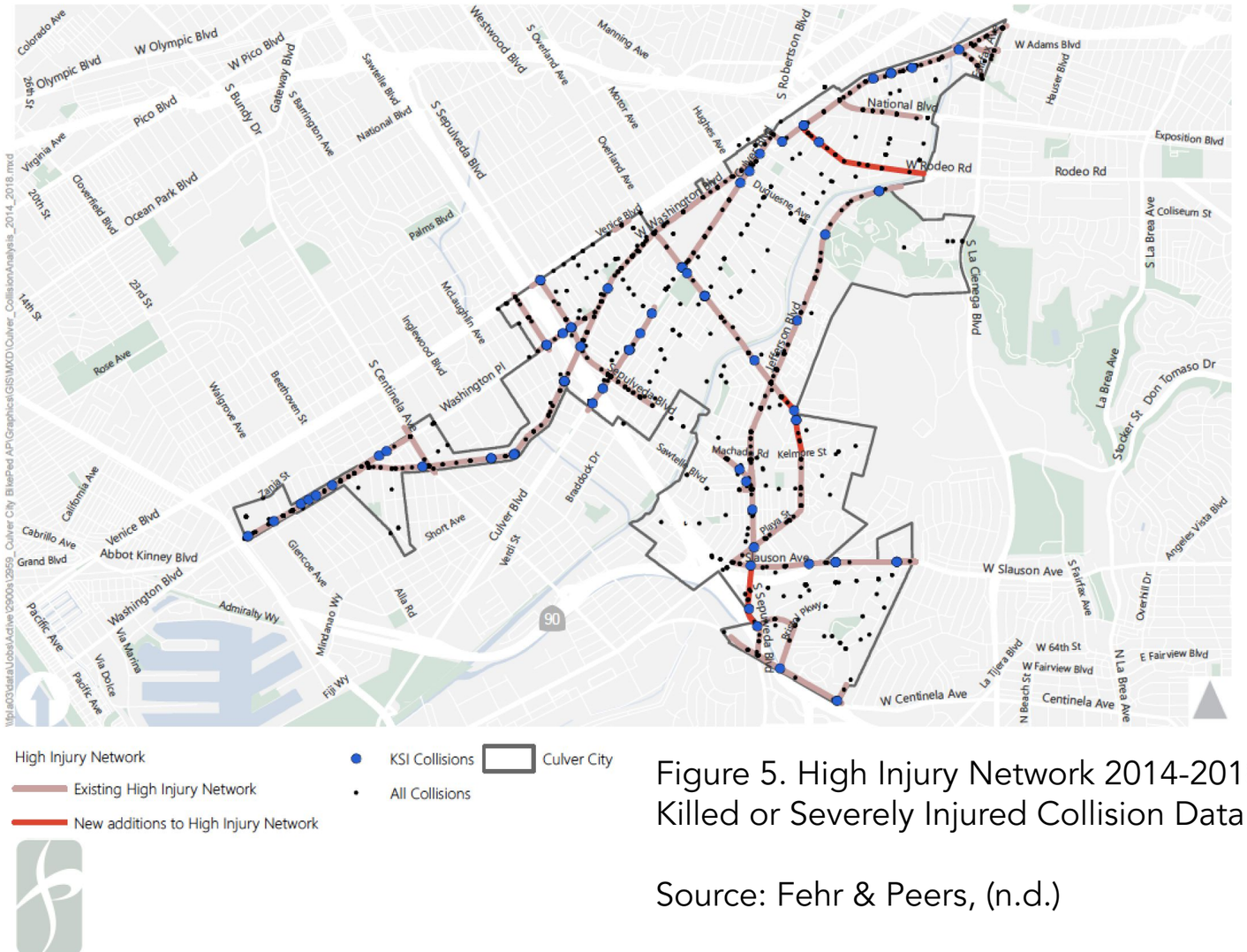


Figure 5. High Injury Network 2014-2018 Killed or Severely Injured Collision Data

Source: Fehr & Peers, (n.d.)

03
Culver City Streets Need Assessment

As part of our analysis, we collected quantitative data on average daily traffic (ADT) counts, citywide collision data, as well as transit boarding and alighting data within the city limits. We then supplemented our findings with qualitative data from the Culver City's Bike and Pedestrian Action Plan community feedback.

(Snapshot of Culver City street signs)

Types of Data

Average Daily Traffic Counts

In terms of ADT, the City shared traffic counts they conducted of autos, pedestrians, and bicyclists at 30 intersections throughout the city in 2019. This data allows us to analyze traffic volumes in the area and pinpoint intersections that have higher volumes for each group of stakeholders. We used intersections as a proxy for street segments. We relied on this data to map peak hour volumes at intersections throughout the city during the AM peak (8am-9am) and the PM peak (4:45pm-5:45pm). We mapped the results for each in Figures 6-8 below.

Figure 6 shows that peak hour pedestrian volumes are concentrated around the same areas in both the AM and PM. Volumes are slightly higher during the PM peak. Pedestrian volumes seem to be highest throughout different sections along Washington Boulevard, the highest cluster is off Overland and near the Downtown Culver City area from la Salle Avenue to National Boulevard. The highest pedestrian volume intersection in 2019 was

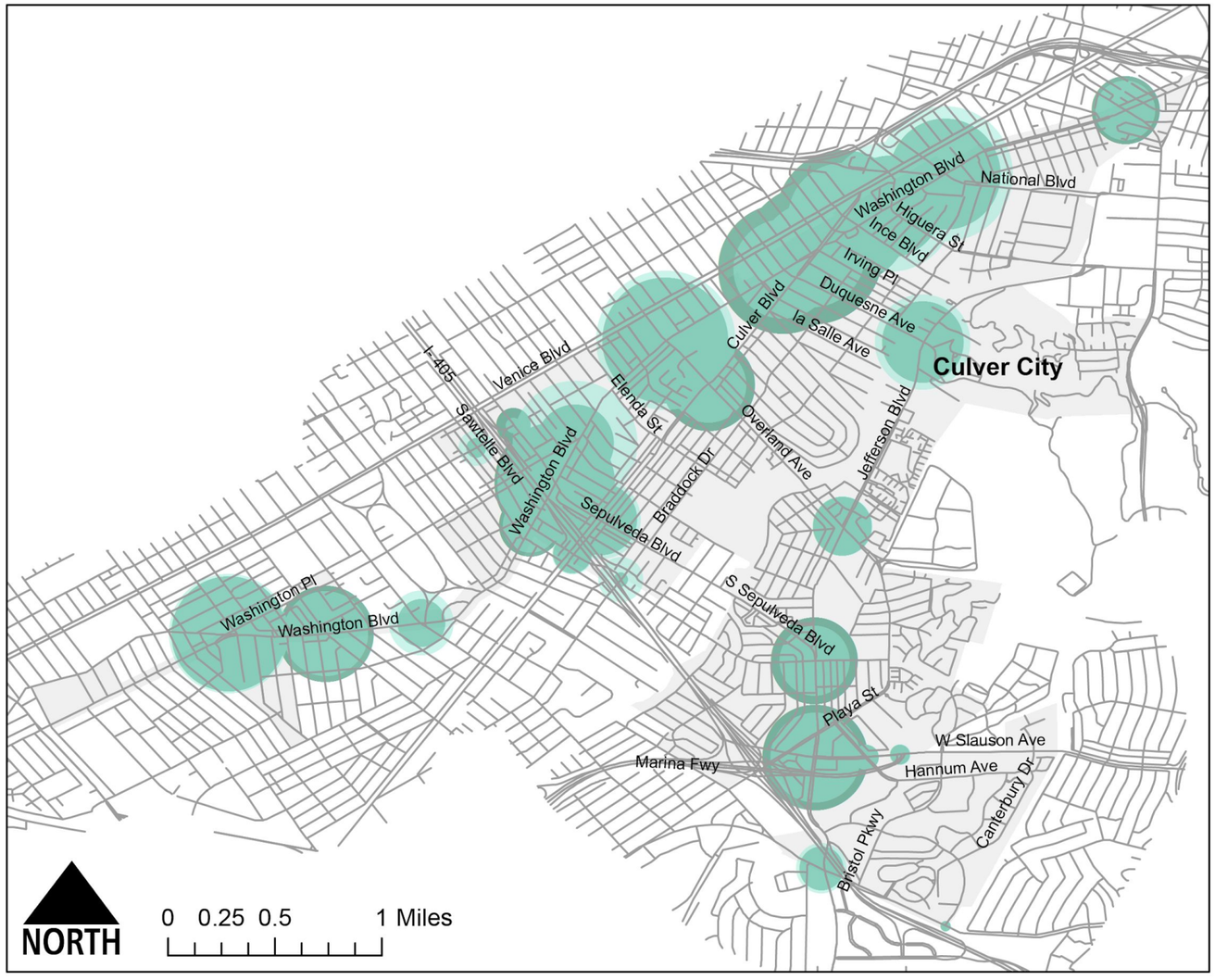


Figure 6. Pedestrian peak hour volume

during the PM peak at Washington Boulevard and Watseka/Irving Place and Culver Boulevard. This intersection is located in the center of Downtown Culver City, and connects to the residential area (south of Culver Boulevard).

Figure 7 shows that bike volumes are concentrated in nodes along Washington Boulevard, with the highest off of Overland and near Downtown Culver City. Additionally, most bike volumes are correlated to existing bike infrastructure. Notably, the National and Washington Boulevard intersection experiences the highest volume during AM and PM peak hours because of its connection to the Metro Expo line. The second common area for high volume bike traffic is along Overland Avenue. The City recently installed a Class II bicycle lane along Overland, which may help explain the high volume. The AM peak in this case seems to be slightly higher, by five cyclists, than the PM peak.

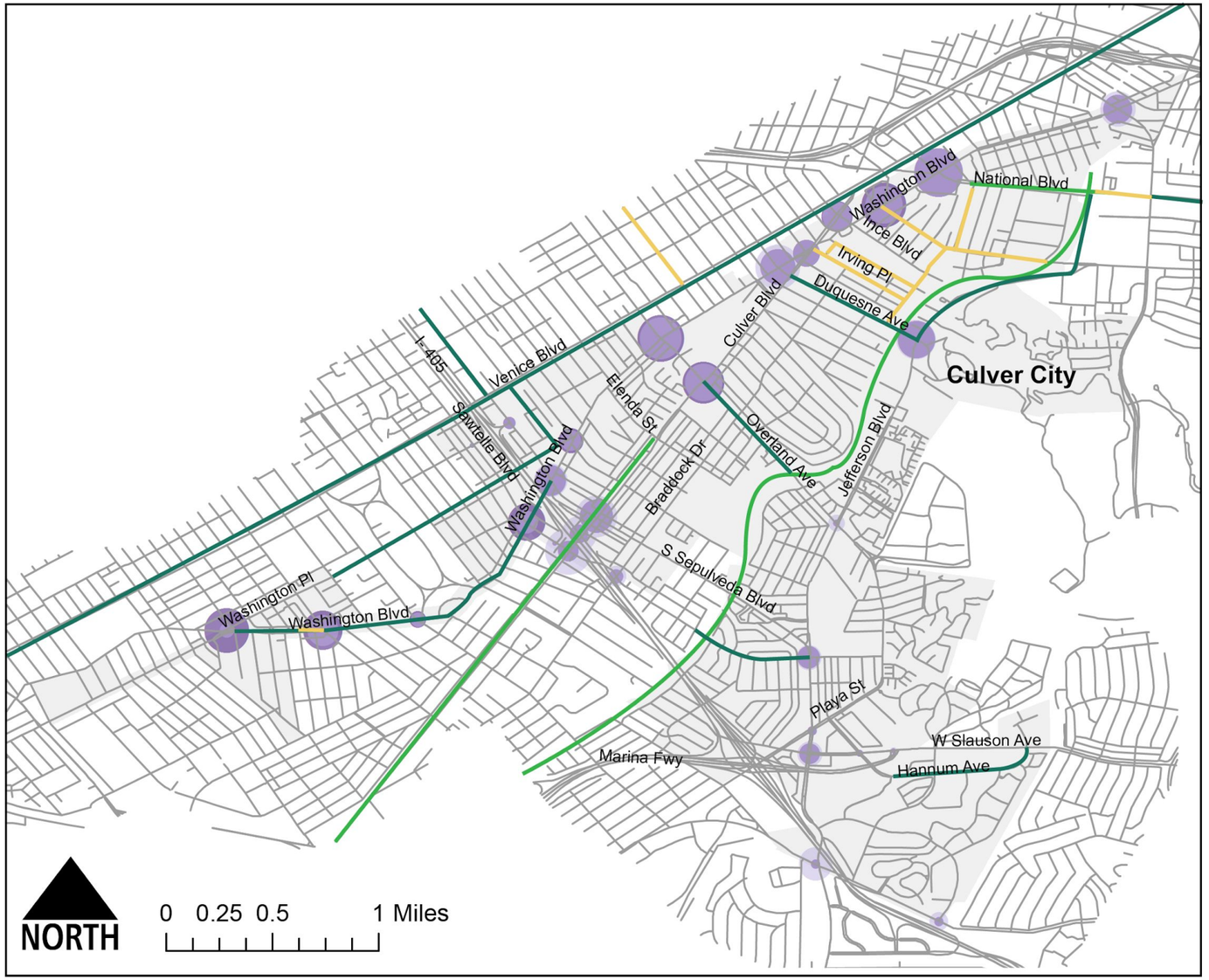


Figure 7. Bicycle peak hour volume

Peak hour volumes for automobiles differ from pedestrians and bikes. The higher volume areas are dispersed throughout the city, rather than just along Washington Boulevard (Figure 8). Major nodes occur near freeways. Most of the high peak hour volumes are concentrated on or off Sepulveda Boulevard, which serves as a connector to the 405 freeway. Additionally, high peak hour volumes are also present on Overland Avenue, which runs parallel to Sepulveda Boulevard and serves as a north/south alternative to Sepulveda and the 405 freeway. The PM peak also experiences larger volumes than the AM for most areas throughout the city. Appendix E shows volumes in more detail, and pinpoints the top five intersections with the highest pedestrian, bike, and auto volumes in the City for AM and PM peak hours.

Figure 8. Automobile peak hour volume

Citywide Collision Data

Using TIMS collision data from 2016 to 2018, we examined the collision rates across Culver City. The 405 freeway runs through and bisects the city, so we removed all 405-related collisions from our analysis because it is controlled by Caltrans. We mapped collisions by all collision types — pedestrian-involved collisions and bicycle-involved collisions (Figure 9). Not surprisingly, the intersections with the highest number of collisions in the city (Appendix E) correspond with the high peak hour volume areas as shown in Figure 10.

Though we removed 405 freeway related collisions from our analysis, many of the major collision nodes still appear near highways. Additionally, as with peak hour volumes, a lot of the collision activity occurs on or near Washington Boulevard. A lot of the activity seems to be concentrated on this thoroughfare, most likely because it serves as an east-west connector for residents, and non-residents alike.

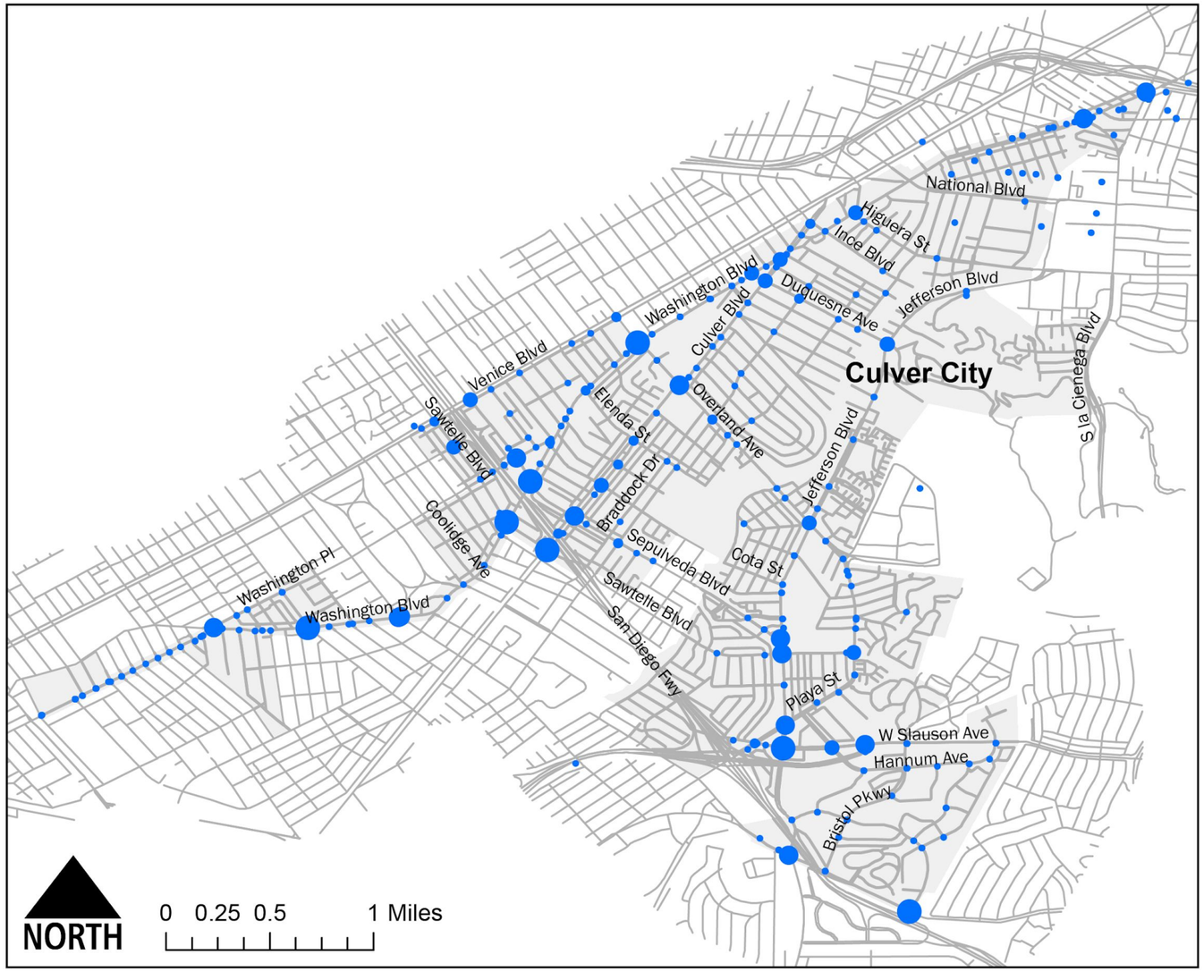


Figure 9. All collisions (automobile and pedestrian/bike)

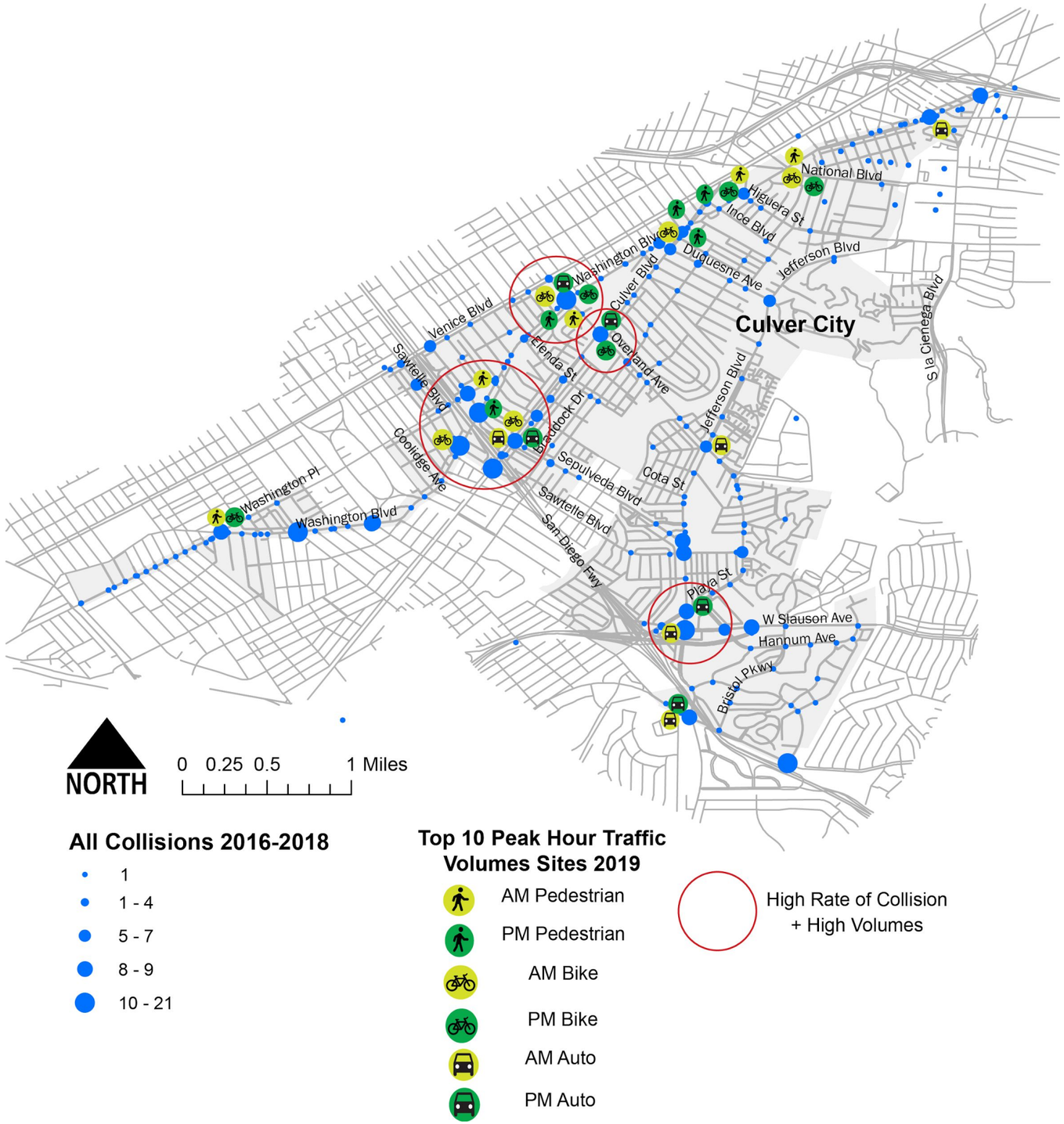


Figure 10. High peak hour volume (ped/bike/car) and collisions

Figure 10 shows that many of the intersections with the highest number of collisions correspond with intersections with the high peak hour volumes for all modes. Particularly, the most prominent intersection is at Washington Boulevard and Overland Avenue, where there is high AM peak hour volumes for bikes, high PM peak hour volumes for bike, pedestrians and automobiles, and where collision numbers are the second highest for all intersections in the city.

To further pinpoint where dangerous intersections are located, we divided pedestrian, bicycle and auto collisions by their respective volumes at that intersection and multiplied it by a 100% to determine the collision rate. This collision rate allows us to account for the distortion effect of higher volumes on collisions (higher volumes = higher chances of collisions).

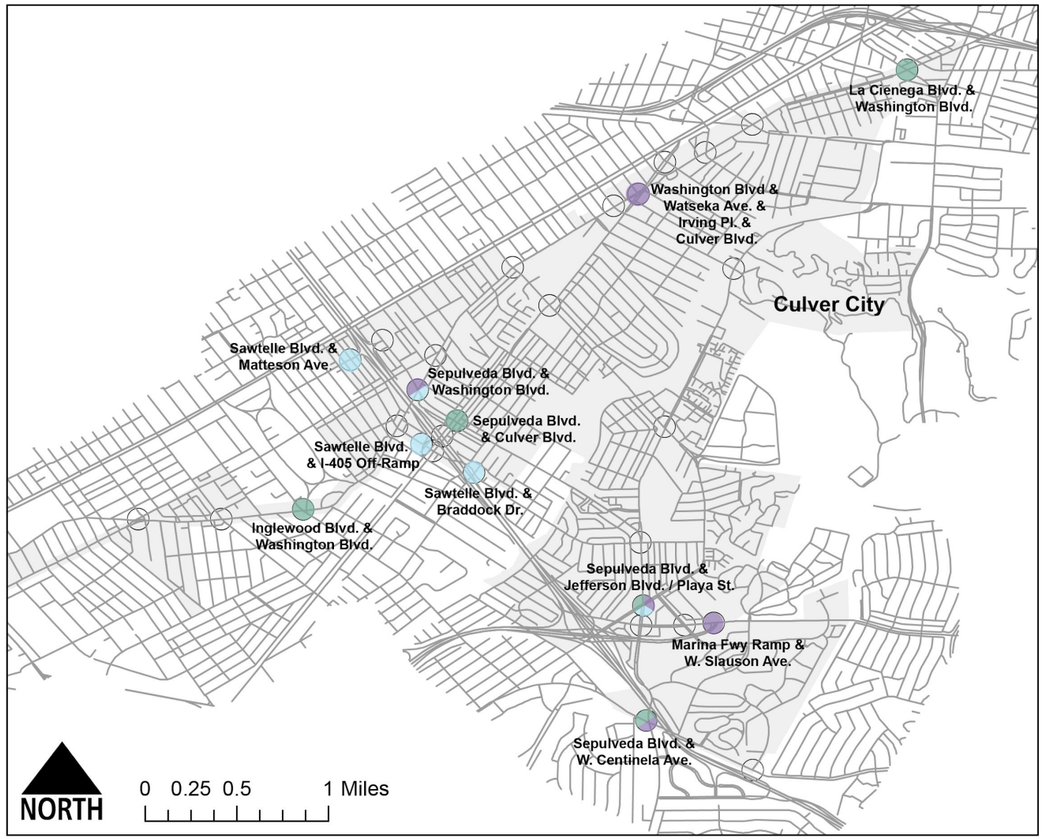
Table 2 and Figure 11 show our results. A high rate means that collisions happen more frequently for a given flow at the intersection, meaning it is more dangerous. This shows Sepulveda and Jefferson/Playa as a particularly dangerous intersection for all three modes. Sepulveda and Centinela also appeared in the top five intersections for both pedestrians and bicycles and Sepulveda & Washington are dangerous for both bicycles and automobiles.

Combining peak hour volumes and collisions informs our analysis because it denotes the most-used intersections, and therefore street segments.

Transit Data

Our analysis also referred to the Culver CityBus (CCB) ridership data to determine transit-priority streets. CCB currently provides eight (8)

Intersection Rank	Pedestrian (Ped Collisions/Ped Volumes)	*Rate (%)*	Bicycle (Bike collisions/Bike volumes)	*Rate (%)*	Auto (All Collisions*/Auto Volumes)	*Rate (%)*
1	Sepulveda & Jefferson / Playa	2.8	Sepulveda & Jefferson / Playa	11.1	Sawtelle & Matteson	0.18
2	La Cienega Blvd & Washington Blvd	0.9	Marina Fwy Ramp & Slauson	7.1	Sawtelle & I-405 Off-Ramp, Sawtelle & Braddock	0.14
3	Sepulveda & Centinela	0.7	Sepulveda & Washington	4.2	Sepulveda & Jefferson / Playa	0.11
4	Inglewood Blvd & Washington Blvd, Culver & Sepulveda	0.4	Sepulveda & Centinela	3.6	Sepulveda & Washington	0.10
5	Sepulveda & Jefferson/Sawtelle	0.35	Washington Blvd & Watseka Ave & Irving Pl & Culver	3.3	Robertson Blvd & Higuera & Washington Blvd	0.09



Left: Table 2. Intersections with high frequency of collisions by volume

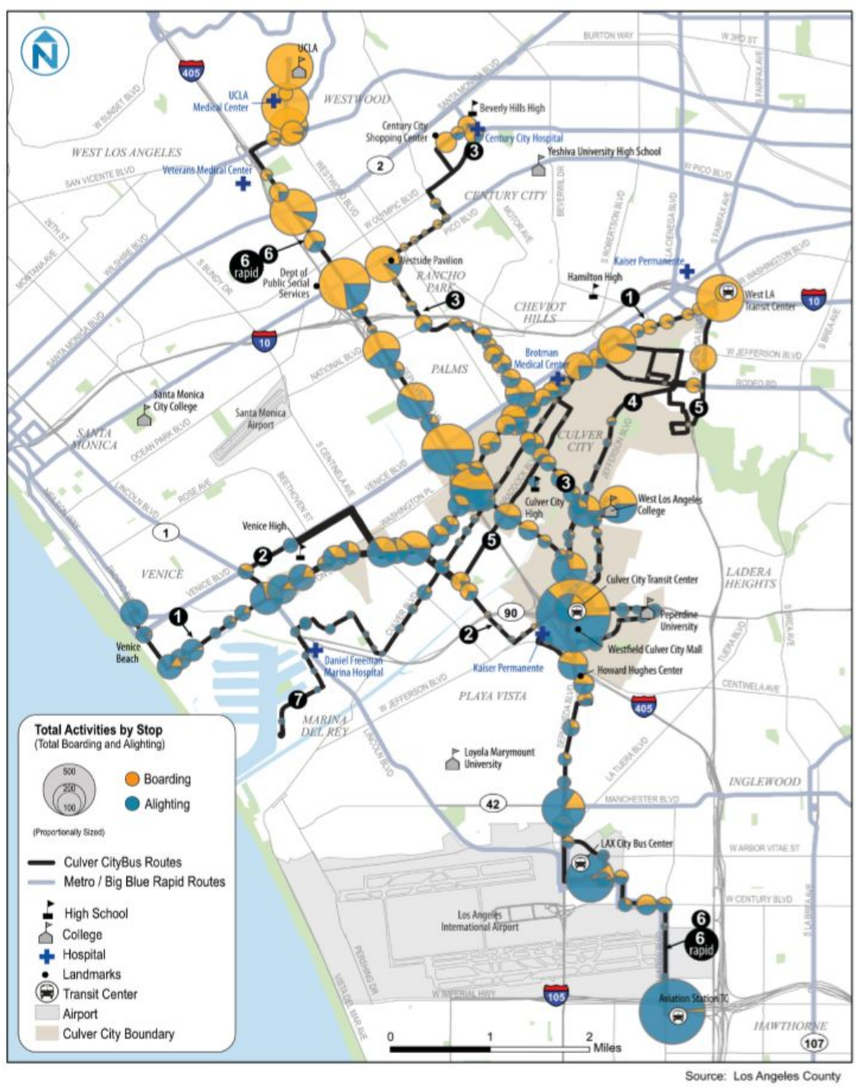
Right: Figure 11. Intersections with high frequency of collisions by volume

Data Limitation: We were only able to calculate this rate for the 30 intersections we had volume counts on.

**All collisions reported involve an automobile.*

routes that serve Culver City and neighboring cities (Culver CityBus, n.d.). The boarding and alighting data by stops reveal popular routes, destinations, and travel patterns within Culver City. When selecting priority streets for transit improvements, we considered the routes and time segments that transport higher numbers of passengers.

Our preliminary examination shows that many destinations along CCB Line 6 and Rapid 6 have significantly higher numbers of passengers compared to other CCB routes. In addition to Line 6 and Rapid 6, Line 1 also shares a relatively high proportion of the systemwide ridership. Popular destinations served by these high-ridership lines include Culver City Transit Center, LAX Bus Center, UCLA, and Downtown Culver City (Nelson\Nygaard Consulting Associates Inc., 2019).



[Left] Figure 12. Total activity by stop - Weekday (North-East)
[Right] Figure 13. Total activity by stop -Weekday (South-West)
Source: Culver CityBus Line by Line Study by Nelson\Nygaard Consulting Associates Inc (2019).

Community Feedback Data

In addition to quantitative data, we also used qualitative data to assess which segments communities and residents deem as important for their daily use. Among all qualitative sources, the City's Bike & Pedestrian Master Plan (BPMP) served as one of the important sources of qualitative data. The process of updating the BPMP involved an extensive amount of community feedback and comments (2010). Additionally, the Safe Routes to School (SRTS) program has conducted several surveys (*Survey/Pledge | Walk N Rollers*, n.d.). The existing qualitative data informs our project through indicating some of the improvements that the community has raised as important or desirable.

Prioritization Matrix Methodology

Using the quantitative and qualitative data from our initial analysis, we developed a prioritization matrix to identify areas of need. The purpose of the prioritization matrix is to identify and rank streets in Culver City that would benefit the most from Complete Street interventions. The prioritization matrix uses both sets of data described in previous sections to create a ranking system of the City's major streets that are highest in need and demand for Complete Street interventions.

Culver City has a total of 94 miles of roadway (Caltrans, 2018). To simplify our analysis, we focused only on major arterials and critical biking and pedestrian networks which are 25 miles of the city's roads. We divided this 25 miles of roadway into roughly 0.5 mile segments, using cross-streets as breaking points. We subsequently scored each of these 0.5 mile segments using five types of criteria. These factors were chosen based on existing literature on the goals and purposes of Complete Streets and guidance from the NCSC's ten elements for Complete Streets.

Table 3 presents our prioritization matrix criteria and respective weights.

Criteria	Weight
Collision Rate*	25%
Number of Community Feedback	23%
Proximity to Schools and Educational Institutions	18%
Proximity to Existing and Recommended Bikeways	18%
Proximity to High Ridership Transit Lines	16%

Table 3. Criteria used in prioritization matrix and their respective weights
* Collision rate is a combination of pedestrian, bicycle and auto collisions divided by their respective counts

Since one of the main priorities of Complete Street interventions is to improve traffic safety, we weighted the pedestrian, bicycle and collision rate factor the highest at 25%. We computed the collision rate score by counting the number of high collision rate intersections that fall within a 0.25 mile radius of the street segment and adding the points for each of these high collision rate intersections (Table 4).

For example: Suppose that segment X is within a 0.25 mile proximity from the Sepulveda/Centinela intersection which has the 3rd highest pedestrian collision rate (3 points) and the 4th highest bicycle collision rate (2 points), segment X will be scored 5 (= 3 + 2).

Rank	Pedestrian (Ped Collisions/Ped Volumes)	*Rate (%)*	*Points*	Bicycle (Bike collisions/Bike volumes)	*Rate (%)*	*Points*	Auto (All Collisions/Auto Volumes)	*Rate (%)*	*Points*
1	Sepulveda & Jefferson / Playa	2.8	5	Sepulveda & Jefferson / Playa	11.1	5	Sawtelle & Matteson	0.18	5
2	La Cienega Blvd & Washington Blvd	0.9	4	Marina Fwy Ramp & Slauson	7.1	4	Sawtelle & I-405 Off-Ramp, Sawtelle & Braddock	0.14	4
3	Sepulveda & Centinela	0.7	3	Sepulveda & Washington	4.2	3	Sepulveda & Jefferson / Playa	0.11	3
4	Inglewood Blvd & Washington Blvd, Culver & Sepulveda	0.4	2	Sepulveda & Centinela	3.6	2	Sepulveda & Washington	0.10	2
5	Sepulveda & Jefferson/ Sawtelle	0.35	1	Washington Blvd & Watseka Ave & Irving Pl & Culver	3.3	1	Robertson Blvd & Higuera & Washington Blvd	0.09	1

Table 4. Top 5 intersections for pedestrian, bicycle and auto collision rates and respective points given for Collision Rate in prioritization matrix.

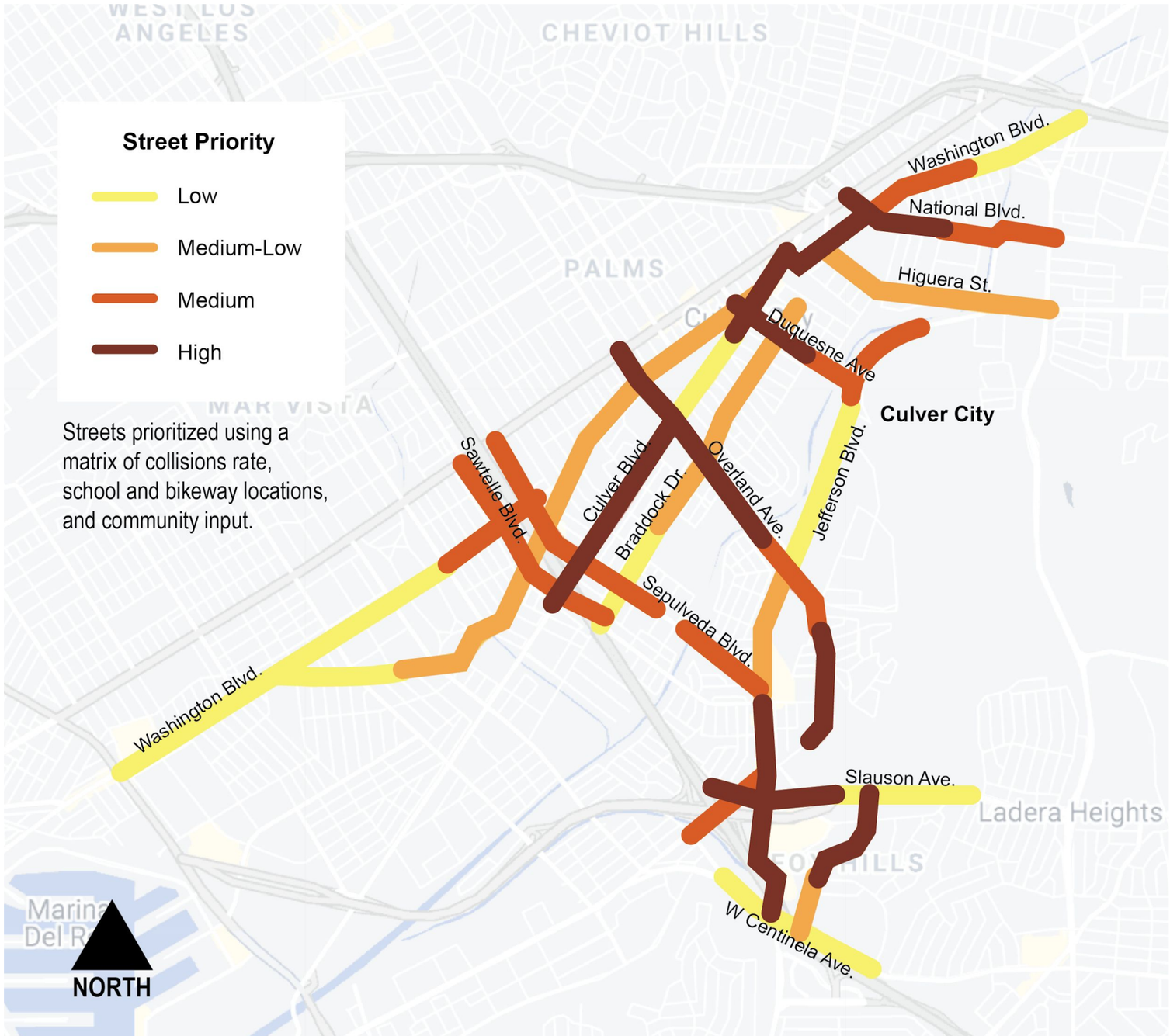


Figure 14. Overall assessment of Culver City streets based on prioritization matrix

Community feedback is an important aspect of identifying where Complete Streets interventions should be located because communities and residents use streets on a daily basis. As such, their feedback on the needs and gaps of the current street infrastructure or network can provide more information and complement existing statistics and data that we have. Because we were not able to conduct our own community survey, we gathered community feedback through Culver City's Bike and Pedestrian Action Plan (2019) online interactive feedback platform. This platform allows individuals to provide feedback on specific street locations which is then collated into a publicly available map. The score for community feedback was tabulated by summing the total number of feedback that falls within each 0.5 mile street segment.

Another goal of Complete Street interventions is to ensure network connectivity to existing or planned transportation infrastructure such as

bikeways and transit lines, and to important community institutions like schools. We thus incorporated proximity to bikeways (within 0.5 miles), high ridership transit lines and schools into our prioritization matrix. The high ridership transit lines that were considered included the Culver City 6 (North-South), Culver City 1 (East-West) and the Metro Expo Line.

We calculated the total score for each street segment by summing up the individual weighted scores for each criteria.

The total scores range from 36 to 625. A larger number indicates a higher priority for Complete Street improvements (Appendix G). We used these ranges to break the road network into quartiles of high, medium, medium-low, and low priority pictured in Figure 14.This resulted in thirteen high priority street segments, concentrated in the areas near Downtown Culver City, Washington-Culver, and the southern

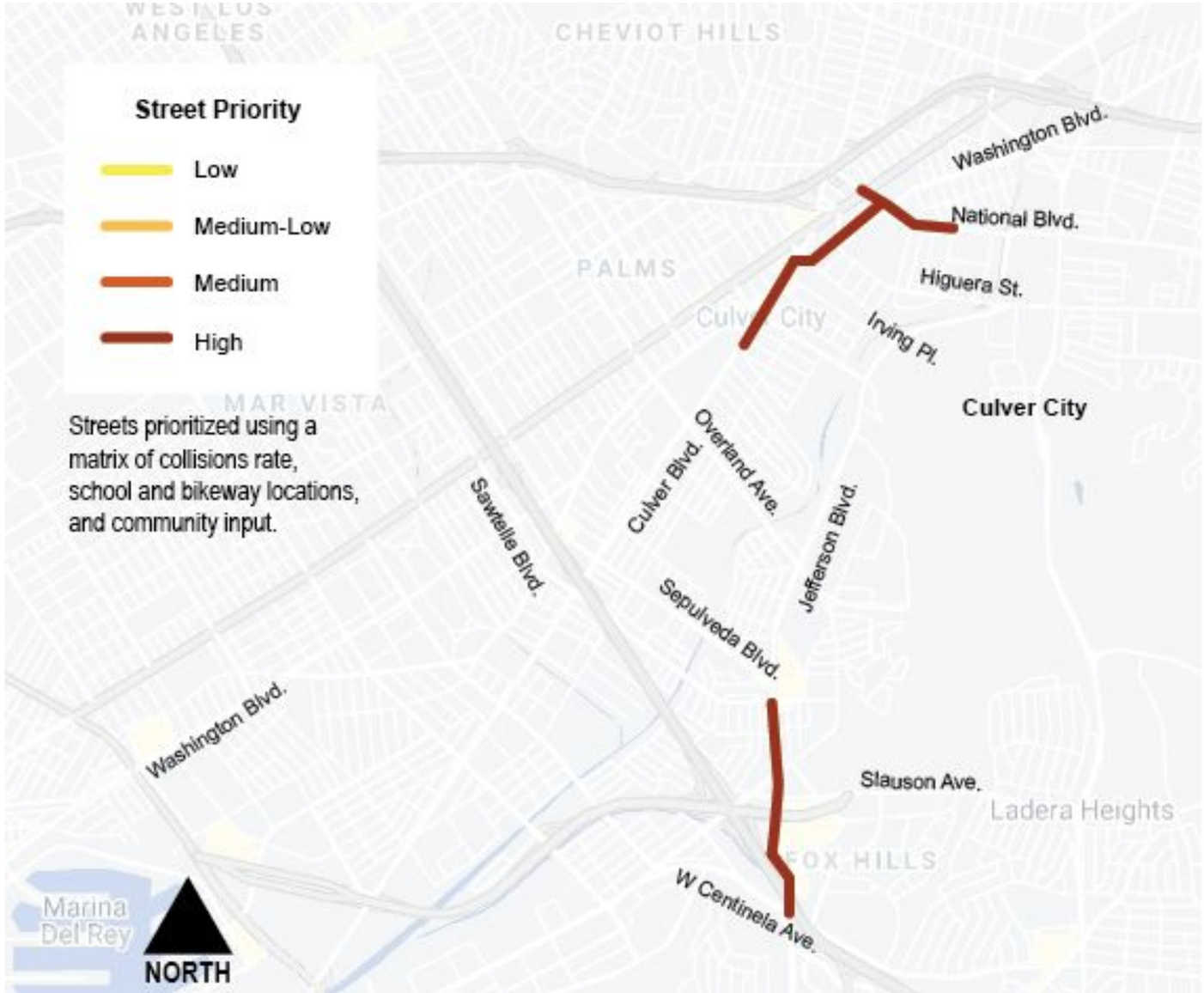


Figure 15. Top 5 High priority segments

neighborhoods of Sunkist Park (El Marino) and Fox Hills.

The concentrated high priority areas represent different community needs and landmarks as they connect to three distinct hubs in the City: the Downtown commercial area, Sony Studios, and the Fox Hills commercial area. A further analysis of the data shows that the top five high priority segments appear near Downtown Culver City and Sunkist Park-Fox Hills (Figure 15).

Of the streets we examined, 98% are within half a mile of an existing or recommended bikeway, and 72% are within half a mile of a school. A high percentage of the streets are also near a high priority transit line (76%). All of these indicators point to the importance of making Culver City's streets safe for non-motorized vehicles. Two issues helped bring some streets higher up on the priority list: collision rate and community feedback. Only 38% of our street segments are within a quarter mile of an intersection with a high pedestrian collision rate, 34% are within a quarter mile of an intersection with a high bicycle collision rate, and 36% are within a quarter mile of an intersection with a high auto collision rate. While almost all segments are close to some community feedback, 24% of street segments had more than 12 pieces of feedback, and only 8% had 20 or more.

All of the high priority segments either have high community feedback or are close to two or more intersections with a high collision rate. The city of Culver City already has projects in the works on some of the high priority corridors like Overland Avenue. We also chose to exclude Venice Boulevard from our street analysis to avoid doubling the work of groups like Venice4All.

Selected Streets for Intervention

We thus focused our Complete Streets efforts in the areas of Southwest Sepulveda (Sepulveda Boulevard from Sawtelle to Centinela) and Downtown Culver City (Washington Boulevard and Culver Boulevard intersection) as they emerged as priority corridors based on the results of our prioritization matrix.

Downtown Culver City (Culver Blvd. & Washington Blvd.)

We identified Downtown Culver City as the one of the priority areas for Complete Streets improvements. The Washington Boulevard and Culver Boulevard intersection ranks among the top five priority segments because it received a high concentration of public comments concerning potential improvements for pedestrians and bicyclists (Culver City, 2010). Its proximity to nearby institutions and amenities means that the intersection plays a pivotal role in enhancing multimodal accessibility and traffic safety for the city. Within a half mile radius of the high priority segment on Culver Boulevard, there are three schools and learning centers: Linwood E. Howe Elementary School, Park Century School, and Turning Point School. Furthermore, nearby bike paths along Venice Boulevard and National Boulevard make it an important future node of connectivity for bike paths in Culver City. The corridor is also close

to high-ridership transit lines such as the Culver City Line 1 and Metro Expo Line. A well connected Downtown Culver City can attract high volume foot traffic from adjacent transit lines. Unlike Sepulveda Boulevard, Downtown Culver City does not have a high auto collision rate. Existing safety issues primarily involve pedestrians and bicyclists.

There has been a desire to improve the walkability of downtown from both the public and city. The City has invested in transforming downtown Culver City into a more pedestrian-friendly area through nearby projects such as the Culver Steps, which aim to bring economic vitality and walkability into the heart of Culver City. In addition to the focus on economic benefits, existing community comments also indicate that the Complete Streets projects could help address safety concerns for biking and walking in downtown Culver City (2010).

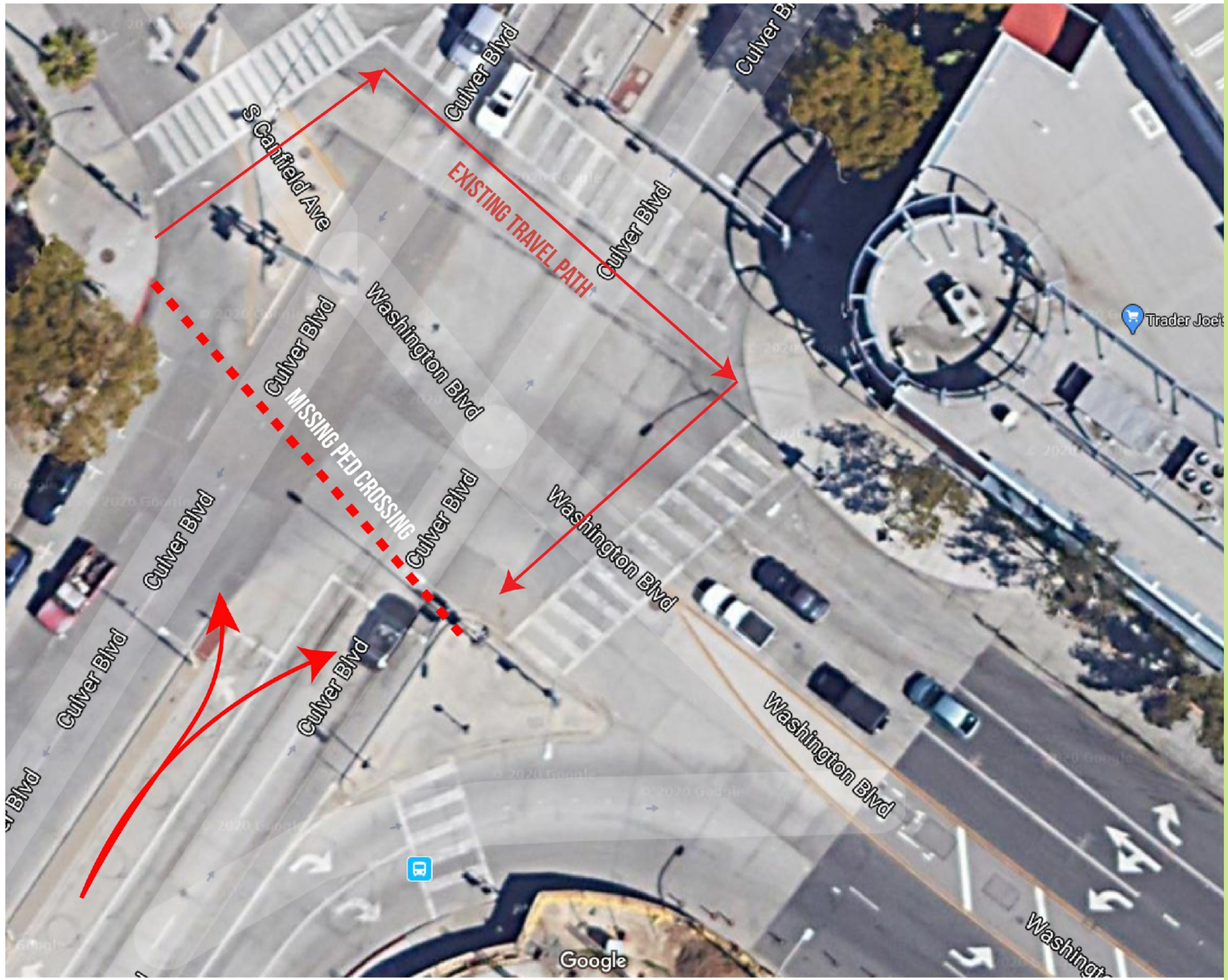


Figure 16. Existing conditions, Washington Blvd. & Culver Blvd. intersection

Sepulveda (Sawtelle to Centinela)

The other priority area is the segment of Sepulveda from Sawtelle to Centinela. This segment is the most dangerous for pedestrians and bicyclists in the city. According to our analysis, the intersection of Sepulveda/Jefferson/Playa has the highest rate of pedestrian and bicycle collisions in Culver City, and the second highest peak hour afternoon auto volume for the city. This particular intersection is very wide. The two pedestrian refuge islands on the northeast and southwest corners do not break up the two longest crosswalk lengths which are over 120 feet long. Additionally, the street segment's overall design is auto-oriented, as it features three wide auto travel lanes in each direction, narrow sidewalks, and no bicycle infrastructure (Figure 17).

The street segment's clear priority of auto travel over all other modes - in addition to the high crash rate - denotes the need for Complete Streets interventions. The City has already taken steps in adding space for other modes along this segment, as it plans to implement a Class IV separated bike lane as part of its new Bike Project Map (Culver City, 2020).

This segment is also important for transit, connecting to the nearby Culver City Transit Center, which serves municipal lines such as Culver CityBus and Santa Monica Big Blue Bus, as well as regional lines operated by Los Angeles Metro. The Transit Center connects to a commercial corridor along Sepulveda that includes restaurants, grocery stores, and the Westfield Culver City Mall. Thus, the area serves as a node for commerce, and attracts residents as well as visitors. The commercial zone sees a lot of activity, underscored by the high peak hour auto volumes at the Sepulveda/Jefferson/Playa intersection and the Sepulveda/Slauson intersection.

Pedestrian and transit enhancements, in addition to bicycle infrastructure, would elevate this segment to serve as an important connector for residents to the commercial area of Fox Hills.

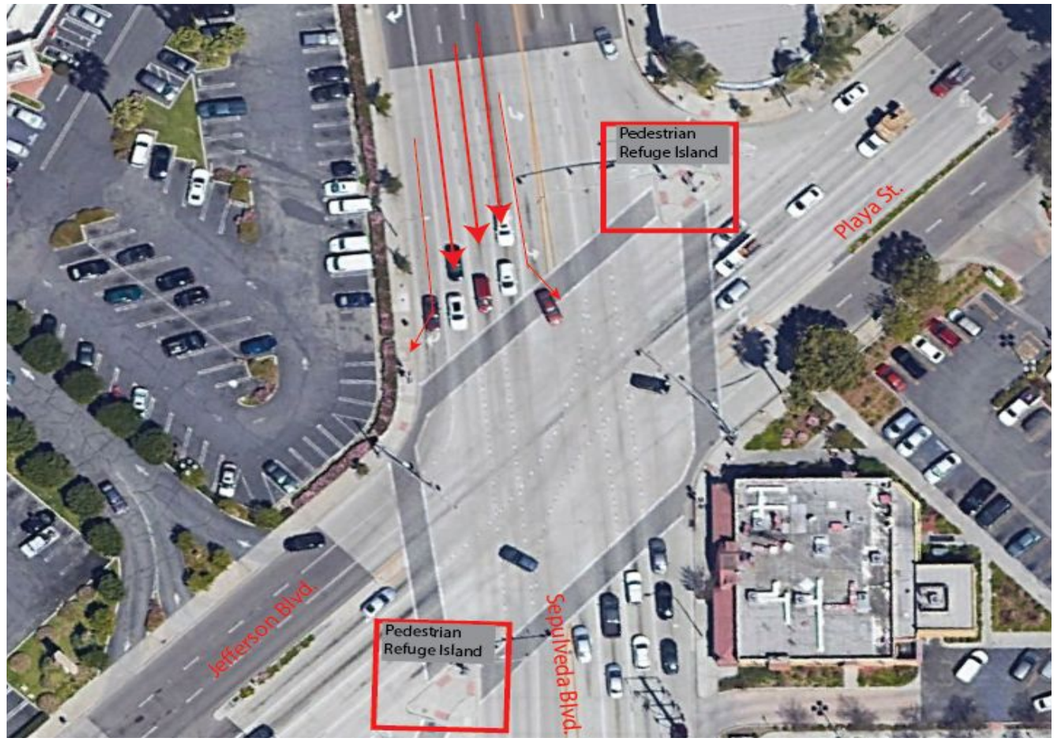


Figure 17.
Existing conditions, Sepulveda Blvd/Jefferson Blvd/Playa St intersection

04 Existing Conditions of Selected Priority Corridors

In this chapter, we delve deeper into the existing conditions of our selected corridors by conducting a Strengths, Weaknesses, Opportunities, and Threats (S.W.O.T.) analysis. The S.W.O.T. analysis helps us better understand priority areas and leads to our design and policy recommendations. We divide both corridors into three individual segments (A, B, C) for ease of reference.

Study Area 1: Downtown Culver City

The section of Downtown Culver City we will focus on is located along Culver Boulevard, between Duquesne Avenue and Washington Boulevard (Figure 18). This area is an important node as it includes major commercial destinations in the City, as well as municipal sites of interest (City Hall and the Fire Department). Segments A,B, and C are outlined in Figure 18.

Figure 18. Downtown Culver City existing conditions

Strengths: Commercial and Civic Center Core, High Pedestrian Volumes

Our study area is in the heart of Downtown Culver City. City Hall anchors it at the southwestern corner and various retail and food and beverage establishments line the streets of Culver Boulevard and Washington Boulevard. These uses contribute to a strong downtown identity and are conducive to more active modes of transportation, especially walking. Our study area is currently one of the most actively used pedestrian areas of Culver City, based on our previous analysis. The busiest pedestrian intersection is located at Washington Boulevard and Watseka/Irving Place and Culver Boulevard. Given high pedestrian volumes, our study area is an ideal location for Complete Streets interventions that focus primarily on the pedestrian experience.The current pedestrian experience is pleasant for most of the segment. Interesting store frontages and outdoor alfresco dining create a strong visual quality along the corridor. The study area features wide sidewalks that allow for a comfortable walking experience. In Segment A, the sidewalks are approximately 14 to 15 feet wide on the eastbound side of Culver Boulevard, and 26 to 46 feet wide on the westbound side.

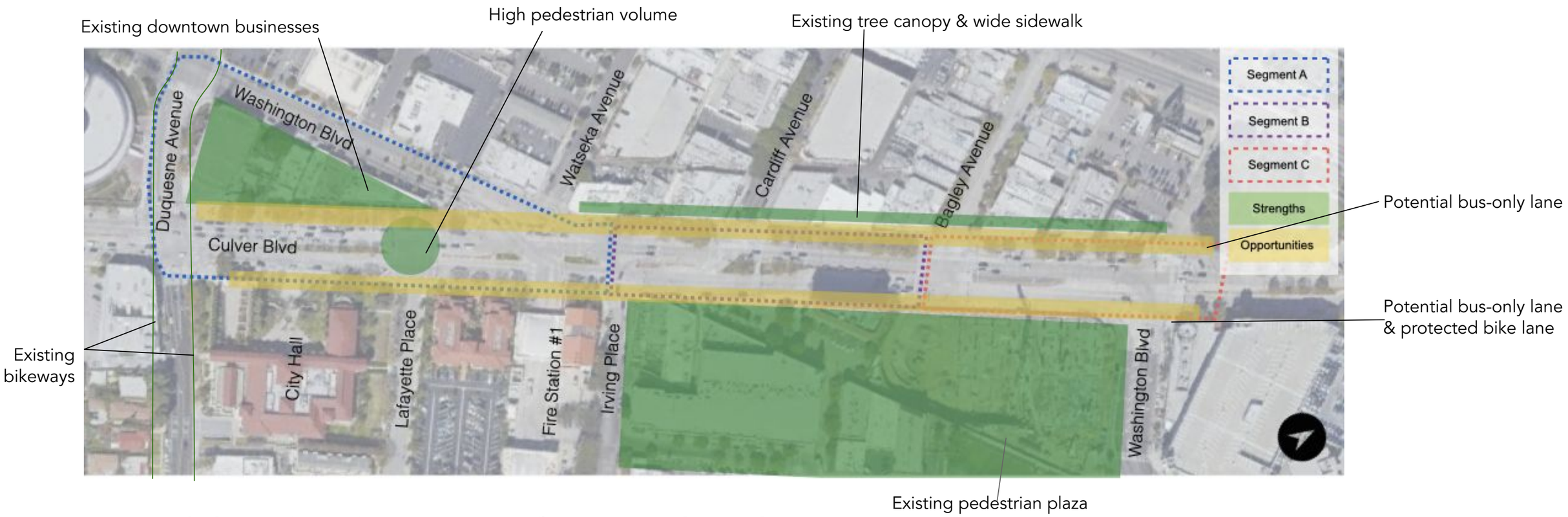


Figure 19. Strengths and opportunities of Downtown Culver City

In Segment B and Segment C, the sidewalks are approximately 10 to 20 feet wide on both sides of Culver Boulevard. Segment B and Segment C are also flanked by a fully pedestrianized plaza on the eastbound side of Culver Boulevard.

In addition, the sidewalks on the westbound side of Culver Boulevard have a greater provision of tree cover, urban greenery, and public seating in comparison to the eastbound side.

Figure 20. Downtown-Expo Bike Connector project area

Source: Culver City Expo-Downtown Bicycle Connector Feasibility Study

Opportunities: Bikeway Network, Transit Service Connectivity, and Improved Pedestrian Experience

The study area on Culver Blvd. currently does not have bike lanes. Nearby bike lanes on Duquesne Avenue, Venice Boulevard, and National Boulevard suggest the possibility of a connected bikeway network. In addition to existing bikeways and bike-friendly roads, the city is also planning the Expo-Downtown Bike Connector Project (Figure 20). This project will build biking infrastructure that connects the Metro Expo Line Culver City Station and segments on Washington Boulevard that are slightly east to the core of Downtown Culver City (Culver City Public Works Department, 2017). As such, adding bike lanes on Culver Blvd. could significantly expand the local bikeway network. The downtown corridor also has high-quality transit lines. Culver City Line 1, a high-ridership transit line, directly serves our study area. The area is also within a half-mile radius of the Expo Line station. The adjacency to existing public transit lines suggests that Downtown Culver City is equipped with public transit services that can potentially provide high foot traffic volume to the study area. Bus-only lanes on Culver Blvd. can improve the utilization of existing transit services through further improving the service quality. Lastly, existing infrastructure and the downtown business profile indicate that improving the pedestrian experience is beneficial.

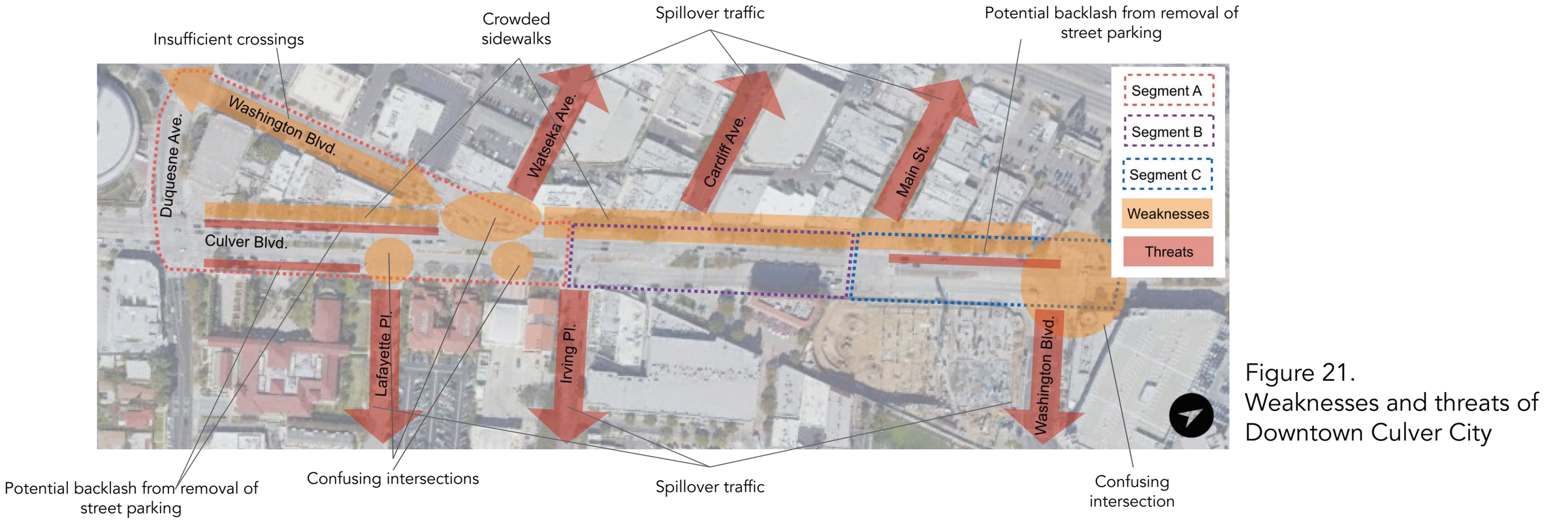


Figure 21.
Weaknesses and threats of Downtown Culver City

By improving the existing crosswalks and sidewalks, Downtown Culver City can serve as a pedestrian-friendly center for community gathering.

Weaknesses: Crowded sidewalks, inadequate crossings, confusing and inconvenient intersections

Sidewalks along Culver Boulevard are wide, however they are crowded with planters and tree wells that hinder foot traffic. This is especially true for sidewalks on the westbound side of Culver Boulevard. Trees and urban greenery can create a shaded walking environment however, their ill placement effectively shrinks available sidewalk space for pedestrian circulation (Figure 22).

The only pedestrian crossings on Washington Boulevard within our study area are Duquesne Avenue/Washington Boulevard and Watseka Avenue/Washington Boulevard. The distance between these two crossings is approximately 0.15 miles, which is about a 3 to 4 minute walk. Because there are not enough opportunities to cross the street, many individuals jaywalk between these two intersections.

There are three intersections within our study area that make crossing Culver Boulevard confusing and inconvenient. These three intersections are: 1) Watseka Avenue/Washington Boulevard (Segment A); 2) Culver Boulevard/Washington Boulevard (Segment A); and 3) Culver Boulevard and Washington Boulevard (Segment C). The Watseka Avenue/Washington Boulevard intersection is among the

top five intersections with the highest bicycle collision rate in Culver City.

At the Watseka Avenue/Washington Boulevard intersection, pedestrians are required to cross between two to three times to get from one side of Washington Boulevard to the other side. For the Culver Boulevard/Washington Boulevard (Segment A), pedestrians have to cross Washington Boulevard onto a pedestrian island before crossing a five-lane wide Culver Boulevard. While a pedestrian median is provided on Culver Boulevard, it is not wide enough for a comfortable waiting experience (Figure 23).

At the Washington Boulevard/Culver Boulevard (Segment C) intersection, pedestrians have to cross four times to get from one side of Culver Boulevard to the other (Figure 24). This makes crossing the street far too onerous for pedestrians. Moreover, pedestrian traffic is expected to increase as the retail shops open at the Culver Steps development.

Figure 22. Crowded sidewalk in front of Honey's Kettle
Source: Google (2020-a)

Figure 23. Small pedestrian median on Culver Boulevard for waiting
Source: Google (2020-b)

Threats: Spillover Traffic, Removing Parking Space, Community Pushback

With the existing conditions and potential opportunities in mind, our study primarily considered threats including the removal of parking spaces as well as changed traffic flows as a result of newly proposed Complete Streets elements. Cut-through traffic has been a concern for the city as it is surrounded by multiple jurisdictions. Local streets must bear associated congestion, environmental impacts, and safety concerns. Culver Blvd is one of the few arterial streets within the city that accommodates a high volume of daily vehicle traffic. Modifications to the existing road geometry under the Complete Streets guidelines could incite public pushback due to concerns of spillover traffic on adjacent residential streets and prolonged commute time. For example, community pushback from the Great Streets road diet in Mar Vista stemmed from community members considering multimodal travel lanes as a major threat to automobile travel.

Moreover, the proposed treatments are likely to change the current on-street parking conditions on Culver Boulevard. Business owners tend to consider on-street parking as a pivotal amenity for attracting customers, thus, they and local residents may view changes to existing on-street parking as a threat to the economic vitality of Downtown Culver City.

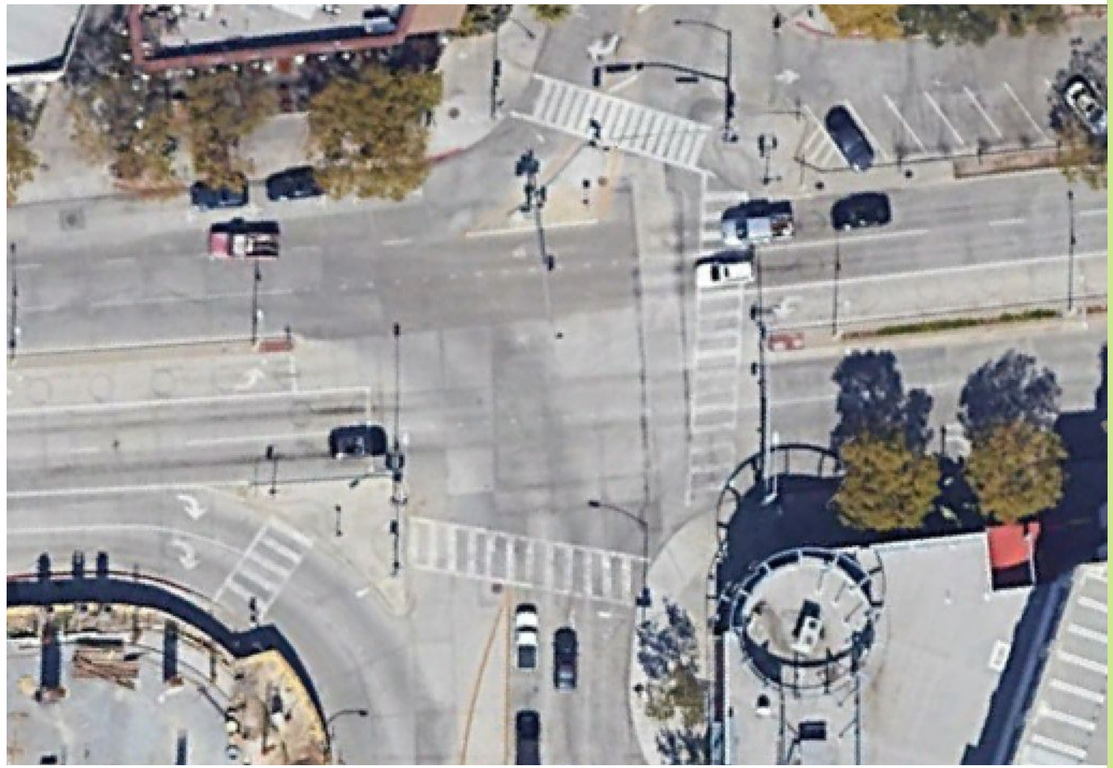


Figure 24. Intersection crossing at Washington Boulevard/Culver Boulevard (Segment C)

Source: Google (n.d.)

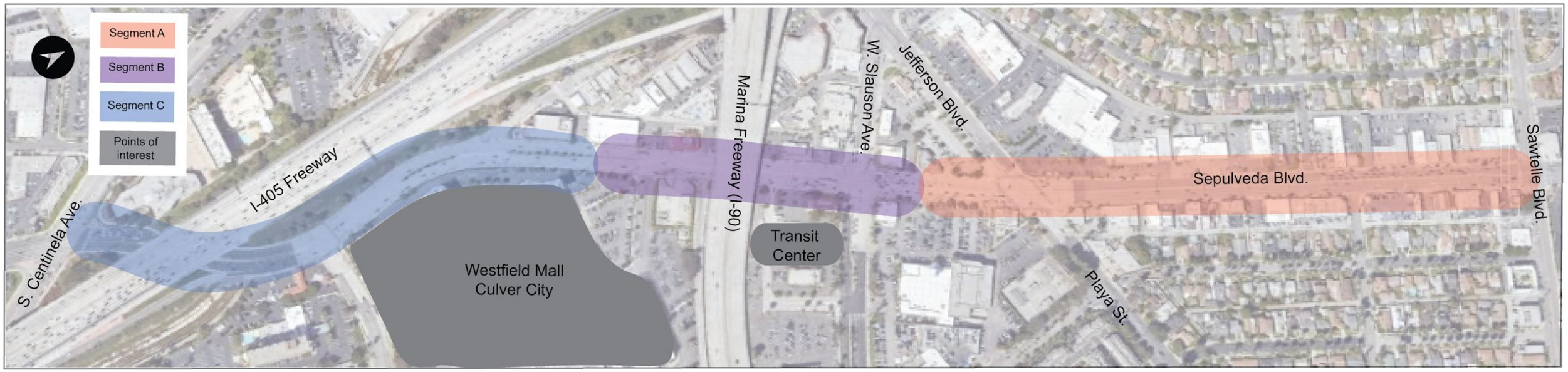


Figure 25. Southwest Sepulveda study area

Study Area #2: Southwest Sepulveda

The segment (Figure 25) covers a one mile area of Sepulveda Boulevard from Sawtelle Boulevard to South Centinela Avenue. The area is one of the City's major commercial corridors and includes a regional commercial center. Segment A (red) covers the area from Sawtelle Boulevard to right before the Sepulveda/Jefferson/Playa intersection. Segment B (purple) runs from the Sepulveda/Jefferson/Playa intersection and past the I-90 Freeway, while Segment C (blue) covers the area past the I-90 Freeway underpass to South Centinela Avenue.

Strengths: Transit Connectivity, Large Public Right of Way, Commercial Focal Points

The strengths of the corridor include its accessibility to transit, commercial destinations, and its large public right of way (Figure 25). This section of Sepulveda is served by the high ridership Culver CityBus 6 and Rapid 6 bus lines, which connect to LAX and UCLA. Additionally, the corridor connects to regional bus lines served by L.A. Metro via the Culver City Transit Center located at Sepulveda and Slauson. In addition, there is a large public right-of-way to work with (100' – 115' wide lanes) which provides ample room for road reconfigurations that could widen sidewalks and include bikeways.The corridor is primarily zoned for commercial uses, and has points of interest, such as the Westfield

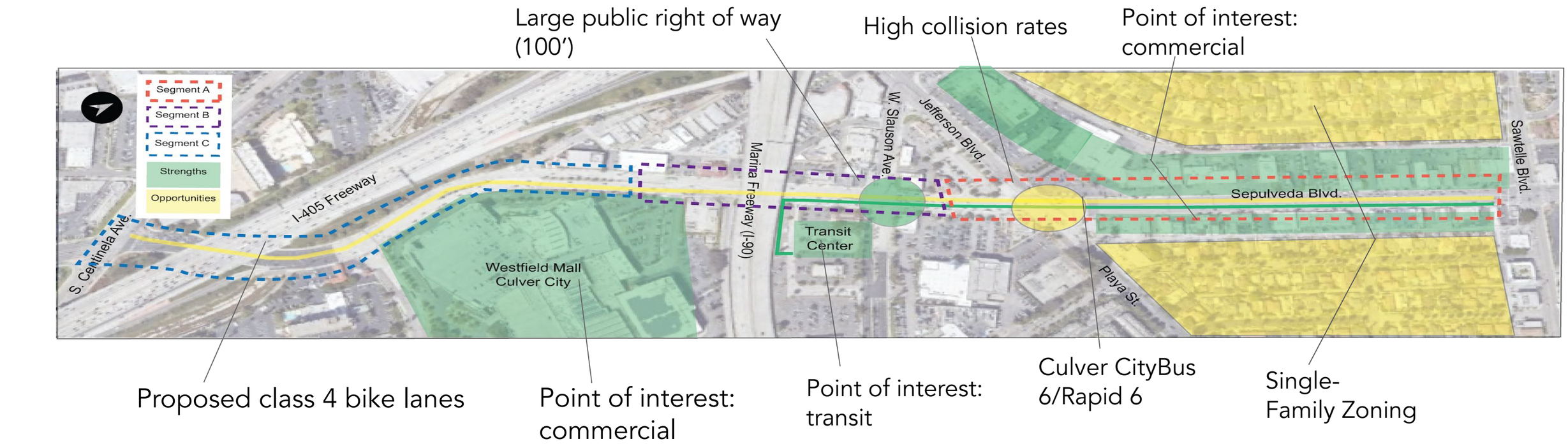


Figure 26. Southwest Sepulveda strengths and opportunities

Culver City Mall. Currently, the primary mode for patrons to access these commercial areas is by automobile. However, we believe there is potential to connect patrons to these locations via other modes. Lastly, the street segment does not go over sewer lines from Sawtelle to Jefferson/Playa, which avoids potential issues with new project infrastructure.

Opportunities: Proposed Bikeway Network, Alleyways, Increased Safety

The current transportation network for this segment of Sepulveda prioritizes auto use. The segment lacks any bike infrastructure, which the City hopes to correct with a planned Class IV (protected) bike lane. This bike lane, once completed, will be a major opportunity as it will be one of the longest bikeways (1.46 miles) in the City, connecting the Ballona Creek to the city limits at Centinela Avenue and into the City of Los Angeles. Another opportunity this corridor provides is linked to its preponderance of alleyways and rear side parking. Businesses along the corridor with curbside parking also have access to alleyways which fulfill loading/unloading needs. These alleyways are important amid potential removal of parking lanes for street projects. The corridor's proximity to single-family residential zoning should

also be taken into consideration. As evidenced by the recent COVID-19 public health emergency, cities need to find solutions in terms of access to public space and physical distancing needs. Expanded sidewalks and the inclusion of bikeways would not only serve commercial interests but would be an added benefit to nearby residents. Additionally, the Sepulveda/Jefferson/Playa intersection ranked in the top five worst intersections in terms of collision rates for pedestrians, bicyclists, and automobiles based on our analysis. By prioritizing safe streets in this area, the City could have a large impact on overall traffic safety. While there are large volumes at this intersection (Figure 27 and 28), some lanes, like the eastbound right-turn slip lane have very low volumes. The average daily traffic (ADT) along the corridor ranges from 10,452 - 13,473, well below 20,000 ADT (a typical threshold for road reconfiguration), making a lane reduction feasible.

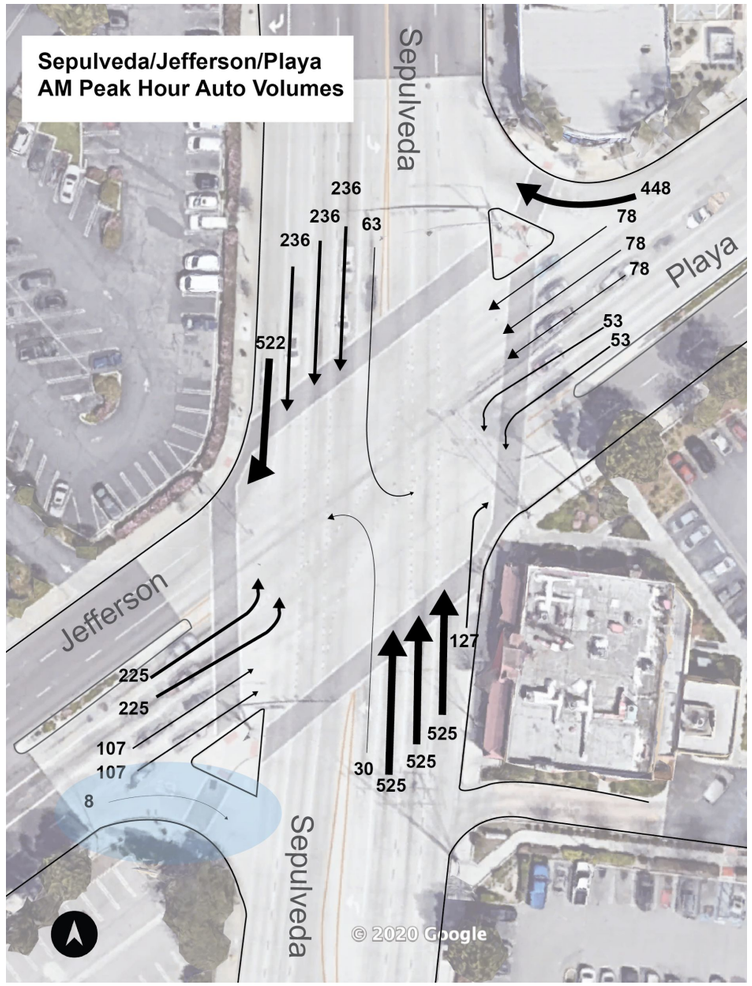


Figure 27-28. AM and PM peak hour auto volumes
Source: Traffic counts collected by Culver City

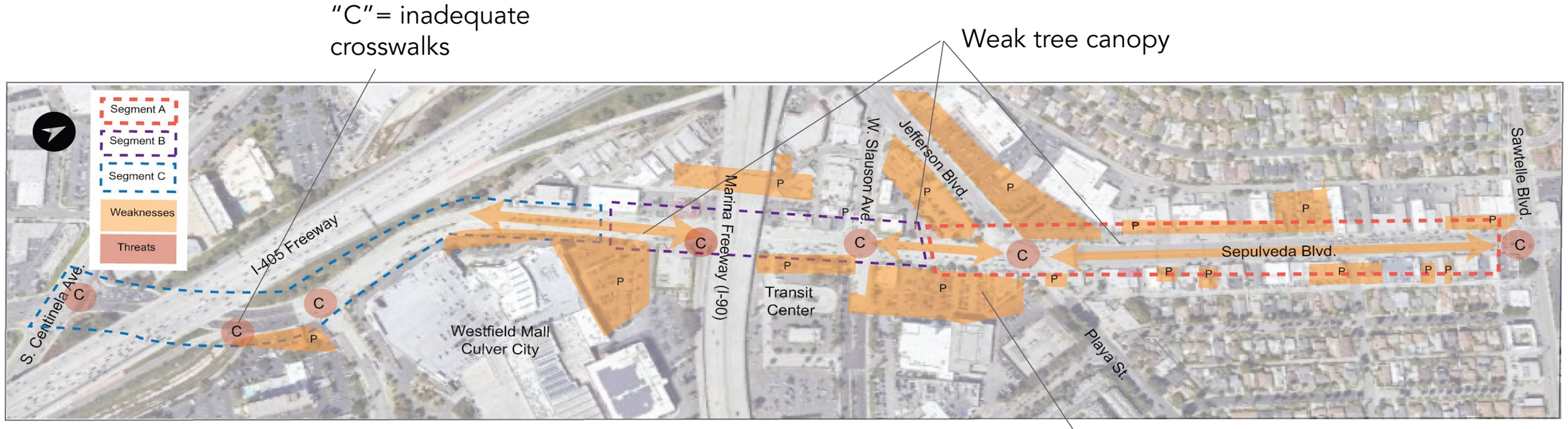


Figure 29. Southwest Sepulveda weaknesses and threats

Weaknesses: Disjointed Streetscape, Lack of Trees, Narrow Sidewalks

This section of Sepulveda does not fall into any of the City's overlay zones, thus there are little to no design guidelines for the area. The resulting streetscape features buildings with incongruent designs, limited trees, and no street furniture. Where trees do appear along the corridor, they do not provide adequate shade, and thus do not provide a hospitable environment for pedestrians, especially along Segment A. According to the City's Urban Forest Master Plan (2016), existing tree wells along this segment of Sepulveda do not support large canopy shade bearing trees (Culver City, 2016). Additionally, the plan named Sepulveda, south of Ballona Creek, as the City's top priority for expanding the urban forest. The plan called attention to Sepulveda's "wide (6-lane) commercial street line[d] with storefronts and expansive parking lots, with little visual buffer" where the existing trees do not match the scale of the area's hardscape (Culver City, 2016). Street-facing parking lots line Sepulveda, detering walkability (Figure 29). In Segment A, the prevalence of parking lots also makes the west side of the street much hotter to walk on compared to the east side of the street where storefronts abut the sidewalk and cast shade. The number of parking lots in the area also encourages auto

use and contributes to auto volumes. In addition, existing pedestrian access points do not adequately promote safe passageways. Lastly sidewalk conditions along the corridor vary greatly. Sidewalk lengths range from 10 feet while some are as narrow as 6 ft (Segment C). Moreover, Utility boxes and electrical poles also impede sidewalks throughout the corridor (Figure 30).

Threats: Political Feasibility, Poor Crosswalks, Traffic Demand, Existing Infrastructure

Sepulveda is a heavily trafficked street of regional importance, thus removing auto-lanes to make room for other modes will affect circulation and may be politically difficult. Street projects in this area will need to take into account various stakeholders, including businesses and nearby residents. Additionally, this segment connects to the City of Los Angeles at Centinela Avenue, which may call for inter city coordination and dialogue. In terms of safety, crosswalks in several different areas of the corridor lack the appropriate infrastructure that enables pedestrians to feel safe. For example, there are unmarked crosswalks that give priority to automobiles and put pedestrian safety at risk. In Segment B there is no direct pedestrian access from Sepulveda Boulevard to the Transit Center.

Lastly, any improvements will need to take into consideration existing infrastructure such as highways, private businesses,parking lots, and driveways.

Figure 30. Street facing parking lot
Source: Google (2019-a)

05 Towards Complete Culver City Streets: Design

In this section we recommend physical improvements for our two focus street segments: Downtown Culver City and Southwest Sepulveda. Our streets analysis shows that many areas of Culver City would benefit from Complete Street treatments, however the two selected segments are of high priority. Our recommendations serve as a roadmap of what the City could implement on similar streets and in similar areas. We framed our recommendations based on a phased approach.

Phase I includes street treatments that are generally low-cost and incur little political pushback; the City can consider implementing these in the near term.

Phase II includes more moderate street treatments that entail higher monetary and political costs.

Phase III presents the most ambitious treatments, and is inclusive of all the elements of a Complete Street.

Phases build off of each other and offer the City a menu of options regarding implementation. Detailed cost estimates are included in Appendix H.

Downtown Culver City

With potential community feedback in mind, our recommended treatments for Downtown Culver City aim to meet the needs of ensuring community buy-in and accommodating business-generated traffic and parking demands.

Goals

1. Enhance the Downtown pedestrian experience and make Downtown a pedestrian-prioritized zone.

2. Transform Downtown Culver City's streets into bike-friendly boulevards.

3. Improve transit service quality through Downtown Culver City.

Phase I

Our Phase I interventions focus primarily on improving pedestrian safety and ease of crossing streets within Downtown Culver City with low cost materials, specifically paint. None of the recommended treatments change the existing road geometry. Pedestrian safety is improved by marking all crosswalks within the study area with high visibility stripes. This improves intersection visibility for drivers and also makes it easy for pedestrians to identify where intersections and crossings are from a distance.

Scramble Crossings

We propose two scramble crossings, one near City Hall (Culver Boulevard/Lafayette Place) and the other in front of Culver Steps (Culver Boulevard/Main Street).

(Culver City City Hall,
Source: Culver City (n.d. -b)

We select these two intersections because of their relatively high foot traffic. Scramble crossings stop vehicular traffic and allow pedestrians to cross in all directions. This creates a safer, more convenient, and more aesthetic crossing experience for pedestrians.

Crosswalk Improvements

We also propose new crosswalks in three locations: Delmas Terrace/Washington Boulevard, Watseka Avenue/Washington Boulevard and Culver Boulevard/Washington Boulevard (Segment C). The Delmas Terrace/Washington Boulevard crosswalk is between two existing intersections on Washington Boulevard that are spaced nearly 600 feet apart. It thus serves as a mid-block crossing which reduces the distance pedestrians need to cover in order to reach an intersection to cross Washington Boulevard.

The additional crosswalks proposed at Watseka Avenue/Washington Boulevard and Culver Boulevard/Washington Boulevard (Segment C) reduce the number of crossings pedestrians have to make at the intersection, thereby creating a more direct path to get to the other side of the street.

Scramble crossings, high visibility crosswalks, and shortened crossing distances are the recommended Phase I interventions because they are common strategies widely deployed by other cities for improving pedestrian experience. Over 70% of crashes involve vehicles failing to yield, according to the City of Santa Monica's 2016 Pedestrian Action Plan. The statistics further show the importance of enhancing pedestrian infrastructure. Scramble crossings are a desirable option at locations of high pedestrian demand because it allows pedestrians to cross from all directions without competing with vehicular traffic (City of Santa Monica, 2016).

For comparison, the City of Santa Monica proposed a total of eleven (11) scramble crossings in Downtown Santa Monica in its five-year Pedestrian Action Plan (PAP).

The U.S. Federal Highway Administration (FHWA) has proven that high visibility crosswalks can reduce crash rates between 23% and 48% (2018). Santa Monica's PAP also included measures to reduce pedestrian crossing distances across the city. They believe that these cost-effective interventions can create a safer and more comfortable walking environment. The pedestrian-friendly environment will in turn entice people to choose walking over driving for short-distance trips (Barragan, 2016).

(Top) Figure 31. Existing conditions of segment A
(Bottom) Figure 32. Proposed Phase I treatments for segment A

Downtown Culver City Phase I Segment A

(Top) Figure 33. Existing conditions of segment C
(Bottom) Figure 34. Proposed Phase I treatments for segment C

Downtown Culver City Phase I Segment C

Phase I Intervention Cost Overview | ~$26,000 (See Appendix H for detailed Cost Estimate)		
Treatment Type	Estimated Cost	Benefits
High-visibility crosswalks on existing crosswalks	$4,900	Safety, Mobility
New crosswalks	$2,830	Safety, Mobility
Scramble crossings	$17,600	Safety, Mobility

Table 5. Downtown Culver City Phase I cost overview

Phase II

Our Phase II interventions focus on improving the travel experience for pedestrians, bus riders, and bicyclists through appropriating more space for non-automobile users. In addition to proposed changes from Phase I, the following recommendations include installing additional crosswalks, rearranging sidewalk space, and redesigning vehicle travel lanes to accommodate bus-only and bike lanes.

Signalized Crosswalks

We propose a signalized crosswalk with high-visibility striping at the Washington Blvd. /Delmas Tr. intersection to allow pedestrians to safely cross mid-block. This additional crosswalk will also help divert some pedestrians from the Washington Blvd. /Watseka Rd. /Culver Blvd. intersection, where there is a higher volume of vehicular traffic.

Sidewalk Rearrangements

To further improve the pedestrian experience, we examined the sidewalks along the corridor. We propose an expansion of the tree canopy on the southern side of Culver Boulevard, in front of Culver City Hall. Additional shade trees can integrate with the existing plaza in front of City Hall, which would enhance the overall pedestrian experience. On the northern side of Culver Boulevard, there is already an ample amount of planters and shade. The sidewalk

Figure 35. Existing conditions of segment A

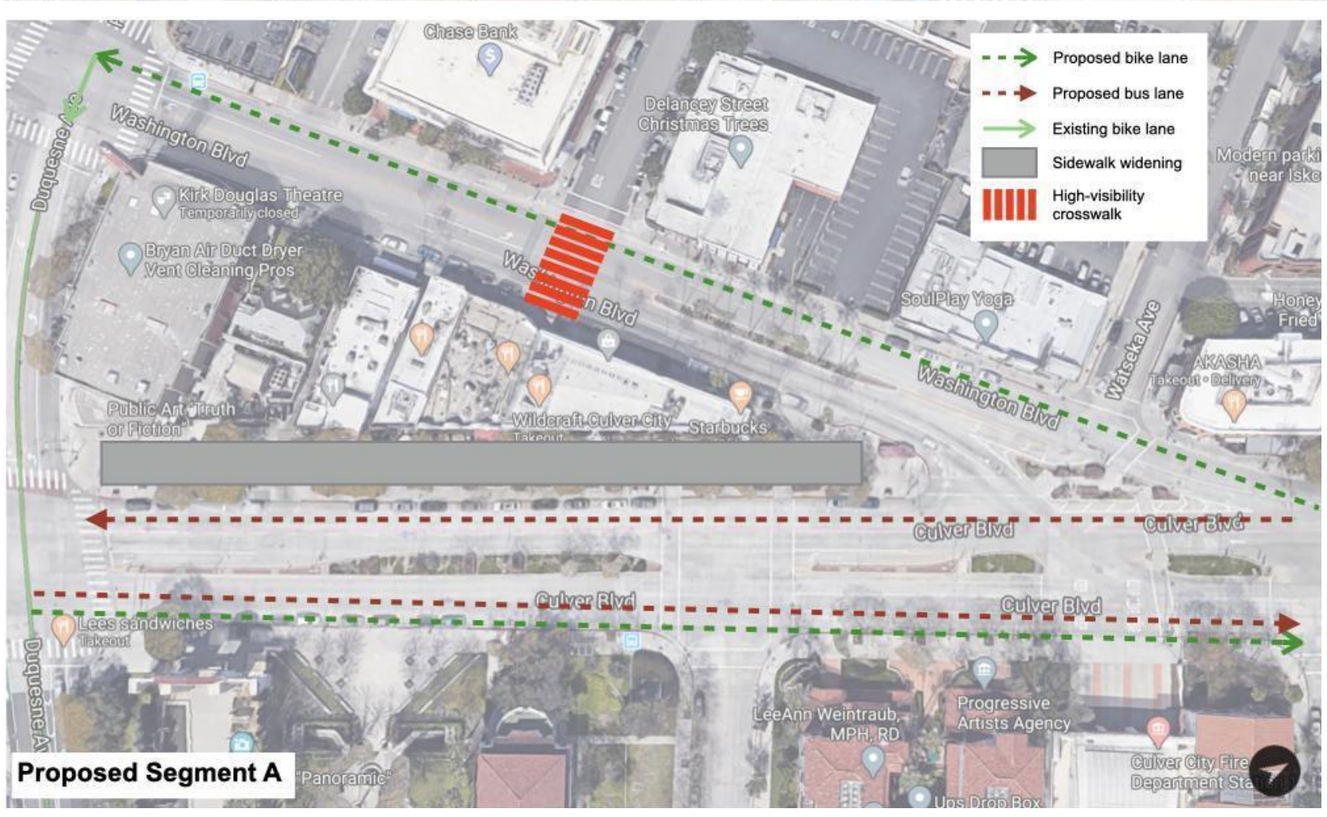


Figure 36. Proposed Phase II treatments for segment A

Downtown Culver City Phase II Segment A

however, is crowded with patio seating belonging to businesses along the northern side of Culver Boulevard. The planters occupy roughly 22 feet of the total sidewalk. To take advantage of existing vegetation, we propose that existing planters be rearranged to be closer to the curb and expand the existing six-feet pedestrian sidewalk to 12-feet wide. This rearrangement could create a more effective buffer between pedestrians and motorists as well as provide additional space on the sidewalk for pedestrians.

We recommend rearranging existing pedestrian spaces based on the City of Boston's Complete Streets Guidelines. The City of Boston's Complete Streets Guidelines align with the fundamental concepts of Complete Streets and also include an in-depth study of sidewalk arrangements. The guidelines recommend that pedestrian zones within downtown commercial areas should have a minimum width of eight (8) feet, with an ideal width up to 12-feet. Moreover, the preferred width of greenspace for these sidewalks is around 6-feet (2013). Wide downtown commercial streets have the potential to attract high pedestrian volumes. The proper integration of planters, pedestrian space, and frontrage zones provide comfort and attraction for pedestrians.

Bike Paths & Bus-only Lanes

The existing configuration of Culver Boulevard within our study area does not include a bikeway nor a bus-only lane. We propose to install a Class IV bikeway on eastbound Culver Boulevard as well as bus lanes on both northbound and southbound directions, between Duquesne Avenue and Irving Place, by removing parking lanes on Culver Boulevard in both directions. The Class IV bike lane will temporarily change to a Class II bike lane in front of the Fire Station to ensure the circulation of emergency response vehicles. The proposed bike lane provides opportunities to connect existing bikeways on Duquesne Avenue as well as the upcoming Downtown-Expo connector. The new configuration on segment A will remove a total of 26 on-street parking spaces. Our study estimates that nearby public parking lots on Watseka Avenue and the parking lot beneath City Hall would be able to accommodate additional parking demand that would directly result from on-street parking removal. The new configuration (Figure 36) indicates that the rearrangement of existing public right-of-way for vehicles can provide dedicated space for bike lanes and bus-only lanes while maintaining two vehicle travel lanes in both directions.

We propose bus-only lanes and partially protected bike lanes after examining similar practices in neighboring cities. Bus-only lanes are effective in reducing bus travel time and are a favorable strategy for increasing ridership. The City of Santa Monica piloted its first bus-only lane on Lincoln Boulevard in 2016 and has moved forward with studies of two additional peak-hour bus-only lanes in 2019. Santa Monica's Big Blue Bus has found improvements in travel time by up 25% based on the Implementation of bus-only lanes (Big Blue Bus, 2019).

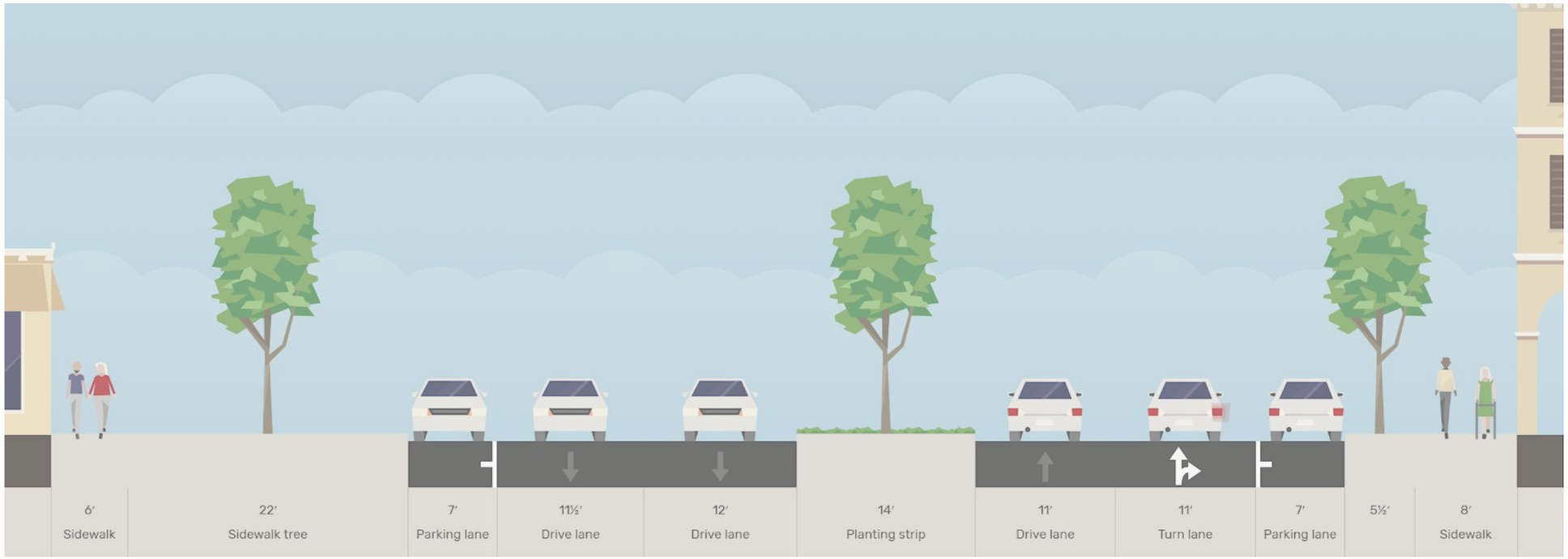


Figure 37. Existing condition Culver Blvd. & Lafayette Pl. (Segment A) Made on Streetmix.net

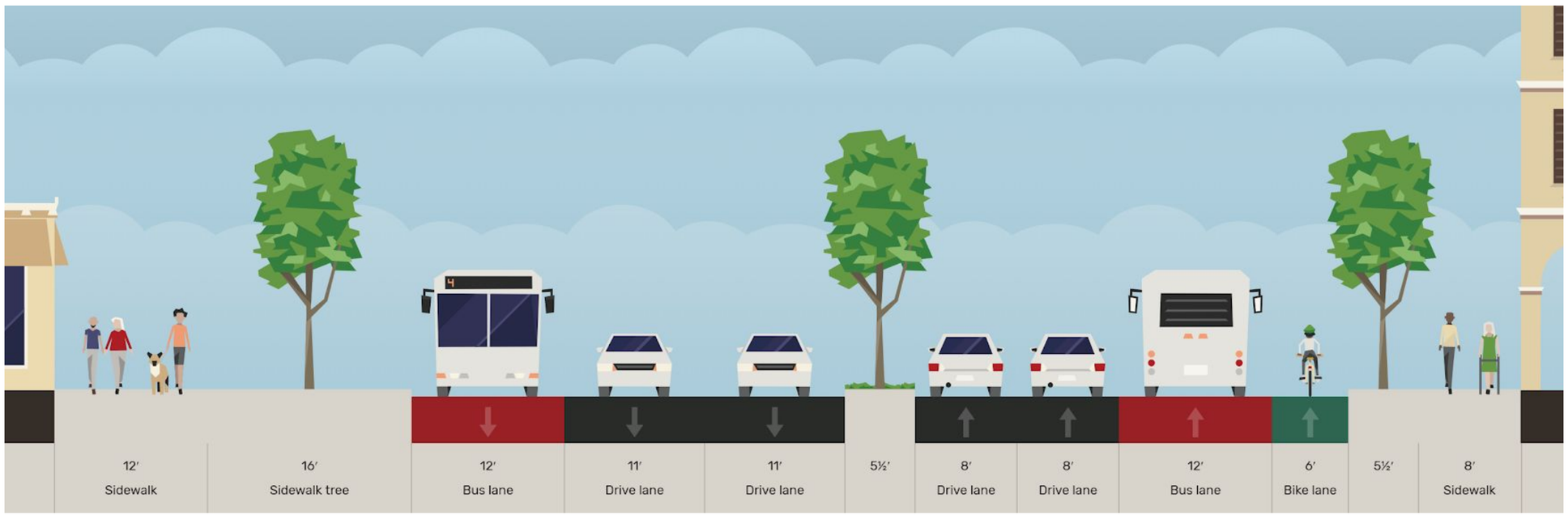


Figure 38. Proposed phase II treatments for segment A Made on Streetmix.net

Downtown Culver City Phase II Cross-Section

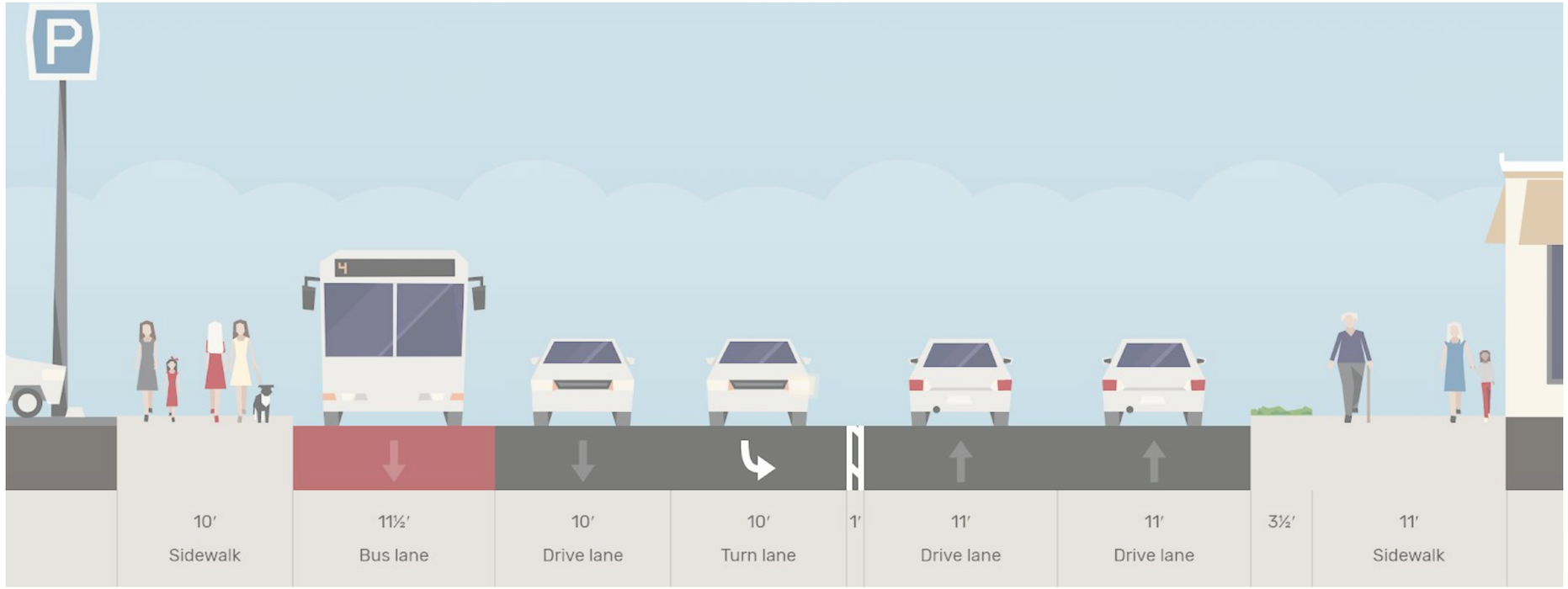


Figure 39. Existing condition of Washington Blvd. & Duquesne Ave. (Segment A) Made on Streetmix.net.

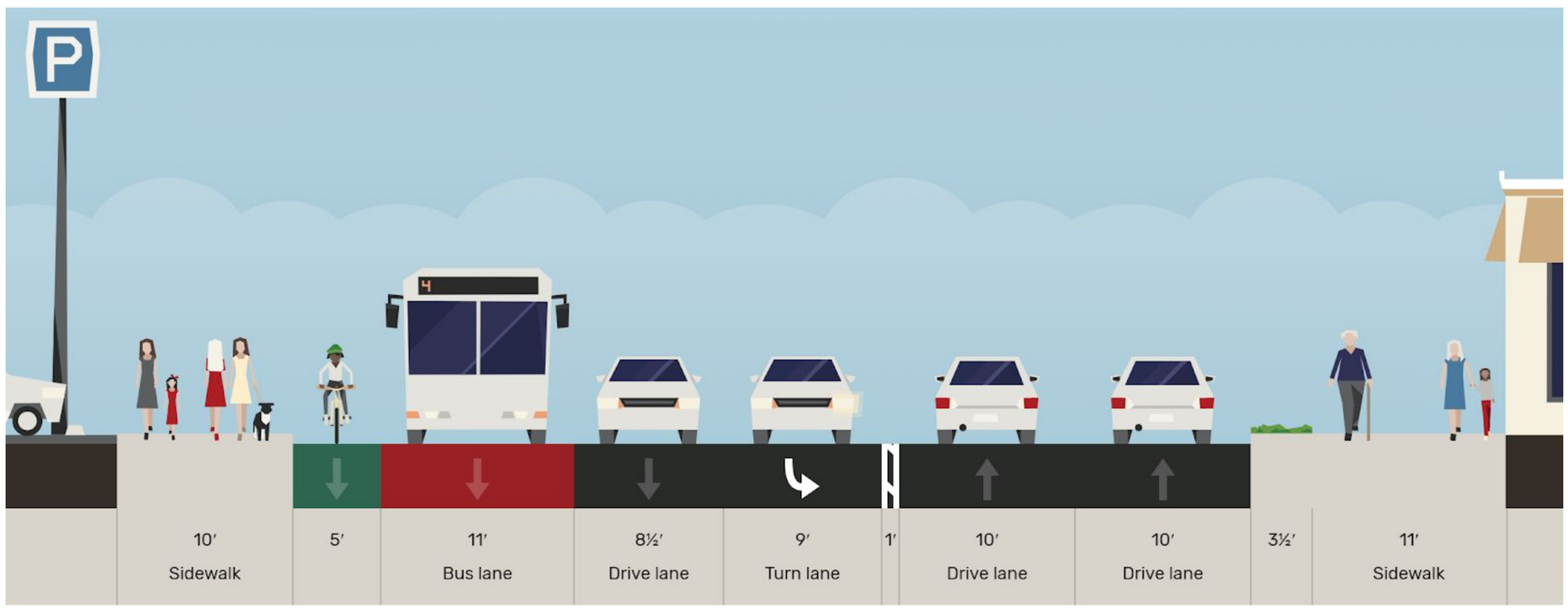


Figure 40. Proposed Condition Washington Blvd. & Duquesne Ave. (Segment A Made on Streetmix.net.

Downtown Culver City Phase II Cross-Section

The agency has also looked into alternative bus-only lane options such as peak-hour only and bus-bike shared bus lanes. The different options provide opportunities to maximize the benefits of bus lanes while also accommodating other travel modes.

To assess our proposed bike lanes, we considered the Venice Boulevard Great Streets Project in anticipation of similar constraints and potential community feedback. The new configuration on Venice consists of a series of changes with objectives to make the street safer for non-vehicle users and transform the freeway-like Venice Blvd. into a lively heart of Mar Vista. The complete package of the pilot program included new pedestrian crosswalks with signals and a 0.8-mile protected and buffered bike lane.

The reconfiguration incited negative community feedback with concerns about extended travel time and increased traffic congestion. In the post-completion evaluations, LADOT discovered that with proper adjustments to traffic lights, the impacts on commute time and travel speed are minimal. Moreover, the evaluations also indicate that the reconfiguration project has been effective in reducing crash rates and improving safety for pedestrians and cyclists alike. The Venice Boulevard Project lends insight into people's concerns regarding removing auto lanes. They believe this will negatively affect their drive time. Our recommendation incorporated such concerns and opted to maintain the existing number of driving lanes and focus on reassigning the lane widths. The NACTO Urban Street Design Guide suggested avoiding auto lanes of 11-feet or wider because the wide

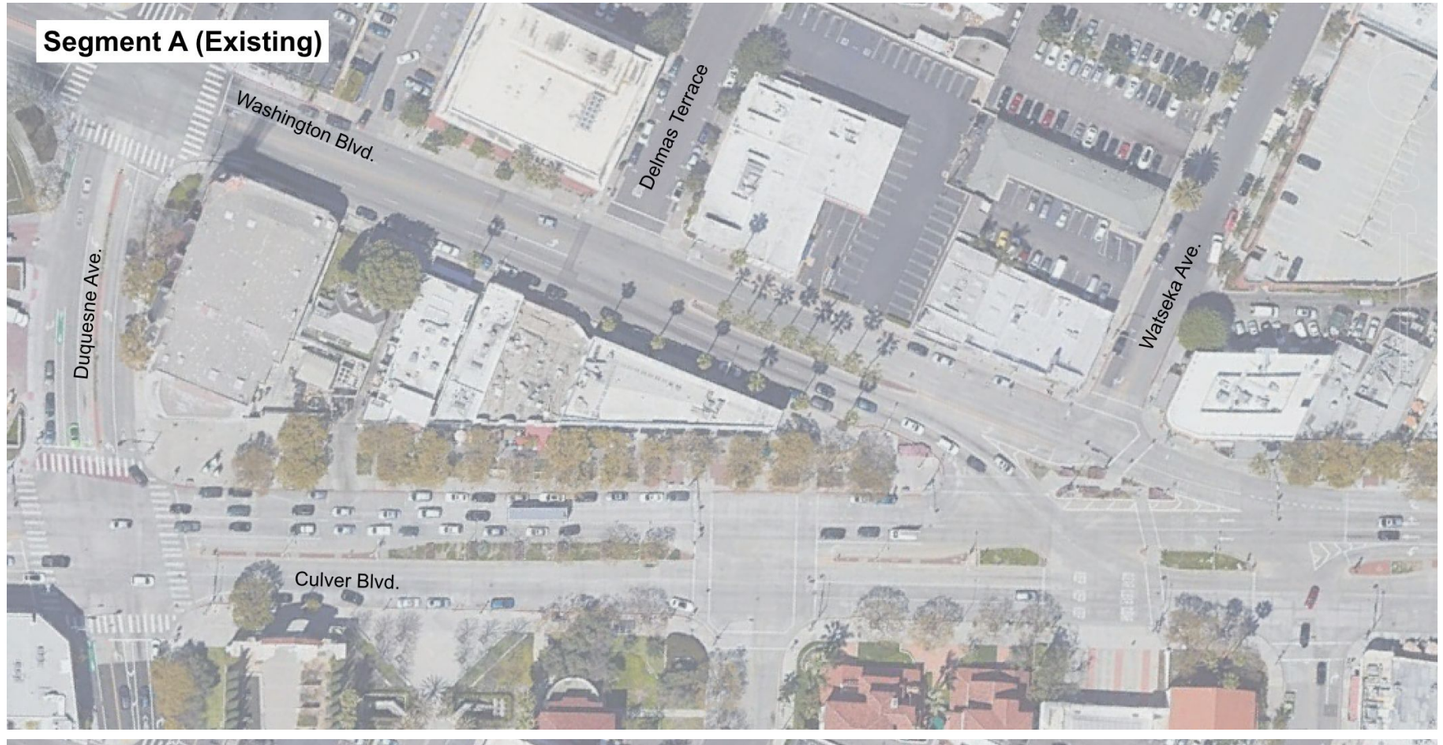
Phase II Intervention Cost Overview | ~$350,000 (See Appendix H for detailed Cost Estimate)		
Treatment Type	Estimated Cost	Benefits
Stree reconfiguration (medium, painting)	$260,300	Safety, Mobility
Bus-only lanes	$28,200	Safety, Mobility
Bike lanes	$10,200	Safety, Mobility
Sidewalk rearrangement	$45,000	Placemaking, Accessibility

Table 6. Downtown Culver City Phase II cost overview

Roads encourage speeding and compromises the space of other travel modes (2013). As such, our recommendation can achieve the goals of traffic calming and expanding space for traditionally underserved travel modes.

Phase III

Our Phase III intervention converts the eastbound vehicular lanes on Washington Boulevard, the westbound vehicular lanes on Culver Boulevard and the pedestrian island on Watseka Avenue/Washington Boulevard into a fully pedestrianized linear pocket park (Figure 42). Vehicular lanes are removed while ensuring that eastbound and westbound circulation are maintained. The proposed configuration also ensures that emergency vehicle access is not blocked from Fire Station No. 1 and that emergency vehicles can get onto the westbound direction of Washington Boulevard via a U-turn at the tip of the pedestrianized plaza. The current configuration of the plot of land bounded by Duquesne Avenue,



(Top) Figure 41. Existing conditions of segment A
(Bottom) Figure 42. Proposed Phase III treatments for segment A

Washington Boulevard and Culver Boulevard creates a confusing and inconvenient intersection for all modes of transportation at the Watseka Avenue/Washington Boulevard/Culver Boulevard intersection. The conversion of vehicular lanes into a pedestrianized plaza removes this intersection and promotes a safer pedestrian experience.

We propose using the converted lanes as a linear pocket park. There is currently one park in downtown Culver City – Media Park – east of our study area. Media Park is occasionally used for events, but is otherwise a shady green space with few amenities. In contrast, we envision the linear pocket park to be a beautifully landscaped park with shady trees, shrubbery, public art and plenty of outdoor public seating. The linear pocket park will provide a place of respite in the heart of the City while providing more informal, public seating capacity for food and beverage establishments in the vicinity. The linear pocket park will also serve as a visual connection to the public plaza in front of City Hall, integrating the civic center with the commercial uses of downtown. A crosswalk at the tip of the pocket park should also be installed to allow pedestrians to cross over to the pedestrianized plaza on the southeast corner of Culver Boulevard and Irving Place. Figure 43 is a rendering of this linear park. While our Phase III intervention proposes the permanent construction of this linear pocket park, the City may test this street closure out on a more temporary basis, such as on weekends, as part of its Phase I or Phase II interventions. Temporary road closure signages may be installed at the boundaries of the proposed linear pocket park. The City Planning Department should engage with community members regarding programming and public input on how they hope for the space to be used when permanent. Some potential ideas for activities during a temporary street closure include a farmer's market, food truck nights, and CicLAvia events.

Compared to Phase I and II interventions, the Phase III street closures require long-term planning and community buy-ins. Many cities have been piloting street closure programs to reclaim more road space for non-vehicle users. In 2012, LADOT Worked in collaboration with the Mayor's office and multiple city departments and converted one block on Griffith Boulevard and Sunset Boulevard to the Sunset Triangle Plaza (RCH Studios, n.d.). The Sunset Triangle Plaza transformed from a vehicle-oriented drive lane into a vibrant plaza dedicated for pedestrians and bicyclists. The City planning staff identified the selected space as an underutilized public right-of-way and the conversion is highly beneficial for enhancing community space.

"Complete Streets are for everyone. They are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities."

The conversion primarily relied on paint and planters, which demonstrated the possibility of time and resource-effective changes. The plan also enhanced the converted space with necessary amenities such as benches and vegetation medians, which are designed for community gathering and physical activities. Sunset Triangle Plaza now provides additional space for outdoor activities and existing twice-weekly farmers market.

Other than permanent closures, soft or temporary closures are becoming more familiar to the public. In the midst of the COVID-19 pandemic, cities such as Los Angeles and Oakland are rolling out Slow Streets Initiatives. The Slow Streets Initiative emerged from the issue highlighted by the pandemic that cities lack public space for physical activities and do not have sufficient sidewalk

Figure 43. Sketch of linear pocket park

space. Such programs discourage drivers to use certain streets via temporary signage and visual cues suggesting that these streets are closed to local traffic. Despite these programs being temporary in response to the unprecedented times, they intend to provide safe road spaces for pedestrians and cyclists. The Mayor of Los Angeles has also expressed an inclination to keep some of the implemented measures beyond the current stage as cities work on reclaiming more spaces for non-vehicle road users (Fonseca, 2020).

"Multi-modalism is a salient value in transportation planning because it promotes modes of transportation that are often used by the less privileged."

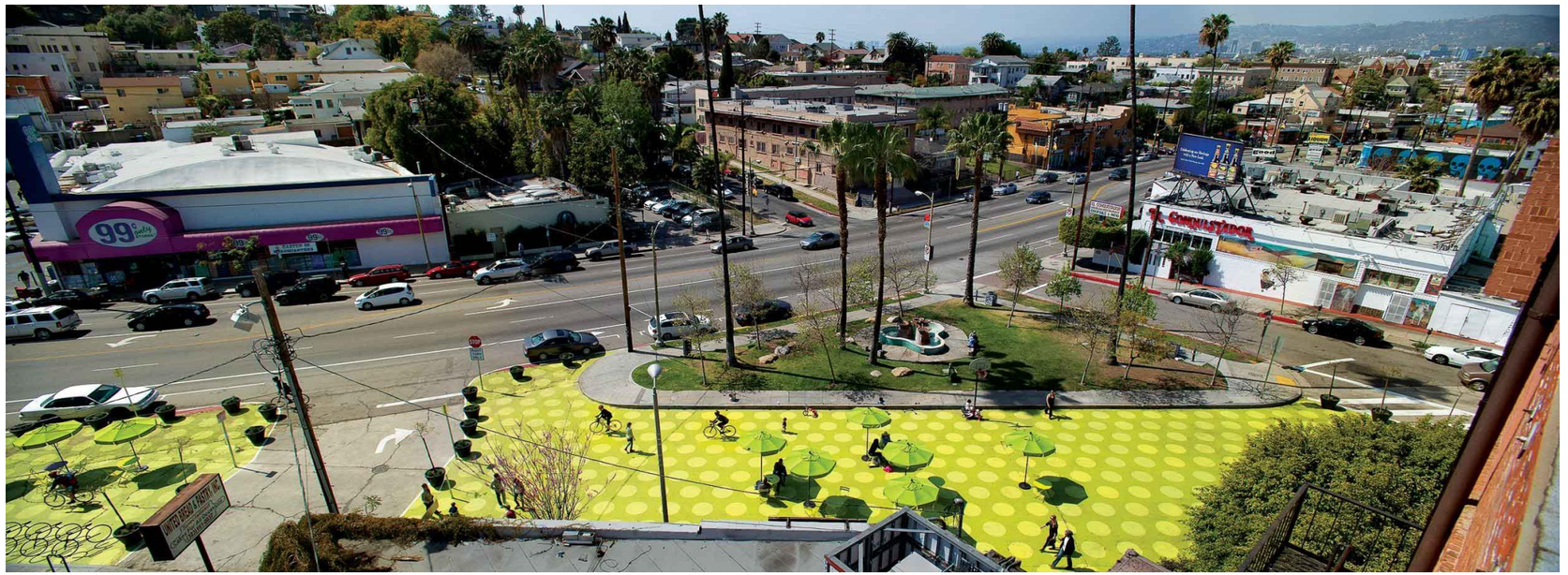


Figure 44. Sunset Triangle Plaza in SilverLake, Los Angeles
Source: Clementi Hale Studios (n.d.)

Phase III Intervention Cost Overview | ~$17 Million (See Appendix H for detailed Cost Estimate)		
Treatment Type	Estimated Cost	Benefits
Pedestrian Plaza	~$17 Million	Placemaking, Community, Sustainability, Safety

Table 7. Downtown Culver City Phase III cost overview

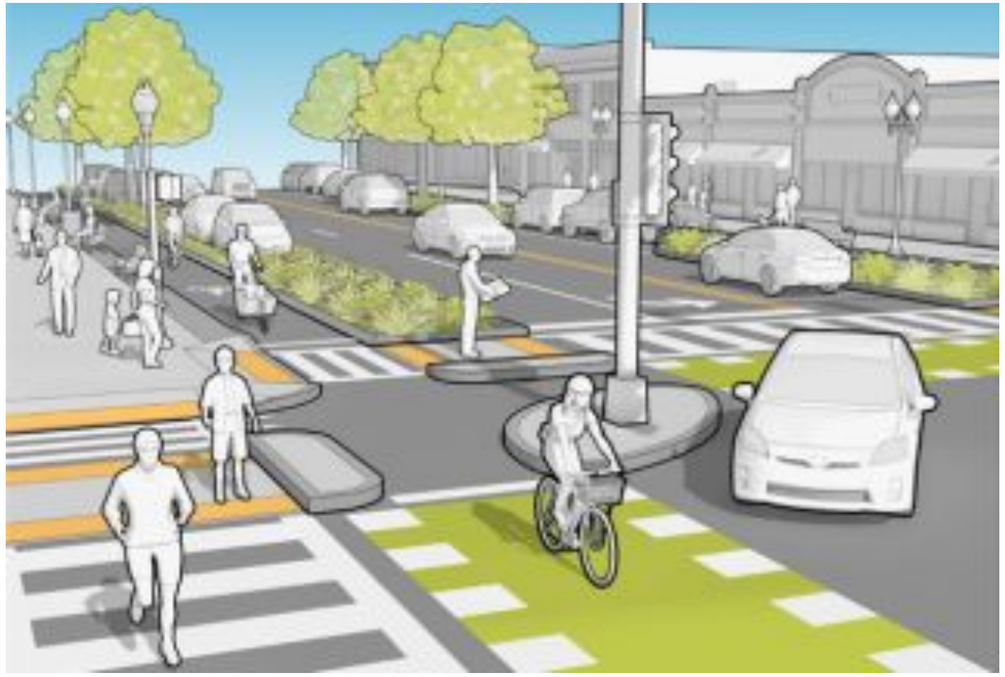
Southwest Sepulveda

Goals

1. Improve walkability throughout the corridor
2. Enhance pedestrian and bicycle connections to transit
3. Enhance the City's urban forest
4. Re-imagine public spaces to serve pedestrians and bicyclists

Phase I

For the first phase of treatments on this corridor, we limited our improvements to paint-only, low-cost options. All treatments aim to improve pedestrian and bicycle mobility along this segment. In addition to low monetary cost, recommendations under this phase are intended to be low risk politically and demand less of infrastructure. Culver City should consider these options in the short term, while looking to add on treatments from Phase II and III for a comprehensive Complete Streets program. Typical treatments in this phase across all segments include painted and high visibility crosswalks, public art programs (Figure 45), as well as a low cost protected bike lane option for the City's proposed Class IV bike lane along this corridor.



(Complete Streets Elements Rendering),
Source: Massachusetts Department of Transportation (2015)

Figure 45. Underpass mural, Sacramento, CA
Source: Sactown Magazine (2016)

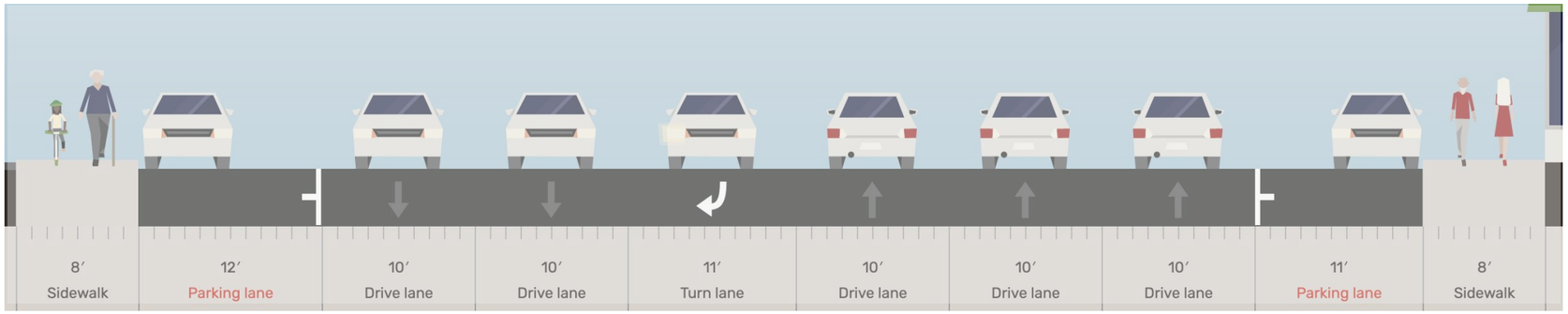


Figure 46. Segment A, existing street cross-section. Made on Streetmix.net.

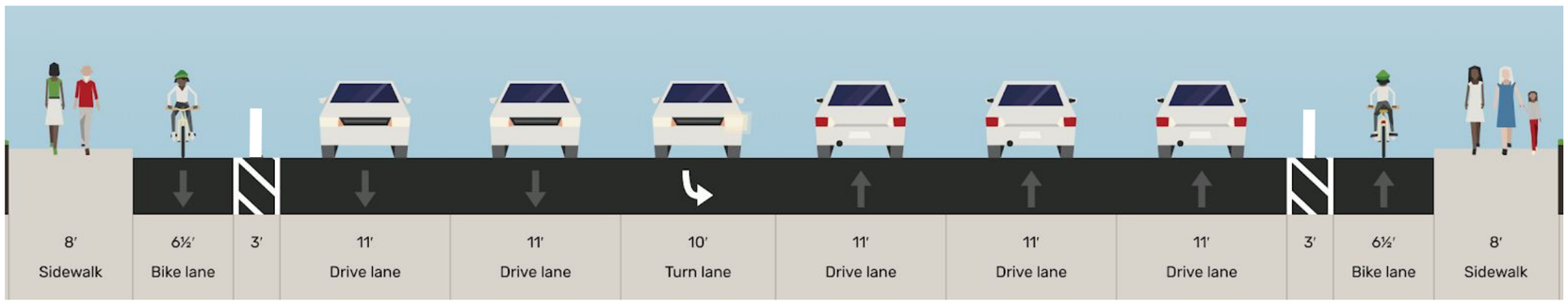


Figure 47. Segment A, Phase I street reconfiguration cross-section. Made on Streetmix.net

Southwest Sepulveda Phase I Segment A

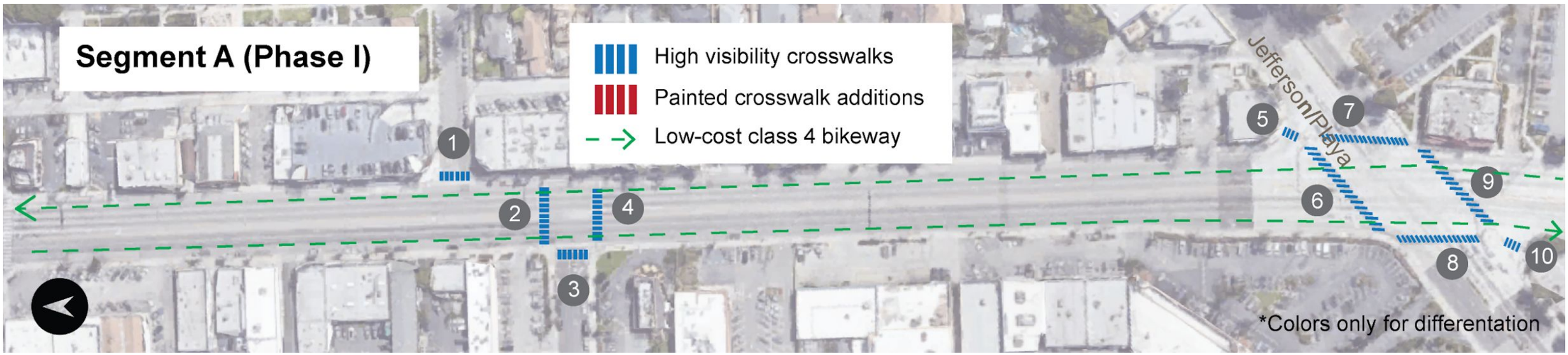


Figure 48. Segment A, Phase I recommendations

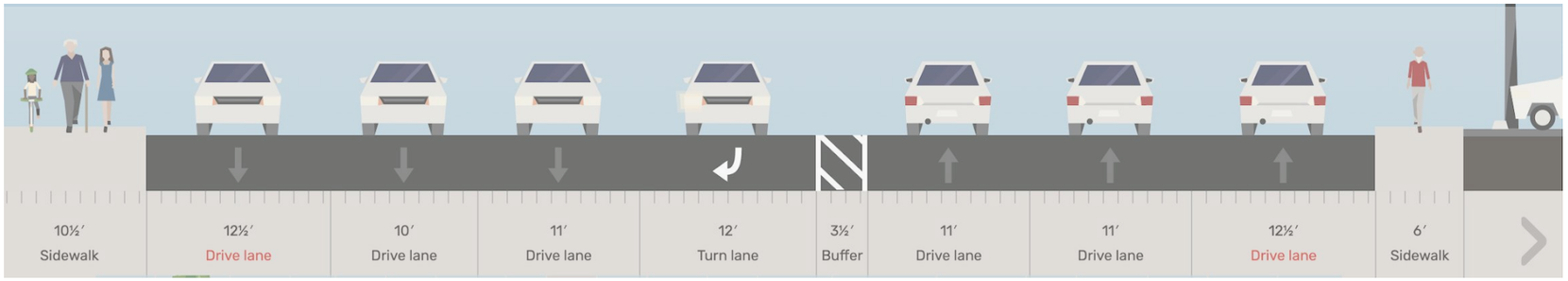


Figure 49. Segment B, existing street cross-section Made on Streetmix.net

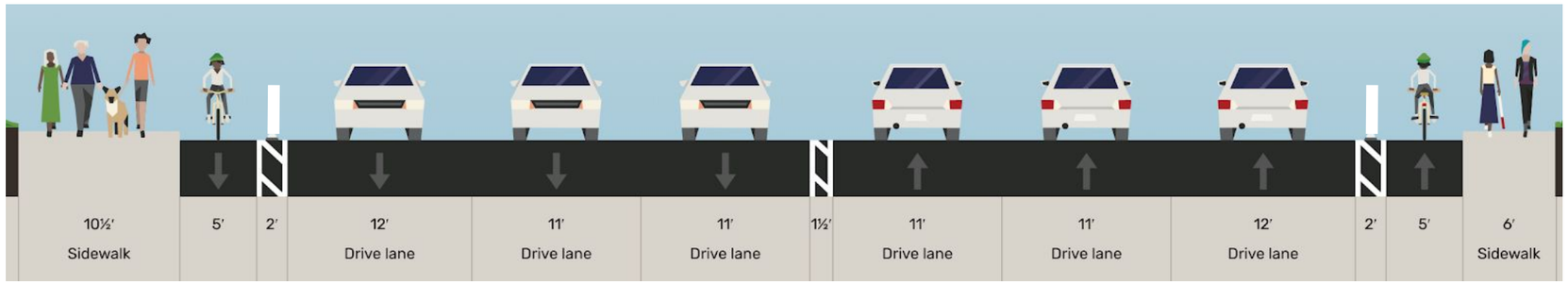


Figure 50. Segment B, Phase I street reconfiguration cross-section Made on Streetmix.net

Southwest Sepulveda Phase I Segment B

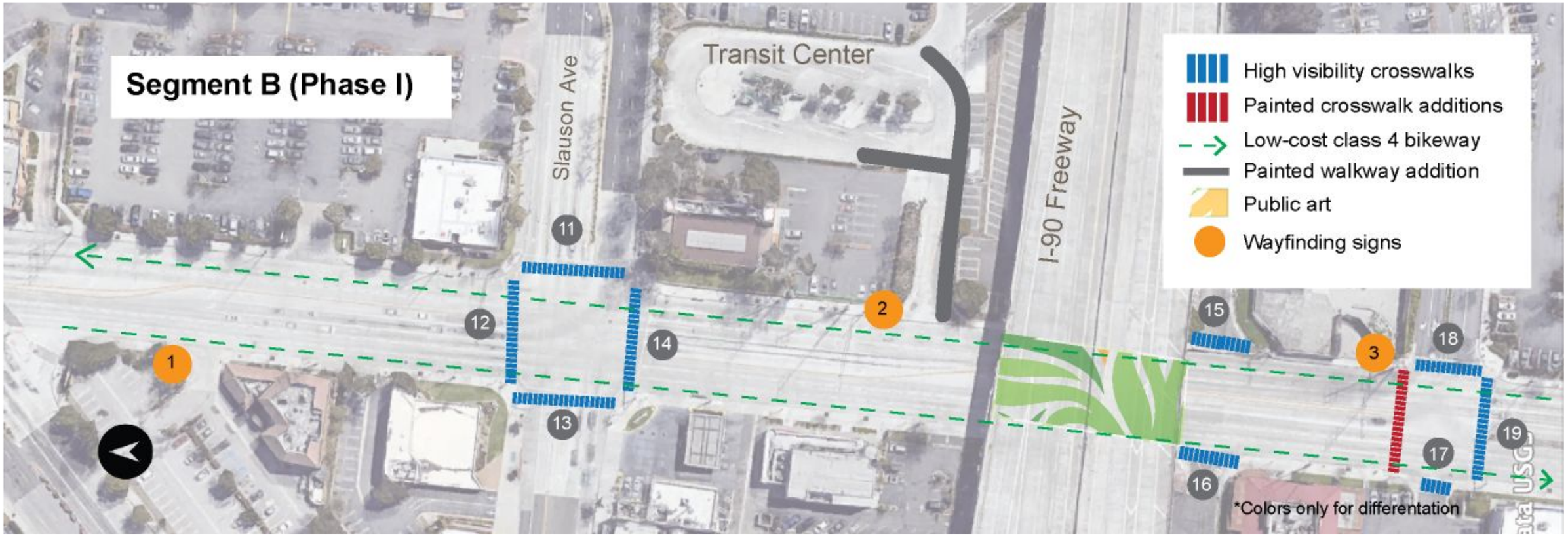


Figure 51. Segment B, Phase I recommendations

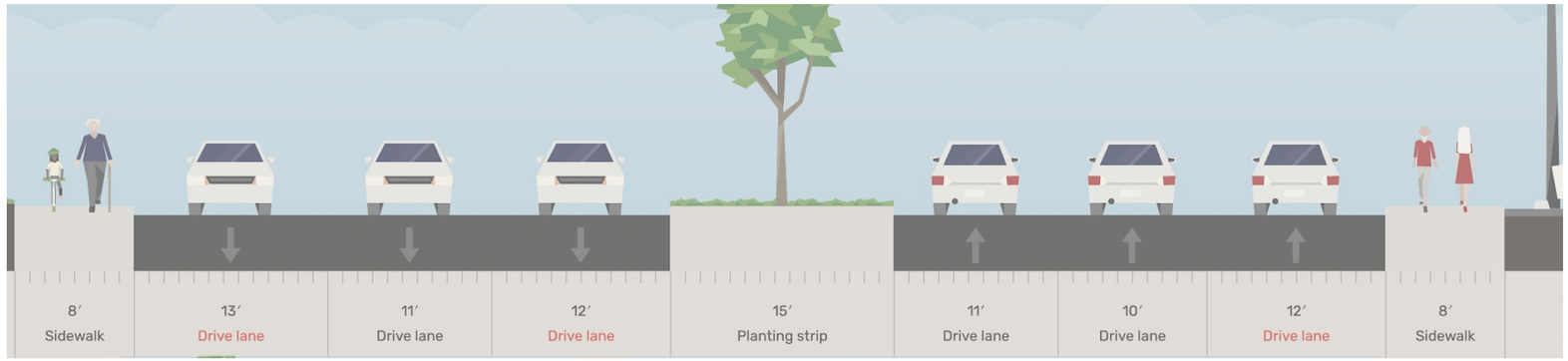


Figure 52. Segment C, existing street cross-section Made on Streetmix.net

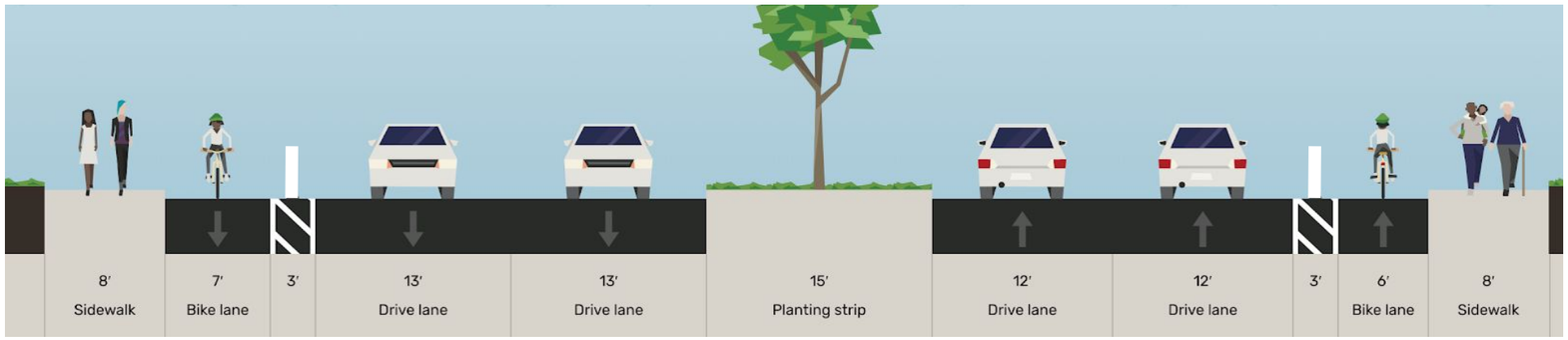


Figure 53. Segment C, Phase I street reconfiguration cross-section Made on Streetmix.net

Figure 54. Segment C, Phase I recommendations

Southwest Sepulveda Phase I Segment C

Class IV Bikeway

Throughout the corridor this treatment implements the City's planned class IV bikeway with low cost materials including a painted striped buffer and plastic bollards (Figure 55). To allow for the protected bike lane, we propose removing parking from both sides of Segment A (Figure 47), removing a lane of southbound traffic and reallocating lane space in Segment B (Figure 50), and taking away a lane of traffic on either side of the median in Segment C (Figure 53). There are many parking lot driveways in Segment A that necessitate the bikeway to be unprotected to allow for auto-access. In these areas we recommend the bikeway be striped with dashed lines to alert both bike riders and drivers that the section is shared and that they should maneuver with caution. These stripings have the added benefit of helping to protect pedestrians crossing the sidewalk in front of these driveways. Average daily traffic (ADT) levels in this study area are low enough (10,452 - 13,473 vehicles per day) that reallocating lane space to make room for bike lanes should reduce collisions without impacting circulation. In 2008, Santa Monica implemented a similar treatment on Ocean Park Boulevard. The City changed the street configuration from two lanes in each direction with parking on either side, to one lane in each direction with a turn lane in the middle and bike lanes on either side of the street. These changes resulted in a 65% decrease in collisions along the corridor. The ADT on Ocean Park Boulevard was on the higher-end of the ADT for a recommended road diet candidate — 23,000 (Federal Highways Administration. n.d.). In contrast, this segment of Sepulveda is well below the standard threshold of 20,000 ADT. Thus, we believe that the recommended treatment is not only feasible, but will also produce similar trends in collision reduction in an area where collisions are high for the city.

Figure 55. Class IV plastic bollard protected bike lane
Source: ChicagoCompleteStreets.org (n.d.)

High Visibility Crosswalks

This intervention also enhances all the existing crosswalks in the corridor with high-visibility striping and adds marked crosswalks where existing legs are unmarked. The Federal Highway Administration found that drivers can see high-visibility crosswalks (Figure 56) from twice as far away, giving them more time to stop (High-Visibility Crosswalks | AmericaWalks, n.d.). Segment A treatments include high-visibility crosswalk striping on all three legs of Berryman Avenue, across Vera Way, and enhanced brick crosswalk treatments at the Sepulveda/Jefferson/Playa intersection to help improve low-light visibility. In Segment B, we propose to add high visibility treatments to the all-way crosswalk at the Slauson/Sepulveda intersection, the crosswalk across the I-90 on-ramp, and at the Westfield Drive which also adds an additional crosswalk to the north legs of this intersection. In Segment C high-visibility crosswalks will aid

Figure 56. HIgh visibility crosswalk, San Francisco
Source: San Francisco Metropolitan Transportation Authority (n.d.)

pedestrian mobility at Bankfield Avenue, at Green Valley Center Drive, and fills in a pedestrian gap across the 405-exit ramp. The crosswalks we propose at signalized intersections will also include pedestrian walk signs. In terms of safety, estimates show that high visibility enhancements can reduce collisions by 23-48% (Federal Highway Administration, 2018). This reduction is crucial for this area where our recommendations hope to increase pedestrian activity, while balancing auto needs.

Painted Walkways/Crosswalks

To help boost access to the Culver City Transit Center, we propose a painted walkway that connects Sepulveda Boulevard to the Transit Center. Currently, pedestrians on Sepulveda Boulevard are only able to access the Center via a driveway which creates an inhospitable walking environment. Studies show that delineating and separating walkways from the roadway area helps prevent up to 88% of "walking along roadway" collisions (Federal Highway Administration, 2013a). Painted crosswalks are added in Segment B at Westfield Drive, as well as in Segment C at a crosswalk juncture near the I-405 Freeway as a low cost safety improving measure.

Wayfinding

We propose installing wayfinding signs in Segment B that signal where to find the Transit Center. These signs are a low-cost way to create a sense of place and indicate that transit is a priority on the corridor (Alta Planning + Design, 2019). Signs can range from low cost painted (Figure 57) or plastic markers, to more durable metal signage.

Public Art

We also suggest the incorporation of art along the corridor. The City could include utility box murals as part of its Art Ordinance, and allow for local artists to liven up the walking space by painting these boxes. Additionally, we recommend that the areas under the highway at the I-90 and I-405 underpasses, be enhanced in order to

Figure 57. Painted wayfinding, Newport Beach, CA
Source: Christopher Lord Designs (n.d.)

provide improved passageways for pedestrians. Specifically, we recommend murals for the underpass area. The City would need to coordinate with Caltrans as part of the agency's Transportation Art Program. Public art programs, such as underpass murals, help to mitigate some of the harm (noise, neighborhood disruption) often caused by highways with aesthetic improvements (Hadden Loh & Livi Smith, 2012).

Phase I Cost Projections

Preliminary cost projections are included in Table 8, (detailed costs in Appendix H). We calculated the estimated costs based on statewide averages where available. If no statewide average was available, the calculated averages were based on national examples.

Phase I Intervention Cost Overview | ~$383,600 (See Appendix H for detailed Cost Estimate)		
Treatment Type	Estimated Cost	Benefits
Class IV protected bike lane	$100,000 - $400,000 Average: $250,000	Safety, Mobility
Public art	$81,500	Placemaking, Community
High-visibility crosswalks	$31,236	Safety, Mobility
New crosswalks	$3,610	Safety, Mobility
Painted walkway to transit center	$2,340	Safety, Mobility, Wayfinding
Pedestrian Signals	$5,920	Safety, Mobility
Wayfinding	$9,000	Safety, Mobility, Wayfinding

Table 8. Phase I cost overview

Phase II

For the second phase of treatments on this corridor we suggest higher cost interventions with an added level of permanence. This phase requires slightly higher monetary as well as political investments. Interventions under this phase include a strengthened bike lane along the corridor, the temporary closure of a slip lane, bike boxes, and pedestrian islands (Figure 58) at the Sepulveda/Jefferson/ Playa intersection, as well as a shared-use agreement for temporary use of land at the Westfield Culver City Mall. Options under this phase begin to change the character of the corridor and set the stage for larger interventions under the following phase. The slip lane closure as well as the shared-use agreement for example, are pilots in this phase with the intention that results will favor a more permanent solution in Phase III.

Figure 58. Pedestrian island
Source: NACTO (n.d.-b)

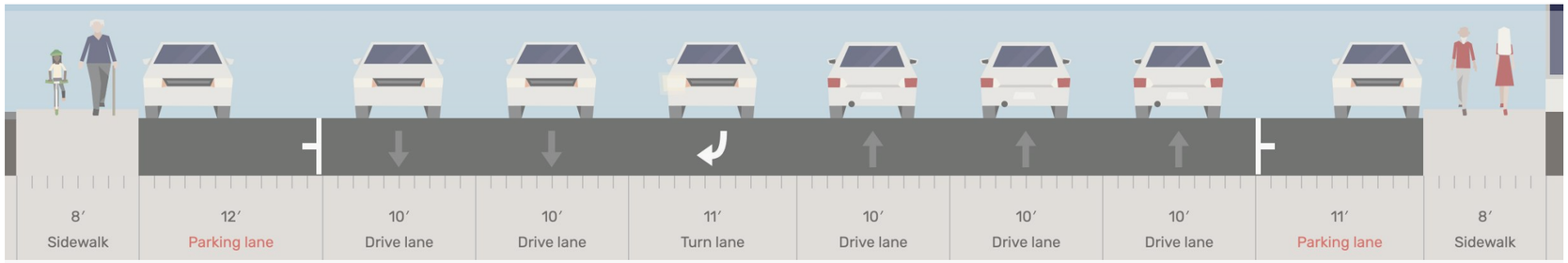


Figure 59. Segment A, existing cross-section Made on Streetmix.net

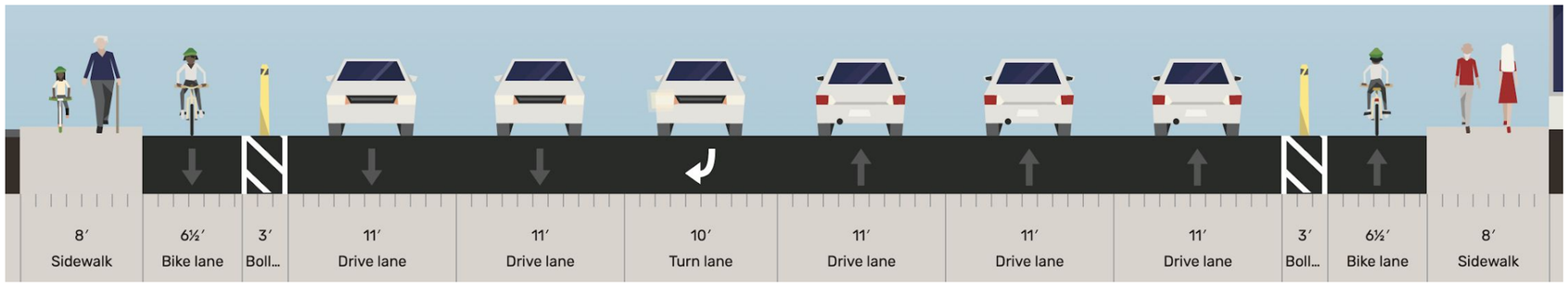


Figure 60. Segment A, Phase II street reconfiguration cross-section. Made on Streetmix.net

Southwest Sepulveda Phase II Segment A

Figure 61. Segment A, Phase II recommendations

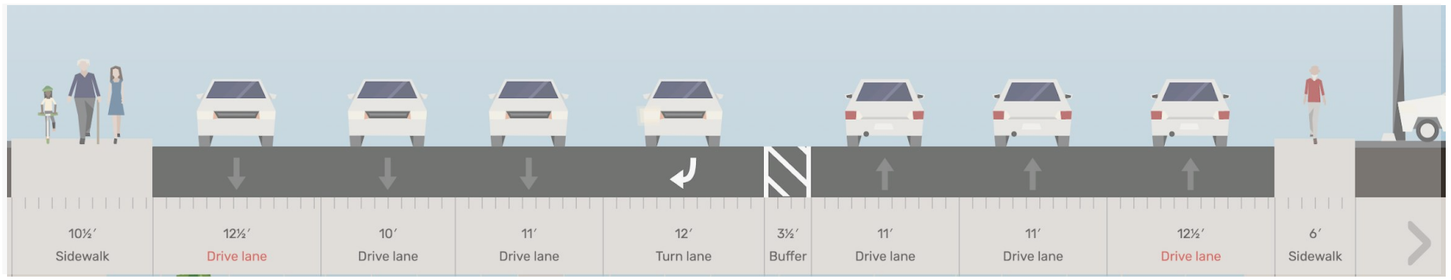


Figure 62. Segment B, existing street cross-section. Made on Streetmix.net

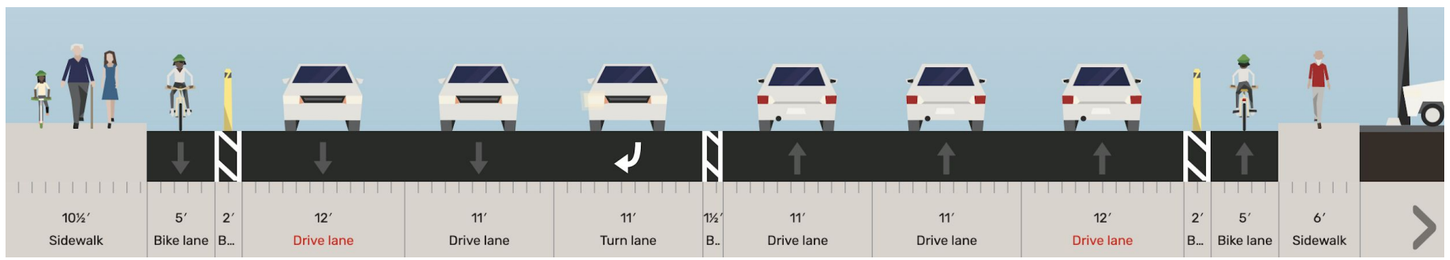


Figure 63. Segment B, Phase II street reconfiguration cross-section.
Made on Streetmix.net

Southwest Sepulveda Phase II Segment B

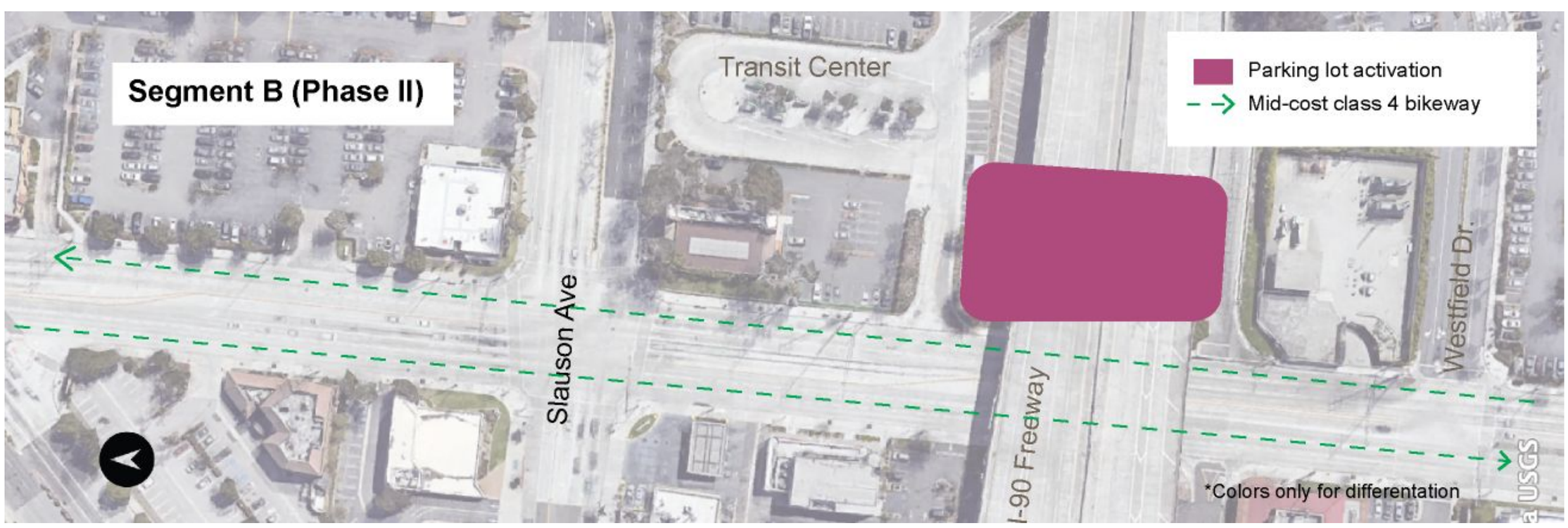


Figure 64. Segment B, Phase II recommendations

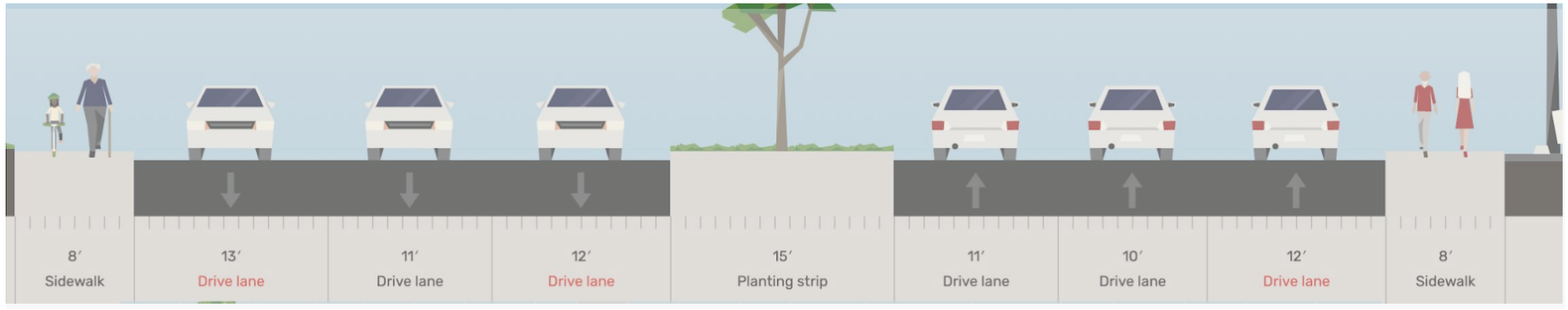


Figure 65. Segment C, existing street cross-section. Made on Streetmix.net

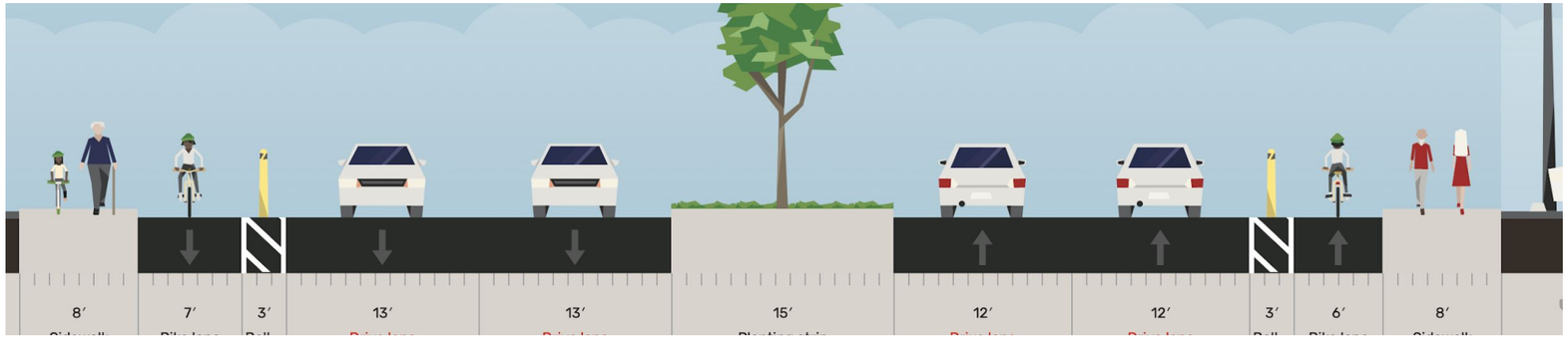


Figure 66. Segment C, Phase II street reconfiguration cross-section. Made on Streetmix.net

Southwest Sepulveda Phase II Segment C

Figure 67. Segment C, Phase II recommendations

Class IV Bikeway

In this treatment, the bikeways are upgraded with more permanent vertical separation from the roadway using bollards made with more durable material (Figure 68) as opposed to the plastic bollards, recommended in Phase I. The road configuration stays the same as the previous phase, and the only difference lies in the bollard material. Again, ADT levels are low enough that we are confident that the reallocation of the public right-of-way in this manner will not negatively impact traffic flow.

Making space for protected bicycle lanes in our study area aligns with Culver City's Bicycle and Pedestrian Master Plan, but it's also a proven way to increase bicycling and decrease collisions. In 2011, Long Beach installed protected bicycle lanes on a 1.2 miles on-street segment in their Downtown area. They saw a 33% increase in bike riders, 13% increase in pedestrian traffic, a 80% decrease in car-bike collisions, and 50% decrease in car-car collisions (*SCAG,* n.d.).

Figure 68. Class IV two-way bollard protected bike lanes
Source: City of Escondido, CA (2018)

Bike Boxes

In Segment A, we propose the addition of bicycle turn boxes to aid in turning movements off of our protected bike lanes and connect the planned bikeway network. A bike box designates the area near the crosswalk at the top of a traffic lane for bicyclists to safely wait for traffic signals, as well as safely turn (National Association of Transportation Officials, n.d.). Bike boxes provide a variety of benefits for bicyclists and pedestrians such as increasing visibility of cyclists, preventing "right hook" conflicts with turning vehicles, as well as reducing vehicle encroachment into the crosswalk (Figure 69) (National Association of Transportation Officials, n.d.). In one study, bike boxes reduced vehicle encroachment by 88% compared to other intersections with no boxes (National Association of Transportation
Officials, n.d.).

Slip Lane Temporary Closure

In Segment A, we recommend a demonstration to temporarily close the underutilized slip lane on the Southwest corridor of the Sepulveda/Jefferson/Playa intersection. This treatment will use low cost, temporary materials including paint and bollards, to test if a permanent closure to reduce pedestrian exposure to right-turning vehicles makes sense.

Cities across the country are converting underutilized and dangerous slip lanes into low-cost pedestrian areas, and even bicycle-only turn lanes ("Cities Are Replacing Dangerous Slip Lanes With Space for People," 2018). In 2019, the City of West Hollywood created temporary pedestrian improvements along Sunset Boulevard with paint and bollards to test what worked (Figure 70). After six months, they evaluated what they wanted to make permanent — providing an inexpensive way to make the improvements they deemed most effective ("West Hollywood Brings Walking Improvements to the Sunset Strip," 2018). A similar closure in the City of Darebin in Melbourne Australia, resulted in a 32 and 35 percent increase in AM cyclists and pedestrians

Figure 69. Bike Box Rendering
Source: NACTO (n.d.-c)

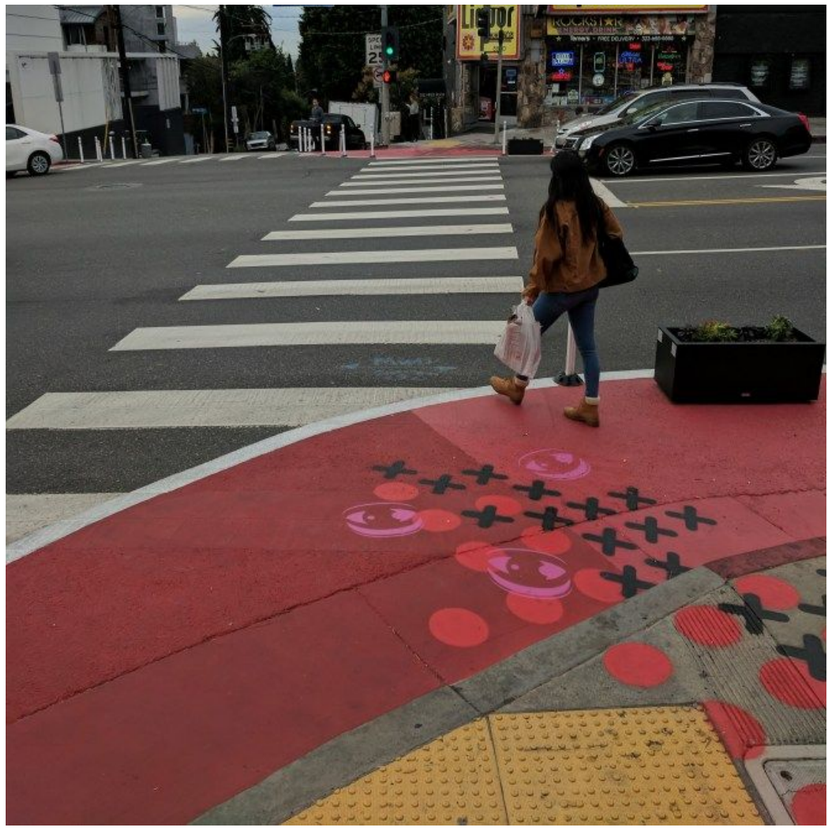


Figure 70. Slip Lane Closure, West Hollywood
Source: Scott Epstein (2018)

(respectively) at the intersection in question (City of Darebin, n.d.).

Pedestrian Island

We also recommend a pedestrian island on the south and north legs of the Sepulveda/Jefferson/Playa intersection crossing to help make the distance more manageable for slower walkers. Pedestrian refuge measures at marked crosswalks, such as these islands, have demonstrated a 46% reduction in pedestrian collisions (Federal Highway Administration, 2013b).

Parking Lot Activation

We propose enhanced public space opportunities on the corridor by activating the parking lot in Segment B, on the east side of Sepulveda below the I-90 Freeway. The parking lot is under Westfield ownership, thus the City would need to enter into a shared-use agreement. Most of the land occupied by Westfield Culver City is dedicated to parking lots, so we believe that it is feasible for the City to

Figure 71. Underpass activation, Sacramento, CA
Source: Sactown Magazine (2016)

temporarily occupy the approximately 900 square feet of space in our recommendation for events (Figure 71).

The City could host community events, such as a farmer's markets, though we recommend the specific types of events come from community feedback. We did not include the parking lot on the west side of the street since it is owned by a smaller business and it is its only dedicated lot.

Phase II Cost Projections

Preliminary cost projections are included in Table 9 , (detailed costs in Appendix H). Costs were estimated based on statewide averages where available. If no statewide average was available, averages were calculated based on national examples.

Phase II Intervention Cost Overview | ~$432,500 (See Appendix H for detailed Cost Estimate)		
Treatment Type	Cost	Benefits
Class IV protected bike lane -Green paint -Permanent Bollards	$400,000	Safety, Mobility, Sustainability
Temporary slip lane closure	$13,000	Safety, Community
Pedestrian island	$13,520	Safety, Mobility
Bike boxes for turning bikes	$6,000	Safety, Mobility

Table 9: Phase II cost overview

Phase III

The final phase of recommended treatments for this study area truly transforms Sepulveda into a multimodal corridor giving transit, pedestrian, and bicycle infrastructure equal priority with auto traffic (Figure 72). These interventions require large investments and requires the City to consider the needs of various stakeholders involved in such a reimagination of the corridor. This phase features bus only lanes, planter protected bike lanes, as well as tree enhancements and sidewalk widening. Additionally, this phase makes the temporary pilots in Segment A and Segment B permanent, as well as adds pedestrian amenities in Segment C. The treatments are ambitious, however they present an immense opportunity to the City and its residents. Successful implementation of recommendations under this phase would make the City a leader in Complete Streets across the region.

Figure 72. Bus only lane rendering, Austin, Texas
Source: Austin Monitor (2016)

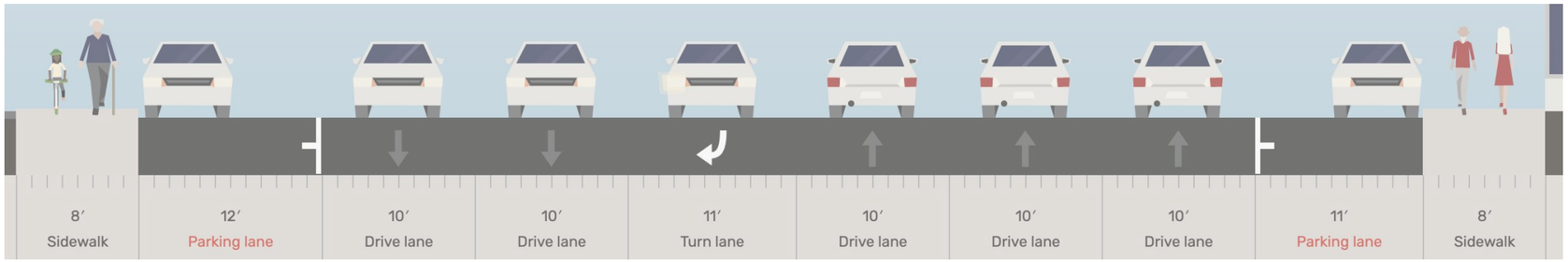


Figure 73. Segment A, existing street cross-section. Made on Streetmix.net.

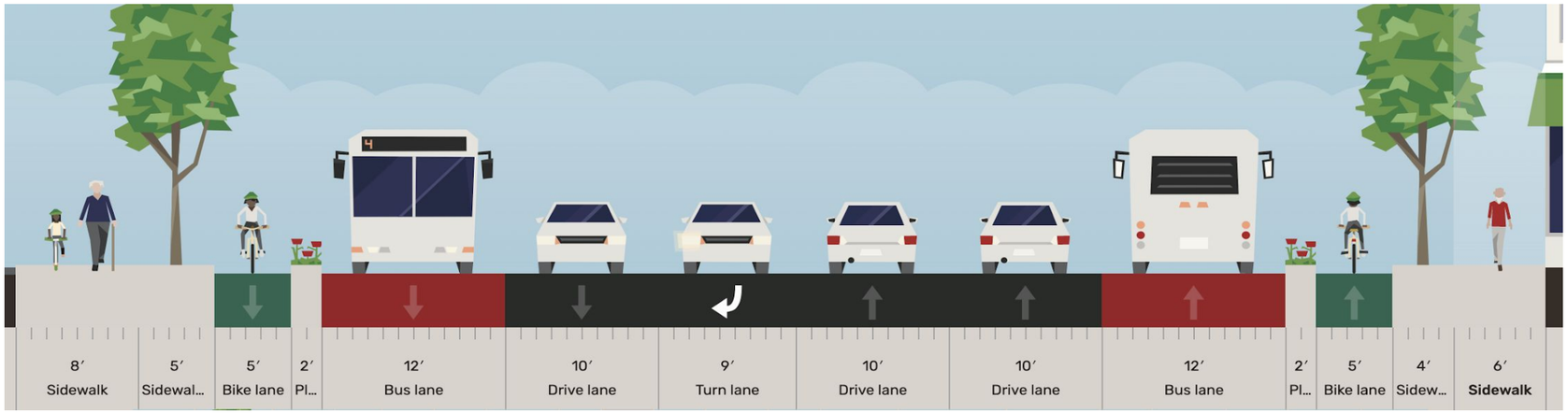


Figure 74. Segment A, Phase III street reconfiguration cross-section. Made on Streetmix.net.

Southwest Sepulveda Phase III Segment A

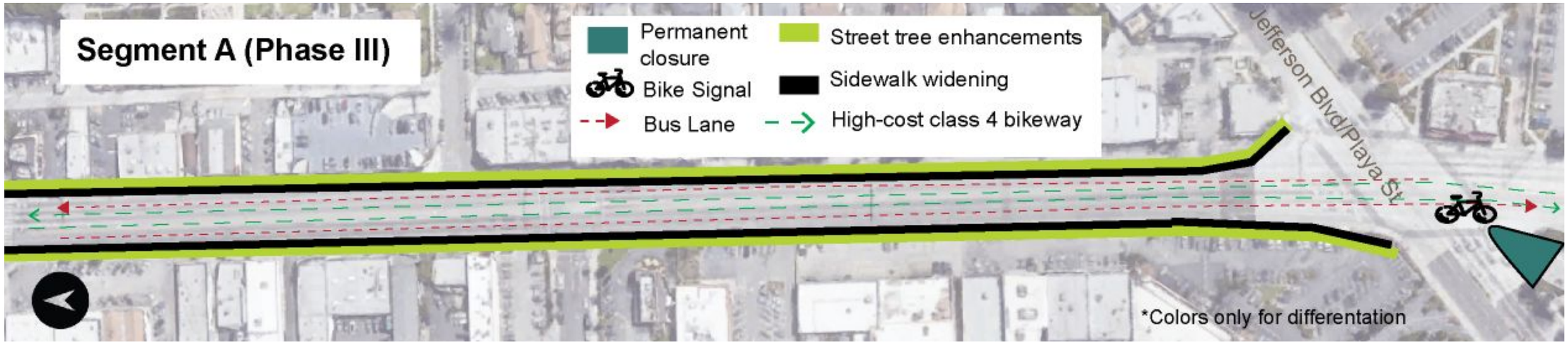


Figure 75. Segment A, Phase III recommendations

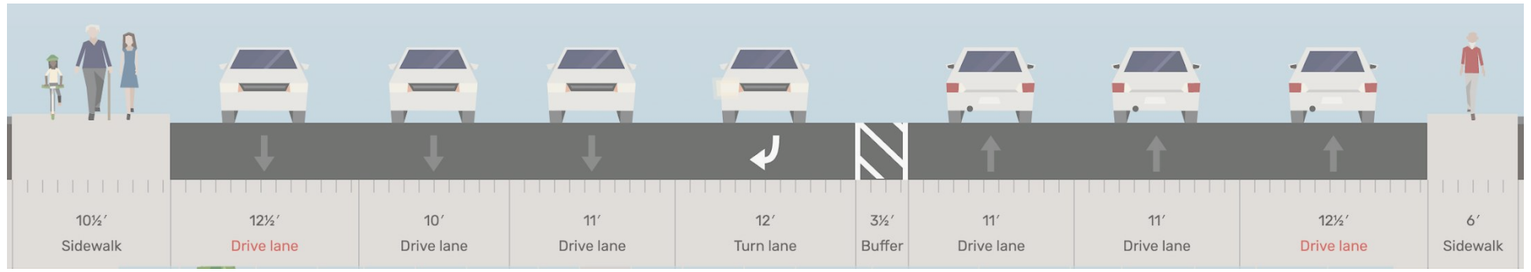


Figure 76. Segment B, existing street cross-section. Made on Streetmix.net.

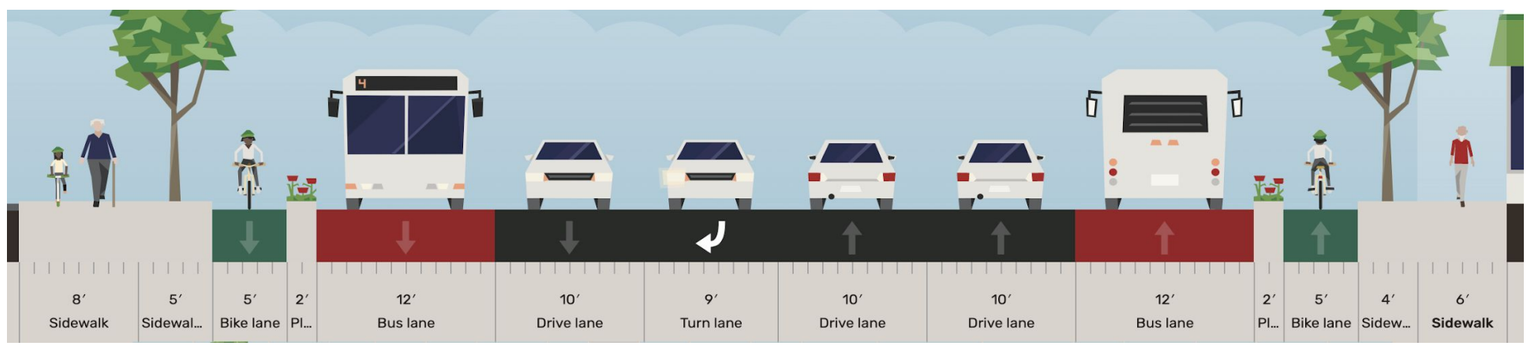


Figure 77. Segment B, Phase III street reconfiguration cross-section. Made on Streetmix.net.

Southwest Sepulveda Phase III Segment B

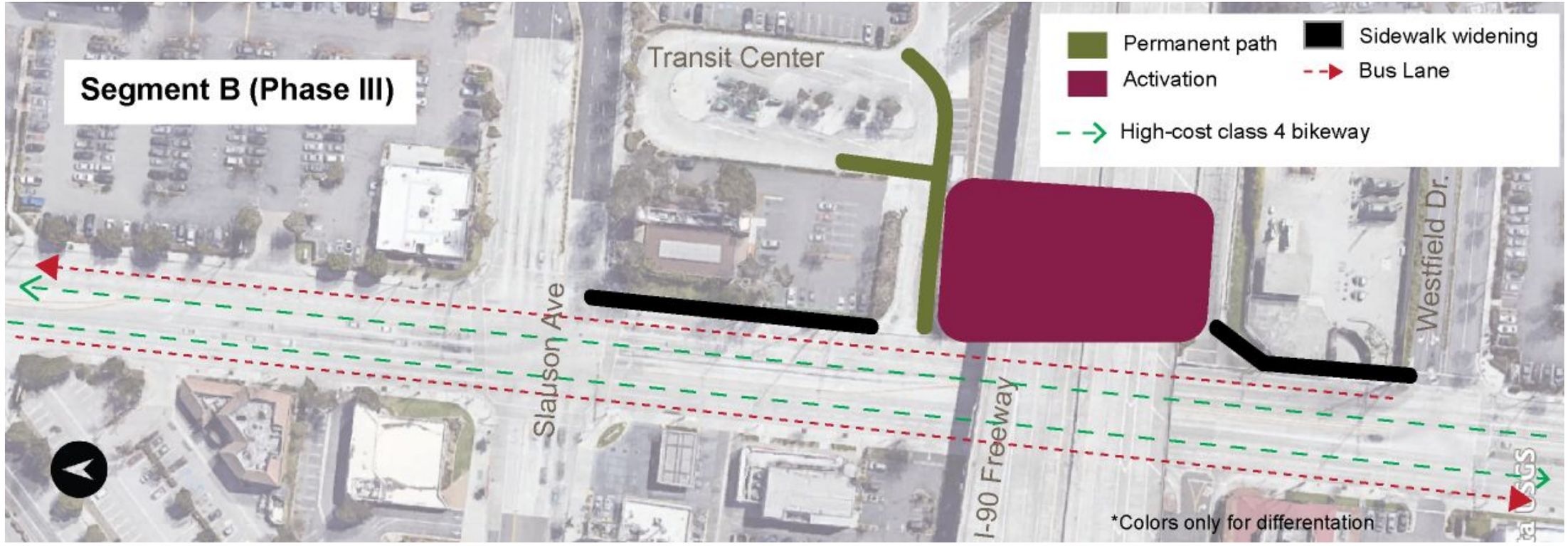


Figure 78. Segment B, Phase III recommendations

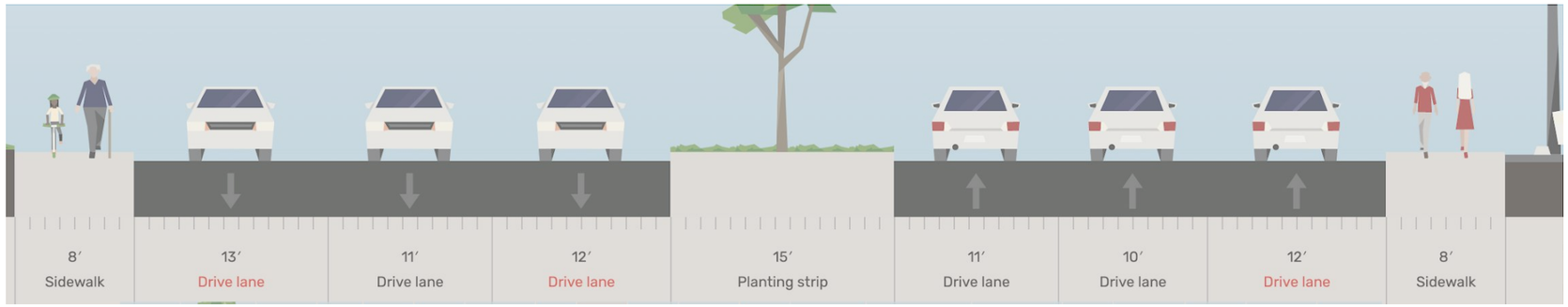


Figure 79. Segment C, existing street cross-section. Made on Streetmix.net.

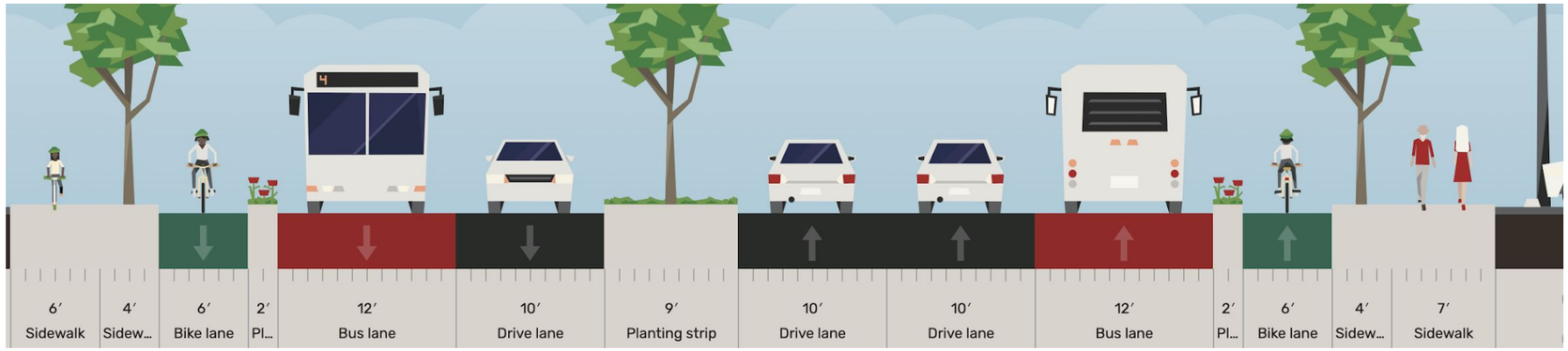


Figure 80. Segment C, Phase III street reconfiguration cross-section. Made on Streetmix.net.

Southwest Sepulveda Phase III Segment C

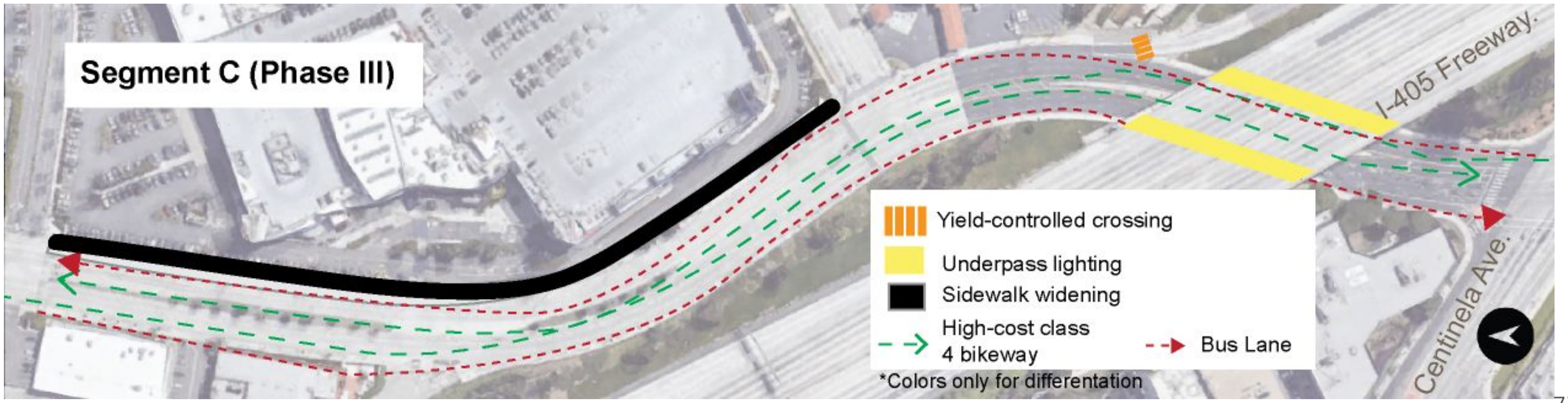


Figure 81. Segment C, Phase III recommendations

Class IV Bikeway

For this phase we recommend planter protected bike lanes as an added safety measure (Figure 82). According to a 2014 National Institute for Transportation Communities (NITC) study, bicyclists felt that planter protected bike lanes provided the most level of comfort compared to other bikeway designs (NITC, 2014). In addition to safety, planter protected bikeways benefit the surrounding streetscape—an aforementioned deficit along this corridor. To fit both the protected bikeway and recommended bus-only lanes on the corridor, there will be one southbound auto lane, two northbound auto lanes and a turn lane throughout (Figures 74, 77, 80).

Bus Only Lanes

Strategically placed bus-only lanes (Figure 83) can enhance service by reducing variability and improving operating efficiency (UCLA ITS, 2019). Bus-only lanes have proven to reduce peak transit travel-time congestion (down 20-28% in Boston) and have the potential to boost ridership (UCLA ITS, 2019). For example, reductions of 5-15% in transit travel times can increase peak ridership by 2-9% (UCLA ITS, 2019). These lanes also help protect cyclists by allowing a further buffer between them and motorists. Additionally, bus stops will include bus islands to safely allow passengers to

Figure 82. Class IV planter protected bike lanes, Toronto, Canada
Source: Cycle Toronto (n.d.)

Figure 83. Bus and bike lane, Portland, Oregon
Source: Blair Stenvick (2020)

board across the bikeways. Lastly, a bus lane along this corridor will be an important transit connection, as the Transit Center includes high ridership local lines, such as the Culver City 6, and regional lines serviced by LA Metro.

Sidewalk Widening

We propose sidewalk widening measures along different points of the corridor. In Segment A, we recommend widening the sidewalk on both sides to make room for larger tree wells and improved accessibility. In Segment B we also propose to widen the sidewalk along the east side of Sepulveda in order to facilitate better access to the Culver City Transit Center. Specifically, we propose that the sidewalk be widened south of Slauson Blvd to Westfield Drive. Segment C features widened sidewalks that allow for better walking conditions along the east side of Sepulveda between Westfield Dr. and Green Valley Circle. This segment abuts Westfield Culver City, and though the mall has trees adjacent to the right of way, widened sidewalks allow for enhanced walking conditions and an additional safeguard against the high vehicle speeds. According to the National Association of City Transportation Officials (NACTO), sidewalks in downtown or commercial areas should have an 8-10 feet pedestrian through zone, that ensures pedestrians have an adequate and safe place to walk (Figure 84) (National Association of City Transportation Officials, n.d.). The sidewalks we propose to be widened along this segment currently range from 3 feet to 6 feet of pedestrian through zone. The current COVID-19 pandemic underscores the need for sufficient walking space in the public realm.

Figure 84. Sidewalk rendering, Seattle
Source: The Urbanist (2019)

Enhanced Urban Forest

The study area is the city's number one priority for urban tree canopy improvements, according to its Urban Forestry Master Plan. Larger shade trees help cool the sidewalk during high temperatures and provide a vertical element to slow traffic along

Figure 85. Tree lined wide sidewalk, Citrus Heights, CA
Source: Bennett Engineering Services (n.d.)

the corridor (City of Culver City, 2015). Large trees also create a memorable street, enhancing wayfinding in the area, and helping foster a sense of community pride (City of Culver City, 2015). To that end, we recommend that tree wells be widened as well as lengthened to allow for larger trees and an additional barrier from autos (Figure 85). The City could incorporate bioswales as part of the tree well widening which provide added environmental benefits. According to the U.S. Environmental Protection Agency (EPA) urban water runoff makes up about 70% of water pollution in lakes, rivers, and creeks (American Society of Landscape Architects, n.d.). A 13 foot bioswale can reduce this runoff on a typical road by approximately 25% (American Society of Landscape Architects, n.d.).Following tree well enhancements, we recommend tree re-planting in Segment A for Phase III. Tree re-planting would entail the removal of non large canopy trees from the corridor in order to plant new recommended trees based off of Culver City's Urban Forest Master Plan. The plan specifically recommends Chinese Pistache and Evergreen Pear trees for this section of Sepulveda (Culver City, 2016). Enhanced tree coverage along the corridor provides benefits that go beyond the streetscape, which include reduced UV-B exposure rates (50% reduction in some studies), as well as Increased property values (average increase of 15%) (Tree People, n.d.).

Bicycle Signal

In Segment A, we will enhance the Sepulveda/Jefferson/Playa intersection by adding a bicycle signal on the southbound side of the street where there is a dedicated right turn lane. A case study in Davis, CA found that both drivers and bicyclists felt bike signals reduced intersection conflict, and results over a two year period showed a decrease in bicycle/auto collisions based on a bike signal installation from 16 to 4 (National Association of Transportation Officials, n.d.).

Permanent Slip Lane Closure

We will also permanently close the slip lane on the southwest corner of the intersection to reduce pedestrian exposure to right-turning vehicles. The permanent closure would include cement barriers, a painted street treatment, and could include street furniture for additional public space activation; similar to Sunset Triangle Plaza in Silverlake mentioned in the Downtown Culver City Segment. The permanent closure intends to maximize the safety benefits previously enumerated. It also signals to all modes the importance of pedestrian passageways along this corridor.

Permanent Walkway

In Segment B, we recommend a permanent pathway to the Transit Center to implement safe connections from the corridor. This would require the City to negotiate with the adjacent commercial property owners to allow for a path from Sepulveda Boulevard directly to the Transit Center (Figure 86). Similarly to the slip lane closure, the escalation of this treatment from Phase II to III hopes to continue to maximize the safety benefits of this treatment.

Underpass Lighting

In Segment C, we propose the addition of lighting in the I-405 underpass (Figure 87). As a connection to the yield controlled pedestrian crossing, lighting would enable a more comfortable passageway for those walking from Centinela Avenue. Lighting also provides an added security measure, especially for those walking along this road at night. The City would need to coordinate with Caltrans for this particular improvement as it falls within their right of way.

Figure 86. Parking lot walkway
Source: Nationwide Consulting LLC. (n.d.)

Figure 87. Underpass lighting treatment
Source: Alissa Walker (2016)

Yield Controlled Pedestrian Crossing

To further enhance safety and connectivity along Sepulveda, we recommend a yield-controlled pedestrian crossing near the 405 off-ramp (Segment C). Currently, the sidewalk under the highway going north ends abruptly, with a connection to the highway off-ramp (Figure 88). This causes pedestrians to turn back and go very far out of their way to reach their destination, or risk crossing an uncontrolled ramp. A yield controlled crossing at this location would enhance safe connections and and influence driver behavior (Figure 89). Results from a study of a similar treatment in Las Vegas, showed that at one site, prior to a yield controlled crossing, 11% of all motorists blocked the sidewalk before proceeding; after a "Yield to Pedestrian Sign" was installed, no motorists blocked the sidewalk (Federal Highway Administration, 2008).

Phase III Cost Projections

We include preliminary cost projections in Table 10, (detailed costs in Appendix H). Costs were estimated based on statewide averages where available. If no statewide average was available, averages were calculated based on national examples.

Figure 88. Crossing at I-405 in Segment C
Source: Google (2019-b)

Figure 89. Yield controlled pedestrian crossing
Source: Texas Transportation Institute (n.d.)

Phase 3 Intervention Cost Overview ~$3 million (See Appendix H for detailed Cost Estimate)		
Treatment Type	Cost	Benefits
Class IV protected bike lane -Green paint -Planters or raised concrete curb	$400,000	Safety, Mobility, Sustainability
Bus lane -Removing lane of traffic on each side	$1,000,000	Safety, Mobility, Improved Transit Service
Sidewalk Widening	$1,317,876	Safety, Mobility, Placemaking
Tree enhancement	$187,500	Sustainability, Increased Shade, Safety, Placemaking, Stormwater Retention
Bicycle signal	$1,000	Safety, Mobility
Permanent pathway to Transit Center	$79,170	Safety, Mobility, Sustainability
Permanent slip lane closure	$13,000	Safety, Placemaking
Street Lights	$9,610	Safety, Mobility
Yield-controlled pedestrian crossing	$2,428	Safety, Mobility

Table 10. Phase III cost overview

06 Towards Complete Culver City Streets: Policy

The previous section described specific plan recommendations for Downtown Culver City and Southwest Sepulveda. These design plans must be coupled with a comprehensive approach for Complete Streets at a policy level.

This section presents high-level strategies that Culver City can pursue to get public buy-in for Complete Streets interventions as well as to integrate Complete Streets into the General Plan update.

Achieving Public Buy-In

The implementation of Complete Streets interventions is contingent on buy-in from city staff, political leaders and members of the public. The public backlash to Complete Streets interventions in some cities demonstrates that community support is a necessary component to implementation. Figure 90 presents strategic elements that Culver City can pursue to achieve public buy-in.

Citywide Campaign on Traffic Safety for All Modes		
Project-specific messaging and campaigns	Pre and post project data collection	Partnerships with stakeholders, local community groups, and related projects

Figure 90. Strategic elements for public buy-in for Complete Streets

Although Complete Streets promise to deliver many benefits, such as environmental sustainability, lower reliance on automobiles, more aesthetic streets and public spaces, these goals are neither the most urgent nor the most unifying across different groups. City staff may adopt these other benefits of Completes Streets during the roll out of Complete Street interventions but should ultimately focus public messaging on traffic safety among *all* roadway users to tie it back to the broader citywide traffic safety campaign. In addition, City staff should focus on the deficiencies of current roadways and streets as the cause for traffic injuries and fatalities in their public messaging. Care should be taken to ensure that fault is not assigned to drivers nor victims in order to focus the problem on infrastructure design.

Project campaigns should also anticipate community concerns around Complete Street interventions such as impacts on emergency response times and local businesses. Proactively addressing these concerns and debunking myths through public messaging channels, prior to or during the implementation of Complete Street interventions, can prevent detractors from undermining and hijacking the implementation process. Los Angeles' Streets for All for example, provides a factsheet page on their website debunking common Complete Street myths (Figure 93).

Apart from proactively addressing such concerns, it is important that such concerns are addressed in a way that is couched in more positive terms that emphasize gain over loss. One of the most challenging aspects of Complete Streets projects is public backlash from the removal of street parking and vehicle lanes. For projects where some type of automobile space is removed or taken away, the City should frame the intervention as "curbside management" or "reallocation of space." The term "curbside management" emphasizes many potential uses such as parklets, outdoor alfresco dining or loading and

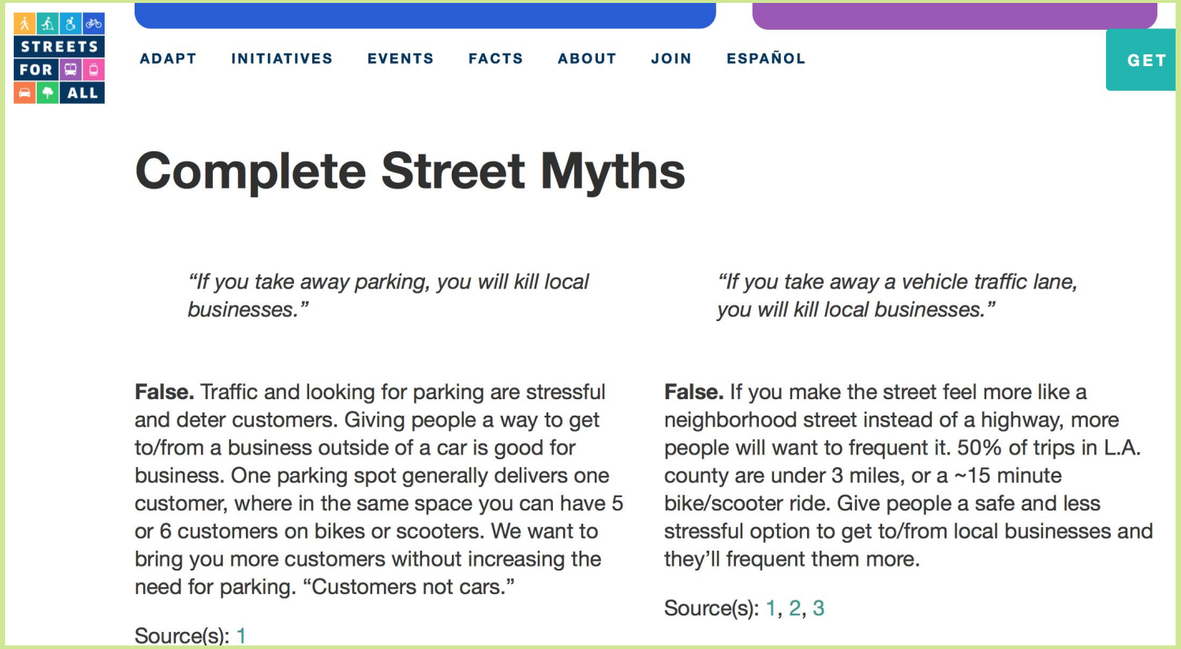


Figure 93. Streets for All Complete Street Myths webpage. Source: Streets for All (n.d.)

unloading. With public health concerns over COVID-19 and the need for physical distancing, the allocation and management of curb space becomes ever more important. In particular, food and beverage establishments may require more storefront space to spread diners out and curbside space has to be freed up for quick pick-ups and deliveries as opposed to parking. The emphasis on these alternative uses may help to reduce the sense of loss aversion that comes with street parking removal.

Complete Street project campaigns should also include frequent and regular pilot demonstrations or tactical urbanism projects (Figure 94). These are important to achieving public buy-in for several reasons. Firstly, they allow the community to experience and envision how change can look like. Secondly, frequent and regular demonstrations enable the City to test out alternative arrangements and improvements based on community input, and demonstrate that community feedback is valued and taken into consideration. Thirdly, the frequency and regularity of such demonstrations and projects can build momentum within a community for Complete Street interventions and may move people to consider permanent interventions. The goal is for the community to enjoy these temporary demonstrations or tactical urbanism projects, with the hope that they ask for them to be made permanent.

Pre and post project data collection

Data can be a powerful tool in identifying and addressing community concerns, as well as communicating the successes of Complete Streets post-implementation. However, data is only useful if it is collected and then made publicly available in a digestible form. As such, City staff should ensure that data collection before and after the implementation of Complete Street treatments is a compulsory part of the process.

To collect data on community concerns, City staff should move away from more traditional forms of public

Figure 94. Tactical urbanism project for curb extension in Honolulu
Source: Street Plans (n.d.)

Citywide campaign on traffic safety for all modes

Prior to the implementation of any Complete Streets project, the City should launch a citywide public campaign on traffic safety for all modes, inclusive of all residents, and commit to a goal of zero traffic fatalities within city boundaries. The purpose of this citywide public campaign on traffic safety is two-fold. First, it unifies all Complete Streets projects and other street-related programs such as Safe Routes to School under a common goal and public messaging strategy. In doing so, the public is able to understand these various projects and programs as part of a coherent brand about traffic safety. Second, a city-wide campaign on traffic safety also provides a common goal and platform for different City departments such as Public Works, Transportation and the Police Department to come together to resolve traffic problems in a unified manner.

An example of such a citywide campaign on traffic safety is Santa Monica's "Take the Friendly Road" initiative. This initiative is Santa Monica's version of a rebranded Vision Zero campaign and its goal is to raise awareness and educate road users on how to travel safely with others. The City's street safety infrastructure projects, such as protected bike lanes, are also planned and promoted under this initiative. Santa Monica has prominently promoted their traffic safety initiative by adding promotional materials on light pole banners, Big Blue Buses and publicizing them via online platforms (Figure 91 and 92). Santa Monica hired a consultant to design and carry out this traffic safety campaign and Culver City may consider adopting a similar approach to gain widespread awareness and support for traffic safety improvement projects.

Project-specific messaging and campaigns

Complete Streets project-specific campaigns should align with this

Figure 91. Large billboard publicizing Santa Monica's "Take the Friendly Road" initiative
Source: GOOD Corp (n.d.)

Figure 92. Promotional material for Santa Monica's "Take the Friendly Road" initiative on Big Blue Bus
Source: GOOD Corp (n.d.)

citywide campaign on traffic safety. participation such as sit-down community meetings as they are not particularly effective in eliciting feedback about street improvements. Instead, City staff should adopt more active forms of public participation that enable people to experience the street such as walk or bike audits (Figure 95 and 96).

Culver City should also ensure that data is representative of all residents and everyone's experience with the road and public space. A study done by the Portland Bureau of Transportation (PBOT) for example, serves as a model for this type of data collection. Portland's "Walking While Black" study done as part of the city's Pedestrian Action Plan (PedPDX) sought to capture the, "unique experiences of the Black community to better understand their transportation concerns and barriers" (Portland Bureau of Transportation, 2019).

Going beyond a survey, PBOT worked with community partners to organize focus groups to solicit input from the Black community. The outcomes of the focus groups helped the City better understand the needs of this community, including their concerns surrounding their personal safety and security in the public realm. For example, one of the responses captured in one of the focus groups demonstrated, that there is a fear associated with walking, as the respondent said they are, "always feeling the extra pressure to follow the law and go to the right crossing, which can be hard to do. This is like having to keep your receipt on you when you go shopping because you might get stopped for no reason and have to prove yourself" (Portland Bureau of Transportation, 2019). Culver City would benefit from integrating a study such as this to ensure that along with traffic safety, personal safety and security is taken into account in the Complete Streets planning process. This can serve as one step to help eliminate racial bias on Culver City streets that Black residents currently face.

Figure 95. Walk audit in St. Louis
Source: Trailnet (2015)

Figure 96. Bike audit
Source: City of Boulder (2013)

Thus, the types of pre and post data may include several factors such as collision rates and ridership numbers, as well as public opinions on comfort, personal safety, and security. Data relating to collision numbers and traffic fatalities among pedestrians, cyclists, children, elderly and people with disabilities are necessary in relaying the current dire state of traffic safety, the necessity of Complete Street interventions and their impacts. Data can also help the City with its evaluation of Complete Street projects and guide future plans.

Partnerships with stakeholders, local community groups, and related projects

Partnerships, in particular with disadvantaged groups such as disability groups, are crucial in ensuring that Complete Street plans are equitable and address the needs of the most vulnerable. In addition, partnering with local community groups, such as Bike Culver City, allows the City to gather on-the-ground data and information from major users of the street. These groups can assist the city in developing Complete Street plans that are aligned with specific modal needs. In addition, these community groups also have strong connections within the community and can act as important advocates and champions for Complete Street projects. Complete Street projects should also partner with other street safety programs such as Safe Routes to School. Doing so can allow Complete Streets to expand its scope of reach and achieve public buy-in with parents and school staff who want to make it safer for children to walk or bike to school.

(Culver City Safe Routes to School Program Source: Culver City., n.d. -a)

Integrating Complete Streets into the General Plan

The General Plan provides a pivotal opportunity for Culver City to integrate Complete Streets principals into the charter and thereby influence policy citywide. Including explicit language in the General Plan will help reinforce the nascent Complete Streets policy that the City recently adopted in January of 2020. Inclusion in the General Plan could enhance the recent Complete Streets policy and provide a framework for how the City moves forward with such projects. Evidence shows that robust Complete Street measures in the General Plan help lead to implementation of strong Complete Streets policies, as "circulation elements can play a critical role in setting network priorities, ensuring transportation-land use coordination, and establishing concrete implementation actions and policies" (Alameda County Transportation Commission, n.d.).

(Complete Streets Designs for Culver City. Source: Culver City., n.d. -b.)

As part of the California Complete Streets Act, the State requires all cities and counties to include Complete Streets policies as part of any substantial revision to the circulation element of their general plans, however the statute itself is vague and does not provide guidance in terms of implementation (California Governor's Office of Planning and Research, 2010).The law only states that the circulation element plan for a transportation network that, "meets the needs of all users of streets, roads, and highways for safe and convenient travel in a manner that is suitable to the rural, suburban, or urban context of the general plan" (California Governor's Office of Planning and Research, 2010).

Culver City should use the statute as a floor, and go beyond what the law requires in planning for multi-modal roads. The City should take this opportunity to re-imagine the Circulation Element and prioritize

the needs of pedestrians, bicyclists, and transit riders.

This section outlines three broad policy recommendations for how to implement Complete Streets principals into the General Plan. The following does not represent an exhaustive list, rather it provides an overall framework for implementation. Recommendations are based on best practices from Santa Monica and Long Beach; chosen due to their local applicability and focus on Complete Streets.

1. Reframe the Circulation Element

Based on best practice from Santa Monica, Culver City should consider drafting its Circulation and Land Use Elements together. Though typical General Plan guidelines call for the Circulation Element to be "correlated" to the Land Use Element, examples from Santa Monica show that the City could further re-envision corridors by ensuring that land use not only supports, but is built to accommodate multi-modal travel. Santa Monica drafted its Land Use and Circulation Element together, referred to as LUCE, and states that land use and circulation are "intrinsically linked" (City of Santa Monica, 2017).

Doing so provides the city the opportunity to tie land use decisions to transportation, in order to "reorient the City's auto-dependent boulevards into inviting avenues with wider sidewalks, improved transit, distinctive architecture, landscaping, trees and planted medians, and neighborhood-friendly services" (City of Santa Monica, 2017). Though land use and circulation would still have to address distinct issues, such as urban form and congestion respectively, joining both elements together ensures that Complete Streets policies are possible.

As our design recommendations show, Complete Streets go beyond the road network and include land use changes such as enhancing the urban forest. Thus, it is critical that both elements not only work in correlation, but work together towards a shared vision.

(Culver City Council Meeting about the General Plan)

2. Explicitly Include Complete Streets Language in the Re-framed Element's Vision and Goals

Santa Monica and Long Beach both call out Complete Streets in their vision and goals. As part of Long Beach's Mobility Element—formerly Circulation—the vision calls for a community that, "plans, maintains, and operates mobility systems consistent with the principles of complete streets, active living, and sustainable community design" (Long Beach, 2013).

By including Complete Streets in the overall vision, the element that follows must adhere to those principles, and reimagines mobility away from auto dependency. The vision is not enough however, as that alone might fulfill the State requirement, but there should be actionable goals that move Complete Streets forward. As part of the land use goals for example, Santa Monica specifically targets Complete Streets where Goal LU9 states, "Design Complete Streets – Design and manage complete streets and alleys to support adjacent land uses and human activity, keeping in mind the unique character of each area of the City"(Santa Monica, 2017).

Similarly, the first goal of Long Beach's Mobility Element is: "Create an Efficient, Balanced, Multimodal Mobility Network" (Long Beach, 2013). Both Santa Monica and Long Beach reinforce these goals in the plan with actionable policies such as expanding the use of streets as open space, and reclassifying streets respectively. Culver City should first tackle the vision by including language that prioritizes a multimodal network. Example language could state, "The City's transportation network prioritizes safety and sustainability by championing a multi-modal network that serves the needs of all residents no matter age, race, ability, or mode." The City should then integrate goals into the element that reflect Complete Streets principles. Goals could follow the previously enumerated examples from Santa Monica and Long Beach to include language such as, "Develop a new street typology that promotes environmental sustainability and supports a, multi-modal mobility network." Lastly, the City needs to delve into the goals and include specific targets for Complete Streets projects. For example, one of Long Beach's policies states, "Support the temporary closure of streets for community and commercial activity that encourages residents to see their streets as public spaces and promote biking and walking in the City" (Long Beach, 2013). Culver City should use examples such as this to integrate specific and explicit actionable policies in the element. We believe that by adding Complete Streets to its vision and goals, and enumerating specific policies, Culver City can center the element around the needs of pedestrians, bicyclists, and transit.

3. New Performance Metrics

Road performance metrics are often based on automobiles—i.e. vehicle miles traveled and level of service. According to analysis by the Alameda County Transportation Commission

(ACTC), the Circulation Element is a great opportunity to focus on metrics that rely on the multimodal user experience (Alameda County Transportation Commission, n.d.). Culver City should redesign performance criteria to include other modes in order to bolster a Complete Streets focus for this new re-framed element. Santa Monica for example, considers the streets "full range of functions" by prioritizing "person capacity and person delay, over vehicle capacity and vehicle delay" (Santa Monica, 2017). Rather than focus on vehicle congestion, reframing performance metrics to focus on per person throughput helps emphasize other modes such as walking and public transit. Culver City should include walk and bike counts, as well as bus boarding and alighting data to fully assess the needs of streets for all modes. The newly incorporated metrics can help the City push for a full range of multimodal street measures.

(Downtown Culver City before and after the closing of Washington Boulevard. Photos framed in City Hall)

07
Conclusion

In this report, we provide an overview of Complete Streets policies, what Culver City has done so far, opportunities for improvement, and offer a framework for incorporating Complete Streets into City plans and the General Plan update.

The principles of Complete Streets require that every project respond to the local context. No one treatment fits every city, or every street in that city. The General Plan provides a pivotal opportunity for Culver City to integrate Complete Streets principles into the charter and influence policy citywide. Every new project provides an opportunity to engage with the community about the many benefits of Complete Streets strategies and more importantly, to make streets safer for all users, regardless of age, race, income, and ability.

Our analysis and recommendations seek to help Culver City grow and evolve their streets and public space in a way that fits the needs of their residents and visitors. In Downtown Culver City we recommend enhancing the active mobility experience by making a pedestrian-prioritized zone, creating bike-friendly boulevards and improving transit service quality. On Southwest Sepulveda, we prioritize walkability, create pedestrian and bicycle connections to transit, and enhance the City's urban forest. We hope that this report provides a better understanding of the context-specific goals of Complete Streets policies, and shifts the narrative of what roads in communities could look like.

We completed a majority of this report in a pre-COVID-19 world. Job growth projections and government budgets have changed dramatically in the past few months. At the same time, attempts to keep a safe distance from one another while carrying out

essential tasks have highlighted the value of ample pedestrian infrastructure and public space. It has also laid bare the gaps that exist on our streets. Cities could use this moment as a catalyst for reorienting how they address these gaps in public infrastructure. Investing in Complete Streets could help fight this current pandemic, and prepare us for future threats by increasing space for travel modes that allow for social distancing while protecting our air quality.

We believe that Complete Streets policies are important and necessary to ensure an equitable allocation of one of Culver City's largest public resources — streets — and empower everyone to move around safely.

(Downtown Culver City during CicLavia Culver City Meets Mar Vista + Palms 2019)

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Appendix A

Complete Streets Literature Review

This section reviews the extant literature on Complete Streets. It begins with an investigation of how the automobile and its dominance greatly contributed to the development of "incomplete" streets in U.S. cities today. Prioritizing the automobile, made other forms of travel, biking and walking in particular, unsafe due to high-volume vehicular streets. In addition, the prioritization of the automobile reinforced and contributed to economic inequity as low-income residents with no access to cars are unable to fulfill their travel needs.

The discussion of "incomplete streets" is followed by a discussion on Complete Streets. In contrast to the automobile-oriented planning model, Complete Streets seeks to achieve:

1) Equity and access;
2) Safety;
3) Multi-modalism; and
4) Reclaim streets as public spaces.

Despite the value that Complete Streets bring to cities, Complete Streets proposals are often facing pushback from community groups. This literature review evaluates three common pushbacks, namely:

1) Impact on traffic;
2) Impact on safety; and
3) Gentrification.

As prior case studies have repeatedly suggested, we argue that Complete Streets impacts traffic to a negligible extent while improving overall safety. In short, the benefits outweigh the costs. There might be initial stages of confusion among different users of the street, in the medium term it is highly beneficial. Complete Streets improvements can result in gentrification if cities plan them only for wealthier, incoming residents but the threat of gentrification can be overcome through collaboration and planning with existing communities (Hoffmann 2015).

The Automobile and "Incomplete Streets"

To understand why our roads are designed the way they are, we must consider why people travel. Transportation is a derived demand, which means people travel because they need to go somewhere not for the sake of traveling itself (Hanson, 2017). How people travel depends on where the places they need to go are located, and where things are located depend on how people can travel. Land use patterns change when people have access to different types of transportation. For example, early American suburbs were made possible by the invention of the street car, and houses clustered within walking distance of their stops (Muller, 2004). The private automobile allowed people to travel greater distances faster and led to the sprawling land use patterns that exist today (ibid).

People adopted cars so quickly because they allow flexible, fast point-to-point travel (Gordon, 2016). In 1916, the Federal Aid Road Act began the United States long history of subsidizing car-oriented infrastructure (Gordon, 2016). Culver City was incorporated into Los Angeles County in 1917 just when streets were being designed to accommodate automobile travel (*Culver City Timeline,* n.d.). The United States helped make cars the dominant mode of travel by

(The results of auto-centric design on Jefferson Blvd. near the 405 freeway in Culver City.)

constructing interstate highways, passing jaywalking laws and standardizing parking requirements (Gordon, 2016; Strombeg, 2015; Manville, 2017).

Cars have been the most popular way for people in the United States to get around for about 100 years. There were 8.2 million cars registered in the United States in 1920, by 1930 there were over 23 million (Federal Highway Administration, n.d.). According to the National Household Travel Survey 2017 update, private automobile is the travel mode that accounts for around 80% of all trips in the United States.

When we prioritize car travel, we make streets wider, speed limits higher and limit the number of intersections. All of these design features make moving around the city by means other than a car more difficult and dangerous (King, Smart & Manville, 2019). They also make people dependent on cars to get around and participate in the economy. People who own cars are able to access more jobs, have higher employment rates and make more money (Blumenberg, 2017). Owning a car makes it so much easier to look for jobs and obtain them that low-income households will go to great lengths to keep their cars even if it causes financial strain (King, Smart & Manville, 2019).

Under our current system of incomplete streets, the logical way to improve economic mobility is to increase car-access in low-income households (Blumenberg, 2017). This option is expensive for individuals and increases pollution, land-use devoted to car movement and storage, and traffic violence (Blumenberg, 2017). Facing obvious limitations of an auto-centric way of life, the Complete Streets approach attempts to create multi-modal streets where it is safer and easier to travel by modes other than the private automobile.

(Man rides bike across Marina Freeway on-ramp)

Complete Streets and its Values

The National Complete Streets Coalition (NCSC) defines *Complete Streets* as follows:

"Complete Streets are for everyone. They are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities." (NCSC, n.d.).

(*Multimodal street in Portland, Oregon.*)

Embedded within this definition are three values. The first is equity – Complete Streets are streets for everyone, regardless of age and ability. The second is safety – too many people die on America's streets every day and one death is a death too many. The third is multi-modalism – streets ought to accommodate users on all modes, not just the automobile. In addition to these three explicit values as written in the definition of *Complete Streets*, we propose a fourth related value of streets as public space (Loukaitou-Sideris & Ehrenfeucht, 2009). This value allows us to envision streets not merely as channels for the efficient movement of people and goods, but as spaces that contribute to vibrant urban life and activity. The following sections examine these four underpinning values of *Complete Streets* more closely.

Equity: Access Not Mobility

The dominance of planning for the automobile on American roads has limited access to many users (everyone without a car) based on mode and socioeconomic factors. It perpetuates disparities based on race and class. Travel mode and socioeconomic status are typically interlinked (Sanchez et al 2003). People's income levels generally correspond to vehicle ownership, but race also plays a factor. Only a small percentage of white households do not own a car (seven percent), compared to 24% of African American households and 17% of Latino households (Sanchez et al., 2003).

Streets centered on the automobile also harm the health and well-being of minorities and low-income people. In urban areas, those without cars typically have less access to sidewalk space and pedestrian-friendly streets, which leads to an increased risk of pedestrian collisions and fatalities (The Leadership Conference Education Fund, 2011). This also affects minorities adversely. People without cars make up 34% of the population but account for 46% of pedestrian deaths (Anzilloti, 2017). In addition to race, car-oriented streets also affect older Americans as people over the age of 65 are 50% more likely to be struck and killed by a car while walking (Anzilloti, 2017).

Complete Streets programs can implement equitable transportation solutions by providing equal access to all places for all users of all modes (Sanchez et al., 2003). Zavestoki and Agyeman (2015) go further, and argue that Complete Streets should move away from focusing solely on access as it relates to mobility, which is inexorably linked to neoliberal ideas that moving freely in a city represents one's ability to participate in economic productivity.

The Complete Streets Movement is therefore a catalyst for change, but it must confront the history and current landscape of places and spaces. Streets and their design are, "inseparable from politics, community, and visions of its past and future". Policies must include processes that are inclusive of the entire community, namely those who have been excluded from these processes in the past such as low-income people of color (Zavestoki and Agyeman, 2015). According to Vikas Mehta, streets should be seen as an ecology; a place of dynamic relationships that thrive on the coexistence of diverse people, activities, forms, and objects (Zavestoki and Agyeman, 2015).

The NCSC recognized the need to include equity as a central component of Complete Streets programs, and in 2017 re-wrote their framework to include an equity element as part of its evaluation criteria. The NCSC grades Complete Streets programs throughout

(Multi-modal street in Portland, Oregon)

the nation based on a 100 point rubric. In order to encourage planners to develop programs with a focus on equity, and to be more inclusive of communities, the NCSC included a diversity measure worth nine percent of the total score (Anzilloti, 2017). As the NCSC states, "Complete Streets are intended to benefit all users equitably, particularly vulnerable users and the most underinvested and underserved communities". As such, the onus is placed on jurisdictions to identify those groups in their community and plan programs with them at the center (NCSC, 2017).

In order to fulfill the equity or "Diverse users" element, and receive the full nine points, the NCSC (2017) states that programs must, "prioritize" vulnerable users or neighborhoods with histories of systematic disinvestment or underinvestment and establish an accountable, measurable definition for priority groups or places. This definition may be quantitative (i.e. neighborhoods with X% of the population without access to a vehicle or where the median income is below a certain threshold) or qualitative (i.e. naming specific neighborhoods).

Though the criteria is somewhat broad, the inclusion of equity as part of this framework is indicative of the role that Complete Streets programs could have on transforming streets for all facets of the population, and thus, creating more inclusive spaces.

Improving Safety: Combating Traffic Violence

The Vision Zero movement asserts that pedestrian deaths by vehicles are preventable and strives toward ending fatalities on the road (Sahuguet, 2018). This movement encompasses a shift away from an auto-centric culture where society accepts a certain amount of death as a part of the cost of getting places as fast as possible.

When someone driving a car hits a pedestrian, the greatest predictor of pedestrian survival is vehicle speed (U.S. Department of Transportation (USDOT), 1999). The slower the car is going, the more likely the pedestrian is to survive. This relationship between pedestrian death rates and vehicle speed is well established. In 1999, the U.S. Department of Transportation's National Highway Traffic Safety Administration reviewed the literature on vehicle speeds and pedestrian injuries (USDOT, 1999). They found 1) the faster someone is driving when they strike a pedestrian, the more likely the pedestrian is to die; 2) when roadway design speeds are 20 mph or below, the risk of a crash even happening decreases significantly, and death rates also fall dramatically; and 3) the most effective way to reduce vehicle speeds is by implementing traffic-calming roadway interventions.

In 2011 the American Automobile Association (AAA) ran a statistical analysis that measured impact speed and a pedestrian's risk of severe injury or death. Their study reconfirms the

importance of reducing vehicles speeds (Appendix C), as there is a high risk of pedestrian death or severe injury at impact speeds above 30 mph, rising to a 90% chance of severe injury at 46 mph and a 50% risk of death at 42 mph (Tefft, 2011). These risk factors vary by population and age. For example, children and the elderly are more likely to suffer injuries and death at lower speeds than the average person (Tefft, 2011).

Physical traffic calming interventions promoted by Complete Streets are the most practical and effective way to lower driving speeds because they change the design speed of the roadway (USDOT, 1999). Unlike traffic speed enforcement, they work round the clock and do not require the watchful eye of a police officer. The idea is to make driving at a safe speed the only reasonable way for a driver to approach a roadway. For example, on a flat, broad, straight road, it takes a concerted effort for a motorist to drive 20 mph — even if that is the posted speed limit. In contrast, traffic calming interventions, like narrowing lanes physically (through traffic islands and curb extensions) and visually (by planting trees on either side of the street), and using roundabouts at intersections, make it harder to drive at unsafe speeds (USDOT, 1999).

Reducing the need for enforcement-based policing also lowers the exposure of vulnerable populations to unjust traffic stops. For black and brown people, traffic stops can be deadly. Racial profiling, implicit bias, and outright racism lead police to stop black and brown people more than white people (ACLU, 2020). Traffic stops can escalate quickly. In 2015, 11% of all fatal police shootings (where the police shot a civilian) occurred after that person was pulled over (Lowery, 2015). Police pull Black people over more frequently than any other race, increasing their risk of death (Lowery, 2015). Pointedly, black people are killed by the police at more than twice the rate as white people even though only 13 percent of the US population is black (Washington Post, 2020). According to the Washington Post database, in 2019 the rate of people killed by the police was 11 per million for white people, 21 per million for Hispanic people and 29 per million for black people.

Traffic stops that end in death are another form of traffic violence. Speed enforcement is an important example of how safety interventions affect populations differently. The heart of the Complete Streets Movement is to ensure that chosen interventions combat traffic violence and promote the safety of all users of the street.

Multi-modalism

Complete Streets is an “intransigent transportation and construction system” that “assert(s) a new, more inclusive view of transportation; by developing a clear path from current practice toward a multimodal future” (McCann 2013, 21). By a multimodal

future, McCann (2013) refers to the inclusion of active transportation modes such as bicycling, walking and taking public transit, in addition to driving.

Multi-modalism is a salient value in transportation planning because it promotes modes of transportation that are often used by the less privileged. As Litman (2013) writes "planning practices that favor mobility over accessibility and automobiles over other modes tend to be unfair and regressive since they reduce the transport options available to non-drivers" (14). In addition, multi-modalism also supports the travel needs of those who are young and old, and those who suffer from physical disabilities. Planning for multi-modalism represents an effort to treat the mobility needs of the less financially- and bodily-abled individuals more seriously.

Multi-modalism is also important from a public health perspective. Active forms of transportation contribute to higher physical activity levels among urban dwellers, and reduce the risk of negative health outcomes such as heart disease, obesity, and diabetes.

Active modes of transportation are also an important strategy in addressing climate change as they are less pollutive, less energy-intensive and do not emit as much greenhouse gas as automobiles.

Biking and Walking

Existing infrastructure on American streets cannot adequately support active modes of transportation. In 2015, the USDOT conducted a pedestrian and bicycle road safety assessment in every state, Puerto Rico and the District of Columbia. The assessment identified a wide range of physical barriers that prevented safe walking and bicycling. This included roadway designs that prioritize drivers over pedestrians and cyclists, and included designs such as wide multi-lane roads, poor intersection designs that do not account for pedestrian and bicycle movement, and poor provision of sidewalk and bicycle

(Pedestrian walkway, Portland, Oregon)

facilities (USDOT, 2015).

Complete Streets offer an opportunity to make walking and biking safe. Solutions range from widening and repairing broken sidewalks, extending traffic signal times for pedestrians, increasing the night-time visibility of streets to constructing protected and/or separated bike lanes, protected intersections and implementing road diets. However, the task of integrating pedestrian and bicycle facilities into existing roadways has to be contextual. There is no 'one-size-fits-all' solution or design prescription and that these design solutions depend on the existing condition of the street in question. The *Separated Bike Lane Planning and Design Guide* produced by the Federal Highway Administration provides a useful framework to evaluate when and where separated bike lanes (SBLs) are appropriate (Figure A.1).

Planning Considerations	
SBLs within a Bike Network	Plan for a separated bike lane in context of a bike network, not as an isolated project. Connect origins and destinations. Develop a low-stress bike network accessible to novice cyclists.
Safety Benefits	Use separated bike lanes to create safety benefits at specific locations or along high-volume corridors. Providing physical separation may improve safety and provides peace of mind to novice cyclists.
Design Flexibility	Strategically deploy separated bike lanes where most needed. Consider context and use design flexibility on separation type, intersection treatments, and other design elements to promote safety and manage traveler expectations.
Existing and Potential Users	Desired bikeway routes may already attract cyclists. Plan for separated bike lanes along corridors that naturally draw cyclists to expand opportunities. Fill unmet needs on busy streets that discourage cycling due to high-traffic volumes.
Local Support	Successful locations start with local support. Choose corridors where residential or business communities have bought into the idea of encouraging cycling through strategic infrastructure investment.
SBLs and Equity	Use separated bike lanes to promote cycling as an option for commuting to transit-dependent or carless households. Facilities can also improve connections to transit, jobs, schools, and essential services through safer first / last mile trips.
Contextual Considerations	
Roadway Capacity Effects	Consider how a separated bike lane affects motor vehicle volumes. Potentially implement a road diet, remove on-street parking, or remove a travel lane. Evaluate capacity effects holistically against mobility benefits of separated bike lanes and potential safety improvements relating to SBL implementation. Perform traffic modeling to measure disbursement of vehicles in road network.
Pedestrian and Other Street User Safety Effects	When locating bicycle facilities on higher-speed or higher-volume facilities, the separation afforded by SBLs may provide increased comfort and safety benefits. Improved organization of motor vehicle travel lanes and turn lanes, as well as reduced crossing distances and potential pedestrian safety islands, all provide benefits related to those found in FHWA's 9 proven pedestrian safety countermeasures.
Transit Corridors	Consider how a separated bike lane shares a corridor with transit services. Design lanes for safe interaction at transit stops or measures that separate bus and bike lanes, such as boarding islands. Consider placing facilities on left-sides of 1-way streets or on parallel, non-transit corridors.
Loading and Unloading	Engage in site-specific research on local loading and unloading requirements when designing separated bike lanes. Commercial corridors may require dedicated loading zones with clear markings. Explore off-street loading options and off-peak loading time incentives.
Accessibility	Ensure that the interface of the SBL with pedestrian facilities at crosswalks, parking spaces, transit stops and other locations is accessible and in compliance with the Americans with Disabilities Act and other local requirements. Consider access to the curb for fire and emergency vehicles.
Parking	Evaluate parking needs holistically and attempt to minimize parking space losses where possible. Educate the public on floating parking regulations. Identify opportunities to provide parking on streets adjacent to separated bike lanes.
Installation Opportunities	
Pilot Projects	Use "pilot projects" to test reactions to separated bike lane concepts with minimal upfront investment. Evaluate designs, make necessary changes, and transition successful pilots to permanent buildouts where feasible.
Street Retrofits	Using the existing right-of-way, change geometry of the street to accommodate separated bike lanes. Consider changes to number or width of travel lanes and/or presence of on-street parking. Reduce costs by using scheduled resurfacing projects as opportunities for street retrofits.
New Construction or Major Reconstruction	Leverage major capital construction projects and include separated bike lanes in designs. The addition of separated facilities may represent a minimal increase on total construction investment.

Figure A.1. Planning Elements for Separated Bike Lanes (FHWA 2015)

Public Transit

Public transit is another core component of multimodal connections. It connects road users who may bike, walk, or drive to their final destinations (Los Angeles County Metropolitan Transportation Authority, 2014). Public transit must be the centerpiece of a road network that delivers large quantities of passengers and provides public space (National Association of Transportation Officials, 2016). High-quality transit streets allow the "cities to grow without slowing down" (2016). In addition to regional connectivity, investments in public transit also contribute to economic revitalization, neighborhood safety, and environmental quality (American Public Transportation Association, 2018).

The implementation of transit-focused Complete Streets policies faces challenges on multiple levels, despite its benefits (Los Angeles County Metropolitan Transportation Authority, 2014). On a national level, declining ridership coupled with limited funding resources impose pressures on attracting investments towards public transit systems (Los Angeles County Metropolitan Transportation Authority, 2014). Cities and jurisdictions disproportionately adopt Complete Streets policies that focus on biking and walking (Babb & Watkins, 2016). On a regional level, Los Angeles Metro has identified that multi-jurisdictional coordination would further complicate the implementation. On a local level, the lack of budgets, political will, and community feedback also constrain the inclusion of transit in Complete Streets policies (King, 2019).

(The Culver City Transit Center)

Existing incomplete street networks create barriers for users to access public transit. They also create difficulties in providing on-time services for transit agencies (Smart Growth America, n.d.). A Complete Streets transit design addresses these insufficiencies through targeting intersections, streets configurations, stations & stops, and transit systems.

(Left: Transit-only street in Portland, Oregon. Right: Culver City's next bus real-time information)

Successful strategies include:

1) Transit-only lanes
2) Signal prioritization; and
3) Transitways

Transit-only lanes refer to segments of the streets dedicated exclusively to transit and emergency vehicles. Combining transit only-lanes and signal prioritization can cut travel times by up to 50% (Smart Growth America, n.d.). Signal prioritization is another measure of reducing travel. Providing signal prioritization to transit vehicles can decrease the travel time by up to 25% (Smart Growth America, n.d.). Transitways go a step further, creating runways exclusively for transit vehicles separated from the rest of the street network by physical barriers (National Association of Transportation Officials, 2016).

Streets as Public Space

The fourth value we identify for Complete Streets is public space. Streets represent more than just mobility, and form an ecology of uses and users (Mehta, 2014). Streets exist as a form of public space. As Moryahim poses, "to what extent can one claim the existence of a public realm if the streets are more or less devoid of people and social interactions?" (Zavestoki and Agyeman, 2015). Since streets play an integral role in public space, Complete Streets programs should integrate policies that bolster social interactions as a prominent component of street use. Complete Streets programs can learn from people who already activate and use streets in this manner. For example,

street vendors in Los Angeles “create hotspots of social interactions in a city that too often lacks public life” (Zavestoki and Agyeman, 2015). By using the street as commercial space, vendors not only create a source of income for themselves, but also activate the street and re-purpose the street for uses other than mobility. Expanding the use of streets beyond mobility increases access, and equitable outcomes.

In drafting Complete Streets policies, planners and city officials should include public space that is “accessible and open, meaningful in its design and the activities it supports, provides a sense of safety, physical and environmental comfort and convenience, a sense of control, and sensory pleasure” (Mehta, 2014). Mehta’s (2014) “Public Space Index” provides a framework that evaluates the use of public space, and can serve as a tool in drafting Complete Streets programs with this in mind. The index rates different aspects of public space including inclusiveness, meaningful activities, comfort, safety, and pleasurability (for streets and plazas).

The index provides an evaluation for each of the five categories based on several variables, and includes an overall evaluation of the space. The index provides a roadmap to practitioners who design public space by outlining important variables to consider, as well as highlighting specific issues planners need to address (Mehta, 2014).

(Streets as Public Space, Vancouver, B.C.)

Common Challenges to Complete Streets

Complete Streets' priority of modes other than the automobile has spurred backlash from drivers. From West Los Angeles to Pasadena, residents have shown up in large numbers to protest street reconfigurations that decrease travel lanes for cars (Tinoco, 2018). Some of the most common complaints are about impacts on traffic delays, impacts on safety, and impacts to gentrification. The following section reviews each challenge with an aim to disprove these concerns and, particularly in the case of gentrification, provide solutions to mitigate these adverse effects where present.

Impacts on traffic

The major challenge in implementing Complete Streets programs is concern over traffic. Congestion is primarily caused by single-occupancy vehicles. By repurposing the street to become conducive to other modes, Complete Streets has the potential to reduce the demand for peak-hour travel in cars — the primary cause of congestion (NCSC, n.d.). For example, re-designing roadways where pedestrian and cycling are allowed, but vehicle access is limited increases pedestrian activity for local travel, and decreases vehicle miles for local travel (Victoria Transport Policy Institute, 2015). Additionally, per capita congestion costs are higher for systems that do not offer alternatives to driving. Furthermore, 44% of vehicle trips during peak and non-peak hours are errands that may be replaced by other modes if options are available (NCSC, n.d.).

In practice, there is limited data regarding Complete Streets implementation. However, the case in Mar Vista, Los Angeles, provides an important regional context. The Mar Vista Great Streets Initiative was implemented in 2017. It consisted of improved pedestrian crossings as well as parking-protected bike lanes for a 0.8-mile corridor (Linton, 2018).

After a year of implementation, peak-period travel times along the corridor are within one minute longer than during the pre-project baseline in 2015, and continue to decrease (Los Angeles Department of Transportation, 2018).

	Pre-project Travel Time	Post-project Travel Time
Eastbound AM peak	2 minutes, 11 seconds	2 minutes, 25 seconds (+14s)
Westbound AM peak	2 minutes, 20 seconds	3 minutes, 6 seconds (+46s)
Eastbound PM peak	2 minutes, 25 seconds	3 minutes, 56 seconds (+31s)
Westbound PM peak	2 minutes, 22 seconds	2 minutes 25 second (+3s)

Table A.1. Pre and post Mar Vista Great Streets Initiative travel time comparison

Though travel times increased by seconds, we should not focus on traffic delays and vehicle counts in measuring congestion. Rather, we should instead focus on moving more people through a variety of modes (Davis, 2016). Relying on measuring vehicular travel time as the only indicator of road service quality is incomplete because it overlooks other travel modes and cannot count the total traffic volume (Davis, 2016). The Great Streets project reported that pedestrian counts increased by 32%, and combined pedestrian, bicycle, and scooter counts increased by 11% (Linton, 2018).

If congestion remains a primary concern for residents and stakeholders, there are options to mitigate these adverse effects using traffic engineering tools. Some options include adding turn lanes at major locations, flashing yellow pedestrian signals, re-assessing signal timing, and altering lane width (Kienitz, n.d.). The Mar Vista Great Streets Initiative enlisted some of these options including new left-turn signals and adding extended right turn pockets on two streets to address concerns around congestion (Linton, 2018).

Impacts on Safety

Opponents of Complete Streets argue that these street improvements are not in fact safer, but more dangerous following new changes. For example, following the street improvements in Mar Vista under the Great Streets Initiative, opponents insisted that the street became more unsafe (Figure A.2). Opponents, including neighborhood residents and business owners, argued that Venice Boulevard became less safe because increased traffic congestion led to confusion and impatience among drivers, higher vehicular traffic along residential streets and confusion on how to interact with cyclists (Stop Unsafe Streets Project on Venice Blvd Petition, n.d.).

Such unsupported and anecdotal claims were, however, dispelled with data and evidence. The Los Angeles Department of Transportation found that the protected bike lanes on Venice Boulevard reduced the number of

Figure A.2. Community disagreement with report on safety in Mar Vista, City of Los Angeles
Source: RecallBonin Campaign, 2018

temporary confusion among motorists, pedestrians, and cyclists is valid. Users have to adjust to new rules of the road and get comfortable interacting with more alternate modes of travel. This problem can be resolved through educational campaigns and community engagement programs that teach people how to use the street. For example, the City of Santa Monica launched an educational campaign to equip electric scooter riders with knowledge about how to ride and share the street with other users. The city displayed posters on highly visible locations such as on buses, light pole banners and parking structures (Figure A.3).

Figure A.3. Santa Monica electric scooter educational campaign poster, City of Santa Monica (2018)

Impacts on Gentrification

In lower-income neighborhoods and communities that have experienced patterns of disinvestment, Complete Streets street improvements may come as harbingers of gentrification and displacement. Referred to as environmental gentrification, this process of neighborhood change is argued to hijack the environmental justice movement to serve the interests of the upper creative class, facilitating their movement into working-class neighborhoods and the displacement of low-income residents (Checker 2011).

Two examples are in Washington D.C. and Oakland, CA. In the first, Gibson (2013) documents the year-long public marketing campaign called "city living, dc style" which featured cycling strongly to pander to the pro-environmental sensibilities of the creative class. Following the city's commitment to attracting the creative class, the District saw an influx of richer, younger, whiter residents, which resulted in "two Washingtons;" a discernible split between affluent white newcomers and struggling old black residents (Gibson 2013, 239). In Oakland, Cadji and Alkon (2015) write about how weekly street closures for the North Oakland Farmers Market on Stanford Avenue is accelerating the process of gentrification in the neighborhood. They argue that "farmers markets and Complete

Streets share unacknowledged racial and class connotations," thereby making it possible that "attempts to create Complete Streets in low-income, urban communities of color might similarly appeal to the tastes and proclivities of gentrifiers" (158).

Unlike the previous three challenges to Complete Streets, gentrification presents a legitimate source of concern. If planners, advocates and community organizers are not careful, pedestrian plazas and bike lanes can become a "rolling signifier of environmental friendliness and bourgeois leisure, doing economic work that has little to do with progressive (transportation) politics such as increased mobility for *all* people regardless of class position" (Hoffmann 2015, 142). To overcome the threat and potential of gentrification, planners must be sensitive to the racial and class implications of Complete Streets. The purpose of Complete Streets must be clarified by asking the question of "for whom?" Low-income communities must be consulted and included meaningfully in the planning process, and strategies mitigating gentrification such as affordable housing should be pursued alongside Complete Street policies.

Cost	Description
Construction Costs	The planning and construction cost associated with implementing Complete Street elements.
Maintenance Costs	The cost of maintaining the Complete Street elements.
Rehabilitation Costs	Every 15-20 years streets have to be rehabilitated, which includes grinding off old roadway surfaces, resurfacing the pavement with new asphalt, and repairing/replacing curbs where necessary.
Equipment Costs	The cost of bike ownership and appropriate bike equipment.
Vehicle Traffic Impacts	Incremental delays to motor vehicle traffic or parking.
Gentrification	The social cost of possibly displacing low-income families and small businesses. Complete Streets increases property values, which can displace low-income families and small businesses if the health and economic stability of current residents is not considered.

Table A.2. Complete Streets Elements (Abdullah et al., n.d., P. 57)

Moving from Policy to Implementation

Costs and Funding for Complete Streets Programs

In many places, the implementation of Complete Streets programs is dependent primarily on the availability of funds. Assessing the cost-benefit ratio determines whether Complete Streets is the best investment for local jurisdictions. Because there is no one-size-fits-all design for Complete Streets, the cost of each project is subject to factors such as number and types of users, available and planned right-of-way, existing conditions, and community desires (Table A.2) (Abdullah et al., n.d.).

The City of Los Angeles studied the economic feasibility of its Complete Streets plan, providing a roadmap to estimate the cost of a Complete Streets project. The cost estimates enable city governments to explore ways of redistributing existing budgets and seeking dedicated funds for Complete Streets projects. Examples from other state and local governments can also provide insight into how to adapt existing budgets to accommodate Complete Streets initiatives. Based on the successful precedents from various levels of jurisdictions across the country, Complete Streets programs are valuable investments to local communities. And they are financially feasible (Smart Growth America, n.d.). Many complete streets measures are moderate in scale but provide invaluable safety enhancements. Moreover, careful designs of the streets can utilize existing budgets without adding significant pressure on seeking additional funding (Smart Growth America, n.d.). The City of Los Angeles has deployed a two-phase strategy to effectively contain the costs of its Vision Zero programs (Llewellyn Jr. & Tso, 2017). In the city's 2017-18 Budget for Road Construction and Vision Zero, the document describes that phase one would consist of low-cost, easy-to-implement measures like crosswalks and striping. Phase two recommended incorporating projects that involve street reconstruction activities (Llewellyn Jr. & Tso, 2017, 7).

When Complete Streets projects cannot be accommodated through existing financial budgets, additional funding sources may include federal and state-level grants as well as funding programs. Efforts towards establishing a federal funding program for Complete Streets are on the rise. The Complete Street Act of 2019 was recently introduced in the senate, and it attempts to reserve five percent of federal highway funding for Complete Streets measures (*Text - S.2077 - 116th Congress (2019-2020)*, 2019). Transportation agencies have also relied on other federal-level funds such as Active Transportation Program (ATP) and SB535 Greenhouse Gas Reduction Funds (Heal the Bay, n.d.) to fund their Complete Streets projects.

In addition to federal funding, local jurisdictions can also seek various state-level and local-level funding to implement complete streets programs. For instance, the City of Los Angeles's Vision Zero Program was funded through a combination of 1) Special Gas Tax Improvement Fund (SB1); and 2) Measure M Local Return Fund (Llewellyn Jr. & Tso, 2017). A combination of different levels of funding and grants enables the implementation of Complete Streets projects. Further, the environmental, economic, and social benefits achieved by Complete Streets projects can potentially outweigh the costs (Smart Growth America, n.d.).

Appendix B

City of Santa Monica Crash Data 2016-2018 (TIMs data)

Collision Type	2016 (N=543)	2017 (N=566)	2018 (N=543)
Head-on	5%	4%	4%
Sideswipe	9%	12%	9%
Rear End	35%	32%	28%
Broadside	30%	23%	25%
Hit Object	4%	5%	4%
Overturned	2%	1%	1%
Vehicle/ Pedestrian	13%	16%	14%
Other	2%	7%	14%

Beverly Hills Crash Data 2016-2018 (TIMs data)

Collision Type	2016 (N=133)	2017 (N=366)	2018 (N=259)
Head-on	8%	7%	10%
Sideswipe	10%	10%	9%
Rear End	20%	23%	25%
Broadside	48%	44%	40%
Hit Object	5%	4%	3%
Overturned	2%	1%	1%
Vehicle/ Pedestrian	7%	9%	7%
Other	2%	1%	6%

Appendix C

Planning Elements for Separated Bike Lanes (FHWA 2015)

Planning Considerations	
SBLs within a Bike Network	Plan for a separated bike lane in context of a bike network, not as an isolated project. Connect origins and destinations. Develop a low-stress bike network accessible to novice cyclists.
Safety Benefits	Use separated bike lanes to create safety benefits at specific locations or along high-volume corridors. Providing physical separation may improve safety and provides peace of mind to novice cyclists.
Design Flexibility	Strategically deploy separated bike lanes where most needed. Consider context and use design flexibility on separation type, intersection treatments, and other design elements to promote safety and manage traveler expectations.
Existing and Potential Users	Desired bikeway routes may already attract cyclists. Plan for separated bike lanes along corridors that naturally draw cyclists to expand opportunities. Fill unmet needs on busy streets that discourage cycling due to high-traffic volumes.

Planning Elements for Separated Bike Lanes (Cont'd)

Local Support	Successful locations start with local support. Choose corridors where residential or business communities have bought into the idea of encouraging cycling through strategic infrastructure investment.
SBLs and Equity	Use separated bike lanes to promote cycling as an option for commuting to transit-dependent or carless households. Facilities can also improve connections to transit, jobs, schools, and essential services through safer first / last mile trips.
Contextual Considerations	
Roadway Capacity Effects	Consider how a separated bike lane affects motor vehicle volumes. Potentially implement a road diet, remove on-street parking, or remove a travel lane. Evaluate capacity effects holistically against mobility benefits of separated bike lanes and potential safety improvements relating to SBL implementation. Perform traffic modeling to measure disbursement of vehicles in road network.
Pedestrian and Other Street User Safety Effects	When locating bicycle facilities on higher-speed or higher-volume facilities, the separation afforded by SBLs may provide increased comfort and safety benefits. Improved organization of motor vehicle travel lanes and turn lanes, as well as reduced crossing distances and potential pedestrian safety islands, all provide benefits related to those found in FHWA's 9 proven pedestrian safety countermeasures.
Transit Corridors	Consider how a separated bike lane shares a corridor with transit services. Design lanes for safe interaction at transit stops or measures that separate bus and bike lanes, such as boarding islands. Consider placing facilities on left-sides of 1-way streets or on parallel, non-transit corridors.
Loading and Unloading	Engage in site-specific research on local loading and unloading requirements when designing separated bike lanes. Commercial corridors may require dedicated loading zones with clear markings. Explore off-street loading options and off-peak loading time incentives.

Planning Elements for Separated Bike Lanes (Cont'd)

Accessibility	Ensure that the interface of the SBL with pedestrian facilities at crosswalks, parking spaces, transit stops and other locations is accessible and in compliance with the Americans with Disabilities Act and other local requirements. Consider access to the curb for fire and emergency vehicles.
Parking	Evaluate parking needs holistically and attempt to minimize parking space losses where possible. Educate the public on floating parking regulations. Identify opportunities to provide parking on streets adjacent to separated bike lanes.
Installation Opportunities	
Pilot Projects	Use "pilot projects" to test reactions to separated bike lane concepts with minimal upfront investment. Evaluate designs, make necessary changes, and transition successful pilots to permanent buildouts where feasible.
Street Retrofits	Using the existing right-of-way, change geometry of the street to accommodate separated bike lanes. Consider changes to number or width of travel lanes and/or presence of on-street parking. Reduce costs by using scheduled resurfacing projects as opportunities for street retrofits.
New Construction or Major Reconstruction	Leverage major capital construction projects and include separated bike lanes in designs. The addition of separated facilities may represent a minimal increase on total construction investment.

Appendix D

Culver City Pedestrian, Bike, and Auto High Peak Hour Volumes

Data provided by the City of Culver City. Counts conducted in November of 2019.

Rank	Intersection	Volume (# of people)
1	Overland & Washington Blvd.	231
2	National and Washington Blvd.	220
3	Robertson Blvd & Higuera & Washington Blvd.	173
4	Washington Pl. & Harter & Tilden	147
5	Washington Pl. & Wade & Zaja & Washington Blvd.	145

Table D.1. **Pedestrian** AM (8-9 am) Peak Hour Volume

Rank	Intersection	Volume (# of people)
1	Washington Blvd. & Watseka Ave / Irving Pl & Culver	345
2	Washington Blvd & Canfield Ave & Culver	244
3	Hughes & Duquesne & Washington Blvd.	201
4	Overland & Washington Blvd.	190
5	Sepulveda & Washington Blvd.	185

Table D.2 **Pedestrian** PM (4:45-5:45 pm) Peak Hour Volume

Culver City Pedestrian, Bike, and Auto High Peak Hour Volumes (Cont'd)

Rank	Intersection	Volume (# of Bikes)
1	National & Washington Blvd	40
2	Sawtelle Blvd & Culver Blvd	32
3	Hughes/Duquesne & Washington Blvd	29
4	Overland & Washington Blvd	28
5	Sepulveda & Culver Blvd	28

Table D.3. **Bicycle** AM (8-9 am) Peak Hour Volume

Rank	Intersection	Volume (# of bikes)
1	National & Washington Blvd	35
2	Overland & Washington Blvd	33
3	Robertson Blvd & Higuera & Washington	26
4	Washington Pl. & Wade & Zaja & Washington Blvd.	26
5	Overland and Culver	25

Table D.4. **Bike** PM (4:45-5:45 pm) Peak Hour Volume

Rank	Intersection	Volume (# of Vehicles)
1	Sepulveda & Centinela	5,834
2	Sepulveda & Culver Blvd	5,653
3	La Cienega Blvd. & Washington Blvd.	4,969
4	Jefferson Blvd. & Overland Ave.	4,916
5	Marina Fwy Ramp & Slauson	4,802

Table D.5. **Auto** AM (8-9 am) Peak Hour Volume

Rank	Intersection	Volume (# of Vehicles)
1	Sepulveda & Centinela	6,054
2	Sepulveda & Jefferson / Playa	5,126
3	Sepulveda & Culver	5,097
4	Overland & Washington Blvd	4,976
5	Overland & Culver	4,771

Table D.6. **Auto** PM (4:45-5:45 pm) Peak Hour Volume

Appendix E

Culver City Top Five Dangerous Intersections, Ped/Bike/Auto

Collisions reported from 2016-2018, excluding the 405 freeway. Data from the Transportation Injury Mapping System (TIMS).

Rank by Danger Level	Pedestrian Collisions	# of collisions
1	Sepulveda & Jefferson/Playa	3
2	Washington Place/ Washington Blvd	2
3	Overland/Braddock	2
4	Sepulveda/Washington Blvd.	2
5	Washington Place /Wade/Zaja/Washington Blvd	2

Table E.1. **Pedestrian** collisions

Rank by Danger Level	Bicycle Collisions	# of collisions
1	Centinela & Washington Blvd	4
2	Overland & Washington Blvd	3
3	Duquesne & Culver Blvd	2
4	Sepulveda / Jefferson / Playa	2
5	Sawtelle & Washington Blvd	2

Table E.2. **Bicycle** collisions

Culver City Top Five Dangerous Intersections, Ped/Bike/Auto (Cont'd)

Rank by Danger Level	All Collisions	# of collisions
1	Centinela & Washington Blvd.	21
2	Sepulveda & Washington Blvd.	16
3	Overland & Washington Blvd.	16
4	Sawtelle & Culver Blvd.	16
5	Sawtelle Blvd & Washington Blvd.	12

Table E.3. **Auto** collisions

Appendix F

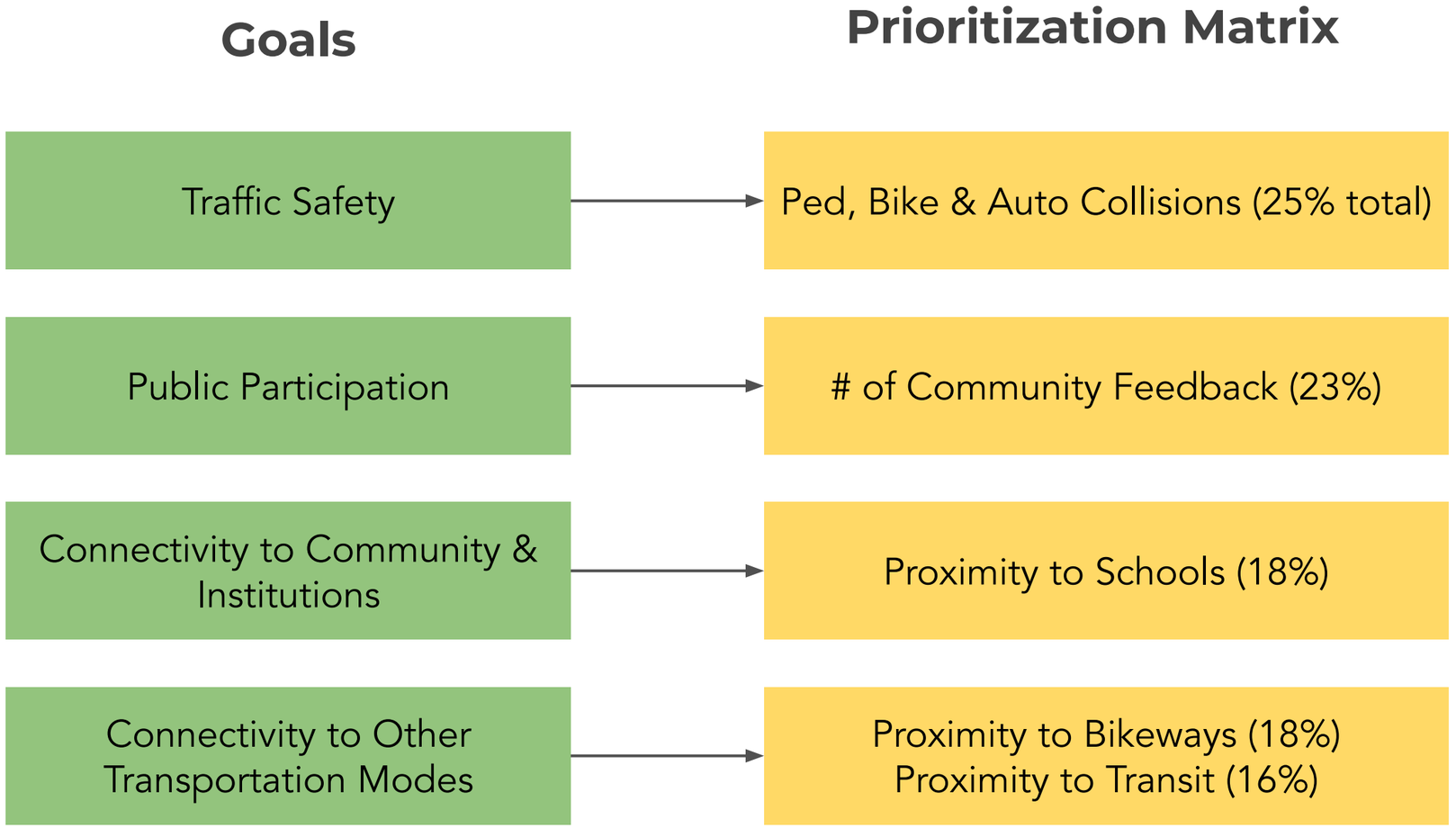
Bicycle and Pedestrian Master Plan Project Prioritization, Culver City and Alta Planning + Design, 2010

Table 6-2 Bicycle Project Prioritization

	Bikeway Type	Project Name	From	To	Connec - tivity	Activity Centers	Transit	Schools	Public Input	Collis- ions	Score Total
					WEIGHT						
				Blvd	3	3	2	2	1	1	
	BFS	Irving Pl	Lucerne Ave	Culver Blvd	0	2	0	2	1	1	12
	BR/L	Centinela Ave	Mesmer Ave	Green Valley Cir	0	2	2	0	1	1	12
	BL	Washington Pl	Washington Blvd. (east end)	Washington Blvd (west end)	0	2	0	1	1	2	11
	BFS	Harter Ave	S. City Limit	Washington Blvd	2	0	0	2	0	1	11
	BFS	Huron Ave	Braddock Dr	Venice Blvd	2	0	0	2	0	1	11
	BL	Green Valley Cir	Centinela Ave	Sepulveda Blvd	0	2	2	0	0	1	11
	BFS	Fox Hills Dr	Hannum Ave	Green Valley Cir	0	2	2	0	0	1	11
	BFS	Elenda St	Washington Blvd	Farragut Dr	0	1	0	2	2	1	10
	BFS	Lucerne Ave	Higuera St	Duquesne Ave	1	0	1	1	2	1	10
Tier 3	BRS/L/R/SLM	Hannum Ave	Sawtelle Blvd	Slauson Ave	0	2	0	1	1	1	10
Tier 3	BFS	Kinston Ave	Rhoda Way	Flaxton St		2	0	1	1	1	10
Tier 3	BR	Bristol Pkwy	Slauson Ave	Centinela Ave	0	2	2	0	0	0	10
Tier 3	BFS	Madison Ave	Washington Blvd	Farragut Dr	0	2	0	0	1	1	8

Appendix G

Prioritization Matrix



Prioritization Matrix (Cont'd)

Prioritization Level High | Mid High | Mid Low | Low

Street	From	To	Length (ft)	Proximity to Intersection w High Ped Collision Rate (Score 1-5)	Proximity to Intersection w High Bike Collision Rate (Score 1-5)	Proximity to Intersection w High Auto Collision Rate (Score 1-5)	Proximity to Recommended Bikeway (Score 0 or 1)	Proximity to School (Score 0-1)	Proximity to High Ridership Transit Line (Score 0-1)	Community Feedback	Total Weighted Score (100%)
Sepulveda Blvd	Slauson	Centinela	2851.2	8	2	7	1	0	1	20	625
National Blvd	Venice Blvd	Hayden Avenue	2534.4	0	0	0	1	1	2	24	620
Culver Blvd	Madison Ave	Washington Blvd	2481.6	0	2	1	1	0	2	22	581
Sepulveda Blvd	Sawtelle Blvd.	Slauson	2323.2	5	2	5	1	1	1	18	547
Washington Blvd.	Culver Blvd.	National Blvd.	2,541	0	1	0	1	1	2	20	538
W Slauson Ave	The 405	Marina Fwy	2904	5	5	3	1	1	1	15	512
Overland Ave.	Barman Ave.	Virginia Ave.	2745.6	0	0	0	1	1	0	18	450
Overland Ave.	Galvin St.	Playa St.	3696	0	5	2	0	1	1	14	416
Duquesne Ave.	Washington Blvd.	Farragut Dr.	2164.8	0	1	0	1	1	1	13	361
Culver Blvd	Corinth Avenue	Huron Ave	2904	2	0	4	1	1	2	11	361
Culver Blvd	Huron Ave	Overland Ave	2428.8	0	0	0	1	1	1	13	351

Prioritization Matrix (Cont'd)

Prioritization Level High | Mid High | Mid Low | Low

Street	From	To	Length (ft)	Proximity to Intersection w High Ped Collision Rate (Score 1-5)	Proximity to Intersection w High Bike Collision Rate (Score 1-5)	Proximity to Intersection w High Auto Collision Rate (Score 1-5)	Proximity to Recommended Bikeway (Score 0 or 1)	Proximity to School (Score 0-1)	Proximity to High Ridership Transit Line (Score 0-1)	Community Feedback	Total Weighted Score (100%)
Overland Ave.	Venice Blvd.	Barman Ave.	2956.8	0	0	0	1	1	1	12	328
Bristol Parkway	Green Valley Cir	Slauson	2587.2	3	0	2	1	0	0	12	319
Washington Pl.	Coolidge Ave.	Sepulveda Blvd.	2481.6	0	3	5	1	1	1	9	314
Washington Blvd.	National Blvd.	Roberts Ave.	2,783	4	0	0	1	1	2	8	292
Overland Ave.	Virginia Ave.	Galvin St.	2692.8	0	0	0	1	1	0	11	289
Duquesne Ave.	Farragut Dr.	Leash Ln	2587.2	0	0	0	1	1	0	11	289
Sepulveda Blvd	Ballona Creek Bike Path	Sawtelle Blvd.	2587.2	0	0	0	1	1	1	11	277
Sawtelle Blvd	Venice Blvd	Herbert St	2745.6	1	5	0	1	1	1	7	277
Jefferson Blvd	Duquesne Ave	Hetzler Road	2217.6	0	0	0	1	0	0	11	271
Sawtelle Blvd	Herbert St	Braddock	2587.2	1	8	3	1	1	1	4	271
Jefferson Blvd / Playa	Mesmer Ave	Sepulveda Blvd	2745.6	5	0	0	1	0	1	8	268

Prioritization Matrix (Cont'd)

Prioritization Level High | Mid High | Mid Low | Low

Street	From	To	Length (ft)	Proximity to Intersection w High Ped Collision Rate (Score 1-5)	Proximity to Intersection w High Bike Collision Rate (Score 1-5)	Proximity to Intersection w High Auto Collision Rate (Score 1-5)	Proximity to Recommended Bikeway (Score 0 or 1)	Proximity to School (Score 0-1)	Proximity to High Ridership Transit Line (Score 0-1)	Community Feedback	Total Weighted Score (100%)
Sepulveda Blvd	Venice Blvd	Washington Blvd.	2428.8	1	1	3	1	1	1	8	257
Sepulveda Blvd	Washington Blvd.	Culver City Limit (34.00154, -118.40431)	3379.2	1	1	3	1	1	1	8	257
National Blvd	Hayden Avenue	La Cienega Blvd	2587.2	0	0	0	1	2	1	8	254
Higuera St.	Hayden Ave.	La Cienega Blvd	2,963	0	0	0	1	1	0	9	243
Washington Blvd.	Sepulveda Blvd.	Elenda St.	2,549	0	3	1	1	1	2	6	241
Washington Blvd.	Elenda St.	Motor Ave.	2,773	0	0	0	1	1	1	8	236
Braddock Drive	Menton Ave.	Irving Pl.	3643.2	0	1	0	1	1	1	7	223
Higuera St.	Washington Blvd.	Hayden Ave	2,839	0	0	0	1	1	2	6	206
Jefferson Blvd / Playa	Sepulveda Blvd	Machado Road	2745.6	6	0	0	1	1	1	4	204
Washington Blvd.	Lindblade Dr.	Coolidge Ave.	2,600	3	0	1	1	1	1	5	202
Washington Blvd.	Coolidge Ave.	Sepulveda Blvd.	2,669	1	3	5	1	1	2	2	179

Prioritization Matrix (Cont'd)

Prioritization Level High | Mid High | Mid Low | Low

Street	From	To	Length (ft)	Proximity to Intersection w High Ped Collision Rate (Score 1-5)	Proximity to Intersection w High Bike Collision Rate (Score 1-5)	Proximity to Intersection w High Auto Collision Rate (Score 1-5)	Proximity to Recommended Bikeway (Score 0 or 1)	Proximity to School (Score 0-1)	Proximity to High Ridership Transit Line (Score 0-1)	Community Feedback	Total Weighted Score (100%)
Braddock Drive	Huron Ave.	Menton Ave.	2798.4	0	0	0	1	1	1	5	167
Jefferson Blvd	Machado Road	Overland Ave	2481.6	0	0	0	1	3	0	4	164
Bristol Parkway	West Centinela	Green Valley Cir	1320	0	0	4	1	0	0	6	161
Washington Blvd.	Motor Ave.	Irving Pl.	2,730	0	1	0	1	0	2	4	152
W Centinela Ave	Bristol Parkway	Green Valley Cir	2006.4	3	0	2	1		0	4	151
W Centinela Ave	Mesmer	Bristol Parkway	2217.6	3	0	2	1	0	0	3	130
Braddock Drive	Sawtelle Blvd.	Huron Ave.	2534.4	1	0	3	1	1	1	2	123
Washington Blvd.	Roberts Ave.	Fairfax Ave.	2,760	4	0	0	1	1	1	1	115
Washington Blvd.	Bosie Ave.	Lindblade Dr.	2,333	2	0	0	1	0	1	2	100
Jefferson Blvd	Raintree Circle	Duquesne Ave	2534.4	0	0	0	1	1	0	2	82
Washington Blvd.	Walnut Ave	Alla Road	2,612	0	0	0	1	0	1	2	80

Prioritization Matrix (Cont'd)

Prioritization Level High | Mid High | Mid Low | Low

Street	From	To	Length (ft)	Proximity to Intersection w High Ped Collision Rate (Score 1-5)	Proximity to Intersection w High Bike Collision Rate (Score 1-5)	Proximity to Intersection w High Auto Collision Rate (Score 1-5)	Proximity to Recommended Bikeway (Score 0 or 1)	Proximity to School (Score 0-1)	Proximity to High Ridership Transit Line (Score 0-1)	Community Feedback	Total Weighted Score (100%)
Washington Pl.	Wade St.	Grand View Blvd.	2428.8	0	0	0	1	0	1	2	80
W Slauson Ave	Marina Fwy	Wooster Ave/Hospital	3326.4	0	0	0	1	1	1	1	75
Washington Blvd.	Alla Road	Bosie Ave.	2,687	0	0	0	1	0	1	1	57
Washington Pl.	Grand View Blvd.	Coolidge Ave.	2692.8	0	0	0	1	0	1	1	57
Culver Blvd	Overland Ave	Madison Ave	2587.2	0	1	0	1	0	1	0	44
Jefferson Blvd	Overland Ave	Raintree Circle	2323.2	0	0	0	1	1	0	0	36

Appendix H

Cost estimates for Recommended Treatments

Downtown Culver City: Phase I

Phase I Intervention Overview				
Treatment Area	**Treatment Type**	**Treatment Details**	**Estimated Cost**	**Special Considerations**
Segment A	Scramble crossing	1. Lafayette Pl. and Culver Blvd. ~ 448 ft *(5 units)*	448 ft * $19/LF = $8,512 (Caltrans)	
	High visibility crosswalks on existing crosswalks	2. Watseka Ave. ~37 ft *(1 unit)*	37 ft * $19/LF = $703 (Caltrans)	
		3. Washington Blvd. ~32 ft *(1 unit)*	32 ft * $19/LF = $608 (Caltrans)	
		4. Washington Blvd. and Culver Blvd. ~ 64 ft *(1 unit)*	64 ft * $19/LF = $1,216 (Caltrans)	

Cost estimates for Recommended Treatments

Downtown Culver City: Phase I (Cont'd)

Phase I Intervention Overview (Cont'd)				
Treatment Area	**Treatment Type**	**Treatment Details**	**Estimated Cost**	**Special Considerations**
Segment A	High visibility crosswalks on existing crosswalks	5. Culver Blvd. (in front of Fire Station No. 1) ~ 77 ft *(1 unit)*	77 ft * $19/LF = $1,463 (Caltrans)	
		6. Irving Pl. ~ 47 ft *(1 unit)*	47 ft * $19/LF = $893 (Caltrans)	
	Painted crosswalk additions	7. Washington Blvd. and Delmas Terrace ~ 62 ft *(1 unit)*	62 ft * $19/LF = $1,178 (Caltrans)	
		8. Washington Blvd. and Watseka Ave. ~ 43 ft *(1 unit)*	43 ft * $19/LF = $817 (Caltrans)	
Segment C	Scramble Crossing	9. Culver Blvd/Main Street ~ 475 ft *(5 units)*	475 ft * $19/LF = $9,025 (Caltrans)	
	Painted Crosswalk Additions	10. Culver Blvd/Washington Blvd ~ 87 ft *(1 unit)*	87 ft * $19/LF = $1,653 (Caltrans)	
Total	-	~1372 ft *18 units*	1372 ft * $19/LF = $26,068 (Caltrans)	

Cost estimates for Recommended Treatments

Downtown Culver City: Phase II

Phase II Intervention Overview (cost estimates based on Caltrans Cost Database)				
Treatment Area	**Treatment Type**	**Treatment Details**	**Estimated Cost**	**Special Considerations**
Segment A	Eastbound bike lane	Irving Pl. & Duquesne Ave. on Culver Blvd.	$7.17/SQFT *740=$5306	Remove on-street parking spaces & road reconfiguration
	Eastbound bus-only lane	Irving Pl. & Duquesne Ave. on Culver Blvd.	$19/LF * 740= $14060	Fire Station/ Circulation of emergency response vehicles
	Westbound bus-only lane	Irving Pl. & Duquesne Ave. on Culver Blvd.	$19/LF*740= $14060	Remove on-street parking spaces & road reconfiguration
	Remove raised median	Irving Pl. & Duquesne Ave. on Culver Blvd.	$76.47/ SQYD *270 = $20647	

Cost estimates for Recommended Treatments

Downtown Culver City: Phase II (Cont'd)

Phase II Intervention Overview				
Treatment Area	**Treatment Type**	**Treatment Details**	**Estimated Cost**	**Special Considerations**
Segment A	Concrete median Planter	Irving Pl. & Duquesne Ave. on Culver Blvd.	$463.30/LF* 490 = $226870	
	Paint traffic strip	Irving Pl. & Duquesne Ave. on both Culver Blvd. and Washington Blvd.	$1.8/LF *5 *(680+740)= $12780	
	Remove concrete barrier with planter	Irving Pl. & Duquesne Ave. on Culver Blvd.	$750/ EA * 20=$15000	
	Planter box	Lafayette Pl. & Duquesne Ave. on Culver Blvd.	$1478.15/ EA *20 =$29563	
Total			$350,000	

Cost estimates for Recommended Treatments

Downtown Culver City: Phase III

Phase III Intervention Overview				
Treatment Area	**Treatment Type**	**Treatment Details**	**Estimated Cost**	**Special Considerations**
Segment A	Pedestrian Plaza	Area bounded by Duquesne Ave., Washington Blvd. and Culver Blvd. ~ 1 hectare/2.5 acres (total) ~ 0.4 hectares (excluding existing pedestrianized area)	2.5 acres * $6.8 million/acre = $17 million (Estimated cost based on Tongva Park development in Santa Monica where a parking lot was converted into a park)	The removal of eastbound vehicular lanes on Washington Blvd. and westbound vehicular lanes on Culver Blvd. will potentially cause traffic to be redirected to neighboring streets.

Cost estimates for Recommended Treatments

Southwest Sepulveda: Phase 1 Segment A

Phase 1 Intervention Overview				
Treatment	**Treatment Type**	**Treatment Details**	**Estimated Cost**	**Special Considerations**
Study Area	Class IV protected bike lane	1 mile The bike lane would include delineator posts And dashed markings through the intersection	1 mile striping at $100,000-$400,000/mile = $100,000-$400,000 (BPAP) Projected average cost= $250,000	Removing parking from the east side of Sepulveda in Segment A to fit a bikeway may be politically difficult.
	Public art	Utility boxes along the entire corridor (6 locations/unit)	6 boxes X$250/unit= $1,500 (Estimates based on: City of LA)	The City would need to include utility box painting as part of its Art ordinance.
Segment A	Parking lane removal	Sawtelle to Jefferson/Playa (east and west) ~1742 feet East: Removal of 11 foot lane West: Removal of 12 foot lane	N/A* *Included in the cost of bike lane additions	The lane removal allows for space to include a bicycle treatment, expanded sidewalks, and tree well increases. This measure should be done in conjunction with the aforementioned treatments, in order to avoid multiple street and sidewalk closures.
	High-visibility crosswalk	1. Vera Way East leg ~48 ft. 2-4. All existing legs of Berryman Ave./Sepulveda ~222 ft. 5-10. All existing legs of Sepulveda/Jefferson/Playa intersection ~498 ft. 8 Units	768 ft. x $19/LF = $14,592 (Caltrans average) *$2,500/unit * 8 = $20,000 (BPAP low)* *3,750*8=* *$30,000 (BPAP average)* *$5,000/unit * 8 = $40,000 (BPAP high)*	

Cost estimates for Recommended Treatments

Southwest Sepulveda: Phase 1 Segment B

Phase 1 Intervention Overview				
Treatment	**Treatment Type**	**Treatment Details:** Exact location Dimensions	**Estimated Cost**	**Special Considerations**
Segment B	High-visibility crosswalk	11-14. All sides of Slauson/Sepulveda intersection. ~352 ft. 15. Across the I-90 highway on-ramp ~49 ft. 16. Across parking lot entrance ~56 ft. 17-19. All existing crosswalks at Westfield Dr./Sepulveda ~187 ft. 9 Units	644 ft. x $19/LF= $12,236 (Caltrans average) *$2,500/unit * 9 = $22,500 (BPAP low)* *$3,750*9= $33,750 (BPAP Average)* *$5,000/unit * 9 = $45,000 (BPAP high)*	
	Painted walkway leading to transit center	Access to transit center from Sepulveda ~195 ft	195 x $12/LF = $2,340 (Estimates from: FHWA)	
	Add crosswalk to North side of intersection	1. At Westfield Drive across Sepulveda ~84 ft. 1 Unit	84 ft. x $19/LF = $1,596 (Caltrans average) *$2,500/unit * 1 = $2,500 (BPAP low)* *$3750/unit *1= $3750 (BPAP average)* *$5,000/unit * 1 = $5,000 (BPAP high)*	
	Pedestrian Signal	Westfield Drive across Sepulveda 2 Units	2 x $1,480/unit = $2,960 (Estimates from: FHWA)	
	Wayfinding to Transit Center	Along Sepulveda: -By Westfield Dr. -By turn-in to transit center off of Sepulveda -On north side of transit center by bus stop on Sepulveda	3 x $3,000/per unit =$9,000 (BPAP estimate)	
	Public art	Under the I-90 Freeway (10 pillars/units) Enlist local artists to paint the pillars in the underpass	$2,000/unit X 10= $20,000 total (Estimates: City of Charleston)	The City would need to work with Caltrans on this project and get their approval as part of their Transportation Art program. The high cost could be offset with partnerships, such as the California Endowment.

Cost estimates for Recommended Treatments

Southwest Sepulveda: Phase 1 Segment C

Phase 1 Intervention Overview				
Treatment	**Treatment Type**	**Treatment Details**	**Estimated Cost**	**Special Considerations**
Segment C	High-visibility crosswalks	20. Bankfield Ave ~76 ft. 21-22. All existing legs of Green Valley Cr. ~156 ft.	232 ft. x $19/LF = $4,408 (Caltrans average) *$2,500/unit * 4 = $10,000 (BPAP low)* *$3,750*4= $15,000* *$5,000/unit * 4 = $20,000 (BPAP high)*	
	New crosswalk	2. South leg of Green Valley Cr. ~94 ft. 3. 405 off-ramp onto Sepulveda Blvd. ~12 ft.	106 ft. x $19/LF = $2,014 (Caltrans average) *$2,500/unit * 4 = $10,000 (BPAP low)* *$5,000/unit * 4 = $20,000 (BPAP high)*	
	Pedestrian Signal	2. South leg of Green Valley Cr. 2 units	2 x $1,480/unit = $2,960	
	Public art	Under the 405 Freeway (30 pillars/units) Enlist local artists to paint the pillars in the underpass	$2,000/unit X 30= $60,000 total (Estimates from: City of Charleston)	The City would need to work with Caltrans on this project and get their approval as part of their Transportation Art program. The high cost could be offset with partnerships, such as the California Endowment.

Cost estimates for Recommended Treatments

Southwest Sepulveda: Phase 2

Phase 2 Intervention Overview				
Area	**Treatment Type**	**Treatment Details**	**Cost**	**Special Considerations**
Study Area	Class IV protected bike lane -Green paint -Permanent Bollards	1 mile	1 mile striping at $100,000-$400,000/mile = $400,000 (BPAP)	
Segment A	Temporary slip lane closure	Southwest corner of the Sepulveda/Playa/ Jefferson intersection ~170 square ft Low-level closure would include a painted curb extension and plastic barriers.	Low cost: $2,000 for painted curb extension Average cost: $13,000 for curb extension High cost: $20,000 for curb extension (FHWA)	Traffic volumes are very low at this location (approximately 8 vehicles in the AM and 25 in the PM hours). Closure would have minimal impacts to traffic volumes. Treatments should follow precedent from other cities to ensure safety.
	Pedestrian island	Crosswalk on Jefferson/Sepulveda/Playa north and south legs of Sepulveda	Either $9.80/sq. Ft. Or $13,520 per unit	
	Bike boxes for turning bikes	At intersection Jefferson/Sepulveda/Playa 4 units ~8ft each	~$1, 500/unit = $6,000 (Estimates from: NACTO)	
Segment B	Parking lot activation	East side of Sepulveda below the 90 Freeway underpass ~900 sq. ft Work with Westfield Culver City on a joint-use agreement that would allow the City to use the parking lot for community events.	N/A* *Cost is dependent on type of use. Typically both parties pay operating and facilities costs under a joint-use agreement	Westfield will have to assess their parking needs, and may not be willing to partner with the City. Additionally, if a joint-use agreement is reached, the community should be heavily involved in selecting the types of events/use for the lot. Environmental constraints will also need to be assessed due to the vehicle emissions from the highway.

Cost estimates for Recommended Treatments

Southwest Sepulveda: Phase 3

Phase 3 Intervention Overview				
Area	**Treatment Type**	**Treatment Details**	**Cost**	**Special Considerations**
Study Area	Class IV protected bike lane -Green paint -Planters or raised concrete curb	Along all of segment, 1 mile	Class IV bikeway with paved shoulder = $400,000 per mile	
	Bus lane -Removing lane of traffic on each side	Along all of segment, 1 mile	Cost per 1 mile/1 side= $500,000 1 mile x2= $1,000,000 (Estimates from: Boston Region Metropolitan Planning Org)	
Segment A	Sidewalk widening	Sawtelle to Jefferson/Playa (east and west) ~581 CY per side East and west: Addition of 1 foot of sidewalk space	1 side $1218/CY X 581CY= $707,658 Both sides $707,658 x 2= $1,415,316 (Caltrans average)	The sidewalk widening is dependent on parking lane closures, and should take place concurrently with tree well increases.Sidewalk construction should be prioritized first, to ensure that contingencies are put in place to designate temporary walking space. Additionally, the City will have to work closely with businesses who will be affected by the construction.
	Tree well increase/Bioswales	Sawtelle to Jefferson/Playa (east and west) East: Addition of 2 feet for tree wells= 6 feet total (includes ~15 tree wells) West: Addition of 4 feet for tree wells= 8 feet total (includes ~20 tree wells)	East: Bioswales $50/SF X 6= $300 $300X15 tree wells= $4,500 West: Bioswales $50/SF X 8=$400 $400 X 20= $8,000 Both sides: $4,500 +$8,000= $12.500 (City of Long Beach)	Tree well increases follow recommendations from the Culver City Urban Forest Master Plan. These increases are dependent on parking lane closures and should take place concurrently with sidewalk widening.The tree well increase will allow for tree replanting during the high level intervention.Bioswales are another alternative which capture water runoff. East: Buildings are closest to the right of way and thus provide some shade cover for pedestrians. Tree wells should increase to 6 ft for mid-large trees. West:Parking lots are closest to the right of way and create a hot, unshaded environment. Tree well should increase to 8ft for large canopy shade bearing trees

Cost estimates for Recommended Treatments

Southwest Sepulveda: Phase 3 (Cont.)

Phase 3 Intervention Overview				
Area	**Treatment Type**	**Treatment Details**	**Cost**	**Special Considerations**
Segment A	Tree replanting	Sawtelle to Jefferson/Playa (east and west) East: ~15 tree locations/units West: ~20 tree locations/units	East: $5,000/unit X 15= $75,000 West: $5,000/unit X20= $100,000 Both sides: $175,000 (City of Sacramento)	The Culver City Urban Forest Master Plan specified the types of trees to be included along this corridor (Chinese pistache and evergreen pear). Removing existing trees may become an issue if the roots have compromised any infrastructure.
	Bicycle signal	Sepulveda/Jefferson/PlaySouthbound Sepulveda where there is a dedicated right turn lane	1 x $1,000 = $1,000 (FHWA)	
Segment B	Sidewalk widening	East side of Sepulveda south of Slauson to the I-90 Freeway entrance ~167 CY Addition of 4 feet of sidewalk space	$1218/CY X 167 = $203,406 (Caltrans average)	The sidewalk widening is dependent on parking lane closure of the east side of Sepulveda.Sidewalk construction should be prioritized before other treatments to ensure that contingencies are put in place to designate temporary walking space. Additionally, the City will have to work closely with businesses who will be affected by the construction.
	Permanent pathway to Transit Center	Off of Sepulveda Blvd. 195 ft	65 CY x $1218/CY $79,170 (Caltrans average)	Would require negotiation with Westfield Mall property
	Permanent slip lane closure	Southwest corner of the Sepulveda/Playa/ Jefferson intersection ~170 square ft Permanent closure includes cement barriers, painted street treatment, and could include furniture.	Low cost: $2,000 for painted curb extension Average cost: $13,000 for curb extension (FHWA) High cost: $20,000 for curb extension	Traffic volumes are very low at this location (approximately 8 vehicles in the AM and 25 in the PM hours). Closure would have minimal impacts to traffic volumes. Treatments should follow precedent from other cities to ensure safety.

Cost estimates for Recommended Treatments

Southwest Sepulveda: Phase 3 (Cont.)

Phase 3 Intervention Overview				
Area	**Treatment Type**	**Treatment Details**	**Cost**	**Special Considerations**
Segment B	Permanent parking lot activation	East side of Sepulveda below the 90 Freeway underpass ~900 sq. ft Work with Westfield Culver City to designate a portion of the parking lot for permanent public use.	N/A* *Cost is dependent on type of use. Typically both parties pay operating and facilities costs under a joint-use agreement	Westfield will have to assess their parking needs, and may not be willing to apportion a part of their land to the City. The community should be heavily involved in selecting the use for the lot once land is appropriated.. Environmental constraints will also need to be assessed due to the vehicle emissions from the highway
Segment C	Sidewalk widening	East side of Sepulveda from Westfield Drive to Green Valley Circle ~334 CY Addition of 2 feet of sidewalk space	$1218/CY X 334 = $406,812	The sidewalk widening is dependent on parking lane closure of the east side of Sepulveda.Sidewalk construction should be prioritized before other treatments to ensure that contingencies are put in place to designate temporary walking space. Additionally, the City will have to work closely with businesses who will be affected by the construction.
	Street Lights	405 freeway underpass north of Centinela	2 x $4,805 per unit = $9,610	May required special installation/light type to fit while not impeding the walkway.
	Yield-controlled pedestrian crossing	Across 405 exit-ramp ~12 ft high-visibility crosswalk markings 2 Yield signs 2 Curb ramps	Markings 12 ft x $19LF = $228 Yield Sign 2 x $300 = $600 Curb Ramps 2 x $800 = $1,600 Total $2,428	Would necessitate coordination with Caltrans to remove part of a guardrail on the off-ramp, clear way for concrete pouring.