

CURB SPACE MANAGEMENT STUDY

SUBMITTED BY IBI GROUP WITH CONSENSUS, SUTRA RESEARCH,
CITYFI, AND FORWARD PROGRESS

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Glossary & Acronyms

Accessible Parking Permit	APP	A type of parking permit that issues parking privilege on designated parking facility to the individual with the disability.
Americans with Disabilities Act	ADA	A civil rights law that prohibits discrimination against individuals with disabilities in all areas of public life, including jobs, schools, transportation, and all public and private places that are open to the general public.
Bike Share		A shared transport network service in which bicycles are made available for shared use to individuals on a short-term basis for a price or free, where a member or renter can check out a bike from a station and return it to any other station within the network.
Capability Maturity Model Curb Readiness Assessment Survey	CMM	An online survey used to establish a baseline for each community and the region related to project readiness and curb space management initiatives. This survey tool benchmarked the program status and desired levels of improvement across the 21 CMM program elements.
City Advisory Team	CAT	6-10 representatives from a broad range of agency departments, such as parking, enforcement, public works, police/fire/emergency services, finance, traffic engineering, etc. CATs were formed in consultation with SCAG and the city's Project Champions. These representatives serve as subject matter experts.
Curb Space/Curbside		The space on the street that is closest to the curb. These two terms are used interchangeably throughout the report to refer to the same thing.
Curb Space Management Study	CSMS	A curb space study conducted by SCAG with IBI Group, taking a comprehensive and multimodal review of some of the most congested and complicated curb space locations within the SCAGs' region.
Curbside Typologies/Curb Types/Corridor Types		Categorization on curb space relying on different curbside stakeholders and curb functions to guide decisions on how to prioritize and optimize curbside uses for any street.
Electric Vehicle	EV	An automobile that is powered entirely or partially by electricity from a battery that requires recharging.
Greenhouse Gas Emissions	GHG	The emission into the earth's atmosphere of any of various gases, especially carbon dioxide, that contribute to the greenhouse effect.
Institute of Transportation Engineers	ITE	An international membership association of transportation professionals who work to improve mobility and safety for all transportation system users and help build smart and livable communities.
Last-Mile Freight Delivery Study	LMFDS	A study conducted by SCAG to increase understanding of last-mile delivery issues for the SCAG and its member cities by examining the relationship between last-mile access conditions, the delivery of goods, and the role of last-mile delivery in the overall transportation system.

License Plate Recognition	LPR	A technology that can capture and match license plate numbers to lists of plates stored in a database.
Orange County Transportation Authority	OCTA	The transportation planning commission for Orange County, California in the Los Angeles metropolitan area, being responsible for funding and implementing transit and capital projects for the transportation system for the travel needs, including freeway improvements, express lane management, bus and rail transit operation, and commuter rail oversight.
Pick-Up/Drop-Off	PUDO	A designated location where TNC could pick up or drop off customers to enhance safety and efficiency.
Project Advisory Committee	PAC	Consists of the 4 CATs and Project Champions from each of the 6 participating cities along with key curb space vendors and private technology innovators. This group met during each phase of the study to understand conditions, curb management concepts, site locations, data collection needs and methods, and pilot project or other recommendations.
Project Champions		The key contact(s) at each selected agency who served as the project manager for each community, helping coordinate the formation of the CAT, distribute the surveys, connect with data collection coordinators, and champion the project for their city.
Regional Working Group	RWG	The purpose of this group is to serve as a conduit to inform and educate regional stakeholders on curb management concepts, ideas, and potential projects.
Riverside Transit Agency	RTA	The main transit agency for western Riverside County, California, providing both local and regional services throughout the region with 33 fixed routes, four CommuterLink express routes, and Dial-A-Ride services using 334 vehicles.
Southern California Association of Governments	SCAG	US's largest metropolitan planning organization (MPO), representing six counties, 191 cities and more than 19 million residents. SCAG undertakes a variety of planning and policy initiatives to encourage a more sustainable Southern California now and in the future.
Transportation Network Companies	TNC	A ridesharing company that matches passengers with drivers of vehicles for hire through mobile apps. Examples include Uber and Lyft.
Vehicle Hours Traveled	VHT	The total travel time each vehicle is present on the roadway.
Zero-Emissions Delivery Zone	ZEDZ	A freight delivery region where goods, from food to packages, would be transported in a zero-emission vehicle (ZEV) to lower transportation emissions, reduce traffic congestion and advance the e-mobility sector.

Executive Summary

Curbside management is the deliberate design, organization, and governance of the curb space – the space on the street that is closest to the curb. In recent years, the curb space has become a battle ground between traditional uses, such as parking, goods delivery, transit, and bike lanes, and new users, such as rideshare, micromobility, and e-commerce. To address these evolving curb space needs, the Southern California Association of Governments (SCAG) conducted a Curb Space Management Study (CSMS) to analyze curb space segments of some of the more congested and complicated curb space within the SCAG region. This CSMS is intended to be the first step in the Region’s curb space journey; to set up a blueprint for the SCAG cities to undertake studies to further transform their curb space.

Additionally, CSMS directly supports one of the Key Connections in Connect SoCal, SCAG’s adopted 2020 Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS). Called Shared Mobility & Mobility as a Service, this Key Connection acknowledges that it is increasingly critical for cities to manage their curb space to ensure safe access for all people, and involving low-speed modes, ridesourcing, parking and local deliveries. Subsequent to adoption of Connect SoCal, SCAG completed work on the Last Mile Freight Delivery Study (LMFS). While the LMFS was mostly focused on the delivery and pick up of shipments via commercial vehicle operators and their relationships with retail/receiver customers, the confluence of vehicles utilizing curb space adjacent to loading zones and other commercial parking areas was assessed and has quickly become a pertinent issue. Therefore, SCAG’s efforts to understand regional curb challenges are also reflected in Last Mile Freight Program as well as Sustainable Communities Program Smart Cities & Mobility Innovations.

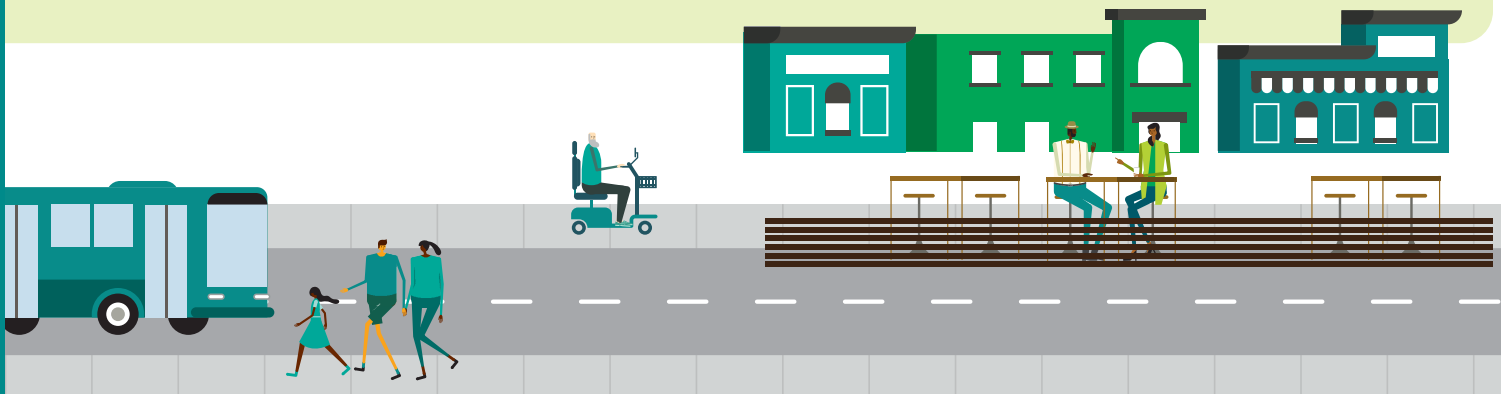
Primary objectives of the CSMS:

- Provide various curb space management strategies and recommendations for multiple cities within the SCAG region; and
- Develop a work plan for multiple pilot project concepts and/or analysis plans for pilot projects currently underway.

The regional goal of the CSMS will be to develop recommendations that will:

- **Reduce vehicle hours traveled (VHT) and greenhouse gas (GHG) emissions.** There are multiple opportunities to reduce VHT and GHG emissions at the first- and last-mile level;

- **Reduce congestion.** By taking a comprehensive and multimodal approach within complicated curb space areas, the study will consider optimal strategies for managing demand and reducing congestion;
- **Promote a balanced transportation system** by better understanding first- and last-mile relationships between TNCs and existing transit and active transportation systems;
- Establish key **collaboration** and **partnerships** with public agency and private sector stakeholders; and
- **Improve quality of life.**



Study Overview

SCAG's CSMS focused on six cities representing some of the most contested curb space and diverse curb attributes in Southern California. The participating cities were divided into two sets based on the degree of involvement in the project.

- **1A Cities** – Anaheim, Riverside, Santa Ana, and Santa Monica – participated in the data collection and implementation of pilot projects and best practice topics.
- **1B Cities** – Los Angeles and Long Beach – are interested in following the study and helping to guide the overall direction but did not participate in data collection or the implementation of pilot projects.

The CSMS study was divided into three phases:

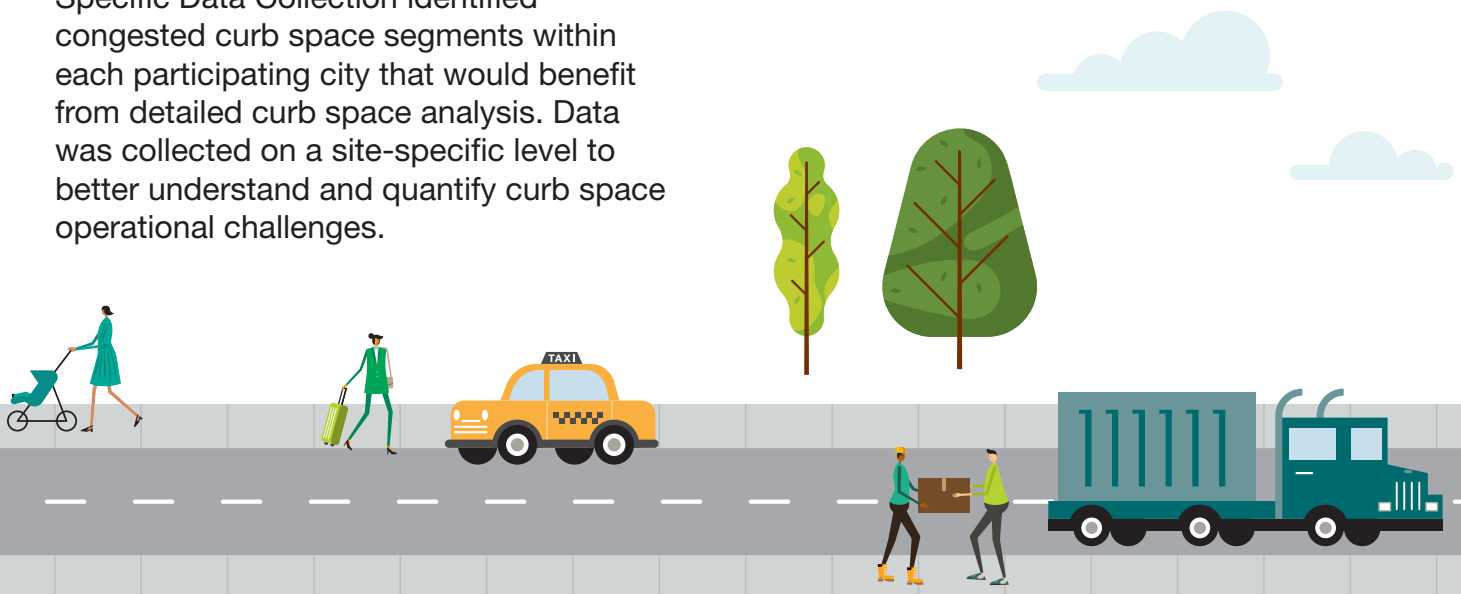
- **Phase 1:** Data Consolidation and Existing Conditions provided an overview of the existing conditions in participating cities. This included discussions with participating City staff and stakeholders, a survey to understand each city's current state and desired future state in relation to curbside management, and a review of background documents and policies to better understand existing curb space needs and challenges.
- **Phase 2:** Location Selection and Site-Specific Data Collection identified congested curb space segments within each participating city that would benefit from detailed curb space analysis. Data was collected on a site-specific level to better understand and quantify curb space operational challenges.

- **Phase 3:** Best Practices, Policies, and Potential Pilot Projects informed specific curb space management strategies and the identification of a toolkit of pilot projects, including recommendations for implementation and evaluation. A blueprint for these pilot projects is provided to facilitate larger scale deployment across the SCAG region.

Existing Conditions

The initial list of selected sites was identified through the process outlined, with a focus on existing datasets and input from stakeholders. The project team then met with City Champions to review the proposed sites and narrow down the list to three sites per city that align with the City's specific goals and objectives.

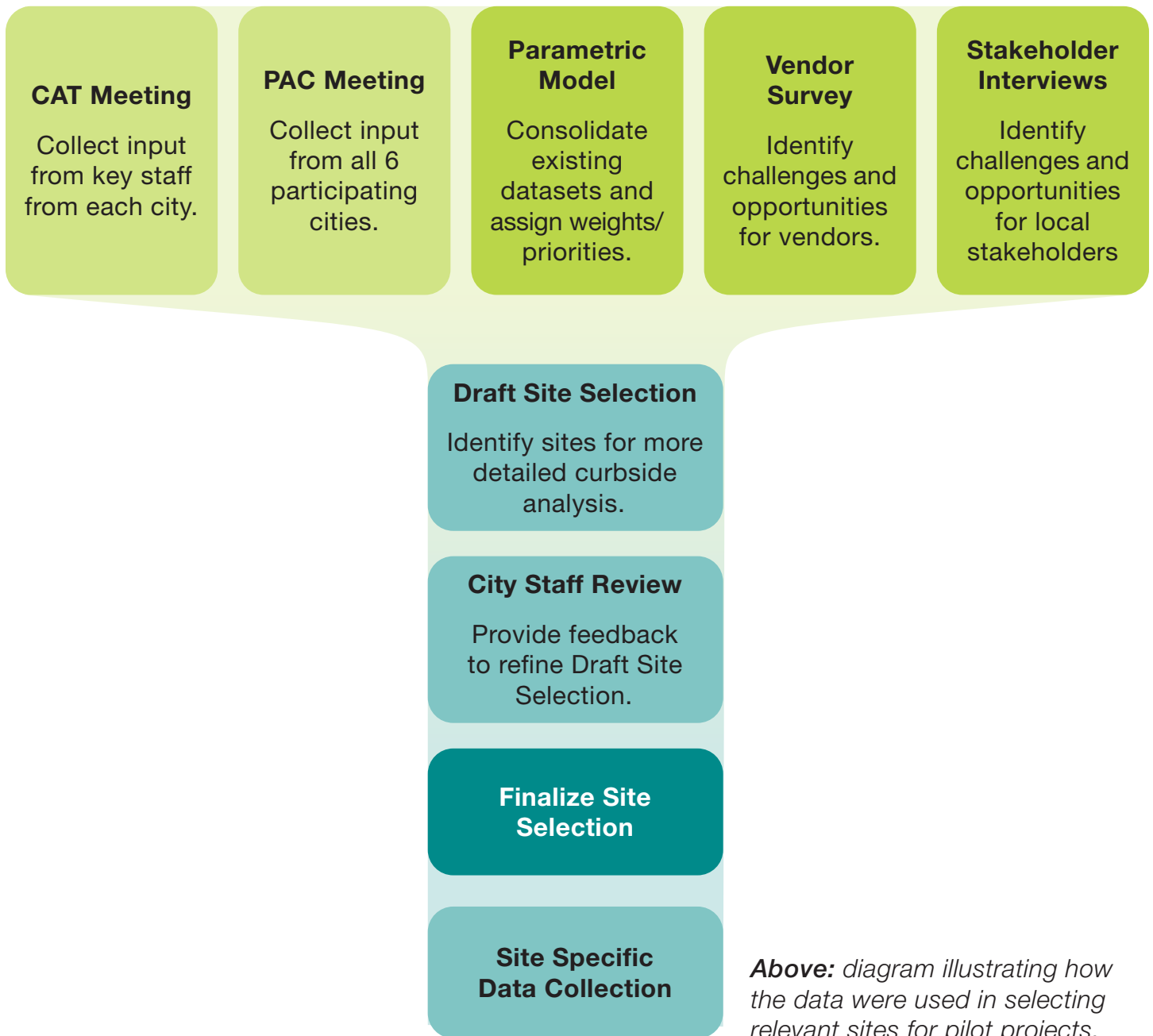
For each identified site, additional data collection was undertaken to deepen our understanding of on-the-ground conditions. Inventory and supply data (i.e., a record of all assets and regulations that exist on the curbside) was collected and analyzed using CurblQ – a parking, curbside, and asset management software solution. Demand data (i.e., events that occur at the curbside, such as a parking session) was collected using dashcam video or through curbside camera footage and aggregated in 20-minute increments.



Below: Summary of the sites selected

City	Site #	Location	Curbside Typology	Key Rationale for Selection
Riverside	1	University Avenue between Market Street and Lime Street	9. Mixed-Use Main Street	<ul style="list-style-type: none"> High loading activity compete with on-street parking and loading Transit routes and stops compete with on-street spaces Class II bike lane on east side of street Intersects with Riverside Pedestrian Mall
	2	Market Street between University Avenue and 6th Street	8. Mixed-Use Urban	<ul style="list-style-type: none"> High loading activity demand On-street metered parking supply Class II bike lane on both sides of street Near the Fox Performing Arts Center
	3	Orchard Street between Cortez Street and Madison Street	5. Neighborhood Street	<ul style="list-style-type: none"> On-street parking supply Mix of low-density and higher-density residential developments Nearby elementary school and shopping plaza
Santa Ana	1	3rd Street 300 feet west of Ross Street to Ross Street and Ross Street between 3rd and 5th Street	3. Employee Access	<ul style="list-style-type: none"> On-street parking, bus stops, and cyclist infrastructure present Inadequate parking and loading zone for parents and vendors at NOVA Academy Diverse land uses (government buildings, NOVA Academy Early College High School, Sasscer Park, Latino Health Access, and Downtown Santa Ana)
	2	3rd Street between Birch Street and Main Street	8. Mixed-Use Urban	<ul style="list-style-type: none"> Identified as an interest area by City staff On-street parking, loading zones, cycling facilities, and curbside patios present Mixed-use area with restaurants, retail, and mid-rise apartments
	3	Cubbon Street between Broadway to Main Street and Sycamore Street between Cubbon Street and McFadden Avenue	7. School Street	<ul style="list-style-type: none"> Adjacent to a school On-street parking present Near restaurants and a popular food truck Low-density residential and commercial areas

City	Site #	Location	Curbside Typology	Key Rationale for Selection
Santa Monica	1	2nd Street between Santa Monica Boulevard to Colorado Avenue	2. Multimodal Mobility	<ul style="list-style-type: none"> On-street parking, loading zones, cycling lanes, and bus stops present Heavily commercialized area with retail, hotels, and restaurants Vehicles often block bike lanes Courier delivery trucks often double park
	2	Ocean Avenue between Santa Monica Boulevard to Colorado Avenue	8. Mixed-Use Urban	<ul style="list-style-type: none"> Shared mobility drop zone Class II bike lanes on east side, Class IV bike lanes on the west side Restaurant patios present Mixed-use area with apartments, hotels, and restaurants
	3	Wilshire Boulevard between Yale Street to Princeton Street, and Harvard Street between Wilshire Boulevard and Arizona Avenue	8. Mixed-Use Urban	<ul style="list-style-type: none"> High loading and parking demand associated with Erewhon Market Mixed use area with commercial, medical centers, and residential On-street parking, loading zones, and bus stops present Mid-City neighborhood
Anaheim	1	Anaheim Boulevard between North Street and Wilhelmina Street	4. Mixed-Use Suburban	<ul style="list-style-type: none"> On-street parking, cycling facilities, and bus stops present Commercialized area consisting mostly of auto shops, restaurants, and bars Center City Corridor
	2	Center Street Promenade between Clementine Street and Harbor Boulevard and Lemon Street between Center Street Promenade and Broadway	10. Entertainment Corridor	<ul style="list-style-type: none"> On-street parking and loading spaces present Mixed-use area consisting of restaurants, offices, and apartment complexes Restaurant patios present Near St. Joseph Health Center and the Rinks Anaheim Ice
	3	Betmor Lane and Mason Lane between Lewis Street and Katella Avenue	6. Multi-family Residential	<ul style="list-style-type: none"> Located within Platinum Triangle near Coral Tree Park and Angel Stadium On-street parking and loading spaces present Dense residential site with condo and townhouse complexes



Stakeholder Engagement

Extensive stakeholder engagement was held throughout the study process to ensure that the six participating cities were engaged to their desired level, and that the study’s recommendations are both aligned with their specific goals and objectives and within their ability to action. All SCAG member agencies were given the opportunity to complete a readiness survey, participate in Regional Workshops, and receive information and educational emails.

The types of stakeholder engagement include:

- **Capability Maturity Model (CMM) Curb Readiness Assessment Survey:** an online survey used to establish a baseline for each community and the region related to project readiness and curb space management initiatives. This survey tool benchmarked the program status and desired levels of improvement across the 21 CMM program elements.

- **Stakeholder interviews:** including project champions, City departments and transit operators, SCAG committees, community-based organizations, and curb space vendors.
 - **City Advisory Teams (CATs):** 6-40 representatives from a broad range of agency departments. These representatives serve as subject matter experts.
 - **Project Advisory Committees (PACs):** includes the CATs and project champions from all participating cities along with key curb space vendors and private technology innovators. This group met during each phase of the study to understand conditions, curb management concepts, site locations, data collection needs and methods, and pilot project or other recommendations.
 - **Peer-to-Peer Exchange Sessions:** intended to bring expertise from the region and the nation to examine best practices and pilot projects for curb space management.
 - **Regional Working Group (RWG):** a conduit to inform and educate regional stakeholders on curb management concepts, ideas, and potential projects.
- Key findings and themes from the stakeholder engagement directly influenced the toolkit of recommendations and priority of pilot projects to ensure the results of this study are desirable, effective, and actionable for each participating city as well as saleable across the Region.

Below: Summary of key findings from stakeholder engagement

City	Active Transportation	Parking and Loading	Transit
Riverside	<ul style="list-style-type: none"> • The City is interested in adding more bike lanes. • Scooter, bike share, trolley systems have not been successful. 	<ul style="list-style-type: none"> • Parking availability is constrained in the downtown due to new residential developments, entertainment uses, and a loss of parking spaces serving businesses. • Residential parking from multi-family housing is spilling over to single-family neighborhoods 	<ul style="list-style-type: none"> • Current transit service does not support late night entertainment district transportation needs. • Reduced transit service has resulted in increased TNC activity and demand at the curb.
Santa Ana	<ul style="list-style-type: none"> • The City has added more bike lanes and is focused on improving active transportation. • Bike and scooter sharing system have had mixed success. • Safety for pedestrians and students is a priority. 	<ul style="list-style-type: none"> • The current residential parking permit program is an issue for tenants in large complexes who do not qualify for a permit. • Overnight parking in loading zones create issues for their intended use the next day. • Permitted parking spaces for food trucks are not clear enough. 	<ul style="list-style-type: none"> • Improvements to both transit frequency and connectivity are desired. • Curb space considerations will need to be made for the new streetcar. • Buses need space to deploy ramps and allow pedestrians safe access around it

City	Active Transportation	Parking and Loading	Transit
Santa Ana		<ul style="list-style-type: none"> • Confusing parking signage, lack of enforcement officers, and advanced technology have been barriers for parking enforcement. • Expanding on-street paid parking has received pushback from the community. • The City is interested in better consistency and coordination for parking meter rates and times. 	<ul style="list-style-type: none"> • OCTA has partnered with Lyft to provide supplemental service in some areas.
Santa Monica	<ul style="list-style-type: none"> • Bike and scooter share is operating relatively well. • There is an issue with TNCs parking in bike lanes. 	<ul style="list-style-type: none"> • There is not enough loading zones to support the city's increasing density, especially with an increase in TNC use and food deliveries. • The City uses sensors for informing enforcement routes and gathering data on turnover and pricing. Additional enforcement technology must be well-planned. • Double parking, particularly for ridesharing, is an issue and a safety concern. 	<ul style="list-style-type: none"> • Bus stops have become de facto loading zones. • More designated ADA access is needed.
Anaheim	N/A	<ul style="list-style-type: none"> • Food deliveries and pick-up/drop-off are not occurring in designated areas. 	<ul style="list-style-type: none"> • Bus stops are often blocked by illegal activity. Additional enforcement is desired.

Approach to Recommendations

The overall approach to recommendations was to systematically categorize and consolidate all the inputs and insights gained through the existing conditions review and stakeholder engagement, until manageable and logical recommendations arise.

At the top, inputs from a collection of sources were coded into unique insights that represented either problems or desired solutions at the curb. These insights were then organized into generalized curbside themes. To provide greater searchability within these themes, they have been organized into this project's best practice categories. 70 themes were organized into the following 9 best practice categories:



DEMAND

The amount of parking that would be used at a particular time, place, and price.

- Access (multimodal)
- Access (passenger)
- Access (short-term)
- Delivery (demand)
- Delivery (loading)
- Event planning
- Food trucks
- Loading (pick-up drop-off)
- Outdoor dining parking
- Parking (on-street)
- Parking (residential) parking (long-term)
- Parking (micromobility) parklets
- Pick-up drop-off zones
- Transit



POLICY

The process, guidelines, regulations, and laws that guide curb management decisions and work to achieve intended outcomes.

- Enforcement
- Permits (residential parking)
- Policy



NEW + CHANGING USES AND TECHNOLOGY

Improving city preparedness to manage new mobility solutions and increased curb demand.

- Bike share
- Biking
- Bikes (electric)
- Curb technology
- Electric vehicle
- Electric vehicle (charging)
- Electric vehicle (car share)
- Micromobility
- Mobility hubs
- Mobility (shared) parking (meters)
- Scooters
- Scooter share
- Shuttles
- Transportation network companies (TNCs)



DATA + PRIVACY

How the city collects, utilizes, manages, shares, and secures the information that it collects to inform curb management.

- Data
- Data-driven decision making
- Performance metrics



DESIGN

The way in which the street, including the curb space, is designed to accommodate access and serve city goals.

- Bike lanes
- Construction
- Development (real estate) infrastructure
- Loading (vehicle size)
- Painting treatments public space
- Public space (reallocation of)



COST

Pricing the curb space to reflect its true value and to encourage intended use, using the resulting revenue to pay for public services.

- Pricing
- Pricing (dynamic)
- Pricing (short-term)
- Pricing (regulatory hurdles)
- Pricing (equitable) revenue
- Revenue (parking)



AGENCY RESOURCES

The staff, budget, time, and capacity an agency has to dedicate to curb space management.

- Capacity (staff)
- Capacity (cost)
- Change management (organizational) leadership
- Organizational structure
- Organizational management partnerships
- Resources (organizational)



SAFETY

Creating safer streets through the design, designation, and regulation of curb space.

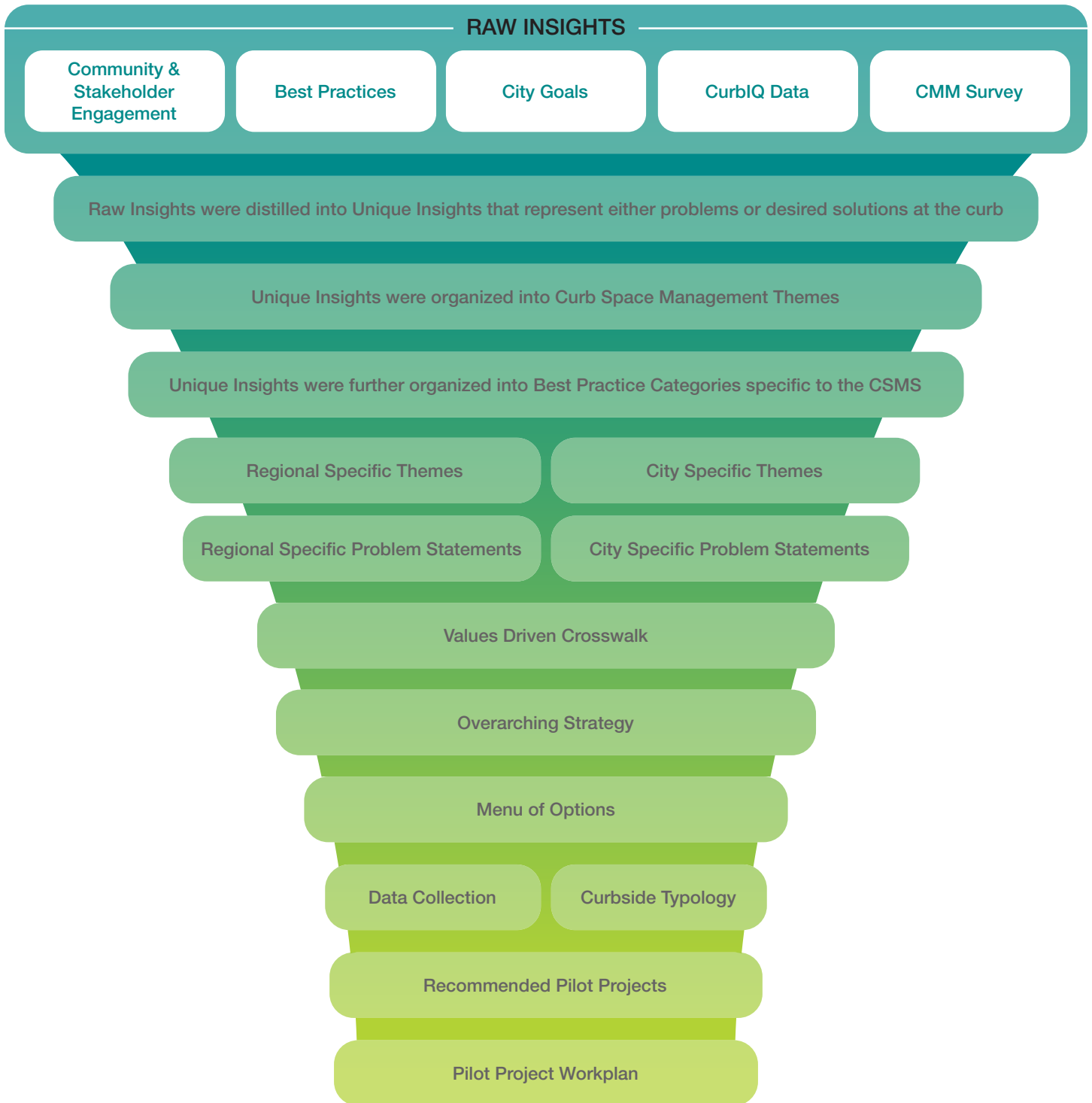
- Safety
- Traffic calming



COMMUNICATIONS + STAKEHOLDER PERCEPTIONS

Ensuring the public and stakeholders understand curb regulations and the reasoned policy rationales behind the regulations.

- Communications
- Education
- Engagement
- Public perception
- Signage



Above: Flowchart of the approach to recommendations

This generalized list of 70 themes was then organized and expanded upon with engagement and data inputs specific to either the region or a particular city to prepare the basis of regional and city-specific problem statements at the curb.

All problem statements were then crosswalked against additional factors to guide the organization of recommended options and to ensure values and desired outcome-driven recommendations. At this level, the crosswalking is intended to help the agency prioritize what might be the most appropriate solution from the menu of options for them, depending on their unique circumstances.

For each problem statement and its associated category, key strategies to solve that challenge were identified. The key strategies have 2 layers:

1. An **overarching strategy**, such as permitting, engagement, data analysis, etc.
2. A **menu of options** within the overarching strategy that provides an array of actions that could be taken to satisfy the original problem statement.

A note on curb types:

The key to effectively applying curb types is understanding that the defined typologies are a starting point in the design process and are a guiding principle, not an iron clad or rigid rule. They provide a common language to help decision makers, stakeholders, and the public alike better understand the different ways the curb space can be used, how the current curb space can be improved, and transparency in why decisions are made.

Text Box Before pilot projects can be recommended, the street's vision must be understood. Curbside typologies bridge the gap between high-level policy documents and detailed design work. They are aspirational visions of how a street can be used to serve the unique needs and wants of the local community and road users, while also working towards the larger visions and objectives of both the individual cities, as well as the SCAG region. Ten curb typology profiles were created to best reflect a range of existing and planned contexts in the SCAG region. The curb types were informed by factors such as stakeholder needs, curb functions, and surrounding land use, and loosely fit into three subcategories:



Recommendations

When developing the menu of options, a top-down approach was used to identify solutions that best address the concerns and priorities raised by stakeholders throughout all of SCAG. However, when cities are looking for specific solutions to implement, they often begin with a problem statement. The overarching strategies and menu of options toolkit developed allows for searchability in either direction (i.e., to see the types of projects associated with a particular theme, or to find a pilot project to address a specific problem statement).

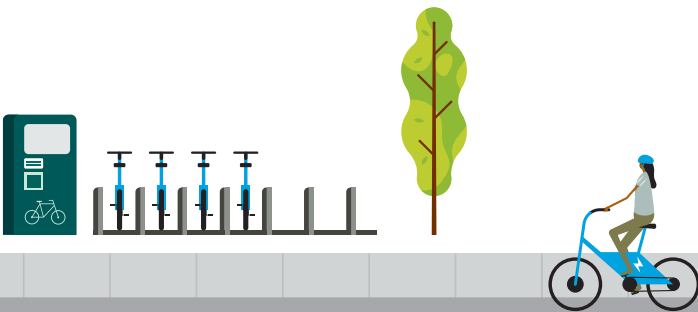
The intention with this CSMS is to provide the SCAG and its member cities with all the tools and direction needed to implement a successful curbside management program. To further guide decision-makers, a workplan template and accompanying step-by-step guidance was developed to help any city in the SCAG region design, implement, and evaluate a curb space pilot. Additional supporting material on specific topics, such as equity, preliminary cost estimates, and public-private partnerships, are also provided as supplementary material.

The recommendations that resulted from this study included the following:

- **Key problem statements for each city of the four participating cities were mapped to a series of pilot projects** (from the larger Menu of Options) that would address and improve the stated curbside need. Each

pilot project was also mapped to a pilot area (one of the selected sites) and assigned a rank in terms of regulatory complexity and effectiveness/impact to allow for prioritization. These city-specific short-lists are intended to serve as the first steps in improving and intentionally managing each city's curbside space. They are targeted plans to address each city's critical curbside needs.

- **At least one pilot project was selected to be recommended for immediate implementation for each city.** Project cutsheets were developed to describe the project, including the pilot area, the problem statement it addresses, potential partners, and additional descriptors.
- **A workplan was filled out for the city's recommended pilot project** (at least one per participating city) to provide each City with a solid starting point and set them up for success.



Below is a summary of the key findings and recommended strategies that resulted from the study.

City	Site #	Location	Curbside Typology	Key Data Findings	Recommended Strategies
Riverside	1	University Avenue between Market Street and Lime Street	9. Mixed-Use Main Street	<ul style="list-style-type: none"> Parking occupancy can reach 95% during peak hours on a weekday. Vehicles were often parked in no parking zones or blocking driveways for over 20 minutes at a time. The high occupancy percentage and frequency of illegal curbside activity indicate a high demand for on-street parking. 	<ul style="list-style-type: none"> Recommended Pilot: Computer Vision Cameras + Lidar to Better Understand Curb Congestion Through Data.
	2	Market Street between University Avenue and 6th Street	8. Mixed-Use Urban	<ul style="list-style-type: none"> During the week, parking occupancy is low outside of dinner hours. On the weekend, parking occupancy increases through the afternoon, peaking at capacity in the evening. 	<ul style="list-style-type: none"> Fluctuating parking occupancy rates present an opportunity to create flexible curb zones that accommodate various curbside functions throughout the day.
	3	Orchard Street between Cortez Street and Madison Street	5. Neighborhood Street	<ul style="list-style-type: none"> High average dwell times of 3-4 hours for free parking observed both during the week and on the weekend, likely due to residents in multi-family apartment buildings using on-street parking. 	<ul style="list-style-type: none"> Recommended Pilot: Residential Parking Program Pilot to Regulate Curb Demand and Access. Incentive programs for active transportation, such as e-bike rebate or transit pass trade in programs can support a mode-shift and reduce demand for on-street parking.

City	Site #	Location	Curbside Typology	Key Data Findings	Recommended Strategies
Santa Ana	1	3rd Street 300 feet west of Ross Street to Ross Street and Ross Street between 3rd and 5th Street	3. Employee Access	<ul style="list-style-type: none"> Significantly different demand is observed between weekdays and weekends, and between different times of day. Higher demand is observed during the week with an average of 100% parking occupancy during the observation hours. Illegal PUDO activity was observed, with nearly 40 instances occurring at this site. 	<ul style="list-style-type: none"> Recommended Pilot: Alternative Micromobility Permitting Pilot.
	2	3rd Street between Birch Street and Main Street	8. Mixed-Use Urban	<ul style="list-style-type: none"> During the observation period, the curbside space was consistently over capacity, both during the week and over the weekend, and usage increased into the night. Average dwell times range from under 20 minutes to over 2 hours. High use of driveways and no parking zones for short periods of time indicates a need for short-term parking with high turnover. 	<ul style="list-style-type: none"> Recommended Pilot: Performance-Based Pricing and Rebate Program Pilot. There is opportunity to shift long-term parking to adjacent streets, or off-street locations to free up curb space for short term parking with higher turnover, thereby serving a greater number of curbside users in a safe manner.
	3	Cubbon Street between Broadway to Main Street and Sycamore Street between Cubbon Street and McFadden Avenue	7. School Street	<ul style="list-style-type: none"> During the week, curbside activity is highest during the morning drop-off, and remains relatively consistent at 80% occupancy throughout the rest of the observation period. Parking occupancy is similar between weekdays and weekends. 	<ul style="list-style-type: none"> Improvements can be made to improve safety for people and to make PUDO times at the start and end of the school day easier for parents.

City	Site #	Location	Curbside Typology	Key Data Findings	Recommended Strategies
Santa Monica	1	2nd Street between Santa Monica Boulevard to Colorado Avenue	2. Multimodal Mobility	<ul style="list-style-type: none"> Throughout the observation period, parking occupancy rates are within the optimal range of 80%. Average dwell times indicate a need for both short-term and long-term parking, however short-term parking and loading activity is occurring in no-parking zones. Illegal curbside activity is problematic for transit operations as there is a bus lane along the corridor. 	<ul style="list-style-type: none"> Recommended Pilot: Analyze bus lane enforcement opportunities at the 2nd and Colorado bus stop.
	2	Ocean Avenue between Santa Monica Boulevard to Colorado Avenue	8. Mixed-Use Urban	<ul style="list-style-type: none"> On-street parking is heavily utilized with average occupancy rates greater than desired, in particular during the week. Average dwell times indicate a greater need for short-term parking as opposed to loading zones. There is a challenge with vehicles double parking along the curbside and parked in no parking zones blocking both bike lanes and driveways. 	<ul style="list-style-type: none"> Innovative parking strategies, such as a graduated price structure, automated enforcement, or flex zones.
	3	Wilshire Boulevard between Yale Street to Princeton Street, and Harvard Street between Wilshire Boulevard and Arizona Avenue	8. Mixed-Use Urban	<ul style="list-style-type: none"> Parking occupancy rates stay above 90% on average during the week and on weekends during the early afternoon. There is a high volume of vehicles that utilize the curbside for significant lengths of time, which impedes access for other multimodal users. Numerous instances of blocked driveways, parking spaces, and traffic lanes were observed. 	<ul style="list-style-type: none"> There is a need for more clearly defined curb space for the appropriate user, as well as a need for innovative enforcement strategies to ensure that curb space is utilized equitably. There is an opportunity to leverage curbside functions depending on the time of day, and day of week.

City	Site #	Location	Curbside Typology	Key Data Findings	Recommended Strategies
Anaheim	1	Anaheim Boulevard between North Street and Wilhelmina Street	4. Mixed-Use Suburban	<ul style="list-style-type: none"> On-street parking is not fully utilized at this site, but there are high average dwell times. 	<ul style="list-style-type: none"> There is opportunity to re-allocate unused on-street parking to other multimodal uses. Paid parking could be considered to promote curb space turnover.
	2	Center Street Promenade between Clementine Street and Harbor Boulevard and Lemon Street between Center Street Promenade and Broadway	10. Entertainment Corridor	<ul style="list-style-type: none"> This site has a high volume of vehicles using the curbside for parking and PUDO activity, including in no parking zones. Parking occupancy rates are over capacity during the week and on the weekend with little fluctuation. 	<ul style="list-style-type: none"> Improvements should focus on streamlining access for the most frequent curbside users for each time of day and day of week. Consideration for strategies involving pricing or enforcement of time-based curb spaces should be encouraged.
	3	Betmor Lane and Mason Lane between Lewis Street and Katella Avenue	6. Multi-family Residential	<ul style="list-style-type: none"> Parking occupancy rates are above 90% both during the week and on the weekend, with little variation throughout the observation period. There is a high volume of vehicles parked for over 2 hours. Significant illegal PUDO activity of less than 10 minutes was observed. 	<ul style="list-style-type: none"> There is opportunity to manage demand and access for various modes, such as TNCs, at the curb of major event centers, such as Disneyland. Time-based strategies and associated enforcement efforts could be used to promote turnover.

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1 Introduction

“Curbside management is fundamentally about creating an organization scheme that improves mobility and safety for all via prioritized and optimized curb space use.”

ITE Curbside Management Practitioners Guide

1.1 BACKGROUND CONTEXT

What is the curb space? At a very technical level, the curb space, also known as the curbside, is simply the space on the street that is closest to the curb. But the curb space is so much more than just empty space. It is where movement meets access. It is where you park your car when you visit your local shop, get into your taxi, ride your bicycle, or scooter, or dine at an outdoor patio. How you use the curbside defines and shapes how you interact with the land use around it.

Curbside management is not new. People have been parking in the curb space, driving through it, or using it as a loading zone for decades. The rise of the term “curbside management” in recent years is from a parallel shift in technology-based mobility, such as transportation network companies (TNCs) and bike share, the rise of e-commerce, as well as a desire to prioritize active transportation and safety.

Over the past decade, emerging trends in the transportation industry have greatly impacted the number of curb space users and how the curb space is used. Every single road user interacts with the curbside at some point, including drivers, cyclists, pedestrians, transit users, emergency services, delivery vehicles, taxis, and TNCs among other users. The impacts of the COVID-19 pandemic have forced cities to quickly reimagine what the curb can be

used for, repurposing on-street parking spaces to better support local businesses and residents through the implementation of curbside delivery zones, patios, and parklets. The number of competing uses results in curb space being a very scarce resource that needs to be carefully managed to ensure that it serves the users that need it the most.

A comprehensive Curb Space Management Study (CSMS) will tie into other parallel initiatives within the Southern California Association of Governments’ (SCAGs’) region, including the 2020/2021 Sustainable Communities Program, and the 2020 Last-Mile Freight Delivery Study (LMFDS). A well-designed curbside is critical in achieving goals related to active transportation, transit, road user safety, transportation demand management, place-making, community building, and the economy. In undertaking this study, SCAG is joining the progressive movement across the globe to re-imagine what the curb space can be, and how it can better serve its communities.

1.2 PROJECT BACKGROUND

To address these evolving curb space needs, the SCAG conducted a CSMS to analyze curb space segments of some of the more congested and complicated curb space within the SCAG region. Considering the increasing impacts of e-commerce on curb space, the CSMS will build off SCAG's previous work, namely LMFDS, which assessed the use of curb areas for deliveries in the City of Los Angeles and the role of last-mile delivery in the overall transportation system. This CSMS will not be the end of the SCAG region's curb space journey, but a step near the beginning. This study will set up a blueprint for the SCAG cities to undertake studies to further transform their curb space.

While the LMFDS resulted in recommendations for commercial vehicle curb space needs, the CSMS aims to leverage this previous work to develop a holistic curb space management approach that carries over the goals of the LMFDS and integrates the needs of all curb space users across the SCAG region.

Primary objectives of the CSMS:

- Provide various curb space management strategies and recommendations for multiple cities within the SCAG region; and
- Develop a work plan for multiple pilot project concepts and/or analysis plans for pilot projects currently underway.

The regional goal of the CSMS will be to develop recommendations that will:

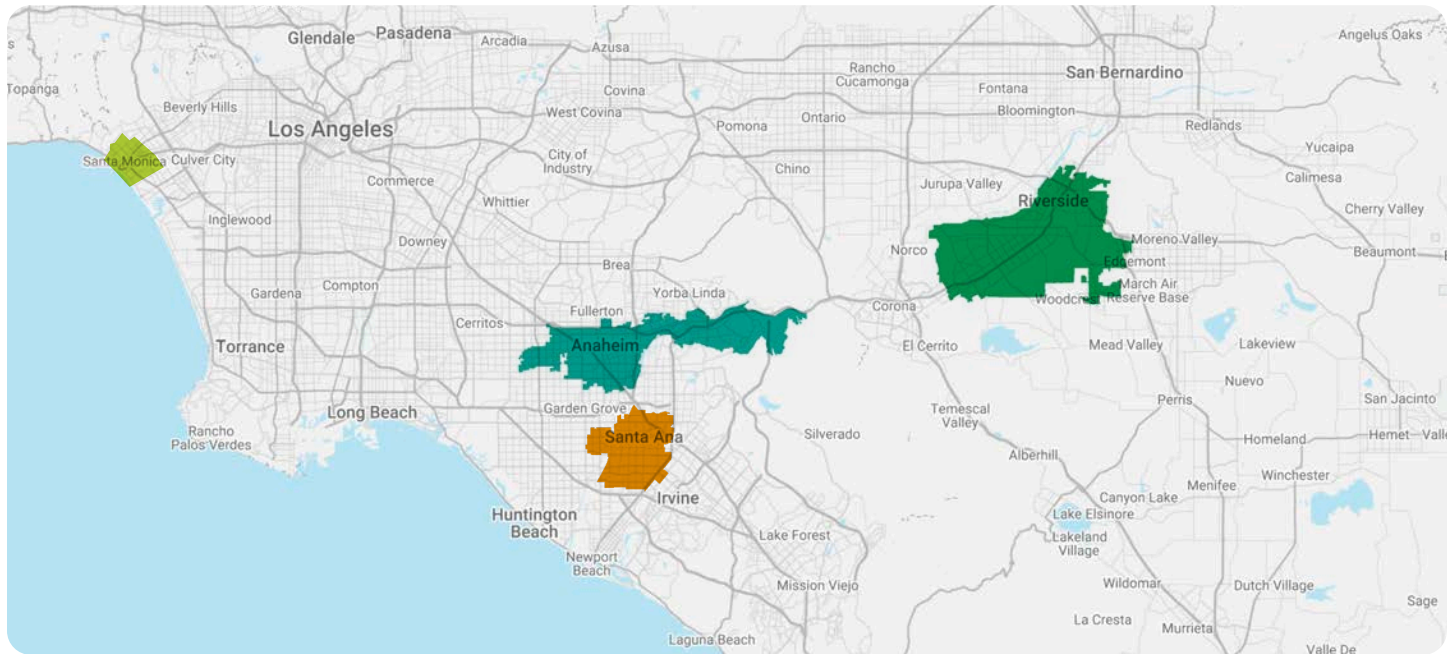
- **Reduce vehicle hours traveled (VHT) and greenhouse gas (GHG) emissions.** There are multiple opportunities to reduce VHT and GHG emissions at the first- and last-mile level;
- **Reduce congestion.** By taking a comprehensive and multimodal approach within complicated curb space areas, the study will consider optimal strategies for managing demand and reducing congestion;
- **Promote a balanced transportation system** by better understanding first- and last-mile relationships between TNCs and existing transit and active transportation systems;
- Establish key **collaboration** and **partnerships** with public agency and private sector stakeholders; and
- **Improve quality of life.**



To achieve these goals and objectives for the SCAG region, the study focused on six cities representing some of the most contested curb space and diverse curb attributes in Southern California. The participating cities were divided into two sets – 1A and 1B cities – based on the degree of involvement in the project:

1A Cities: Anaheim, Riverside, Santa Ana, and Santa Monica:

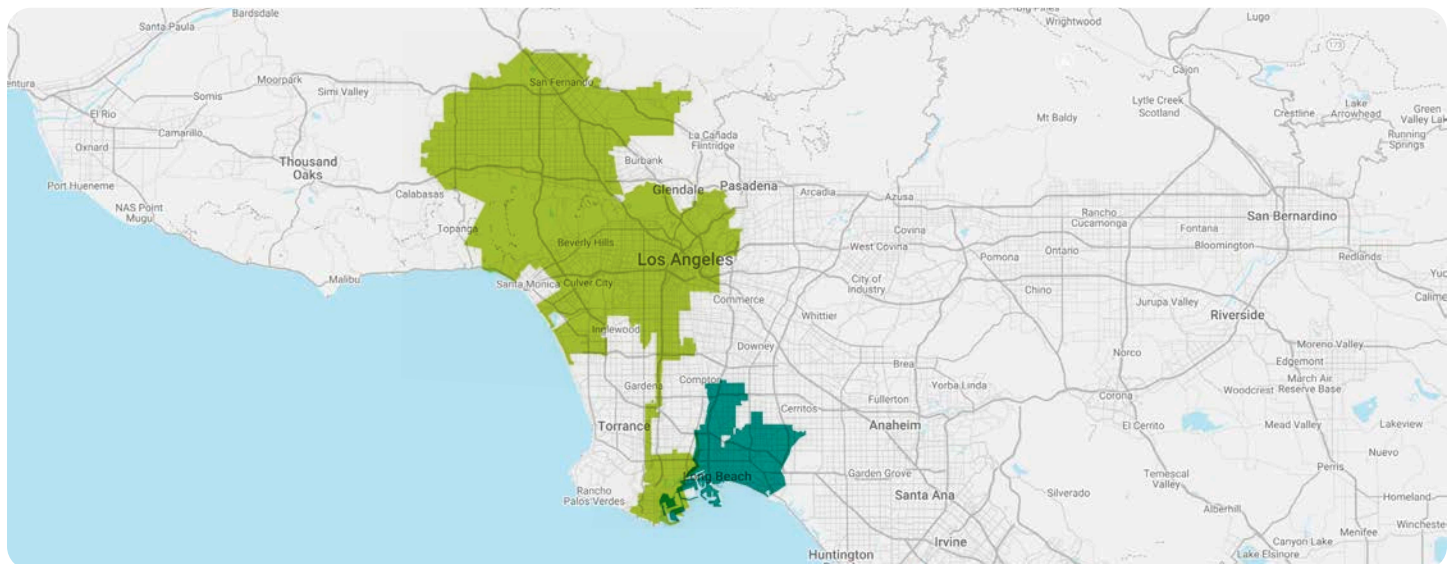
- These cities will be participating in the data collection and implementation of pilot projects and best practice topics.



■ Anaheim ■ Riverside ■ Santa Ana ■ Santa Monica

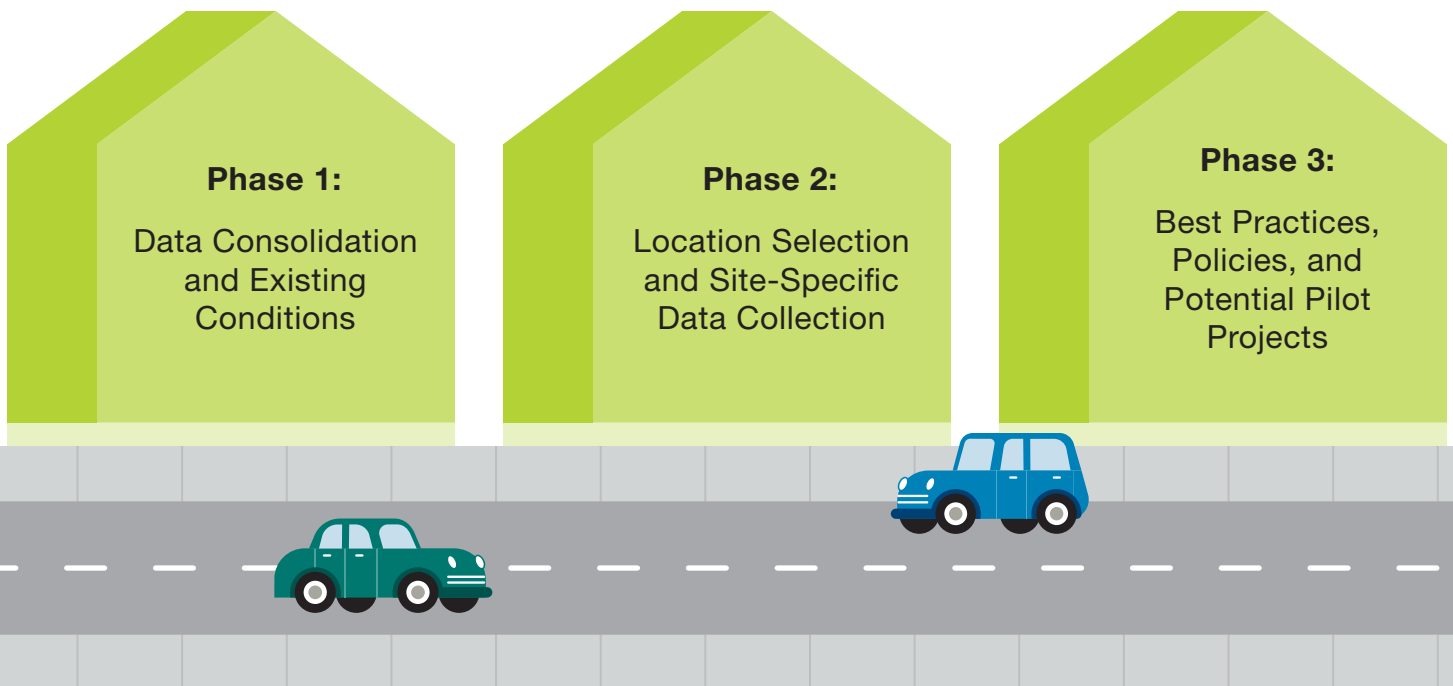
1B Cities: Los Angeles and Long Beach:

- These cities are interested in following the study and helping to guide the overall direction but will not be participating in data collection or the implementation of pilot projects.



■ Los Angeles ■ Long Beach

The CSMS study was divided into three phases:



Provided an overview of the existing conditions in participating cities. This included discussions with participating City staff and stakeholders, a survey to understand each city's current state and desired future state in relation to curbside management, and a review of background documents and policies to better understand existing curb space needs and challenges. Available data was provided by City staff and consolidated to inform an inventory of curb space datasets and identify existing data gaps.

Identified congested curb space segments within each participating City that would benefit from detailed curb space analysis. Sites were selected with the goal of including a variety of roadway configurations, land uses, and curb space uses that are representative of curb spaces found throughout the SCAG region. Within these smaller areas, data was collected on a site-specific level to better understand and quantify curb space operational challenges.

Based on the findings of Phase 2, the project team conducted a best practice review of curb space policies and initiatives to assist cities in developing effective management strategies. In some cases, pilot projects will be recommended for implementation. The project team will develop a toolkit of pilot projects, outlining recommendations for implementation and evaluation. A blueprint for these pilot projects will be provided to facilitate larger scale deployment across the SCAG Region.

1.3 REPORT LAYOUT

This report is a comprehensive summary of SCAG's CSMS, from data collection and stakeholder engagement through to the recommended pilots and implementation plan. It is intended to provide the reader with an understanding of what does the curbside currently look like in the Region, what do users want the curbside to look like, what tools are available to bridge that gap (both policy and design), and a concrete road map on how to achieve the Region's vision.

Section 1: Introduction provides the reader with an understanding of why this project was undertaken.

Section 2: Curbside Typologies provides a description of the curbside typologies that exist in the SCAG region, including stakeholder profiles and primary curbside functions for each typology.

Section 3: Existing Conditions and Site Selection describes the findings of the Existing Conditions review, how sites were selected, and findings from the data collection. An overview of Riverside, Santa Ana, Santa Monica, and Anaheim, and the associated document reviews, conversations, and site selection methodology for each of these cities is highlighted in this section.

Section 4: Stakeholder Engagement provides an overview of the different levels of engagement that were conducted throughout the study and describes how the results of those efforts were incorporated into the study.

Section 5: Approach to Recommendations This section notes the overall approach to recommendations, and how the process was to systematically categorize and consolidate all the inputs and insights gained through the existing conditions review and stakeholder engagement, until manageable and logical recommendations arose.

Section 6: Recommended Pilot Projects outlines what a pilot project is, why undertake one, and also summarizes best practices for managing the curbside and provides a toolkit of specific pilot projects recommended across the SCAG region.

Section 7: Data Collection and Analysis outlines the different types of data collected (i.e., inventory and demand), the collection method used as part of this project, challenges experienced, as well as an overview of the current state of curb data for SCAG cities.

Sections 8 to 11 does a deeper dive for each of Riverside, Santa Ana, Santa Monica, and Anaheim. These sections provide the existing and desired scores as it relates to the Curbside Maturity Model, emerging themes, and overall strategies and recommendations. An examination of each of the three sites is covered, and an overview of a pilot project for the cities is also explored for one of the sites.

Section 12 provides a high-level summary and best practices review for Los Angeles and Long Beach, based on initial discussions with these cities.

Section 13: Approach to Implementation then takes these pilot project templates for the sites and makes them actionable, not only for these cities, but for any city in the SCAG region. This is accomplished by both a questionnaire, and then a workplan template, that any city can implement.

Section 14: Next Steps provides guidance on where SCAG and its member cities can go from here, with all the information, strategies, workplan templates, and methodologies that came before this section.



2 Curbside Typologies



Stakeholder Profiles

Who uses the curbside?

What are their needs?

How can the curbside be designed to improve their experience?



Curbside Functions

What is the function of the curbside?

Which stakeholders benefit from each function?

What are the design objectives of the different functions?



Curbside Typologies

Who are the primary stakeholders?

What is the hierarchy of curbside functions?

What is the adjacent land use?

What is the street's primary purpose?

Curbside typologies bridge the gap between high-level policy documents and detailed design work. They are aspirational visions of how a street can be used to serve the unique needs and wants of the local community and road users, while also working towards the larger visions and objectives of both the individual cities, as well as the SCAG region. A curb typology is comprised of three main components: of stakeholder profiles, curbside functions, and curb types. Each component will be described further in this section.

Ten curb typology profiles were created to best reflect a range of existing and planned contexts in the SCAG region. Flexibility in the profiles is required since every corridor will have unique needs and priorities, and local stakeholders should be consulted during the design stage to confirm the selected uses address their needs (recognizing there will be trade-offs). The curb typologies framework created is not an exhaustive list of every type of possible corridor, stakeholder, or curbside function that could exist in the SCAG region. It is intended to serve as a starting point in better defining the corridor's context, primary functions, and understanding design considerations, while ensuring each corridor also works towards the larger network-wide objectives of the City and Region. Implementing a consistent typology framework also promotes consistency across the region, improving communication and understanding among residents and visitors that travel within. It is meant as a broad tool and guidance for planning curb space functions, and repurposing existing uses for other uses.

Above: Visualization of the process by which the curbside typologies were developed

2.1 STAKEHOLDER PROFILES

Before a street can be designed, its users must be understood. Illegal curbside use is typically either a sign of improperly designed space or a change in the curbside demand and highlights an unmet need. The solution isn't necessarily to enforce proper usage, but to change the design and provide education to better address stakeholder needs. Each stakeholder brings a unique perspective of curbside function and desired improvements. Having a good understanding of the key stakeholders for a given corridor is preferred to effectively balance the needs of all stakeholders without causing negative effects to the experience of other corridor user groups.

The stakeholder profiles serve as the first building block to identifying corridor types. Stakeholders were used to identify the main curbside functions that were performed along the selected corridor segments. For example, identifying businesses and couriers/goods movement as stakeholders helped to inform that access for deliveries is a critical curbside function to allocate curb space for, but more so the specific curb space access needs and elements surrounding the access. Note that the list of stakeholders is primarily informed by industry best practice with input from SCAG and members of the participating cities used to ensure all curbside users within their cities are included. These stakeholder profiles are intended to be high-level, used to provide initial guidance into how to improve curb space design. Stakeholder needs, wants, and challenges for specific curb segments will be further explored with input from community members during the design process. This section is focused on general guidance that can be applied throughout all SCAG member cities.

	Cyclists	Uses curbside space for exclusive cycling facilities separated from vehicles, either from physically separated cycle tracks, or bicycle lanes buffered by pavement markings.
	Micromobility	Uses curbside space for exclusive cycling facilities separated from vehicles, either from physically separated cycle tracks, or bicycle lanes buffered by pavement markings. Uses space for bicycle storage/parking, bicycle/scooter docking areas.
	Pedestrians	Use the curbside to access goods and services or interact with other users.
	Motorists	Want to have reliable and predictable travel times across the road network.
	Motorists (Parking)	Uses curbside space for parking to visit businesses, residents, etc. User surveys indicate that few drivers are willing to walk further than 1/4 mile from a parking location to their destination.
	Transit/ Paratransit	Want to have reliable and predictable travel times across the road network (improved travel times); need curbside stops to load/unload passengers.
	Accessible Parking Permit	Uses curbside space for parking, and loading/unloading of passengers. Dedicated/designated space would be preferred.
	TNCs/Taxis	Uses curbside space to idle and park while awaiting future passengers; uses curbside areas to load/unload passengers. Dedicated/designated space would be preferred.
	Businesses (patios, loading/pickup zones)	Uses curbside space for patios/designated outdoor areas for customer gathering; uses space for loading/pick up zones for food delivery services and order pick up.
	Couriers/Goods Movement	Uses curbside space for loading/unloading of goods in close proximity to their destination. Dedicated/designated space would be preferred. Surveys of couriers indicate that very few are willing to park further than 1/8 mile from their destination.
	Emergency Services	Uses curbside access to park, as well as curbside space to access buildings and set up facilities; needs to travel quickly and unimpeded across the road network, and uses passable space to do so.
	Food Trucks	Uses curbside space to park their vehicle with space for customer gathering, especially during peak times.

2.2 CURBSIDE FUNCTIONS

There are 5 main curbside functions, each with a profile of the curbside stakeholders that are most dependent on the function. Improvements in any of the functions can improve the experience of their associated stakeholders.

Curbside functions serve as the second building block for defining corridor types. Just as curbside functions were defined by the stakeholders that use them, curbside functions were used to inform corridor types. More specifically, corridor types were defined by identifying which curbside functions should be prioritized along certain corridors. Prioritization was pre-dominantly determined based on industry best practice while ensuring that there was diversity in the different curb types, and that they generally aligned with SCAG's goals and objectives. The curbside function should serve both the surrounding land uses, and the street's primary purpose.

FUNCTIONS	PROFILE	DESIGN OBJECTIVES
 <p>Movement</p>	<ul style="list-style-type: none"> • Motorists • Cyclists • Micromobility • Transit/Paratransit • Emergency Services 	<ul style="list-style-type: none"> • Reliable and predictable travel times • Restricted curbside access • Dedicated infrastructure for different users (e.g., transit lanes, cycle tracks, etc.)
 <p>Deliveries</p>	<ul style="list-style-type: none"> • Couriers/Goods Movement • Businesses 	<ul style="list-style-type: none"> • Ensure access for couriers/goods delivery trucks • Loading zones for both short-term and long-term (or multiple) pick-ups/deliveries
 <p>Access for People</p>	<ul style="list-style-type: none"> • Pedestrians • Motorists • Transit/Paratransit • Accessible Parking Permit • TNCs/Taxis • Businesses 	<ul style="list-style-type: none"> • Provide safe, dedicated spaces for vehicles to pick-up/drop-off passengers, including valet loading areas • Ensure safe access for Accessible Parking Permit holders is provided near their destination • Provide unimpeded access to transit stops
 <p>Parking</p>	<ul style="list-style-type: none"> • Micromobility • Motorists (parking) • Accessible Parking Permit • Businesses 	<ul style="list-style-type: none"> • On-street parking for cars, bikes, scooters, and bus layovers • Metered parking can help to manage turnover and car parking availability • Accessible parking spaces should be provided along the curb space to accommodate those with differences in ability • Short-term on-street parking can be complemented with nearby off-street lots for longer-term parking • Bike racks, bike share hubs, scooter corrals, micromobility hubs, and protected/covered bike parking located nearby key destinations can increase accessibility for travelers and make their trips more convenient and efficient
 <p>Placemaking</p>	<ul style="list-style-type: none"> • Pedestrians • Motorists • Food Trucks 	<ul style="list-style-type: none"> • Provide seasonal space for placemaking, such as patios, parklets, food trucks, etc.

2.3 CURBSIDE TYPOLOGIES

Curbside typologies, or curb types, were identified by relying on curbside stakeholders and curb functions as primary building blocks. Curb types were also informed by the diverse land uses surrounding study corridors, including residential, commercial, office space, schools, and mixed use. Surrounding land uses informed which stakeholders and functions were present along study corridors. Once the importance of each curbside function was ranked along each study corridor, the corridor type was defined. Note that the rankings assigned are not set in stone. Curbside functions were ranked primarily based on the prevalence of certain types of land use (e.g., if a curbside had a high proportion of commercial or mixed-use buildings, or if it was a school) and the stated goals and objectives for the study (e.g., promote a balanced transportation system, and reduce VHT and GHG emissions). The rankings were used to identify different types of corridors that exist within the SCAG region, so that there is consistency within the region as each City continues forward with implementing their curbside management strategies. As noted before, the curbside typologies are intended to be more aspirational desires for the corridor to guide strategy development. They are not intended to be hard and fast definitions.

To ensure the diverse variety of streets within the SCAG region were accounted for, 10 curbside typologies were defined, loosely fitting into three subcategories:



2.3.1 Mobility Corridors

Mobility corridors predominantly serve as a means of moving high volumes of people with the goal of having fewer traveler delays and stops along the corridor. These corridors prioritize through-movements for motorists, cyclists passing by on bike lanes, buses along dedicated transit lanes, and dependable emergency vehicle access. The focus of these corridors is to provide ease of movement by creating a corridor with restricted access and predictable travel times for travelers. However, this often comes at the expense of reducing the frequency of other curbside functions, such as Parking and Placemaking.

1. ARTERIAL

- High volume of vehicular travel
- Vehicle throughput oriented
- Higher speed limits
- Roadway classification is a major, primary, principal, or secondary arterial

Below: Looking eastbound on Katella Avenue from Lewis Street in Anaheim

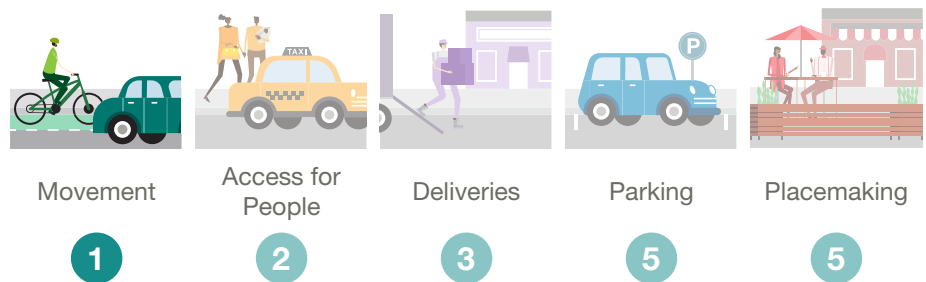


Primary purpose: Efficiently moving high volumes of traffic.

Key stakeholders: Motorists, Emergency Services.

Main design consideration: Accommodating both weekday rush hour commuter activity as well as off-peak recreational use, usually achieved through a right-of-way with more than 2 lanes in each direction and coordinated signalized intersections.

Secondary design considerations: Placemaking and parking have the least amount of function along these corridors as even small volumes of vehicles accessing the curb have a significant impact on roadway capacity. To achieve desired traffic flows, vehicle parking will have to be displaced to off-street locations or to a neighboring corridor.



2. MULTIMODAL MOBILITY

- Prioritizes the movement of transit, micromobility users, bicyclists, and pedestrians
- Requires clear separation of curbside space for all functions to avoid conflicts between stakeholders

Primary purpose: Support multimodal movement.

Key stakeholders: Cyclists, micromobility, pedestrians, transit/paratransit.

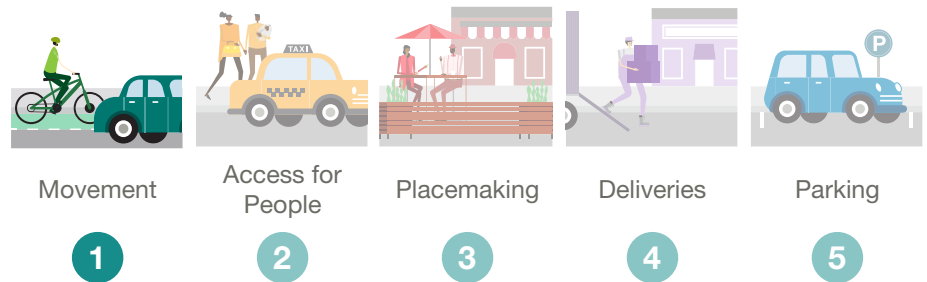
Main design consideration: Since there are more stops made along this type of corridor, efforts should be made to differentiate between curb space designated for transit stops, micromobility and bike parking, and pick-up drop-off (PUDO) locations. Transit and micromobility facilities, such as transit

Below: Looking westbound on 2nd Street from Santa Monica Boulevard in Santa Monica



lanes and bicycle lanes, are often implemented to support the multimodal movement along this corridor.

Secondary design considerations: To ensure that there is sufficient space for deliveries and parking, these curbside functions should be pushed to a nearby corridor that is more focused on vehicular traffic.



3. EMPLOYEE ACCESS

- Promotes employee access to office space or government buildings & may be located near off-street parking

Primary purpose: Supports access for employees.

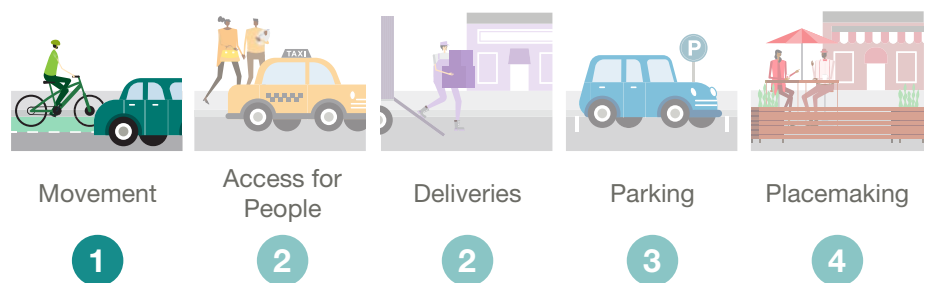
Key stakeholders: Transit, cyclists, pedestrians, couriers/goods movement, motorists (parking), TNCs/taxis, businesses (patios, loading/pickup zones).

Main design consideration: Facilitate dedicated transit lanes, enhanced transit waiting areas for transit access. Promote cyclist and pedestrian safety by implementing protected or high visibility bike lanes, high visibility crosswalks, and accessible pedestrian signals, and enhance street lighting.

Below: Looking northbound on Ross Street from 3rd Street in Santa Ana



Secondary design considerations: Dedicated loading zones should be implemented along corridors where possible to ensure that there is sufficient curb space and to avoid couriers and delivery trucks receiving tickets for double parking. While deliveries and PUDO activity is a more common function along Employee Access corridors, parking for personal vehicles should be relocated to off-street parking structures.



2.3.2 'Community Corridors' Typologies

Corridors where the surrounding land use is predominantly residential can be classified into the “community corridors” category. These corridors provide space for people to access their homes and accommodates street space for deliveries and on-street parking. Some community corridors have varying levels of person-throughput, and as such the priority of movement will depend on each corridor. Additionally, these corridors may also have mixed-use settings with a combination of low-density retail and residential land uses. Community corridors promote an activated street space to make people feel safe, while also creating a quiet environment for residents. The focus of these corridors is to provide a desirable environment that encourages safe and efficient access for all residents.

4. MIXED-USE SUBURBAN

- Wide lane widths
- High volume of vehicular traffic
- Diverse modes of transportation
- Commonly located in suburban areas
- Prioritizes access to retail space or strip malls on one side of the corridor and access to single family homes on the other

Below: Looking northbound on Anaheim Boulevard from Wilhemina Street in Anaheim



Primary purpose: Supports access to multimodal movement.

Key stakeholders: Motorists, couriers/goods movement, transit, bicyclists, pedestrians.

Main design consideration: Businesses and homes located along Mixed-Use Suburban corridors rely on package deliveries. Include sufficient loading space along the curb for couriers and larger delivery trucks to accommodate deliveries to both businesses and residents.

Secondary design considerations: Given that strip malls and private residences often have off-street parking reserved for visitors and residents, providing on-street parking for vehicles along these corridors is less important. Instead, some curb space should be allocated for bike and micromobility parking for customers visiting retail spaces.



5. NEIGHBORHOOD STREET

- Is surrounded by a blend of single-family homes and multi-family residential buildings

Primary purpose: Supports access to residences.

Key stakeholders: Pedestrians, couriers/goods movement, motorists, cyclists.

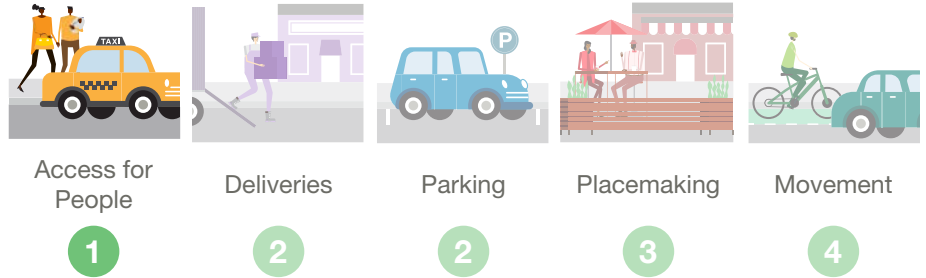
- Prioritizes people’s access to their homes, access for couriers, and activated public spaces

Below: Looking southbound on Orange Street in Santa Ana



Main design consideration: Accommodate both driveway access and parking needs, as well as safe pedestrian access.

Secondary design considerations: Through movement of vehicles should be directed to neighboring corridors with higher vehicle movement priority. While Neighborhood Streets also function as corridors for through movement of vehicles and delivery access, these functions are lower in priority and generally occur less frequently.



6. MULTI-FAMILY RESIDENTIAL

- High density of apartment homes
- Higher density of people than on-street parking spaces available
- This corridor type provides space for PUDO, courier deliveries
- Provide activated common spaces for residents

Below: Looking southbound on Betmor Lane from Mason Lane in Anaheim

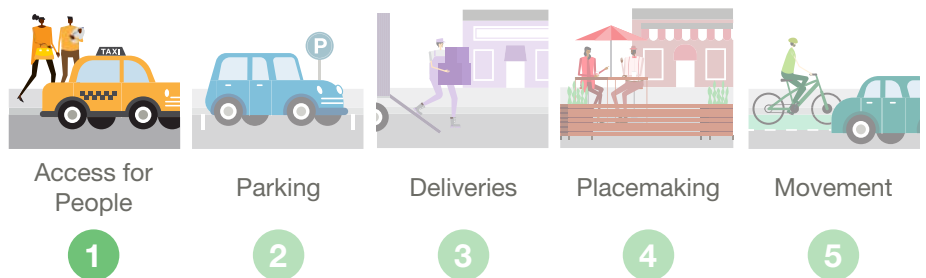


Primary purpose: Supports access to high-density residences.

Key stakeholders: Pedestrians, couriers/goods movement, TNCs.

Main design consideration: Accommodate access for residents and courier and food delivery vehicles.

Secondary design considerations: While some apartment complexes may have public spaces for residents located nearby, there is a lower importance on placemaking along Multi-Family Residential Corridors, as it is not the primary function of the corridor type.



7. SCHOOL STREETS

- Promotes safe access to vulnerable road users
- Two peak activity times: morning drop off & after school pick up
- Prioritize pedestrian safety and allows sufficient space for PUDO activity
- Lower speed limits

Below: Looking eastbound on Cubbon Street from Broadway in Santa Ana

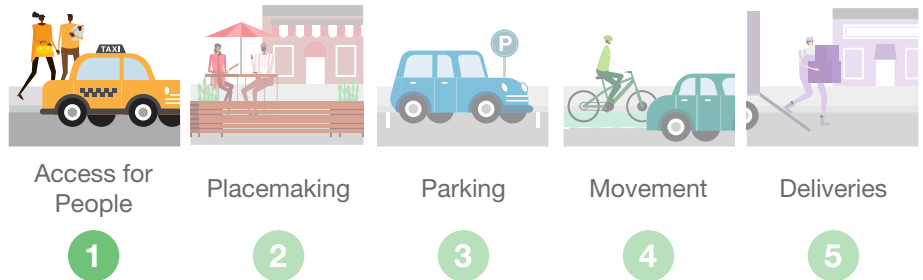


Primary purpose: Support access for students, teachers, and pick-up drop-off activity.

Key stakeholders: Pedestrians, motorists, cyclists.

Main design consideration: Design to slow vehicle speeds and accommodate safe access for students and their parents, especially during pick-up/drop-off hours. Whether they are traveling by walking, vehicle, or school bus, students will access the curb as pedestrians and need to access the curb safely.

Secondary design considerations: Allocate curb space for parking and movement along the corridor, particularly outside of morning and afternoon pick-up/drop-off. Parking for personal vehicles, movement, and deliveries functions should be diverted to neighboring corridors to prioritize safe access to school and pedestrian activity along the curb.



2.3.3 'Urban Corridors' Typologies

Corridors that have a higher volume of travelers interacting with the surrounding land use can be classified into the “urban corridors” category of corridor types. These corridors are located in urban cores and neighborhoods and have a mix of uses along the corridor, including retail, outdoor dining, and residential. Due to these mixed-use land uses, these corridors receive a lot of foot traffic. For this reason, it is important to provide access for people waiting for transit and TNCs as well as ensuring that public spaces are safe and comfortable for people. Urban corridors lined with businesses will also aim to provide access for couriers, delivery trucks, and business owners, promote access for people visiting businesses (outdoor dining), and ensure easy access for curbside pick-ups. The focus of these corridors is to provide an environment that encourages safe and efficient access for people and businesses along the corridor, which can create a desirable corridor for residents and businesses.

8. MIXED-USE URBAN

- Prioritizes access for people, order pick-up, retail space & space for outdoor dining
- This corridor includes space for PUDO and safe pedestrian, bicyclist, and micromobility access
- Parking provided should be exclusive to micromobility, and not vehicles

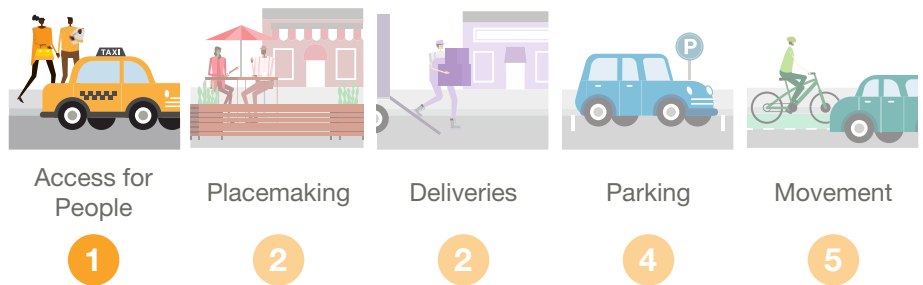
Primary purpose: Support multimodal access to a mix of uses.

Key stakeholders: Pedestrians, micromobility, transit, couriers/ goods movement.

Main design consideration: Improve safety for non-motorists, including protected bikeways, high visibility bike lanes, secure bike parking, and scooter corrals to minimize conflicts between pedestrians and bicyclists and micromobility parking along the curbside. Avoid crowding transit waiting areas and pedestrian access along the corridors.

Secondary design considerations: Allocate curb spaces to deliveries during certain hours of the day to minimize competition for parking and passenger PUDO at its peak. However, to ensure that there is sufficient space for courier/ goods delivery, this curbside function should be pushed to a nearby street more focused on cars. On-street parking for personal vehicles should also be relocated to a nearby street or to an off-street parking structure.

Below: Looking westbound on 2nd Street in Santa Monica



9. MIXED-USE MAIN STREET

- This corridor type is the focal point of a downtown area and includes a mix of uses
- May provide access to public spaces where motorist access is prohibited

Below: Looking eastbound on University Avenue in Riverside

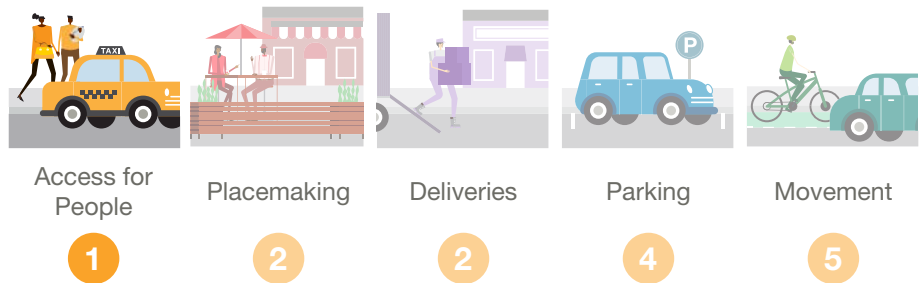


Primary purpose: Facilitate access for people and placemaking.

Key stakeholders: Pedestrians, couriers/goods movement, cyclists, micromobility, transit.

Main design consideration: Because Mixed-Use Main Streets also serve as destinations themselves, design considerations should accommodate access for people, including implementing pedestrian crossing improvements and public art installations.

Secondary design considerations: Allocate curb space to couriers/deliveries. People visiting this corridor type may also require curbside pick-up, and design consideration to mitigate conflicts between these two curbside stakeholders should be implemented. Similarly, allocated curb space for PUDO locations for TNCs, bike and scooter parking, and micromobility docking stations. Accommodate transit by providing dedicated transit lanes and bus bulbs. Relocate parking for personal vehicles to off-street parking to allow sufficient curb space for other curbside functions.



10. ENTERTAINMENT CORRIDOR

- High density with various entertainment options (e.g., theatres, sports arenas, movie theatres, retail/dining locations, etc.)
- Prioritize PU/DU curb space and safe crossings for pedestrians, especially at night

Below: Looking eastbound on Center Street Promenade and Lemon Street in Anaheim

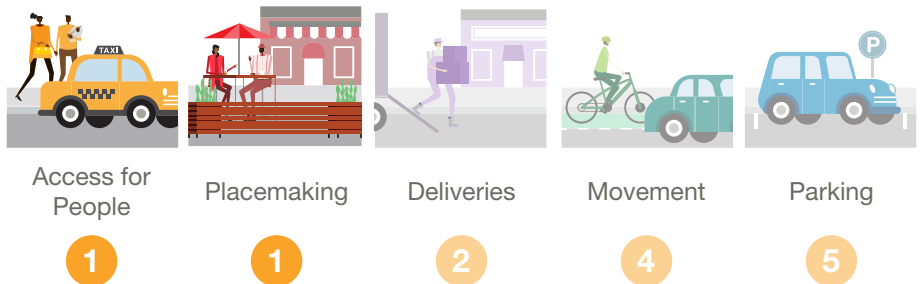


Primary purpose: Support access to entertainment options.

Key stakeholders: Pedestrians, TNCs, bicyclists, micromobility.

Main design consideration: Allocate adequate pick-up/drop-off curb space and safe crossings for pedestrians, especially those crossing at night. Curb space can be timed depending on peak hours for deliveries during the daytime versus pick-up/drop-off at night.





Secondary design considerations: Accommodate multimodal travel to provide multiple options for access, including bike and scooter parking. Long-term vehicle parking and through movement for vehicles should be displaced to neighboring corridors with a higher priority for vehicle through travel and storage.



2.4 CURBSIDE TYPOLOGIES SUMMARY

SCAG is a large geographical area with multiple counties and cities, each with their own unique flavor. Not every street within the region will fit perfectly within a specific curb type. Some streets may be combinations of two or more curb types, some streets may change curb types along its length, or during different times of day, or seasons. A street’s curb type may evolve over time as the vision for the street transforms. The key to effectively applying curb types is understanding that the defined typologies are a starting point in the design process and are a guiding principle, not an iron clad or rigid rule. The curb types provide a direction and inspiration, but the path forward is flexible. They provide a common language to help decision makers, stakeholders, and the public alike better understand the different ways the curb space can be used, how the current curb space can be improved, and transparency in why decisions are made.

The 10 Curb Space Typologies defined are intended to broadly capture the key types of streets that are generally applicable to the cities and counties within SCAG. The different design projects and designations will allow each street to be tailored to properly serve the surrounding land use and local curb space user.

TYPOLOGY	DESCRIPTION	FUNCTIONS (RANKED IMPORTANCE)
<p>1. Arterial</p> <ul style="list-style-type: none"> High volume of vehicular travel Vehicle throughput oriented Higher speed limits Roadway classification is a major, primary, principal, or secondary arterial 	 <p>Movement Access for People Deliveries Parking Placemaking</p> <p>1 2 3 5 5</p>	
<p>2. Multimodal Mobility</p> <ul style="list-style-type: none"> Prioritizes the movement of transit, micromobility users, bicyclists, and pedestrians Requires clear separation of curbside space for all functions to avoid conflicts between stakeholders 	 <p>Movement Access for People Placemaking Deliveries Parking</p> <p>1 2 3 4 5</p>	
<p>3. Employee Access</p> <ul style="list-style-type: none"> Promotes employee access to office space or government buildings & may be located near off-street parking 	 <p>Movement Access for People Deliveries Parking Placemaking</p> <p>1 2 2 3 4</p>	
<p>4. Mixed-Use Suburban</p> <ul style="list-style-type: none"> Wide lane widths High volume of vehicular traffic Diverse modes of transportation Commonly located in suburban areas Prioritizes access to retail space or strip malls on one side of the corridor and access to single family homes on the other 	 <p>Movement Deliveries Access for People Parking Placemaking</p> <p>1 2 3 4 5</p>	

TYPOLOGY	DESCRIPTION	FUNCTIONS (RANKED IMPORTANCE)
<p>5. Neighborhood Street</p>	<ul style="list-style-type: none"> Is surrounded by a blend of single-family homes and multi-family residential buildings Prioritizes people's access to their homes, access for couriers, and activated public spaces 	 <p>Access for People (1), Deliveries (2), Parking (2), Placemaking (3), Movement (4)</p>
<p>6. Multi-Family Residential</p>	<ul style="list-style-type: none"> High density of apartment homes Higher density of people than on-street parking spaces available This corridor type provides space for PUDO, courier deliveries Provide activated common spaces for residents 	 <p>Access for People (1), Parking (2), Deliveries (3), Placemaking (4), Movement (5)</p>
<p>7. School Streets</p>	<ul style="list-style-type: none"> Promotes safe access to vulnerable road users Two peak activity times: morning drop off & after school pick up Prioritize pedestrian safety and allows sufficient space for PUDO activity Lower speed limits 	 <p>Access for People (1), Placemaking (2), Parking (3), Movement (4), Deliveries (5)</p>
<p>8. Mixed-Use Urban</p>	<ul style="list-style-type: none"> Prioritizes access for people, order pick-up, retail space & space for outdoor dining This corridor includes space for PUDO and safe pedestrian, bicyclist, and micromobility access Parking provided should be exclusive to micromobility, and not vehicles 	 <p>Access for People (1), Placemaking (2), Deliveries (2), Parking (4), Movement (5)</p>
<p>9. Mixed-Use Main Street</p>	<ul style="list-style-type: none"> This corridor type is the focal point of a downtown area and includes a mix of uses May provide access to public spaces where motorist access is prohibited 	 <p>Access for People (1), Placemaking (1), Deliveries (2), Movement (4), Parking (5)</p>
<p>10. Entertainment Corridors</p>	<ul style="list-style-type: none"> High density with various entertainment options (e.g., theatres, sports arenas, movie theatres, retail/dining locations, etc.) Prioritize PUDO curb space and safe crossings for pedestrians, especially at night 	 <p>Access for People (1), Placemaking (1), Deliveries (2), Movement (4), Parking (5)</p>

■ Mobility Corridors
 ■ Community Corridors
 ■ Urban Corridors



3

Existing Conditions & Site Selection

One of the key objectives of the CSMS is to identify and outline a series of strategies and recommendations to resolve curbside challenges that can be implemented in cities across the region. Due to the timing of the Notice to Proceed and in consideration of the requirements of the grant used to fund this study, SCAG worked with member agencies to gauge level of interest, then identified and selected the cities for participation. The SCAG CSMS team ultimately selected the cities of **Anaheim, Riverside, Santa Ana, Santa Monica, Los Angeles, and Long Beach** to participate. These are referred to as the 6 Selected Cities or 6 Participating Cities and were selected based on the presence of major trip generators/attractors, on-going curbside initiatives, and interest in participation expressed by the cities. This selection includes a set of cities with both a demonstrated need for improving curbside management with unique needs and diverse challenges which allow for a wide array of curbside initiatives to be explored.

Los Angeles and Long Beach further reduced their level of engagement by choosing not to form a City Advisory Team and host focus groups, preferring to learn from the peer exchanges and best practices vs a deeper dive into engagement and the study outcomes. The remaining four cities are referred to as “target cities”. Detailed investigations into existing conditions and design recommendations will focus on these target cities. The tools developed are designed in a flexible manner so that they can be modified and applied to all cities within SCAG, recognizing the unique priorities and visions of each city.

3.1 DATA OVERVIEW

Comprehensive and accurate data management is an important component of a successful curbside management strategy; before the curb can be managed, it must be understood. There are different types of data that can inform curbside management (such as inventory

and demand) and there are different ways of obtaining and maintaining datasets. Data-focused analysis was conducted at every step of this study. To provide a comprehensive strategy that can be scaled across the entire SCAG region, the level of detail of the compiled datasets differs between steps to make the most of the available resources. For example, the first step typically includes an office review of city-wide (curb space) datasets, such as parking regulations and cycling facilities, while the last step includes a breakdown of the curbside use in 20-minute intervals on a block-by-block basis.

A broad overview of where the data inputs fit in to the overall study, and how data collection and analysis complements other inputs, such as stakeholder feedback, is provided in the figure below. Additional detail is provided in the relevant sections of the report.

Note that the process outlined is what was done as part of this study, and steps can be skipped or modified depending on the City’s specific context. For example, if a City has a known curbside issue they wish to address, or if a street is already being modified as part of a separate study, they can skip step 1 and begin with gathering field data. Similarly, if cities do not have the resources to develop a Parametric model, other tools, such as ArcGIS, can be used to analyze existing datasets to identify potential sites.

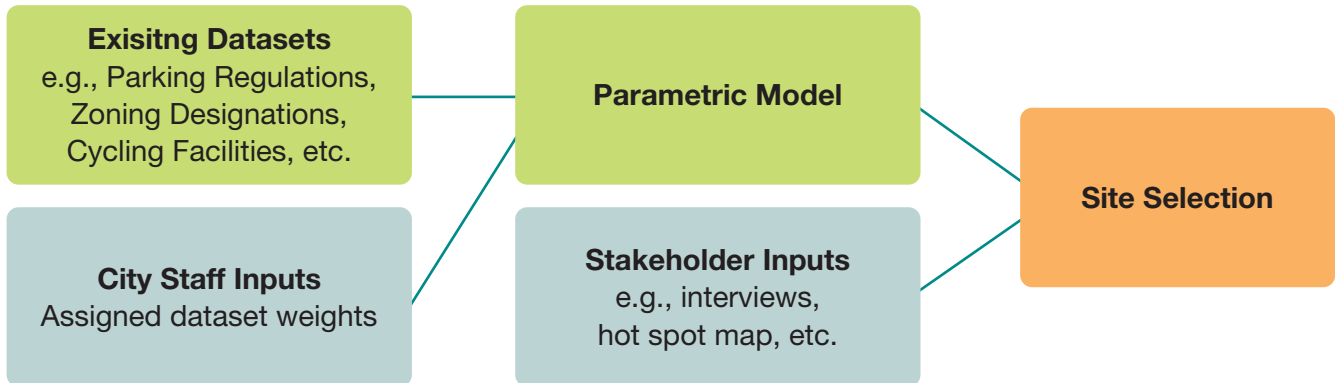
While data collection and analysis were important in the development of this CSMS, it is also recognized that it is impossible to collect detailed data for the entire curbside throughout the SCAG region. The focus of this study was on gathering enough data to provide informed recommendations, while also providing an understanding of the process and strategy for cities to continue the work. Data is part of a larger process, not the entirety of the process.

In addition, data collection does not end with the recommended strategies. Long-term ongoing data collection allows for faster turnaround times, unbiased evaluation of implemented pilots, and increased transparency with the public.

Below: Overview of Data Inputs

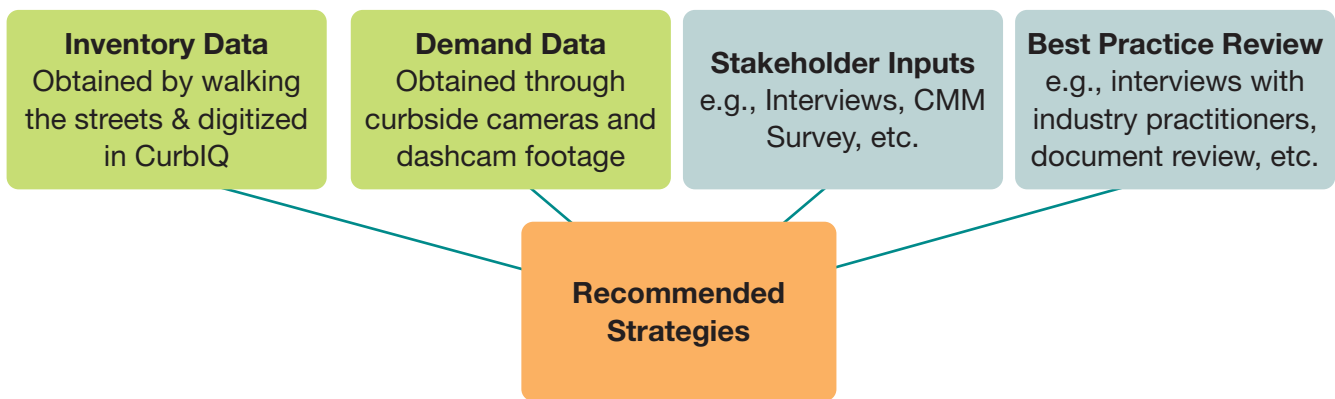
1. Office Review

Obtained for the entire city, for all participating Cities.

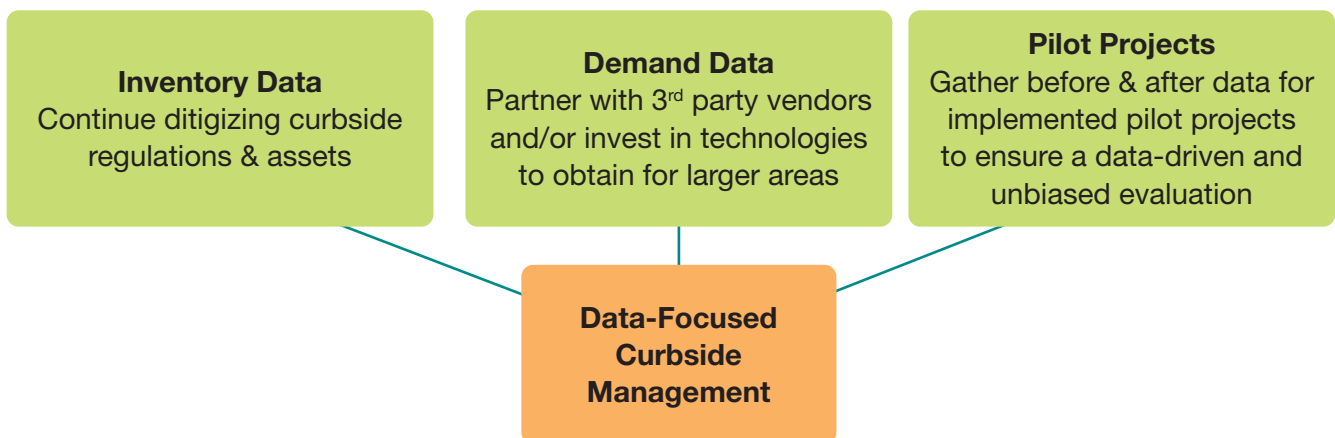


2. Field Data

Obtained for the selected sites.



3. Post Study



■ Data Inputs ■ Output

3.2 SITE SELECTION

The intent of the CSMS is to develop an approach, policy direction, and a toolbox of strategies that can be broadly applied to all curb space. To begin the process of transforming curbside space in SCAG, a series of smaller sites were identified for detailed evaluation and design recommendations. For each of the four target cities, three sites were selected. Care was taken to ensure the selected sites represented a wide variety of curb space uses so recommendations can be applied on a wider scale across the Region.

Site selection was based on existing available datasets and feedback from city staff and stakeholders. Once the sites were identified, additional data collection was undertaken.

3.2.1 Inputs to Site Selection

Background Document Review

When developing curb space strategies, best practices are important benchmarks to help a city conceive the realm of the possible and identify successfully proven strategies to achieve desired goals and outcomes. The best practices studied for this project were adapted from the Institute of Transportation Engineers (ITE) Curbside Management Guide, chosen for the organization's leading reputation in curbside management, and Transportation for America's COVID and the Curb, chosen because of its direct relevance to how the curb has changed due to the current public health context.

The top key themes identified based on a review of these sources were the need for:

- Flexibility in uses of the curb.
- Prioritization of public transit, active transportation, and pedestrians.
- Facilitation of pickup, drop-off, and delivery services.
- Utilization of pricing, priority, and restrictions to incentivize desired parking behaviors; and
- Coordination, updating, and streamlining of policies and regulations.

Parametric Model

What is a Parametric Model?

A tool used to assist the project team in narrowing down a handful of curb segments that have higher curb space uses from the thousands of segments that exist within a City to several key areas of interest or high impact. Parametric design is like a recipe – the ‘ingredients’, or datasets, can be customized in real time to change different areas that are highlighted by the model.

What are the “ingredients”?

Inputs to the parametric model include a variety of datasets in the categories listed below. These datasets tell us about many of the conditions in the city that impact the curbside and can highlight areas of interest for further study. This primarily consists of inventory-based data but can also include demand data if available.

- **Land use/socioeconomic data** – This data can point to areas of high population and employment density as well as land uses, such as commercial, mixed-use, or high-density residential, that may generate high curbside demand.
- **Transportation data** – Mobility conditions, including vehicle travel and locations of transit and micromobility facilities, can indicate curbsides with a high number of competing modes.
- **Parking operations data** – Existing parking supply and regulations, as well as utilization data, can highlight areas of high vehicle demand along the curbside.
- **Public amenities and services data** – These locations are important key destinations and public facilities that require curbside access.

How is it used?

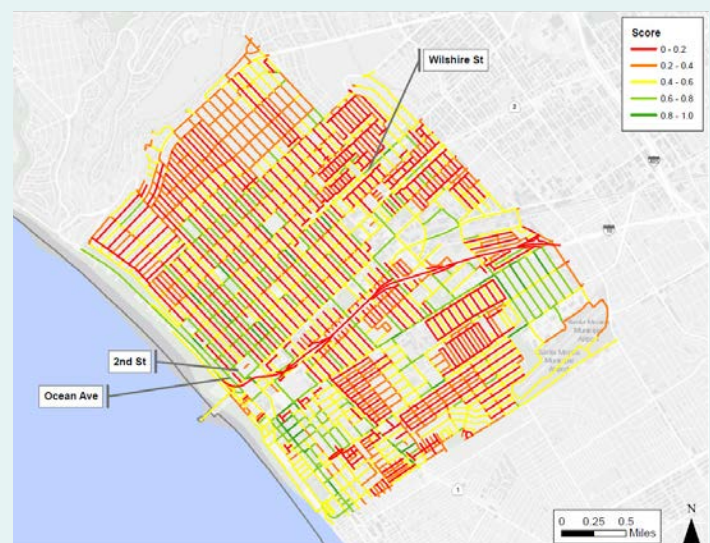
The parametric model analyzes layered geospatial datasets to determine the relative suitability of street segments for further study based on dynamic, user-defined weights.

Available data are associated and aggregated such that each dataset contributes a performance score per street segment, higher scores reflecting increased suitability for detailed curb space analysis. The model outputs were taken into consideration with the other factors to identify a list of proposed sites to be carried forward in the study.

City staff helped assign weights for each dataset based on the perceived impact to curb space demand, determining the extent to which different datasets affect a segment’s overall score. The scores for each dataset were on a scale of 1 to 5, where a score of 1 assigned to datasets that City staff felt had limited impact on curb space demand, and a score of 5 for datasets that were perceived to have a high impact on curb space demand. Separate weightings were applied to each City’s model based on input from staff and stakeholders, which allowed for the unique needs and perspectives for different cities to be incorporated into model results. These results are presented and discussed for each City.

What does it produce?

The result is an interactive map visualizing areas of opportunity for further study of curb space management issues. This map was used to narrow down and identify appropriate study sites within each target city.





The study's recommendations must also align with SCAG and city-specific curb space management goals and objectives. A review of individual city goals and plans related to the curb was also conducted to ensure that the city and regional recommendations and pilot recommendations are aligned with the vision and goals of each city involved. The review consisted of an analysis of 18 strategic and comprehensive plans for Anaheim, Riverside, Santa Ana, and Santa Monica, with the document being studied primarily focused on topics including mobility, environmental sustainability, climate adaptation, and community well-being.

What We Heard








Conversations were had with city staff and stakeholders who are intimately familiar with the transportation context of where they live and work. These interactions allowed the project team to better understand the transportation context in each City and to better identify areas of interest related to curb space operations. Various touchpoints were held throughout the course of the study to discuss the following:

- Gain insights into the transportation context of the City.
- Understand what curb space initiatives already exist.
- Identify any major focus areas the City wants examined through this study.
- Learn what is pushing cities towards a more progressive curb space management study.
- Identify challenges related to curb space management at both the regional and local level.
- Confirm project goals and objectives.
- Solicit feedback about potential pilot projects, using examples that have been implemented across North America.

The inputs collected as part of these discussions with City staff and stakeholders were paramount in identifying key curb space operations challenges, focus areas, and potential pilot projects of interest for each City.

Hot Spot Map

An online curb space hot spot map was used to allow stakeholders to identify areas within each City that experience challenges related to curb space operations. Respondents were asked to identify locations on a map and select an issue category and add comments related to their selection. The topics they could select from along with examples of associated challenges are as follows:

-  **Parking availability:** areas where a lack of parking can lead to challenges with curb space operations;
-  **Cycling infrastructure:** areas where conflicts exist between curb space users near cycle lanes or tracks. Example issues could be that vehicles regularly block cycling facilities at a given location;
-  **Transit infrastructure:** areas where transit facilities (e.g., stops or routes) are competing for space with other curb space users;
-  **Pick-up/drop-off or loading/unloading:** areas with high short-term parking demand, this can be related to curb space deliveries or the loading/unloading of passengers;
-  **Safety:** areas where road user safety challenges exist that could be related to curb space activity;
-  **Enforcement:** areas that could benefit from increased parking enforcement to address unwanted behavior; and
-  **Other:** a catch-all category for curb space challenges that do not apply to the options above. Participants were asked to specify the issues in the comment field.

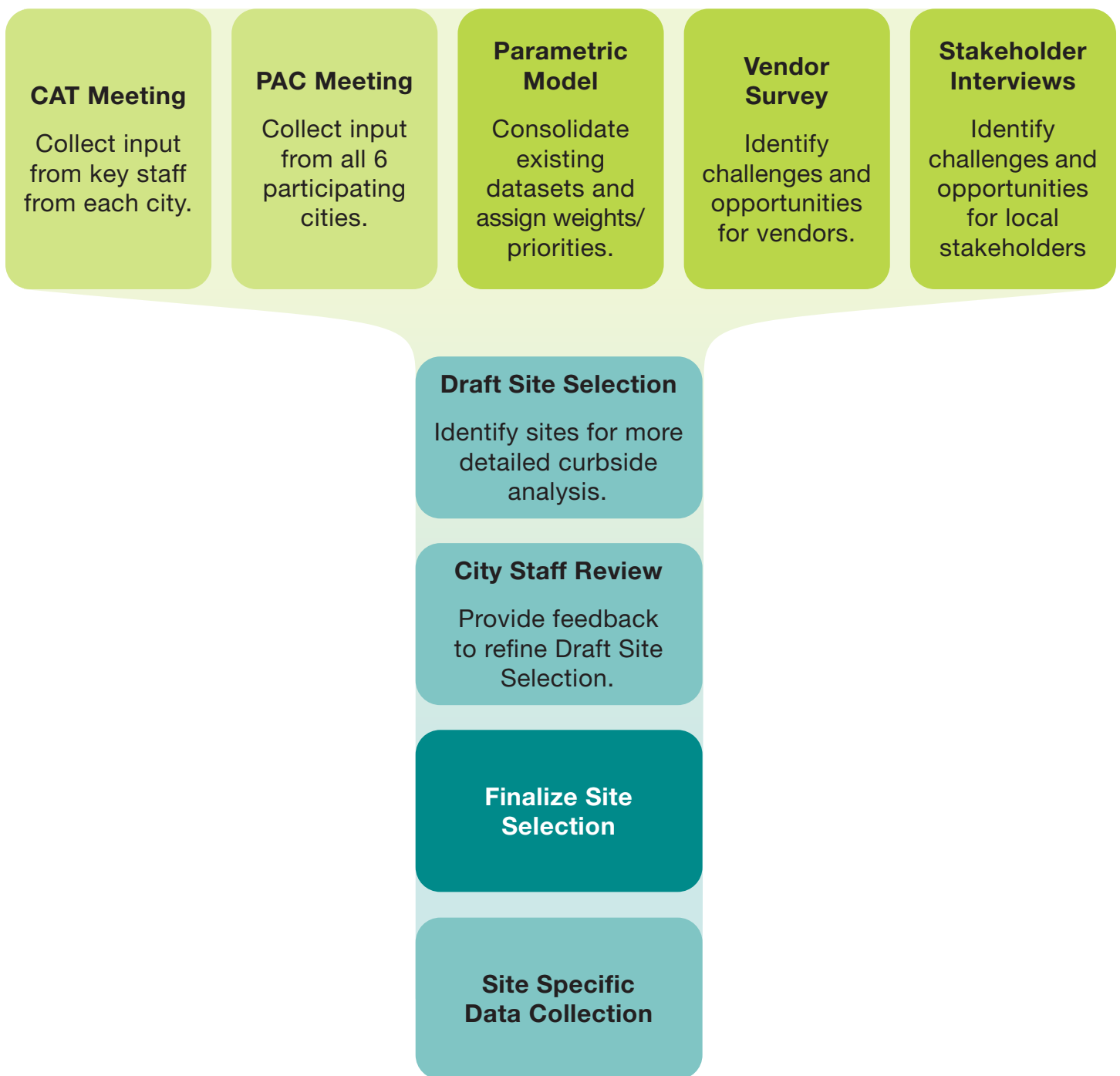
Data Compilation

Existing (curb space) datasets, such as parking regulations and cycling facilities, were compiled to provide an overview of the current curb space within each participating city. These datasets cover the entire city and were used to inform the transportation context within each participating City, identify locations within each City for more detailed curb space analysis, and better understand the existing data inventory to identify key data gaps.

Existing conditions datasets were received from two sources: 1) provided by the Cities, and 2) retrieved from Open Data Portals and other publicly available sources. The data were compiled in a map-faced interface (i.e., a Parametric Model) to visualize the curb space and highlight key areas for further investigation. Details on the Parametric Model analysis is provided later in this report.

TYPE	DATASET	AVAILABLE?			
		ANAHEIM	RIVERSIDE	SANTA ANA	SANTA MONICA
Land Use/ Socioeconomic	Zoning Designations	•	•	•	•
	Employment	•	•	•	•
	Population	•	•	•	•
	Neighborhood improvement areas			•	
	Designated business areas				
Transportation Data	Cycling facilities	•	•	•	•
	Bus stops	•	•	•	•
	Bus routes	•	•	•	•
	Metrolink stops	•	•	•	•
	Bike/scooter docking stations				
	Cyclist and pedestrian collisions	•	•	•	•
	Roadway traffic volumes	•			
	Speed limits	•	•	•	•
	Oversized Vehicle Routes	•			
Parking Operations Data	Parking regulations				
	Parking violations data	•	•	•	•
	On-street parking supply	•	•	•	•
	On-street parking occupancy and turnover				
	Off-street parking supply	•	•	•	•
	Off-street parking occupancy and turnover	•	•	•	•
	Third party demand data				
Public Amenities and Services Data	Public Parks	•	•	•	•
	School locations	•	•	•	•
	Hospitals		•	•	•
	Fire station locations		•	•	•
	Police station locations		•	•	•
	Fire Hydrants		•	•	•

• Available



Above: Diagram illustrating how the datasets were used in selecting relevant sites for pilot projects

The initial list of selected sites was identified through the process outlined, with a focus on existing datasets and input from stakeholders. The project team then met with City Champions to review the proposed sites and narrow down the list to three sites per city that align with the City’s specific goals and objectives. For each identified site, additional data collection was undertaken to deepen our understanding of on-the-ground conditions, and recommended solutions were proposed. The following sections highlight the sites selected by the City Champions.



3.3 RIVERSIDE

Three of the main neighborhoods in Riverside include – Downtown, University, and Magnolia to University Avenue corridor. The Downtown area is compact, with streets in a grid pattern conducive to walking due to its higher density and presence of historic and public sites. This is further enhanced by the main street pedestrian mall with many attractive destinations for locals and tourists. The University neighborhood is centered around the University of California Riverside Campus, with significant single-family home areas, ongoing revitalization of commercial areas and a growing encouragement for future mixed-use development and increased student housing. The Magnolia to University Avenue corridor is a key multi-modal transportation area of the City with a focus on mixed-use development. Corridors within the City of Riverside present an interesting opportunity to explore curbside management challenges and strategies to ensure equitable access to the curbside.



3.3.1 Background Document Review

A review of existing background documents and policies was conducted to better understand previously identified curb space operations issues, challenges, and opportunities that could be further explored as part of this study. Plans including the Bicycle Master Plan discuss closing gaps in the existing bicycle network, by introducing new bike routes and bike lanes along City roadways. These improvements aim to improve safety for bicyclists, which are critical curb space users. This is also supported by the Riverside PACT, which encourages the implementation of complete streets policies to increase the number of trips taken by walking or biking. Moreover, motorist curb side needs are discussed in the Parking Ecosystem Sustainability Plan. This plan identifies strategies for phasing out free parking to increase parking turnover in high-demand parking areas. The documents reviewed highlight that curb space management strategies must consider the diverse needs of multimodal curb space users.

3.3.2 What We Heard

- High demand for on-street parking, especially within entertainment and dining areas;
- Food trucks are an emerging trend;
- Concerns with residential parking from high-density developments spilling over into lower density residential areas;
- A changing attitude towards what the curb space can be used for has allowed for new and innovative strategies to better manage curb space;
- Increased demand for curb space deliveries and pick-up/drop-off activity related to the COVID-19 pandemic; and
- Access to the curb for transit and emergency service vehicles should be prioritized.

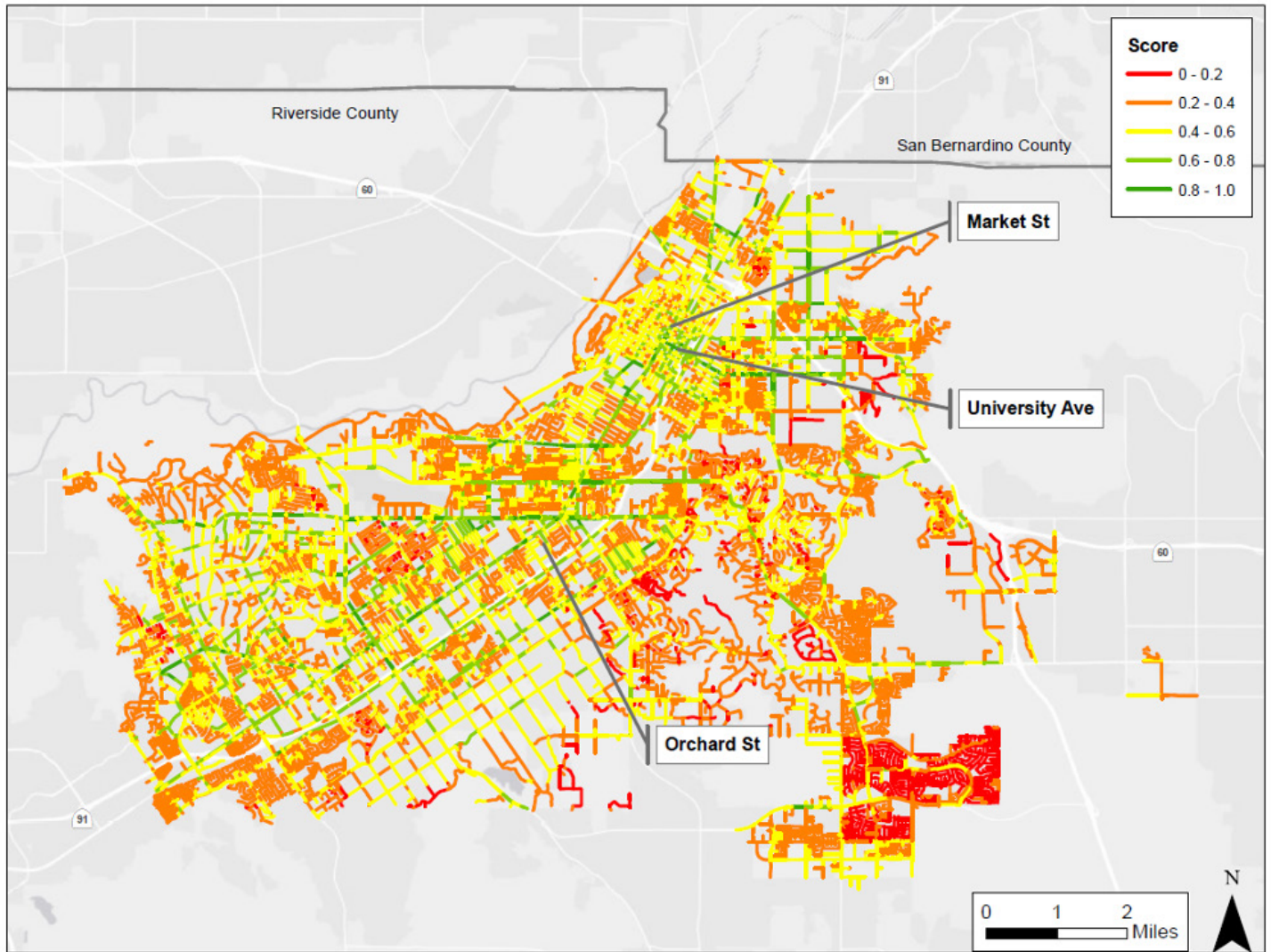
Background Documents Reviewed

- Riverside Bicycle Master Plan
- Riverside PACT
- Riverside Parking Ecosystem Sustainability Plan
- Climate Action Plan First & Last Mile Mobility Plan
- Riverside General Plan – Air Quality Element
- Riverside General Plan – Circulation and Community Mobility Element

Key Themes

- Public health and air quality through emissions reductions
- Regional, multimodal, connected transportation systems that minimize harm to communities

3.3.3 Parametric Model Analysis



Above: The parametric model for the City of Riverside, highlighting the different levels of demand on the curb space.

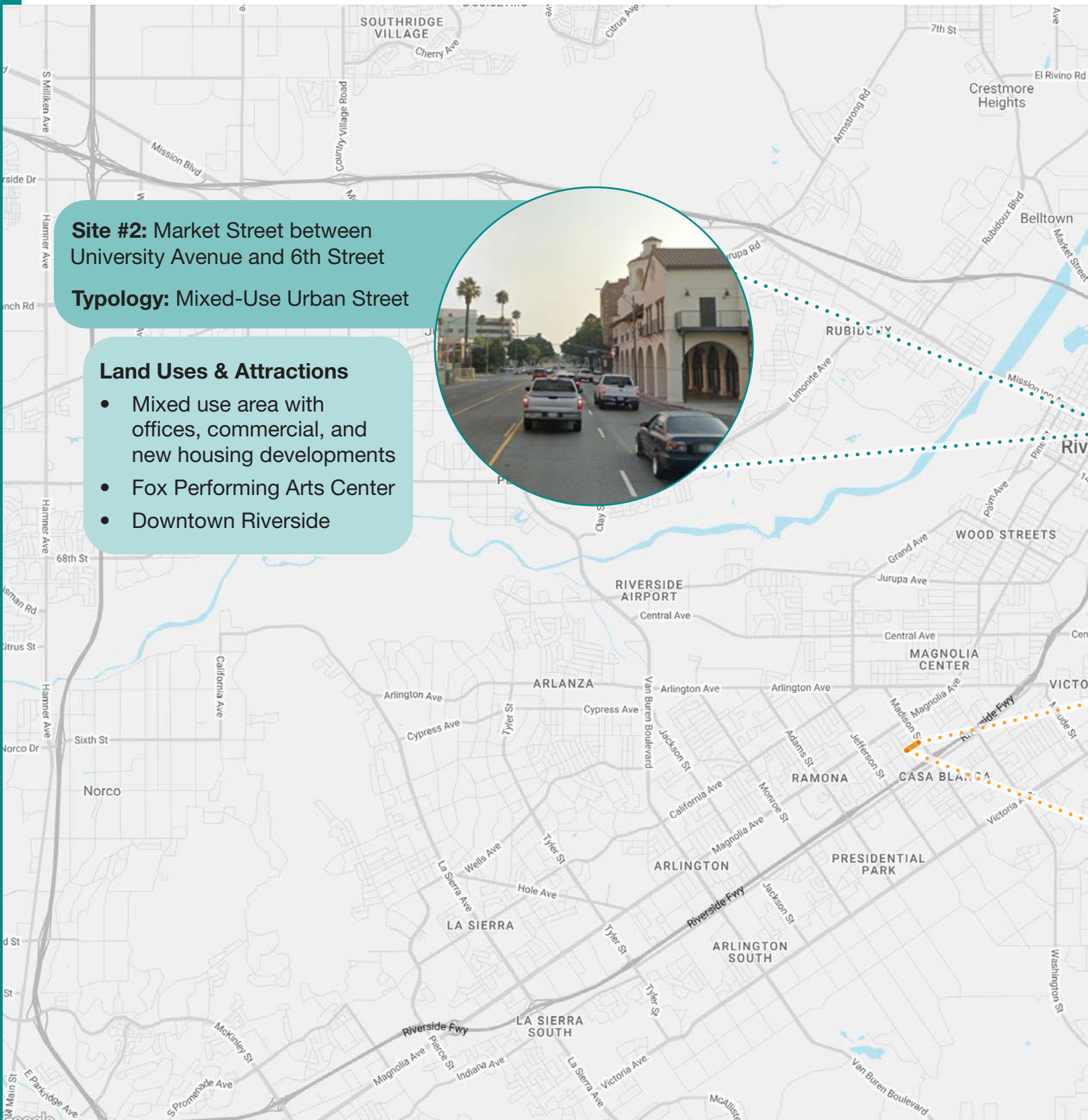
As shown in the table below, the datasets with the highest perceived impact on site selection for Riverside were on-street and off-street parking supply, transit infrastructure (presence of transit infrastructure indicating higher curb space demand), and land use designations (commercial, mixed-use and office land uses indicating higher curb space demand).

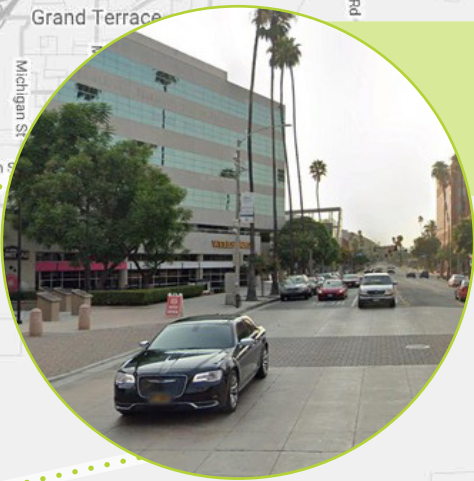
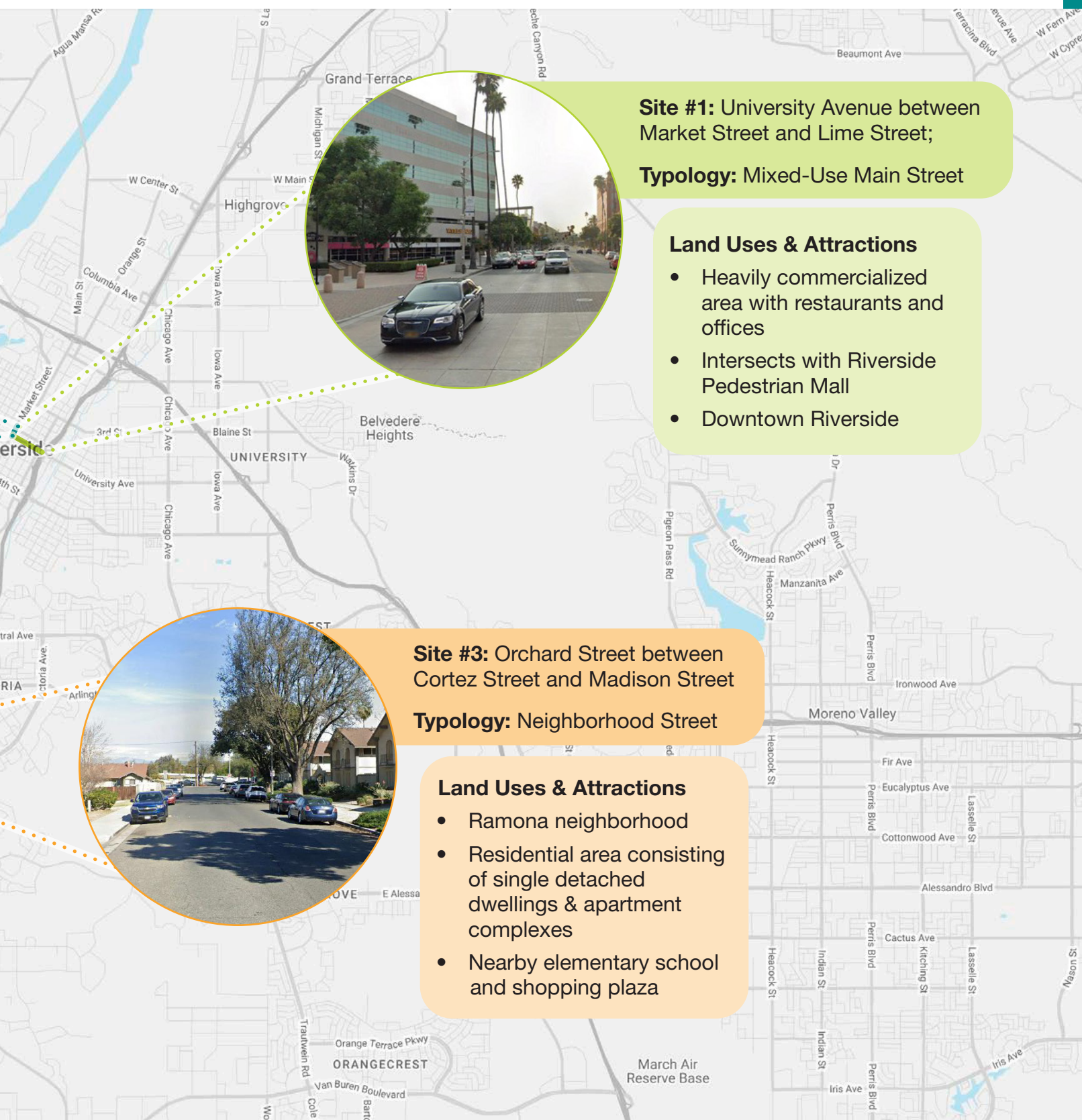
DATASET	ASSIGNED WEIGHT
On-street and off-street parking supply and demand	4.2
Land use designations (office, commercial, mixed use)	3.4
Population and employment	3.1
Micromobility infrastructure (cycle routes, docking stations)	2.8
Transit infrastructure	3.5
Cyclist and pedestrian collisions	2.8
Public amenities (e.g., schools, parks, etc.)	3.1
Emergency service locations (e.g., hospitals, fire stations, police stations)	2.9

The model resulted in a map visualizing an overall score of 0 (red) to 1 (green) for each street segment. Green street segments indicate areas with a high number of curb space uses and likely high demand. As presented in the map, these include main arterials running east to west through the city, as well as the downtown area where there is a high mix of various land uses that generate curbside demand, including entertainment and dining, as well as a higher variety of mobility infrastructure. These areas of opportunity gave further context to our background document research as well as inputs received from stakeholders that indicated that on-street parking, coupled with new curbside demands, create challenges in these areas. Addressing the gaps in data, such as parking regulation inventory, as well as on-street parking occupancy and turnover, is needed to better understand how to manage the existing curb space in these vehicle-oriented areas. After site selection, this data was collected for each city as a part of this study.

3.3.4 Sites Selected

Three areas were chosen to proceed with more detailed curbside analysis.





Site #1: University Avenue between Market Street and Lime Street;

Typology: Mixed-Use Main Street

Land Uses & Attractions

- Heavily commercialized area with restaurants and offices
- Intersects with Riverside Pedestrian Mall
- Downtown Riverside



Site #3: Orchard Street between Cortez Street and Madison Street

Typology: Neighborhood Street

Land Uses & Attractions

- Ramona neighborhood
- Residential area consisting of single detached dwellings & apartment complexes
- Nearby elementary school and shopping plaza

Site #1: University Avenue between Market Street and Lime Street;

Typology: Mixed-Use Main Street

Site Description and Rationale for Selection

Curbside Uses

- On-street metered parking supply
- Class II bike lane on East side of street

Transit Routes serving the corridor

- Transit routes: 1, 12, 13, 14, 15, 22, 29, 49, 204, 215

Rationale For Selection

- High loading activity compete with on-street parking and loading for curb access
- Several transit routes and stops compete with on-street spaces
- Access points for service vehicles
- On-street parking supply
- Identified in the hotspot mapping tool and discussions with City staff
- High score in the parametric model
- There are two bus stops, one on either side of University near Lemon. This leads to congestion at the traffic light during rush hours.
- With two residential developments, office buildings, and cultural amenities located around a pedestrian mall, loading zones are at a premium at times.
- High demand for loading/unloading
- Nine bus lines compete with on-street parking, passenger and freight loading/unloading, a fire hydrant and access points for service vehicles (e.g., restaurant wastewater clarifiers) on this block face



Site #2: Market Street between University Avenue and 6th Street

Typology: Mixed-Use Urban Street

Site Description and Rationale for Selection

Curbside Uses

- On-street metered parking supply
- Class II bike lane on both sides of street
- Passenger loading zones

Transit Routes serving the corridor

- Transit routes: 12, 204

Rationale For Selection

- High loading activity demand
- On-street parking supply
- Identified in the hotspot mapping tool and discussions with City staff
- High score in the parametric model New development will soon open on this block with retail storefronts on a high-volume arterial.

- Balancing through traffic, on-street parking (if allowed), passenger loading/unloading, pedestrian and cyclist access and safety will require careful consideration.



Site #3: Orchard Street between Cortez Street and Madison Street

Typology: Neighborhood Street

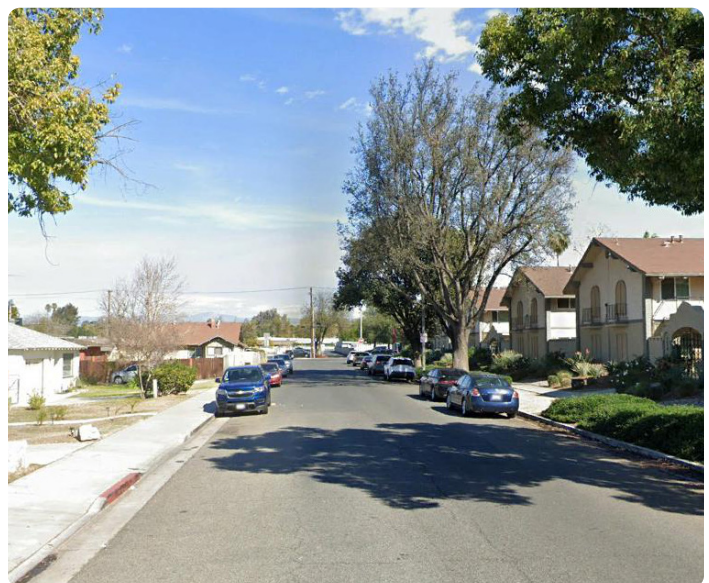
Site Description and Rationale for Selection

Curbside Uses

- On-street un-metered parking supply

Rationale For Selection

- On-street parking supply
- Mix of low-density and higher-density residential developments





3.4 SANTA ANA

The City of Santa Ana is a densely populated City with a lively night life, which comes with the associated curb space management challenges, including safe pick-up/drop-off zones for TNCs, late night food deliveries, and congestion out front of night clubs. The downtown area also regularly holds daytime and evening events where streets are closed off to vehicles and parking demand is distributed to the area's parking structures, surface lots, or other nearby streets. The City has expressed interest in using price as an incentivizing tool to manage demand. The City is also home to the Santa Ana Regional Transportation Center, located just outside of the downtown area, which connects travelers to regional destinations via Metrolink and Amtrak. Additionally, The OC Streetcar is currently being constructed, with fixed routes running through the downtown and creating a multimodal landscape with the mixing of the streetcar, cars, and bicycles, particularly on 4th Street and Santa Ana Boulevard. The addition of new transit services which will connect travelers to regional travel hubs and the existing high level of curbside activity within the City present unique challenges to curbside users. This section will provide an overview of existing and foreseen challenges that will impact curbside users in Santa Ana.

3.4.1 Background Document Review

A review of existing background documents and policies was conducted to better understand previously identified curb space operations issues, challenges, and opportunities that could be further explored as part of this study. In recent years, the City of Santa Ana has conducted several safety-focused initiatives resulting in plans for complete streets for different areas in the City, as well as citywide plans for active transportation improvements and multimodal roadway improvements that would impact curb space uses, such as traffic calming treatments and placemaking efforts. Five of the ten transit opportunity corridors identified by the OC Transit Vision pass through

Santa Ana, including the OC Streetcar, whose alignment runs primarily through Santa Ana, into its downtown. Curb space uses near these corridors will need to support access to these potential routes, stops, or stations. In addition, consideration must be given on how to avoid reducing access to existing curbside users, including couriers, businesses, pedestrians, and bicyclists.

3.4.2 What We Heard

- Concerns residential parking from high-density developments spilling over into lower density residential areas;
- Frequent TNC activity leads to high demand in loading zones, especially in the evenings;
- Food trucks are an emerging trend;
- Increase in the presence of live/work developments which can lead to long-term parking demand in on-street and off-street facilities;
- The addition of the of Orange County Streetcar will greatly impact traffic operations within the Downtown area; and
- City staff face challenges in managing and allocating the right-of-way to users that need it the most.

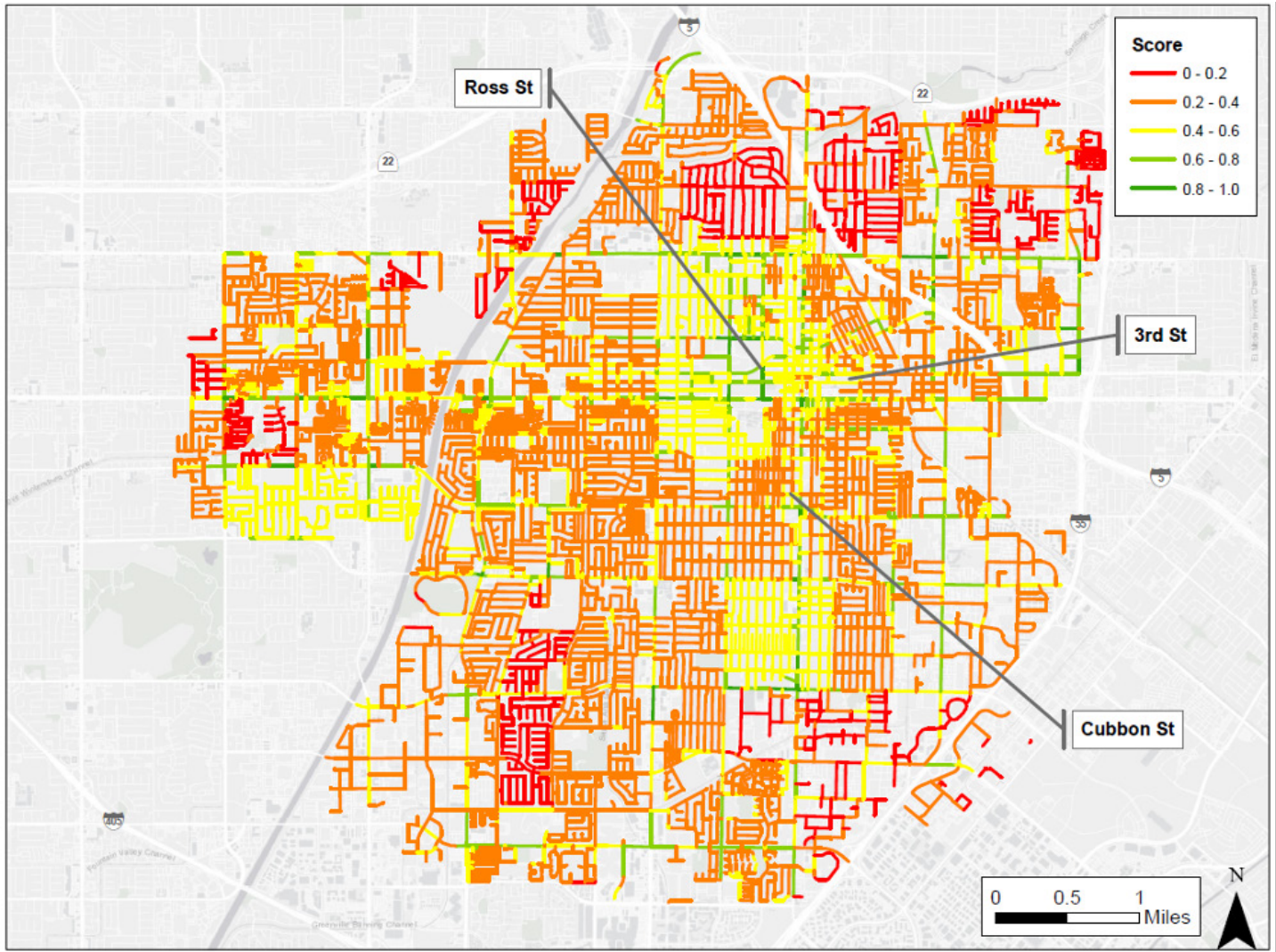
Background Documents Reviewed

- Downtown Santa Ana Complete Streets Plan
- Safe Routes to School Plan
- OC Active
- OC Transit Vision
- Safe Mobility Santa Ana Plan
- Santa Ana Active Transportation Plan
- Santa Ana General Plan – Mobility Element
- Santa Ana General Plan – Urban Design Element

Key Themes

- Responsible, safe, and equitable multimodal transportation systems
- Coordinated mobility planning that supports economic development, neighborhood development, and wellness
- Community identity and vitality through urban design

3.4.3 Parametric Model Analysis



Above: The parametric model for the City of Santa Ana, highlighting the different levels of demand on the curb space.

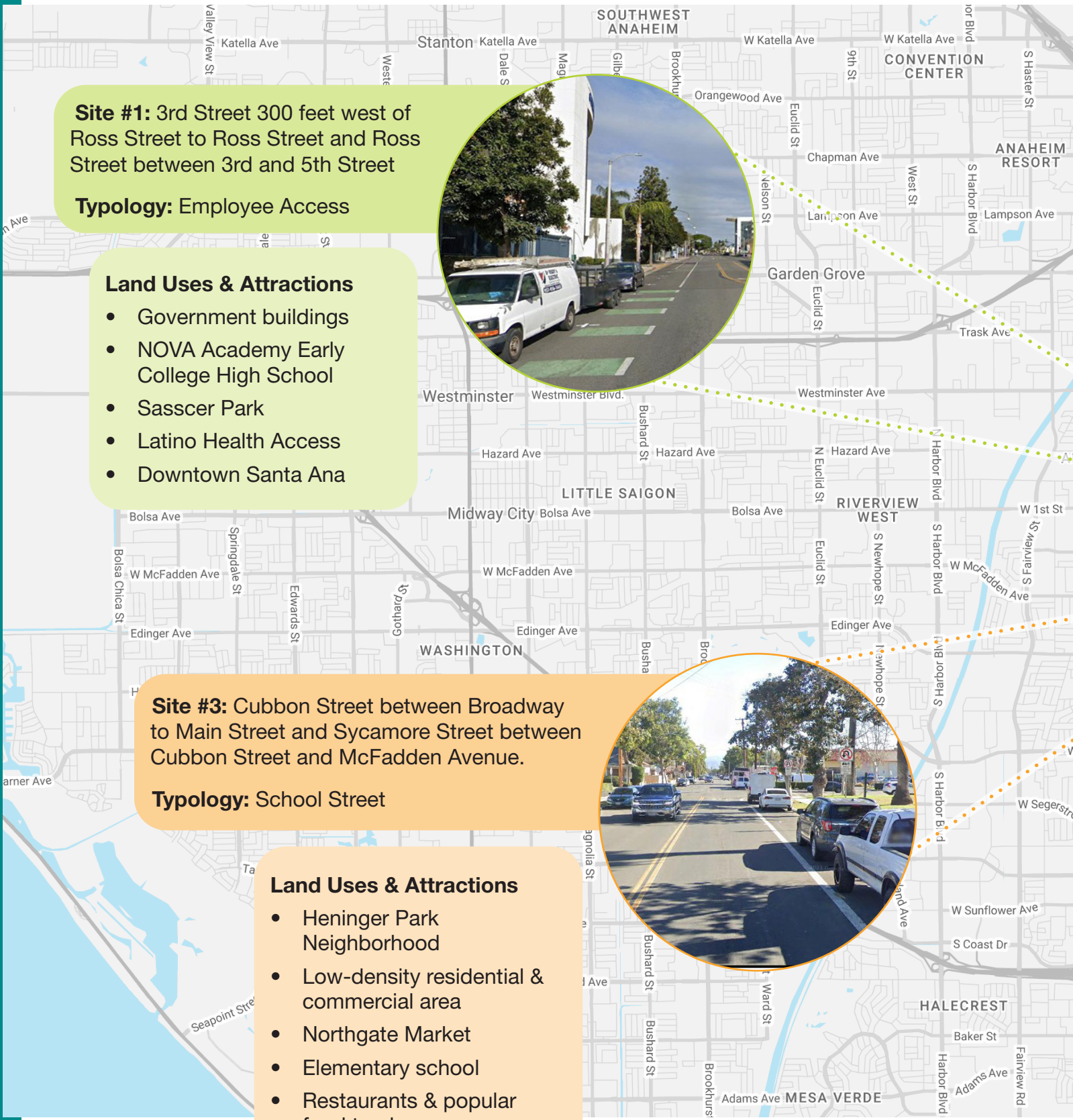
As shown in the table below, the datasets with the highest perceived impact on site selection for Santa Ana were land use designations, the presence of cycling infrastructure and transit infrastructure, and cyclist and pedestrian collisions, as well as population, employment, and income.

DATASET	ASSIGNED WEIGHT
On-street and off-street parking supply and demand	3.7
Land use designations (office, commercial, mixed use)	4.3
Population and employment	4.0
Micromobility infrastructure (cycle routes, docking stations)	2.0
Transit infrastructure	4.0
Cyclist and pedestrian collisions	4.0
Public amenities (e.g., schools, parks, etc.)	3.0
Emergency service locations (e.g., hospitals, fire stations, police stations)	3.7

The model resulted in a map visualizing an overall score of 0 (red) to 1 (green) for each street segment. Green street segments indicate areas with a high number of curb space uses and likely high demand. These segments generally align with the city’s main arterials running through the central areas of the city, as well as segments along corridors with high-density, mixed uses typically located near the downtown area. These findings support areas of interest from stakeholders, areas of recent development, and transit efforts, such as the OC Streetcar. Additionally, bikeways throughout the city contribute to the high number of competing uses along some of these segments. Data gaps include parking regulation inventory, as well as on-street parking occupancy and turnover that can help to understand parking utilization and competing modes in these areas.

3.4.4 Sites Selected

Three areas were chosen to proceed with more detailed curbside analysis.



Site #1: 3rd Street 300 feet west of Ross Street to Ross Street and Ross Street between 3rd and 5th Street

Typology: Employee Access

Land Uses & Attractions

- Government buildings
- NOVA Academy Early College High School
- Sasscer Park
- Latino Health Access
- Downtown Santa Ana



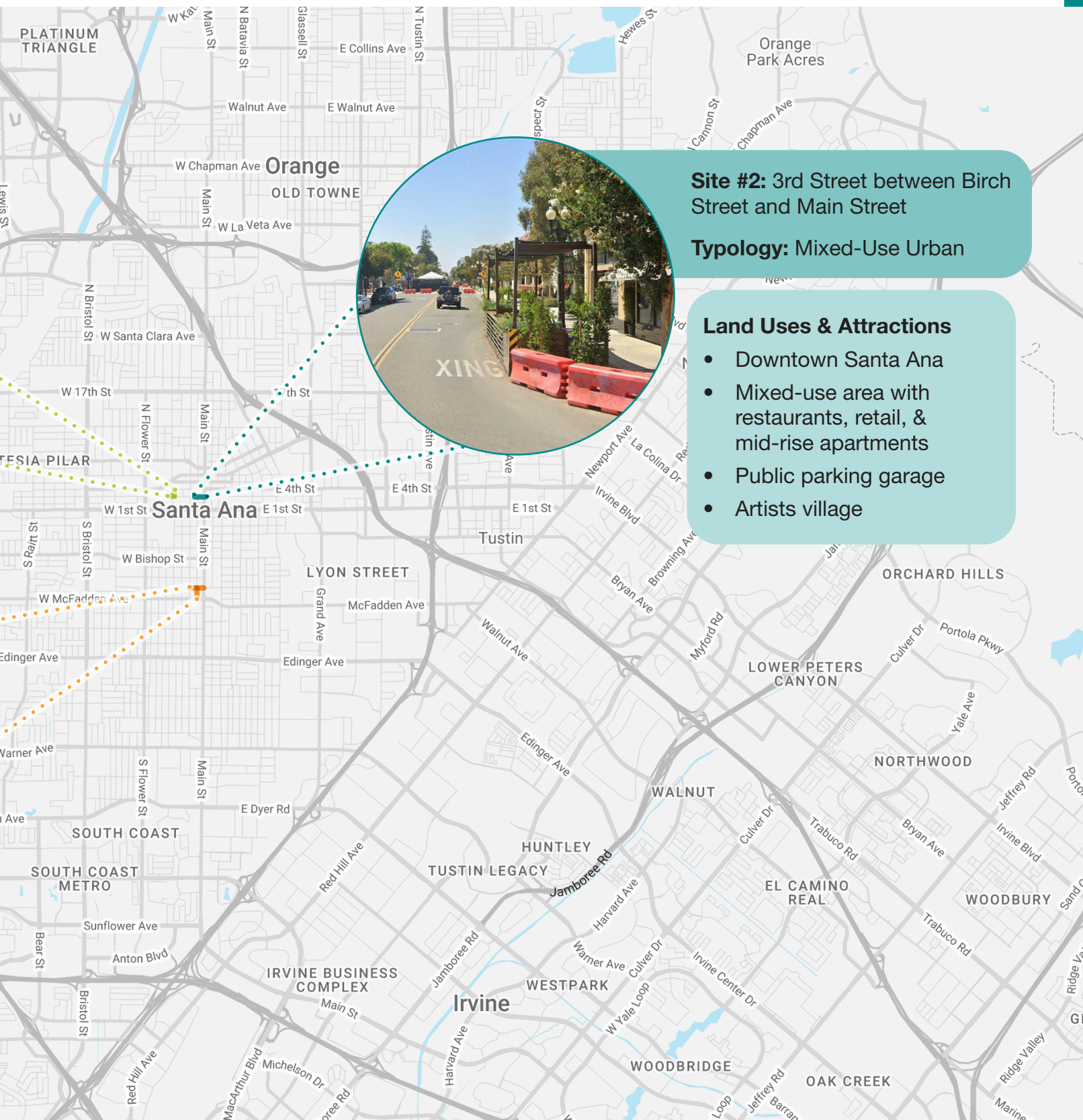
Site #3: Cubbon Street between Broadway to Main Street and Sycamore Street between Cubbon Street and McFadden Avenue.

Typology: School Street

Land Uses & Attractions

- Heninger Park Neighborhood
- Low-density residential & commercial area
- Northgate Market
- Elementary school
- Restaurants & popular food truck





Site #2: 3rd Street between Birch Street and Main Street

Typology: Mixed-Use Urban

Land Uses & Attractions

- Downtown Santa Ana
- Mixed-use area with restaurants, retail, & mid-rise apartments
- Public parking garage
- Artists village

Site #1: 3rd Street 300 feet west of Ross Street to Ross Street and Ross Street between 3rd and 5th Street

Typology: Employee Access

Site Description and Rationale for Selection

Curbside Uses

- On-street metered parking supply
- Class II bike lane on Ross St
- Class III bike route on 3rd St
- Passenger loading zones

Transit Routes serving the corridor

- Transit routes: 55 - Santa Ana - Newport Beach

Rationale For Selection

- High loading activity demand.
- On-street parking, bus stops, and cyclist infrastructure present.

- Diverse land uses.
- Loading zone present (North of 4th Street).
- Identified in the hotspot mapping tool and discussions with City staff.
- High score in the parametric model.
- Inadequate parking and loading zone for parents and vendors at NOVA Academy.
- Pedestrian safety concerns at intersection.

Relevant Planning Efforts/Planned Projects

- Future OC Streetcar Stop at Ross St and W 4th St



Site #2: 3rd Street between Birch Street and Main Street

Typology: Mixed-Use Urban

Site Description and Rationale for Selection

Curbside Uses

- On-street metered parking supply
- On-street loading zones
- Cycling facilities
- Restaurant patios
- Curbside patios

Rationale For Selection

- On-street parking present
- Adjacent to commercial land uses
- Identified as an interest area by city staff
- High score in the parametric model

Relevant Planning Efforts/Planned Projects

- Future OC Streetcar Stop at Ross St and W 4th St



Site #3: Cubbon Street between Broadway to Main Street and Sycamore Street between Cubbon Street and McFadden Avenue.

Typology: School Street

Site Description and Rationale for Selection

Curbside Uses

- On-street unmetered parking supply
- School loading zones
- Food truck

Transit Routes serving the corridor

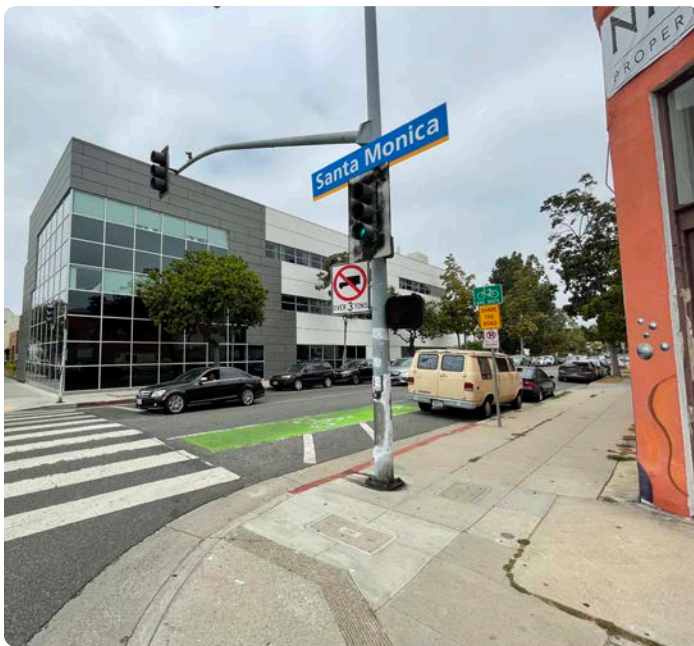
- Transit routes: 53 - Anaheim to Irvine, 66 - Huntington Beach to Irvine

Rationale For Selection

- Adjacent to a school

- On-street parking present
- Food truck present





3.5 SANTA MONICA

The City of Santa Monica is a smaller beachfront city located within the Los Angeles metropolitan area. Santa Monica is embracing technology on multiple fronts, including a digital inventory of the downtown area curbspace and a Zero-Emissions Delivery Zone (ZEDZ). Additionally, the City is currently using the application “SMARKing” to centralize and digitize their parking demand data. The application provides the City with the data required to make informed decisions regarding parking policy as well as the ability to set dynamic parking rates based on real-time demand to maximize the efficiency of the curbspace and provide a source of revenue for the City. Moreover, the City also permits numerous types of micromobility systems, including e-bikes, sit down scooters, and stand up scooters. These micromobility systems provide residents with convenient alternatives to personal vehicles. The breadth of new technology being implemented requires careful integration to ensure the overlapping needs and objectives of the individual initiatives work together to provide a seamless user experience. Santa Monica provides a unique setting for curbspace management initiatives to be data-driven and integrated, with clear benchmarks for understanding and analyzing the impact of various initiatives.

This section will describe the background documents reviewed, input gathered from City staff and community stakeholders, as well as results from the parametric model analysis. These elements were used as critical inputs throughout the site selection process.

3.5.1 Background Document Review

A review of existing background documents and policies was conducted to better understand previously identified curbspace operations issues, challenges, and opportunities that could be further explored as part of this study. The City of Santa Monica has taken action to create more vibrant, pedestrian-oriented spaces, particularly in the Downtown area.

The Downtown Specific Plan aims to improve pedestrian access through design and improved pedestrian infrastructure. This includes widening sidewalks and incorporating pedestrian friendly design elements such as improved wayfinding signage and green street features. The need for improved active transportation infrastructure is also highlighted in the Santa Monica Bike Action Plan, which discusses strategies for improving bike access, by increasing the number of bikeways and availability of bike amenities including bike parking. Understanding where these amenities are needed must be considered when implementing curb space management strategies. In addition, the Santa Monica Vision Zero Action Plan also highlights how the successful implementation of pedestrian and bicyclist infrastructure improvements is directly related to safety. This document provides specific improvements for reducing the number of Killed or Seriously Injured (KSI) collisions.

3.5.2 What We Heard

- The City has also deployed the first of its kind Zero-Emissions Delivery Zone (ZEDZ), including sidewalk delivery robots, micromobility for last-mile delivery, and improved safety for road users;
- Concerns about Lyft and Uber drivers idling at bus stops which can lead to delay for transit vehicles;
- Many business owners feel that the curb space in front of their businesses are integral to their success, which can lead to challenges when proposing new curb space uses;
- Increased demand for curbside deliveries and pick-up/drop-off activity; and
- Interest in monetizing the curb space for activities other than on-street parking.

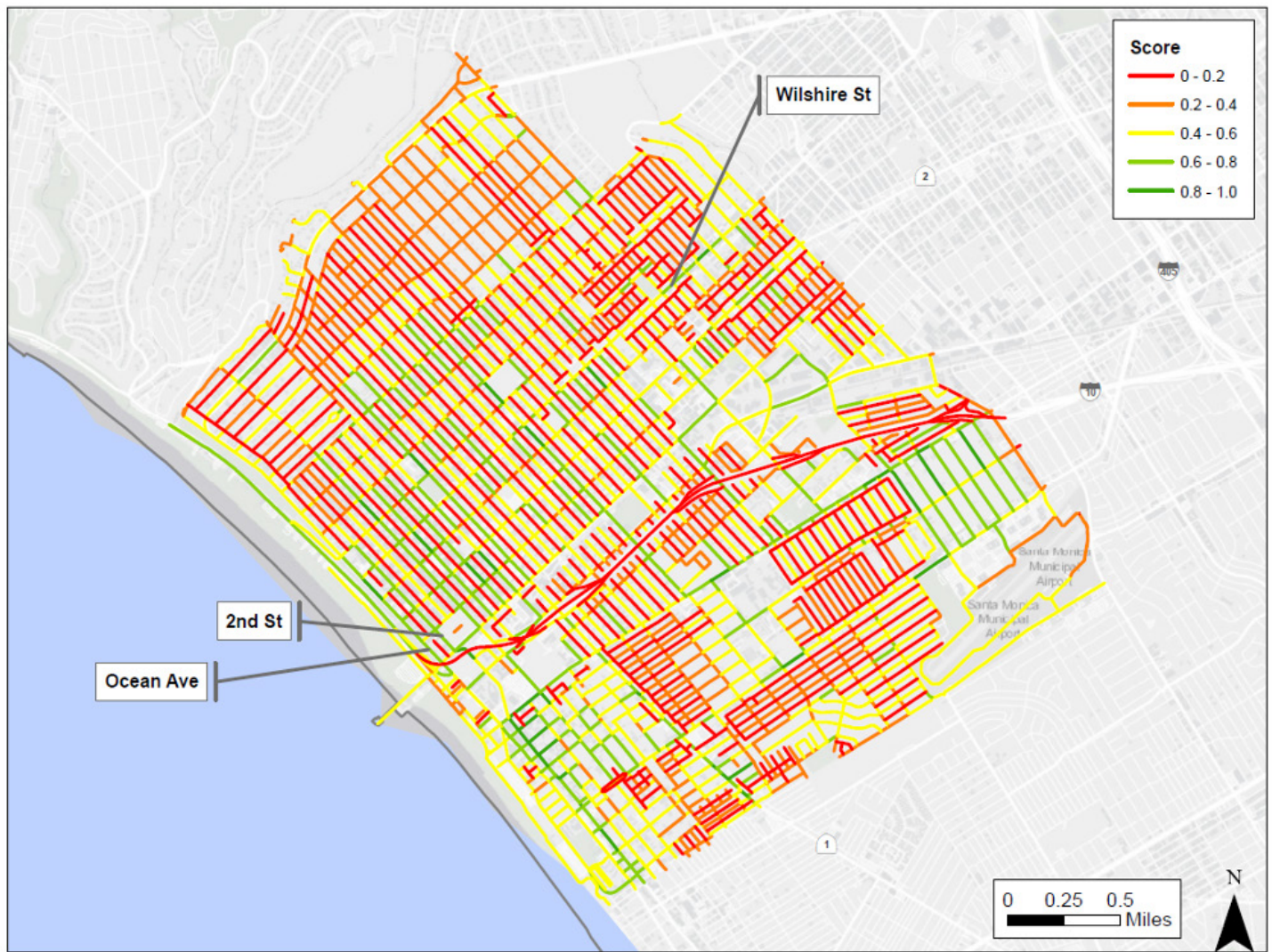
Background Documents Reviewed

- Downtown Specific Plan
- Vision Zero Action Plan
- Bike Action Plan
- Climate Action and Adaptation Plan
- Electric Vehicle Action Plan
- Land Use and Circulation Element
- Pedestrian Action Plan
- Sustainable City Plan
- The Framework – Creating a Sustainable City of Wellbeing

Key Themes

- Public health and wellbeing
- Sustainable, safe, multimodal, and equitable transportation systems
- Community stewardship and collective responsibility

3.5.3 Parametric Model Analysis



Above: The parametric model for the City of Santa Monica, highlighting the different levels of demand on the curb space.

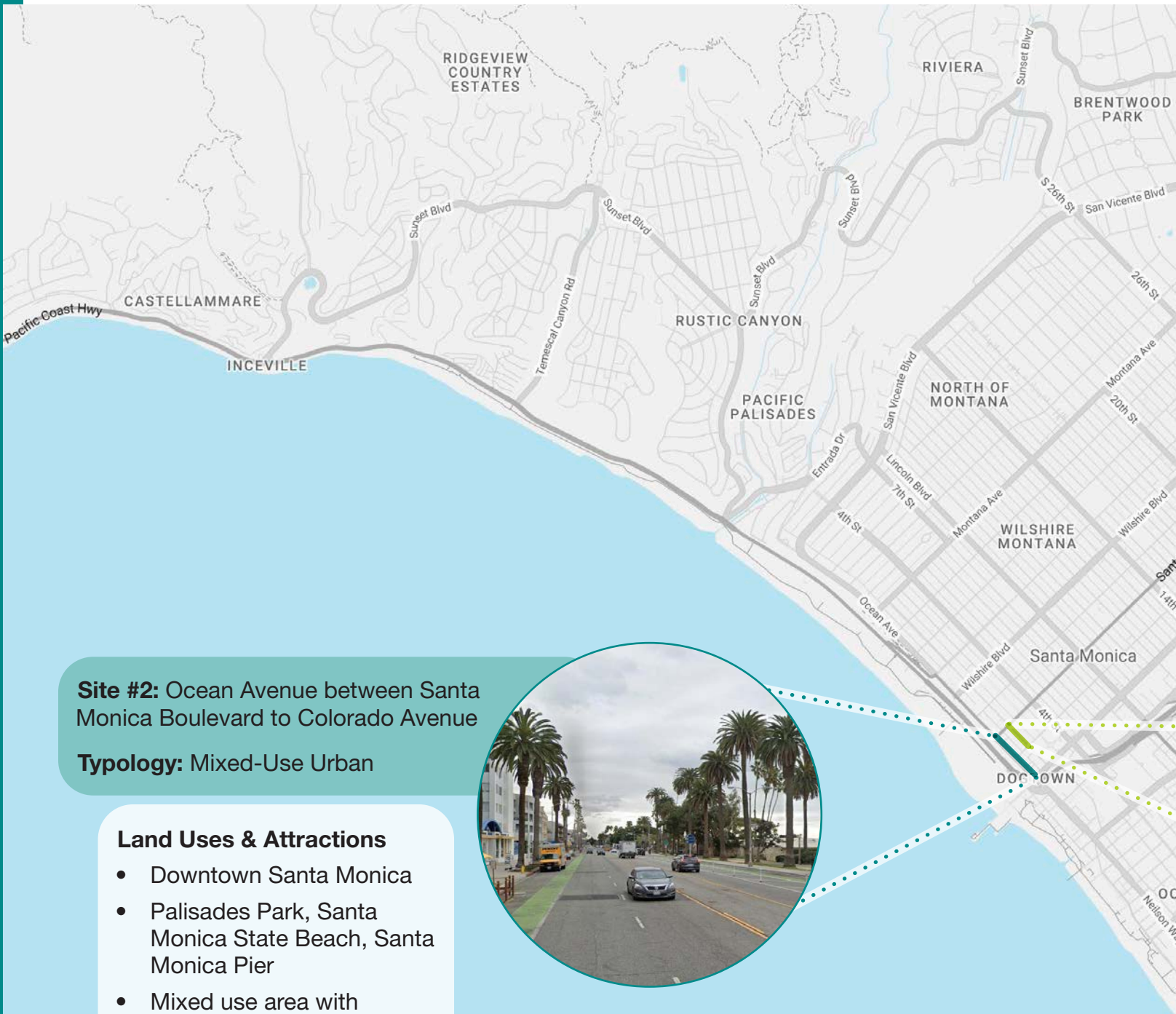
As shown in the table below, the datasets with the highest perceived impact on site selection for Santa Monica were land use designations, on-street and off-street parking supply and demand, micromobility infrastructure (e.g., cycling routes and docking stations), and transit infrastructure.

DATASET	ASSIGNED WEIGHT
On-street and off-street parking supply and demand	4.3
Land use designations (office, commercial, mixed use)	5.0
Population and employment	3.3
Micromobility infrastructure (cycle routes, docking stations)	4.0
Transit infrastructure	4.0
Cyclist and pedestrian collisions	2.7
Public amenities (e.g., schools, parks, etc.)	3.3
Emergency service locations (e.g., hospitals, fire stations, police stations)	2.3

The model resulted in a map visualizing an overall score of 0 (red) to 1 (green) for each street segment. Green street segments indicate areas with a high number of curb space uses and likely high demand. As presented in the map, these segments are located throughout the entirety of the city, generally perpendicular to Interstate 10 and along the coast and southwestern area of the city. These correlate with areas of high density of land uses and mobility infrastructure, as well as high parking and loading demands as residents and visitors access the city’s several key destinations and attractions. As the city is interested in maintaining curb space for uses other than on-street parking, these segments provide further context for site selection. Data gaps include parking regulation inventory, as well as on-street parking occupancy and turnover that can help to understand parking and loading behaviors as well as potential conflicts with other modes.

3.5.4 Sites Selected

Three areas were chosen to proceed with more detailed curbside analysis.



Site #2: Ocean Avenue between Santa Monica Boulevard to Colorado Avenue

Typology: Mixed-Use Urban

Land Uses & Attractions

- Downtown Santa Monica
- Palisades Park, Santa Monica State Beach, Santa Monica Pier
- Mixed use area with apartments, hotels, & restaurants



Site #3: Wilshire Boulevard between Yale Street to Princeton Street, and Harvard Street between Wilshire Boulevard and Arizona Avenue

Typology: Mixed-Use Urban Street

- Land Uses & Attractions**
- Mixed use area with commercial, medical centers, and residential
 - Erewhon Market
 - Mid-City Neighborhood

Site #1: 2nd Street between Santa Monica Boulevard to Colorado Avenue

Typology: Multimodal Mobility

- Land Uses & Attractions**
- Downtown Santa Monica
 - Heavily commercialized area with retail, hotels, and restaurants
 - Santa Monica Place
 - Public parking garages

Site #1: 2nd Street between Santa Monica Boulevard to Colorado Avenue

Typology: Multimodal Mobility

Site Description and Rationale for Selection

Curbside Uses

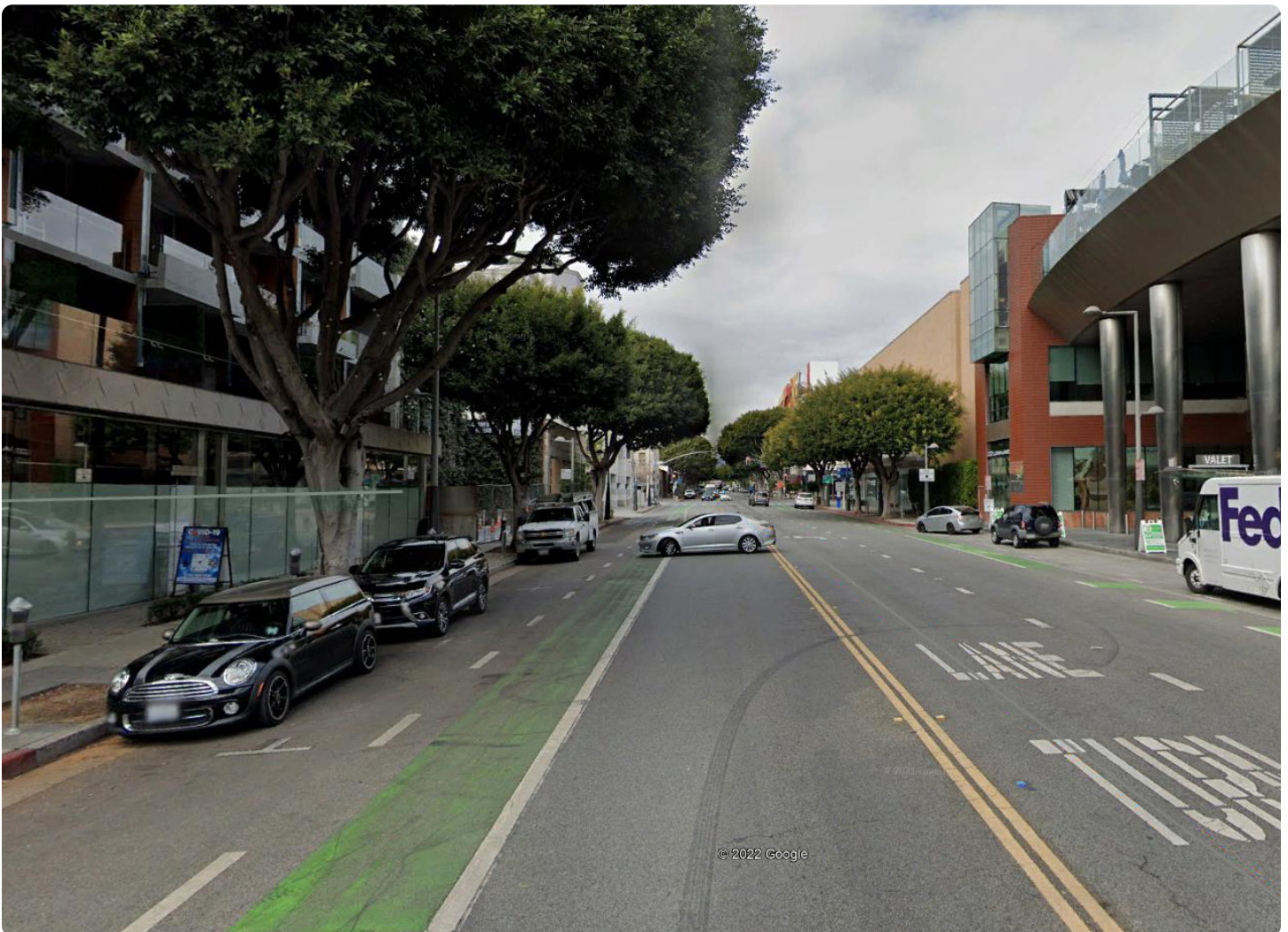
- On-street metered parking supply
- Class II bike lanes
- Shared mobility drop zone
- Restaurant patios
- Loading zones

Transit Routes serving the corridor

- Big Blue Bus Route: 5
- LA Metro Bus Route: 33

Rationale For Selection

- Adjacent to retail and restaurant land uses
- Cycling lanes and bus stops present
- Loading zones present
- On-street metered parking
- High loading demand present
- Vehicles often block bike lanes
- Courier delivery trucks often double park
- High score in the parametric model



Site #2: Ocean Avenue between Santa Monica Boulevard to Colorado Avenue

Typology: Mixed-Use Urban Street

Site Description and Rationale for Selection

Curbside Uses

- On-street metered parking supply
- Class II bike lanes on east side, Class IV bike lanes on the west side
- Shared mobility drop zone
- Restaurant patios
- Passenger loading zone

Transit Routes serving the corridor

- Big Blue Bus Route: 8
- LA Metro Bus Routes: 4, 33, 534
- Santa Clarita Transit Routes: 101, 102

Rationale For Selection

- Adjacent to hotels and restaurants
- On-street metered parking
- Cycling lanes and bus stops present
- High score in the parametric model



Site #3: Wilshire Boulevard between Yale Street to Princeton Street, and Harvard Street between Wilshire Boulevard and Arizona Avenue

Typology: Mixed-Use Urban Street

Site Description and Rationale for Selection

Curbside Uses

- On-street metered parking supply (Wilshire Boulevard)
- On-street non-metered parking supply (Harvard St)

Transit Routes serving the corridor

- Big Blue Bus Route: 2
- LA Metro Bus Routes: 20, 720

Rationale For Selection

- On-street metered parking and loading zones
- Adjacent commercial and medical land uses

- High loading and parking demand associated with Erewhon Market
- Identified in the hot spot mapping tool and discussions with City staff





3.6 ANAHEIM

The City of Anaheim is home to several major attractions, including Disneyland, Disney California Adventure Park, The Platinum Triangle, and Angel Stadium. As development is planned to intensify these already densely built areas, the City needs a strategic curb space management approach that supports the unique needs of all curbside uses.

Curb space uses vary drastically throughout the City, ranging from residential parking demands to curb space deliveries, to loading zones for alternative forms of transportation. While parking is only one component of curb space management, this study should serve as a guiding document for how curb space can be designed to complement the desired street life. Moreover, integrating flexible curb space will help the City achieve its mode-shift goals, which aim to increase transit ridership and active transportation use.

3.6.1 Background Document Review

Plans for areas such as the Platinum Triangle and Center City discuss how activating public spaces near mixed uses plays an important role in generating economic development and enhancing streetscapes. The plans discuss how creating complete streets that serve various modes of transportation – especially for pedestrian and transit users – can streamline curbside activities for all users. More specifically, planned bikeways and pedestrian infrastructure improvements will need to be balanced with other curb space uses, such as transit and parking.

Four of the ten transit opportunity corridors identified by the Orange County Transit Vision pass through the City of Anaheim. Curb space uses near these corridors need to support access to these future routes, stops, and stations. These items were critical sources for consideration when selecting sites, understanding which stakeholders utilize the curbside most frequently, how they utilize this space.

3.6.2 What We Heard

- The Platinum Triangle area contains many mixed-use developments that experiences high loading demand that requires careful parking and curb space management;
- There is currently paid parking for some off-street parking lots in Downtown, but parking is free for on-street spaces and parking lots outside of Downtown;
- There is residential spillover parking experienced in both Downtown and suburban areas. This is being addressed through a residential parking permit that they implemented earlier, so the residential areas are not a focus for this study; and
- The demand for online orders and goods movement increased during pandemic. There is also a fear of impacting access for small businesses owners.

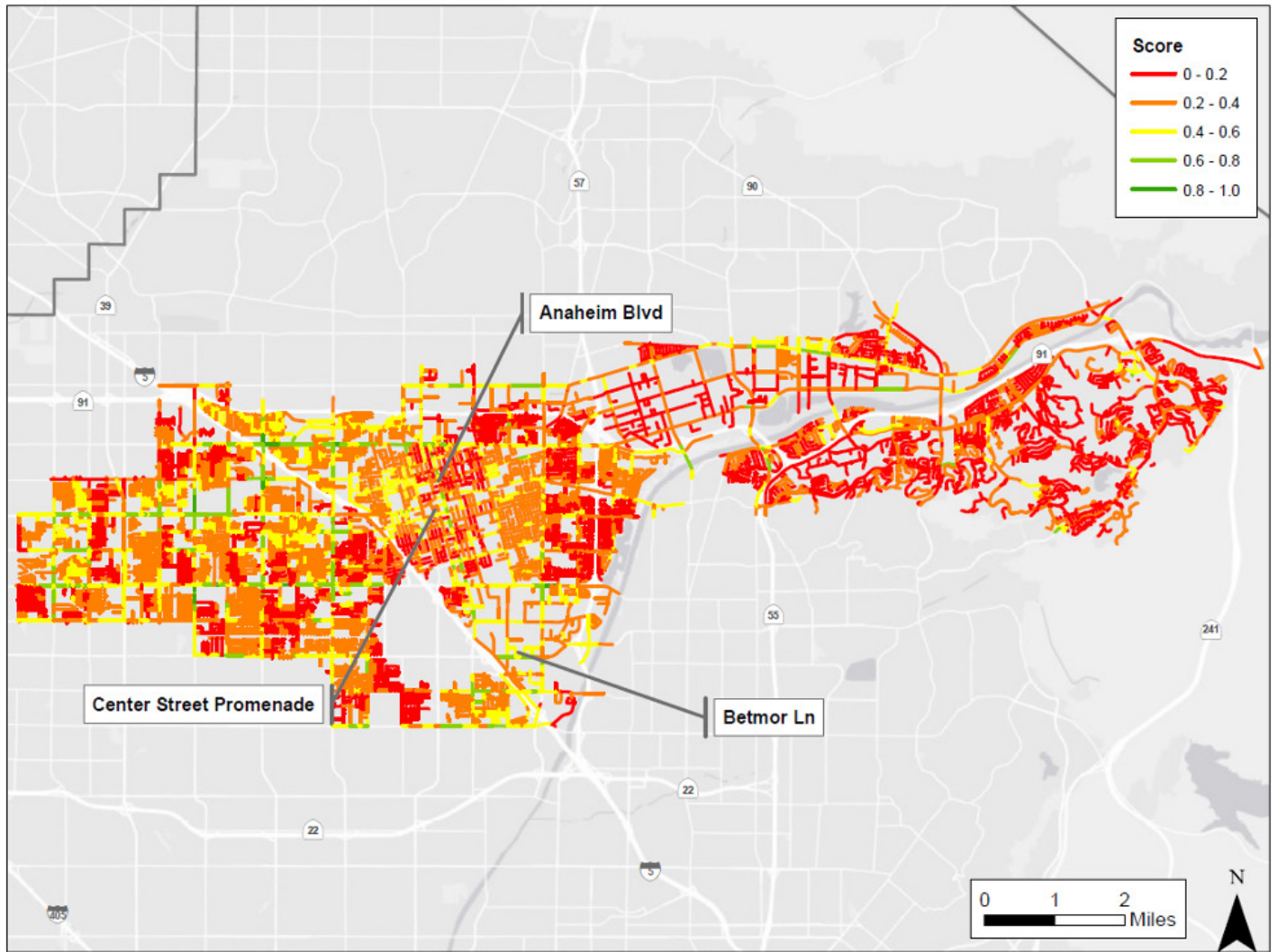
Background Documents Reviewed

- Platinum Triangle Master Land Use Plan
- Center City Corridors Vision Plan
- OC Active
- OC Transit Vision
- Bicycle Master Plan
- Anaheim General Plan – Circulation Element
- Anaheim General Plan – Green Element

Key Themes

- Healthy natural environment and city
- Comprehensive equitable, efficient, and multimodal transportation system for the future

3.6.3 Parametric Model Analysis



Above: The parametric model for the City of Anaheim, highlighting the different levels of demand on the curb space.

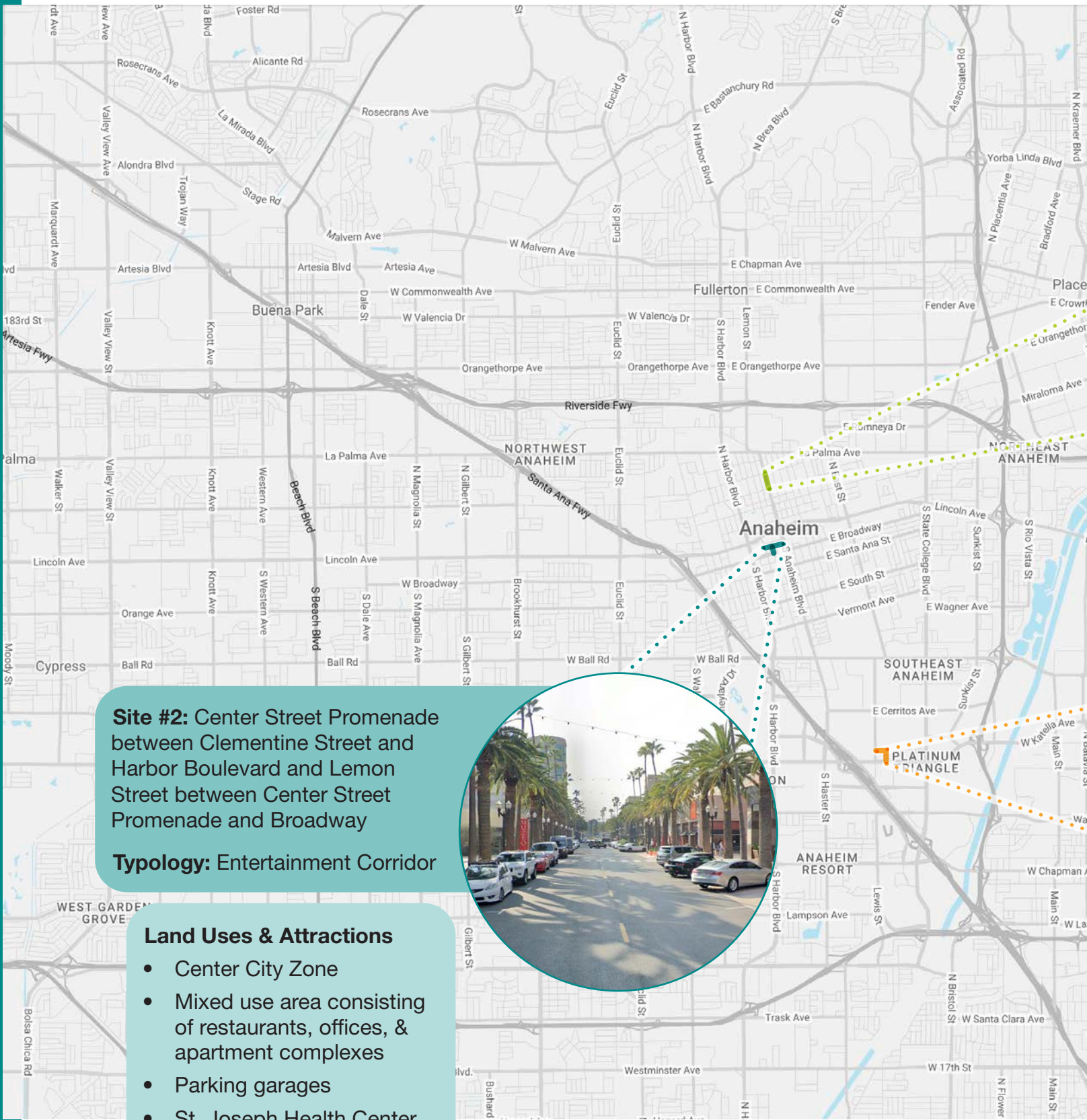
As shown in the table below, the datasets with the highest perceived impact on site selection for Anaheim were on-street and off-street parking supply, population and employment, and land use designations.

DATASET	ASSIGNED WEIGHT
On-street and off-street parking supply and demand	4.3
Land use designations (office, commercial, mixed use)	5.0
Population and employment	3.3
Micromobility infrastructure (cycle routes, docking stations)	4.0
Transit infrastructure	4.0
Cyclist and pedestrian collisions	2.7
Public amenities (e.g., schools, parks, etc.)	3.3
Emergency service locations (e.g., hospitals, fire stations, police stations)	2.3

The model resulted in a map visualizing an overall score of 0 (red) to 1 (green) for each street segment. Green street segments indicate areas with a high number of curb space uses and likely high demand. Due to the residential nature of much of Anaheim and the varied topography of the eastern part of the city, the highest scoring segments were located in the city’s western half, along major arterials off of Interstate 5, as well as along corridors near the downtown area, where much of the parking is currently free. Adjacency to single-family residential areas can create a dynamic requiring innovative curb space management. Data gaps include parking regulation inventory, on-street parking occupancy and turnover, and the locations of public amenities and services. These are areas of opportunity that were considered, along with the inputs above, for further study of curb management issues.

3.6.4 Sites Selected

Three areas were chosen to proceed with more detailed curbside analysis.





Site #1: Anaheim Boulevard between North Street and Wilhelmina Street

Typology: Mixed-Use Suburban

Land Uses & Attractions

- Center City Corridor
- Commercialized area consisting mostly of auto shops, restaurants, and bars
- Adjacent to low-density residential developments

Site #3: Betmor Lane and Mason Lane between Lewis Street and Katella Avenue

Typology: Multi-family Residential

Land Uses & Attractions

- Platinum Triangle Area
- Dense residential site with condo and townhouse complexes
- Coral Tree Park
- Angel Stadium nearby

Site #1: Anaheim Boulevard between North Street and Wilhelmina Street

Typology: Mixed-Use Suburban

Site Description and Rationale for Selection

Curbside Uses

- On-street parking supply
- Class II bike lane on-street

Transit Routes serving the corridor

- Transit routes: 47 - Fullerton - Balboa

Rationale For Selection

- Bus stops and cycling facilities present
- On-street parking present
- Adjacent to commercial and residential uses



Site #2: Center Street Promenade between Clementine Street and Harbor Boulevard and Lemon Street between Center Street Promenade and Broadway

Typology: Entertainment Corridor

Site Description and Rationale for Selection

Privately owned roadway

Curbside Uses

- On-street parking supply
- Restaurant patios
- Loading zones

Rationale For Selection

- On-street parking present
- On street loading present
- Adjacent to commercial, healthcare, and office land uses



Site #3: Betmor Lane and Mason lane between Lewis Street and Katella Avenue

Typology: Multi-family Residential

Site Description and Rationale for Selection

Curbside Uses

- On-street parking supply
- Loading zones

Transit Routes serving the corridor

- Transit routes: 50

Rationale For Selection

- On-street parking present
- On street loading spaces present
- Adjacent to residential land uses
- Located within Platinum Triangle



3.7 SITE SELECTION SUMMARY

The participating cities were selected based on the presence of major trip generators/attractors, on-going curbside initiatives, and interest in participation expressed by the cities. For the 4 cities of Riverside, Santa Ana, Santa Monica, and Anaheim, 3 sites were selected for detailed evaluation and design recommendations. Site selection was based on existing available datasets and feedback from city staff and stakeholders. These sites are intended to be a detailed demonstration of how curb space can be managed, and to provide each participating city with a comprehensive workplan and starting point from which, they can begin transforming their curb space. Note that additional data collection and analysis was undertaken for some sites, detailed in Section 7.

Below: Summary of the sites selected

City	Site #	Location	Curbside Typology	Key Rationale for Selection
Riverside	1	University Avenue between Market Street and Lime Street	9. Mixed-Use Main Street	<ul style="list-style-type: none"> High loading activity compete with on-street parking and loading Transit routes and stops compete with on-street spaces Class II bike lane on east side of street Intersects with Riverside Pedestrian Mall
	2	Market Street between University Avenue and 6th Street	8. Mixed-Use Urban	<ul style="list-style-type: none"> High loading activity demand On-street metered parking supply Class II bike lane on both sides of street Near the Fox Performing Arts Center
	3	Orchard Street between Cortez Street and Madison Street	5. Neighborhood Street	<ul style="list-style-type: none"> On-street parking supply Mix of low-density and higher-density residential developments Nearby elementary school and shopping plaza
Santa Ana	1	3rd Street 300 feet west of Ross Street to Ross Street and Ross Street between 3rd and 5th Street	3. Employee Access	<ul style="list-style-type: none"> On-street parking, bus stops, and cyclist infrastructure present Inadequate parking and loading zone for parents and vendors at NOVA Academy Diverse land uses (government buildings, NOVA Academy Early College High School, Sasscer Park, Latino Health Access, and Downtown Santa Ana)
	2	3rd Street between Birch Street and Main Street	8. Mixed-Use Urban	<ul style="list-style-type: none"> Identified as an interest area by City staff On-street parking, loading zones, cycling facilities, and curbside patios present Mixed-use area with restaurants, retail, and mid-rise apartments
	3	Cubbon Street between Broadway to Main Street and Sycamore Street between Cubbon Street and McFadden Avenue	7. School Street	<ul style="list-style-type: none"> Adjacent to a school On-street parking present Near restaurants and a popular food truck Low-density residential and commercial areas

City	Site #	Location	Curbside Typology	Key Rationale for Selection
Santa Monica	1	2nd Street between Santa Monica Boulevard to Colorado Avenue	2. Multimodal Mobility	<ul style="list-style-type: none"> On-street parking, loading zones, cycling lanes, and bus stops present Heavily commercialized area with retail, hotels, and restaurants Vehicles often block bike lanes Courier delivery trucks often double park
	2	Ocean Avenue between Santa Monica Boulevard to Colorado Avenue	8. Mixed-Use Urban	<ul style="list-style-type: none"> Shared mobility drop zone Class II bike lanes on east side, Class IV bike lanes on the west side Restaurant patios present Mixed-use area with apartments, hotels, and restaurants
	3	Wilshire Boulevard between Yale Street to Princeton Street, and Harvard Street between Wilshire Boulevard and Arizona Avenue	8. Mixed-Use Urban	<ul style="list-style-type: none"> High loading and parking demand associated with Erewhon Market Mixed use area with commercial, medical centers, and residential On-street parking, loading zones, and bus stops present Mid-City neighborhood
Anaheim	1	Anaheim Boulevard between North Street and Wilhelmina Street	4. Mixed-Use Suburban	<ul style="list-style-type: none"> On-street parking, cycling facilities, and bus stops present Commercialized area consisting mostly of auto shops, restaurants, and bars Center City Corridor
	2	Center Street Promenade between Clementine Street and Harbor Boulevard and Lemon Street between Center Street Promenade and Broadway	10. Entertainment Corridor	<ul style="list-style-type: none"> On-street parking and loading spaces present Mixed-use area consisting of restaurants, offices, and apartment complexes Restaurant patios present Near St. Joseph Health Center and the Rinks Anaheim Ice
	3	Betmor Lane and Mason Lane between Lewis Street and Katella Avenue	6. Multi-family Residential	<ul style="list-style-type: none"> Located within Platinum Triangle near Coral Tree Park and Angel Stadium On-street parking and loading spaces present Dense residential site with condo and townhouse complexes



4

Stakeholder Engagement

Key Terms

Project Champions: The key contact(s) at each selected agency who served as the project manager for each community, helping coordinate the formation of the CAT, distribute the surveys, connect with data collection coordinators, and champion the project for their city.

City Advisory Team (CAT): 6-10 representatives from a broad range of agency departments, such as parking, enforcement, public works, police/fire/emergency services, finance, traffic engineering, etc. CATs were formed in consultation with SCAG and the city's Project Champions. These representatives serve as subject matter experts.

Santa Ana and Riverside: CATs include departmental and transit representatives, and community stakeholders such as transit advocacy groups, academic representatives, health of business associations, and various chambers of commerce.

Santa Monica: CATs include departmental and transit representatives.

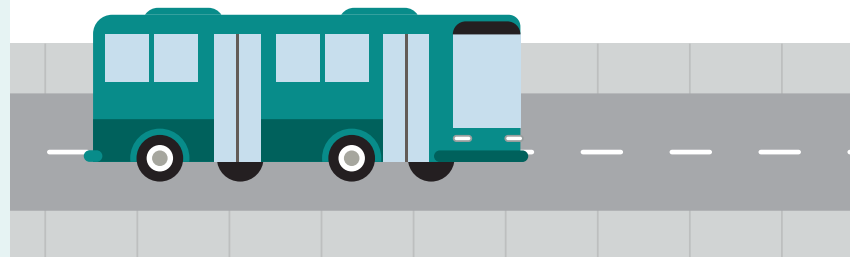
Anaheim: CAT only consisted of the two project champions.

Project Advisory Committee (PAC): Consists of the 4 CATs and Project Champions from each of the 6 participating cities along with key curbspace vendors and private technology innovators. This group met during each phase of the study to understand conditions, curbspace management concepts, site locations, data collection needs and methods, and pilot project or other recommendations.

Peer-to-Peer Exchange Sessions: Organized for each PAC session with the purpose of bringing expertise from the region and the nation to examine best practices and pilot projects for curbspace management.

Extensive stakeholder engagement was held throughout the study process to ensure that the six participating cities were engaged to their desired level, and that the study's recommendations are both aligned with their specific goals and objectives and within their ability to action. All SCAG member agencies were given the opportunity to complete a readiness survey, participate in Regional Workshops, and receive information and educational emails. The engagement for this study was conducted virtually, with video conference meetings and no in-person meetings, conforming to current public safety practices due to COVID-19.

This study provided stakeholders opportunities to provide input and learn more about curbspace management via surveys, focus groups, peer exchanges, interviews, and briefings. This section provides an overview of the various engagement activities, including how the engagement was conducted, who was involved, what types of information was solicited, and how key findings were received. These key findings were incorporated into outcomes at various milestones throughout the study and ultimately informed the resulting project recommendations. Stakeholder engagement activities shaped the human side of the study, while data allows for comparison and contrasting to drive a data-driven decision-making process.



Goals and Objectives of Stakeholder Engagement:

- Provide information and materials that are relevant to the target audiences;
- Engage key stakeholders in an authentic and transparent manner;
- Ensure ample opportunities for inclusive and ongoing input;
- Reach out in a comprehensive manner to ensure broad representation across the regions, ethnicities, and socioeconomic groups; and
- Gather input about issues affecting our key stakeholder's constituencies.

The project team completed 39 interviews to gain insights from four different types of stakeholders:

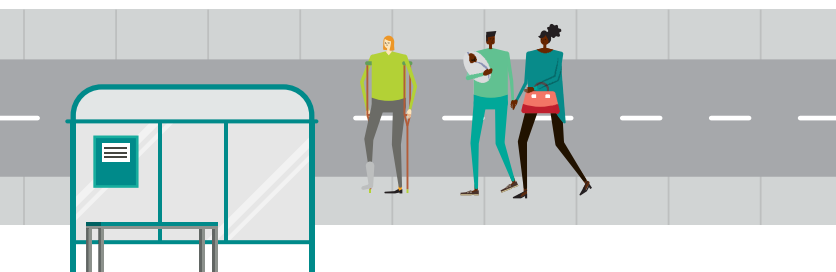
1. Project champions (6 interviews)
2. City departmental and transit operators (16 interviews)
3. City public stakeholders (5 interviews)
4. Curb space vendors (12 interviews)

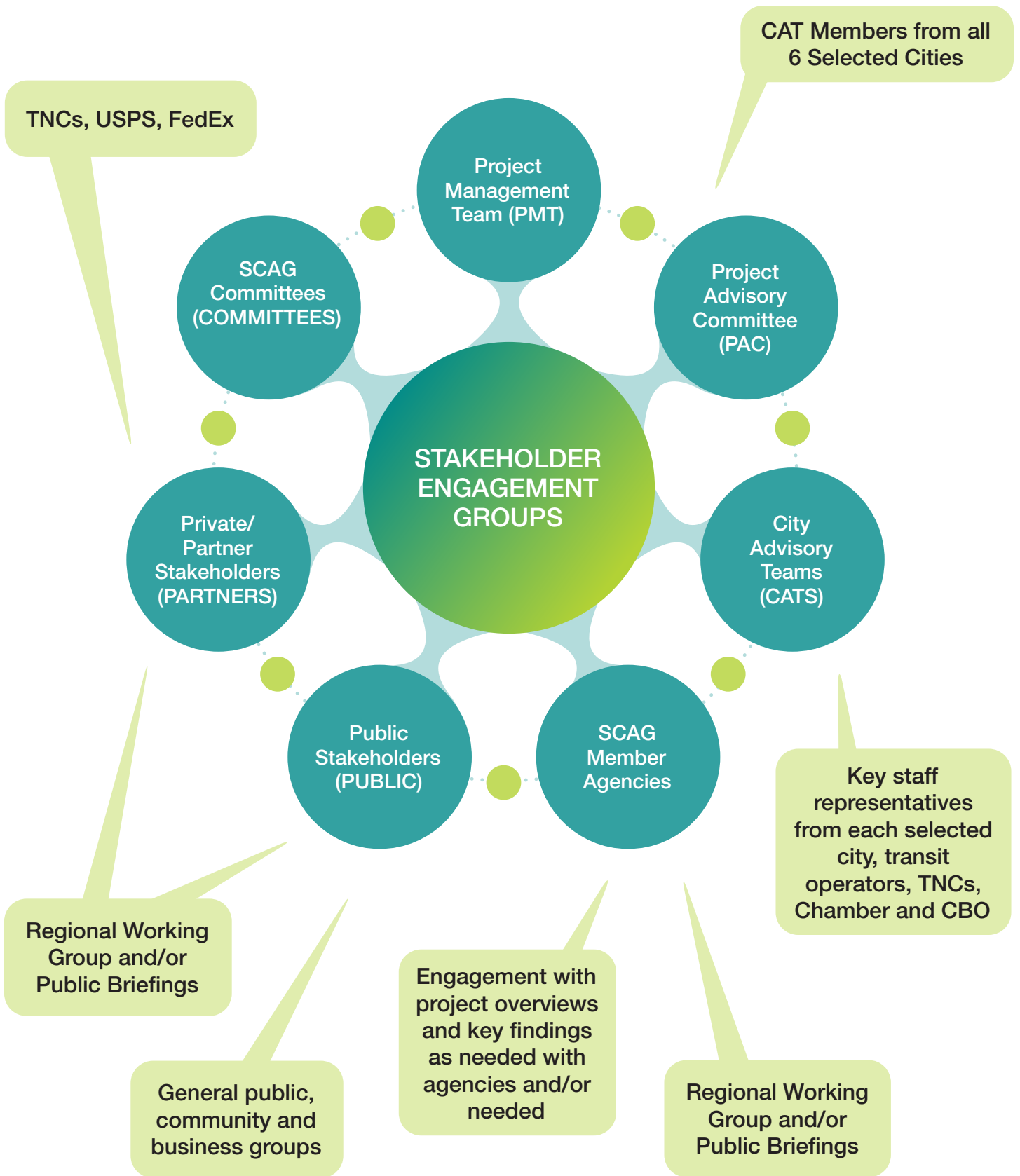
Ultimately, a total of 708 insights were collected as a result of the stakeholder engagement effort. Key findings have been summarized in this section.

Regional Working Group (RWG): The purpose of this group is to serve as a conduit to inform and educate regional stakeholders on curb management concepts, ideas, and potential projects. There currently is no standing RWG. In the short-term, a current working group will be expanded to include recurring agenda items relevant to curb space management in the region. The goal of the long-term RWG is to provide a forum for cities to engage in peer-to-peer exchanges to:

- 1) Provide the opportunity for participants to share curbside management challenges, best practices, and discover progressive solutions from their peers;
- 2) Learn how to measure and track the success of their program based on a structured approach;
- 3) Begin to map a path forward for success leveraging expertise and experience from peers;
- 4) Identify achievable goals and strategies via a structured program assessment;
- 5) Learn from other peers' data collection and analysis efforts, and potential pilot projects and other strategies for this study; and
- 6) Gain access to peers across North America experiencing similar challenges, exchanging lessons learned and strategies for success.

Capability Maturity Model (CMM) Curb Readiness Assessment Survey: An online survey used to establish a baseline for each community and the region related to project readiness and curb space management initiatives. This survey tool benchmarked the program status and desired levels of improvement across the 21 CMM program elements.





Above: Overview of the categories of stakeholders engaged through the SCAG CSMS



Phase 1: Data Collection & Existing Conditions

Fall/Winter
2021



PAC Session #1

The intention of the session was to share:

- The study purposes, goals, and local benefits of curb space management.
- How curb space has evolved.
- Why it needs management plans
- The state of curb space practice in Southern California.



CAT Focus Group #1

The intention of the session was to:

- Understand curb space management concepts.
- Review results of the CMM Curb Space Readiness Assessment Survey.
- Explore potential pilot projects that this study may recommend.
- Identify curb space hot spots.



Stakeholder Interviews (Fall 2021 to Winter 2022)

- **Project Champions:** Project kick-offs for the efforts in each city. Information discussed included an overview of engagement activities, validation of high-level concerns, determination of CAT members, distribution of the survey to CAT members, and data collection.
- **Curb Space Vendors** (e.g. ride-share, food/package/commercial delivery, scooter/bike share, etc.): Helped inform best practices, help the region prepare for current or future innovations and to shape the city and regional best practices.
- **City Departments and Transit Operators:** Provided insights that impact the organizational structure, indicated the need for cooperation between departments, and provided key details on current or planned impacts to the curb.
- **City Public Stakeholders:** Were key for Santa Ana and Riverside in gaining perspective into the public perception of activity at the curb including conflicts between modes, prioritizing access and current or planned curb uses.

Winter
2021-22



Phase 2: Site Locations



PAC Session #2

- Shared site selection and data collection updates
- Reviewed key findings from the Vendor Survey.
- Collected feedback for potential curb space elements / pilot projects.



CAT Focus Group #2

- Discussed the inputs and methodology to determine site selection.
- Collected feedback related to potential study sites.
- Determined key stakeholders for further interviews.



RWG Session #1

Curb space education and information exchange for all member agencies.



Winter
2021-22



Stakeholder Interviews (Fall 2021 to Winter 2022)

9 sessions were held with SCAG committees, elected and community based organizations. The purpose was to educate and bring awareness of curb space management goals and benefits to the region. Information shared includes the project overview, key curb space management concepts, stakeholder inputs and resulting problem statements, recommendations, and best practices.

Spring
2022



Phase 3: Pilot Project Recommendations



PAC Session #3

- Summarized data collection efforts
- Reviewed findings from stakeholder interviews
- Presented regional themes and recommendations



CAT Focus Group #3

- Summarized key findings from stakeholder interviews
- Reviewed data collection findings
- Presented a regional curb space framework
- Discussed potential pilot projects and recommendations



RWG Session #2

Education session on potential projects and implementation

Post
Project



CAT Focus Group #4

Santa Ana and Riverside will have a 4th CAT session to work through the Pilot Project Recommendation Work Plan.
*Anaheim and Santa Monica are not interested in implementing pilot projects at this time due to limited staffing resources



Participating City Pilot Project Evaluation



Quarterly RWG Meetings

Quarterly meetings to review and advance curb space management with SCAG

Above: Key engagement activity across the project timeline.

4.1 CAPABILITY MATURITY MODEL (CMM) SURVEY SCORES

SCAG municipalities, including Anaheim, Long Beach, Santa Monica, Los Angeles, Riverside, and Santa Ana, responded to the online CMM Survey in Fall/Winter 2021. The CMM Survey results revealed each city's current state and desired future state in relation to curbside management, resulting in a self-assessed benchmark score for the city's preparedness to implement progressive curbside management policies. These benchmark scores were taken into consideration when making regional and city-specific recommendations for strategies and actions to solve identified challenges at the curb (i.e., a solution must not only solve an identified challenge, but be feasible given the current context of a city's curb or parking management program). In short, the survey was intended to provide a gap analysis into the regions and each city's current versus desired state for a curb space management program. This then provides direction as to what strategies and actions may be most appropriate to solve a city's curb space management problem statements given their current and desired ideal state.

The CMM Survey was based on factors such as Organizational Structure, Leadership, Progressive Performance Measures, and Curbside Inventory practices. The surveys resulted in each city numerically ranking its maturity and progress in implementing or achieving their curb management goals for each criteria according to the following typical CMM scale:

1. **No Program**
2. **Traditional Program**
3. **Some Progressive Elements**
4. **Progressive Approach**
5. **World Class and Advancing**

This gap analysis was then compared with challenges and opportunities expressed during initial meetings and interviews, compared with expanded CMM elements survey results, and matched up with best practice categories to provide an early analysis of high-level, potential focus areas for future projects that would meet the cities' expressed curb space management needs. Each city's results will be outlined in the recommendations section of this report.

4.2 KEY FINDINGS

4.2.1 Riverside

Interviews were held with city champions, the city departments of Traffic Engineering, Parking, and Land Development, Riverside Downtown Partnership, and Riverside Transit Agency (RTA). Three key curb space uses arose through these interviews.

Active Transportation

Scooter, bike share, and trolley systems have all been previously tested in downtown Riverside, without success. Riverside is looking for opportunities to improve the bike network, predominantly through the addition of bike lanes.

Parking

New residential developments, entertainment district businesses (restaurants and bars), and loss of parking spots serving businesses are putting a strain on the curb space, particularly between Market Street and Lemon Street. Parking variants granted to developers in the past, along with changes in intended use and availability of certain parking garages, are currently contributing to a constraint on parking in the downtown area.

There is a negative perception among the public regarding walking from a parking space to a destination in downtown/urban pedestrian environments, even though the distance is often the same or less than walked for a similar business in a shopping mall. Business and

property owners in the area are having difficulty renting out their spaces since they cannot secure parking for their tenants.

There are opportunities to improve parking through reclaiming some parking from the District Attorney's (DA) office parking structure, resulting from an increase in remote working, implementing shuttle buses for large employers, and tapping into underutilized private parking inventory in garages.

Regarding residential parking, there are multi-family housing sites where parking is spilling over to single family neighborhoods.

Transit

Transit schedules do not support late night entertainment district transportation needs, as most routes stop at approximately 10:30 p.m. Reduced transit service results in increased TNC activity (i.e., higher curbside impact). RTA is not currently experiencing conflicts with other curbside users blocking bus stops.

4.2.2 Santa Ana

Interviews were held with city champions, the city departments of Planning, Public Works – Bike Lanes/Infrastructure, Parking and Enforcement, Waste Management, Parking Operations, and Orange County Transit Authority, the Latino Health Access, Nova Academy, and Micromobility Company - Circuit. Three key curb space uses arose through these interviews.

Active Transportation

Santa Ana is focusing on improving active transportation, notably through the addition of bike lanes and the expansion of scooter and bike share systems. The City has not received any complaints about the bike lanes currently installed; however additional coordination with waste management is required to both improve access to the bins, and reduce safety impacts of bins blocking cyclists.

Latino Health Access advocated for the bike share system; however, the cost of micromobility systems (i.e., bike share and scooter share) is often a barrier for low-income residents. Overall, scooter share was viewed less favorably than other micromobility initiatives. A scooter pilot project was run and was generally well received; however, an Americans with Disabilities Act (ADA) lawsuit stopped the effort. Main complaints about the scooter pilot were that the devices were dumped in problematic locations. If a scooter share program was to be incorporated for first/last mile connections, careful planning and coordination is required, ideally with designated parking locations, as well as updates to the municipal code and policies.

The safety and quality of maintenance of active transportation was flagged as needing improvement, especially in locations used by pedestrians and students. Considerations for how to safely accommodate skateboarders should also be included.

Additional signage and education are required for how vehicles can park around protected lanes, both for the user as well as enforcement officers.

Parking

Santa Ana is car centric, with more parking needed than what is available. Parking is a consistent concern within the City. The City offers residential permits for homeowners, however tenants in larger complexes do not qualify and struggle to find overnight parking for their vehicles. This is especially problematic for multi-generational families living together. The Public Works department is currently looking to revamp the residential parking permit program.

Loading zones are currently from 7:00 a.m. until 6:00 p.m. unless signed otherwise. Vehicles often park in loading zones overnight, which impacts their intended activities the next day. Food trucks in particular were observed to use loading zones as overnight parking, inhibiting the use by other users, such as food deliveries or TNC riders. This issue was specifically pointed out for the loading zones near Nova

Academy, where morning drop-off activity was impeded. Illegal use of the loading zones near Nova Academy is especially problematic as delivery and work trucks cannot use the parking structure due to low clearances. Consideration to expanding the designated time from 6:00 p.m. until 10:00 p.m. is desired to accommodate new curbside uses, such as deliveries and rideshare. Modifications to the designated uses of loading zones should also be revised to accommodate these new users.

Below are additional desired legislative modifications:

- Allow for the enforcement of EV only parking zones.
- Modify and clarify the definition of where food trucks are permitted to park, and/or increase the citation. Currently food trucks can only be ticketed if they don't fit in the stall, and the citation is \$64. There is also confusion from food truck operators about where they are permitted to park.

Clear concerns were raised regarding how to deter illegal curbside use as well as how to better enforce restrictions. Confusing signage is a big contributor to illegal use, and a lack of enforcement officers and advanced technology is a barrier for enforcement. Some technology options discussed include: License Plate Recognition (LPR) technology (not being pursued due to public concerns about information gathering and privacy issues) and smart meters (difficulties with sensor battery life and frequency of maintenance). There are also inefficiencies with the current parking app (Park Mobile) where drivers with more than one vehicle need to update the app each time they use a different vehicle (leads to drivers inadvertently paying for parking for the wrong vehicle).

Expanding on-street paid parking has received pushback from the community, and parking enforcement would need to add staff to accommodate it. Additional public education is required regarding the intent of on-street parking to encourage turnover.

Better consistency and coordination is also desired for parking meters in terms of both rates and maximum times.

Transit

Many residents rely on transit services to move about the city, and improvements to both transit frequency and connectivity are desired. OCTA is currently constructing a new streetcar route, and the streetcar design should be reviewed for guidelines on curb space and bulb outs near stations. No specific conflicts at bus stops were noted for Santa Ana. The City does not have any plans to implement transit only lanes.

A general comment is that it is important for buses to have space to deploy ramps and allow pedestrians safe access around it. OCTA also indicated that they are open to, and actively implementing in some districts, partnerships such as using Lyft to provide service, supporting circulator shuttles to connect residential areas with commercial cores, etc.

4.2.3 Santa Monica

Interviews were held with city champions, the city departments of Traffic Engineering, Parking Operations, Parking Enforcement, and Planning, and Big Blue Bus. Three key curbside uses arose through these interviews.

Active Transportation

Issues with scooter and bike shares have mostly been worked through, and are not the primary source of conflict at the curb. There are issues with TNCs double parking in bike lanes.

Parking and Loading

Density is going up extremely quickly, and curbside regulations are not keeping pace. Specifically, there are not enough loading zones to support the increased density. A better balance of serving users like TNCs and food deliveries as well as parking is required. This becomes more problematic as bus stops become de facto loading zones.

The City of Santa Monica reported mixed feelings on the use of enforcement technology. Currently they use sensors more for informing enforcement routes and to gather data on turnover and pricing. There is interest in pursuing technologies such as LPR and virtual permits, with a recognition that it must be well-planned, properly executed, and supported by public education. Changes in legislature are required for some enforcement technologies. Time of day and dynamic pricing are being actively investigated.

The primary concern with parking violations was with double parking as it is a safety concern. In particular, customers accessing ride share services are viewed as problematic. There is interest at the City in ensuring loading zones are identified through data, and to partner with private companies to find workable solutions.



Transit

The primary feedback related to transit was that bus stops are often used as loading zones, and that more designated ADA access is needed.











4.2.4 Anaheim

The City of Anaheim indicated that they were interested in best practices, peer review, data management, and generally wanted to be involved in the CSMS to better inform future policies and initiatives. However, they are not yet ready for broad stakeholder engagement or pilot project implementation.

OCTA did provide specific feedback for the City of Anaheim in that there are frustrations with illegal activity blocking bus stops, including food deliveries and pick-up/drop-off activity, especially in front of busy generators. Additional enforcement is required, or potentially crossing guards or transit police to discourage improper use of bus stops.

Stakeholder Interviews – Curb Space Vendors

The project team worked with SCAG to determine the most advantageous cross-section of curb space vendors and innovators active at the curb in the region. Twelve interviews were conducted with these companies, which resulted in 364 unique findings. A summation of the findings categorized by themes as well as eleven key findings from these interviews are provided.

COMPANY NAME		TYPE OF CURB SPACE VENDOR
 Uber	Uber/Uber Eats	TNC/Food Delivery
 Lyft	Lyft	TNC/Scooter & Bike Share
 UPS	UPS	Parcel Delivery
 ALSCO	Alsco	Commercial Delivery
 SPIN	Spin	Micromobility
 Circuit	Circuit	Micromobility
 Urban Movement Labs	Urban Movement Labs	A hub to design proofs-of-concept and test new mobility solutions
 Automotus	Automotus	Machine vision curb space technology
 Passport	Passport	Curb space payment
 JOLT	Jolt Charge	Electric vehicle charging stations

Increasing demand

- There is a huge increase in number of companies offering delivery.
- Ride-share, shuttle services, and cargo e-bikes are all entering the market using passenger vehicles or vehicles designated for delivery.

Enforcement

- Regulations and zones must be enforced consistently.
- Enforcement is essential for turnover.
- Automate enforcement.

Revenue

- Automated payment provides increased revenue over parking/citations.
- Alternative payment approaches - delivery zone permits or placards.
- Revenue sharing models with advertising on infrastructure and furniture.

Municipality Coordination

- Political will and curbspace champion are key to success.
- Coordination across several city departments is challenging.
- Need interdepartmental/Inter-jurisdictional coordination.
- Staffing resources and lack of dedicated staff to curbspace or innovative concepts.
- Education and awareness are needed for cities elected officials & general public.
- How can cities create collaborative environments?

Partnering and Piloting

- Technology and delivery companies want to partner for pilots.
- Communities should involve partners early in pilot concept development.
- Partnering with private organizations can help solve resource issues at cities.
- Interest in piloting for mobility hubs, transit stations or locations with consolidated access to amenities and connectivity to other modes.
- Cities need to try fail, innovate, try, fail, innovate.

Curbs Allocation

- Need sufficient green and yellow curbs for deliveries.
- More designated or dedicated loading zones
- Often a need to use and locate curbspace access in real-time to provide on-demand services to customers.

Curbs Status & Regulation Information

- Technology providers need regular, accurate, timely updates from cities.
- Blocked for construction curbspace colors, loading zones hours, event restrictions, etc.
- Parking time and location regulations need to reflect commercial delivery needs of customers (businesses).

Curbs Availability Information

- Predictive technologies don't guarantee availability.
- Cameras or sensors provide "moment in time" data that can change before arrival.
- Drivers have low utilization of apps.

Key Findings:

- 1 Most want to access curb as close as possible to destination.
- 2 Frequency varies from multiple times per day to weekly.
- 3 Common dwell time ranges from a few minutes to up to 30 minutes.
- 4 Curb access needs extend to all times of the day throughout the year.
- 5 Commercial companies prefer off-street parking.
- 6 Shared mobility providers prefer on-street parking.
- 7 Need alignment of customer delivery needs with curb restrictions.
- 8 Progressive Pricing only benefits some types of vendors:
 - Does not benefit all vendors; those with short dwell time could benefit most.
 - Dynamic pricing is challenging; Need consistency rather than random variability.
- 9 Understanding curb regulations would help with trip & route planning.
- 10 Parking availability communication depends on vendor capabilities:
 - Some are tech forward and use apps while others prefer static analog solutions.
 - Need better wayfinding and better signage (equitable).
- 11 Company size and volume dictate pricing strategy preferences:
 - Many smaller companies or contract driver operations prefer to access loading zones or other free space at curb.
 - Larger parcel companies' budget millions for parking citations due to lack of parking availability or loading zones at the curb.

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Approach to Recommendations

As the curb is a constantly evolving space, and differs jurisdiction to jurisdiction in terms of access, demand, and management, the goal of the project recommendations was two-fold:

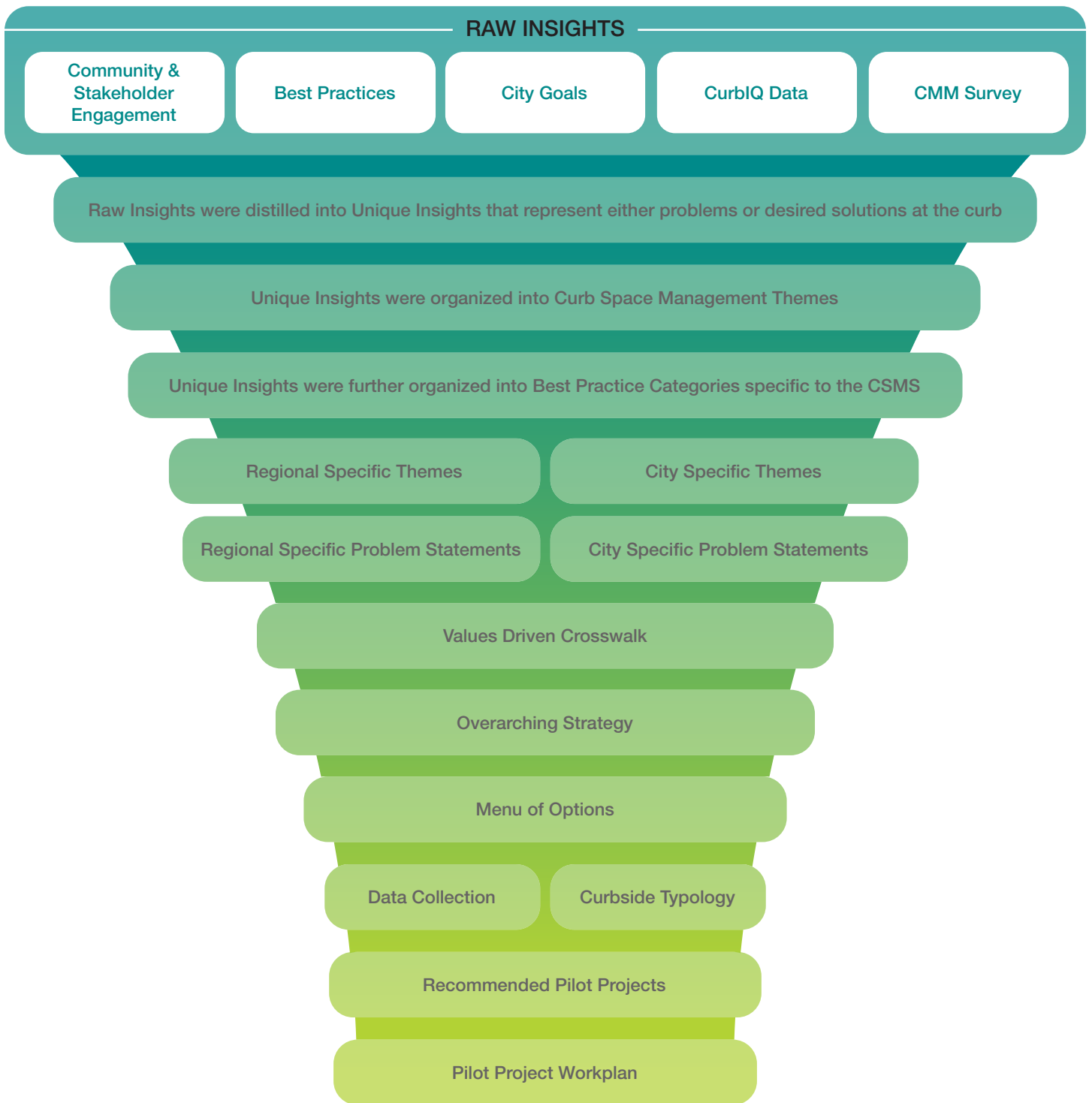
- 1) To provide any municipality within the SCAG region with a toolbox and strategies to identify and prioritize solutions to current and potential future challenges at their curb; and
- 2) To provide the four individual cities with recommendations that directly address their curbside challenges unearthed during the engagement and data collection tasks of this project.

With both the regional and city-specific recommendations, a priority was made to organize and prioritize recommendations based on values-driven outcomes (e.g., SCAG goals for the project, curb space best practice categories, etc.). This ensures that recommendations align with values, can better withstand evolving changes at the curb, and can assist municipal leaders in making decisions driven by desired outcomes.

While a review of curb space best practices provided critical inputs to assess potential solutions to challenges at the curb in the SCAG region, these use cases remain static inputs that only represent a snapshot in time. From increased demand for delivery access, to the implementation of new modes of mobility, to the development of smart infrastructure for data collection and electrification – changing curb space management practices requires flexible frameworks and strategies to allow municipalities to act immediately, as well as assess and respond to new and evolving challenges over time in a nimble and individualized manner. Every city has different needs and challenges and having a blueprint to address these needs was an important part of the structure of this project.

The overall approach to recommendations was to systematically categorize and consolidate all the inputs and insights gained through the existing conditions review and stakeholder engagement, until manageable and logical recommendations arise. The subsections within Section 5 align with each step of the reverse pyramid. For each step, a detailed explanation is provided to highlight the analysis done and show how each step connects to the next.





Above: Flowchart of the approach to recommendations

5.1 CURBSIDE MANAGEMENT THEMES AND BEST PRACTICE CATEGORIES

At the top, inputs from a collection of sources, including stakeholder engagement, were coded into unique insights that represented either problems or desired solutions at the curb. These insights were then organized into generalized curb space management themes. To provide greater searchability within these themes, they have been organized into this project's best practice categories.



DEMAND

The amount of parking that would be used at a particular time, place, and price.

- Access (multimodal)
- Access (passenger)
- Access (short-term)
- Delivery (demand)
- Delivery (loading)
- Event planning
- Food trucks
- Loading (pick-up drop-off)
- Outdoor dining parking
- Parking (on-street)
- Parking (residential) parking (long-term)
- Parking (micromobility) parklets
- Pick-up drop-off zones
- Transit



POLICY

The process, guidelines, regulations, and laws that guide curb management decisions and work to achieve intended outcomes.

- Enforcement
- Permits (residential parking)
- Policy



NEW + CHANGING USES AND TECHNOLOGY

Improving city preparedness to manage new mobility solutions and increased curb demand.

- Bike share
- Biking
- Bikes (electric)
- Curb technology
- Electric vehicle
- Electric vehicle (charging)
- Electric vehicle (car share)
- Micromobility
- Mobility hubs
- Mobility (shared) parking (meters)
- Scooters
- Scooter share
- Shuttles
- Transportation network companies (TNCs)



DATA + PRIVACY

How the city collects, utilizes, manages, shares, and secures the information that it collects to inform curb management.

- Data
- Data-driven decision making
- Performance metrics



DESIGN

The way in which the street, including the curb space, is designed to accommodate access and serve city goals.

- Bike lanes
- Construction
- Development (real estate) infrastructure
- Loading (vehicle size)
- Painting treatments public space
- Public space (reallocation of)



COST

Pricing the curb space to reflect its true value and to encourage intended use, using the resulting revenue to pay for public services.

- Pricing
- Pricing (dynamic)
- Pricing (short-term)
- Pricing (regulatory hurdles)
- Pricing (equitable) revenue
- Revenue (parking)



AGENCY RESOURCES

The staff, budget, time, and capacity an agency has to dedicate to curb space management.

- Capacity (staff)
- Capacity (cost)
- Change management (organizational) leadership
- Organizational structure
- Organizational management partnerships
- Resources (organizational)



SAFETY

Creating safer streets through the design, designation, and regulation of curb space.

- Safety
- Traffic calming



COMMUNICATIONS + STAKEHOLDER PERCEPTIONS

Ensuring the public and stakeholders understand curb regulations and the reasoned policy rationales behind the regulations.

- Communications
- Education
- Engagement
- Public perception
- Signage

5.2 REGIONAL AND CITY SPECIFIC THEMES AND PROBLEM STATEMENTS

This generalized list of 70 themes was then organized and expanded upon with engagement and data inputs specific to either the region or a particular city, to prepare the basis of regional and city-specific problem statements at the curb. Alignment between city goals and SCAG's overall goals was reviewed so that the study's recommendations would help each city achieve its own values-driven goals, and through their collective effort, SCAG would also be able to advance its efforts. The key themes were also aligned with SCAG's best practice categories to confirm that each subsequent recommendation could be easily classified into its categories and provide each city with values-driven and effective tools to implement curb space solutions.

5.3 VALUES DRIVEN CROSSWALK

All problem statements were then crosswalked against 3 additional factors to guide the organization of recommended options and to ensure values and desired outcome-driven recommendations (a crosswalk analysis is a way of connecting or mapping various similar concepts to each other). At this level, the crosswalking is intended to help the agency prioritize what might be the most appropriate solution from the menu of options for them, depending on their unique circumstances. For example, if a city has a higher gap in terms of current and desired state of progressive curb space management (as identified in the CMM survey), they may want to seek out strategies with low regulatory hurdles and high impact to capture the lowest-hanging fruit first. These three additional factors are:

- 1) The category of the problem statement, which took the original list of themes, re-organized and consolidated these findings into the likely type of intervention that is needed, such as EV charging, enforcement, pricing, etc.
- 2) SCAG's goals for the curb space management study:
 - Promote Sustainability.
 - Better Manage Demand.
 - Provide Equitable, Multimodal Access.
 - Leverage Technology and Innovation through Public-Private Partnerships.
 - Improve Quality of Life in the Public Realm through Efficient Curb Management.
- 3) Best Practice Curb Space Management Categories:
 - **Design:** the way in which the street, including the curb space, is designed to accommodate access and serve city goals.
 - **Policy:** the process, guidelines, regulations, and laws that guide curb management decisions and work to achieve intended outcomes.
 - **Demand:** the amount of parking that would be used at a particular time, place, and price.
 - **Data and Privacy:** how the city collects, utilizes, manages, shares, and secures the information that it collects to inform curb management.
 - **Cost:** pricing the curb space to reflect its true value and to encourage intended use, using the resulting revenue to pay for public services.
 - **Safety:** creating safer streets through the design, designation, and regulation of curb space.

- **New + Changing Uses and Technology:** improving city preparedness to manage new mobility solutions and increased curb demand.
- **Community and Stakeholder Perceptions:** ensuring the public and stakeholders understand curb regulations and the reasoned policy rationales behind the regulations.
- **Agency Resources:** the staff, budget, time, and capacity an agency has to dedicate to curb space management.

5.4 OVERARCHING STRATEGY AND MENU OF OPTIONS

For each problem statement and its associated category, key strategies to solve that challenge were identified. The key strategies have two layers:

1. An **overarching strategy**, such as permitting, engagement, data analysis, etc.
2. A **menu of options** within the overarching strategy that provides an array of actions that could be taken to satisfy the original problem statement.

To provide a level of individual city applicability and prioritization within the menu of options (to reference and implement beyond this study), actions were also evaluated against two factors to provide any municipality in the SCAG region with guidance around the ease and impact of a solution (i.e., cost/benefit scenario):

- 1) Regulatory complexity of action (e.g., political will, regulatory hurdles and/or non-starters, etc.).
- 2) Effectiveness/impact of the action in meeting curb space management best practices and the goals of this project.

When developing the Menu of Options, a top-down approach was used to identify solutions that best address the concerns and priorities raised by stakeholders throughout all of SCAG. However, when cities are looking for specific solutions to implement, they often begin with a problem statement. Below is an example of how an agency can identify potential solutions from the menu of options to address their unique problem. The regulatory complexity and effectiveness/impact scores allow the decision maker to prioritize the potential solutions based on current conditions.

For example:

PROBLEM STATEMENT	BEST PRACTICE AREA	STRATEGIES	MENU OF OPTIONS	DOES IT MEET SCAG'S GOALS?	REGULATORY COMPLEXITY (1-5, 5 IS COMPLEX)	EFFECTIVENESS /IMPACT (1-5, 5 HAS THE MOST IMPACT)
There is a lack of sufficient loading and pick-up/drop-off space, often resulting in illegal parking in bike lanes and loading zones.	Policy	Parking Regulations	Flex Zones	Meets all 5 stated goals	1	2
	Policy, Communication and Stakeholder Perceptions	Permitting	Fleet/ commercial parking permits	Promote Sustainability	4	3
				Better Manage Demand		
				Provide Equitable, Multimodal Access		
	Policy, Communication and Stakeholder Perceptions	Pricing	Price short term parking	Improve Quality of Life in the Public Realm through Efficient Curb Management	4	2
				Reservation system		
Policy, Communication and Stakeholder Perceptions	Pricing	Graduated pricing structure	Meets all 5 stated goals	2	4	
			Meets all 5 stated goals			5



6

Data Collection and Analysis

What is CurblQ?



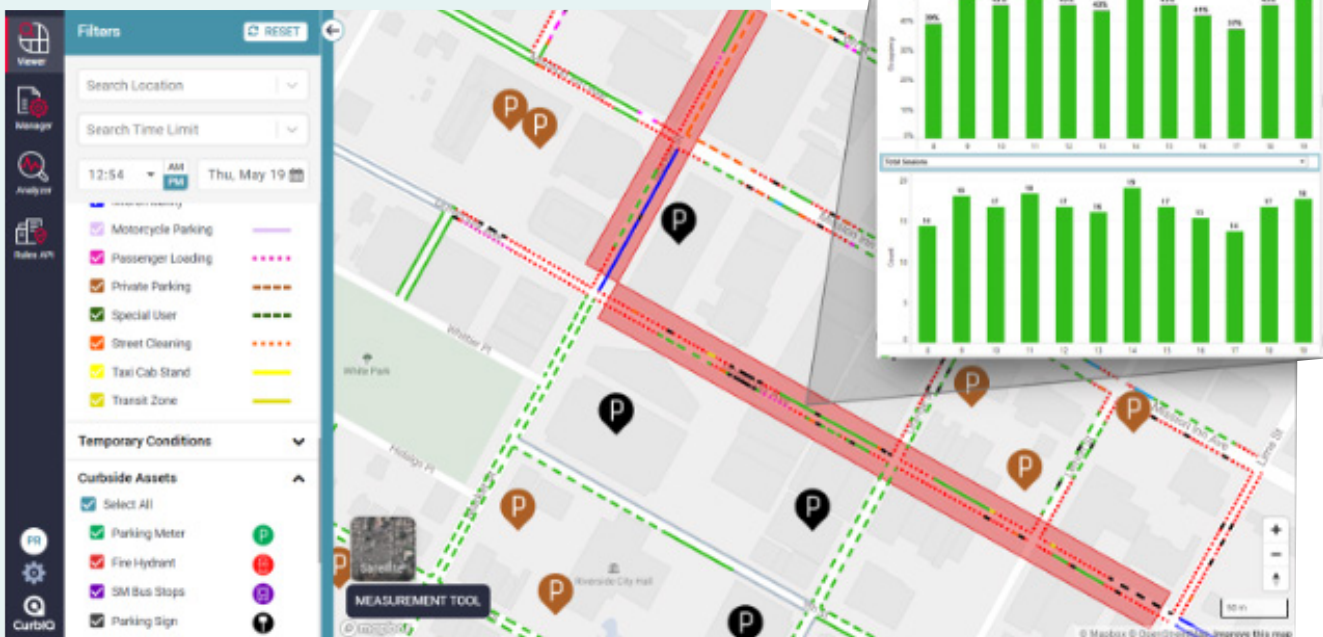
CurblQ is a parking, curbside, and asset management software solution, developed by leveraging IBI Group's software team and subject matter expertise in transportation engineering, parking strategies, and curbside management. This solution helps cities better understand not only their parking options, but all curbside usage and mobility options around them through visualization, management, and analysis tools.

CurblQ played a key role in helping collect and analyze the curbside inventory for the four pilot cities: Santa Monica, Santa Ana, Riverside, and Anaheim. With this curbside space inventory, data about the number of spaces for all curbside uses was known on an hourly, daily, and weekly basis. Curb space trade-offs were analyzed alongside the demand data to identify optimal solutions, such as understanding the walking distance from accessible parking spaces to key destinations or determining the usage and revenue generated from high demand curbside spaces, to help cities maximize and prioritize these values to align with their goals. The platform helped the team identify shovel-ready pilot project concepts in the SCAG region as part of the final deliverable.

There are two key data collection components to help better understand the curb space in a city or area:

- **Inventory/Supply:** a record of all assets and regulations that exist on the curbside. This dataset contains regulations for all curbsides within the selected study areas. This includes the regulation type, relevant timespan, parking rate, date ranges, and other attributes where applicable, along with the coordinate locations along the curbside; and
- **Demand:** curbside events that can be analyzed to quantify curb space operations. Data was aggregated in 20-minute increments and was collected using dashcam video or through curbside camera footage.

This field data complements stakeholder inputs and best practice reviews to develop the recommended strategies for a specific site.



6.1 INVENTORY

To effectively complete a curbside management study, it is essential to have a comprehensive inventory of the curbside, or the curb space supply. A curbside inventory is a georeferenced, digital record of all relevant infrastructure and information that pertains to the curb. This is not simply the location of the curb, but also all relevant assets and regulations that indicate what functions and activities users can and cannot do at the curbside. A breakdown of the components that make up a curbside inventory are described below:

- **Regulations:** these are composed of the restrictions placed on the user for what they can or cannot do at the curbside, often based on the assets and infrastructure. This includes parking, no parking, no stopping, loading and use specific regulations with their associated details such as time span, price, and maximum stays, as applicable.
- **Physical Location:** data on the curbside is only useful if it is accurately located. Having an outline of where points of interest are located can be used to designate regulations on the curbside as well as associated assets.
- **Assets and Infrastructure:** these include physical items located at the curbside. This includes fire hydrants, signage, bike racks, greenery, curb cuts, cross walks, traffic signals, curb paint, bus stops, and parking meters. This list can vary depending on what a municipality is interested in collecting and what is practical or influencing curb behavior.

How Curb Inventory Data is Collected

For this project, curb inventory data was collected and digitized using CurblQ's Curb Level Surveying (CLS) method. Curb inventory data can be collected using pen and paper or digital tablet and a spreadsheet, but this can yield results that are hard to review and update. Some kind of spatial and digital component is preferred to solve this, and there are a couple of open-source tools that can be used. Survey data can then be reviewed using GIS or other rudimentary

software to achieve similar results while providing a method to maintain this data. As noted, one such data collection method uses Esri's Field Maps App to collect curb regulation data with very high positional precision. This data can then be loaded into ArcGIS or other GIS software to review the data points. Note that while this would be in a less dynamic and flexible format than CurblQ, many of the key data points are there for review. Another method is using a CurbWheel, an open source 'smart' measuring wheel and associated app made by SharedStreets.

For both methods, data is collected by walking the streets and curbs of interest in the field. Surveyors capture a picture of the relevant signage/regulation and indicate the relevant regulation type for the asset, such as No Parking. When staff collect data using CurbWheel or Field Maps, they manually enter the regulation type into the respective app, so some of the interpretation is already complete. Additional regulation information such as arrows, time spans, and special user designations can be pulled from the imagery captured during collection with machine vision models, so all relevant data is obtained to convert into an industry standard for the curb (currently Curb Data Specification, maintained by Open Mobility Foundation, or CurbLR, maintained by SharedStreets, but has seemingly become dormant in 2022). Since the data collection occurs right at the curbside in both cases, all curbside attributes can be collected. This includes signage data mentioned above, but also additional curbside assets such as curb cuts and curb furniture. Since mobile apps are used, the geospatial location of the signs, and therefore the start and end points of the regulation (such as a Loading Zone) are known.

Supply data was collected using CurblQ's Curb Level Surveying method. This process uses the Esri's Field Maps App to collect curb regulation data with very high positional precision. CurblQ's processing scripts then automatically convert collected data and imagery into a curbside inventory. Because this data collection occurs right at the curbside, any and all curbside attributes can be collected. More information on the data collection methodology is explained below.

6.2 DEMAND

At its core, demand data is composed of events that occur at the curbside. Events typically include the start and end of a parking session but can also include activities such as entering or exiting a specific area, checking enforcement, or a scheduled update on the occupancy status of a space. Demand data tells us how the curbside is currently being used by different modes. Because curbside uses and the demand for them are continuously changing, demand data should be collected periodically to quantify curbside usage against existing supply. This type of assessment allows the city to assess their current inventory and regulations and identify any curbside issues that need to be further managed.

There are numerous different curbside demand metrics that can be gathered, targeting different curbside users and with different associated levels of effort and cost. The presence of factors that are likely to induce curb user demand (e.g., cyclist facilities, transit facilities, etc.) at each site will be identified and will inform which curb users are likely present and the associated datasets that should be collected.



Vehicle Parking

- Parking Occupancy
- Parking Duration
- Parking Turnover
- Citations Data
- Lane Blockages
- Crosswalk Blockages
- Parking Permit Requests



Micromobility

- User Counts
- Micromobility Parking Supply
- Micromobility Parking Demand
- Blocked Sidewalks
- Blocked Cycling Facilities
- Pedestrian Obstructions Count
- Citations Data



Transit

- Schedule Adherence/On Time Performance
- Transit Ridership
- Travel Time
- Average Travel Speeds
- Lane Blockages
- Citations Data



TNC's & Taxis

- Loading Counts
- Loading Duration
- Lane Blockages
- Crosswalk Blockages
- Citations Data



Goods Movement

- Loading Counts
- Loading Duration
- Fleet Search Time
- Lane Blockages
- Crosswalk Blockages
- Citations Data

How is curbside demand data collected?

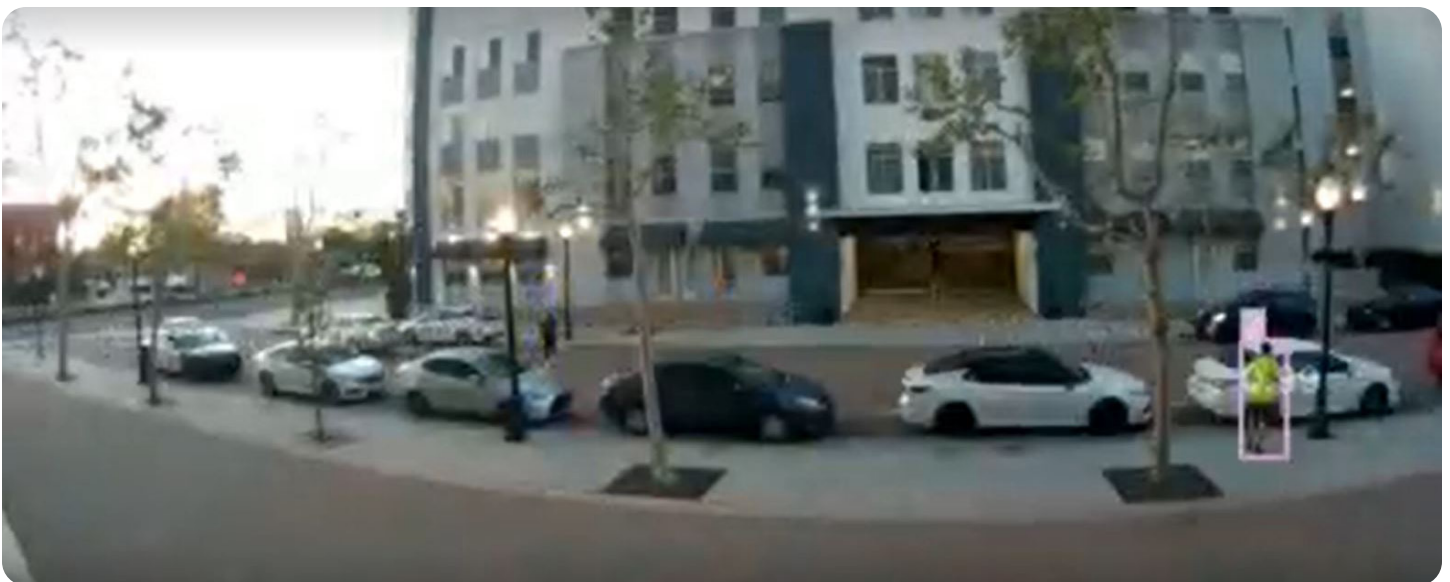
There are several different methods and processes on how to collect, convert, and digitize curbside demand data: manual, video-based, and 3rd party partnerships.

Manual: The most basic method of data collection is to go out into the streets and survey to collect relevant information (i.e., manual data collection). This is a resource intensive method that requires trained survey staff to actively monitor the study area and document their observations. As it is a manual effort, there are challenges in scaling this method to larger study areas, or longer time periods and is best suited for small, targeted study areas with relatively few different types of curbside users.

Video-based: With computer vision technology, a City can get full visibility into multimodal activity at the curb. Each data point can be broken down by vehicle type, including passenger, delivery, freight, ride-hailing, bus, and bike. Using computer vision technology that can accurately analyze the make and model of each vehicle, cities are able to collect the granular data necessary to clearly identify the unique needs and demand patterns for different curb users. Below are two common methods of collecting video-based data:

- **Curbside Cameras:** The use of curbside cameras involves mounting cameras at a site facing the curb and continuously recording curbside activity for a set amount of time per day over an extended period of time. This produces a wealth of information about curbside activity in video format that can then be reviewed by surveyors. Curbside events, such as how long cars were parked, how many people accessed the curb for loading purposes, etc. can be recorded in-office. Alternatively, the video may be processed by a machine vision company to produce quantifiable results. An added benefit to this method is that the city has the video and can refer to it for additional information when needed.

The two primary challenges with curbside cameras are cost and time. Some cities require permits prior to deploying curbside cameras, which is a lengthy process and can take months to obtain. In addition, installing and processing the cameras is expensive, and vendors typically prefer to have them installed for at least three months, which may not align with project timelines. Longer implementation periods allow for better refinement of the models to accurately detect and classify curbside users.



Above: Example curbside camera footage

- **Dashcam Footage:** Dashcam footage requires the use of surveyors on site to collect data at specific intervals throughout the day. To collect dashcam footage, surveyors mount a camera on their dashboard and drive along the study areas at specified intervals while continuously recording video footage throughout the day. Video files are then reviewed and event data is provided for analysis. This method allows a city to collect and record data a bit quicker than using the curbside camera method but requires continuous in-field surveyor time.

Third-Party Vendor Data: Third-party vendors, such as courier companies, TNCs, and food delivery companies, make up a significant number of curbside users. Receiving their associated demand data with curbside usage by location, duration, and date/time information, would provide valuable insights into how the curb is used. This data is often a challenge to obtain. In discussions with curbside vendors, these vendors noted that they either did not have readily available anonymized data or were not willing to share the data due to concerns with privacy or competitors obtaining the data. Additionally, if used, this data should be used to supplement one of the two methods discussed above, which collect data for the entirety of the curbside.

For each of this project’s selected sites, demand data was collected through either curbside cameras or through dashcam footage. In Anaheim and Santa Ana, curbside cameras were used to observe curbside demand and observations. There would typically be two curbside cameras mounted per curb continuously recording video footage for six hours per day; surveyors would review and record event data in-office. In Riverside and Santa Monica, dashcam footage was used in place of curbside cameras due to challenges with obtaining permits to install cameras on City property. To collect dashcam footage, surveyors would drive along the study areas in 20-minute intervals while continuously recording video footage for eight hours. The video files were reviewed, and event data was processed and provided for analysis.

Event data can then be used to generate a variety of metrics that can be filtered or aggregated by different attributes to get a better understanding of curbside demand and operations. Some of these metrics and attributes that can be calculated at the curbside include:

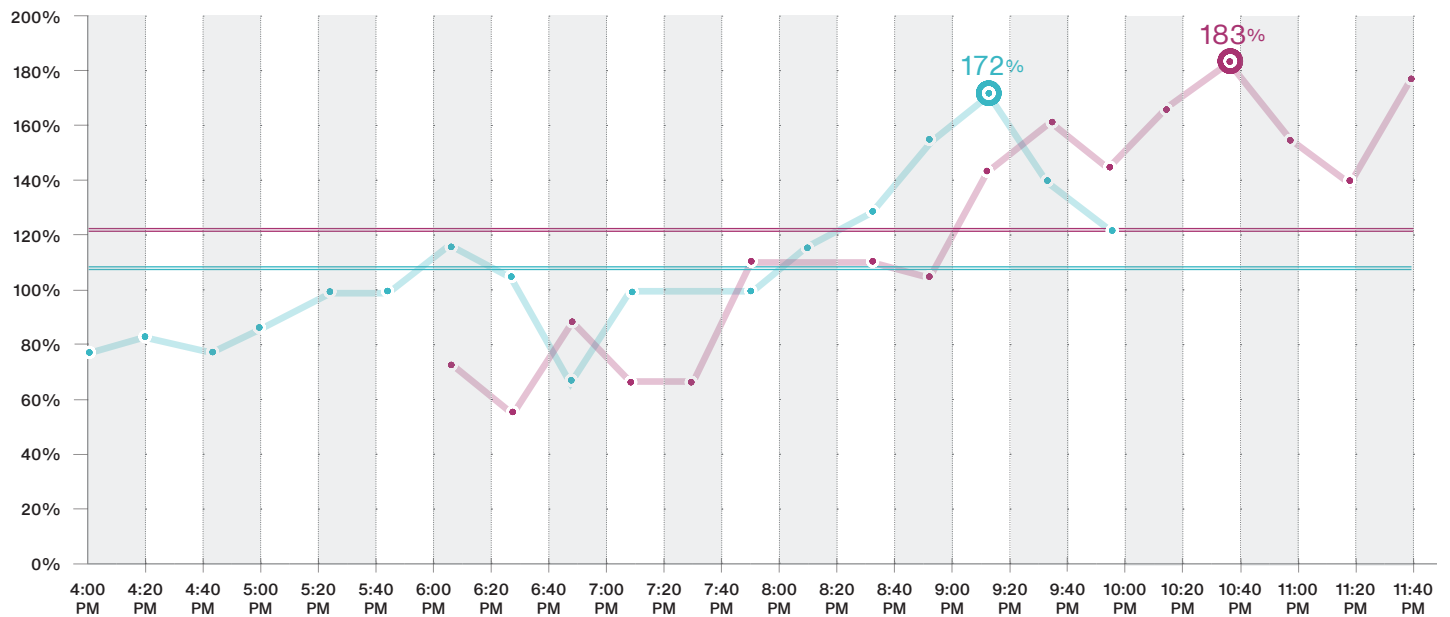
- **Occupancy:** the number of curbside spaces that are occupied at a given time;
- **Dwell Time:** how long each curbside user accesses the curb for; and
- **Turnover:** the number of users that a specific curbside space or segment serves over a given time span.

This demand data provides insight into curbside space utilization. The results can tell us what time of day that the curb is busiest, if vehicles are illegally parking in loading zones and how long they are staying, and which curbside spaces are utilized more than others. By layering on-the-ground data with the identified problems and desired solutions discussed in the previous sections, a list of pilot concepts can then be generated for the target cities that can be used to test a proposed intervention (i.e., recommended action). For example, if we know that curbside occupancy is highest in the evening in an entertainment corridor and the city is interested in allocating curbside space to uses other than vehicles, the city may consider a performance-based pricing pilot. The city may also consider a solution such as allocating curbside space to deliveries during the day and loading zones for pick-up/drop-off at night, while directing longer-term parking to neighboring corridors with a higher priority for vehicle through travel and storage.

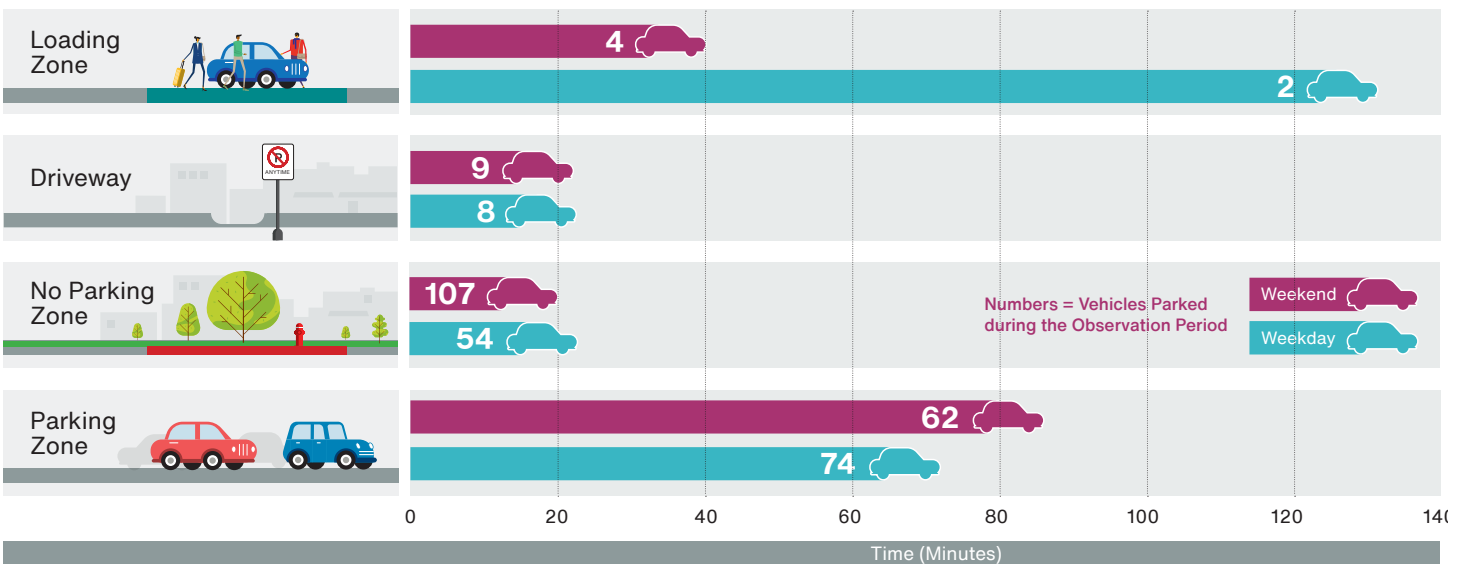
Key findings from the data collection for each of the selected sites, including visualization of existing conditions, is explored in later sections.

Below: Example demand data findings

PARKING OCCUPANCY



AVERAGE DWELL TIME



6.3 DATA COLLECTION CHALLENGES

During the project, there were challenges related to collecting demand data which resulted in gaps of quantitative data that outlines curbside issues and needs. To address this issue, collected demand data were complemented with what the project team heard through the curbside interviews and discussions with city staff to gain an understanding of existing conditions.

As noted above, the project team was unable to obtain demand data from third-party vendors due to the reasons discussed. Moving forward, it is recommended that cities continue to explore options with third-party vendors, who were generally open to exploring curbside space initiatives and participating in pilot projects. Another challenge that was experienced was the limited data collection time period. As discussed in the previous section, there were two days of data collection per site. Various curbside data collection companies were reluctant to participate in the data collection activities due to the relatively short time period. It is recommended that cities explore partnering with curbside data collection companies to collect data over a longer period for specific high demand sites, gaining a better understanding of the unique needs and challenges that exist at the curb.

The purpose of this study is to establish a framework for cities to be able to identify issues and challenges that exist at the curb and provide tools and a process to select and implement recommendations to mitigate those issues.

6.4 CURRENT STATE OF CURB DATA FOR SCAG CITIES

Like most cities, the majority of the studied SCAG cities do not have a digital curb inventory. Santa Monica was the main exception; they had undertaken an exercise where portions of their downtown curb supply were digitized. However, without any curb management software or other analog tools and processes to keep it up to date, this inventory quickly became superseded whenever curb changes happened (especially due to COVID-19). Therefore, the existing digital curb inventory was used as a starting point in Santa Monica and was converted to a common curb data specification for use and sharing beyond this project.

Open data portals were reviewed to determine if any existing transportation or parking datasets could be used to create a digital curb inventory for these cities. The best-case scenario for cities is to take any existing curbside data and automatically convert it into a curb regulation inventory. The only requirements are that the curbside data has some type of geo reference and describes what type of curbside asset or regulation it is. This can also be done for 'transportation asset' information, such as bike share stations, parking lots or meters, transit stops, and other sources of interest. As data is already in a digital format, minimal data extraction is necessary. Additional attributes and outlier data are removed from the open datasets, and all remaining data is input into a database. The main work at this stage is to ensure all relevant attributes are included to convert the data to an industry standard. Even if this data is not complete, at the very least, it can be uploaded to open-source measurement tools mentioned above for verification in the field.

The available parking and transportation information available in Santa Monica, Santa Ana, Riverside, and Anaheim was highlighted in Section 3.1. While the cities generally had important data, such as on-street parking supply, off-street parking supply, bus stops/routes, and

other parking and transportation information, there was not enough granular information and geospatially referenced data to make a digital curb inventory strictly from open data. For cities that have up to date signage sets, which essentially outline the parking and curbside regulations, converting this data is an excellent first step to creating a digital curb inventory. This data can be extracted manually (which is slower) or automatically/digitally, for use in GIS or more robust software, such as CurbiQ.

6.5 CURBSIDE TYPOLOGY

Before pilot projects can be recommended, the street's vision must be understood. Who are the key stakeholders, and what are their needs? How do stakeholder needs align with the needs of the City? The Region? Answers to these visioning and planning questions will allow for a curbside typology to be selected that sets the boundaries and priorities for subsequent selected pilot projects. It narrows the field of options to guide decision makers to select appropriate pilot projects from the menu of options that both address the needs of key stakeholders while furthering the objectives of both the City and the Region.

Document Review

In the development of curb space pilot projects, it is important to look to case studies that provide valuable insights in terms of successes, challenges, opportunities, and lessons learned that the SCAG region can leverage when developing their own pilots. To find real-world examples of successful curb space management projects that may be replicated or altered to solve SCAG region curb problem statements, a review of existing case studies featured in a variety of studies, including the Toronto Curbside Management Study, was conducted. In addition, practitioners who have implemented pilot projects in cities such as Seattle, Washington D.C., Toronto, Minneapolis, and Richmond were brought in to provide valuable insights and lessons learned through their hands-on experience.

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7

Recommended Pilot Projects

What is a Pilot?

This seems like a basic question, but the concept of a pilot is not always clear, and in reality, the net of what constitutes a pilot should be broadly cast. A pilot is a pre-trial of a product or service that may or may not be successful or scalable, but is interesting enough to commit resources to, to see if a larger trial will be justified. A pilot also entails the ability to “co-create”, and this requires trust, as well as aligned incentives and agreed-upon outcomes.

The three types of pilots recommended as part of this CSMS include:

A new technology

Introducing a new innovation that requires real-world experience and application. This assumes there would not otherwise be a procurement process for the solution. These pilots are introducing brand-new technologies that can help to solve challenges at the curb.

A new process

An opportunity to improve service quality or delivery through an innovation that provides an alternative way to work. This pilot model would test different ways to improve current processes rather than introducing something entirely new. This is an opportunity for SCAG municipalities to test new approaches to curb management practices before full adoption.

A new policy

An exploration of the current regulatory framework as it applies to new curb technology or uses to determine how policy may or may not need to be revised. This is an opportunity for private sector vendors to work more closely with SCAG municipalities in policy creation.

Pilot Project Process Best Practices

Streamline and simplify processes for pilots

Government processes and requirements can be an obstacle, especially when department approval is needed. By streamlining and simplifying processes, cities can unlock economic opportunity for the public, create more pathways for effective and innovative projects, and foster openness and efficiency within the city’s processes that last beyond any pilot period.

Work closely with residents and community-based organizations in designing your pilot, with a focus on equity and engagement

Collaborating on pilots with residents and organizations in marginalized communities is foundational towards planning and implementing projects that achieve equitable outcomes. By co-creating with residents and community-based organizations, pilot projects will be informed and actively shaped by the ideas, feedback, and lived experiences of those who stand to benefit most from the pilot. Subsequently, the projects will then be most effective in addressing the problems faced by such communities.

Collaborate across agencies and with local stakeholders throughout the pilot process

Pilot projects are most effective when different government agencies and departments work together along with local stakeholders such as transit and shared mobility providers, businesses, nonprofits and community groups, and residents. Oftentimes, pilot programs span the responsibilities of different departments while each provides their own expertise of processes and regulations, which makes the sharing of information and planning essential towards effective pilots. When stakeholders can co-create along with government, the ensuing solutions will best serve the interests of all involved.

Utilize data-driven processes during your pilot engagement process to generate stakeholder buy-in and public support

Using data as the foundation for analysis, investments, decision-making, and evaluation is an effective way of gaining broader support for pilot projects. Quantitative and qualitative data is effective at forecasting certain trends, providing evidence of patterns, and justifying new investments or decisions based on existing activity. By using data, all stakeholders involved can be more aligned in their understanding of projects and be more convinced to support certain ideas.

Carry out comprehensive evaluation after pilot period before scaling/permanent implementation

Evaluation after a pilot project demonstration helps cities assess the impacts and outcomes of the program, determine where the program succeeded and failed in achieving its original goals, uncover areas of future opportunity and improvement, and determine next steps. By performing a thorough evaluation, cities can gain valuable insights to inform future program development and provide a space for feedback from stakeholders impacted by the program.

From the process described above, 78 pilot projects were identified that provide interventions to test solutions for the city-specific problem statements of Anaheim, Riverside, Santa Ana, and Santa Monica. From this master list of 78 potential pilots, the team further filtered the list using the inputs described above (e.g., city goals, CurbiQ data, etc.) to select 1-3 pilots per city as final recommendations.

The full list of inputs for the filtering process included examining:

CurbiQ Data

- What pilot(s) might be best suited to specific locations based on on-the-ground data (e.g., land uses, current curb uses, transit routes, access points,

emissions data points, revenue generation opportunities, parking supply, etc.).

Best Practices and Values-Driven Outcomes

- What pilot(s) best align with the overarching curb space goals of the chosen city;
- What pilot(s) best align with both curb space management best practices and pilot project best practices;
- What pilot(s) best align with SCAG's goals for this project; and
- What pilot(s) best align with the identified best practice categories for this project (Design, Policy, Demand, Data and Privacy, Cost, Safety, New + Changing Uses and Technology, Communication and Stakeholder Perceptions, and Agency Resources).

City-Specific Problem Statements + Recommendations

- What pilot(s) might best solve the identified problem statements;
- What pilot(s) might have the least regulatory complexity and greatest impact; and
- What pilot(s) might be the most feasible and/or have the greatest likelihood of implementation.

The following sections provide a guided walkthrough of how the information gathered for each agency was distilled into targeted recommended pilots. Aspects covered include: the current curbside status of each agency (i.e., their benchmark score), their tailored list of themes and priorities, their problem statements and associated potential recommendations to address them, data collection undertaken at each selected site, and the detailed recommended pilot projects.

7.1 SCAG REGION

7.1.1 Benchmark Score

Regionally, the largest gaps between the current and desired state of curb space management in the SCAG region was with “organizational structure” and “curbside inventory.” The survey results indicate that there is less of a gap to close with obtaining leadership support for more progressive curb space management changes, as well as with setting performance measures that move toward this progressive state. However, these regional results also indicate that individual municipalities are not currently set up with the organizational structure (e.g., processes, workflow, evaluation, staff capacity, other resources, etc.) to implement more progressive changes, and they are also lacking in an understanding of how their curb is currently being used and by whom to use data to better drive decision making.

CATEGORY	CURRENT STATE	DESIRED STATE	GAP
Organizational Structure	2.4	4.5	2.1
Leadership	3	4.5	1.5
Progressive Performance Measures	2.8	4.5	1.7
Curbside Inventory	2.7	4.5	1.8

Above: Rankings from the CMM survey for the SCAG Region. States are ranked out of 5.

7.1.2 Emerging Themes

The specific regional themes that emerged were:

THEMES	DESCRIPTION
Pickup and drop-off conflicts	<ul style="list-style-type: none"> • TNCs and schools drop off causing conflicts at bus stops and no parking areas • Safety hazards like double parking and blocking of bike lanes
Loading zones	<ul style="list-style-type: none"> • Increases in urban freight (food delivery, package delivery, larger trucks) causing conflicts at bus stops and no parking areas • Safety hazards like double parking and blocking bike lanes
Pricing	<ul style="list-style-type: none"> • General needs for revenue (often associated with staff capacity, especially around enforcement) • Difficulty managing elasticity around supply and demand
Regulation clarity (lack of)	<ul style="list-style-type: none"> • Often analog challenges around wayfinding, signage, and education • Lack of clarity around where/when parking is allowed or not • Lack of clarity around rules for food trucks, including who is regulating them (or should be) • Lack of clarity on how to park around waste management services; concerns for waste management blocking protected bike lanes
Parking overflow	<ul style="list-style-type: none"> • As real estate development opportunities burgeon, many tenants of multi-unit dwellings are parking in neighboring single family areas, downtown and/or commercial areas
Enforcement	<ul style="list-style-type: none"> • No staff capacity to adequately monitor short term parking • Authority to provide automated enforcement in question
Electrification	<ul style="list-style-type: none"> • Not a problem statement but a desired tool to be implemented at the curb, especially to meet other goals around sustainability and resiliency • Cities see increased electrification at the curb as a natural pairing and opportunity
Buy-in (organizational, political)	<ul style="list-style-type: none"> • Difficult to get executive leadership to buy into data-driven decision making at the curb • Difficult to get public on board with curb pricing and/or changes to parking schemas

7.1.3 Recommended Strategies

Based on the problem statements and key themes, recommendation categories were developed with an associated menu of options for each category. The categories are outlined below along with several examples of solutions from the menu of options.

CATEGORY	OPTIONS
Activation	<ul style="list-style-type: none"> • Develop permanent parklets and streateries • Increase street lighting
Advocacy	<ul style="list-style-type: none"> • Advocacy at state level (e.g., for automated enforcement) • Advocacy locally (e.g., for budget; updated parking regulations, etc.)
Data Analysis	<ul style="list-style-type: none"> • Leverage automated data collection tools and technology • Conduct neighborhood parking, accessibility parking, or social return on investment studies • Use parking payment technology, such as multi-vendor platforms or automated payments • Create performance-based program utilizing real time parking data and technology
Design	<ul style="list-style-type: none"> • Design templates and national guidelines • Increase or clarify wayfinding
Demand Management	<ul style="list-style-type: none"> • Develop microtransit program • Develop traffic demand management engagement programs • Create subsidy programs to ensure equity considerations, such as Universal Basic Mobility (UBM)
Engagement	<ul style="list-style-type: none"> • Create process/workflow for information sharing between agencies • Create public education programs to allow residents to understand value of the curb and how to use it
Enforcement	<ul style="list-style-type: none"> • Leverage automated enforcement strategies and technologies, both fixed and mobile (e.g., on buses) • Use machine learning on payment data • Develop a privacy policy to ensure enforcement transparency

CATEGORY	OPTIONS
Infrastructure	<ul style="list-style-type: none"> • Develop EV charging partnerships with private sector partners • Build curb bulbs • Develop a mobility hubs program + infrastructure, such as with micromobility parking and secure bike parking • Build or increase transit lanes
Organizational (Structure, Process, Culture)	<ul style="list-style-type: none"> • Create process and structure for cross agency/departmental/division collaboration • Develop a strategic plan and/or action agenda to guide curb space management through values-based lens
Parking Regulations	<ul style="list-style-type: none"> • Modernize parking regulations (i.e., create real-time regulation changes/ time of day changes) • Create short term parking and/or flex zones • Create food truck zones • Set off street maximums and minimums, plus offset requirements for amenities • Create on-street private developer requirements • Create parking districts
Permitting	<ul style="list-style-type: none"> • Develop commercial load zone permitting and/or fleet permits • Create concession model of shared mobility, with adaptive vehicle requirements or private property shared mobility • Create digital permit by plate program • Create reservation system • Create shared shuttle stops • Develop cost for street use permits by asset type • Develop work zone requirements for street use permit
Pricing	<ul style="list-style-type: none"> • Implement basic pricing • Implement automated load zone pricing • Implement graduated pricing structure • Implement equity-based parking low income rebates • Implement real-time performance-based pricing
Prioritization	<ul style="list-style-type: none"> • Develop a curb space typology based on land use/roadway type hierarchy
Technology	<ul style="list-style-type: none"> • Digitize parking regulations

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8

Riverside



This section provides an overview of the Benchmark Score, Emerging Themes, Strategies and Recommendations, as well as data findings observed across the three sites located in the City of Riverside. Each of these factors were used to identify a menu of options (i.e., potential pilot projects) that would help to streamline curbside efficiency at each of the sites. The main challenge identified at all three sites was a need for flexible curb zones to accommodate the differing needs of stakeholders at different times of day.

8.1 BENCHMARK SCORE

A weighted benchmark score was created for Riverside using the self-reported surveys for strategies and recommended actions specific to the City. Riverside desired improving their data; specifically setting progressive performance measures to drive toward goals of a more dynamic and effective use of the curb and collecting and maintaining a thorough curbside inventory.

CATEGORY	CURRENT STATE	DESIRED STATE	GAP
Organizational Structure	3.1	3.9	0.8
Leadership	3.1	4.1	1.0
Progressive Performance Measures	1.9	4.3	2.4
Curbside Inventory	2.7	4.1	1.4

Above: Rankings from the CMM survey for the City of Riverside. States are ranked out of 5.

8.2 EMERGING THEMES

A comprehensive list of 70 emerging themes were determined for the entire SCAG region. From this list, themes were further organized and expanded upon using engagement and data inputs specific to the City of Riverside.

The specific themes that emerged for Riverside were:

- Delivery services, TNCs, pick-up drop-off zones, and insufficient parking create high congestion at the curb, especially in Downtown Riverside (e.g., nightlife district);
- Lack of space leading to difficulties building bus infrastructure and bike lanes;
- Parking from high density development residents overflowing into parking for single-family residential areas;
- Lack of safety walking from parking garages;
- High interest in and need for exploring new curbside management strategies (new parking limits and pricing, transit lanes, micromobility, automated enforcement, etc.);
- Need to update off-street parking requirements; and
- Foundational steps needed to allow Riverside to improve curb management:
 - Land use/roadway type hierarchies.
 - Neighborhood parking studies.
 - Curbside inventory processes.
 - Coordination between departments and with developers.



8.3 STRATEGIES AND RECOMMENDATIONS

The following presents the key problem statements for Riverside, the strategies associated with addressing that challenge, and the actions that could be taken to solve the challenge.

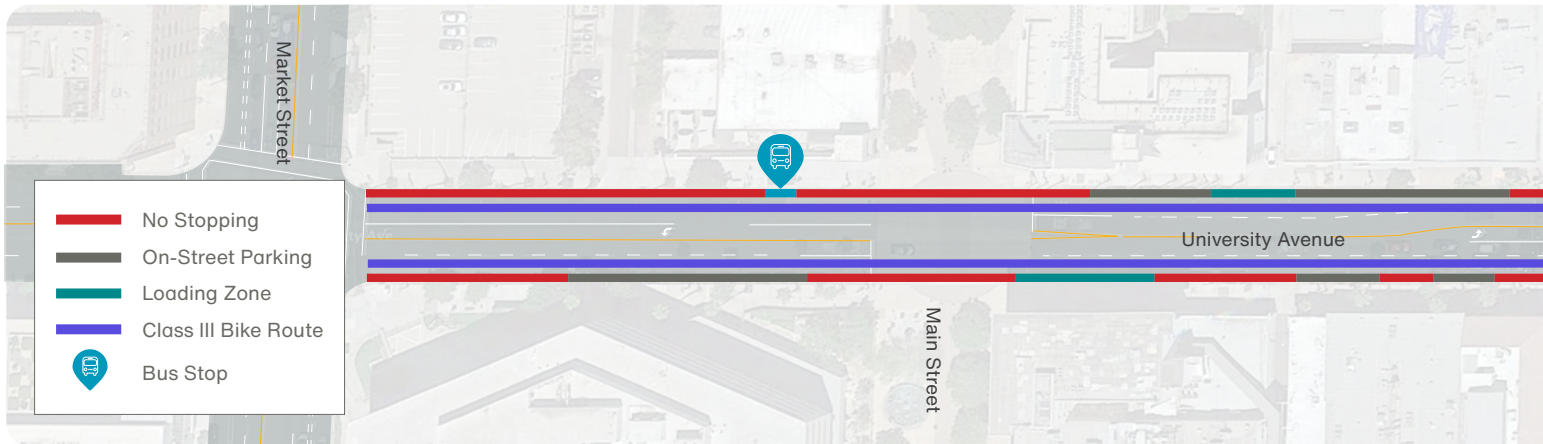
PROBLEM STATEMENT	RECOMMENDATION CATEGORY (STRATEGY)	RECOMMENDATION (FROM MENU OF OPTIONS)	PILOT AREA	PILOT PROJECT
Major congestion caused by multiple modes competing for curb space (delivery, TNC pick-up drop-off, transit, parking, etc.)	Data Analysis	Computer vision cameras	University	Install low cost sensors to monitor curb uses for entire corridor.
		Lidar	University	Install low cost sensors to monitor curb uses for entire corridor.
	Parking Regulations	Flex zones	University	Study short term parking use and develop appropriate time of day regulations to maximize turnover.
	Permitting	Fleet/commercial parking permits	University	Develop permit for short term parking zones for commercial fleets.
		Reservation system	University	Procure reservation system that issues time limited permits for short term parking.
	Pricing	Price short term parking	University	Implement pricing for short term parking including automated payment system.
		Graduated pricing structure	University	Develop graduated structure for short term parking (i.e., \$1 for minute 1, \$2 for minute 2, \$4 for minute 3, etc).

PROBLEM STATEMENT	RECOMMENDATION CATEGORY (STRATEGY)	RECOMMENDATION (FROM MENU OF OPTIONS)	PILOT AREA	PILOT PROJECT
Major congestion caused by multiple modes competing for curb space (delivery, TNC pick-up drop-off, transit, parking, etc.)	Enforcement	Concession for bus lane enforcement	University	Procure on bus enforcement through concession.
		Automated enforcement	University	Procure automated parking enforcement through concession.
		Real time sensors	University	Install low cost sensors (e.g., computer vision cameras, lidar) to monitor curb uses for entire corridor.
		Artificial intelligence-driven enforcement	University	Utilize machine learning on payment data as described above to guide manual enforcement to hot spots.
Challenges in building bus infrastructure (bus stops, transit lanes) and bike lanes	Design	National design guidelines (National Association of City Transportation Officials, or NACTO)	Market/ University	Utilize national best practices such as NACTO to design bike and bus lanes.
	Data Analysis	Neighborhood parking studies	Market/ University	Study parking at a neighborhood rather than corridor level to convey that parking is adequate although not directly in front of each address.

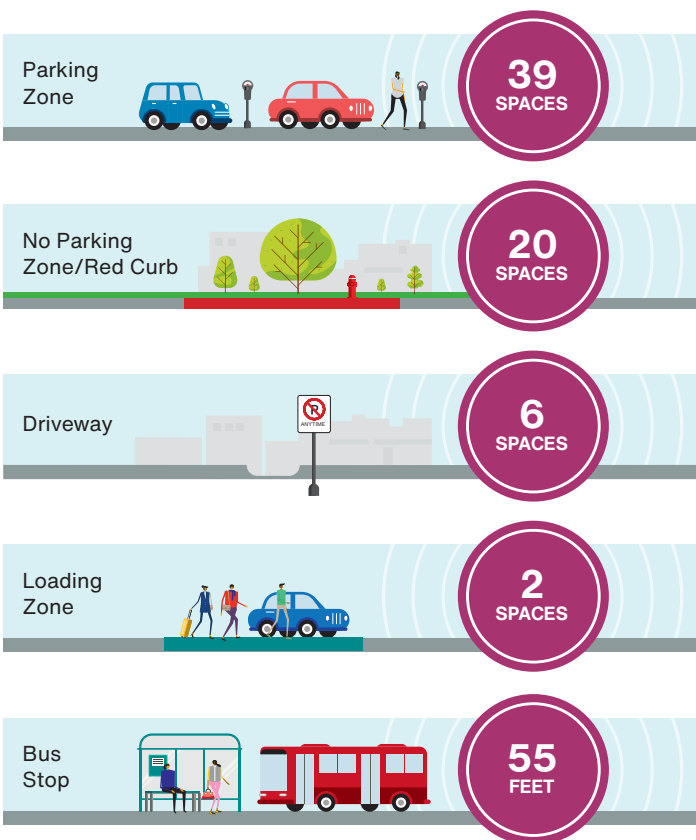
PROBLEM STATEMENT	RECOMMENDATION CATEGORY (STRATEGY)	RECOMMENDATION (FROM MENU OF OPTIONS)	PILOT AREA	PILOT PROJECT
Challenges in building bus infrastructure (bus stops, transit lanes) and bike lanes	Engagement	Public education programs	Market/ University	Develop public education campaigns to highlight the importance of these corridors towards social outcomes and how to use them.
	Prioritization	Social return on investment	Market/ University	Develop cost benefit analysis that quantifies social benefits based on city values such as health, safety, sustainability, prosperity, etc beyond transportation.
		Hierarchy of curb uses	Market/ University	Develop hierarchy of curb uses based on-street typology.
Parking from residents in high-density, multi-family developments overflowing into less dense, suburban residential and commercial areas	Parking Regulations	On-street parking time limits	Orchard	Develop time of day parking limits to reduce long term parking in commercial areas.
		Neighborhood parking permits	Orchard	Develop neighborhood parking permits for single family residential areas.
Lack of agency resources and staffing for parking enforcement	Enforcement	Concession for bus lane enforcement	Market/ University	Procure on bus enforcement through concession.
		Automated enforcement	Market/ University	Procure automated parking enforcement through concession.

PROBLEM STATEMENT	RECOMMENDATION CATEGORY (STRATEGY)	RECOMMENDATION (FROM MENU OF OPTIONS)	PILOT AREA	PILOT PROJECT
Lack of agency resources and staffing for parking enforcement	Enforcement	Real time sensors	Market/ University	Install low cost sensors (e.g., computer vision cameras, lidar) to monitor curb uses for entire corridor.
		AI driven enforcement	Market/ University	Utilize machine learning on payment data as described above to guide manual enforcement to hot spots.
Lack of safety walking from parking garages towards Downtown Riverside	Activation	Street lighting requirements	Market	Develop requirements for street lighting based on-street typology.
		Permanent parklets and streateries permit process	Market	Develop permanent process for privately programmed curbside activation such as parklets and streateries.
	Demand Management	Microtransit	Market	Develop late night shuttle in Downtown area between parking facilities and nightlife.
		Traffic demand management engagement programs	Market	Develop programs for employers to reduce employee parking by offering alternative transportation options.
		Universal basic mobility	Market	Develop subsidy programs for employees to reduce commute trips.

8.4 SITE #1: UNIVERSITY AVENUE BETWEEN MARKET STREET AND LIME STREET



Curb Space Allocation



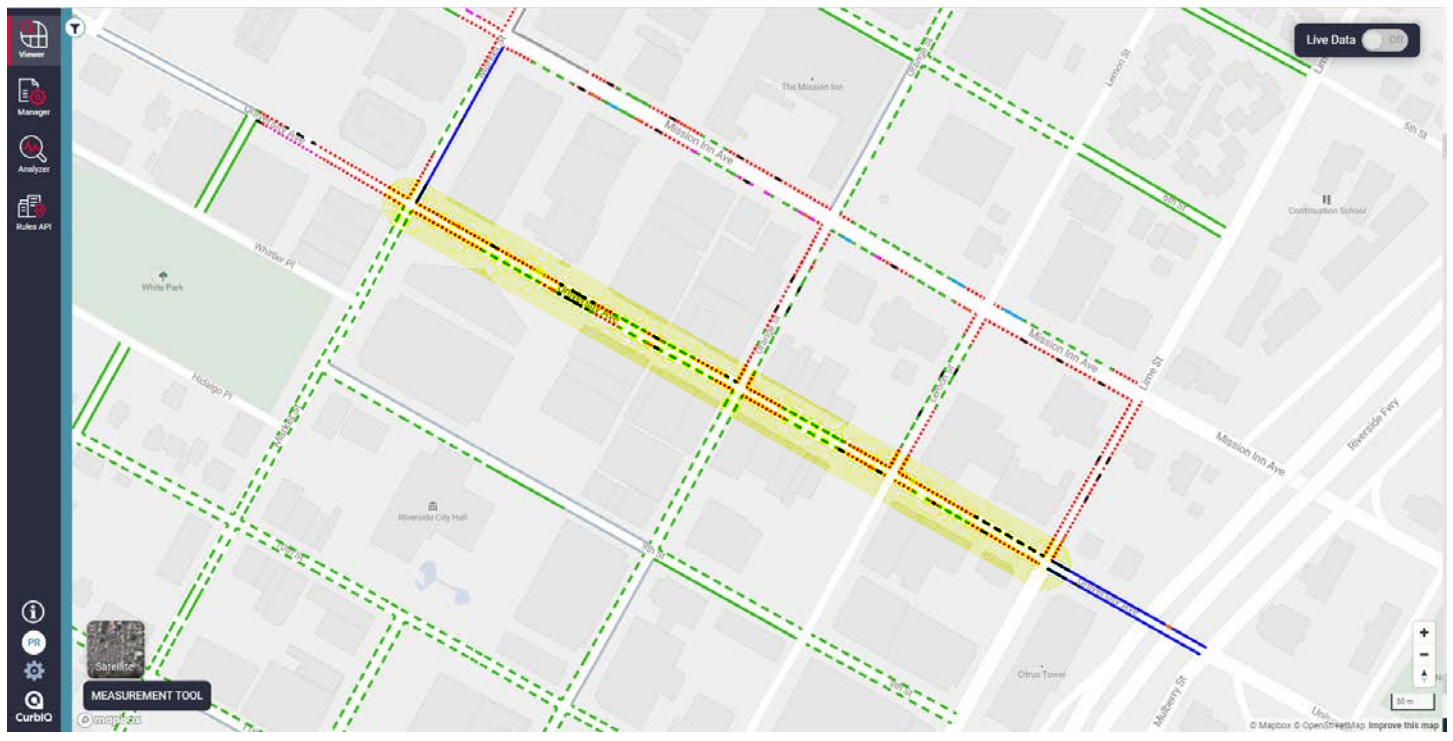
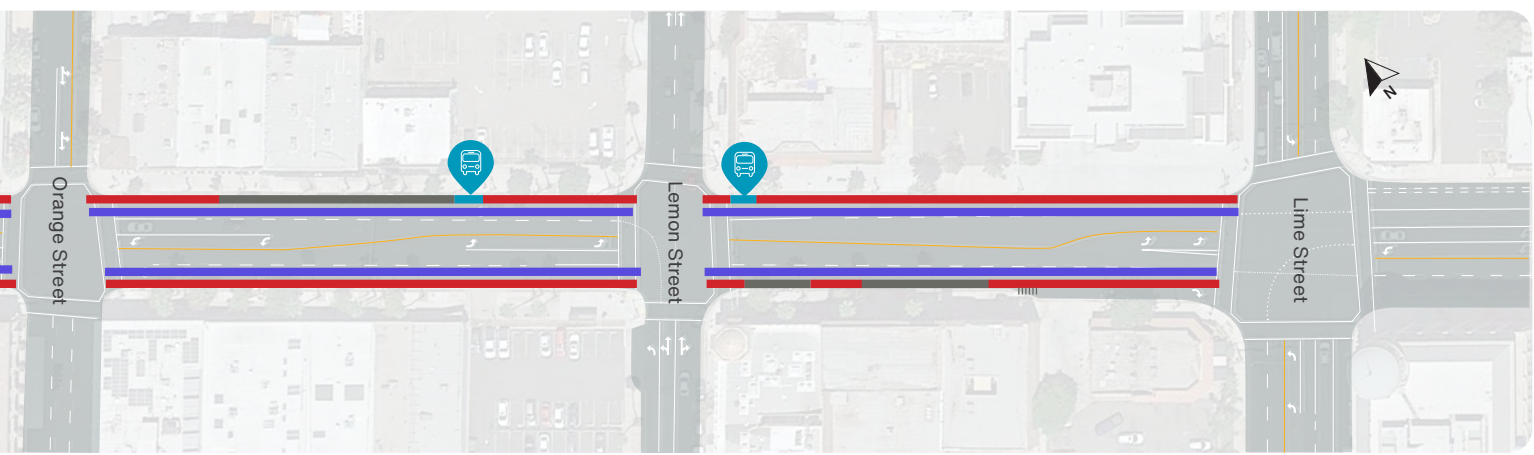
Site Characteristics

- Paid parking operating 9:00 a.m. - 5:00 p.m. Monday through Friday.
- Free parking outside stated hours

Data Findings

Inventory data was collected for a 1 block radius around the site to gain an understanding of the surrounding curb uses. The data was analyzed in CurblQ and used to ensure the recommended pilot projects can be implemented in harmony with the surrounding area. For this and the other 11 sites, the curbside inventory was captured for 1 additional block surrounding the site in every direction, in order to provide a robust understanding of the curbside in the area of influence. For example, sometimes it is necessary to have loading zones on a major corridor, but it is possible to shift parking to the side street or local road (or vice versa). Only focusing the curb inventory on the immediate study area would miss the surrounding, essential components of the broader network that is an all-important part of curbside management. This understanding of the curb inventory was useful for evaluating options for pilot projects, given the supply and data in a given area.

As noted in Section 5.6, in Riverside, **demand data** was collected through dashcam footage. Surveyors drove along the study areas in 20-minute intervals while continuously recording video footage for 8 hours. The video files were reviewed, and event data was processed and provided for analysis.



Above: Screenshot of inventory data from CurbiQ

 Site Limits

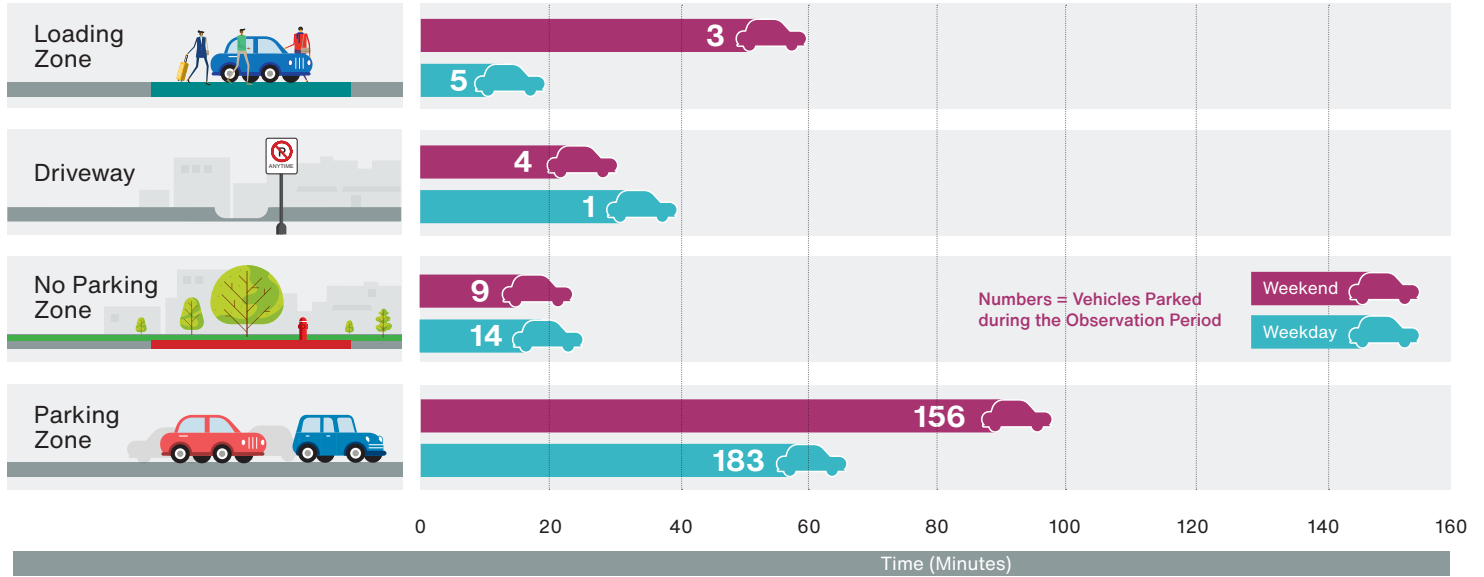
Parking Restrictions <input checked="" type="checkbox"/> Select All <input type="checkbox"/> Undesignated <input type="checkbox"/> Standing <input checked="" type="checkbox"/> Parking (Permit) <input checked="" type="checkbox"/> Parking (Paid) <input checked="" type="checkbox"/> Parking - Other <input checked="" type="checkbox"/> Parking (Free) <input checked="" type="checkbox"/> No Stopping <input checked="" type="checkbox"/> No Standing <input checked="" type="checkbox"/> No Parking <input checked="" type="checkbox"/> Curb Cut		Special Designations <input checked="" type="checkbox"/> Select All <input checked="" type="checkbox"/> Accessible Permit <input checked="" type="checkbox"/> Accessible Permit Loading <input checked="" type="checkbox"/> Bicycle Infrastructure <input checked="" type="checkbox"/> Bicycle Lane <input checked="" type="checkbox"/> Bus Loading <input checked="" type="checkbox"/> Bus Parking <input checked="" type="checkbox"/> Car Share Parking <input checked="" type="checkbox"/> Commercial Loading <input checked="" type="checkbox"/> Curbside Patio		<input checked="" type="checkbox"/> EV Parking <input checked="" type="checkbox"/> Emergency Vehicles <input checked="" type="checkbox"/> Fire Hydrant <input checked="" type="checkbox"/> Food Truck <input checked="" type="checkbox"/> Loading <input checked="" type="checkbox"/> Micromobility <input checked="" type="checkbox"/> Motorcycle Parking <input checked="" type="checkbox"/> Passenger Loading <input checked="" type="checkbox"/> Private Parking <input checked="" type="checkbox"/> Special User		<input checked="" type="checkbox"/> Street Cleaning <input checked="" type="checkbox"/> Taxi Cab Stand <input checked="" type="checkbox"/> Transit Zone Temporary Conditions <input checked="" type="checkbox"/> Select All <input checked="" type="checkbox"/> Construction Zone Curbside Assets <input checked="" type="checkbox"/> Select All <input type="checkbox"/> SA Bus Stops <input checked="" type="checkbox"/> Curbside Patio	
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Data Collection Dates

Weekday: Tuesday, March 22, 2022 from 12:00 p.m. to 8:00 p.m.

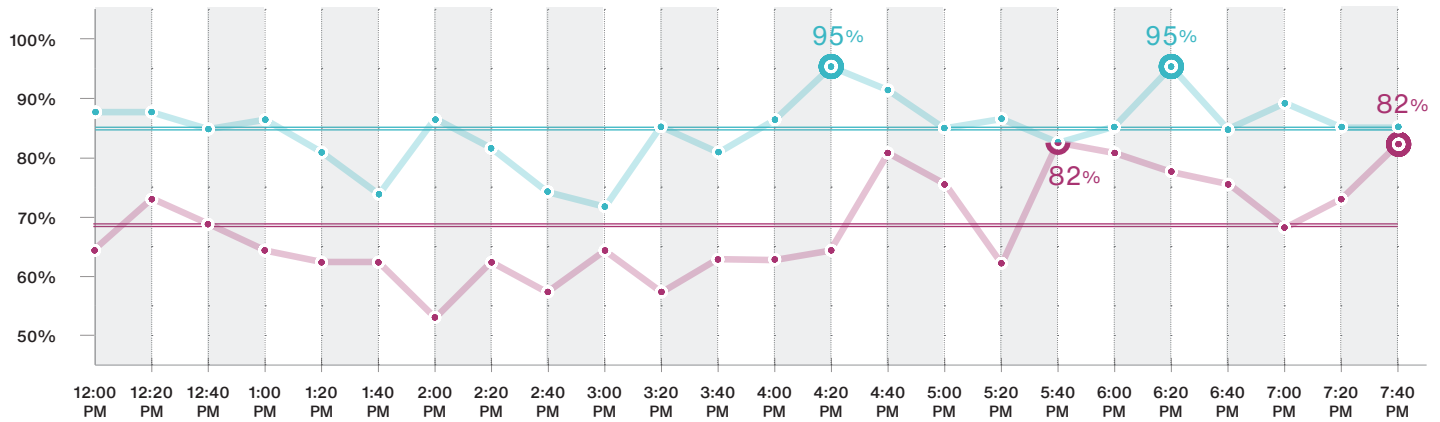
Weekend: Sunday, March 20, 2022 from 12:00 p.m. to 8:00 p.m.

Average Dwell Time



*Note that the dwell times shown for "Driveway" are for vehicles parked in the curb space adjacent to a driveway, blocking access

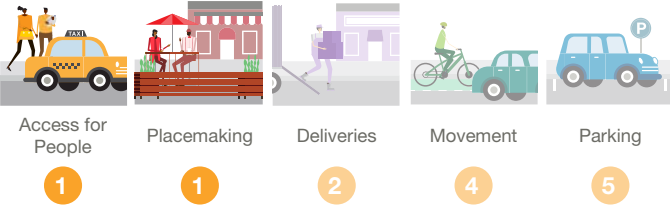
Parking Occupancy



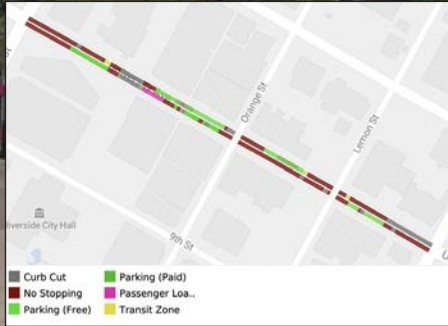
Key data findings at this site include:

- Parking occupancy rates remain relatively constant for both weekdays and weekends, with occupancy rates averaging 85% during the week and 68% on the weekend.
- Vehicles were often parked in no parking zones for 25 minutes at a time.
- On the weekend, vehicles also parked in loading zones for over 40 minutes at a time.
- Parking occupancy can reach 95% during peak hours on a weekday, which indicates that finding parking is relatively challenging throughout the day. Typically, an occupancy of 80-85% is desired to reduce the impacts of vehicles slowing down to search for an open spot while ensuring the curb space is sufficiently utilized.
- During the highest occupancy hours – evenings from 5:00 p.m. to 8:00 p.m. – most users occupied spaces for at least 1 hour, often over 2. Shorter stays under 1 hour were uncommon.
- Driveways were occasionally blocked for over 20 minutes at a time.
- The high occupancy percentage and frequency of illegal curbside activity indicate a high demand for on-street parking. This can result in accessibility challenges for other curbside users, such as TNCs, cyclists, and goods delivery. A high occupancy percentage can indicate an opportunity to consider increasing parking fees or a progressive parking payment system.
- There is an opportunity for innovative parking management strategies, such as a progressive parking payment system, and for improving access for multimodal users who may not be able to access the curbside under current conditions.

Curbside Typology

TYPOLOGY	DESCRIPTION	FUNCTIONS (RANKED IMPORTANCE)
<p>Mixed-Use Main Street</p>	<ul style="list-style-type: none"> • This corridor type is the focal point of a downtown area and includes a mix of uses • May provide access to public spaces where motorist access is prohibited 	 <p>Access for People Placemaking Deliveries Movement Parking</p> <p>1 1 2 4 5</p>

Site #1 has a central location in Downtown Riverside. Based on the surrounding lane use, this street should have a Mixed-Use Main Street curbside typology, with Access for People and Placemaking prioritized over other curbside functions. The current curbside designations favour drivers with lots of on-street parking provided, both paid and free. The demand data also indicates a disconnect between how the curbside is currently being used, and how it should be used. Recommended pilots should focus on better managing the use of on-street parking (e.g. different parking pricing strategies, on-street parking time limits) and ensuring curb space is available for the priority users (e.g. increasing enforcement, public education, or flex zones).



Pilot Area

University Avenue (East of Market Street to West of Lime Street)

Pilot Title

Computer Vision Cameras + Lidar to Better Understand Curb Congestion Through Data

Pilot Solves for the Following Problem Statement

Major congestion caused by multiple modes competing for curb space (delivery, TNC pick-up drop-off, transit, parking, etc.)

Pilot Partners:

- Private sector vendors specializing in curb space management data, parking and payment solutions
- Lidar technology private sector vendors
- Business improvement groups
- Riverside Chamber of Commerce
- Riverside Downtown Partnership
- City Council
- Transportation network companies (TNCs)
- Delivery companies
- Riverside Transit Agency

PILOT DESCRIPTION

Utilize low cost data collection methods (e.g., computer vision cameras or lidar) to collect curbside data on the entire corridor. Use this data to better understand total number and duration of short-term parking to develop time limit regulations, as well as implementation guidance, to determine number of short term parking zones per block that are needed. Once the data is studied through this pilot, the City can implement a second pilot that tests short-term zones based on data analysis.

KEY CONSIDERATIONS AND ANALYSIS FOR PILOT DESIGN

On weekdays, the curb's uses include but are not limited to:

3am to 8am and 5pm to 7pm

- 3 transit zone spaces (serving up to 60 users per hour)
- 2 passenger loading zones (serving up to 36 users per hour)
- 39 free parking spaces (serving up to 93 users per hour)

9am to 4pm

- 3 transit zone spaces (serving up to 60 users per hour)
- 2 passenger loading zones (serving up to 36 users per hour)
- 10 paid parking spaces (serving up to 30 users per hour; generating up to \$15 in revenue per hour)
- 28 free parking spaces (serving up to 63 users per hour)

8pm to 2am

- 3 transit zone spaces (serving up to 60 users per hour)
- 9 passenger loading zones (serving up to 108 users per hour)
- 25 free parking spaces (serving up to 75 users per hour)

On weekends, the curb's uses include but are not limited to:

3am to 7pm

- 3 transit zone spaces (serving up to 60 users per hour);
- 2 passenger loading zones (serving up to 36 users per hour);
- 39 free parking spaces (serving up to 93 users per hour);

8pm to 2am

- 3 transit zone spaces (serving up to 60 users per hour);
- 9 passenger loading zones (serving up to 108 users per hour);
- 25 free parking spaces (serving up to 75 users per hour);

Competing Modes: The site has a significant amount of commercial activity as seen through the high number of restaurants and offices. Subsequently, there are many modes competing for use of the curb with high freight loading/unloading activity, passenger pick-up and drop-off, on-street parking, and transit routes. As seen in the data, the complexity of needs and congestion created at the curb, as well as its central location, makes this site ideal for testing data collection and analysis of curb utilization. This will allow the City to better understand how to best allocate curbside uses through regulation and policy. By using computer vision and lidar, the City can accurately collect curbside data in real-time. Through the pilot, this site provides a valuable foundation for future curbside interventions.

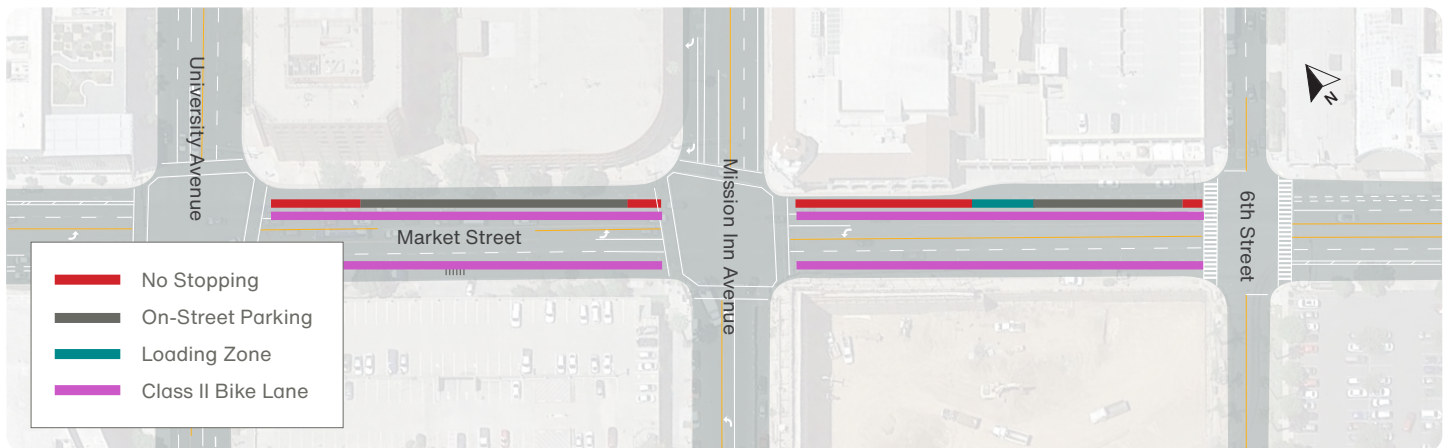
Free Parking: The site has a high number of free parking spaces, which can be modified through parking limits or reduced through the pilot in order to allocate the curb in the most productive manner.

Paid Parking: Paid parking spaces at the site are limited and they are offered at a very low price (\$1.50/hour) during peak hours, which if modified based on pilot data, presents a major opportunity to generate parking revenue based on demand.

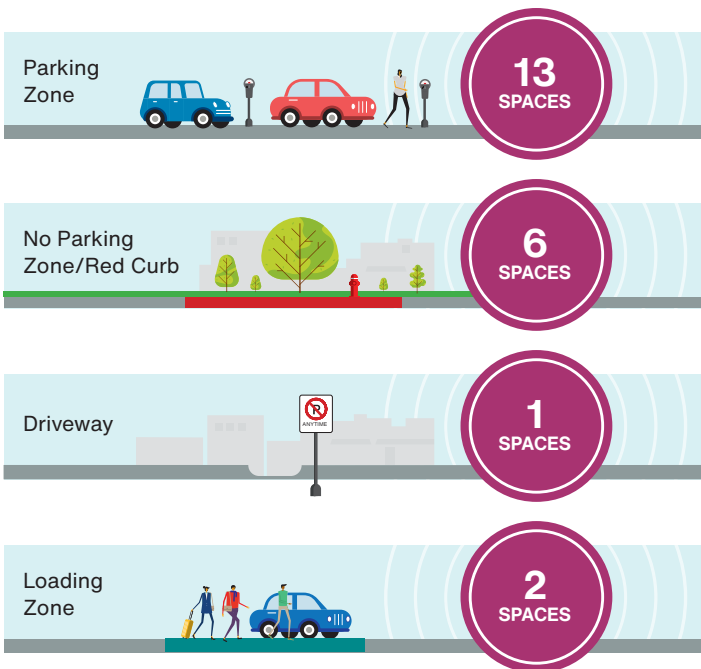
Loading Zones: There is one existing loading zone with three spaces (yellow curb), with no signage to tell how long the maximum is. There is late night passenger loading for most of the block.



8.5 SITE #2: MARKET STREET BETWEEN UNIVERSITY AVENUE AND 6TH STREET



Curb Space Allocation



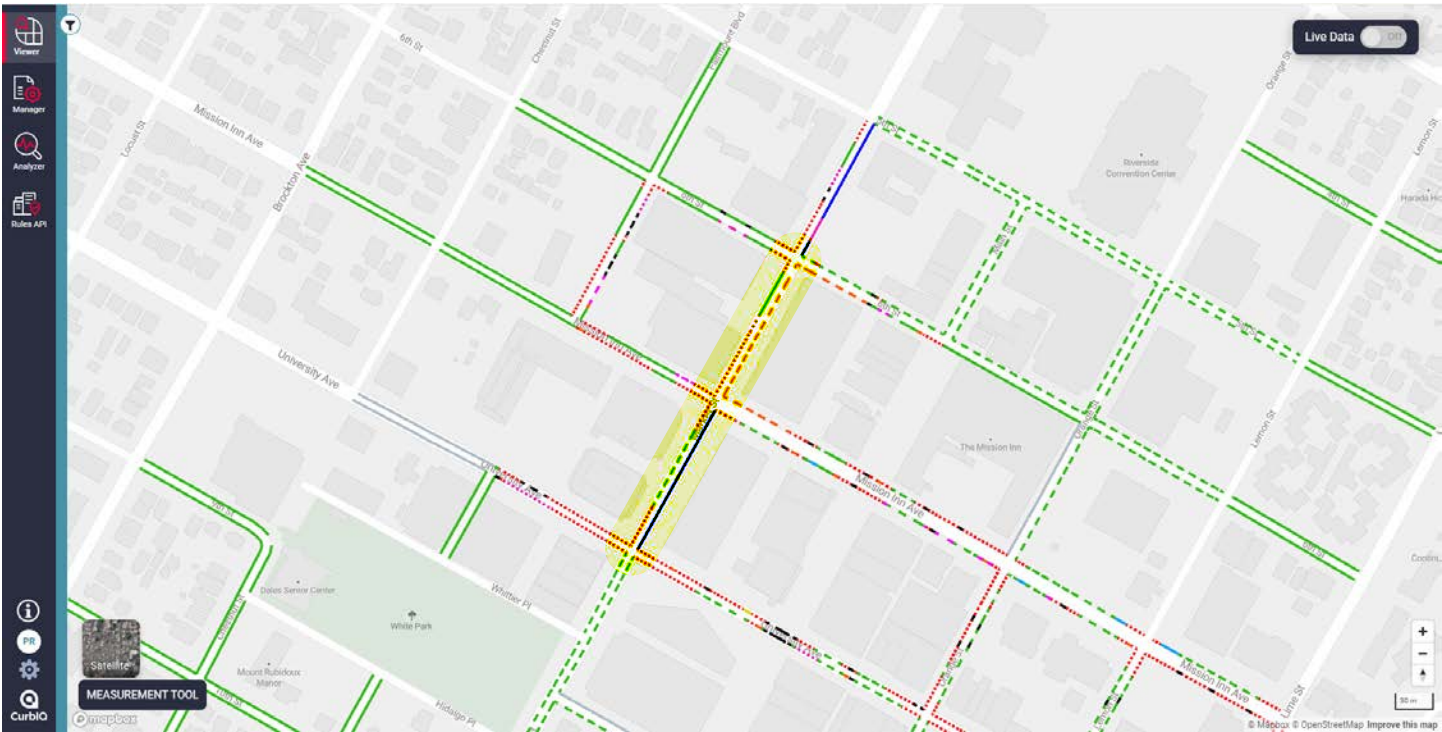
Site Characteristics

- Cycling Lane: 550 ft
- Paid parking operating 8:00 a.m. – 5:00 p.m. Monday through Friday in the first block
- 30 minute paid parking operating 6:00 a.m. – 10:00 p.m. in the 2nd block

Data Findings

Inventory data was collected for a 1 block radius around the site to gain an understanding of the surrounding curb uses. The data was analyzed in CurblQ and used to ensure the recommended pilot projects can be implemented in harmony with the surrounding area.

As noted in Section 5.6, in Riverside, **demand data** was collected through dashcam footage. Surveyors drove along the study areas in 20-minute intervals while continuously recording video footage for 8 hours. The video files were reviewed, and event data was processed and provided for analysis.



Above: Screenshot of inventory data from CurbiQ

● Site Limits

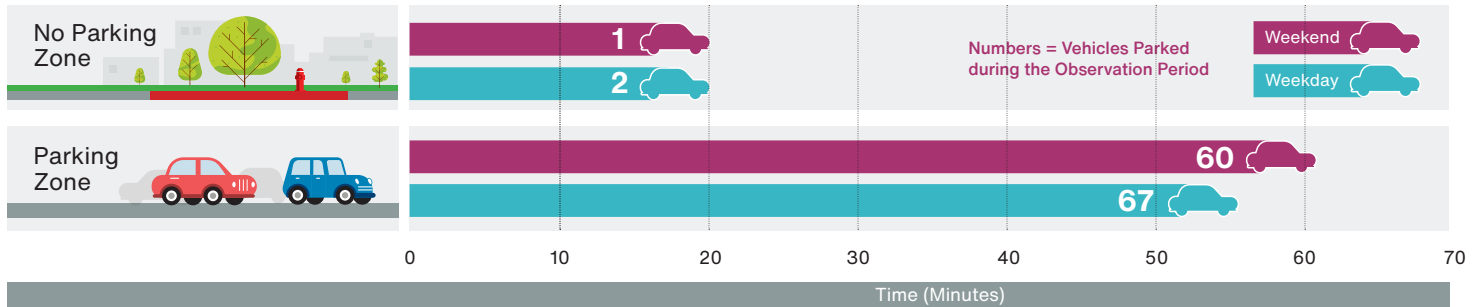
<p>Parking Restrictions</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input type="checkbox"/> Undesignated <input checked="" type="checkbox"/> Standing <input checked="" type="checkbox"/> Parking (Permit) <input checked="" type="checkbox"/> Parking (Paid) <input checked="" type="checkbox"/> Parking - Other <input checked="" type="checkbox"/> Parking (Free) <input checked="" type="checkbox"/> No Stopping <input checked="" type="checkbox"/> No Standing <input checked="" type="checkbox"/> No Parking <input checked="" type="checkbox"/> Curb Cut 	<p>Special Designations</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input checked="" type="checkbox"/> Accessible Permit <input checked="" type="checkbox"/> Accessible Permit Loading <input checked="" type="checkbox"/> Bicycle Infrastructure <input checked="" type="checkbox"/> Bicycle Lane <input checked="" type="checkbox"/> Bus Loading <input checked="" type="checkbox"/> Bus Parking <input checked="" type="checkbox"/> Car Share Parking <input checked="" type="checkbox"/> Commercial Loading <input checked="" type="checkbox"/> Curbside Patio 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> EV Parking <input checked="" type="checkbox"/> Emergency Vehicles <input checked="" type="checkbox"/> Fire Hydrant <input checked="" type="checkbox"/> Food Truck <input checked="" type="checkbox"/> Loading <input checked="" type="checkbox"/> Micromobility <input checked="" type="checkbox"/> Motorcycle Parking <input checked="" type="checkbox"/> Passenger Loading <input checked="" type="checkbox"/> Private Parking <input checked="" type="checkbox"/> Special User 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Street Cleaning <input checked="" type="checkbox"/> Taxi Cab Stand <input checked="" type="checkbox"/> Transit Zone <p>Temporary Conditions</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input checked="" type="checkbox"/> Construction Zone <p>Curbside Assets</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input type="checkbox"/> SA Bus Stops <input checked="" type="checkbox"/> Curbside Patio
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Data Collection Dates

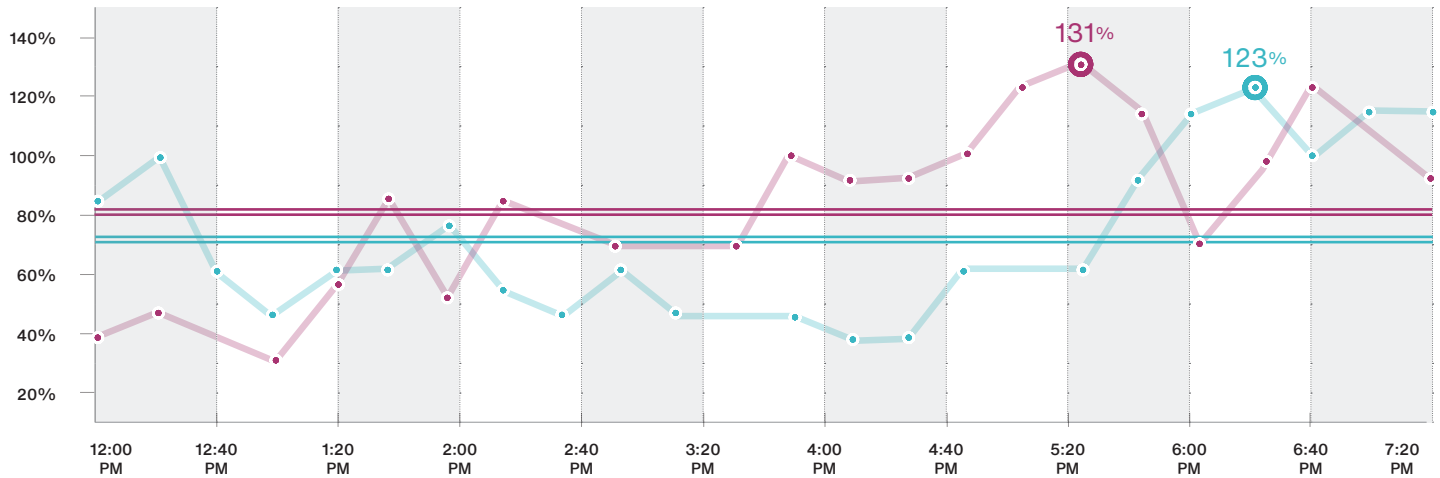
Weekday: Tuesday, March 22, 2022 from 12:00 p.m. to 8:00 p.m.

Weekend: Sunday, March 20, 2022 from 12:00 p.m. to 8:00 p.m.

Average Dwell Time



Parking Occupancy



Key data findings at this site include:

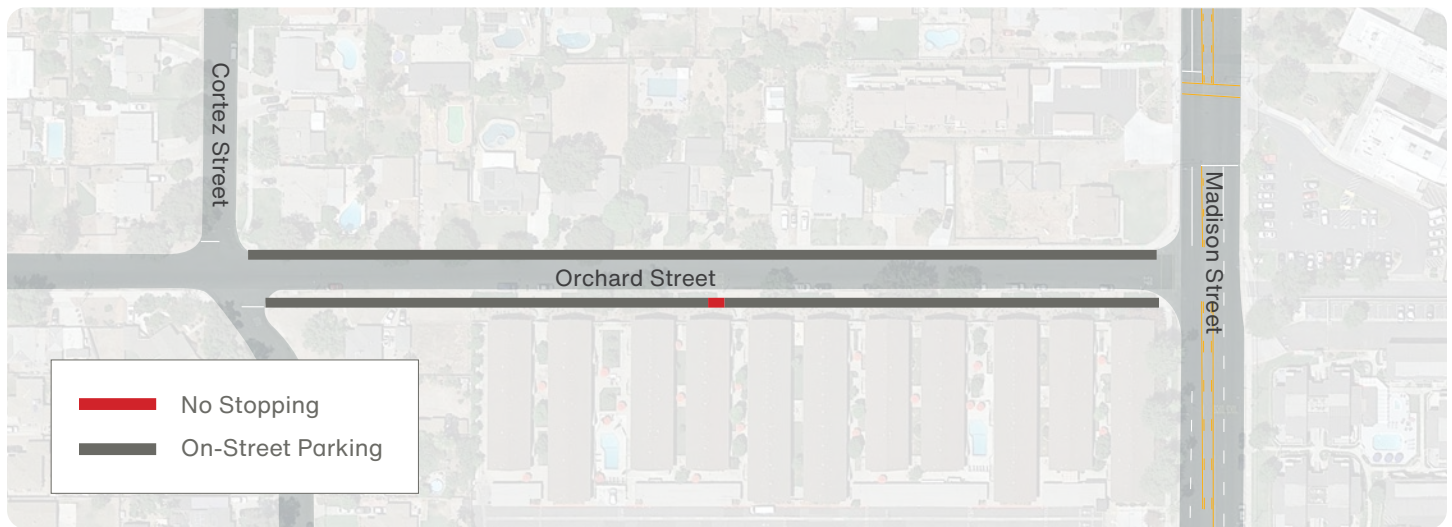
- Paid parking is utilized slightly more during the weekday than on the weekend.
- During the week, parking occupancy is low outside of dinner hours.
- On the weekend, parking occupancy increases through the afternoon, peaking at capacity in the evening.
- Fluctuating parking occupancy rates present an opportunity to create flexible curb zones that accommodate various curbside functions throughout the day.
- Improvements can help to minimize conflicts between multiple modes competing for curb space (delivery, TNC pick-up drop-off, transit, parking, etc.).

Curbside Typology

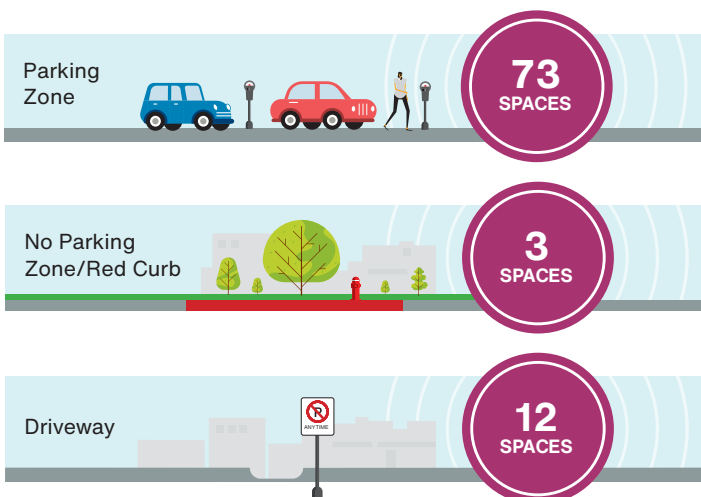
TYPOLOGY	DESCRIPTION	FUNCTIONS (RANKED IMPORTANCE)
<p>Mixed-Use Main Street</p>	<ul style="list-style-type: none"> • This corridor type is the focal point of a downtown area and includes a mix of uses • May provide access to public spaces where motorist access is prohibited 	 <p>Access for People Placemaking Deliveries Movement Parking</p> <p>1 1 2 4 5</p>

Site #2 has a central location in Downtown Riverside with new mixed-use and housing developments being built along the corridor. A curbside typology of Mixed-Use Main Street will help create a safe and welcoming place for people to enjoy the surrounding land use, supporting the City of Riverside’s efforts to create a vibrant Downtown area. The fluctuating parking occupancy supports initiatives to re-purpose the curbside outside of peak hours through initiatives such as flex zones, to improve curbside access for the priority curbside functions (i.e., Access for People and Placemaking).

8.6 SITE #3: ORCHARD STREET BETWEEN CORTEZ STREET AND MADISON STREET



Curb Space Allocation



Site Characteristics

- Parking is restricted on the 2nd and 4th Thursday of the month from 11:00 a.m. – 3:30 p.m.

Data Findings

Inventory data was collected for a 1 block radius around the site to gain an understanding of the surrounding curb uses. The data was analyzed in CurbiQ and used to ensure the recommended pilot projects can be implemented in harmony with the surrounding area.

As noted in Section 5.6, in Riverside, **demand data** was collected through dashcam footage. Surveyors drove along the study areas in 20-minute intervals while continuously recording video footage for 8 hours. The video files were reviewed, and event data was processed and provided for analysis.



Above: Screenshot of inventory data from CurbiQ

● Site Limits

Parking Restrictions

- Select All
- Undesignated
- Standing
- Parking (Permit)
- Parking (Paid)
- Parking - Other
- Parking (Free)
- No Stopping
- No Standing
- No Parking
- Curb Cut

Special Designations

- Select All
- Accessible Permit
- Accessible Permit Loading
- Bicycle Infrastructure
- Bicycle Lane
- Bus Loading
- Bus Parking
- Car Share Parking
- Commercial Loading
- Curbside Patio

- EV Parking
- Emergency Vehicles
- Fire Hydrant
- Food Truck
- Loading
- Micromobility
- Motorcycle Parking
- Passenger Loading
- Private Parking
- Special User

- Street Cleaning
- Taxi Cab Stand
- Transit Zone

Temporary Conditions

- Select All
- Construction Zone

Curbside Assets

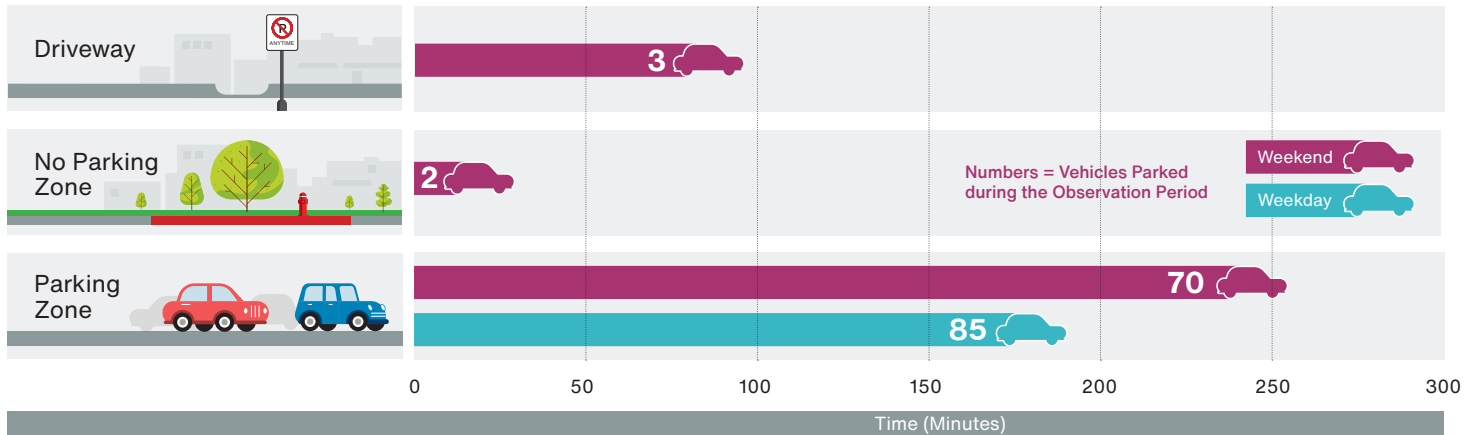
- Select All
- SA Bus Stops
- Curbside Patio

Data Collection Dates

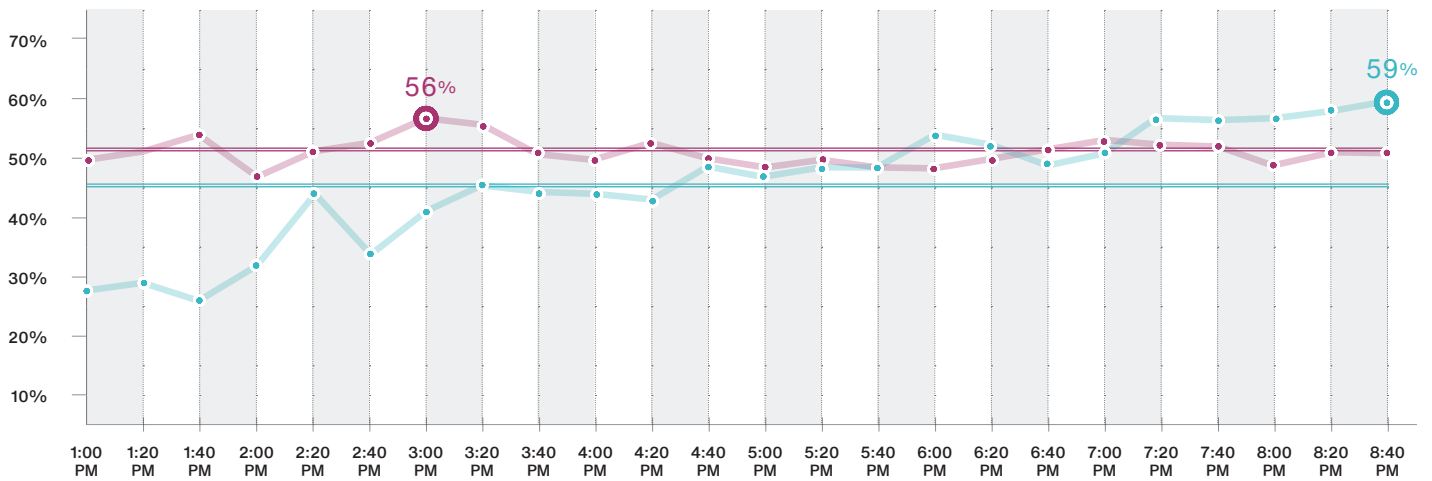
Weekday: Tuesday, March 31, 2022 from 12:00 p.m. to 8:00 p.m.

Weekend: Sunday, March 20, 2022 from 12:00 p.m. to 8:00 p.m.

Average Dwell Time



Parking Occupancy



73

Total Number of Spaces

59%

Peak Curb Space Demand
43/73 Spaces

56%

Peak Curb Space Demand
41/73 Spaces

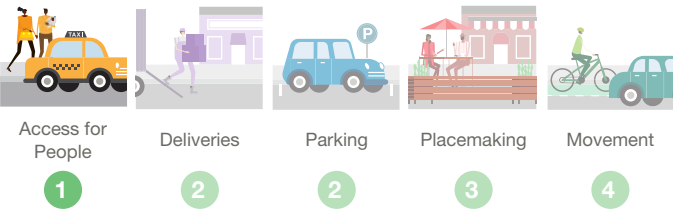


- Weekday
- Weekday Average
- Weekend
- Weekend Average

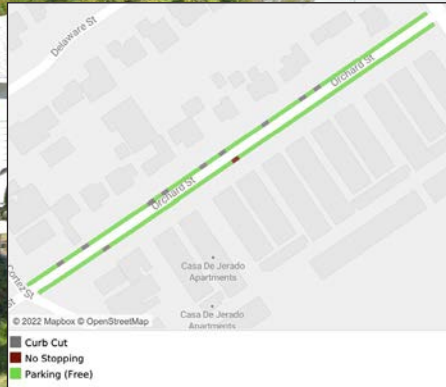
Key data findings at this site include:

- 5 instances of parking violation were observed on a single Thursday afternoon, 3 of which were cars parked at disallowed times and 2 parked on red curb lines. The length of these violations ranged from under 20 minutes to over 2 hours.
- High average dwell times of 3-4 hours for free parking observed both during the week and on the weekend, likely due to residents in multi-family apartment buildings using on-street parking.
- The presence of illegal activity suggests that despite the curbside being entirely designated to free parking, there is insufficient space for users. This does not mean more parking is required, but rather that initiatives to accommodate the need for long-term parking elsewhere could benefit all curbside users by freeing up space for other users.

Curbside Typology

TYPOLOGY	DESCRIPTION	FUNCTIONS (RANKED IMPORTANCE)
<p>Neighborhood Street</p>	<ul style="list-style-type: none"> • Is surrounded by a blend of single-family homes and multi-family residential buildings • Prioritizes people’s access to their homes, access for couriers, and activated public spaces 	 <p>Access for People Deliveries Parking Placemaking Movement</p> <p>1 2 2 3 4</p>

This site has a curb typology of Neighborhood Street as single-family homes and apartment buildings are on either side of this corridor. High dwell times for parked vehicles restricts curbside access for the priority curbside functions, Access for People and Deliveries). Improvements should be made to re-allocate space for passenger and delivery loading while recognizing that the cars currently parked there need to go somewhere. Incentive programs for active transportation, such as e-bike rebate or transit pass trade in programs can support a mode-shift and reduce demand for on-street parking.



Pilot Area

Orchard Street
(East of Cortez Street to West of Madison Street)

Pilot Title

Residential Parking Program Pilot to Regulate Curb Demand and Access

Pilot Solves for the Following Problem Statement

Parking from residents in high-density, multi-family developments overflowing into less dense, suburban residential and commercial areas.

Pilot Partners:

- Neighborhood groups
- Local developers
- City Council
- Transit agency
- Bicycle shops

PILOT DESCRIPTION

Develop a residential parking reduction program that includes incentives and disincentives. Develop a neighborhood parking program that includes a maximum number of permits per household. Develop an incentive program for active transportation, such as e-bike rebate or transit pass trade in program (e.g., Seattle One Less Car project; Denver E-Bike and E-Cargo Bike Instant Rebate Program).

KEY CONSIDERATIONS AND ANALYSIS FOR PILOT DESIGN

The pilot area has 76 total spaces that can serve up to 219 users per hour. The curb's uses include but are not limited to:

- 73 spaces for free parking (serving up to 219 users per hour)

Overflow Parking: The site is in a primarily residential neighborhood with a mix of low-density and higher-density developments. Furthermore, there is a high amount of on-street free parking spaces that could be repurposed for other uses like transit and active transportation. Thus, both factors combined in this location make it an ideal site to test how overflow parking from high-density areas can be more effectively regulated.

Active Transportation: Data and mapping of the site's infrastructure shows that the existing area is walkable, so this pilot is not only about parking, but also about incentivizing active transportation. This includes looking at design and infrastructure, such as street lighting, to ensure safety in leveraging active modes of transportation, especially at night.

Free Parking: Most of the curb space is for free parking, with no parking from 11am to 3:30pm, which indicates there is the opportunity for a more balanced approach.



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SAMC Section 10-5

ART
VILL
DOWNTOWN OF

↑ N. Sycamore
← W. 3RD ST
← Fourth St.

9

Santa Ana



This section provides an overview of the Benchmark Score, Emerging Themes, Strategies and Recommendations, as well as data findings observed across the three sites located in the City of Santa Ana. Each of these factors were used to identify a menu of potential pilot projects that would help to streamline curbside efficiency at each of the sites. The main challenge identified was a need to improve curbside access for multimodal stakeholders.

9.1 BENCHMARK SCORE

A weighted benchmark score was created for Santa Ana using the self-reported surveys for strategies and recommended actions specific to the City. Santa Ana has big aspirations in improving all angles required for an effective curbside management strategy, including organizational structure, leadership, progressive performance measures, and curbside inventory. Key focus areas were to improve the way they collect and maintain their curbside inventory and to improve their organizational structure so they can proactively act upon what the data is telling them.

CATEGORY	CURRENT STATE	DESIRED STATE	GAP
Organizational Structure	2	5	3.0
Leadership	3	5	2.0
Progressive Performance Measures	2.5	5	2.5
Curbside Inventory	2	5	3.0

Above: Rankings from the CMM survey for the City of Santa Ana. States are ranked out of 5.

9.2 EMERGING THEMES

A comprehensive list of 70 emerging themes were determined for the entire SCAG region. From this list, themes were further organized and expanded upon using engagement and data inputs specific to the City of Santa Ana.

The specific themes that emerged for Santa Ana were:

- Interest in investigating progressive pricing strategies to address current parking challenges;
- Need for increased wayfinding and signage for education and safety;
- Need for management strategies and clear regulations around special uses, such as parklets, food trucks and produce vendors;
- Need for updating policies and curb design to match with current community conditions and land uses;
- Lacking ordinances for some mobility modes that need curb access (e.g., bike share, scooter share);
- Growing demand for delivery; and
- Conflict of various modes and uses of the curb (e.g., waste management, food trucks, school pick-up/drop-off, bicyclists, construction zones).



9.3 STRATEGIES AND RECOMMENDATIONS

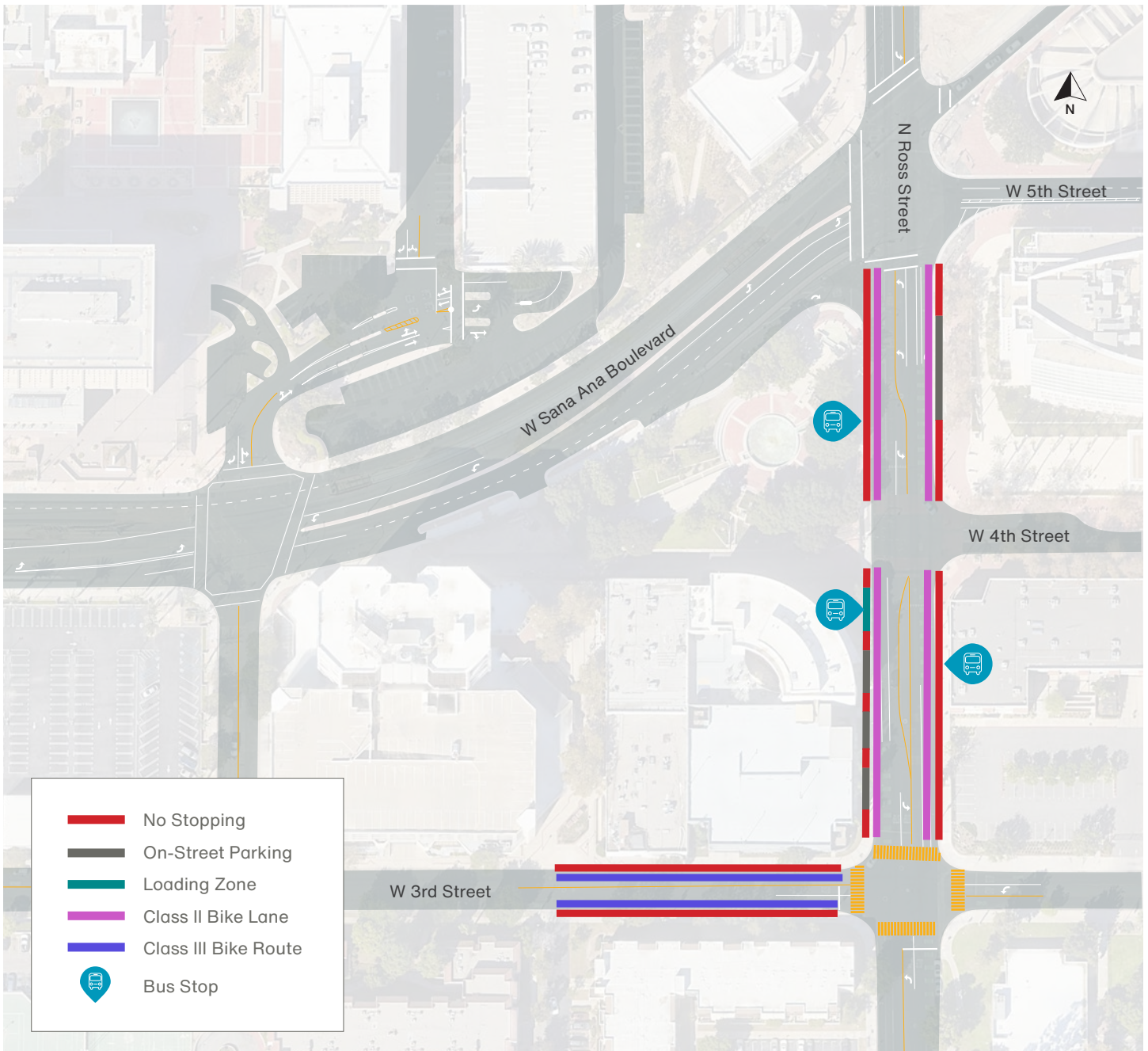
The following presents the key problem statements for Santa Ana; the strategies associated with addressing that challenge; and the actions that could be taken to solve the challenge.

PROBLEM STATEMENT	RECOMMENDATION CATEGORY (STRATEGY)	RECOMMENDATION (FROM MENU OF OPTIONS)	PILOT AREA	PILOT PROJECT
There is no ordinance that prohibits or allows scooter share or bikeshare but previous shared mobility pilot failed because of street clutter	Alternative Micromobility Permitting	Single vendor concession	3rd/Ross	Procure a single micromobility vendor for the city with a strict service level agreement.
		Private property shared mobility	3rd/Ross	Partner with large private property owners/operators to provide micromobility options to employees, customers, residents, etc.
There is a lack of community education and appropriate signage at the curb to promote safety and offer information on curb changes	Engagement	Public education programs	Cubbon	Develop public education campaigns to highlight the importance of these corridors towards social outcomes and how to use them.
	Technology	Digitization of parking regulations	Cubbon	Develop digital twin of parking regulations that is publicly available and can interpret current conditions.
There is a lack of clear regulations for food trucks and not enough resources for enforcement	Permitting	Food truck permitting	Cubbon	Develop permit for food trucks.

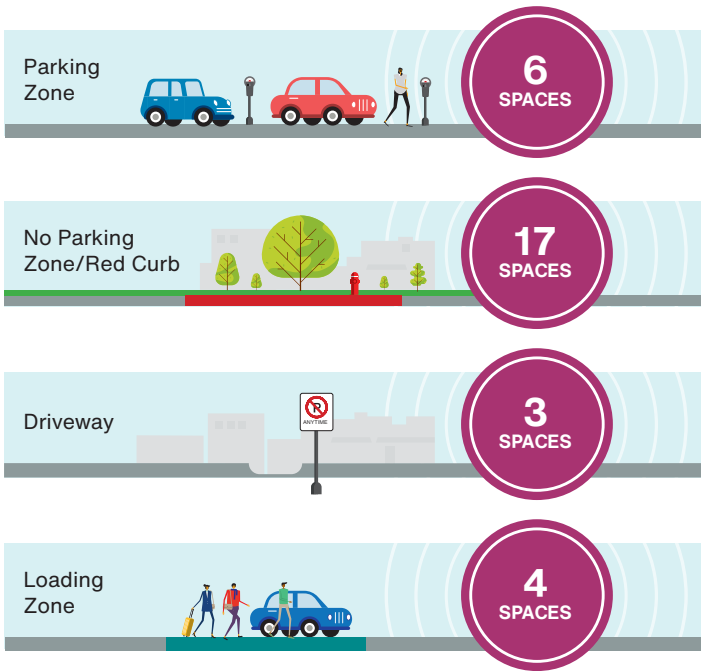
PROBLEM STATEMENT	RECOMMENDATION CATEGORY (STRATEGY)	RECOMMENDATION (FROM MENU OF OPTIONS)	PILOT AREA	PILOT PROJECT
There is a lack of clear regulations for food trucks and not enough resources for enforcement	Parking Regulations	Digital permitting	Cubbon	Develop digital permit by plate.
		Food truck zones	Cubbon	Develop zones for food trucks with permits.
	Enforcement	Automated enforcement	Cubbon	Automate enforcement of food truck zones by plate.
Curb colors and loading zones are out of date and do not necessarily reflect current demand or land uses	Parking Regulations	Flex zones	3rd/Birch and Main	Study short term parking use and develop appropriate time of day regulations to maximize turnover.
	Advocacy	Advocacy with local elected officials	3rd/Birch and Main	Advocate for parking regulation changes and authority for department to make more nimble changes.
	Permitting	Fleet/ commercial parking permits	3rd/Birch and Main	Develop permit for short term parking zones for commercial fleets.
Current pricing strategies are inadequate, but changing pricing structure would create community pushback	Equity	Transit pass parking rebates	3rd/Birch and Main	Increase parking prices but maintain existing pricing to low income residents through a rebate to their transit pass.

PROBLEM STATEMENT	RECOMMENDATION CATEGORY (STRATEGY)	RECOMMENDATION (FROM MENU OF OPTIONS)	PILOT AREA	PILOT PROJECT
<p>Current pricing strategies are inadequate, but changing pricing structure would create community pushback</p>	Pricing	Performance based pricing	3rd/Birch and Main	Establish clear guidelines for parking price increases that strictly follows a data driven process around an ideal occupancy range.
	Engagement	Public education programs	3rd/Birch and Main	Develop public education campaigns to highlight the importance of these corridors towards social outcomes and how to use them.
	Data Analysis	Social return on investment	3rd/Birch and Main	Develop cost benefit analysis that quantifies social benefits based on city values such as health, safety, sustainability, prosperity, etc beyond transportation.

9.4 SITE #1: 3RD STREET AND ROSS STREET FROM 300 FEET WEST OF ROSS STREET TO SOUTH OF 5TH STREET



Curb Space Allocation



Site Characteristics

- 2 hour paid parking from 8:00 a.m. – 10:00 p.m.
- No parking between 2:00 a.m. – 6:00 p.m.
- Loading zones operate from 7:00 a.m. – 6:00 p.m.

Data Findings

Inventory data was collected for a 1 block radius around the site to gain an understanding of the surrounding curb uses. The data was analyzed in CurblQ and used to ensure the recommended pilot projects can be implemented in harmony with the surrounding area.

As noted in Section 5.6, in Santa Ana, **demand data** was collected through curbside cameras. Two curbside cameras were mounted per curb continuously recording video footage for 6 hours per day. The video files were reviewed, and event data was processed and provided for analysis.



Above: Screenshot of inventory data from CurbiQ

● Site Limits

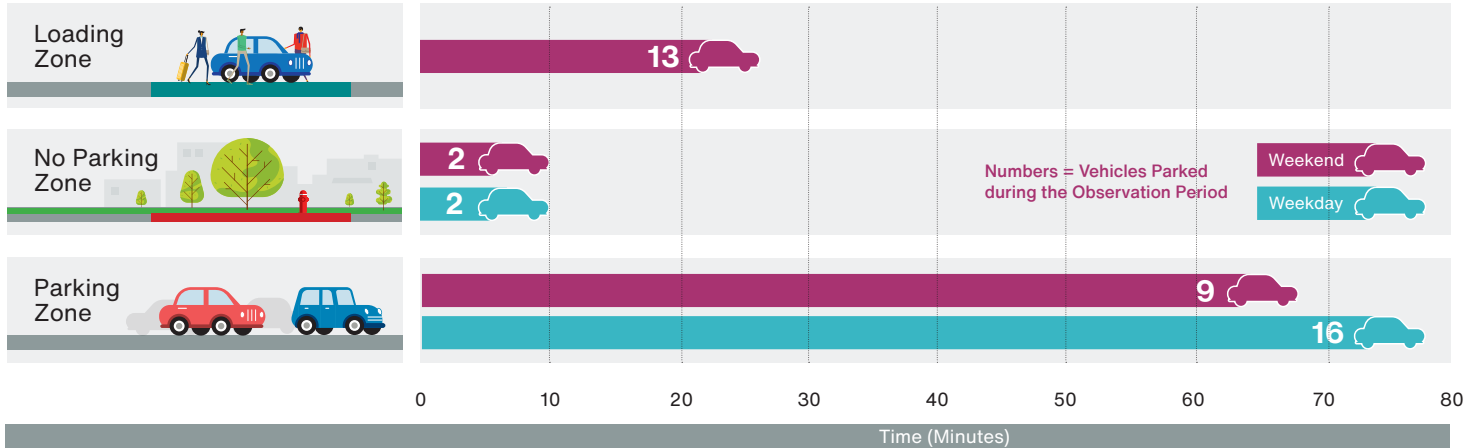
<p>Parking Restrictions</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input type="checkbox"/> Undesignated <input type="checkbox"/> Standing <input checked="" type="checkbox"/> Parking (Permit) <input checked="" type="checkbox"/> Parking (Paid) <input checked="" type="checkbox"/> Parking - Other <input checked="" type="checkbox"/> Parking (Free) <input checked="" type="checkbox"/> No Stopping <input checked="" type="checkbox"/> No Standing <input checked="" type="checkbox"/> No Parking <input checked="" type="checkbox"/> Curb Cut 	<p>Special Designations</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input checked="" type="checkbox"/> Accessible Permit <input checked="" type="checkbox"/> Accessible Permit Loading <input checked="" type="checkbox"/> Bicycle Infrastructure <input checked="" type="checkbox"/> Bicycle Lane <input checked="" type="checkbox"/> Bus Loading <input checked="" type="checkbox"/> Bus Parking <input checked="" type="checkbox"/> Car Share Parking <input checked="" type="checkbox"/> Commercial Loading <input checked="" type="checkbox"/> Curbside Patio 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> EV Parking <input checked="" type="checkbox"/> Emergency Vehicles <input checked="" type="checkbox"/> Fire Hydrant <input checked="" type="checkbox"/> Food Truck <input checked="" type="checkbox"/> Loading <input checked="" type="checkbox"/> Micromobility <input checked="" type="checkbox"/> Motorcycle Parking <input checked="" type="checkbox"/> Passenger Loading <input checked="" type="checkbox"/> Private Parking <input checked="" type="checkbox"/> Special User 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Street Cleaning <input checked="" type="checkbox"/> Taxi Cab Stand <input checked="" type="checkbox"/> Transit Zone <p>Temporary Conditions</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input checked="" type="checkbox"/> Construction Zone <p>Curbside Assets</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input type="checkbox"/> SA Bus Stops <input checked="" type="checkbox"/> Curbside Patio
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Data Collection Dates

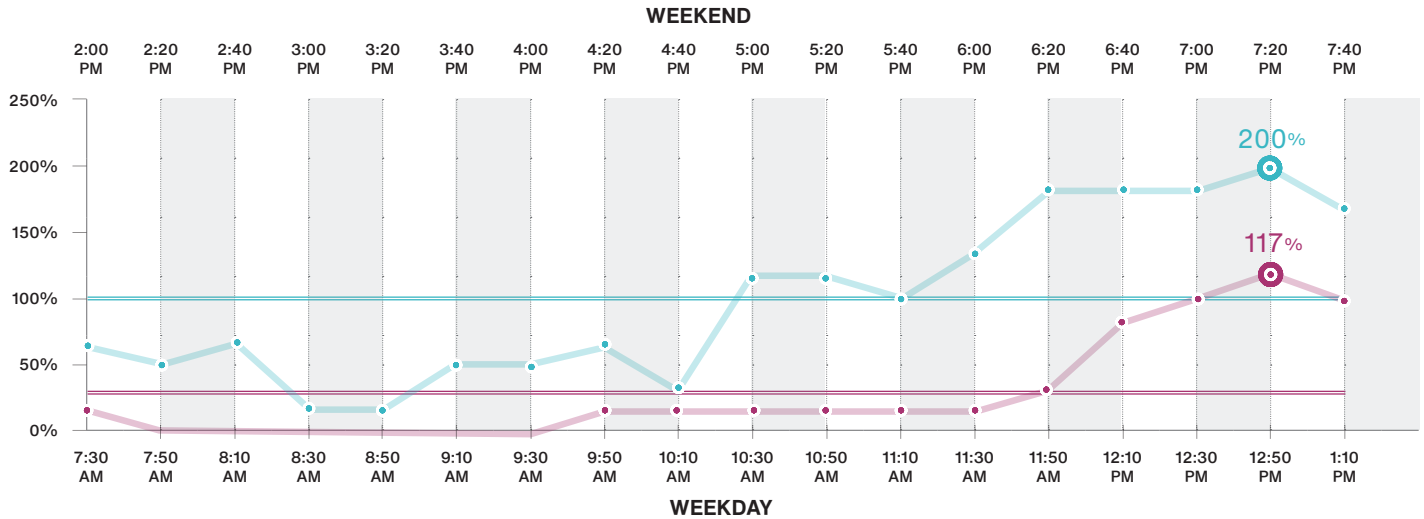
Weekday: Tuesday, March 22, 2022 from 12:00 p.m. to 8:00 p.m.

Weekend: Sunday, March 20, 2022 from 12:00 p.m. to 8:00 p.m.

Average Dwell Time




Parking Occupancy



Key data findings at this site include:

- Illegal PUDO activity was observed, with nearly 40 instances occurring at this site. The illegal activity is what causes the parking occupancy to go above 100%.
- Parking occupancy increases as the day progresses, both during the week and on weekends.
- Significantly different demand is observed between weekdays and weekends, and between different times of day. Higher demand is observed during the week with an average of 100% parking occupancy during the observation hours.
- Most every time curbside activity took place – of which there were about 150 instances – bike lane and pedestrian activity was encroached upon. More disruption of bicycle and pedestrian activity could be identified if continuous observation was available.
- These findings each suggest a clutter of activity along the curbside substantiated by a conflict of activities. A method that organizes this clutter while furthering the City’s goals related to the curb, transportation, and sustainability could be an optimal solution.

Curbside Typology

TYPOLOGY	DESCRIPTION	FUNCTIONS (RANKED IMPORTANCE)
<p>Employee Access</p>	<ul style="list-style-type: none"> • Promotes employee access to office space or government buildings & may be located near off-street parking 	

Given this site’s location alongside Government buildings in Downtown Santa Ana, this site has been characterized as an Employee Access Curb Typology. Site #1 primarily facilitates movement for employees and Access for People entering the workplace, as indicated by the high frequency of illegal PUDO activity observed. Improvements can be made to further improve multimodal access along the curb for employees and users visiting other surrounding land uses, including the Latino Health Access, NOVA Academy Early College High School, Sasscer Park, and Downtown Santa Ana. These improvements can focus on streamlining on-street parking to avoid conflicts with transit stops and bike lanes. Improvements along this corridor will also improve employee access from the future OC Streetcar Stop at Ross Street and W 4th Street.



Pilot Area

Third Street and Ross Street/Citywide

Pilot Title

Alternative Micromobility Permitting Pilot

Pilot Solves for the Following Problem Statement

There is no ordinance that prohibits or allows scooter share or bikeshare, but the previous shared mobility pilot failed because of street clutter.

Pilot Partners:

- Micromobility sharing private sector vendors
- Transit agency (e.g., Orange County Transit Authority)
- Business improvement groups
- Santa Ana City Council

PILOT DESCRIPTION

Reevaluate alternative permitting methods to micromobility. This will include evaluation of single vendor concession, with more rigorous service level agreements related to utilization, integration with transit, and enforcement mechanisms. Evaluate private property docked micromobility options that link major transportation hubs to sites such as employers and retailers. The docks would all be installed on private property and micromobility can only be dropped off at a dock.

KEY CONSIDERATIONS AND ANALYSIS FOR PILOT DESIGN

Monday to Saturday, the curb's uses include but are not limited to:

- ▶ **8pm to 6am**
 - 2 passenger loading zones (serving up to 24 users per hour)
- ▶ **7am**
 - 2 passenger loading zones (serving up to 24 users per hour)
 - 1 loading zone (serving up to 12 users per hour)
- ▶ **8am to 5pm**
 - 2 passenger loading zones (serving up to 24 users per hour)
 - 3 paid parking spaces (serving up to 9 users per hour)
 - 1 loading zone (serving up to 12 users per hour)
- ▶ **6pm to 7pm**
 - 2 passenger loading zones (serving up to 24 users per hour)
 - 3 paid parking spaces (serving up to 9 users per hour)

On Sunday, the curb is allocated in the following manner:

6pm to 6am

- 2 passenger loading zones (serving up to 24 users per hour)

7am to 5pm

- 2 passenger loading zones (serving up to 24 users per hour)
- 1 loading zone (serving up to 12 users per hour)

Micromobility: The site (Third Street and Ross Street) has a high degree of mixed land uses, including offices, schools, and public space. At the same time, there are many competing uses at the curb, including loading, on-street parking, transit stops and bike infrastructure. Because the site has a variety of amenities that attracts people (workers, students, visitors, residents) and could accommodate various modes of transportation,

implementing micromobility services through an alternative permitting process in this location will likely garner substantial ridership. It would also provide the City with a new opportunity to create a successful use case of micromobility as an active transportation option that helps to achieve City goals related to the curb, transportation and sustainability.

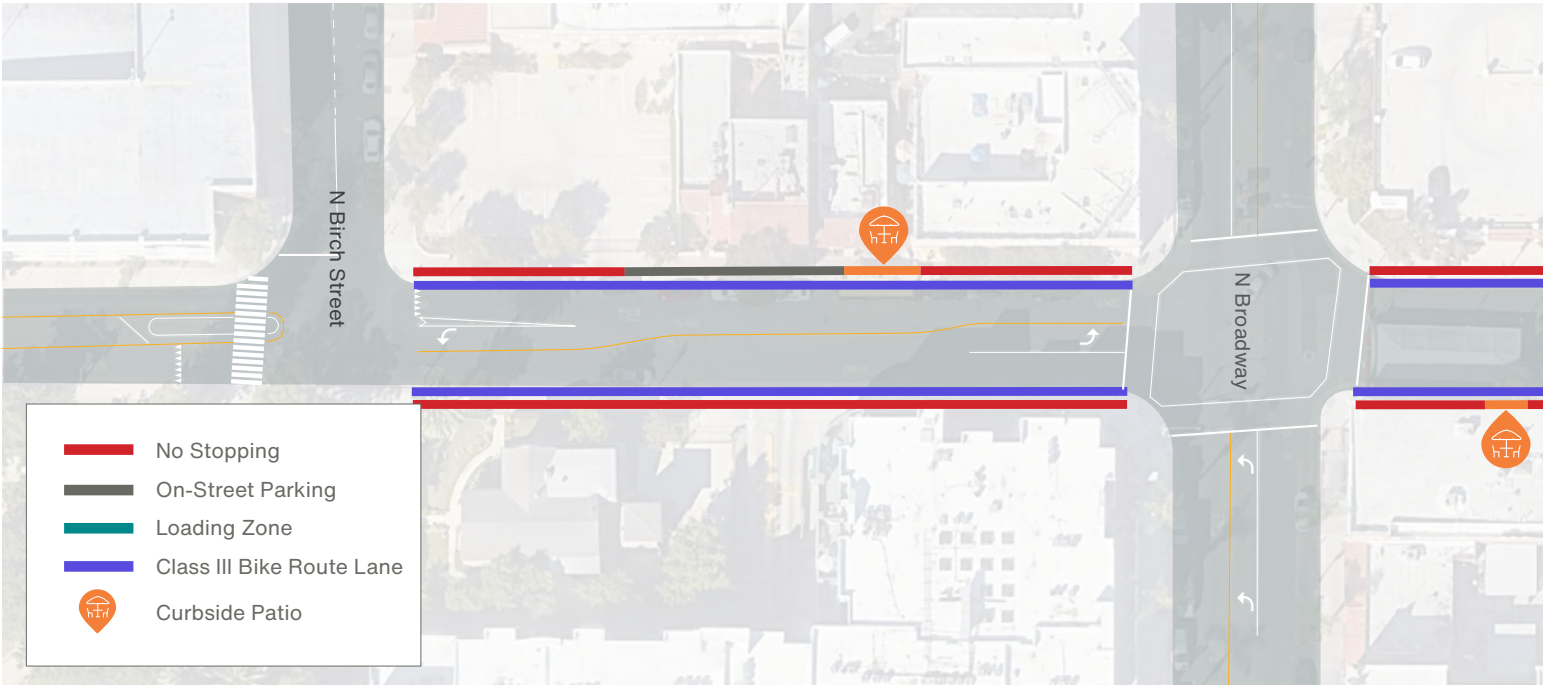
There are already designated Class II and III bike lanes in the site that could be repurposed to accommodate micromobility.

If successful in this site, alternative micromobility permitting can be piloted citywide, and vehicles can be distributed in different locations based on designated criteria that help achieve mobility, sustainability, and equity goals.

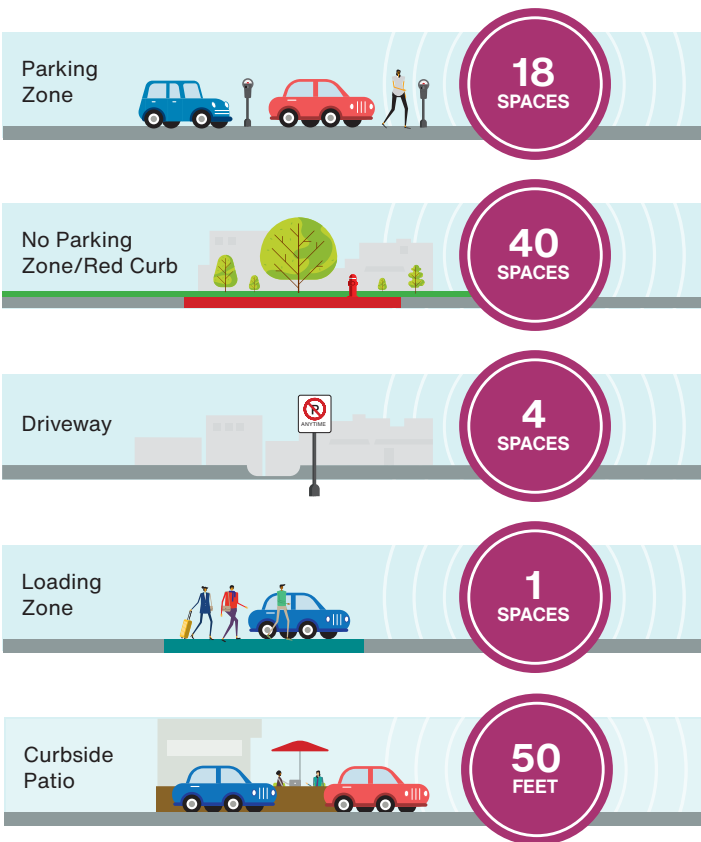
Engagement: The pilot will need to be a partnership with private partners and significant stakeholder engagement and messaging/communications given past pushback to micromobility.



9.5 SITE #2: WEST 3RD STREET BETWEEN MAIN STREET AND BIRCH STREET



Curb Space Allocation



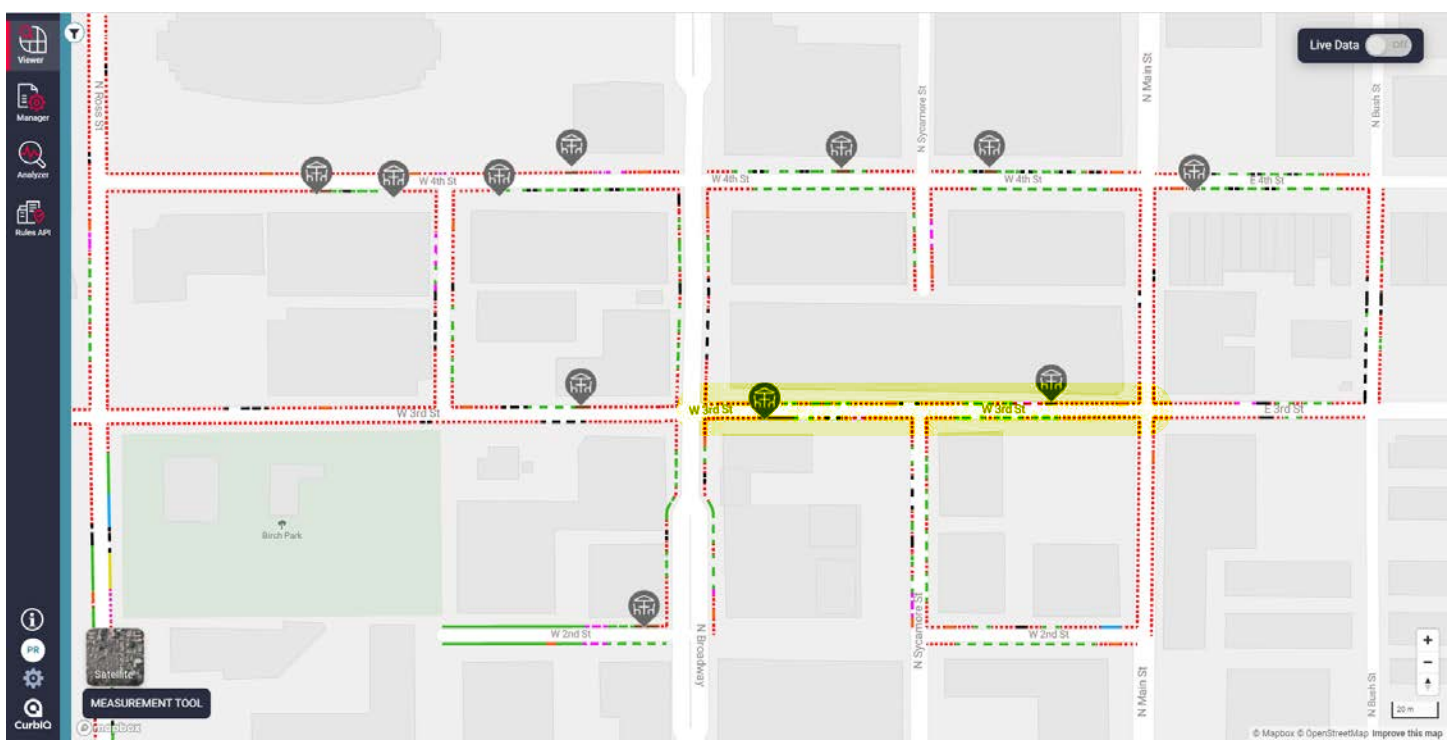
Site Characteristics

- 2 hour paid parking from 8:00 a.m. – 6:00 p.m.
- 3 hour paid parking from 6:00 p.m. – 10:00 p.m.
- No parking from 2:00 a.m. – 6:00 a.m.

Data Findings

Inventory data was collected for a 1 block radius around the site to gain an understanding of the surrounding curb uses. The data was analyzed in CurblIQ and used to ensure the recommended pilot projects can be implemented in harmony with the surrounding area.

As noted in Section 5.6, in Santa Ana, **demand data** was collected through curbside cameras. Two curbside cameras were mounted per curb continuously recording video footage for 6 hours per day. The video files were reviewed, and event data was processed and provided for analysis.



Above: Screenshot of inventory data from CurbiQ

● Site Limits

Above: Screenshot of inventory data from CurblQ

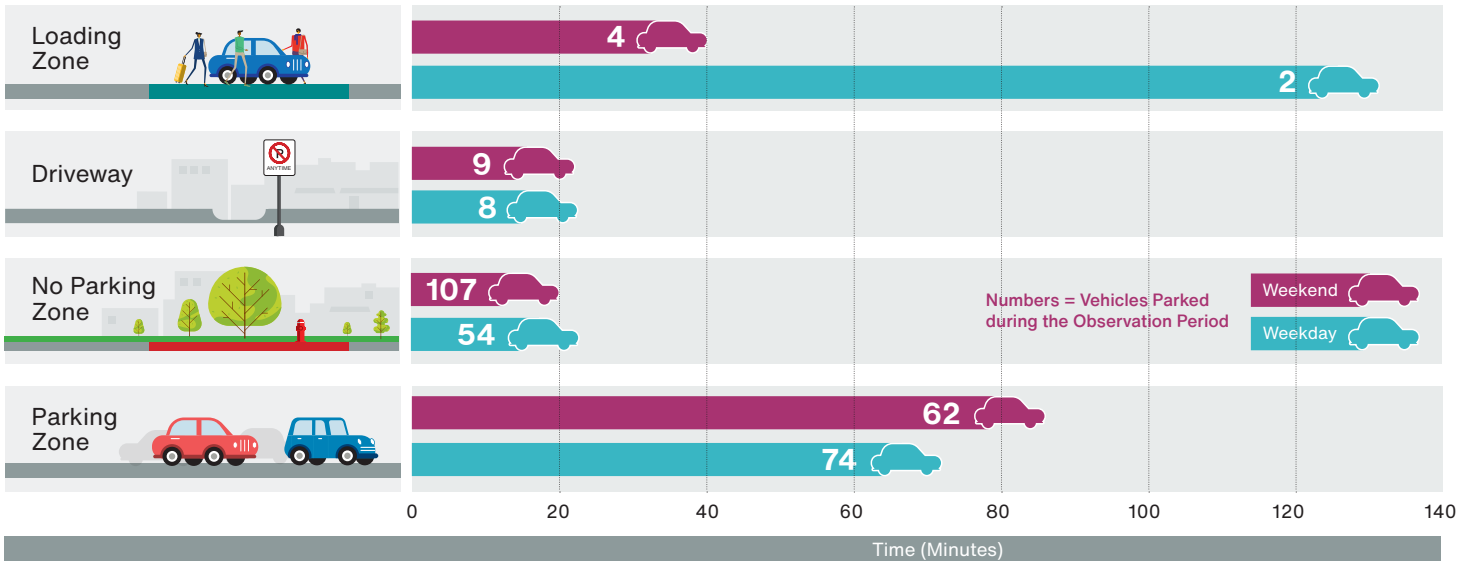
<p>Parking Restrictions</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input checked="" type="checkbox"/> Undesignated <input checked="" type="checkbox"/> Standing <input checked="" type="checkbox"/> Parking (Permit) <input checked="" type="checkbox"/> Parking (Paid) <input checked="" type="checkbox"/> Parking - Other <input checked="" type="checkbox"/> Parking (Free) <input checked="" type="checkbox"/> No Stopping <input checked="" type="checkbox"/> No Standing <input checked="" type="checkbox"/> No Parking <input checked="" type="checkbox"/> Curb Cut 	<p>Special Designations</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input checked="" type="checkbox"/> Accessible Permit <input checked="" type="checkbox"/> Accessible Permit Loading <input checked="" type="checkbox"/> Bicycle Infrastructure <input checked="" type="checkbox"/> Bicycle Lane <input checked="" type="checkbox"/> Bus Loading <input checked="" type="checkbox"/> Bus Parking <input checked="" type="checkbox"/> Car Share Parking <input checked="" type="checkbox"/> Commercial Loading <input checked="" type="checkbox"/> Curbside Patio 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> EV Parking <input checked="" type="checkbox"/> Emergency Vehicles <input checked="" type="checkbox"/> Fire Hydrant <input checked="" type="checkbox"/> Food Truck <input checked="" type="checkbox"/> Loading <input checked="" type="checkbox"/> Micromobility <input checked="" type="checkbox"/> Motorcycle Parking <input checked="" type="checkbox"/> Passenger Loading <input checked="" type="checkbox"/> Private Parking <input checked="" type="checkbox"/> Special User 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Street Cleaning <input checked="" type="checkbox"/> Taxi Cab Stand <input checked="" type="checkbox"/> Transit Zone <p>Temporary Conditions</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input checked="" type="checkbox"/> Construction Zone <p>Curbside Assets</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input type="checkbox"/> SA Bus Stops <input checked="" type="checkbox"/> Curbside Patio
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Data Collection Dates

Weekday: Friday, March 25, 2022 from 4:00 p.m. to 10:00 p.m.

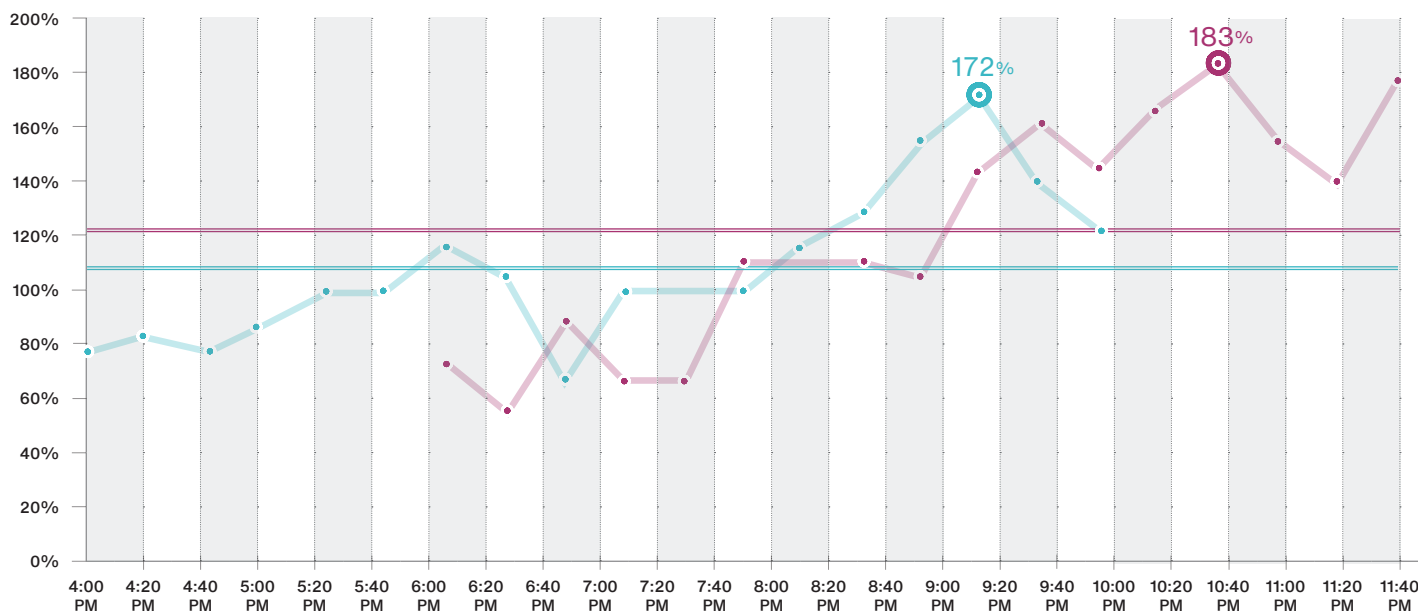
Weekend: Saturday, March 26, 2022 from 6:00 p.m. to 12:00 a.m.

Average Dwell Time



**Note that the dwell times shown for "Driveway" are for vehicles parked in the curb space adjacent to a driveway, blocking access*

Parking Occupancy



18

Total Number of Spaces

172%

Peak Curb Space Demand
31/18 Spaces

183%


Peak Curb Space Demand
33/18 Spaces

- Weekday
- Weekday Average
- Weekend
- Weekend Average

Key data findings at this site include:

- High use of driveways and no parking zones – over 80 instances – for short periods of time indicates a need for short-term parking with high turnover.
- During the observation period, the curbside space was consistently over capacity, both during the week and over the weekend, and usage increased into the night.
- Of the 3 blocks observed, 1 block maintained significantly higher occupancy rates earlier during the observation period than the others and maintained this difference even as increases occurred on all blocks throughout the period.
- Average dwell times range from under 20 minutes to over 2 hours. There is opportunity to shift long-term parking to adjacent streets, or off-street locations to free up curbspace for short term parking with higher turnover, thereby serving a greater number of curbside users in a safe manner.
- The imbalance of parking supply and demand and excess use of disallowed areas for short periods points to the need for management of use, given the limited curbspace available. Programs that seek to manage the level of demand throughout periods of the day could be of great use.

Curbside Typology

TYPOLOGY	DESCRIPTION	FUNCTIONS (RANKED IMPORTANCE)
<p>Mixed-Use Urban</p>	<ul style="list-style-type: none"> • Prioritizes access for people, order pick-up, retail space & space for outdoor dining • This corridor includes space for PUDO and safe pedestrian, bicyclist, and micromobility access • Parking provided should be exclusive to micromobility, and not vehicles 	 <p>Access for People Placemaking Deliveries Parking Movement</p> <p>1 2 2 4 5</p>

Site #2 is surrounded by mixed-use areas, restaurants, and mid-rise apartments, leading to a Mixed-Use Urban curbside typology. This corridor is part of the Artist’s Village and serves as a cultural hub in Downtown Santa Ana. The cultural hub designation presents opportunities to improve access for special curbside users, such as Food Trucks, improving Placemaking. The need to prioritize Access for People is supported by the high number of vehicles with short dwell times. Initiatives such as performance-based pricing programs and transit pass parking rebates can help manage demand and reduce the frequency of long-term parking, freeing up curb space to be used for passenger loading.

Santa Ana

Recommended Pilot Site #2



Pilot Area

Third Street between Birch and Main

Pilot Title

Performance-Based Pricing and Rebate Program Pilot

Pilot Solves for the Following Problem Statement

Current pricing strategies are inadequate, but changing pricing structure would create community pushback.

Pilot Partners:

- Parking solutions private sector vendor (mobile pay parking, parking enforcement, etc.)
- Private sector vendors specializing in curb space management data, parking and payment solutions
- Lidar technology private sector vendors
- Business improvement groups
- City council

PILOT DESCRIPTION

Develop hyper-local, performance-based pricing program pilot, to be scaled citywide. Develop data-driven occupancy targets by different times of day (e.g., AM peak, midday, PM peak, evening). If desired, perform analysis in real-time with low-cost data collection solutions (e.g., lidar, computer vision or machine learning algorithm) to translate payment data into understanding time-based occupancy. This pilot will likely require a multi vendor platform to create a single source of truth on current conditions and pricing. To ensure an equity lens, consider including a low-income solution to provide a discount of 50% off of parking costs paid back in the form of a rebate toward transit credit (this will also require multi-vendor, account based payment platform).

KEY CONSIDERATIONS AND ANALYSIS FOR PILOT DESIGN

On Monday to Saturday, the curb's uses include but are not limited to:

8pm to 7am

- 3 spaces for curbside patios (serving up to 60 people per hour)
- 18 paid parking spaces (serving up to 54 people per hour; generating \$18 in revenue per hour)

On Sunday, the curb is allocated in the following manner:

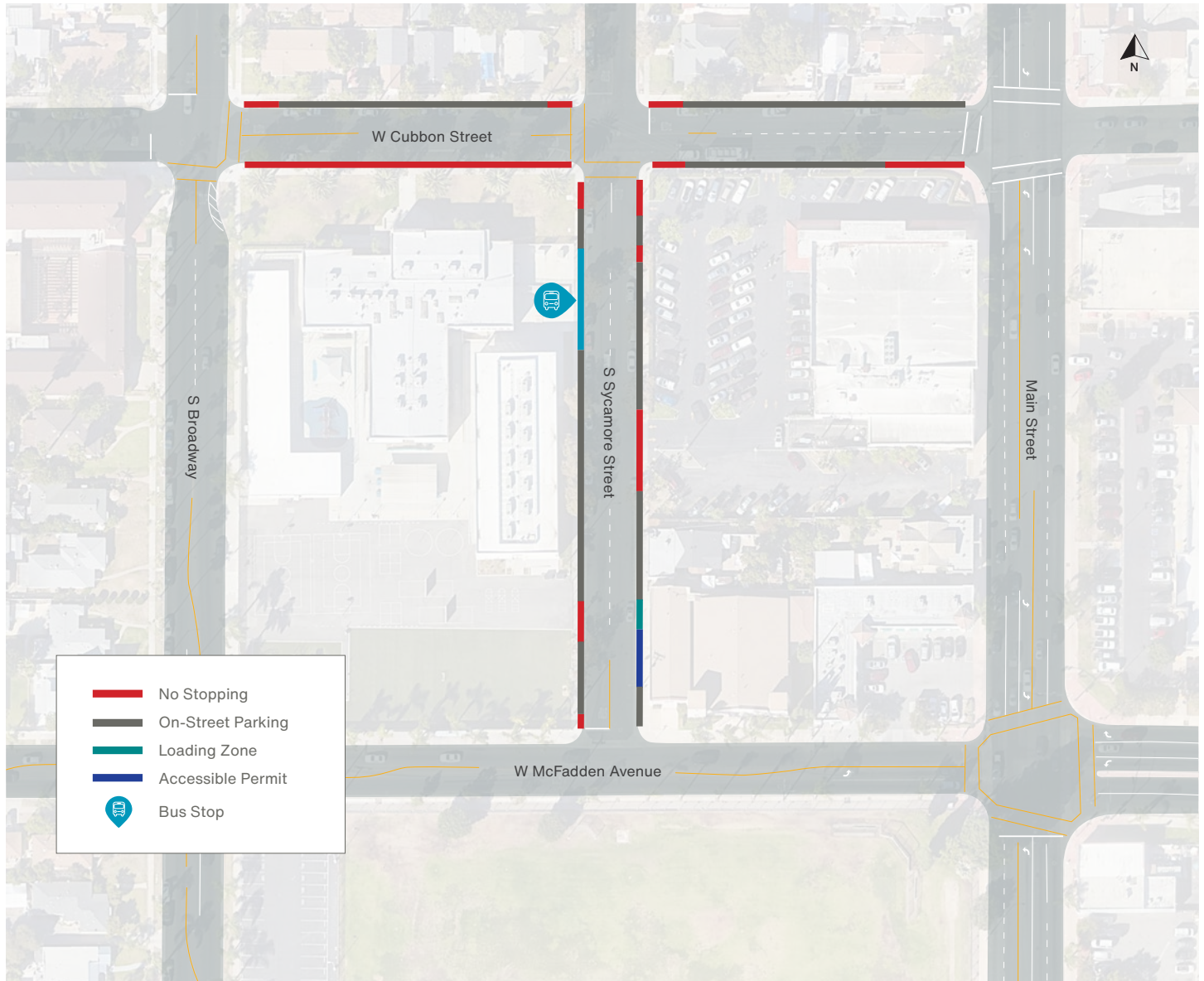
- 3 spaces for curbside patios (serving up to 60 people per hour)

Parking Occupancy: Much of this neighborhood has no parking regulations and high utilization land uses. High parking occupancy (above 90%) was observed for on-street meters during evenings and weekends.

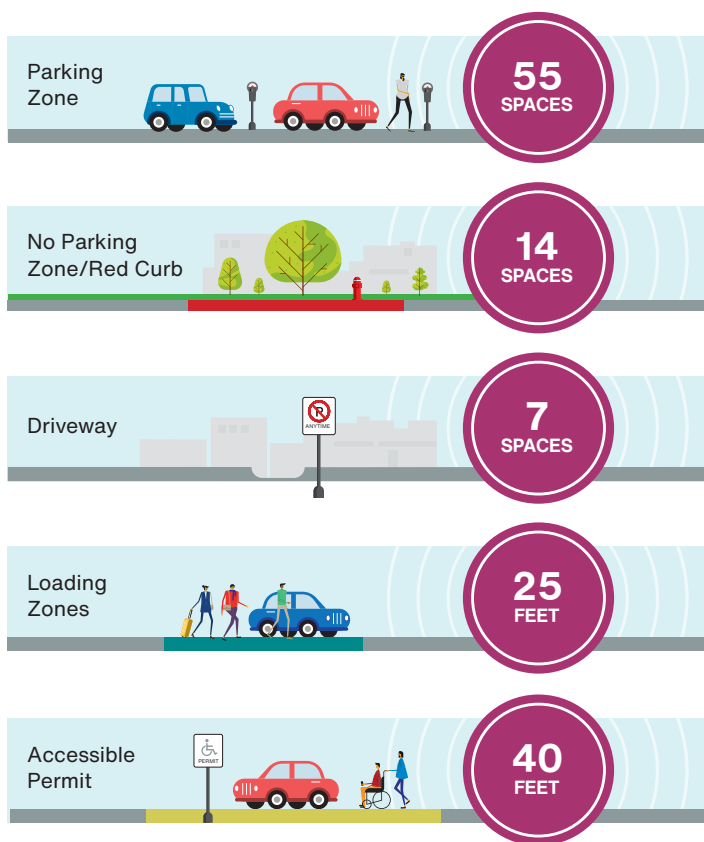
Free Parking: The site is a mixed-use area with restaurants, retail and mid-rise residential land uses, along with designated curbside patio spaces for outdoor dining. It also has loading zones and on-street and off-street paid parking spaces with a nearby public parking garage. As the site is home to many residents and attracts many visitors who utilize paid parking to go to nearby restaurants or shops, this location presents a valuable opportunity to test performance-based pricing to maximize revenues and better control demand from high parking utilization.

Consider driving the performance-based pilot by the following payment increments, which are suggested based on the existing demand and land use: when parking occupancy in a particular time period averages 70% to 90%, keep pricing where it is. If occupancy is below 70%, incrementally decrease parking cost per hour. If occupancy is above 90%, incrementally increase parking cost per hour.

9.6 SITE #3: CUBBON STREET FROM EAST OF BROADWAY TO WEST OF MAIN STREET AND SYCAMORE STREET FROM CUBBON STREET TO NORTH OF MCFADDEN AVENUE



Curb Space Allocation



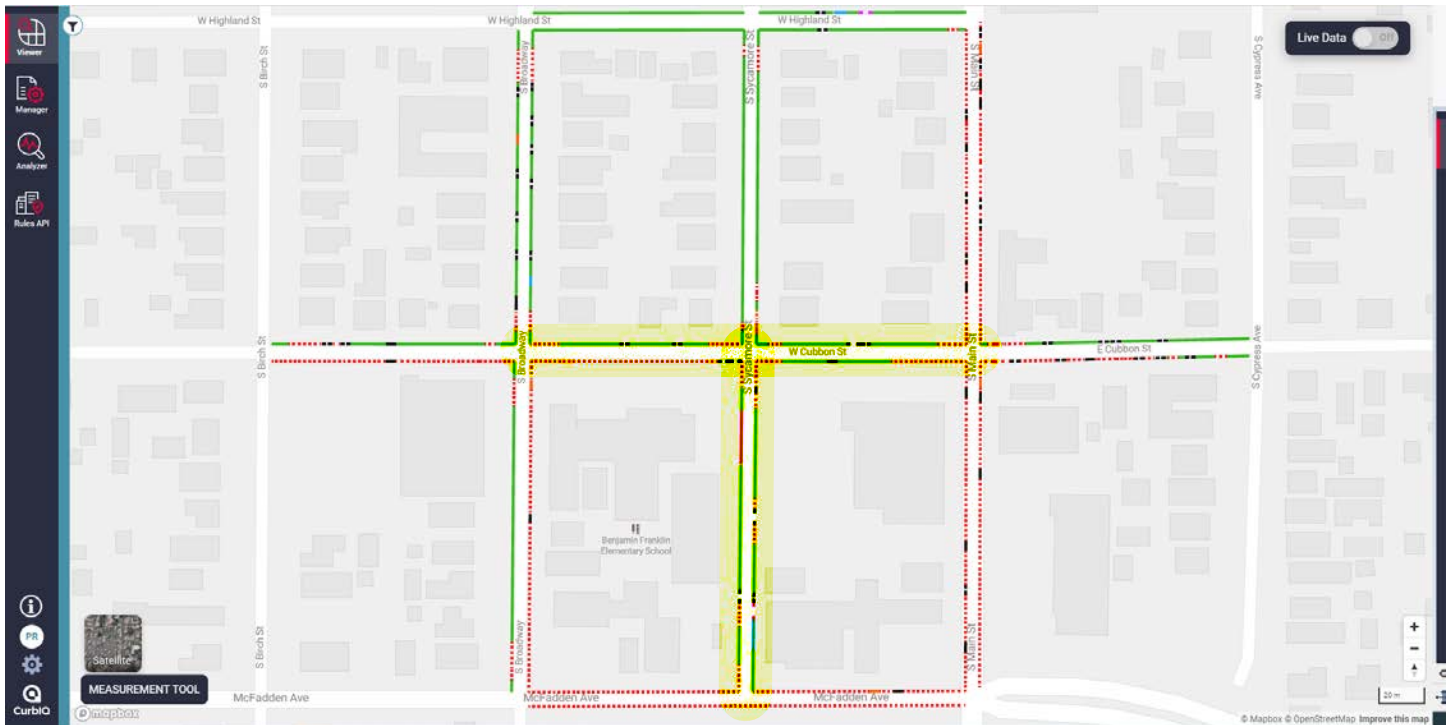
Site Characteristics

- Cubbon St. from Broadway to Sycamore St.: No parking from 8:00 a.m. – 12:00 p.m. on Thursdays
- Cubbon St. from Sycamore St to Main St.: 2 hour parking from 7:00 a.m. – 6:00 p.m. except on Sundays
- Sycamore St. from McFadden Ave. to Cubbon St.: No parking from 2:00 a.m. – 6:00 a.m. on Thursdays on east curb, no stopping from 12 am – 7 am, except Sundays, Saturdays, and holidays on west curb

Data Findings

Inventory data was collected for a 1 block radius around the site to gain an understanding of the surrounding curb uses. The data was analyzed in CurblQ and used to ensure the recommended pilot projects can be implemented in harmony with the surrounding area.

As noted in Section 5.6, in Santa Ana, **demand data** was collected through curbside cameras. Two curbside cameras were mounted per curb continuously recording video footage for 6 hours per day. The video files were reviewed, and event data was processed and provided for analysis.



Above: Screenshot of inventory data from CurbiQ

 Site Limits

Parking Restrictions

- Select All
- Undesignated
- Standing
- Parking (Permit)
- Parking (Paid)
- Parking - Other
- Parking (Free)
- No Stopping
- No Standing
- No Parking
- Curb Cut

Special Designations

- Select All
- Accessible Permit
- Accessible Permit Loading
- Bicycle Infrastructure
- Bicycle Lane
- Bus Loading
- Bus Parking
- Car Share Parking
- Commercial Loading
- Curbside Patio

- EV Parking
- Emergency Vehicles
- Fire Hydrant
- Food Truck
- Loading
- Micromobility
- Motorcycle Parking
- Passenger Loading
- Private Parking
- Special User

- Street Cleaning
- Taxi Cab Stand
- Transit Zone

Temporary Conditions

- Select All
- Construction Zone

Curbside Assets

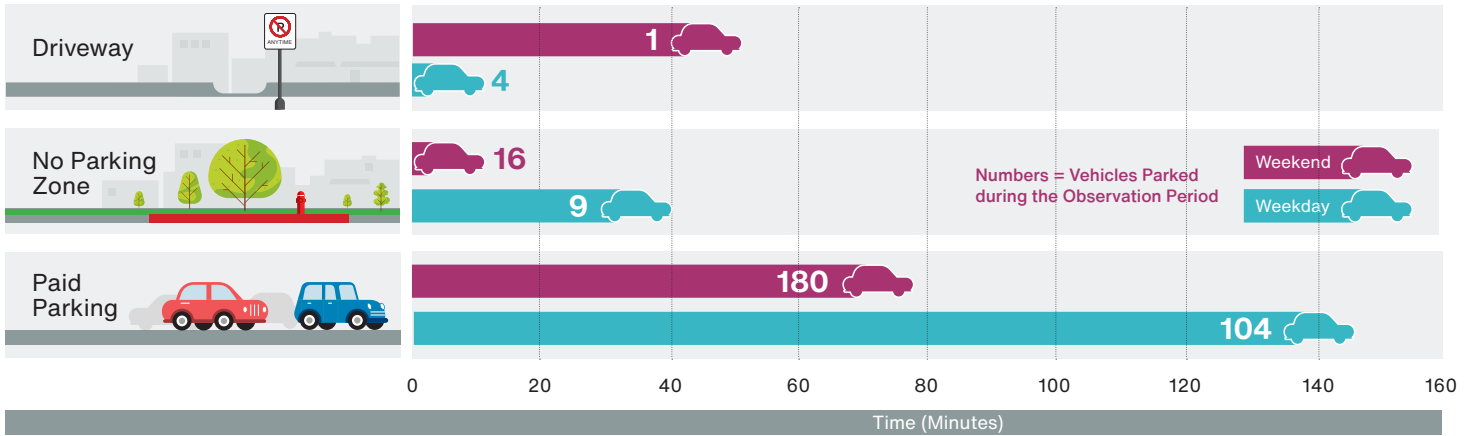
- Select All
- SA Bus Stops
- Curbside Patio

Data Collection Dates

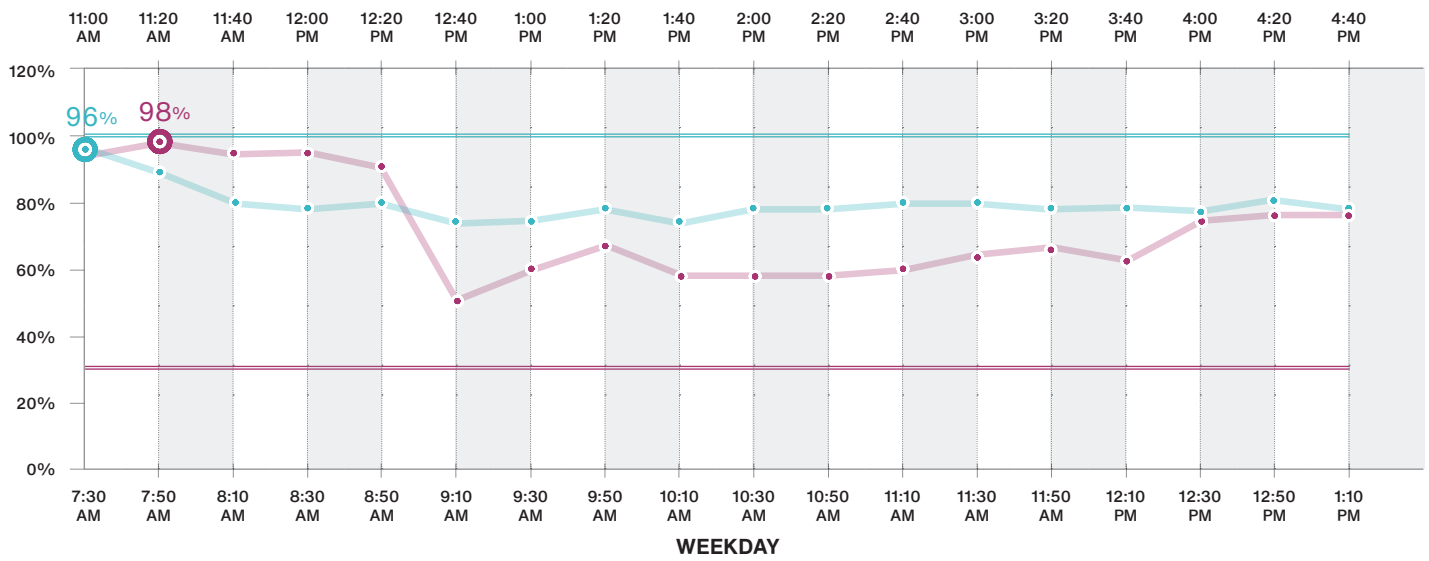
Weekday: Tuesday, April 12, 2022 from 7:30 a.m. to 1:30 p.m.

Weekend: Saturday, April 9, 2022 from 11:00 a.m. to 5:00 p.m.

Average Dwell Time



Parking Occupancy



55

Total Number of Spaces

96%

Peak Curb Space Demand
53/55 Spaces

98%

Peak Curb Space Demand
54/55 Spaces

- Weekday
- Weekday Average
- Weekend
- Weekend Average

Key data findings at this site include:

- During the week, curbside activity is highest during the morning drop-off, and remains relatively consistent at 80% occupancy throughout the rest of the observation period.
- Parking occupancy is similar between weekdays and weekends.
- The parking supply is not being entirely utilized by vehicles and therefore allows some flexibility in how curb space is allocated to other users.

Curbside Typology

TYPOLOGY	DESCRIPTION	FUNCTIONS (RANKED IMPORTANCE)
<p>School Streets</p>	<ul style="list-style-type: none"> • Promotes safe access to vulnerable road users • Two peak activity times: morning drop off & after school pick up • Prioritize pedestrian safety and allows sufficient space for PUDO activity • Lower speed limits 	 <p>Access for People Placemaking Parking Movement Deliveries</p> <p>1 2 3 4 5</p>

Curbside access should be prioritized for the most vulnerable users, including school aged children attending Benjamin Franklin Elementary School and their parents. For this reason, this site is characterized as a School Street Curb Typology. Improvements can be made to improve safety for people and to make PUDO times at the start and end of the school day easier for parents. Improvements at this site should ensure that this location remains a welcoming, vibrant, and safe space for pedestrians, students, and their parents.



10

Santa Monica



This section provides an overview of the Benchmark Score, Emerging Themes, Strategies and Recommendations, as well as data findings observed across the three sites located in the City of Santa Monica. Each of these factors were used to identify a menu of potential pilot projects that would help to streamline curbside efficiency at each of the sites. The main challenges identified at all three sites were a high demand for parking with low turnover and a need for improved access for multimodal stakeholders along the curb.

10.1 BENCHMARK SCORE

A weighted benchmark score was created for Santa Monica using the self-reported surveys for strategies and recommended actions specific to the City. Santa Monica's focus was on improving their organizational structure and leadership. In November 2020, the Department of Transportation was created by merging the Big Blue Bus with the Mobility and Parking Operations divisions. Additional effort and coordination are required to ensure they can effectively implement the curbside space management program they desire.

CATEGORY	CURRENT STATE	DESIRED STATE	GAP
Organizational Structure	2.5	4.5	2.0
Leadership	2.5	4.5	2.0
Progressive Performance Measures	3	4	1.0
Curbside Inventory	3	4.5	1.5

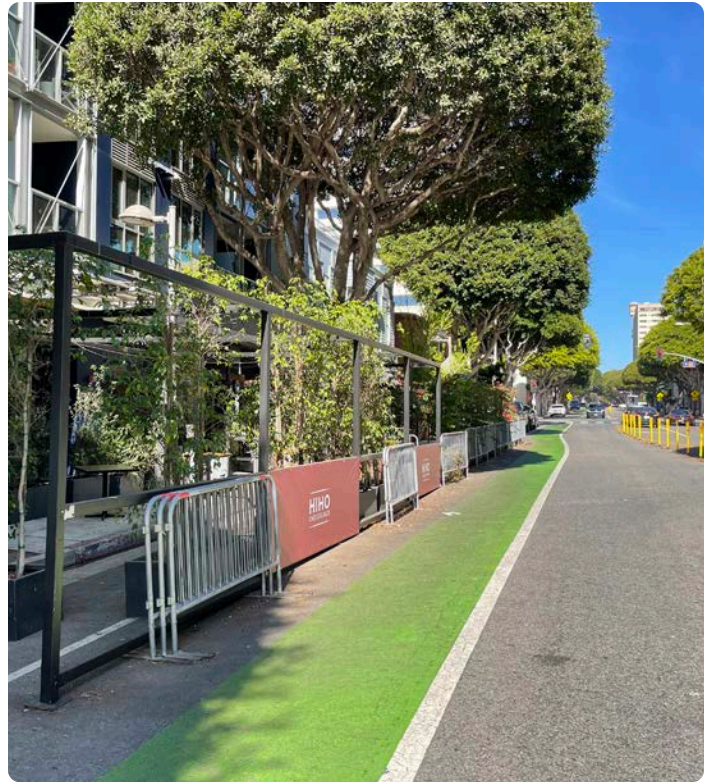
Above: Rankings from the CMM survey for the City of Santa Monica. States are ranked out of 5.

10.2 EMERGING THEMES

A comprehensive list of 70 emerging themes were determined for the entire SCAG region. From this list, themes were further organized and expanded upon using engagement and data inputs specific to the City of Santa Monica.

The specific themes that emerged for Santa Monica were:

- High interest in more effectively managing and digitally managing curb space.
- There are foundational steps needed to allow Santa Monica to improve curb management:
 - Data collection.
 - Regulatory barriers.
 - Cross-departmental coordination.
 - Lack of loading zones and pick-up drop-off space.
- Lack of prioritization at the curb (i.e., curb typology or prioritization framework based on local context).



10.3 STRATEGIES AND RECOMMENDATIONS

The following presents the key problem statements for Santa Monica; the strategies associated with addressing that challenge; and the actions that could be taken to solve the challenge.

PROBLEM STATEMENT	RECOMMENDATION CATEGORY (STRATEGY)	RECOMMENDATION (FROM MENU OF OPTIONS)	PILOT AREA	PILOT PROJECT
<p>We are lacking comprehensive data management/coordination practices, as well as a formulaic solution to make more data-informed decisions about the curb space.</p>	Data Analysis	Computer vision cameras ¹	2nd St	Install low cost sensors to monitor curb uses for entire corridor.
		Lidar	2nd St	Install low cost sensors to monitor curb uses for entire corridor.
	Pricing	Multi-vendor parking platform	Citywide	Procure multi-vendor parking platform that captures all parking transaction data in one system through API that is agnostic to user payment preferences.
		Machine learning on payment data	Citywide	Overlay machine learning algorithm on top payment data to combine payment and ground truth occupancy data into real time occupancy.
<p>There's a lack of sufficient loading and PUDO space, often resulting in illegal parking in bike lanes and loading zones (including EV zones).</p>	Parking Regulations	Flex zones	Ocean Ave/2nd St	Study short term parking use and develop appropriate time of day regulations to maximize turnover.

PROBLEM STATEMENT	RECOMMENDATION CATEGORY (STRATEGY)	RECOMMENDATION (FROM MENU OF OPTIONS)	PILOT AREA	PILOT PROJECT
<p>There's a lack of sufficient loading and PUDO space, often resulting in illegal parking in bike lanes and loading zones (including EV zones).</p>	Permitting	Fleet/ commercial parking permits	Ocean Ave/2nd St	Develop permit for short term parking zones for commercial fleets.
		Reservation system	Ocean Ave/2nd St	Procure reservation system that issues time limited permits for short term parking.
	Pricing	Price short term parking	Ocean Ave/2nd St	Implement pricing for short term parking including automated payment system.
		Graduated pricing structure	Ocean Ave/2nd St	Develop graduated structure for short term parking (i.e., - \$1 for minute 1, \$2 for minute 2, \$4 for minute 3, etc).
<p>We experience a lot of illegal or double parking, but enforcement is difficult due to limited staff capacity (e.g., technology could be leveraged to help achieve greater efficiency).</p>	Advocacy	Advocacy at state level	Citywide	Advocate for additional authority for automated parking enforcement.
		Advocacy with local elected officials	Citywide	Advocate for alternative interpretation of existing automated enforcement authority.

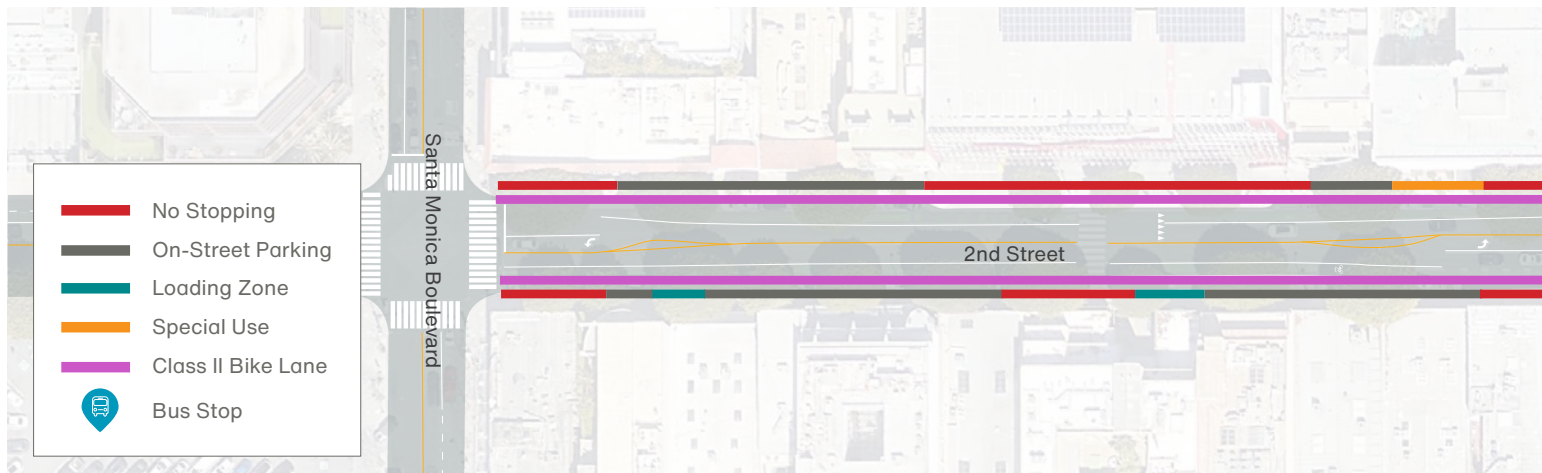
PROBLEM STATEMENT	RECOMMENDATION CATEGORY (STRATEGY)	RECOMMENDATION (FROM MENU OF OPTIONS)	PILOT AREA	PILOT PROJECT
<p>We experience a lot of illegal or double parking, but enforcement is difficult due to limited staff capacity (e.g., technology could be leveraged to help achieve greater efficiency).</p>	Enforcement	Concession for bus lane enforcement	Wilshire/ Harvard	Procure on bus enforcement through concession.
		Automated enforcement	Ocean Ave/2nd St	Procure automated parking enforcement through concession.
		Real time sensors	Ocean Ave/2nd St	Install low cost sensors (e.g., computer vision cameras, lidar) to monitor curb uses for entire corridor.
		Artificial Intelligence-driven enforcement	Ocean Ave/2nd St	Utilize machine learning ² on payment data as described above to guide manual enforcement to hot spots.
<p>Many dynamic demands at the curb (parking, bike lanes, outdoor dining, transit, loading), but lack of prioritization of uses or any formal policy on curb space management</p>	Prioritization	Hierarchy of curb uses	Ocean Ave	Develop hierarchy of curb uses based on-street typology.
	Organizational	Strategic planning and action agenda	Citywide	Develop curb management strategy plan and action agenda.

¹ Computer vision based parking detection uses deep learning models to determine if a parking spot is vacant.

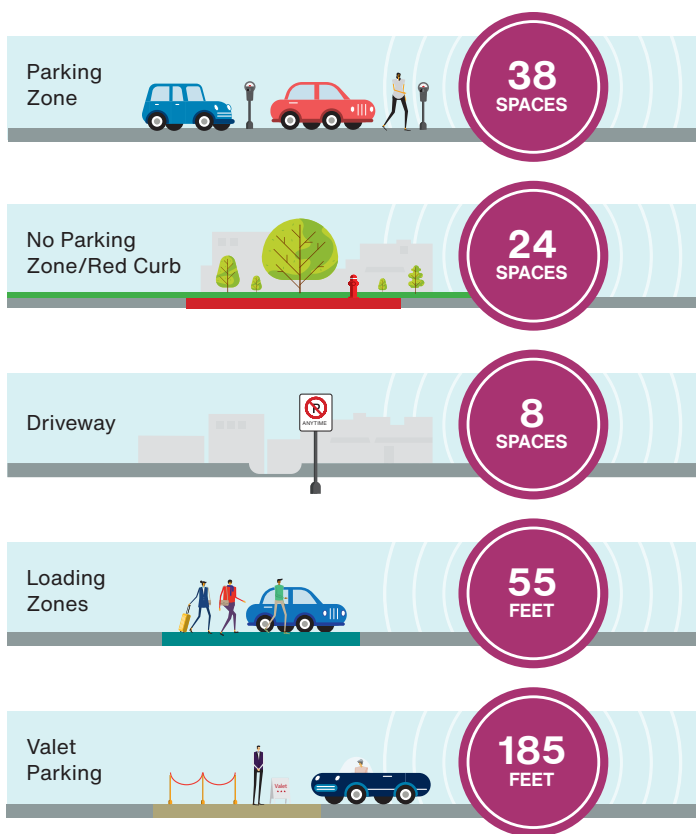
² Machine learning is a prevalent industry term for models that leverage data to improve performance with little to no human intervention.

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10.4 SITE #1: 2ND STREET BETWEEN SANTA MONICA BOULEVARD AND COLORADO AVENUE



Curb Space Allocation



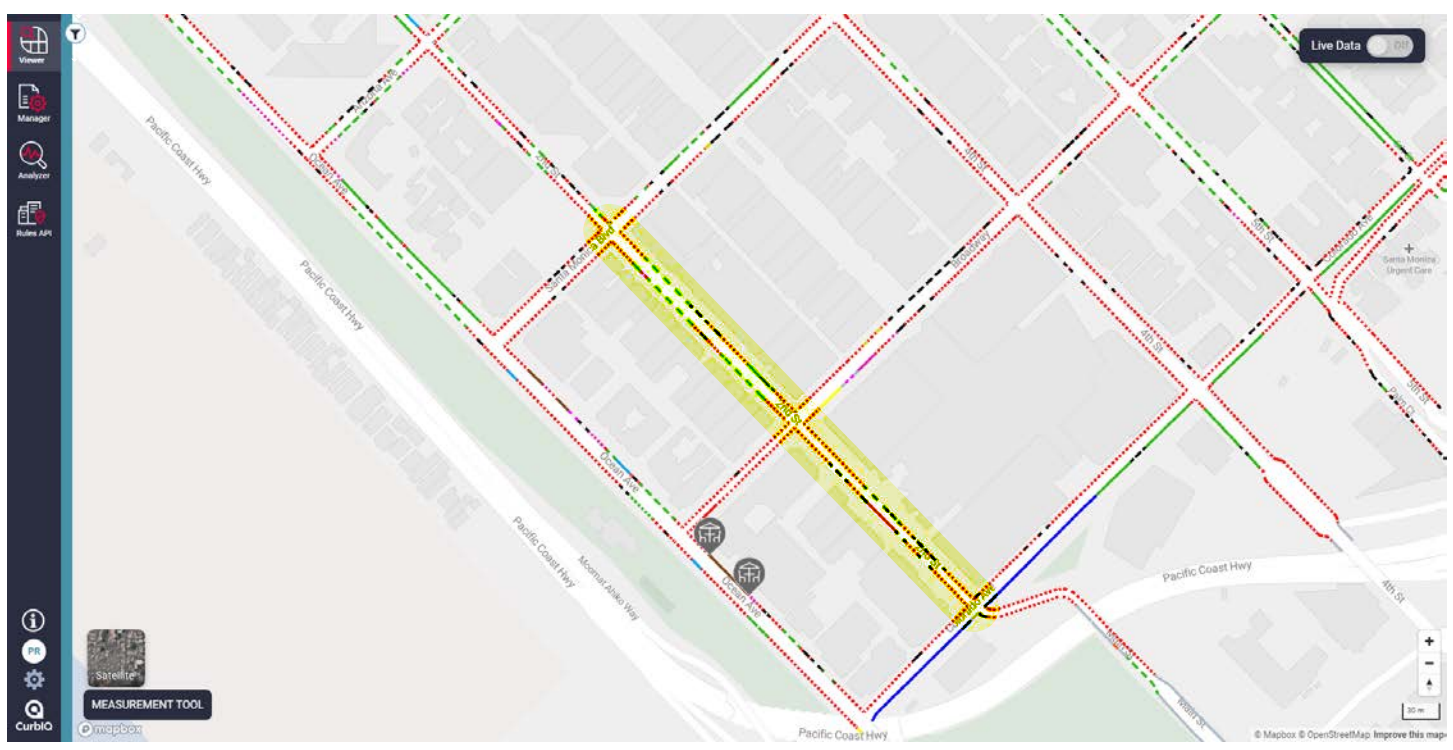
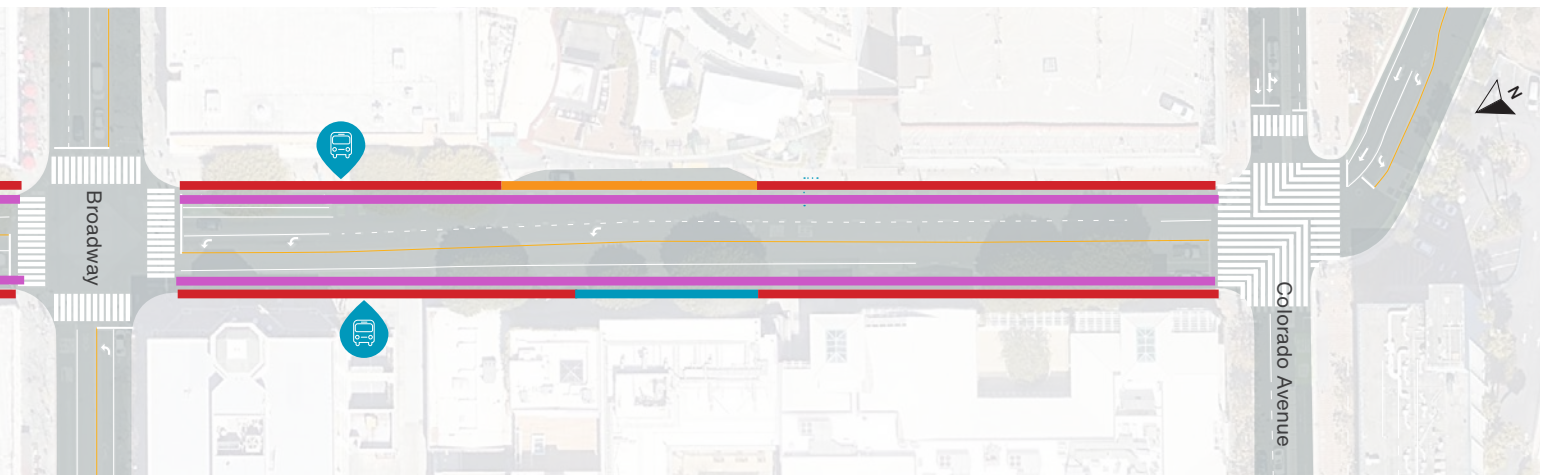
Site Characteristics

- Two different types of loading zones: zero emission vehicles only and passenger loading only
- 3 hour paid parking from 8:00 a.m. – 2:00 a.m.
- No parking from 3:00 a.m. – 5:00 a.m.

Data Findings

Inventory data was collected for a 1 block radius around the site to gain an understanding of the surrounding curb uses. The data was analyzed in CurblQ and used to ensure the recommended pilot projects can be implemented in harmony with the surrounding area.

As noted in Section 5.6, in Santa Monica, **demand data** was collected through dashcam footage. Surveyors drove along the study areas in 20-minute intervals while continuously recording video footage for 8 hours. The video files were reviewed, and event data was processed and provided for analysis.



Above: Screenshot of inventory data from CurbiQ

● Site Limits

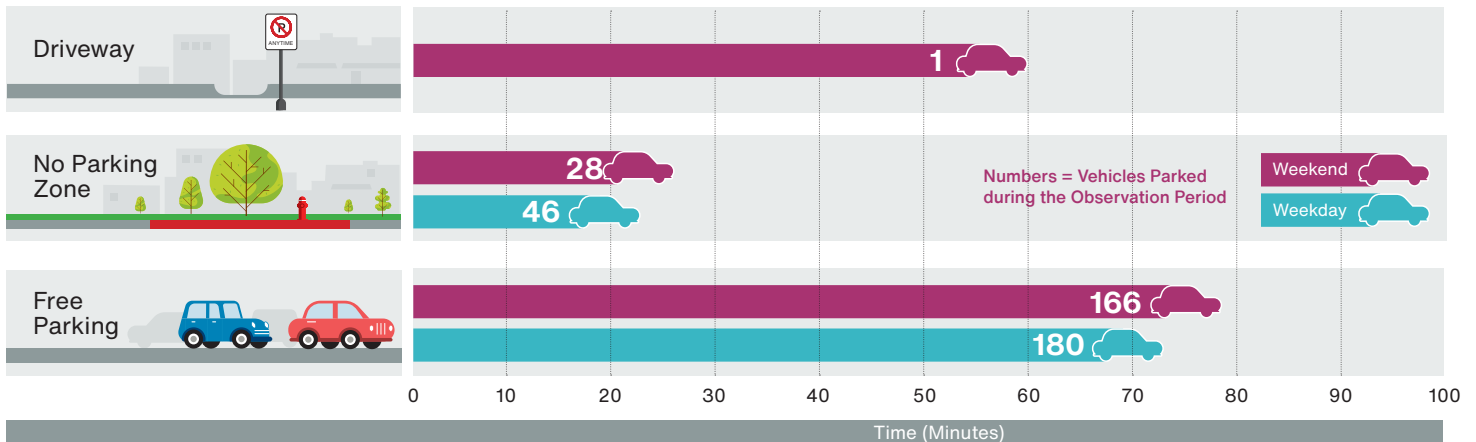
Parking Restrictions <input checked="" type="checkbox"/> Select All <input checked="" type="checkbox"/> Undesignated <input checked="" type="checkbox"/> Standing <input checked="" type="checkbox"/> Parking (Permit) <input checked="" type="checkbox"/> Parking (Paid) <input checked="" type="checkbox"/> Parking - Other <input checked="" type="checkbox"/> Parking (Free) <input checked="" type="checkbox"/> No Stopping <input checked="" type="checkbox"/> No Standing <input checked="" type="checkbox"/> No Parking <input checked="" type="checkbox"/> Curb Cut		Special Designations <input checked="" type="checkbox"/> Select All <input checked="" type="checkbox"/> Accessible Permit <input checked="" type="checkbox"/> Accessible Permit Loading <input checked="" type="checkbox"/> Bicycle Infrastructure <input checked="" type="checkbox"/> Bicycle Lane <input checked="" type="checkbox"/> Bus Loading <input checked="" type="checkbox"/> Bus Parking <input checked="" type="checkbox"/> Car Share Parking <input checked="" type="checkbox"/> Commercial Loading <input checked="" type="checkbox"/> Curbside Patio		<input checked="" type="checkbox"/> EV Parking <input checked="" type="checkbox"/> Emergency Vehicles <input checked="" type="checkbox"/> Fire Hydrant <input checked="" type="checkbox"/> Food Truck <input checked="" type="checkbox"/> Loading <input checked="" type="checkbox"/> Micromobility <input checked="" type="checkbox"/> Motorcycle Parking <input checked="" type="checkbox"/> Passenger Loading <input checked="" type="checkbox"/> Private Parking <input checked="" type="checkbox"/> Special User		<input checked="" type="checkbox"/> Street Cleaning <input checked="" type="checkbox"/> Taxi Cab Stand <input checked="" type="checkbox"/> Transit Zone <hr/> Temporary Conditions <input checked="" type="checkbox"/> Select All <input checked="" type="checkbox"/> Construction Zone <hr/> Curbside Assets <input checked="" type="checkbox"/> Select All <input type="checkbox"/> SA Bus Stops <input checked="" type="checkbox"/> Curbside Patio	
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Data Collection Dates

Weekday: Tuesday, March 22, 2022 from 12:00 p.m. to 8:00 p.m.

Weekend: Saturday, April 3, 2022 from 12:00 p.m. to 8:00 p.m.

Average Dwell Time

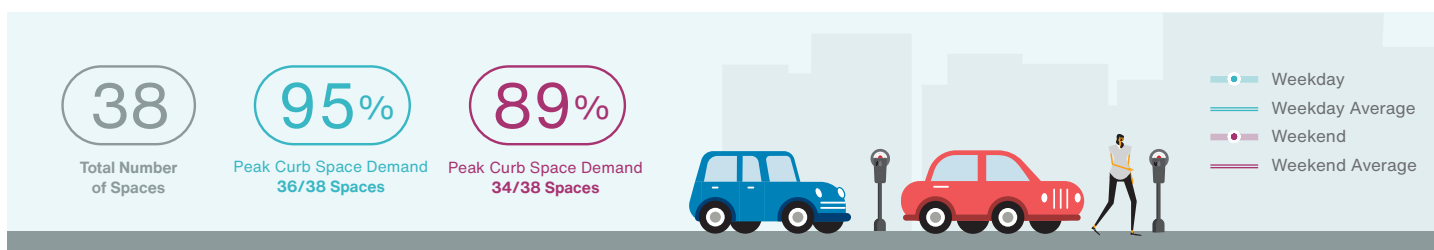
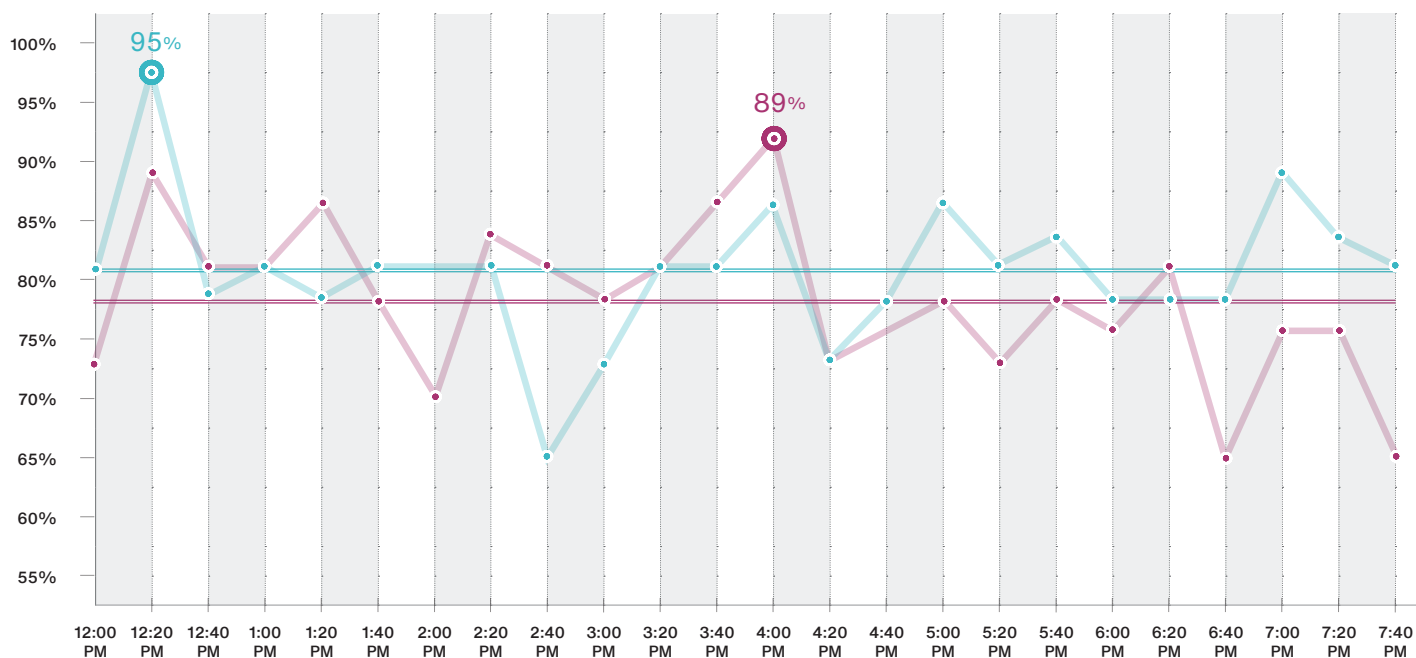


**Note that the dwell times shown for “Driveway” are for vehicles parked in the curb space adjacent to a driveway, blocking access*

Key data findings at this site include:

- In general, throughout the observation period, parking occupancy rates are within the optimal range of 80%, where drivers can access the curbside without having to cruise.
- Average dwell times indicate a need for both short-term and long-term parking, however short-term parking and loading activity is occurring in no-parking zones.
- Double parking is a challenge at this site, with many personal vehicles, taxis, and courier delivery trucks found blocking bike lanes for approximately 20 minutes during weekday peak occupancy hours.
- Vehicles were found queuing while waiting for another vehicle to pull out of a space, increasing traffic congestion at this site.
- Courier delivery trucks and personal vehicles were found parked where there was red curb paint for loading. Additionally, several personal vehicles were found parked along red curbsides for passenger PUDO.
- Courier delivery trucks were found blocking bike lanes for more than 20 minutes during weekday peak occupancy hours.

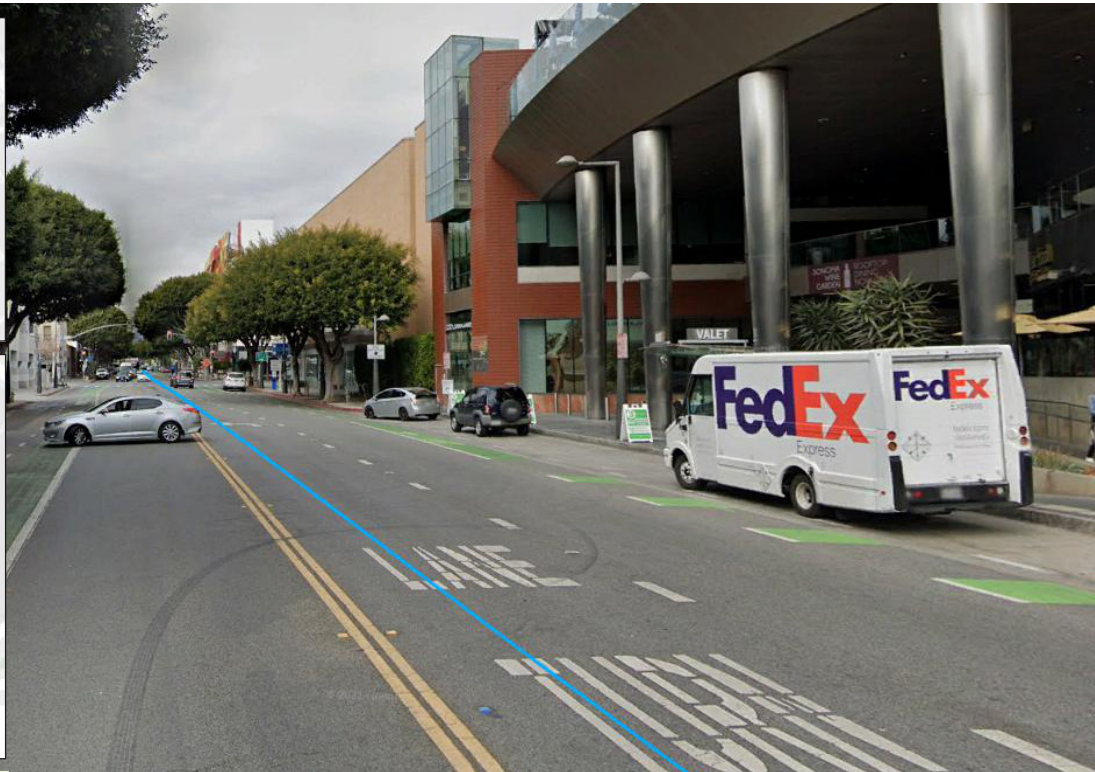
Parking Occupancy



Curbside Typology

TYOLOGY	DESCRIPTION	FUNCTIONS (RANKED IMPORTANCE)
Mixed-Use Main Street	<ul style="list-style-type: none"> This corridor type is the focal point of a downtown area and includes a mix of uses May provide access to public spaces where motorist access is prohibited 	<p> Access for People: 1 Placemaking: 1 Deliveries: 2 Movement: 4 Parking: 5 </p>

Site #1 is a focal point of Downtown Santa Monica and should be characterized as a Mixed-Use Main Street curbside typology. Access for People and Placemaking should be better prioritized. The data indicates the need for curbside PUDO; however, the curbside designations currently do not support the level of activity occurring. Initiatives to convert some on-street parking space to PUDO and increase enforcement of proper curbside use can improve the safety and access for vulnerable users.



Pilot Area

2nd Street (South of Santa Monica Boulevard to North of Colorado Avenue)

Pilot Solves for the Following Problem Statement

We experience a lot of illegal or double parking, but enforcement is difficult due to limited staff capacity (e.g., technology could be leveraged to help achieve greater efficiency).

Pilot Partners:

- Private sector vendors specializing in curb space management data, parking and payment solutions
- Automated traffic enforcement private vendors
- Transportation management platform vendors
- Lidar technology private sector vendors
- SP+ (existing parking vendor)
- Business improvement groups
- City Council
- Transportation Network Companies (TNCs)
- Delivery companies
- Transit agency (i.e., Big Blue Bus)

PILOT DESCRIPTION

Analyze bus lane enforcement opportunities at the 2nd and Colorado bus stop. Install a fixed camera enforcement solution for an initial data collection period of 90 days. Install on-bus camera enforcement for an initial data collection period of 90 days. Evaluate remaining corridor utilizing low-cost data collection technology (e.g., lidar and computer vision) to determine other necessary changes to curb regulations, such as removal of on-street parking and adding more pick-up drop-off zones. Analyze the number of violations to compare solutions and select technology based on outcome.

KEY CONSIDERATIONS AND ANALYSIS FOR PILOT DESIGN

The curb uses include but are not limited to:

8am to 5pm

- 6 special user spaces (serving up to 18 users per hour)
- 22 paid parking spaces (serving up to 66 users per hour; generating \$44 in revenue per hour)
- 1 loading zone (serving up to 12 users per hour)
- 1 passenger loading zone (serving up to 12 users per hour)
- 4 bus loading zones (serving up to 48 users per hour)

6pm to 1am

- 6 taxi cab stand spaces (serving up to 36 users per hour)
- 6 special user spaces (serving up to 18 users per hour)
- 1 passenger loading zone (serving up to 12 users per hour)
- 16 paid parking spaces (serving up to 48 users per hour; generating \$32 in revenue per hour)
- 4 bus loading zones (serving up to 48 users per hour)

2am

- 4 special user spaces (serving up to 12 users per hour)
- 3 passenger loading zones (serving up to 36 users per hour)
18 free parking spaces (serving up to 54 users per hour)
- 4 bus loading zones (serving up to 48 users per hour)

3am to 4am

- 4 special user spaces (serving up to 12 users per hour)
- 3 passenger loading zones (serving up to 36 users per hour)
- 4 bus loading zones (serving up to 48 users per hour)

5am

- 4 special user spaces (serving up to 12 users per hour)
- 3 passenger loading zones (serving up to 36 users per hour)
- 18 free parking spaces (serving up to 54 users per hour)
- 1 loading zone (serving up to 12 users per hour)
- 4 bus loading zones (serving up to 48 users per hour)

6am to 7am

- 6 special user spaces (serving up to 18 users per hour)
- 12 free parking spaces (serving up to 36 users per hour)
- 1 loading zone (serving up to 12 users per hour)
- 1 passenger loading zone (serving up to 12 users per hour)
- 6 commercial loading zones (serving up to 72 users per hour)
- 4 bus loading zones (serving up to 48 users per hour)

Competing Modes: This site has a significant amount of commercial activity in the downtown area with many restaurants, shops, hotels, and offices. Furthermore, there are many competing uses at the curb, including on-street parking, bike lanes, transit stops, shared mobility parking, pick-up and drop off for special users, outdoor dining, and loading zones.

AI-driven Enforcement³: Notably, the configuration of curb uses changes multiple times throughout the day. The high volume of traffic and multiple modes using the curb can cause significant double parking and buses to be blocked and delayed at bus stops, which negatively affects efficiency, reliability, and overall transit service quality. Thus, testing AI-driven enforcement for bus lanes in the site will help the City gain a more accurate and comprehensive understanding of the problems resulting from double parking, as well as inform future efforts to repurpose curb space to increase transit efficiency, reduce curb congestion, and more effectively accommodate multiple modes.

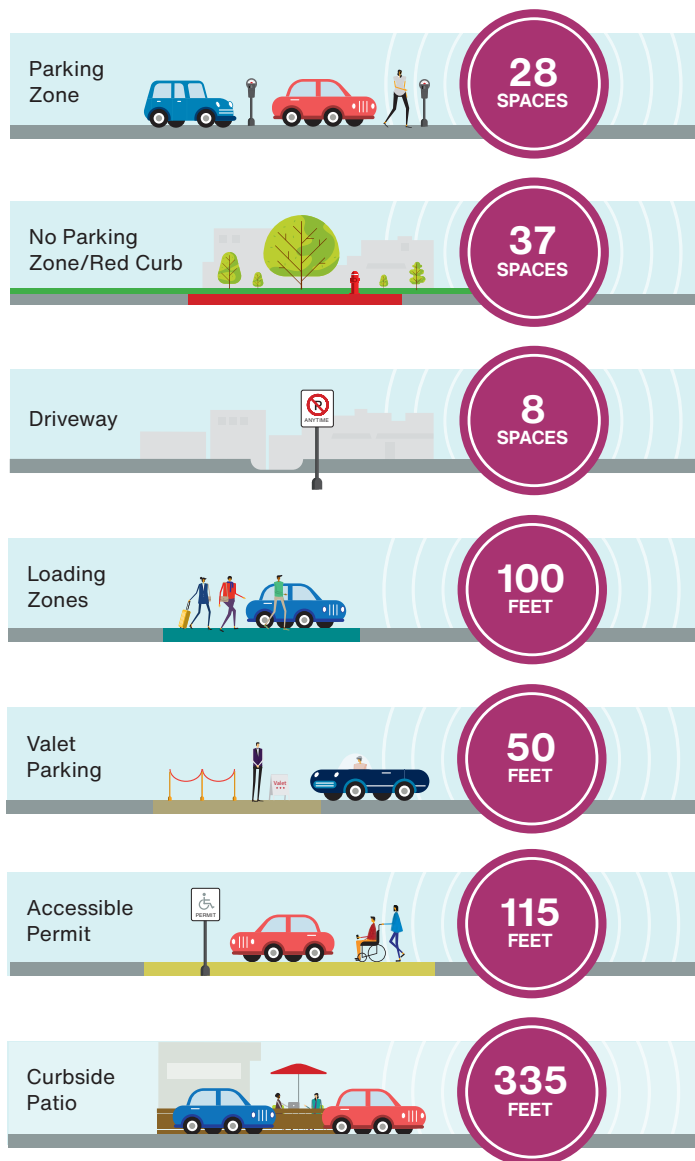
Long Term On-Street Parking: The bus stop is directly across from the Expo Line terminus and is also bordering major retail, tourism, and restaurant pickup and drop off locations. 2nd Street has numerous City-owned parking garages with excess capacity. Therefore, there is no need for long term on-street parking in these locations.

³ *Camera-based artificial intelligence (AI) to automate the enforcement of parking regulations.*

10.5 SITE #2: OCEAN AVENUE BETWEEN SANTA MONICA BOULEVARD AND COLORADO AVENUE



Curb Space Allocation



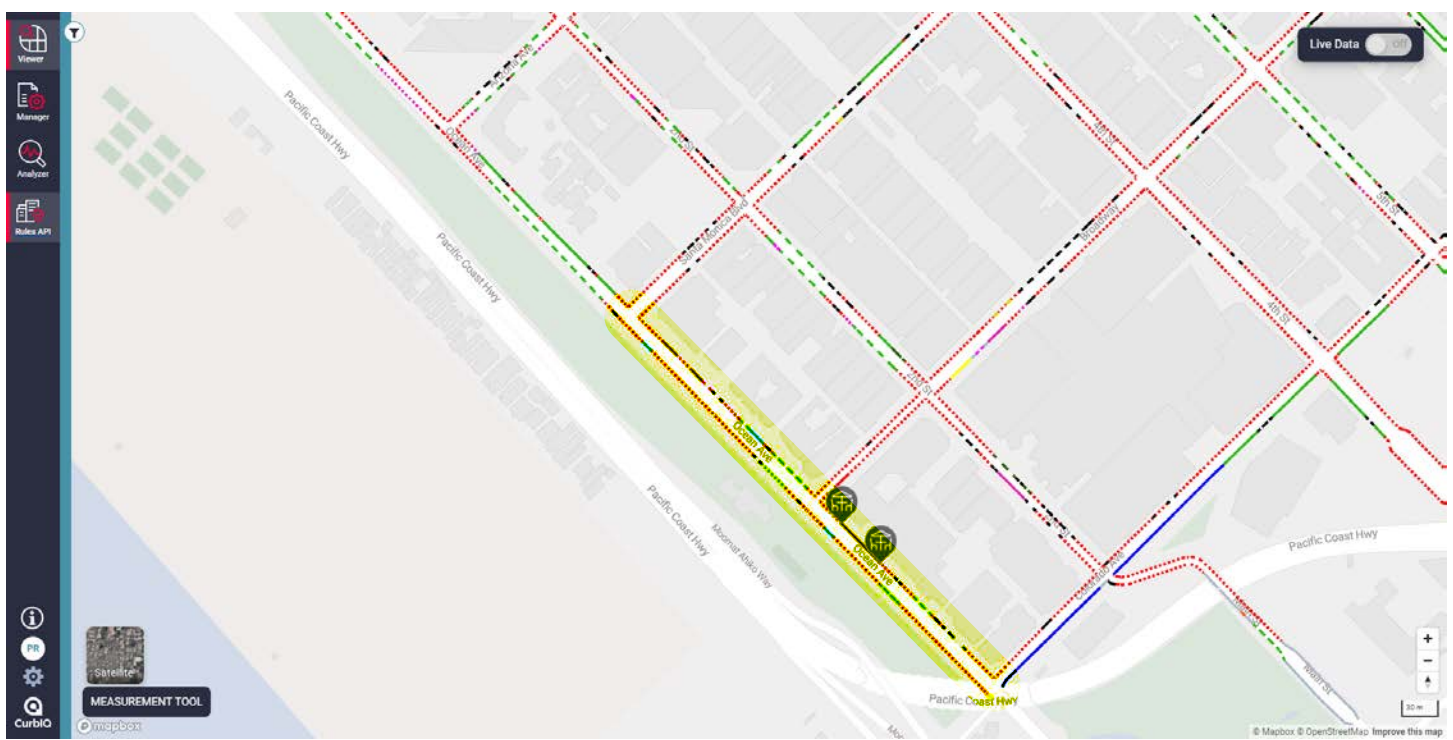
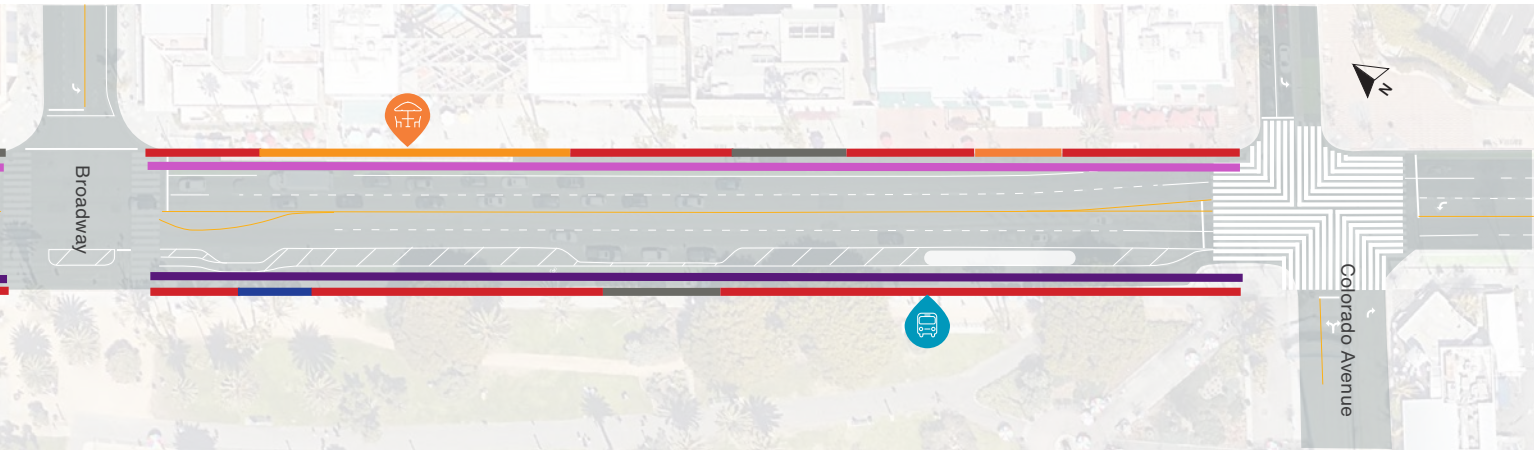
Site Characteristics

- 3 hour paid parking from 8:00 a.m. – 2:00 a.m.
- No parking from 3:00 a.m. – 5:00 a.m.

Data Findings

Inventory data was collected for a 1 block radius around the site to gain an understanding of the surrounding curb uses. The data was analyzed in CurbIQ and used to ensure the recommended pilot projects can be implemented in harmony with the surrounding area.

As noted in Section 5.6, in Santa Monica, **demand data** was collected through dashcam footage. Surveyors drove along the study areas in 20-minute intervals while continuously recording video footage for 8 hours. The video files were reviewed, and event data was processed and provided for analysis.



Above: Screenshot of inventory data from CurbiQ

 Site Limits

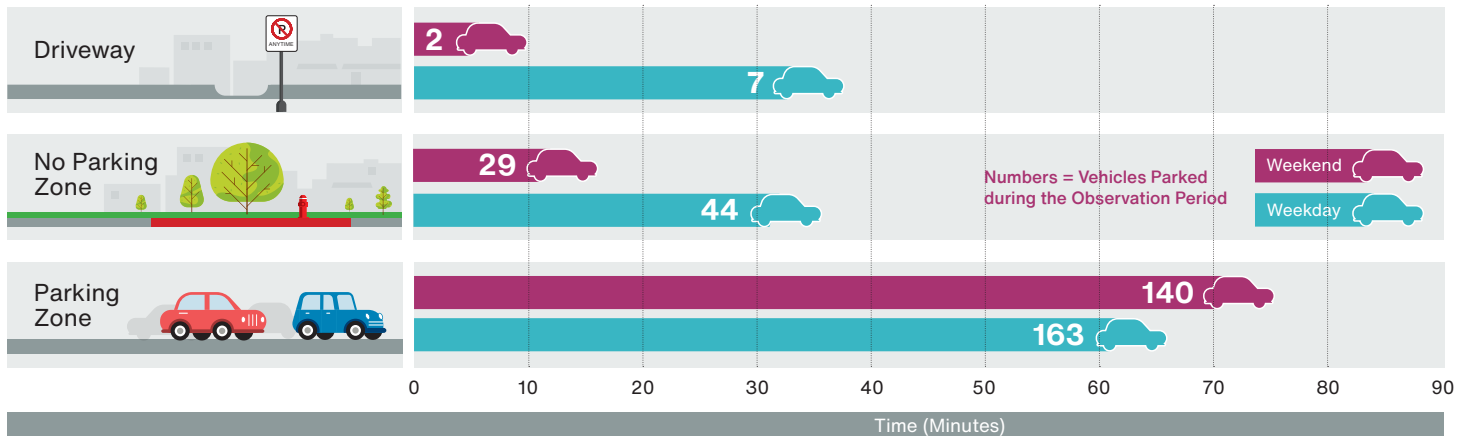
- | | | | |
|--|--|--|--|
| <p>Parking Restrictions</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input checked="" type="checkbox"/> Undesignated <input checked="" type="checkbox"/> Standing <input checked="" type="checkbox"/> Parking (Permit) <input checked="" type="checkbox"/> Parking (Paid) <input checked="" type="checkbox"/> Parking - Other <input checked="" type="checkbox"/> Parking (Free) <input checked="" type="checkbox"/> No Stopping <input checked="" type="checkbox"/> No Standing <input checked="" type="checkbox"/> No Parking <input checked="" type="checkbox"/> Curb Cut | <p>Special Designations</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input checked="" type="checkbox"/> Accessible Permit <input checked="" type="checkbox"/> Accessible Permit Loading <input checked="" type="checkbox"/> Bicycle Infrastructure <input checked="" type="checkbox"/> Bicycle Lane <input checked="" type="checkbox"/> Bus Loading <input checked="" type="checkbox"/> Bus Parking <input checked="" type="checkbox"/> Car Share Parking <input checked="" type="checkbox"/> Commercial Loading <input checked="" type="checkbox"/> Curbside Patio | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> EV Parking <input checked="" type="checkbox"/> Emergency Vehicles <input checked="" type="checkbox"/> Fire Hydrant <input checked="" type="checkbox"/> Food Truck <input checked="" type="checkbox"/> Loading <input checked="" type="checkbox"/> Micromobility <input checked="" type="checkbox"/> Motorcycle Parking <input checked="" type="checkbox"/> Passenger Loading <input checked="" type="checkbox"/> Private Parking <input checked="" type="checkbox"/> Special User | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Street Cleaning <input checked="" type="checkbox"/> Taxi Cab Stand <input checked="" type="checkbox"/> Transit Zone <p>Temporary Conditions</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input checked="" type="checkbox"/> Construction Zone <p>Curbside Assets</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input type="checkbox"/> SA Bus Stops <input checked="" type="checkbox"/> Curbside Patio |
|--|--|--|--|

Data Collection Dates

Weekday: Tuesday, March 22, 2022 from 12:00 p.m. to 8:00 p.m.

Weekend: Saturday, April 3, 2022 from 12:00 p.m. to 8:00 p.m.

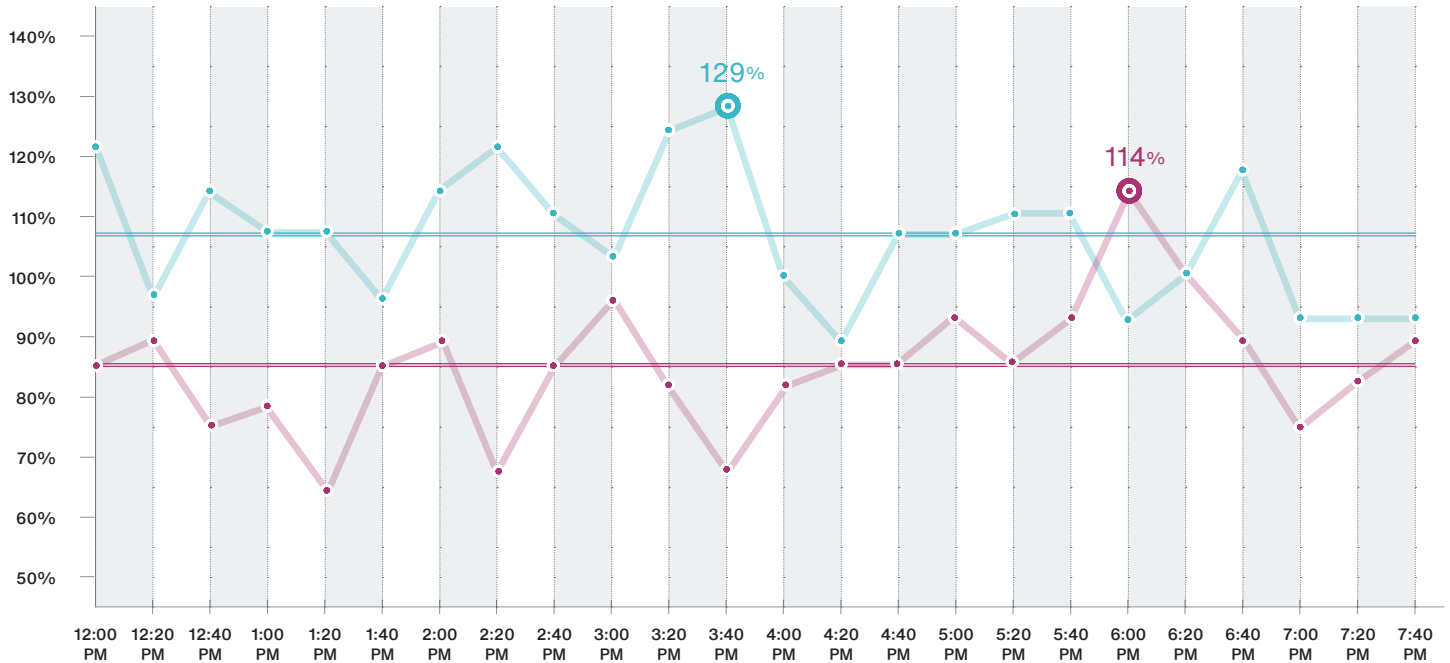
Average Dwell Time



Key data findings at this site include:

- On-street parking is heavily utilized with average occupancy rates greater than desired, in particular during the week.
- Average dwell times indicate a greater need for short-term parking as opposed to loading zones.
- Vehicles were also observed parked in no parking zones along this corridor blocking both bike lanes and driveways, indicating an insufficient parking supply to accommodate demand.
- Observations made along this corridor also indicate that there is a challenge with vehicles double parking along the curbside.
- This data indicates a need for innovative parking strategies, as there is a high demand for parking and a low turnover. This in turn limits accessibility for other multimodal curbside users.
- Personal vehicles were found in loading zones for approximately 30 minutes, which is much longer than the allowed time (5 minutes) during weekday peak occupancy hours.
- A food truck was found parked in metered parking from 4 p.m. to 8 p.m., impacting parking availability for visitors trying to access restaurants and businesses at this site.
- Taxis were found blocking the bike lane for passenger loading for approximately 15 minutes.
- Amazon vans and FedEx trucks were found parked in red curb zones for less than 20 minutes during weekday peak occupancy hours.
- Construction vehicles were found parked in red curb zones for approximately 2-5 hours during weekday peak occupancy hours.

Parking Occupancy



28

Total Number of Spaces

129%

Peak Curb Space Demand
36/28 Spaces

114%

Peak Curb Space Demand
32/28 Spaces

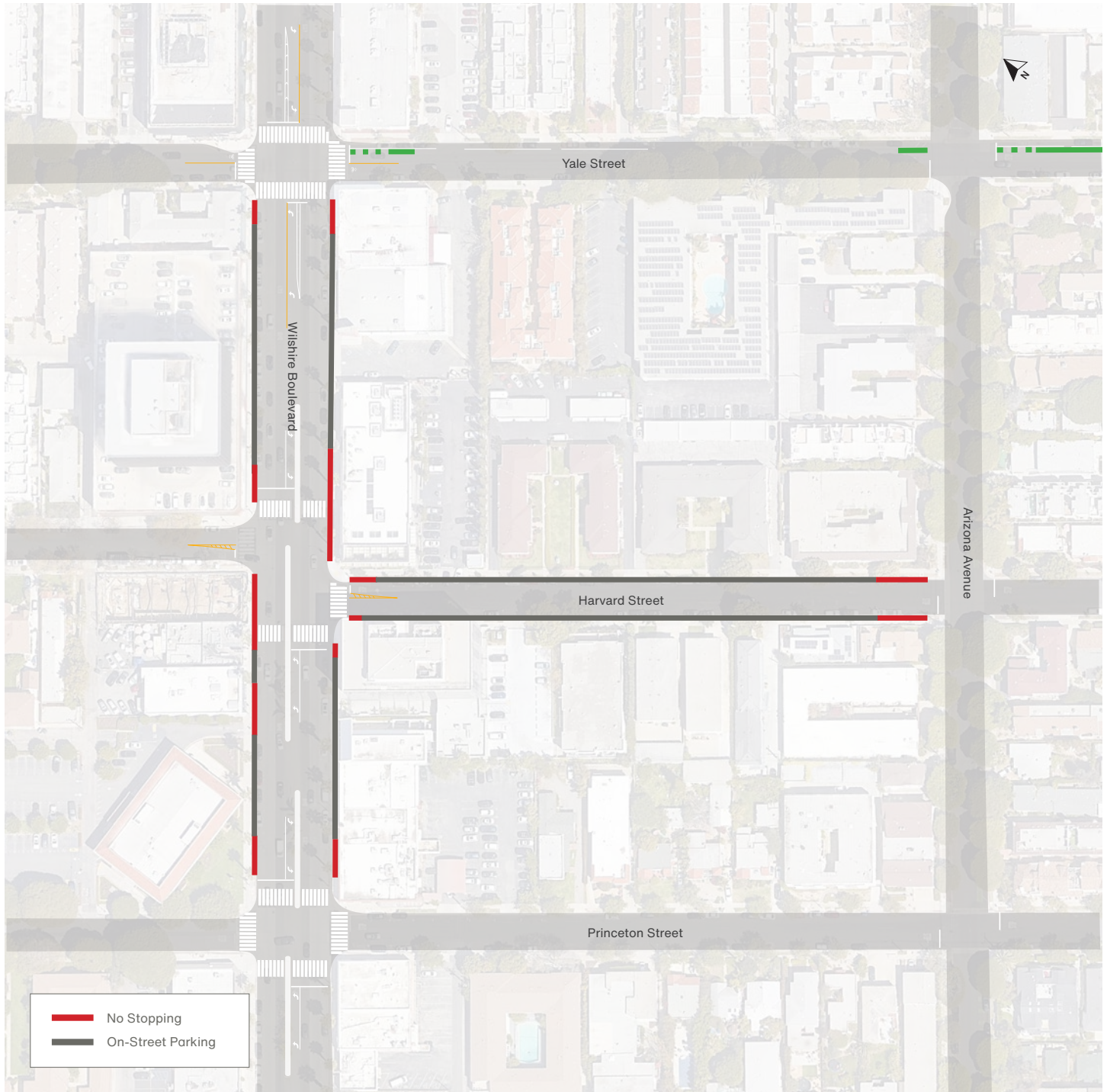
● Weekday
— Weekday Average
● Weekend
— Weekend Average

Curbside Typology

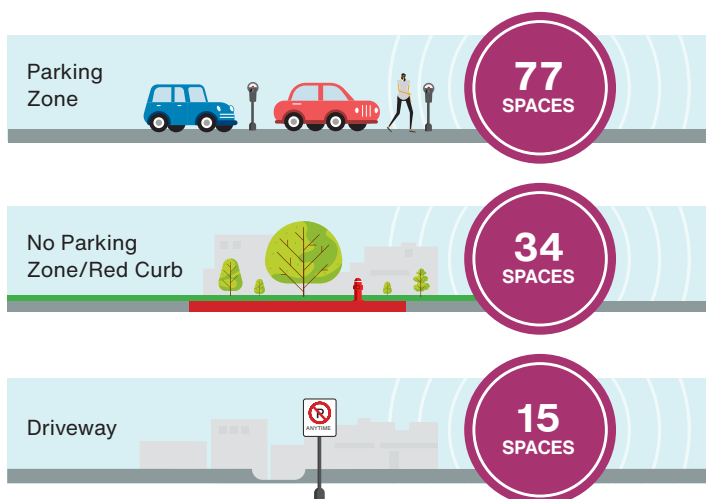
TYPOLOGY	DESCRIPTION	FUNCTIONS (RANKED IMPORTANCE)
Multimodal Mobility	<ul style="list-style-type: none"> Prioritizes the movement of transit, micromobility users, bicyclists, and pedestrians Requires clear separation of curbside space for all functions to avoid conflicts between stakeholders 	<p>Movement Access for People Placemaking Deliveries Parking</p> <p>1 2 3 4 5</p>

Site #2 is characterized as a Multimodal Mobility curbside typology, supporting the significant volume of multimodal travel along the corridor. Stakeholder engagement indicated a stronger demand for improved Access for People at this site. Additionally, there is opportunity to improve access for transit users boarding and alighting buses along this corridor to mitigate conflicts with pedestrians and bicyclists.

10.6 SITE #3: WILSHIRE BOULEVARD BETWEEN PRINCETON STREET AND YALE STREET, HARVARD STREET BETWEEN WILSHIRE BOULEVARD AND ARIZONA AVENUE



Curb Space Allocation



Site Characteristics

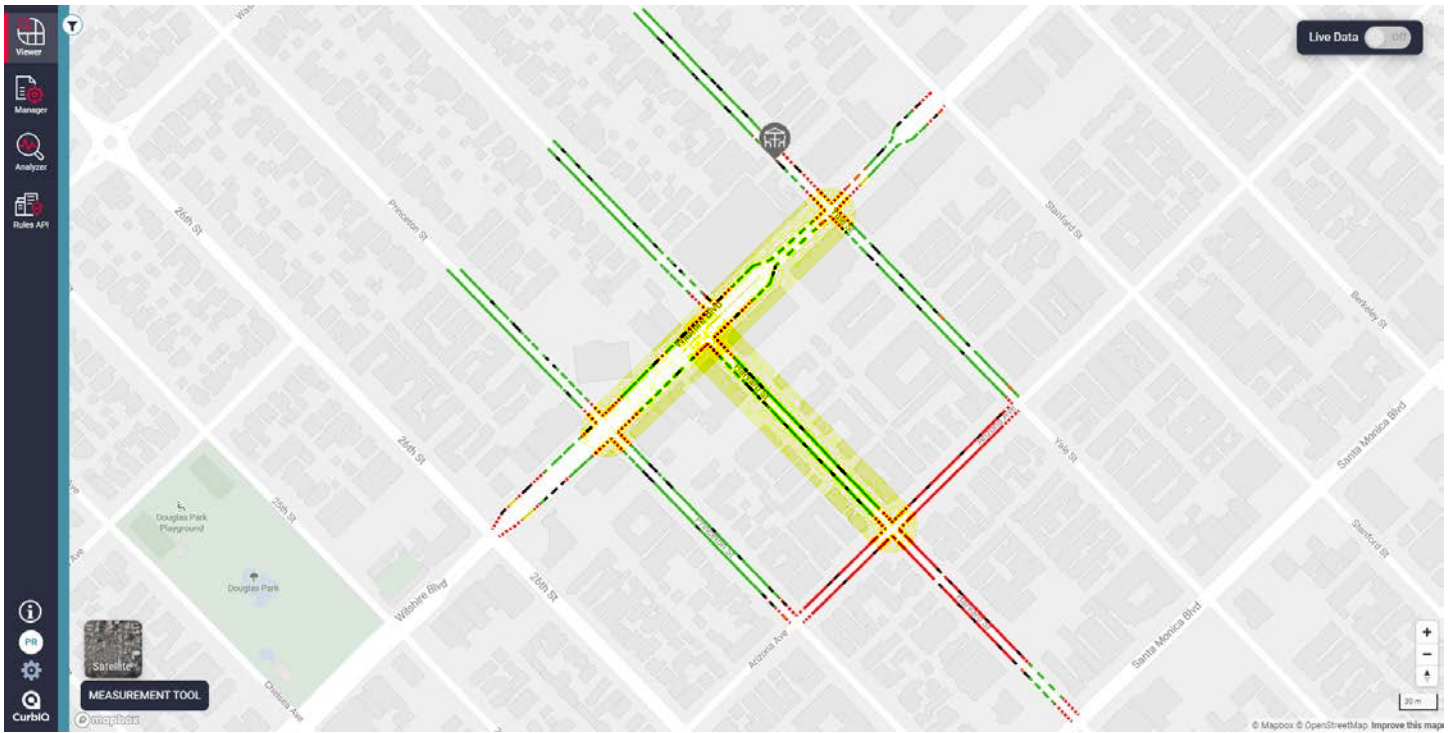
2 different types of parking regulations

- On Wilshire Blvd:
 - 2 hour paid parking from 9 am – 6 pm,
 - No parking daily between 3 am – 5 am
 - 15-minute loading 6 am – 10 am
 - Temporary 10 minute parking for curbside pickup/delivery during business hours
- On Harvard St:
 - 2 hour paid parking 9:00 a.m.-10:00 p.m.
 - No parking 12:00 p.m. – 2:00 p.m. on Thursdays, no parking 9 am – 11 am on Tuesdays

Data Findings

Inventory data was collected for a 1 block radius around the site to gain an understanding of the surrounding curb uses. The data was analyzed in CurblQ and used to ensure the recommended pilot projects can be implemented in harmony with the surrounding area.

As noted in Section 5.6, in Santa Ana, **demand data** was collected through curbside cameras. Two curbside cameras were mounted per curb continuously recording video footage for 6 hours per day. The video files were reviewed, and event data was processed and provided for analysis.



Above: Screenshot of inventory data from CurbiQ

● Site Limits

Parking Restrictions

- Select All
- Undesignated
- Standing
- Parking (Permit)
- Parking (Paid)
- Parking - Other
- Parking (Free)
- No Stopping
- No Standing
- No Parking
- Curb Cut

Special Designations

- Select All
- Accessible Permit
- Accessible Permit Loading
- Bicycle Infrastructure
- Bicycle Lane
- Bus Loading
- Bus Parking
- Car Share Parking
- Commercial Loading
- Curbside Patio

- EV Parking
- Emergency Vehicles
- Fire Hydrant
- Food Truck
- Loading
- Micromobility
- Motorcycle Parking
- Passenger Loading
- Private Parking
- Special User

- Street Cleaning
- Taxi Cab Stand
- Transit Zone

Temporary Conditions

- Select All
- Construction Zone

Curbside Assets

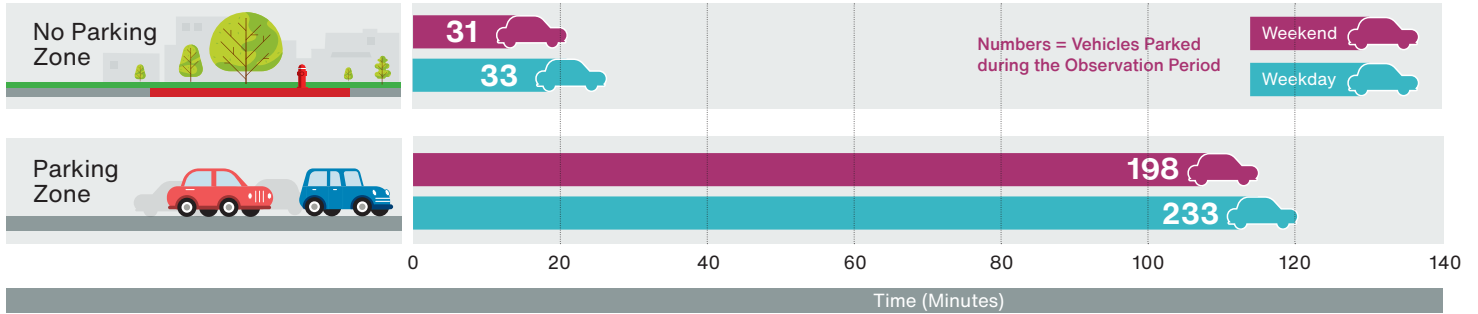
- Select All
- SA Bus Stops
- Curbside Patio

Data Collection Dates

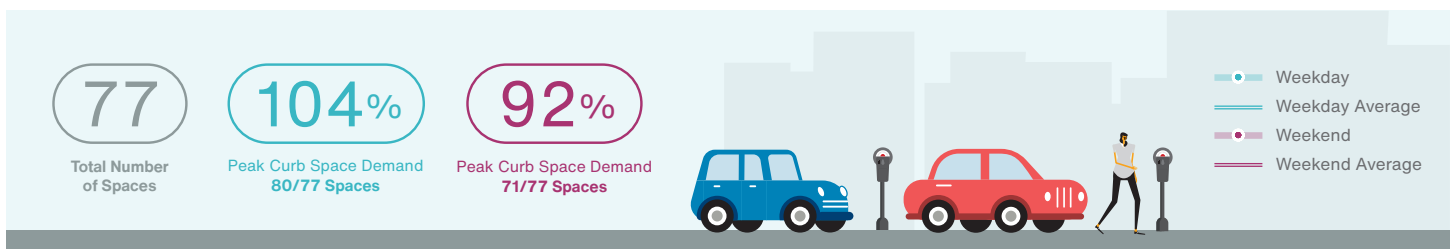
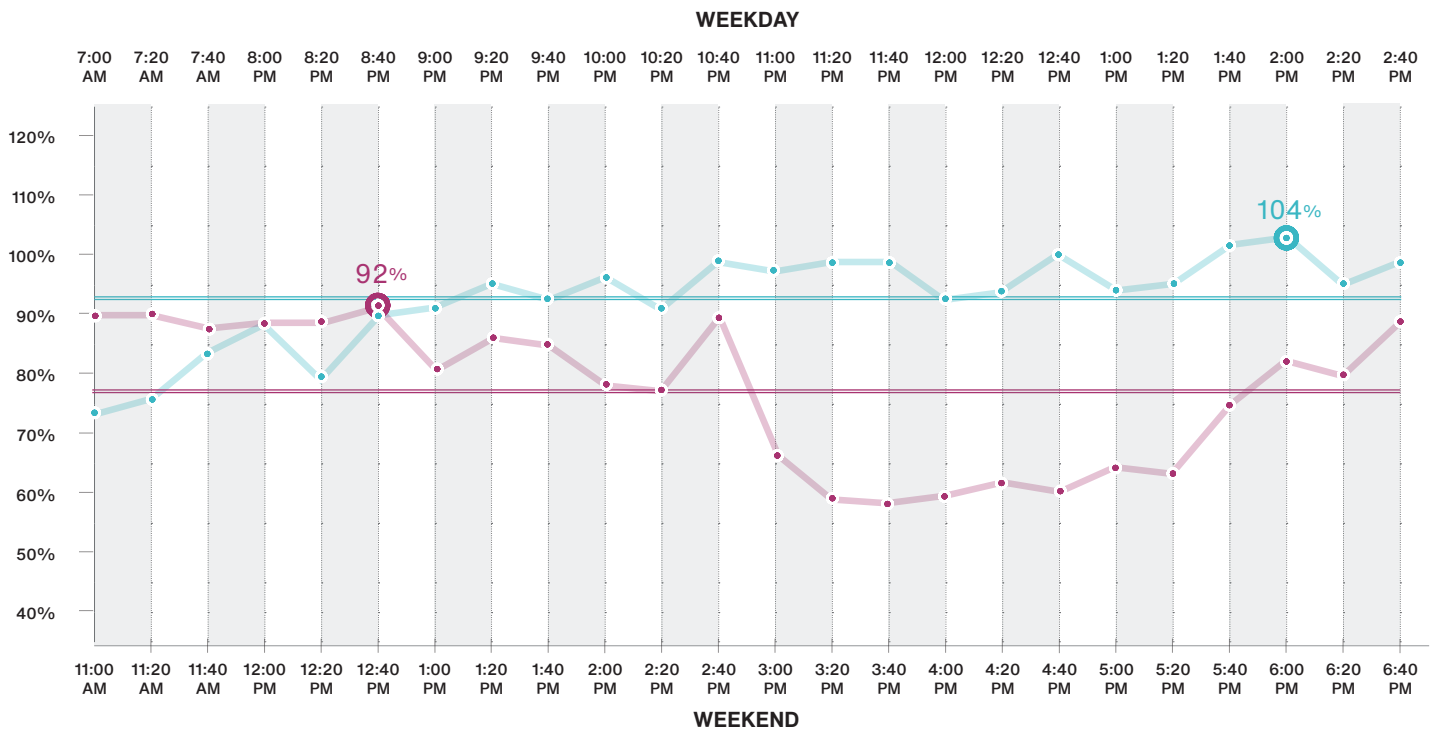
Weekday: Tuesday, April 6, 2022 from 7:00 a.m. to 3:00 p.m.

Weekend: Sunday, March 26, 2022 from 11:00 a.m. to 7:00 p.m.

Average Dwell Time



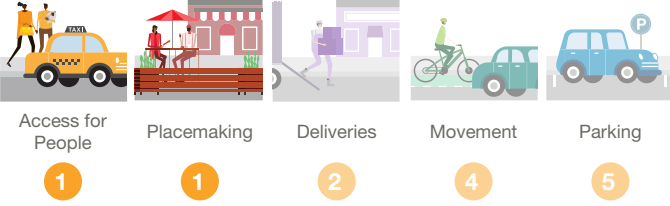
Parking Occupancy



Key data findings at this site include:

- There is a high volume of vehicles that utilize the curbside for significant lengths of time, which impedes access for other multimodal stakeholders.
- There were many instances of blocked driveways, parking spaces, and traffic lanes exacerbating traffic congestion concerns noted by the City.
- Parking occupancy rates stay above 90 percent on average during the week and on weekends during the early afternoon.
- There is a need for more clearly defined curb space for the appropriate user, as well as a need for innovative enforcement strategies to ensure that curb space is utilized equitably.
- Data indicates that there may be opportunity to leverage curbside functions depending on the time of day and day of week.
- USPS and UPS trucks found double parked and parked on red curb paint for package deliveries.
- Cars were found queuing to enter off-street parking lots.
- Work vans were found parked on red curb paint for approximately 20 minutes.
- Cars were found parked along the curb blocking the crosswalk.
- One vehicle was observed parked along a residential curb blocking the driveway for over 9 hours.

Curbside Typology

TYPOLOGY	DESCRIPTION	FUNCTIONS (RANKED IMPORTANCE)
<p>Mixed-Use Main Street</p>	<ul style="list-style-type: none"> • This corridor type is the focal point of a downtown area and includes a mix of uses • May provide access to public spaces where motorist access is prohibited 	 <p>Access for People Placemaking Deliveries Movement Parking</p> <p>1 1 2 4 5</p>

Site #1 is a focal point of Downtown Santa Monica and should be characterized as a Mixed-Use Main Street curbside typology. Access for People and Placemaking should be better prioritized. The data indicates the need for curbside PUDO; however, the curbside designations currently do not support the level of activity occurring. Initiatives to convert some on-street parking space to PUDO and increase enforcement of proper curbside use can improve the safety and access for vulnerable users.



11

Anaheim



This section provides an overview of the Benchmark Score, Emerging Themes, Strategies and Recommendations, as well as data findings observed across the three sites located in the City of Anaheim. Each of these factors were used to identify a menu of potential pilot projects that would help to streamline curbside efficiency at each of the sites. The main challenge identified at all three sites was high occupancy rates with little turnover, thus impeding access for other multimodal stakeholders.

11.1 BENCHMARK SCORE

A weighted benchmark score was created for Anaheim using the self-reported surveys for strategies and recommended actions specific to the City. Anaheim was primarily interested in curb space management best practices as the outcome of this project. The recommendations provided for Anaheim in this report reflect best practice principles for curb space management, and also integrated where appropriate insights from Anaheim-related stakeholder engagement to prioritize the best practices on which to focus.

CATEGORY	CURRENT STATE	DESIRED STATE	GAP
Organizational Structure	1.5	4	2.5
Leadership	2	3.5	1.5
Progressive Performance Measures	1.5	4	2.5
Curbside Inventory	2	4	2

Above: Rankings from the CMM survey for the City of Anaheim. States are ranked out of 5.

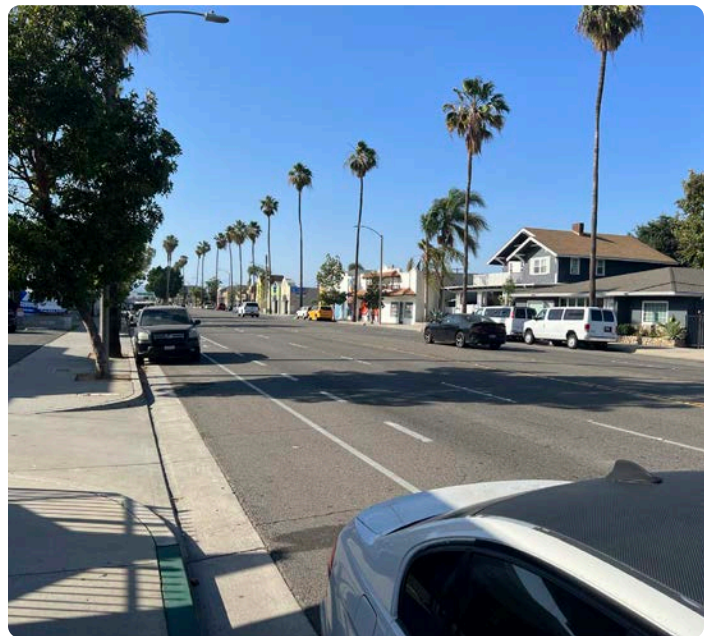
11.2 EMERGING THEMES

A comprehensive list of 70 emerging themes were determined for the entire SCAG region. From this list, themes were further organized and expanded upon using engagement and data inputs specific to the City of Anaheim.

The specific themes that emerged for Anaheim were:

- Primarily seeking curb space management best practices that can be explored and applied by the City at a later date;
- Growing curb space conflicts with increased high density residential housing;
- Currently does not charge for on-street parking, with most parking being off-street;
- Unique curb space needs and access/demand challenges given large event centers and Disneyland; and
- Lack of resources for parking and curb space enforcement, and interest in exploring technology solutions (e.g., LPR).

The following sections detail the recommendations for each site using the process presented in Section 6. This includes each site's existing conditions, relevant problem statements, and desired typology, as well as the resulting curb space management strategies, recommended actions, and pilot projects that the City may choose to implement. For the City of Anaheim, one pilot project was selected and further detailed with specific project partners, design considerations, and analysis to guide the City in launching the project.



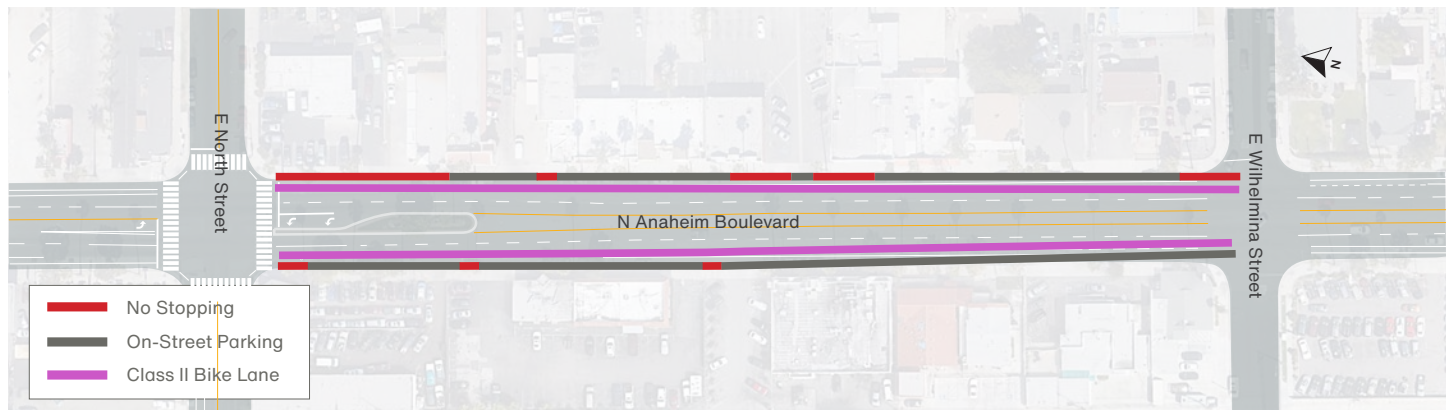
11.3 STRATEGIES AND RECOMMENDATIONS

PROBLEM STATEMENT	RECOMMENDATION CATEGORY (STRATEGY)	RECOMMENDATION (FROM MENU OF OPTIONS)	PILOT AREA	PILOT PROJECT
Increasing curb space demands and conflicts at suburban and urban interfaces (e.g., residential parking spillover)	Parking Regulations	On-street parking time limits	Anaheim Blvd/ Betmore	Develop time of day parking limits to reduce long term parking in commercial areas.
		Neighborhood parking permits	Anaheim Blvd/ Betmore	Develop neighborhood parking permits for single family residential areas.
Management of demand and access for various modes (e.g., TNCs) at the curb of major event centers (e.g., Disneyland) a challenge	Parking Regulations	Flex zones	Promenade	Study short term parking use and develop appropriate time of day regulations to maximize turnover.
	Permitting	Fleet/ commercial parking permits	Promenade	Develop permit for short term parking zones for commercial fleets.
		Reservation system	Promenade	Procure reservation system that issues time limited permits for short term parking.
	Pricing	Price short term parking	Promenade	Implement pricing for short term parking including automated payment system.

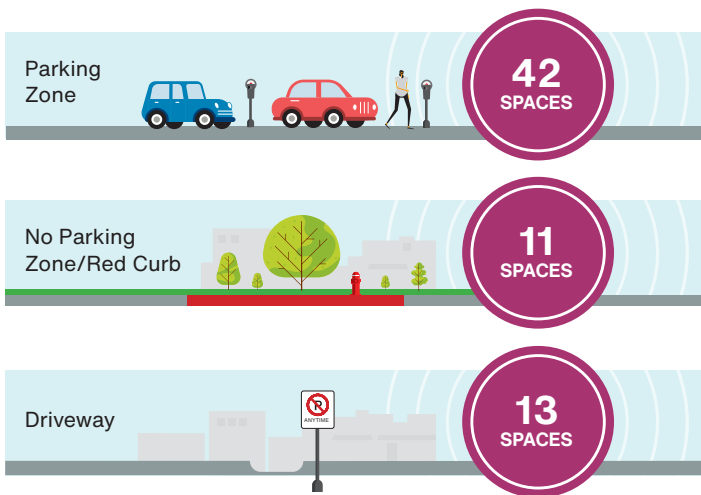
PROBLEM STATEMENT	RECOMMENDATION CATEGORY (STRATEGY)	RECOMMENDATION (FROM MENU OF OPTIONS)	PILOT AREA	PILOT PROJECT
Management of demand and access for various modes (e.g., TNCs) at the curb of major event centers (e.g., Disneyland) a challenge	Pricing	Graduated pricing structure	Promenade	Develop graduated structure for short term parking (i.e., - \$1 for minute 1, \$2 for minute 2, \$4 for minute 3, etc.).
Lack of comprehensive performance metrics to understand use of the curb and how certain programs are performing	Data Analysis	Computer vision cameras	Promenade/ Betmore	Install low cost sensors to monitor curb uses for entire corridor.
		Lidar	Promenade/ Betmore	Install low cost sensors to monitor curb uses for entire corridor.
	Prioritization	Hierarchy of curb uses	Citywide	Develop hierarchy of curb uses based on-street typology.
	Organizational	Strategic planning and action agenda	Citywide	Develop curb management strategy plan and action agenda.

PROBLEM STATEMENT	RECOMMENDATION CATEGORY (STRATEGY)	RECOMMENDATION (FROM MENU OF OPTIONS)	PILOT AREA	PILOT PROJECT
Lack of agency resources for increased staff for enforcement; current resources used to enforce residential parking permits	Enforcement	Concession for bus lane enforcement	Promenade/ Anaheim/ Betmore	Procure on bus enforcement through concession
		Automated enforcement	Promenade	Procure automated parking enforcement through concession
		Real time sensors	Promenade/ Anaheim/ Betmore	Install low cost sensors (e.g., computer vision cameras, lidar) to monitor curb uses for entire corridor
		AI driven enforcement	Promenade/ Anaheim/ Betmore	Utilize machine learning on payment data as described above to guide manual enforcement to hot spots
Desire for more EV charging	EV charging	Curbside charging permits	Promenade/ Anaheim/ Betmore	Develop permit to allow curbside charging in the right of way
		Ad-based curbside charging partnership	Promenade/ Betmore	Procure concession for ad-based curbside chargers that are free to the city and free to residents for basic charging
		Off-street charging concession	Promenade/ Anaheim/ Betmore	Procure off-street parking system for free chargers to the city with the ability to charge to use

11.4 SITE #1: ANAHEIM BOULEVARD BETWEEN NORTH STREET AND WILHEMINA STREET



Curb Space Allocation



Site Characteristics

- 4 different types of free parking:
 - 30 minutes
 - 1 hour
 - 2 hour
 - Unrestricted

Data Findings

Inventory data was collected for a 1 block radius around the site to gain an understanding of the surrounding curb uses. The data was analyzed in CurblQ and used to ensure the recommended pilot projects can be implemented in harmony with the surrounding area.

As noted in Section 5.6, in Anaheim, **demand data** was collected through curbside cameras. Two curbside cameras were mounted per curb continuously recording video footage for 6 hours per day. The video files were reviewed, and event data was processed and provided for analysis.



Above: Screenshot of inventory data from CurbiQ

● Site Limits

Parking Restrictions

- Select All
- Undesignated
- Standing
- Parking (Permit)
- Parking (Paid)
- Parking - Other
- Parking (Free)
- No Stopping
- No Standing
- No Parking
- Curb Cut

Special Designations

- Select All
- Accessible Permit
- Accessible Permit Loading
- Bicycle Infrastructure
- Bicycle Lane
- Bus Loading
- Bus Parking
- Car Share Parking
- Commercial Loading
- Curbside Patio

- EV Parking
- Emergency Vehicles
- Fire Hydrant
- Food Truck
- Loading
- Micromobility
- Motorcycle Parking
- Passenger Loading
- Private Parking
- Special User

- Street Cleaning
- Taxi Cab Stand
- Transit Zone

Temporary Conditions

- Select All
- Construction Zone

Curbside Assets

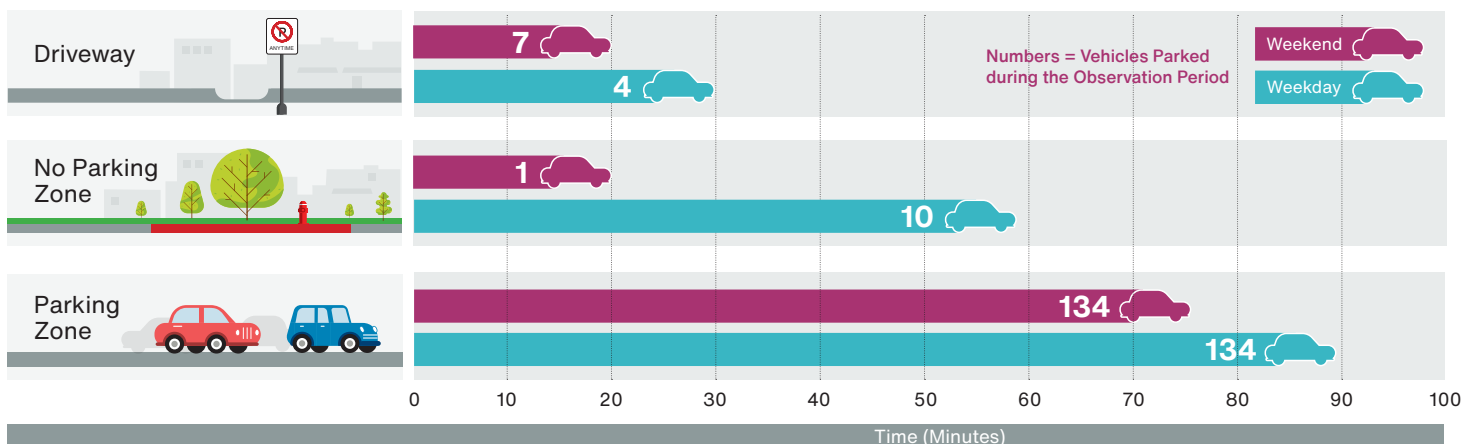
- Select All
- SA Bus Stops
- Curbside Patio

Data Collection Dates

Weekday: Tuesday, March 22, 2022 from 1:00 p.m. to 7:00 p.m.

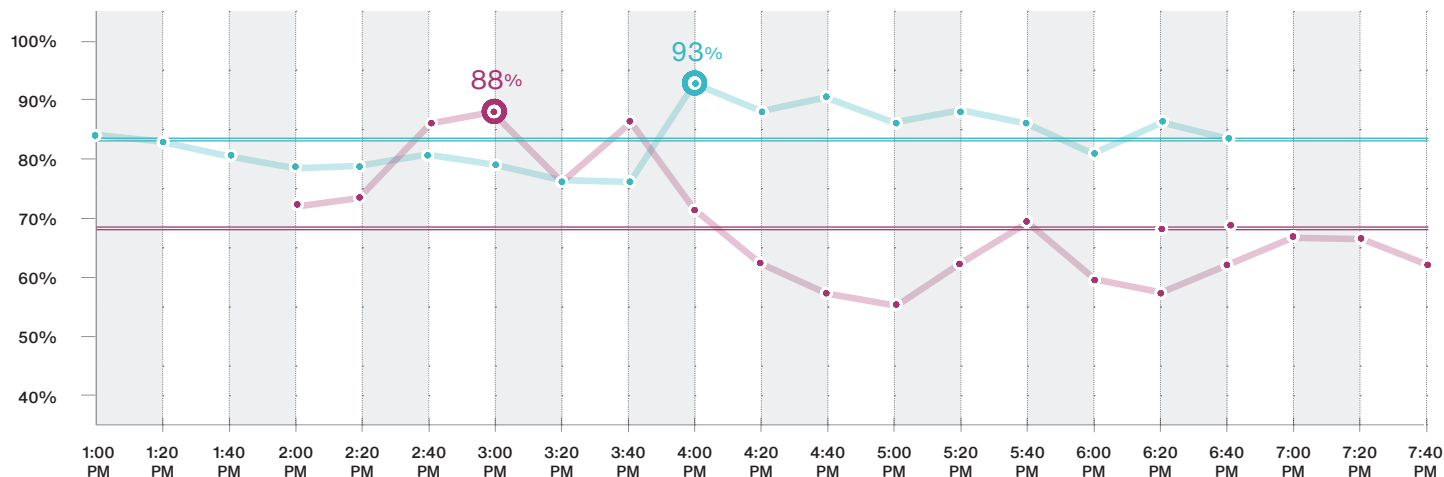
Weekend: Sunday, March 20, 2022 from 2:00 p.m. to 8:00 p.m.

Average Dwell Time



*Note that the dwell times shown for “Driveway” are for vehicles parked in the curb space adjacent to a driveway, blocking access

Parking Occupancy



42

Total Number of Spaces

93%

Peak Curb Space Demand
39/42 Spaces

88%

Peak Curb Space Demand
37/42 Spaces

- Weekday
- Weekday Average
- Weekend
- Weekend Average

Key data findings at this site include:

- There was a high volume of cars parked in no parking zones during weekdays (10 vehicles) for nearly 60 minutes.
- On-street parking is not fully utilized at this site, but there are high average dwell times in these spaces.
- There is opportunity to re-allocate unused on-street parking to other multimodal uses.
- Cars were found parked in red zones or driveways between 5 to 20 minutes.
- A service truck was found parked in a red zone for 20 minutes.

Curbside Typology

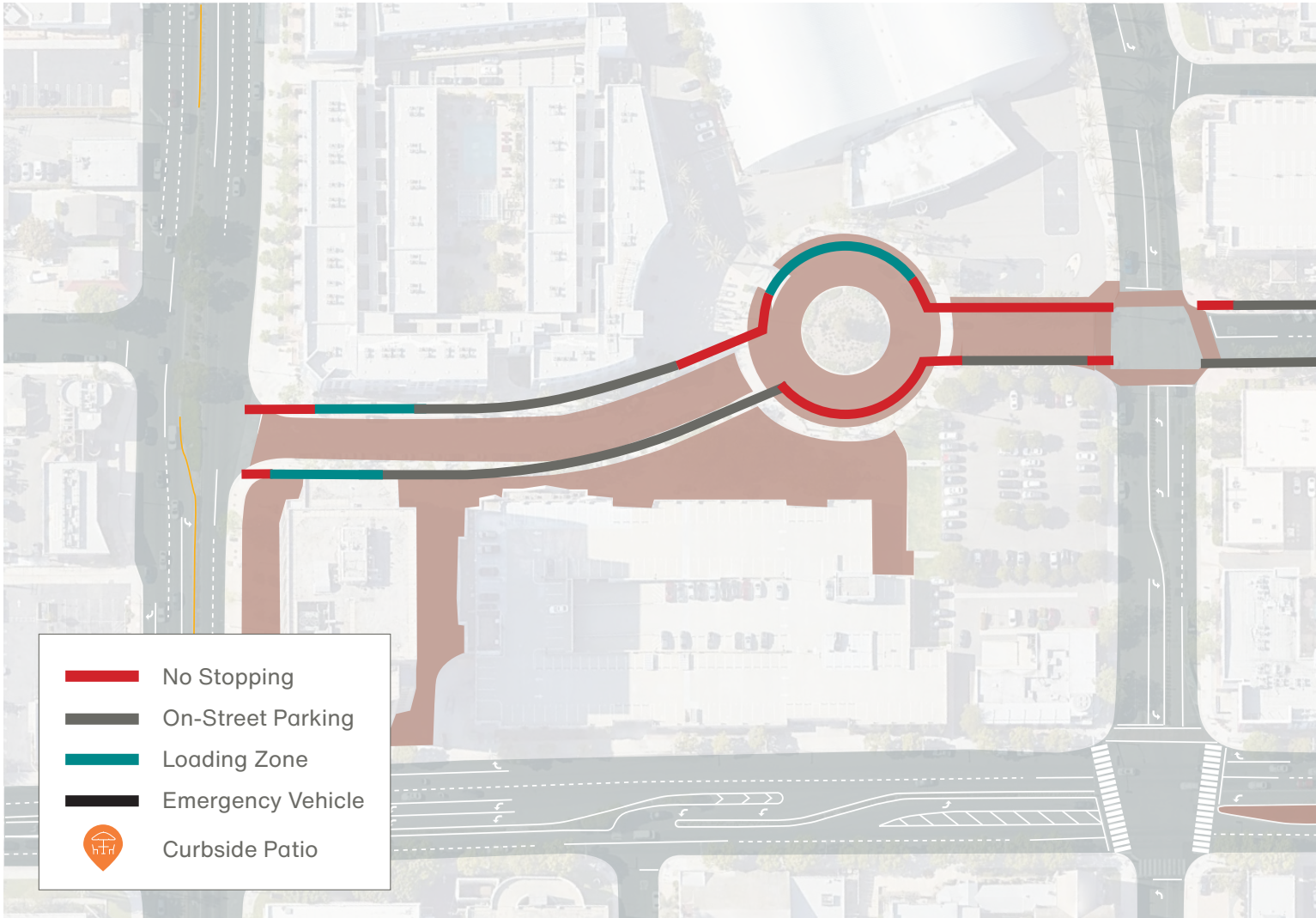
TYOLOGY	DESCRIPTION	FUNCTIONS (RANKED IMPORTANCE)
Multimodal Mobility	<ul style="list-style-type: none"> • Prioritizes the movement of transit, micromobility users, bicyclists, and pedestrians • Requires clear separation of curbside space for all functions to avoid conflicts between stakeholders 	<p>Movement Access for People Placemaking Deliveries Parking</p> <p>1 2 3 4 5</p>

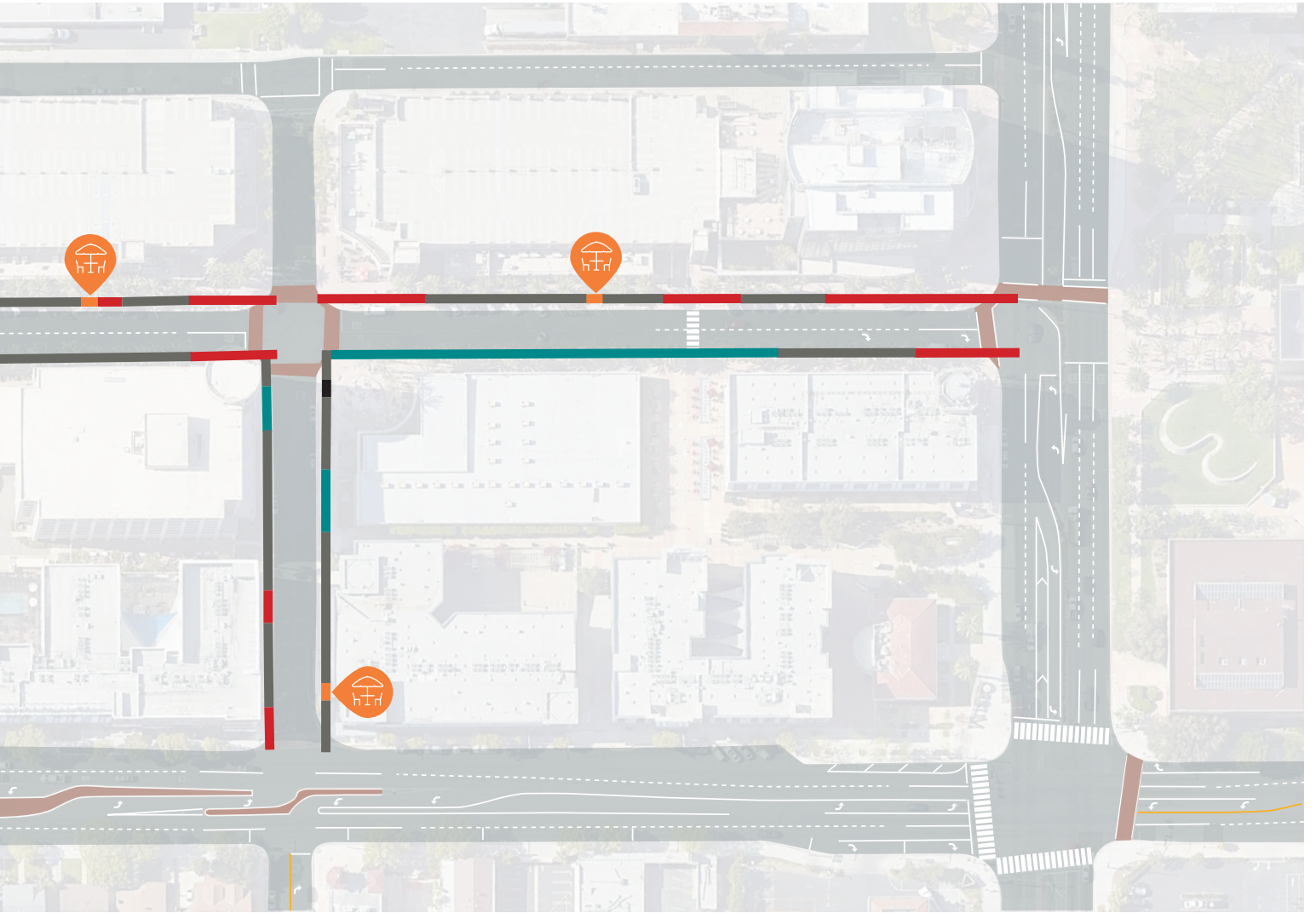
Although this segment of Anaheim Boulevard between North Street and Wilhemina Street is characterized as a Mixed-Use Suburban Curbside Typology. This was determined primarily based on the type of movement that is facilitated and the surrounding land uses along this corridor.

This corridor currently primarily facilitates the access of vehicles. However, with curbside improvements to micromobility, transit, and active transportation, this corridor can grow to support primarily multimodal access. Therefore, there is potential for Site #1 to evolve into a Multimodal Mobility curbside type to prioritize movement, but also facilitate easier access for people, placemaking, and deliveries for businesses located alongside this corridor. Paid parking could be considered to reduce demand and occupancy, and promote curb space turnover.

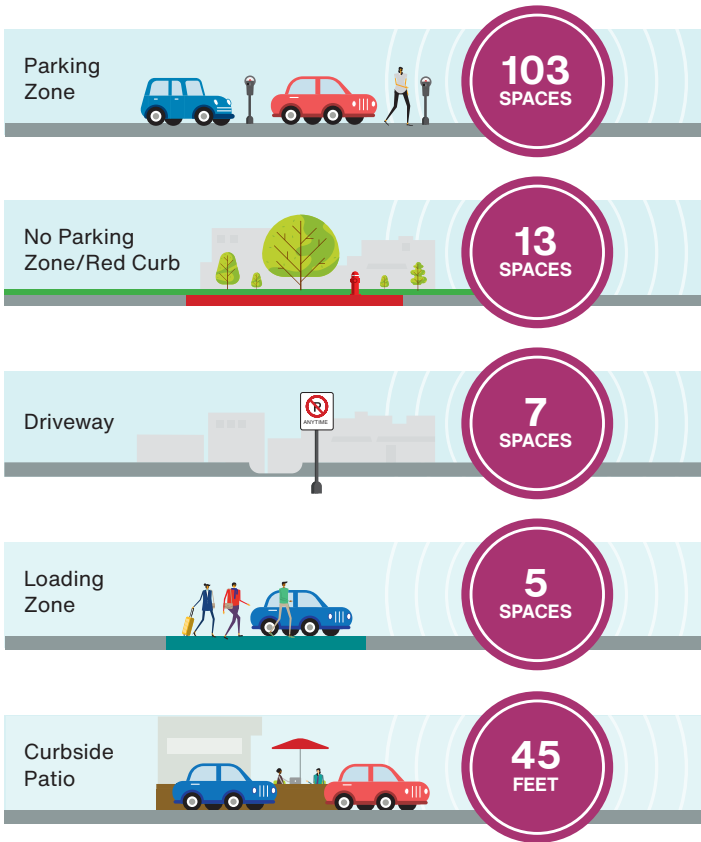
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11.5 SITE #2: CENTER STREET PROMENADE BETWEEN CLEMENTINE STREET AND HARBOR BOULEVARD AND LEMON STREET BETWEEN CENTER STREET PROMENADE AND BROADWAY





Curb Space Allocation



Site Characteristics

- 4 different types of paid parking:
 - 10 minutes
 - 30 minutes
 - 90 minutes
 - Authorized vehicles only

Data Findings





































Inventory data was collected for a 1 block radius around the site to gain an understanding of the surrounding curb uses. The data was analyzed in CurblIQ and used to ensure the recommended pilot projects can be implemented in harmony with the surrounding area.

As noted in Section 5.6, in Anaheim, **demand data** was collected through curbside cameras. Two curbside cameras were mounted per curb continuously recording video footage for 6 hours per day. The video files were reviewed, and event data was processed and provided for analysis.



Above: Screenshot of inventory data from CurbiQ

 Site Limits

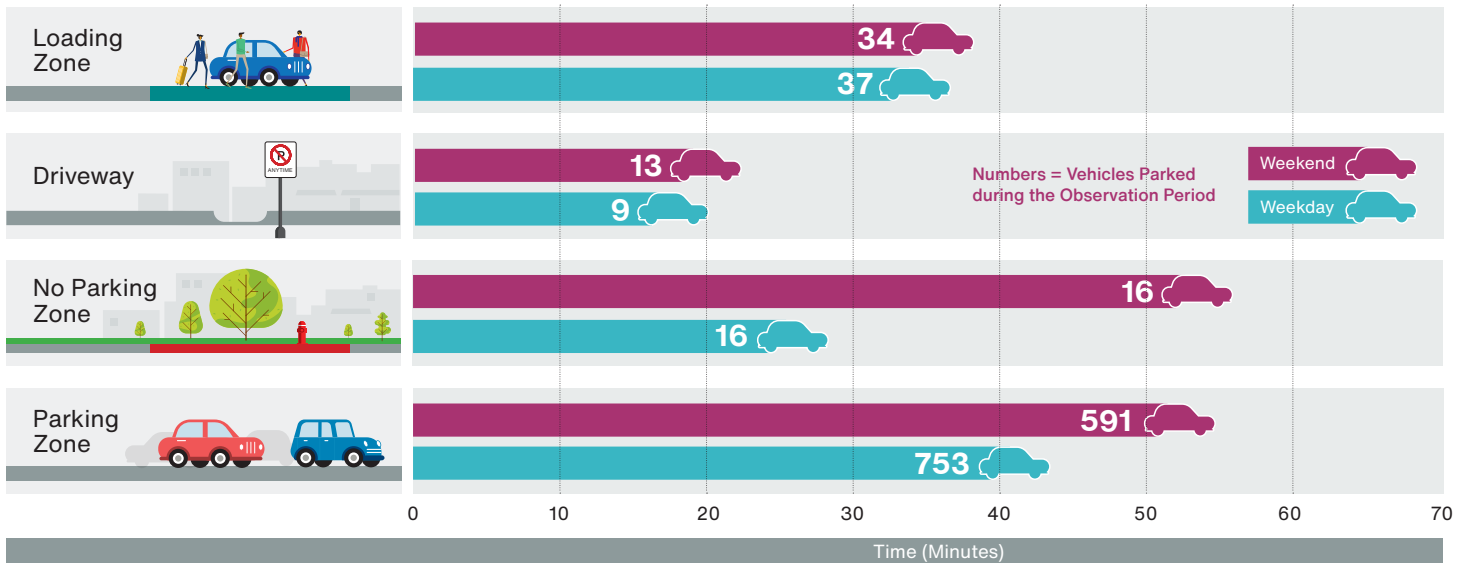
<p>Parking Restrictions</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input type="checkbox"/> Undesignated <input type="checkbox"/> Standing <input checked="" type="checkbox"/> Parking (Permit) <input checked="" type="checkbox"/> Parking (Paid) <input checked="" type="checkbox"/> Parking - Other <input checked="" type="checkbox"/> Parking (Free) <input checked="" type="checkbox"/> No Stopping <input checked="" type="checkbox"/> No Standing <input checked="" type="checkbox"/> No Parking <input checked="" type="checkbox"/> Curb Cut 	<ul style="list-style-type: none">          	<p>Special Designations</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input checked="" type="checkbox"/> Accessible Permit <input checked="" type="checkbox"/> Accessible Permit Loading <input checked="" type="checkbox"/> Bicycle Infrastructure <input checked="" type="checkbox"/> Bicycle Lane <input checked="" type="checkbox"/> Bus Loading <input checked="" type="checkbox"/> Bus Parking <input checked="" type="checkbox"/> Car Share Parking <input checked="" type="checkbox"/> Commercial Loading <input checked="" type="checkbox"/> Curbside Patio 	<ul style="list-style-type: none">           	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> EV Parking <input checked="" type="checkbox"/> Emergency Vehicles <input checked="" type="checkbox"/> Fire Hydrant <input checked="" type="checkbox"/> Food Truck <input checked="" type="checkbox"/> Loading <input checked="" type="checkbox"/> Micromobility <input checked="" type="checkbox"/> Motorcycle Parking <input checked="" type="checkbox"/> Passenger Loading <input checked="" type="checkbox"/> Private Parking <input checked="" type="checkbox"/> Special User 	<ul style="list-style-type: none">            	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Street Cleaning <input checked="" type="checkbox"/> Taxi Cab Stand <input checked="" type="checkbox"/> Transit Zone <p>Temporary Conditions</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input checked="" type="checkbox"/> Construction Zone <p>Curbside Assets</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Select All <input type="checkbox"/> SA Bus Stops <input checked="" type="checkbox"/> Curbside Patio 	<ul style="list-style-type: none">      
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Data Collection Dates

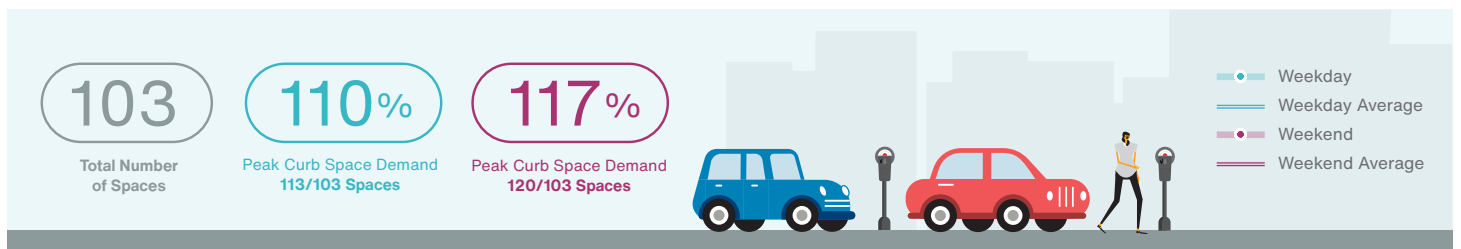
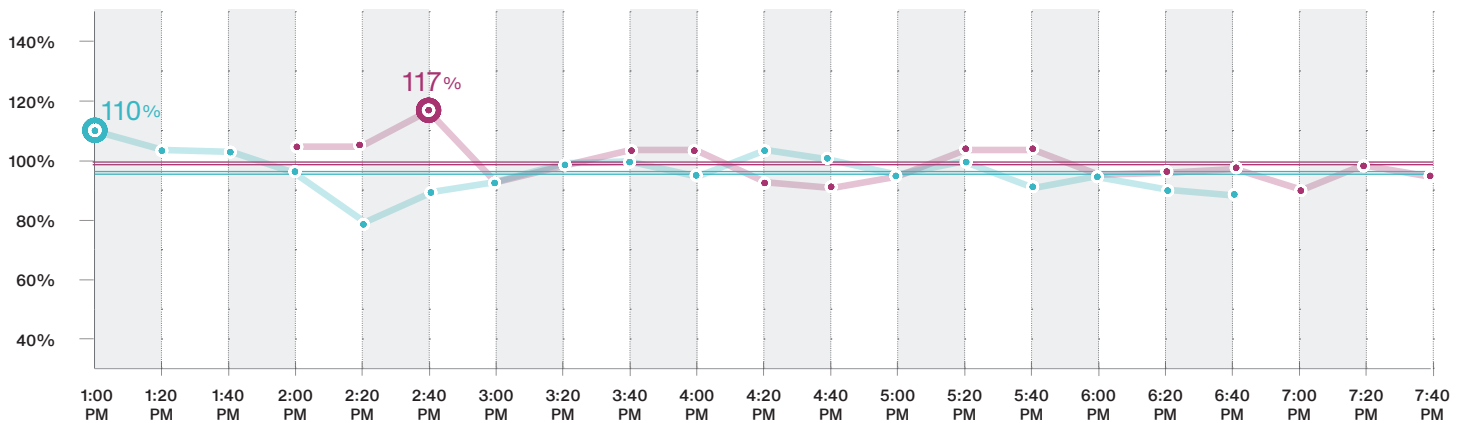
Weekday: Tuesday, March 22, 2022 from 1:00 p.m. to 7:00 p.m.

Weekend: Sunday, March 20, 2022 from 2:00 p.m. to 8:00 p.m.

Average Dwell Time



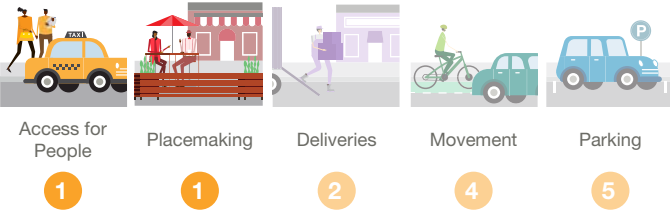
Parking Occupancy



Key data findings at this site include:

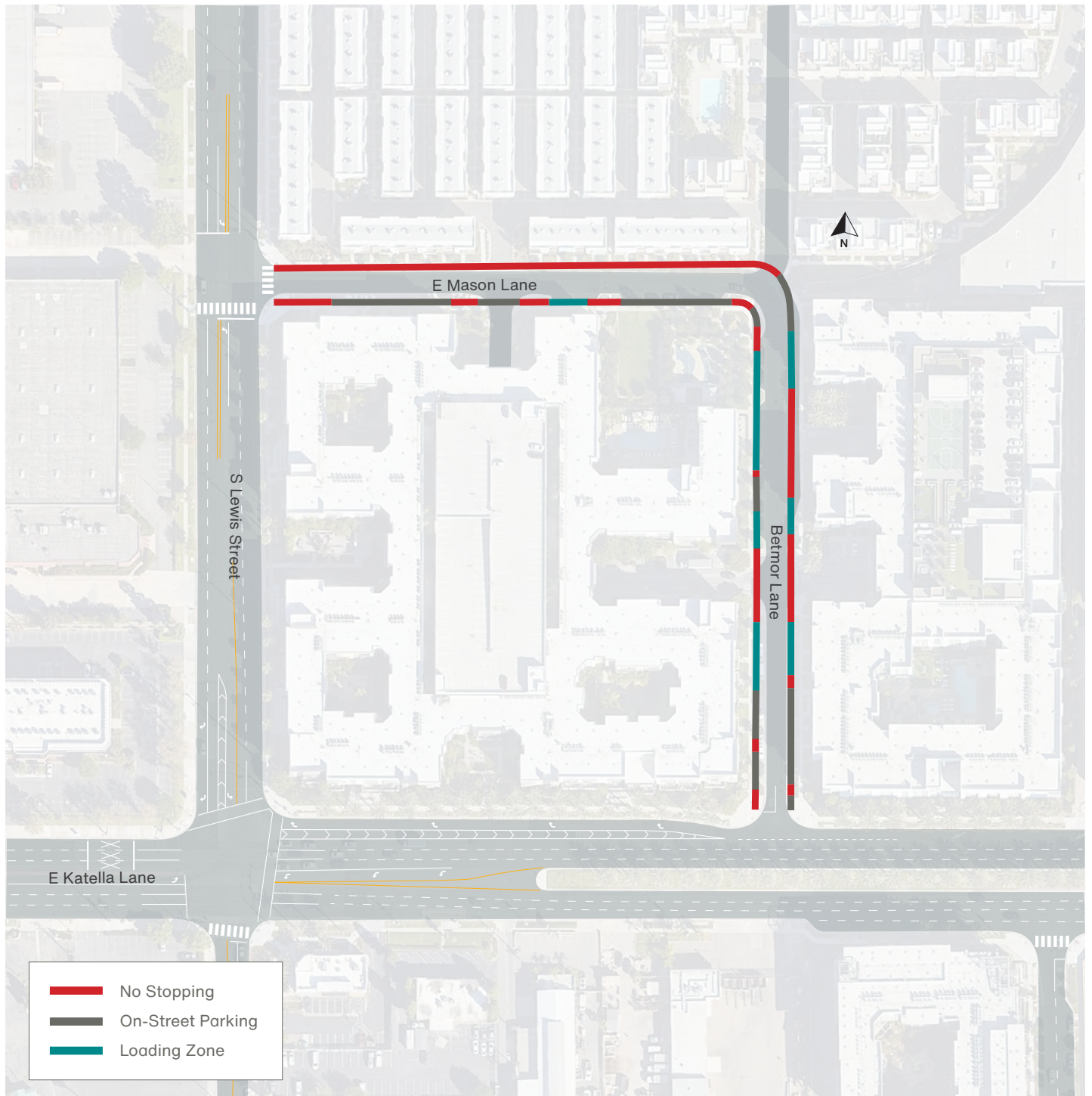
- This site has a high volume of vehicles using the curbside for parking and PUDO activity.
- A considerable number of vehicles were found in loading zones for over 30 minutes.
- Vehicles used no parking zones for loading, pick-up, or drop-off both during the week and on the weekend.
- Data indicates that there is a high demand for parking at this site with insufficient supply.
- Parking occupancy rates are over capacity during the week and weekend with little fluctuation.
- Minimal turnover along the curbside creates a challenge for curbside access for other motorists trying to access surrounding land uses and minimizes access for other multimodal stakeholders.
- Cars were found parked in 90-minute parking zones for approximately 6 hours.
- Many visitors parked in yellow loading zones or red zones and were observed entering restaurants for approximately 10-15 minutes, most likely to pick up an order.
- Many visitors were observed parking in red zones or on the round-about for passenger pick-up and drop-off for approximately 15-minutes.
- Most curbside activity was observed from personal vehicles with less activity from courier deliveries.

Curbside Typology

TYPOLOGY	DESCRIPTION	FUNCTIONS (RANKED IMPORTANCE)
<p>Entertainment Corridors</p>	<ul style="list-style-type: none"> • High density with various entertainment options (e.g., theatres, sports arenas, movie theatres, retail/dining locations, etc.) • Prioritize PUDO curb space and safe crossings for pedestrians, especially at night 	 <p>Access for People Placemaking Deliveries Movement Parking</p> <p>1 1 2 4 5</p>

Given the surrounding land uses, the curbside typology is an Entertainment Corridor. As there is a high demand for curb space along this corridor, improvements should focus on streamlining access for the most frequent curbside users for each time of day and day of week. With these improvements in place, this corridor will be more equipped to clearly designate curb space for users and facilitate multimodal access. Consideration for tactics involving pricing or enforcement of time-based curb spaces should also be encouraged, to promote turnover in this entertainment corridor typology.

11.6 SITE #3: BETMOR LANE AND MASON LANE BETWEEN LEWIS STREET AND KATELLA AVENUE



Curb Space Allocation



Site Characteristics

- Unrestricted
- Loading zone
- No parking 7:00 a.m. – 4:00 p.m.

Data Findings

Inventory data was collected for a 1 block radius around the site to gain an understanding of the surrounding curb uses. The data was analyzed in CurbIQ and used to ensure the recommended pilot projects can be implemented in harmony with the surrounding area.

As noted in Section 5.6, in Anaheim, **demand data** was collected through curbside cameras. Two curbside cameras were mounted per curb continuously recording video footage for 6 hours per day. The video files were reviewed, and event data was processed and provided for analysis.



Above: Screenshot of inventory data from CurbiQ

● Site Limits

Parking Restrictions

- Select All
- Undesignated
- Standing
- Parking (Permit)
- Parking (Paid)
- Parking - Other
- Parking (Free)
- No Stopping
- No Standing
- No Parking
- Curb Cut

Special Designations

- Select All
- Accessible Permit
- Accessible Permit Loading
- Bicycle Infrastructure
- Bicycle Lane
- Bus Loading
- Bus Parking
- Car Share Parking
- Commercial Loading
- Curbside Patio

- EV Parking
- Emergency Vehicles
- Fire Hydrant
- Food Truck
- Loading
- Micromobility
- Motorcycle Parking
- Passenger Loading
- Private Parking
- Special User

- Street Cleaning
- Taxi Cab Stand
- Transit Zone

Temporary Conditions

- Select All
- Construction Zone

Curbside Assets

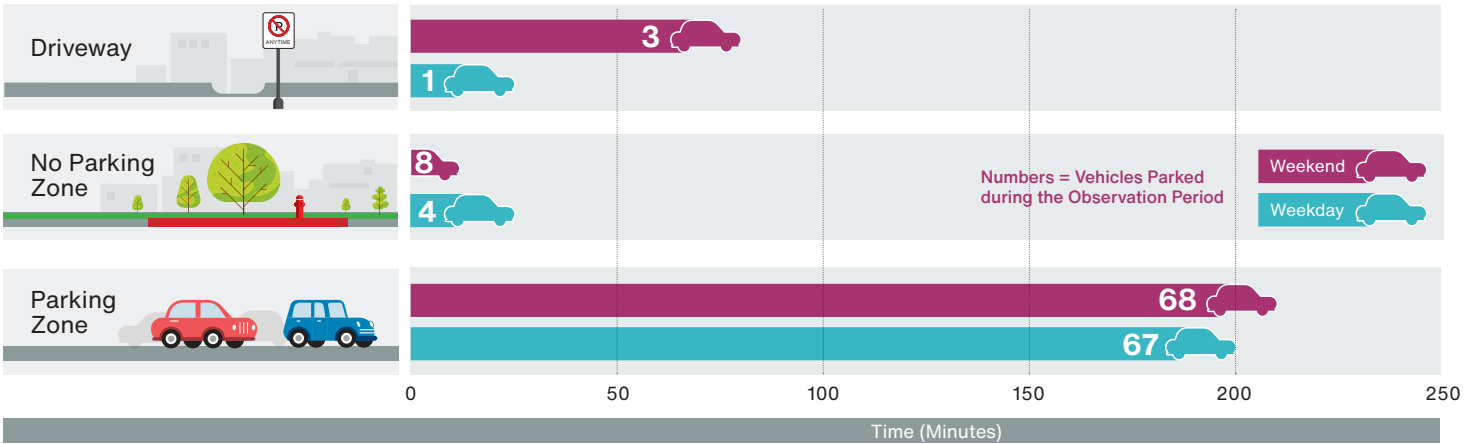
- Select All
- SA Bus Stops
- Curbside Patio

Data Collection Dates

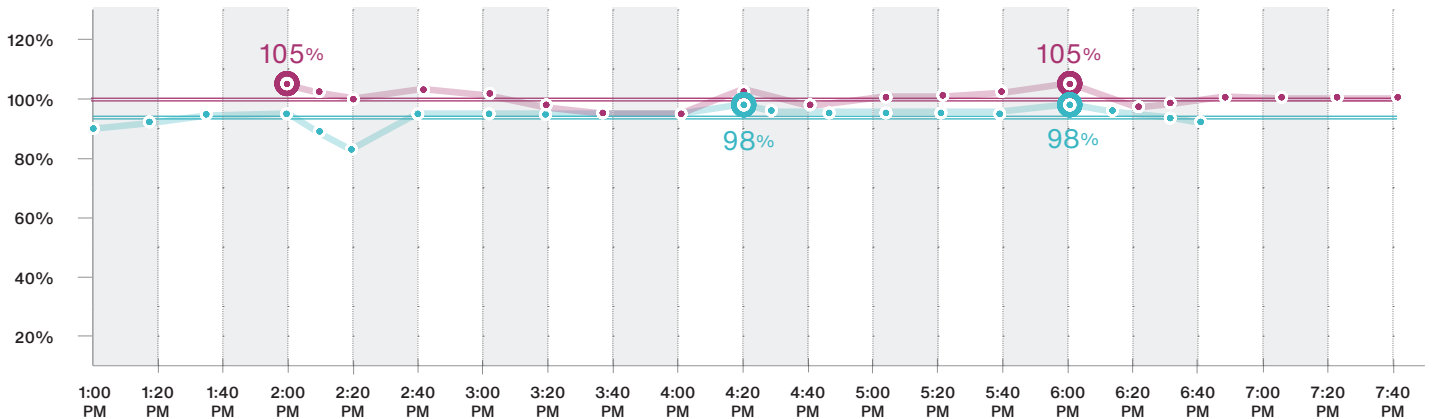
Weekday: Thursday, March 24, 2022 from 1:00 p.m. to 7:00 p.m.

Weekend: Sunday, March 26, 2022 from 2:00 p.m. to 8:00 p.m.

Average Dwell Time



Parking Occupancy



40

Total Number of Spaces

98%

Peak Curb Space Demand
39/40 Spaces

105%

Peak Curb Space Demand
42/40 Spaces

- Weekday
- Weekday Average
- Weekend
- Weekend Average

Key data findings at this site include:

- On-street parking spots are above 90 percent both during the week and weekend with very little variation in parking occupancy throughout the day.
- There is a high volume of vehicles parked for significant lengths of time of over 2 hours.
- Significant illegal PUDO activity was observed. As this loading activity occurred for less than 10 minutes, it is not captured in the above graphics.
- There is opportunity to manage demand and access for various modes (e.g., TNCs) at the curb of major event centers (e.g., Disneyland).
- Most cars parked in yellow zones were observed in the same space for extended periods of time between one to six hours. Some cars were found in the yellow zones for shorter stays under 5 minutes most likely for loading or passenger PUDO.
- Chapman shuttles were found parked in a yellow zone for 10-minute stays.
- UPS trucks were found parked in red zones for up to 30-minute stays.
- Cars were found double parking for short stays for less than 5-minutes.

Curbside Typology

TYPOLOGY	DESCRIPTION	FUNCTIONS (RANKED IMPORTANCE)
<p>Multi-Family Residential</p>	<ul style="list-style-type: none"> • High density of apartment homes • Higher density of people than on-street parking spaces available • This corridor type provides space for PUDO, courier deliveries • Provide activated common spaces for residents 	

Given the high density of apartment buildings surrounding this site, the curbside typology along this corridor is Multi-Family Residential. Improvements can be made to ensure and further streamline access to the curbside along this corridor. As there is a high demand for limited curb space along this corridor, improvements should focus on providing access for the most frequent stakeholders for each time of day and day of week. More specifically, improvements should aim to ensure equitable access for the most common stakeholders including couriers, motorists (parking), and pedestrians. While paid parking may not be desired, other time-based tactics and associated enforcement efforts to promote turnover may be appropriate. Additionally, improvements can be made to facilitate multimodal access for micromobility, cyclists, and TNCs/taxis.



12

Summary of Recommended Strategies

As explained in Approach to Recommendations section, the objective is to provide the cities in the SCAG region a toolbox and strategies to identify and prioritize solutions to tackle current and potential future curb related challenges. The strategies are to be implemented at local level while aligning with the regional goals and withstand the evolving nature of curb, pressures of technological changes, and challenges of local jurisdictions. With each jurisdiction facing unique curb issues, regionally speaking, there is a great overlap that can be identified from the curb typologies outlined in previous sections. These typologies help us identify the challenges providing an opportunity and platform for the local jurisdictions to learn from curb initiatives in the region and exchange ideas.

Three sites were selected within each of the 4 selected cities of Riverside, Santa Ana, Santa Monica, and Anaheim, in coordination with stakeholders. For each selected site, inventory and demand data was collected and analyzed both during the week, and on the weekend. Strategies and pilots are recommended based on inputs including the data analysis and inputs from stakeholders.

The following is a summary table of the key findings and recommended strategies. Note that some sites have specific pilot projects recommended, while others have more high-level recommendations into how the curb space can be re-allocated. A short list of specific pilot projects is provided in the city-specific sections (Sections 7-11) for City staff to reference as they develop their local curbside management strategy.

City	Site #	Location	Curbside Typology	Key Data Findings	Recommended Strategies
Riverside	1	University Avenue between Market Street and Lime Street	9. Mixed-Use Main Street	<ul style="list-style-type: none"> Parking occupancy can reach 95% during peak hours on a weekday. Vehicles were often parked in no parking zones or blocking driveways for over 20 minutes at a time. The high occupancy percentage and frequency of illegal curbside activity indicate a high demand for on-street parking. 	<ul style="list-style-type: none"> Recommended Pilot: Computer Vision Cameras + Lidar to Better Understand Curb Congestion Through Data.
	2	Market Street between University Avenue and 6th Street	8. Mixed-Use Urban	<ul style="list-style-type: none"> During the week, parking occupancy is low outside of dinner hours. On the weekend, parking occupancy increases through the afternoon, peaking at capacity in the evening. 	<ul style="list-style-type: none"> Fluctuating parking occupancy rates present an opportunity to create flexible curb zones that accommodate various curbside functions throughout the day.
	3	Orchard Street between Cortez Street and Madison Street	5. Neighborhood Street	<ul style="list-style-type: none"> High average dwell times of 3-4 hours for free parking observed both during the week and on the weekend, likely due to residents in multi-family apartment buildings using on-street parking. 	<ul style="list-style-type: none"> Recommended Pilot: Residential Parking Program Pilot to Regulate Curb Demand and Access. Incentive programs for active transportation, such as e-bike rebate or transit pass trade in programs can support a mode-shift and reduce demand for on-street parking.

City	Site #	Location	Curbside Typology	Key Data Findings	Recommended Strategies
Santa Ana	1	3rd Street 300 feet west of Ross Street to Ross Street and Ross Street between 3rd and 5th Street	3. Employee Access	<ul style="list-style-type: none"> Significantly different demand is observed between weekdays and weekends, and between different times of day. Higher demand is observed during the week with an average of 100% parking occupancy during the observation hours. Illegal PUDO activity was observed, with nearly 40 instances occurring at this site. 	<ul style="list-style-type: none"> Recommended Pilot: Alternative Micromobility Permitting Pilot.
	2	3rd Street between Birch Street and Main Street	8. Mixed-Use Urban	<ul style="list-style-type: none"> During the observation period, the curbside space was consistently over capacity, both during the week and over the weekend, and usage increased into the night. Average dwell times range from under 20 minutes to over 2 hours. High use of driveways and no parking zones for short periods of time indicates a need for short-term parking with high turnover. 	<ul style="list-style-type: none"> Recommended Pilot: Performance-Based Pricing and Rebate Program Pilot. There is opportunity to shift long-term parking to adjacent streets, or off-street locations to free up curb space for short term parking with higher turnover, thereby serving a greater number of curbside users in a safe manner.
	3	Cubbon Street between Broadway to Main Street and Sycamore Street between Cubbon Street and McFadden Avenue	7. School Street	<ul style="list-style-type: none"> During the week, curbside activity is highest during the morning drop-off, and remains relatively consistent at 80% occupancy throughout the rest of the observation period. Parking occupancy is similar between weekdays and weekends. 	<ul style="list-style-type: none"> Improvements can be made to improve safety for people and to make PUDO times at the start and end of the school day easier for parents.

City	Site #	Location	Curbside Typology	Key Data Findings	Recommended Strategies
Santa Monica	1	2nd Street between Santa Monica Boulevard to Colorado Avenue	2. Multimodal Mobility	<ul style="list-style-type: none"> Throughout the observation period, parking occupancy rates are within the optimal range of 80%. Average dwell times indicate a need for both short-term and long-term parking, however short-term parking and loading activity is occurring in no-parking zones. Illegal curbside activity is problematic for transit operations as there is a bus lane along the corridor. 	<ul style="list-style-type: none"> Recommended Pilot: Analyze bus lane enforcement opportunities at the 2nd and Colorado bus stop.
	2	Ocean Avenue between Santa Monica Boulevard to Colorado Avenue	8. Mixed-Use Urban	<ul style="list-style-type: none"> On-street parking is heavily utilized with average occupancy rates greater than desired, in particular during the week. Average dwell times indicate a greater need for short-term parking as opposed to loading zones. There is a challenge with vehicles double parking along the curbside and parked in no parking zones blocking both bike lanes and driveways. 	<ul style="list-style-type: none"> Innovative parking strategies, such as a graduated price structure, automated enforcement, or flex zones.
	3	Wilshire Boulevard between Yale Street to Princeton Street, and Harvard Street between Wilshire Boulevard and Arizona Avenue	8. Mixed-Use Urban	<ul style="list-style-type: none"> Parking occupancy rates stay above 90% on average during the week and on weekends during the early afternoon. There is a high volume of vehicles that utilize the curbside for significant lengths of time, which impedes access for other multimodal users. Numerous instances of blocked driveways, parking spaces, and traffic lanes were observed. 	<ul style="list-style-type: none"> There is a need for more clearly defined curb space for the appropriate user, as well as a need for innovative enforcement strategies to ensure that curb space is utilized equitably. There is an opportunity to leverage curbside functions depending on the time of day, and day of week.

City	Site #	Location	Curbside Typology	Key Data Findings	Recommended Strategies
Anaheim	1	Anaheim Boulevard between North Street and Wilhelmina Street	4. Mixed-Use Suburban	<ul style="list-style-type: none"> On-street parking is not fully utilized at this site, but there are high average dwell times. 	<ul style="list-style-type: none"> There is opportunity to re-allocate unused on-street parking to other multimodal uses. Paid parking could be considered to promote curb space turnover.
	2	Center Street Promenade between Clementine Street and Harbor Boulevard and Lemon Street between Center Street Promenade and Broadway	10. Entertainment Corridor	<ul style="list-style-type: none"> This site has a high volume of vehicles using the curbside for parking and PUDO activity, including in no parking zones. Parking occupancy rates are over capacity during the week and on the weekend with little fluctuation. 	<ul style="list-style-type: none"> Improvements should focus on streamlining access for the most frequent curbside users for each time of day and day of week. Consideration for strategies involving pricing or enforcement of time-based curb spaces should be encouraged.
	3	Betmor Lane and Mason Lane between Lewis Street and Katella Avenue	6. Multi-family Residential	<ul style="list-style-type: none"> Parking occupancy rates are above 90% both during the week and on the weekend, with little variation throughout the observation period. There is a high volume of vehicles parked for over 2 hours. Significant illegal PUDO activity of less than 10 minutes was observed. 	<ul style="list-style-type: none"> There is opportunity to manage demand and access for various modes, such as TNCs, at the curb of major event centers, such as Disneyland. Time-based strategies and associated enforcement efforts could be used to promote turnover.



13

Los Angeles and Long Beach

Both the cities of Los Angeles and Long Beach, while not receiving city-specific recommendations or pilot project concepts as part of this curb space management study, did participate in several stakeholder engagement activities. These engagements produce 35 insights into the two cities that were considered as part of the regional framework and recommendations. Key themes that arose for Los Angeles and Long Beach from these limited engagements included:

- **Both cities are moving toward a more progressive curb space management program:**

- Changing needs of the curb (delivery, outdoor dining, pick-up drop-off, paratransit, etc.);
- Competing demands at the curb outpacing curb space availability;
- Greater data availability and evolving data standards;
- Effect of COVID-19 created higher demand for curb access and digital management;
- Strong political support, policy framework + vision, and existing efforts in curb space management; and
- Need for effective way to communicate curb space regulations to the public.

- **Los Angeles is challenged with:**

- Curbside reservation process: need to improve capabilities;
- Curbside connections to private lots/spaces;
- Adequate capabilities for curbside payment methods, but room for improvement;
- Adoption of a modal pricing approach;
- Real-time zone allocation: desire to provide dynamic, reservation-based spaces based upon a sustainable approach to mode prioritization; and
- Incorporation of curbside management into the City of Los Angeles' sustainability planning goals.

- **Long Beach is challenged with:**

- Organizational structure: need to evolve to collaborate on new demands.
- Curbside inventory: need for greater foundation for asset management and analysis.
- Modal and real-time pricing: need to improve capabilities.
- Automated enforcement: improve enforcement efficiencies and compliance with priorities; and
- Curbside design/operations: need to be incorporated into the development review process.





14

Approach to Implementation

To achieve successful implementation, it is critical for local jurisdictions to take a comprehensive approach for curb space management. SCAG is building tools and resources for a regional understanding of the curb challenges and can provide support for the process and factors that cities may need to consider when approaching implementation. SCAG also supports local jurisdiction stakeholders in the region through coordination, collaboration, and engagement, data and analysis, and identification of funding and program opportunities and technical assistance. When approaching implementation of recommendations, cities should consider factors such as:

Values-Driven Purpose and Need

- Is there a true purpose and need (e.g., identified problem statement) for implementing the recommendation (e.g., is the recommendation solving for something specific, rather than just testing a new technology, for instance)?
- Does the recommendation help the city have impact/meet desired outcomes (as defined by broader values and agency or citywide goals)?
- Has equity been considered at critical junctures in designing, implementing and evaluating the recommendation? Has community input been solicited at critical junctures?

Agency Resources + Sustainability

- Does the city have the resources to implement the recommendation (i.e., staff capacity, funding, data, technology/tools, etc.)?
- If funding is a challenge, are there avenues that the city could find funding to support implementing the recommendation (e.g., future budget requests, federal funding, partnership opportunities for grants, etc.)?

- Will the recommendation be sustainable? (e.g., a policy can be implemented and is therefore complete; if the recommendation requires ongoing funding/maintenance, what is the plan to provide resources?)
- Can the recommendation be leveraged as part of an existing program or initiative that already has leadership support or funding (e.g., implementing a needed bike lane as part of a Complete Streets ordinance/workflow)?
- Where can your city leverage public-private partnerships as a way to incorporate technology to solve values/outcomes-driven challenges and provide creative finance solutions?

Evaluation and Measurement

- Does the city have a plan for evaluating the impact of implementing the recommendation? This ideally includes:
 - Setting SMART (Specific, Measurable, Achievable, Relevant, and Time-Bound) goals.
 - Setting process and outcome-driven KPIs and metrics.
 - Ensuring accountability for driving toward desired outcomes (e.g., assigning champions to the implementation and monitoring of action items).
 - Having an internal and transparent workflow process to collect measurements, evaluate them, and then use the findings to drive future decisions around that recommendation or the curb.

Communications and Marketing

- Does the city have a plan for how to communicate implementation of this recommendation?

- Internally: ensuring buy-in by communicating the value and importance of the action.
- Externally: ensuring stakeholders (e.g., community groups, the public, special interest groups like Chambers of Commerce and small businesses) understand the value and importance of the action.

no knowledge about how to design or run a pilot, and they are often capacity, and resource constrained. As part of this CSMS, a workplan template and accompanying guidance was developed to help SCAG municipalities better understand what questions need to be asked and answered to ensure a pilot will be an effective test for an identified challenge at the curb. The tool developed is flexible, nimble, and simple that will guide city staff through the pilot process and lower the barriers to solution implementation.

Balanced Portfolio of Risk

- Has the city looked holistically at its curb space-related actions and ensured a balanced portfolio of risk?
 - E.g., a variety of projects that may:
 - Have lower risk but lower impact?
 - Have higher risk but higher impact?
 - Recognize where 1) significant political/leadership support, or 2) overcoming regulation barriers or developing new regulations is required?
 - Does your city or department have an innovation team or role that has the “permission to fail” in order to test and learn from more innovative practices?

Changing Best Practices and Trend

- Does your city or department keep abreast of current trends and technologies in the curb space arena? While this report provides current best practices and case studies, these are sure to evolve and change on an ongoing basis.

While many cities conduct pilots, most municipalities (especially smaller to mid-sized cities) have not developed formal guidance and a process for how to go about testing and measuring pilots (curb space or otherwise). In many cases, city staff may have little or even

14.1 WORKPLAN TEMPLATE

What is the Purpose of a Pilot Workplan?

There are several key benefits to completing a pilot workplan:

- Serve as a go/no go for the different parts of the pilot design, implementation, operations and evaluation process (in short - it provides a quick indication of how ready you are);
- Guide and orient local and regional staff working on curbside projects through the same process;
- Ensure that pilot projects are chosen meaningfully and align with local and regional values and goals, as well as with good pilot design;
- Provide staff with the opportunity to refine a pilot's design, or even pivot a design mid-pilot, if not up to par;
- Help facilitate an understanding of how a new pilot project would connect with other ongoing pilots or programs; and
- Help facilitate whether or not a pilot should be maintained, scaled, pivoted or sunsetted based on evaluation and measurement toward desired outcomes.

The workplan template is designed as a checklist organized by 5 chronological pilot phases, which are further organized by topic areas that are part of a pilot process.

Pilot Phases:

- Phase 1: Conception
- Phase 2: Planning
- Phase 3: Launch
- Phase 4: Pilot

- Phase 5: Learn/Report and Scale

Topic Areas:

- Developing a Pilot Profile;
- Feasibility and Foundations of a Pilot;
- Public-Private Partnership Development (if procuring a technology that requires one);
- Engagement and Outreach;
- Implementation and Operations;
- Evaluation and Measurement; and
- Scaling and Reporting.

The intention of providing activities and topic areas embedded within phasing is to give city staff the steps that should, in general, be taken before moving onto the next phase of pilot design and implementation. However, the workplan is intended to be flexible, in that some cities may not have the resources or capacity to complete all steps, but the most critical steps that can alter a pilot's success can and should be identified and prioritized (such as those part of the Feasibility and Foundations topic area). SCAG, through the agency's numerous study efforts and programs can serve as a resource for local jurisdictions as well.

Phase 1: Conception

Below: Pilot Project Workplan Process.

Pilot Profile



The "proposal" of a curb pilot project. It ensures that city staff have done the following:

- Identified a true purpose and need for the pilot, including a use case that identifies a place and population to test the intervention
- Have considered how that pilot connects to broader agency and city goals and values.
- Have reviewed critical go/no go criteria like funding, staffing, and in-house experience to ensure the pilot is executable.

Pilot Feasibility & Foundations



Pilot Feasibility & Foundations refers to all the initial, critical steps city staff must take to prepare for designing and launching their pilot project. Once the Pilot Profile has been articulated, city staff need to do the following check critical boxes around feasibility of the pilot:

- Ensure leadership support and a project team.
- Identify regulatory barriers.
- Estimate costs and have the necessary funding and other resources to execute the pilot. Note that cost estimating may be a challenge when dealing with new technologies.

If any of these critical elements is missing, city staff may need to go back to redesigning their pilot profile to find a use case/approach that can meet this criteria.

Phase 2: Planning

Public Private Partnership Development



While not all pilot projects will require a public-private partnership (P3), many pilots involving technology and data will engage a private sector partner. Actions related to developing P3s are important for ensuring there is balance of public versus private interest in pilot design and conceptualizing the terms of the partnership so that the city can generate the outcomes they want to see from a pilot (i.e., values-driven, based in desired outcomes, etc.). Topics for negotiating public-private partnerships include:

- Operations agreements.
- Data collection.
- Sharing and privacy.
- Procurement processes.
- "tools and levers" cities can use to generate more favorable agreements with private sector partners. Note that the "tools and levers" are documented in the workplan template and extended guidance documents, included in the Appendices.

Engagement & Outreach



Engagement & Outreach will vary by pilot project depending on the level of community knowledge and acceptance around a particular use case or technology, as well as to help identify and define feedback on pilot ideation. Equitable engagement and outreach should be a major consideration of all engagement activities. Groups engaged include:

- Internal engagement (e.g., communications for City Council support; city staff buy-in, etc.).
- General public.
- External stakeholders (e.g. businesses, chambers of commerce, community based organizations).

Implementation + Operations



Implementation + Operations considers the logistical, management, data collection and monitoring activities that need to take place during a pilot's launch and ongoing activities. Operations are geared toward:

- Ensuring safety during the pilot.
- Ensuring that partners are operating/co-operating the pilot as planned.
- Leveraging historical and new operational data to both feed learnings as well as make any necessary changes to the pilot design and/or day-to-day management.

Phase 3: Launch

Implementation + Operations



Coordinate with private sector partner and the department's or city's communications team to plan at least a small launch event for the pilot, including press releases and earned media coverage.

Phase 4: Pilot

Evaluation & Measurement



Evaluation and Measurement is a critical component to a pilot workplan; it allows a city to understand how effective a pilot approach/use case was toward solving an identified challenge, or purpose and need. Metrics need to be designed at the onset of the pilot to understand what the city wants to learn in terms of both process and outcomes. A data collection and management plan should also be developed to identify other key factors such as data collection, sharing, privacy, security, standardization and analysis approaches. Appropriately evaluating a pilot will help the city make a determination if a pivot is needed mid-pilot, and/or if the pilot should be scaled or concluded at the end of the proposed service dates.

Phase 5: Learn/Report & Scale

Scaling & Reporting



Scaling and Reporting are the final steps in a pilot workplan. When an appropriate evaluation of a pilot has been done to determine if the pilot was "successful" or not (i.e., did the city learn what it set out to learn?), a city must make a determination if the pilot ends, or if it is scaled to a new geography, use case and/or target population. Depending on the success of scaling, a pilot could then become a long-term program or initiative with appropriate funding and resources. Reporting refers to packaging up the evaluation and learnings for a pilot project. Reporting needs to consider a broad body of stakeholders:

- Internal (other staff, City Council, leadership).
- External (businesses, organizations).
- The public/residents.

Reporting should also provide process-related lessons learned for city staff to improve upon future pilot project design. Finally, reporting needs to consider the internal and external facing components of the pilot - for instance, could the city provide a publicfacing data dashboard that informs residents about the pilot's outcomes?



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Next Steps

The curb space management study conducted is a first step in effectively and intentionally managing the curb space within the SCAG region. The study allowed cities to evaluate the current state of their curb space, understand the various influencing factors and how the curb space can be used as a city planning tool, and provided the opportunity to create a vision of where each city wants their curb space to be.

Intentionally designing curbside space is a complex endeavor, requiring both staffing and funding resources as well as public and political buy-in. Not every city is in a position to prioritize curb space management at this point in time. For those cities that are currently prioritizing other initiatives, this study provides the tools for success for when they are ready to tackle curbside management. For those cities that are ready, this study also provides a detailed road map with specific recommendations and work plans to kick-start a re-imagining of curbside management in their unique city.

SCAG's efforts to understand and assess regional curb challenges are reflected in multiple facets including the Last Mile Freight Delivery Study (LMFS), Last Mile Freight Program (LMFP), this Curb Space Management Study, and SCP SCMI efforts including Curb Space Data Study. Naturally, this has allowed SCAG to further work towards regional collaboration and coordination with various cities throughout the region to work together on focused areas of interest whether it be furthering planning studies and analysis or pilot project development.

Managing the curb is a long term and ongoing commitment. In addition to the tools provided through this study, such as the menu of options and workplan template, SCAG is also looking to establish a sustained approach for working further with local jurisdictions throughout the region. The long-term RWG will provide a forum for cities to engage in peer-to-peer exchanges to:

- 1 Provide the opportunity for participants to share curbside management challenges and discover progressive solutions from their peers.
- 2 Learn how to measure and track the success of their program based on a structured approach.
- 3 Begin to map a path forward for success leveraging expertise and experience from peers.
- 4 Identify achievable goals and strategies via a structured program assessment.
- 5 Learn from other peers data collection and analysis efforts and potential pilot projects and other strategies for this study.
- 6 Gain access to peers across North America experiencing similar challenges, exchanging lessons learned and strategies for success.

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