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FLEXIBLE FLEETS

Implementation Strategic Plan

SANDAG

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Introduction

The San Diego Association of Governments (SANDAG) is developing a strategy for the successful deployment of "Flexible Fleets". Flexible Fleets have emerged as a promising travel alternative to driving alone for an increasing number of trip types.

What are Flexible Fleets?

Flexible Fleets consist of a variety of on-demand, shared, mobility services that are typically requested or reserved and paid for through a smartphone app. Flexible Fleet types and technologies include bikeshare and scootershare programs; microtransit, which include a range of on-demand minivans or small buses with flexible routing and pick-up/drop-off locations; carshare, which include various types of short-term car rental programs; ridehailing, which include using a Transportation Network Company (TNC) service such as Lyft and Uber or taxicabs; and rideshare, which include carpool, vanpool, and pooled high occupancy ridehailing such as Lyft Shared or Uber Pool.

DASH, Micro, See Plymouth, Lime

Using a variety of vehicle types and technologies, Flexible Fleets have the potential to provide first-and-last mile connections to transit and major destinations (e.g., work, healthcare, school, etc.), improve mobility in areas that are difficult to serve with other transportation options, reduce private vehicle dependence for short trips, and complement or replace underperforming fixed-route buses.

The Flexible Fleets Implementation Strategic Plan (Strategic Plan) provides a roadmap for planning and implementing Flexible Fleet pilot programs in communities across San Diego County. The Plan includes a description of Flexible Fleets services, a review of case studies, a summary of outreach to SANDAG's various "Community-Based Organizations" (CBOs), a "regional scan" of the County that identifies the suitability for Flexible Fleets services in various opportunity areas, and the Implementation Strategic Plan that identifies a path forward for deploying Flexible Fleets projects in the opportunity areas with the highest suitability.

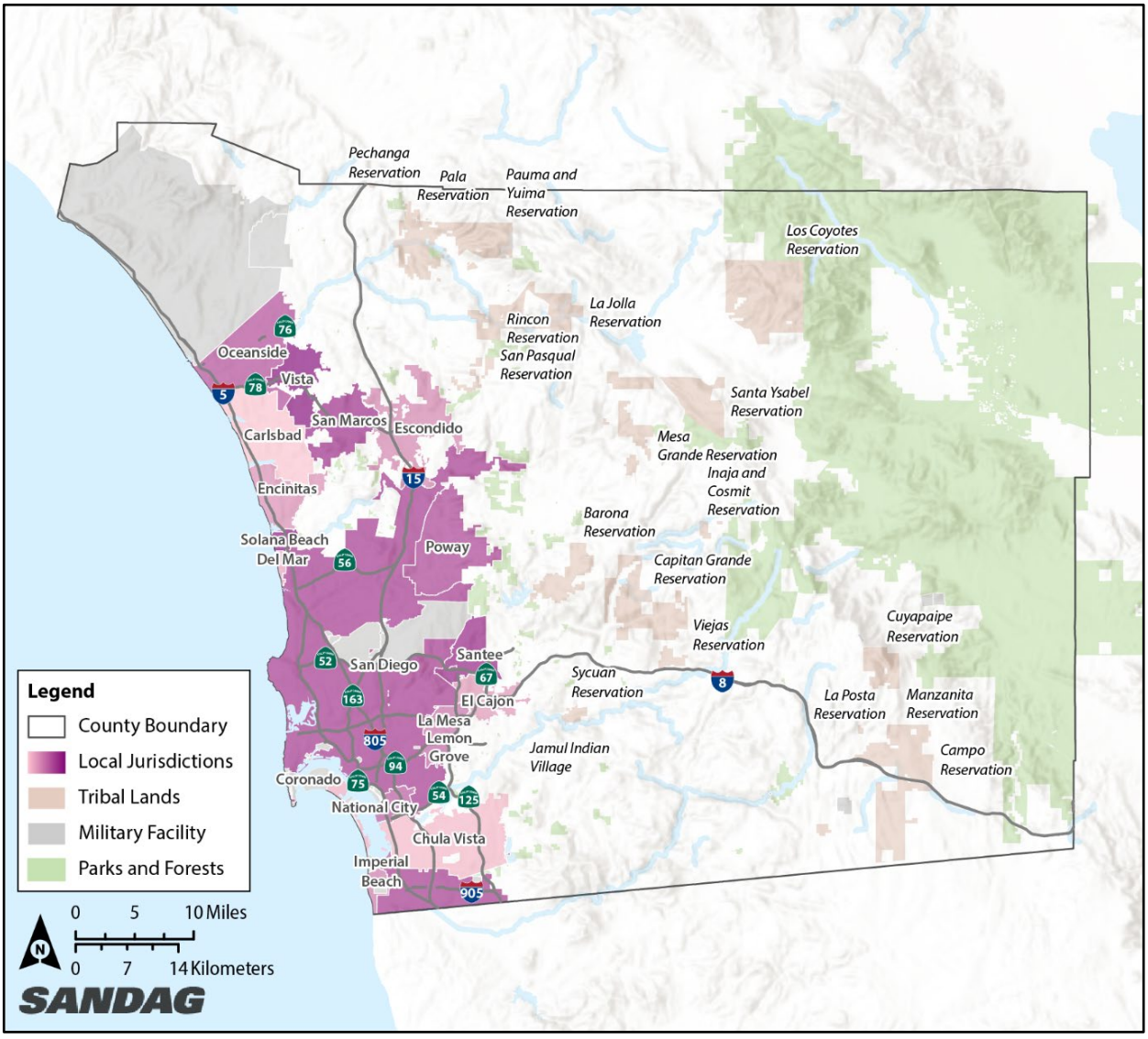
SANDAG's Role in the Region

SANDAG is the San Diego region's Metropolitan Planning Organization and is responsible for public planning, transportation, transit construction, regional research, and provides a public forum for regional policy decisions about growth, transportation planning and transit construction, environmental management, housing, open space, energy, public safety, and binational topics. SANDAG recently released *San Diego Forward: The 2021 Regional Plan* (https://www.sdforward.com/), which recommend a series of physical transportation and digital investments across the region, along with a set of policies and programs to support the achieving regional goals.

Community Context

The San Diego region is home to 3.35 million residents who live in 18 incorporated cities and unincorporated areas of the County of San Diego. The San Diego region is also home to 18 independent sovereign tribal nations with jurisdictions over 19 reservations – the most in any county in the United States. The region also has the largest military presence in the country, with Camp Pendleton, Miramar Marine Corps Air Station, North Island Naval Base, and Naval Base San Diego.

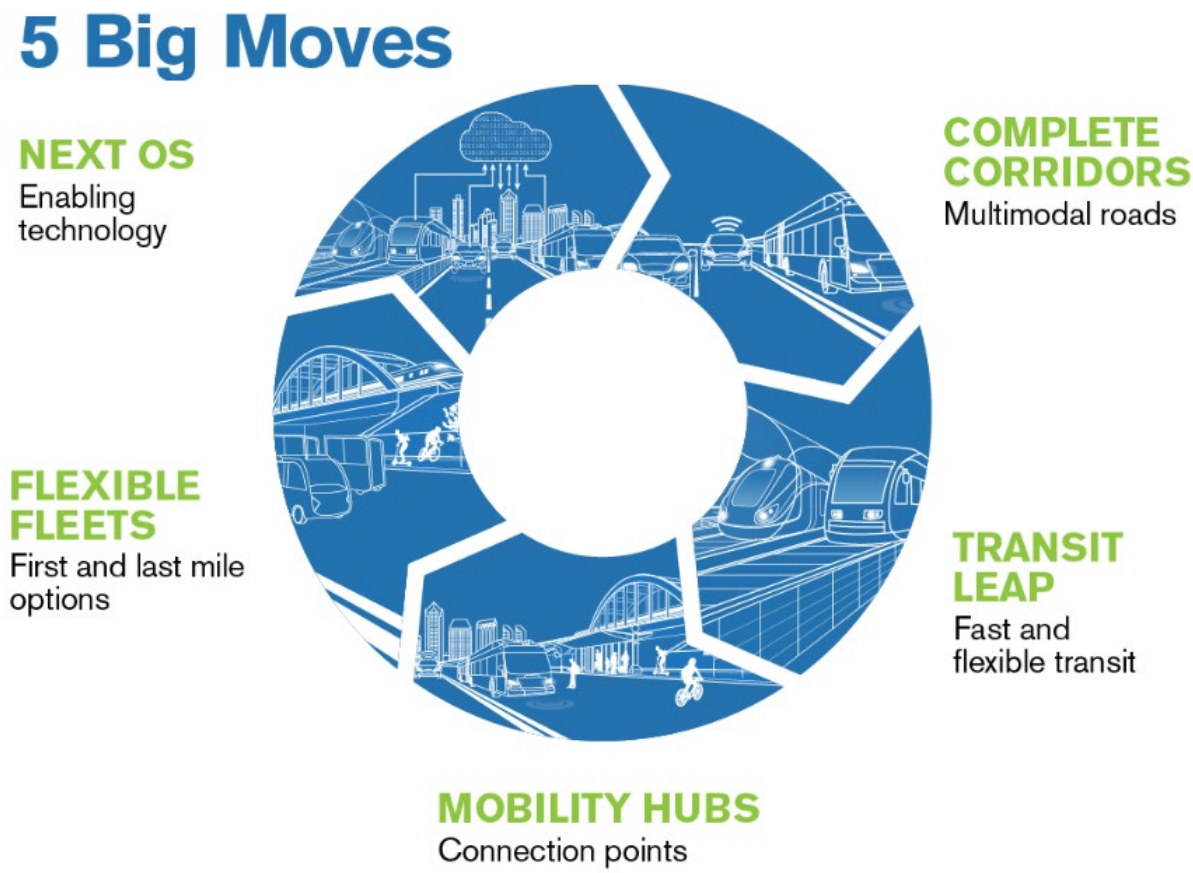
Figure 1-1: The San Diego Region



2021 Regional Plan – The 5 Big Moves

SANDAG's 2021 Regional Plan reimagines how people and goods could move throughout the region in the 21st century. This vision is fundamentally shaped by five key strategies for mobility, collectively known as the "5 Big Moves" —Complete Corridors, Transit Leap, Mobility Hubs, Flexible Fleets, and the Next Operating System (OS).

Figure 1-2: The 5 Big Moves



(SD Forward)

The Flexible Fleets Implementation Strategic Plan is one of the early actions identified in the 2021 Regional Plan that will help jumpstart the overall planning process. The Strategic Plan provides a more detailed roadmap along with short-term and long-term actions necessary for deploying on-demand shared pilot projects in an intentional way across San Diego County. By leveraging these new mobility services and technologies in an intentional and coordinated manner, Flexible Fleet investments can be deployed in their most effective manner to help the region achieve its transportation, social equity, and environmental goals. Flexible Fleets are connected to each of the other Big Moves in a variety of ways. While they have many benefits

as a stand-alone strategy, the full benefits of Flexible Fleets are realized in conjunction with the other strategies. **Table 1-1** below describes each of the Big Moves and how they relate to Flexible Fleets.

Table 1-1: Flexible Fleets Relation to the 5 Big Moves

Complete Corridors	
Description	*Complete Corridors incorporate a variety of travel choices and use technology to manage how highways and major roads are used in real-time. They provide a balance of dedicated, safe space for everyone, including freight vehicles and people who walk, bike, drive, ride transit, and use Flexible Fleets.*
How it Relates to Flexible Fleets	*Complete Corridors will provide the necessary roadway infrastructure to make Flexible Fleet operations safe and efficient. Flexible Fleets could leverage larger infrastructure investments such as protected bikeways to support safe micromobility operations, pick-up/drop-off areas (PUDOs) to facilitate safe passenger loading for ridehail and microtransit services, and dedicated lanes to allow for efficient operations of microtransit services.*
Transit Leap	
Description	*Transit Leap will create a complete network of fast, high-capacity, high-frequency transit services that connect major residential areas with employment centers and attractions throughout the San Diego region. Transit Leap services could connect to supporting Flexible Fleets in Mobility Hubs. New high-speed services — covering longer distances with limited stops— may be separated from vehicle traffic with bridges, tunnels, or dedicated lanes. Improvements to existing transit services—such as the Trolley, COASTER, SPRINTER, and Rapid—may include additional rail tracks, more frequent service, dedicated transit lanes, and traffic signal priority to keep transit moving quickly.*
How it Relates to Flexible Fleets	*Transit Leap investments will significantly increase the competitiveness and desirability of transit for a larger share of regional trips. With greater demand for travel to and from station areas, Flexible Fleet services can facilitate the movement of passengers to transit stations.*

Mobility Hubs

Description	*Mobility Hubs are places of connectivity where different travel options – walking, biking, transit, and shared mobility – come together. They provide an integrated suite of mobility services, amenities, and supporting technologies to better connect high-frequency transit to an individual's start or end of a trip. A Mobility Hub can provide one, two, or several miles of access utilizing a variety of on-demand travel options to connect to/from a point of origin or destination.*
How it Relates to Flexible Fleets	*Mobility Hubs represent locations where Flexible Fleet services are likely to be concentrated. Mobility Hubs are typically located near high-capacity transit stations or major activity centers and provide successful infrastructure require for successful Flexible Fleets deployments. Mobility Hubs provide amenities that support Flexible Fleet services such as bike and scooter docks or dockless bike and scooter corrals, trip planning kiosks, electric vehicle (EV) charging, and pick-up/drop-off curbs for microtransit and ridehailing.*

Next OS

Description	*The Next Operating System (OS) is the "brain" of the entire transportation system. It is a digital platform that compiles information from sources like passenger vehicles, delivery trucks, e-bikes, and scooters into a centralized data hub. Analysis of this data will provide information on travel patterns and utilization, which will improve how transportation is planned, operated, and experienced.*
How it Relates to Flexible Fleets	*Next OS will develop the information technology foundation to facilitate more efficient Flexible Fleet operations and seamless transfers between travel modes. Using smartphone applications like online payments, real-time trip planning and reservations, Flexible Fleets can be made more approachable to users and increase their usefulness to riders. Data collected by Flexible Fleet services and ingested by the Next OS will enable performance analytics to inform operation improvements, and support planning and policy development.*

Flexible Fleets Strategic Plan Framework

The Flexible Fleets Implementation Strategic Plan described in this report utilizes the following framework:

DEFINITIONS AND CASE STUDIES

Defines the range of potential on-demand shared mobility systems and describe how they have been deployed locally and across the US to solve various transportation issues.

ENGAGEMENT

Describes the network of partnerships and public engagement activities completed with Community-Based Organizations (CBOs) and other stakeholders to identify specific transportation needs in the communities and develop a series of "use cases" that respond to these needs.

REGIONAL SCAN

The Regional Scan provides a more detailed and comprehensive regional analysis of San Diego County to identify areas within San Diego County that are the best "fit" for Flexible Fleet services using a comprehensive analysis of demographic, travel demand data, and stakeholder feedback. The Regional Scan considers a broad range of socioeconomic data such as population, employment, and income, as well as travel demand data such as length and type of trip. These data are all strong indicators of Flexible Fleet success and align closely with the transportation needs assessments, use cases, and objectives identified for the services. The Regional Scan then prioritizes the areas into higher priority ("Tier 1") versus lower priority ("Tier 2") opportunities based on their potential.

STRATEGIC PLAN

The Strategic Plan provides a roadmap for near-term pilot implementation and documents a plan for how Flexible Fleet services and infrastructure should evolve to support the 5 Big Moves in the future. The Strategic Plan includes three elements:

1. Implementation Toolbox, which summarizes key physical, infrastructure, operational, and technological considerations for various Flexible Fleet services.

2. Pilot Implementations, which provide maps and tables describing key Toolbox elements and potential implementations across the highest performing Tier 1 markets.

3. Action Plan, which outlines the key actions and responsibilities for various public agencies over a short and long-term time horizon.

Partnerships

Project Development Team

Flexible Fleets can deliver promising benefits to users because of the variety to technologies, services, and geographies they utilize. Because of the diversity of implementation options for a Flexible Fleet service, a Project Development Team (PDT) consisting of the San Diego region's major transit providers – North County Transit District (NCTD) and Metropolitan Transit System (MTS) – and regional planners from SANDAG were consulted on a regular basis to provide input during the development of the Implementation Strategic Plan.

Potential Implementation Partners

In addition to the PDT, a series of implementation partners have been engaged throughout the Strategic Plan process, including local CBOs, City and County planning and public works staff at jurisdictions across San Diego County, and private-sector Flexible Fleet operators. These partners have provided valuable insights into the physical and operational challenges for deploying these types of shared mobility services. Partnering with large universities, employers, developers, and city partners is key for driving successful pilot programs that can deliver consistent ridership, cost-effective service metrics, and can become a sustainable and permanent addition to the local transportation ecosystem.

Flexible Fleets Goals and Objectives

The Flexible Fleet Implementation Strategic Plan goals and objectives align with the Vision established in the 2021 Regional Plan and include:

Flexible Fleet Implementation Strategic Plan Goals & Objectives		
Provide access to diverse mobility options and improve access to transit.	Reduce single-occupancy vehicle trips (SOV), vehicle-miles traveled, air pollution, and congestion.	Produce sustainable and scalable pilot programs

As with any investment into a transportation system, there are inherent trade-offs among potential strategies. The PDT drafted a list of detailed Goals and Objectives that was validated by the CBOs. The Goals and Objectives are consistent with State, Regional, and local priorities to help navigate the strategy development process. Each Goal and associated Objective is shown below.

Free Ride Everywhere Downtown (FRED)/Circuit, left; Micromobility on the University of California San Diego (UCSD) campus.

Strategic Plan Goals and Objectives

EQUITABLE

Objective	*Strategies should fairly distribute the benefits of Flexible Fleets services to all communities and population groups while prioritizing services in underserved communities*
	Strategies should be validated by CBOs representing traditionally underserved communities with significant mobility needs in the Region
	Strategies should connect communities to resources that enhance economic mobility and access to services
	Services should be accessible to vulnerable population groups such as low-income individuals, seniors, people with disabilities, and transit-dependent populations

FLEXIBLE

Objective	*Avoid major infrastructure changes that can increase the cost and logistical steps to implement*
	Services should be easily adaptable and scalable to meet performance objectives and goals

IMPLEMENTABLE

Objective	*Flexible Fleet services should complement other transit services and allow for convenient transfers at key stations and mobility hubs*
	Prioritize strategies that qualify for funding
	Services should require limited up-front public costs for infrastructure, permitting, environmental review, and operations

REPRODUCIBLE

Objective	*Flexible Fleet services should utilize technologies and vehicles that have been successfully deployed in other markets*

LEVERAGE MAJOR INVESTMENTS	
Objective	*Strategies should connect to the existing or future regional transit system to amplify the access the service provides*
	Strategies should connect to the existing or future regional transportation network to extend the areas that can access the service
INFLUENCE TRAVEL BEHAVIOR	
Objective	*Flexible Fleet travel times, ease of use, and reliability should improve total journey times and be competitive with driving a car*
	Strategies should encourage shared rides to reduce SOV trips and vehicle miles travelled
SUSTAINABLE	
Objective	*Services should minimize greenhouse gas emissions (GHGs)*
	Services should leverage zero emission vehicles and clean energy charging solutions where feasible
	Maintenance and disposal of vehicles should minimize potential environmental impacts
PARTNERSHIPS	
Objective	*Leverage SANDAG's relationships with CBOs to co-develop pilot programs*
	Pursue relationships with workforce development and business improvement districts (BIDs) to market Flexible Fleet services to employers
	Pursue services with a strong potential for partnerships such as universities, the military, tribal nations, large residential developments, and hospitals
	Integrate Flexible Fleets with SANDAG's existing Transportation Demand Management (TDM) programs
SAFETY	
Objective	*Service implementation should include appropriate infrastructure improvements needed for user safety*
	Ensure protection of user data privacy

The Goals and Objectives developed with the PDT and validated with the CBOs provide a consistent framework for assessing Flexible Fleet services throughout the Strategic Plan document.

Chapter 02
Flexible Fleet Services

Chapter 02: Flexible Fleet Services

The way that people travel through communities is changing. The evolution of smartphones with GPS-enabled technologies and batteries for electric bikes and scooters has led to a proliferation of different mobility services that provide the capability for flexible routing, on-demand travel, and the sharing or pooling of rides. Flexible Fleet technologies can be applied in a variety of ways to improve mobility in communities where access to transit is limited, the quality of transportation is poor, or where households do not own a car. Flexible Fleets can improve mobility and provide a first/last-mile connection to transit, fill gaps in the transit network in urban, suburban, and rural communities and provide a sustainable alternative to private vehicles for short trips between local destinations.

Flexible Fleet vehicles and technologies are adaptable to many different types of trips and can be scaled to solve a range of transportation problems that transit and other transportation demand management (TDM) programs on their own cannot address. Microtransit shuttles can provide enhanced access to San Diego Metropolitan Transit System (MTS) and North County Transit District (NCTD) stations, which can greatly increase the catchment area for each station well beyond the typical first/last-mile distance. This can generate higher ridership and reduce park-and-ride demand at stations. Micromobility pilot programs utilizing scooters in denser mixed-use commercial areas can replace short distance auto trips with a fun and sustainable electric powered scooter or bike. Electric vehicle (EV) carshare programs that allow for one-way trips within a defined service area can provide a sustainable option for longer auto trips to destinations such as grocery stores and medical appointments.

Flexible Fleet services can take many different forms and this chapter introduces the common components that make up a Flexible Fleet service, summarizes different types of Flexible Fleets, and highlights examples of Flexible Fleet implementations across the United States.

Flexible Fleet Components

Flexible Fleets consist of a wide range of shared mobility systems with the following components and characteristics:

VEHICLES

Flexible Fleet vehicles can range in size from small 1 person bikes or scooters that are human or battery powered, standard passenger cars, 15 passenger minibuses, or 20-25 person minibuses. Power sources include gasoline, hybrid engines, battery electric, or hydrogen fuel cell. Wheelchair accessible vehicles (WAVs) for persons with disabilities are also in use.

DRIVERS

Flexible Fleet drivers can be employers of a privately owned company, public transit agency, city or jurisdiction, or independent contractors. Drivers typically require a standard driver's license; some roles could require a Commercial Driver's License (CDL) or Transportation Charter Permit (TCP).

SMARTPHONE APP

Smartphone apps are the most common way to reserve, schedule, or request a Flexible Fleet service. Apps allow the user to see where vehicles are located, check prices, and render payment. For users without a smartphone, operators have alternative methods for making reservations using a website or call center.

SERVICE AREA

Most Flexible Fleet services are only available anywhere within a geographic area and specified by a virtual "geofence". Pick-up/drop-off (PUDO) locations are identified by the operator in the app and can consist of any location where parking is permitted, such as an on-/off-street parking space, a passenger loading "white curb" space, or a defined facility for carshare or micromobility vehicle.

SERVICE MODELS

Most Flexible Fleet services are provided by private-sector operators in a public-private partnership agreement with a public agency such as a City or transit operator. The agreements specify the terms of service, geofence, driver rules, infrastructure requirements, pricing, customer service protocols, and performance monitoring and metrics. There are numerous models for how the public-private partnership services may be structured and range from the private operator providing a "turnkey" service to the public agency providing the vehicles and drivers, but the operator provides the technology and handles payment and customer service.

Flexible Fleet Technologies & Services

The following sections present the Flexible Fleet technologies and service categories along with some key operating characteristics and examples. A table of detailed case studies are provided in **Appendix A**. Flexible Fleet pilot projects are deploying quickly across the United States as public agencies are testing a wide range of various on-demand technologies and business models that are contributing to a very dynamic and rapidly evolving mobility landscape.

The Strategic Plan is focusing on seven broad Flexible Fleet categories: microtransit, Neighborhood Electric Vehicle (NEV) microtransit, micromobility, ridehail, rideshare, carshare, and last-mile delivery. These categories were selected as they represent the current state of the industry – however, ongoing technological innovation will continue to change the Flexible Fleet landscape and the capabilities of new shared on-demand mobility services. Each type of Flexible Fleet service has the potential to serve a wide range of trip purposes, bridge gaps in the transportation network, and provide greater mobility through the San Diego region. The following sections detail the typical parameters and capabilities of each Flexible Fleet service.

Figure 2-3: Flexible Fleet Technologies

Microtransit

Microtransit includes a variety of shared on-demand transportation services that typically operate within a defined service area where passengers start and end their trip. Microtransit operators can incorporate vehicles of various types and sizes, with most utilizing 6-10 passenger minivans or minibuses / cutaway buses carrying upwards of 15-18 passengers. Some microtransit vehicles can seat over 20 passengers and include Wheelchair Accessible Vehicles (WAV) with features such as wheelchair ramps or lifts.

(Carlsbad Connector)

(City of Porterville Microtransit)

Microtransit services are implemented with a variety of service models. The most common microtransit system incorporates a service model where riders use a smartphone app to request a ride and passenger pick-up and drop-off must occur within the service area's geofence. The pick-up and drop-off locations can be located at any point on the roadway network that is within the geofence, or the microtransit operator can instruct riders to walk a short distance to a "virtual bus stop" identified by the operator to optimize vehicle routing. The microtransit service area can also be tailored to serve key zones or destinations and to integrate with public transit systems and specific stations.

Most microtransit operators utilize some form of a dynamic routing algorithm that matches rides traveling in a similar direction to increase occupancy on the vehicle, improve operating efficiency, and minimize costs. Microtransit services can be designed to incorporate some elements of fixed-route transit such as designating pick-up and drop-off locations or implementing a fixed routing with designated boarding areas with some ability to deviate from the route to drop off a passenger at their destination.

Microtransit services are typically operated by a private sector company, which contracts with a public entity to provide the service. The service can consist of a "turnkey" model, where the vehicles, drivers, app technology, marketing, and support services are all provided by the private company. There are other operational models where some of these functions are provided by a transit agency – for example, the drivers could be provided by the transit agency, while the vehicles, technology, and support services are provided by the private company.

Microtransit Description	
Typical Service Range	1.5 – 4.5 miles
Capacity	Up to 15 passengers
Community Context	Urban mixed-use environments; suburban areas; areas with poor transit
Supporting Infrastructure and Policies	Maintenance and storage depots; pick-up/drop-off infrastructure; wayfinding signage; digital geofence for service boundary; shared mobility lanes
Examples	Carlsbad Connector (suspended, 2020) | Metro Micro (Los Angeles) |OC Flex (Orange County) | Smart Ride (Sacramento) | Flexride (Denver) SamTrans, OnDemand (ceased operations, 2020) | Via to Transit (Seattle) Chariot (ceased operations, 2019)

* *Descriptions are based on case study research, data, and a synthesis of Flexible Fleet operator interviews*

There are two types of microtransit recognized in the region. This study is treating NEV microtransit separately because NEVs differ from minivans and minibuses in terms of size, range, and performance. Conventional gasoline/diesel or hybrid powered minivans and minibuses are larger, have greater range, and can operate on any roadway. The United States Department of Transportation (USDOT) has classified as NEVs as low-speed vehicles (LSVs), which can only be operated on roads where the posted speed limit is 35 mph or less. This limits where NEVs can be deployed.

Microtransit Spotlight

Metro Micro, Los Angeles, CA

LAX/Inglewood Service Area (LA Metro Micro)

Metro Micro Bus (LA Micro Metro)

Micro is Metro's microtransit service in partnership with RideCo, offering trips within eight geofenced zones, approximately 15 to 20 square miles each (as of June 2022) in LA County. The service utilizes 10 seat passenger vans operated by Metro employees. Rides are requested through Metro's Transit app, which utilizes RideCo's matching algorithm to optimize routing and pick-up/drop-off points. The service costs $1.00 per ride and allows users to request a pick-up and drop-off anywhere within the service boundary. After transitioning to a point-to-point service in January 2021, the service delivered 156,000+ passenger trips in its second pilot year.

Via, Jersey City, NJ

Jersey City Service Area (Via)

Via Jersey City Vehicles (Via)

Jersey City partnered with Via to operate an on-demand bus service that can be hailed through a mobile app or a call center within a 13 square mile service area. As of June 2022, rates start at a baseline of $2.00 in the Central Zone but increase by $0.50 per mile in the Outer Zone. Despite launching during the pandemic, the program has seen high levels of demand and has partnered with Meals on Wheels to deliver food. City data indicates that ridership has grown from around 3,000 rides per week in 2020 to over 11,000 per week. However, wait times have increased from around 10 minutes in mid-2020 to over 24 minutes in 2022.

NEV Microtransit

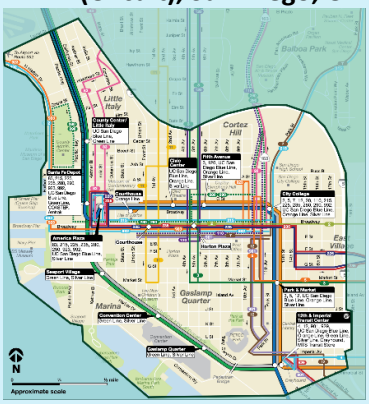
Neighborhood Electric Vehicles (NEV) microtransit operators utilize small, lower speed, battery powered EVs that typically carry up to 6 passengers in an open-air vehicle. NEV microtransit vehicles are permitted to operate on streets with speed limits of 35 miles per hour (mph) or less. NEV microtransit operates with similar service characteristics to the microtransit Flexible Fleet service described above – rides are typically requested with a smartphone app and pick-up and drop-off activities occur anywhere within a defined service area, at designated locations, or a hybrid of the two. The major difference compared to microtransit is that NEVs have less range compared to traditional minivans or minibuses and often require charging during an operating day. For this reason, NEV microtransit service areas are typically smaller and serve shorter trips than microtransit.

NEV Microtransit Description	
Typical Service Range	0.5 – 2 miles
Capacity	Up to 6 passengers
Community Context	Urban, mixed-use activity centers
Supporting Infrastructure and Policies	Maintenance, charging, and storage depots; pick-up/drop-off infrastructure; wayfinding signage; digital geofence for service boundary; shared mobility lanes; reduced speeds in service area
Examples	FRAN (Anaheim)|FRED - Circuit (San Diego)

* *Descriptions are based on case study research, data, and a synthesis of Flexible Fleet operator interviews*

NEV Microtransit Spotlight

FRED (Circuit), San Diego, CA



FRED Service Area (Circuit)

FRAN, Anaheim, CA

FRAN Service Area (Anaheim Regional Transportation)

FRED Vehicle (Circuit, San Diego Union Tribune)

FRAN Vehicle (Anaheim Regional Transportation)

FRED (Free Ride Everywhere Downtown) is a NEV microtransit service in San Diego operated by Circuit. Subsidized by City of San Diego downtown parking district revenue, it provides service within the downtown parking district using 6 passenger electric vehicles. It is free and can be requested from a mobile app anywhere in its service area. The service area is small (2 sq mi) as it only operates within the parking district. The program launched in 2016 and currently serves 250,000+ riders per year.

FRAN (Free Rides Around the Neighborhood) is a free NEV microtransit service operated by Circuit serving downtown Anaheim using 6 passenger electric vehicles. Shuttles are requested through an app with pick-up and drop-offs occurring at 16 stations (soon to be 18). The service is a joint venture between Anaheim Regional Transportation (ART) and the City of Anaheim and further supported by grants and local property assessments. The City was recently awarded a grant through California's Transit and Intercity Rail Program (TIRCP), which will fund the purchase and expansion of FRAN's program.

Micromobility

Micromobility operators utilize small, lightweight, low-speed bikes, scooters, mopeds, or other "rideable" transportation devices for 1 or 2 people that are self-powered or battery powered. Vehicles can be accessed at physical docking stations or can be part of a dockless system where they can be accessed anywhere within a geofenced service area. Dockless systems allow for bikes or scooters to be parked at permitted locations within the public right-of-way (R/W), parked at a bike and scooter corral or parking zone, or locked to bike racks, utility poles, or parking meters per local regulations. Micromobility vehicles are typically located and reserved using a smartphone app. For docked systems, smartphone apps will display the location of the dock and the number and type of vehicles available. For dockless systems, the smartphone app provides the location of the bike or scooter and the information such as the battery status.

Dockless Micromobility Service Characteristics	
Typical Service Range	0-3 miles
Capacity	1 user per bike/scooter
Community Context	Serves high density, mixed-use activity centers, recreational areas
Supporting Infrastructure and Policies	Dedicated bike lanes; digital geofencing; sidewalk space allocation management; micromobility corrals and curb management
Examples	Lime (San Diego) | Bird (San Diego) | Spin (San Diego)

Docked Micromobility Service Characteristics	
Access	Vehicles are accessed at a designated location with a physical docking system that can also provide vehicle charging.
Typical Service Range	0-3 miles; dependent on the locations of docking stations
Capacity	1 user per bike/scooter
Community Context	Serves high density, mixed-use activity centers, recreational areas
Supporting Infrastructure and Policies	Dedicated bike lanes; dedicated and secure docking stations; digital geofencing; sidewalk space management; utilities to support charging
Examples	Citi Bike (New York City/New Jersey) | Biketown (Portland) Decobike (Ceased Operations, San Diego)

** Descriptions are based on case study research, data, and a synthesis of Flexible Fleet operator interviews*

Micromobility Spotlight

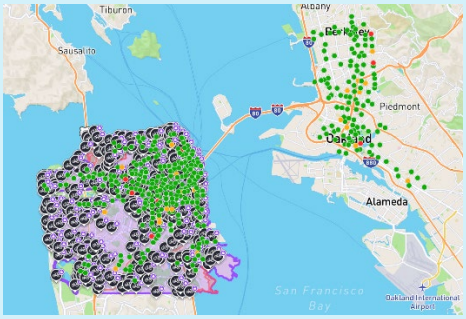
Dockless Scooter Operators, San Diego, CA

Scooter Docking Station (DCist)

Bird, Lime, and Wheels Parked in Dockless Corral (SANDAG)

Several dockless scootershare services operate in various parts of San Diego. They can be reserved via a mobile app and some operators provide incentives for parking the vehicles in designated corrals. Additionally, GPS tracking technology in the micromobility devices prevent vehicles from exiting the service area allowing operators to prevent vehicles from exiting the service area. They are easy to find with fares starting at $1.00 to begin the ride and $0.40 cents a minute. Scooters are typically used to travel short distances. Given there are no docked stations and a limited number of corrals, there are often issues with vehicles cluttering busy areas. Another challenge is that scooters are commonly victims of theft and vandalism.

BayWheels, San Francisco Bay Area, CA



BayWheels Service Area (Medium)

BayWheels Docking Station (SFMTA)

BayWheels (operated by Lyft) in the San Francisco Bay Area provides a hybrid system of docked bikes and docked/dockless e-bikes in San Francisco and parts of Oakland, Berkeley, and San Jose. Monthly bike ridership has increased steadily from almost 180,000 rides a month in May 2018 to 235,000 in May 2022. All of the bikes are located and reserved through the Lyft App. They can be locked at physical docking stations, but also any bike rack or light pole. These options provide convenience but also creates issues with the clustering of bikes in high traffic areas. Ride prices, especially for e-bikes, are also expensive, with fares starting at $3.49 to begin the ride and $0.30 cents a minute, leading the city of San Francisco to consider creating a fleet of e-bikes that are run publicly.

Ridehail

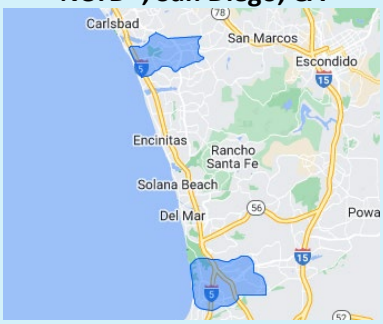
Ridehailing includes single occupant or single party "for hire" vehicles operated by app-based Transportation Network companies (TNCs) such as Uber, Lyft, and taxicabs. TNC rides are typically requested using a smartphone app, website, or a call center. Riders are matched with available drivers that are operating on the platform and prices are determined by the length of the trip and other variables such as surge or peak pricing conditions. Ridehail pick-up and drop-off can occur wherever passenger loading is permitting or on-street parking spaces. Most ridehail drivers are independent contractors who operate their own vehicles or lease them through the TNC company. Taxis are typically hailed on the street, dispatched through a call center, and are increasingly requested using a variety of smartphone apps. For the purposes of the Flexible Fleets Strategic Plan, ridehail services include subsidized ride programs or "taxi scrip" vouchers applied to rides within a defined geographic area or for users of a specific use, such as a guaranteed ride home program at a college or business or subsidized transit first/last-mile programs. Drivers for TNCs are typically independent contractors and are not employees.

Ridehail Service Characteristics	
Typical Service Range	1 – 8 miles
Capacity	Up to 8 passengers
Community Context	Urban mixed-use and suburban environments
Supporting Infrastructure and Policies	Designated pick-up/drop-off; HOV shared mobility lanes; wayfinding signage; public and private EV infrastructure
Examples	Lyft (US) | GoMonrovia – Lyft (Monrovia, CA) | Uber (US) | Voyage (Orlando)

**Descriptions are based on case study research, data, and a synthesis of Flexible Fleet operator interviews*

Ridehail Spotlight

NCTD+, San Diego, CA



Service Area (NCTD)

GoMonrovia, Monrovia, CA

City of Monrovia (Town Square Publications)

Carlsbad Coaster Station (The Coast News)

Lyft Ride(The Balance)

NCTD+ is a pilot program that partners with rideshare services Lyft, Uber, and TripShot to provide discounted first and last mile connections for commuters at the Sorrento Valley and Carlsbad Poinsettia COASTER Stations. Rides can be booked through each company's apps with a coupon or QR code. The program runs from 5:30am to 10:30pm, providing flexibility and safe rides for those that work late. NCTD will subsidize $7.50 for each ride, making ride hailing services more affordable for those who are traveling in the designated service areas surrounding each station.

GoMonrovia partners the City of Monrovia with Lyft to provide reduced-rate rides within the city and to designated areas in neighboring towns. Trips can be fulfilled for $3.00 and are available 24/7 via the Lyft app, making them affordable and accessible for passengers. From March 2018 when the program launched to February 2019, about 1,450 rides were completed every day. About 20,000 rides started or ended at Old Town/Gold Line per month, which comprises 30% of all rides. Service area adjustments and price structure increases later led to a decline in ridership.[1]

[1] Source: https://rosap.ntl.bts.gov/view/dot/58702; *Innovations in Transit? An in-depth case study of Monrovia/Lyft public-private partnership to increase transit ridership in suburbia*, June 2021, USC Price/PSR.

Rideshare

Ridesharing includes services that pool multiple riders into a single vehicle that are traveling between a set of origins and destinations in close proximity. Ridesharing includes carpools, vanpools, and pooled ridehailing services operated by TNCs such as UberPool, Lyft Shared, and Waze Carpool. These services can make multiple stops along a route to pick up and drop off passengers. Carpools typically utilize a private passenger car with the pooling coordinated through commuter-based transportation demand management (TDM) programs, "casual" carpools formed near access points to high-occupancy vehicle (HOV) lanes, or dynamic matching of riders through apps such as RideAmigos or Waze. Vanpools work similarly to carpools, but operate larger vehicles that are often supported by public agencies that help to defray the cost of leasing a passenger van. UberPool and Lyft Shared operate a range of dynamic pooling services that increase the occupancy of each vehicle and reduce the cost of the individual trip.

Rideshare Service Characteristics	
Typical Service Range	1 – 20 miles
Capacity	2 – 4 passengers for carpools; 5-8 passenger for vanpools
Community Context	Urban mixed-use and suburban environments; recreational areas; connecting employees to employment centers
Supporting Infrastructure and Policies	Designated pick-up/drop-off; HOV shared mobility lanes; public and private EV infrastructure; depots for vehicle maintenance and charging
Examples	UberPool (General) | Vanpool (UCLA) | SANDAG Vanpool Program

* *Descriptions are based on case study research, data, and a synthesis of Flexible Fleet operator interviews*

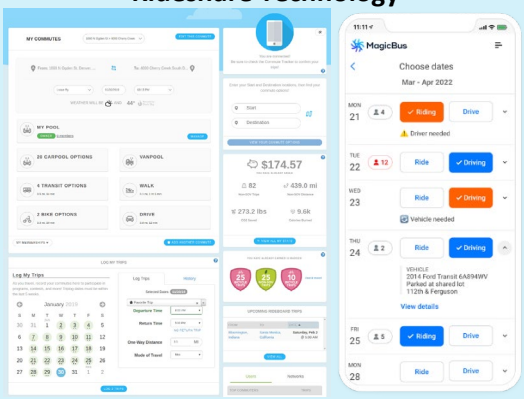
Rideshare Spotlight

SANDAG Vanpool Program, San Diego, CA

A Vanpool Group (Greener Ideal)

SANDAG's Vanpool Program brings together and coordinates groups that are looking to save money on their commute. SANDAG provides $500 dollars monthly per group to help lease a van through prearranged vendors. Through this subsidy, the program alleviates the cost of gas and of owning a car. Currently there are nearly 400 vanpools enrolled as part of the program. The Vanpool program, like many other transit services, saw a decline during the COVID-19 pandemic, yet achieved a reduction in 60 million vehicle miles traveled in 2021.

Rideshare Technology



RideAmigos and MagicBus app

Rideshare technology platforms such as RideAmigos aims to provide the technology resources to employers to gamify their employee's commutes using incentives and rewards in order to encourage various ridesharing options. The software allows for more efficient commutes by organizing car and vanpools that go to the same places to travel together. It also provides traveler information on public transit and micromobility options. Other mobile apps include Metropia, Waze Carpool, and MagicBus.

Carshare

Carshare includes a variety of short-term car rental services that can incorporate fixed stations with dedicated parking spaces or free-floating pick-up and drop-off options within a designated zone. Carshare services typically offer roundtrip (car must be returned to its original space) or one-way trip options (car can be dropped off anywhere within a geofence). Infrastructure to accommodate carshare spaces may include EV charging stations, dedicated parking spaces with signage and wayfinding, and management of the sidewalk space. Roundtrip carshare operations will typically negotiate agreements with private landowners and public agencies to provide parking spaces. One-way carshare operators typically allow parking at any public parking space. However, agreements are often required with cities for carshare vehicles to be exempt from parking regulations or to identify dedicated on-street spaces.

Carshare operations can incorporate vehicles that are owned by a company or organization such as Zipcar, or they can be owned and made available to the network by individuals through a Peer-to-Peer (P2P) system. P2P services incorporate privately-owned vehicles that are rented to drivers through a third-party broker. Carshare vehicles are typically rented for short periods of time (less than a day) and reserved and managed through a smartphone app.

Carshare Service Characteristics	
Typical Service Range	1.5 – 7 miles
Capacity	Up to 8 passengers
Community Context	Urban mixed use and suburban environments; large singular developments
Supporting Infrastructure and Policies	Designated parking spaces; HOV shared mobility lanes; wayfinding signage; public and private EV infrastructure; depots for vehicle maintenance and charging
Examples	Getaround (General)| Zipcar (General) | Our Community CarShare (Sacramento) | BlueLA (Los Angeles)

* *Descriptions are based on case study research, data, and a synthesis of Flexible Fleet operator interviews*

Carshare Spotlight

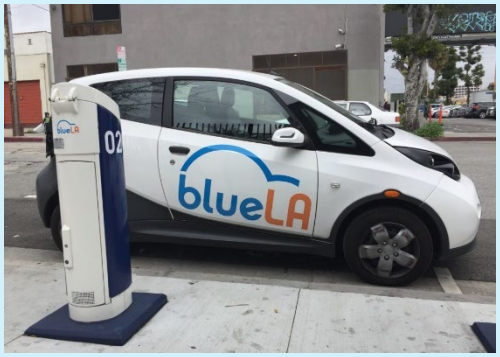
Our Community CarShare

CarShare Vehicle (California Climate Investments)

Our Community CarShare is a free membership-based service in Sacramento where residents of certain low-income communities can reserve a range of EVs. This program utilizes vehicles provided by ZipCar and is funded by various greenhouse gas reduction grants.

Cars can be reserved and accessed at 11 locations across Sacramento. Cars can be reserved for up to 3 hours per day or a total of 9 hours per week and they must be returned to their dedicated space.

BlueLA



Charging Station (The Fourth Revolution))

BlueLA is a public-private partnership between the Los Angeles mayor's office and Blink Mobility to bring electric vehicles to disadvantaged communities in LA. This carshare service aims to provide cleaner transportation options to decrease air pollution in low-income areas of the city. The program has seen impressive growth and utilization since its April 2018 launch.

The service features low monthly membership fees and operating use rates. Vehicles can be picked up and dropped off at 40 locations around the city and feature Chevy Bolt EVs.

Last-Mile Delivery

Last-mile delivery includes delivery options for goods from a local distribution hub to individual residences, businesses, or smart lockers at mobility hubs. These delivery services can be made by small EV delivery vans, e-bikes, autonomous vehicles (AVs), and drones. These services hold a tremendous amount of promise to help consolidate delivery trips and shift these trips to sustainable modes. Last-mile delivery is not explored further in the Flexible Fleets Implementation Strategic Plan for near-term pilots as it is still experimental and not as high of a priority for regional stakeholders and community members. However, opportunities should still be explored to deploy targeted pilot projects in new developments and urban areas that experience congestion and high volumes of deliveries.

Last-Mile Delivery Service Characteristics	
Typical Service Range	1 – 2 miles
Capacity	Varies, 200-300 lbs on a cargo e-bike
Community Context	Urban, high-density, mixed-use environments with mobility hubs
Supporting Infrastructure and Policies	Sidewalk management; strategically sited distribution centers; secure and efficient loading zones; public and private EV infrastructure; curb management; ground services
Examples	Urban Freight Lab (Seattle, WA) | Amazon Drone Delivery (Lockeford, CA)

* *Descriptions are based on case study research, data, and a synthesis of Flexible Fleet operator interviews*

Last-Mile Delivery Spotlight

Urban Freight Lab, Seattle, WA

Package Distribution Center (Geekwire)

The University of Washington's Urban Freight Lab is piloting a last-mile delivery program that seeks to alleviate congestion by addressing the last leg of urban deliveries. The pilot utilizes localized distribution centers where logistics and e-commerce companies can drop off packages, which are then picked up and delivered to homes and businesses by electric-assisted cargo bikes. It decreases the congestion and environmental impacts of parcel delivery, which has surged during the COVID-19 pandemic.

Amazon Drone Delivery, Lockeford, CA

A Delivery Drone in Flight (The Verge)

Companies such as Amazon and Walmart are experimenting with utilizing drones to deliver high-value lightweight packages short distances. Amazon's drone delivery pilot in Lockeford, CA serves packages that weigh under five pounds to residents in a four-mile radius. This is meant to reduce the environmental impact of delivery and decrease the amount of manpower needed to fulfill Amazon orders. There are obstacles including issues of privacy and tampering with drones, as well as permits that are needed from the Federal Aviation Administration (FAA).

Chapter 03
Outreach and Engagement

Chapter 03: Outreach and Engagement

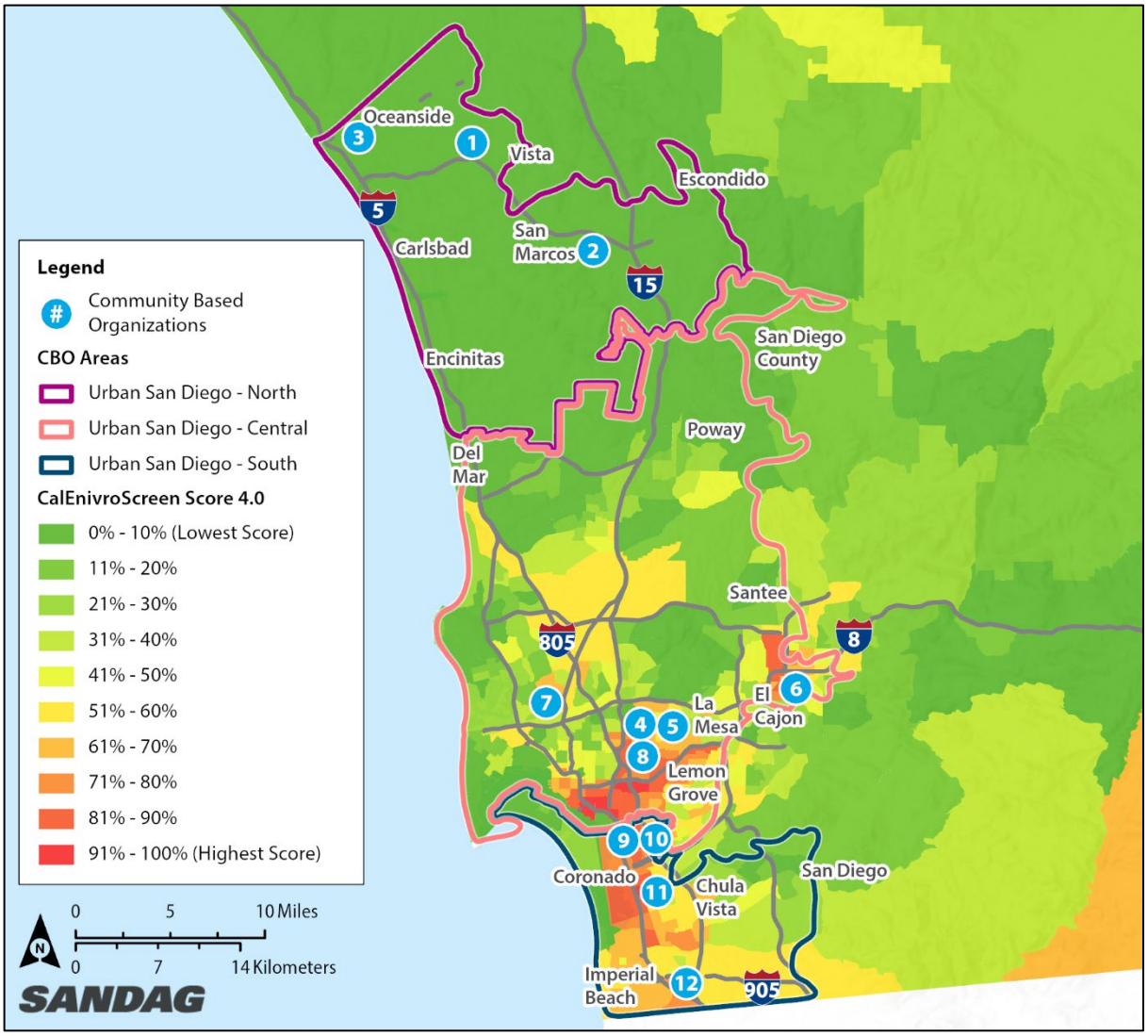
Stakeholder engagement is crucial to building trust in the community and collecting valuable information on local transportation needs. SANDAG has partnered with 12 Community-Based Organizations (CBOs) from across the County to serve as part of the Social Equity Working Group ("Working Group") to provide input for the 2021 Regional Plan projects in their communities. The CBOs were consulted at key points throughout the Strategic Plan process to understand the unique mobility needs of each community and how Flexible Fleets can help deliver better transportation outcomes. **Appendix B** contains the CBO Needs Assessment One Pagers. The main findings from this effort are summarized below.

Community-Based Organization Outreach Process

The Working Group communicates public input from underrepresented and historically marginalized communities regarding key priorities associated with the 2021 Regional Plan and related planning studies such as the Strategic Plan focus on social equity. **Figure 3-4** shows the location of the 12 CBO organizations in the Working Group, which include:

1. Vista Community Clinic
2. National Latino Research Center (California State University – San Marcos)
3. Alliance for Regional Solutions
4. City Heights Development Initiative
5. Nile Sisters Development Initiative
6. El Cajon Collaborative
7. Linda Vista Collaborative (Bayside CC)
8. Urban Collaborative Project
9. Samahan Health
10. Olivewood Gardens
11. Chula Vista Community Collaborative
12. Casa Familiar

Figure 3-4: CBO Area Map



SANDAG conducted an extensive Community Mobility Needs Assessment Survey with the CBOs from late-2020 to early-2021 that provided deeper insight into existing transportation options in the region, barriers to transportation access, and impacts of COVID-19 on the willingness to use various services. The survey results provided valuable information on CBO demographics,

Public Outreach for the 2021 Regional Plan (SANDAG)

travel behavior, and access to technology.

The survey was administered online using SurveyMonkey. The CBOs used various methods to distribute the survey, including social media, newsletters, email distribution lists, food distribution events, and phone banks. The survey utilized a convenience sampling approach. The results are not weighted or statistically representative of the entire San Diego region. However, they are useful for gauging public sentiment in an uncomplicated and economical way that is useful for pilot testing.

The survey collected over 2,900 responses from a diverse group of community members. The majority of respondents identified as female (73%) and black, indigenous, or people of color (BIPOC) (69%). Approximately 87% of respondents reported an annual household income that is less than the region's median household income of approximately $82,000 (based on 2019 SANDAG Population and Housing estimates). More than 45% of respondents reported being full- or part-time employed, 5% reported being students, and 40% reported being either unemployed, retired, or not working.

The survey results provided a strong underpinning for engaging with the CBOs at three different meetings:

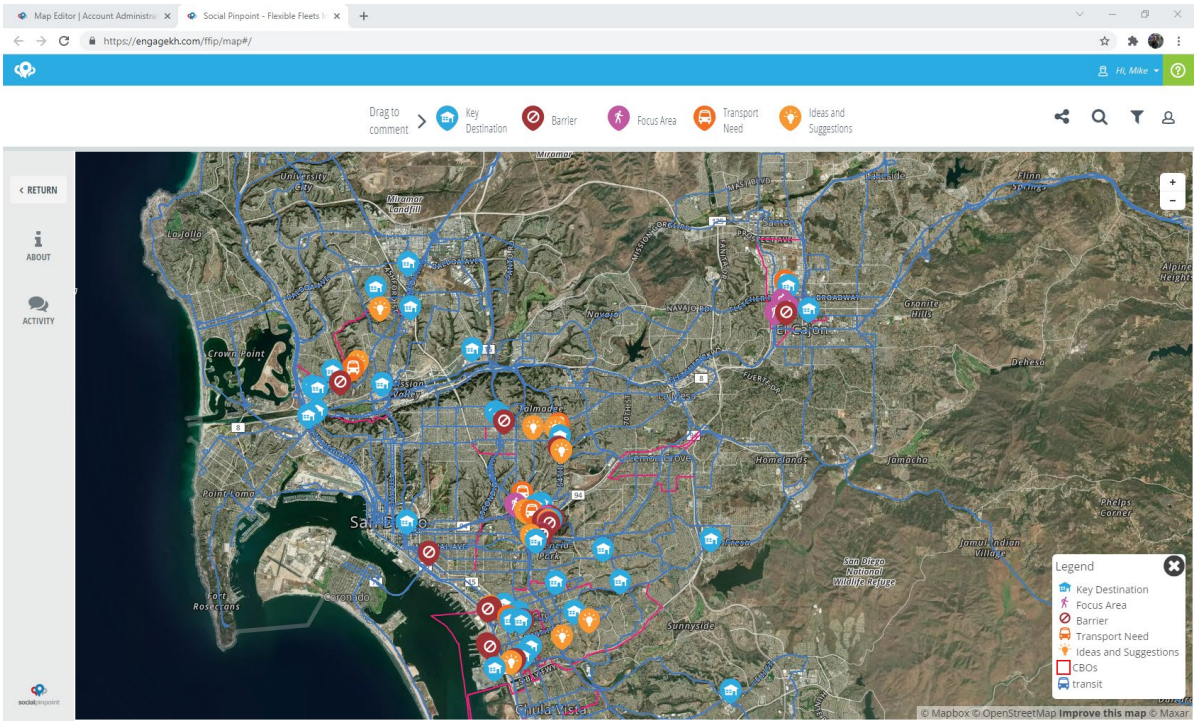
- **July 15, 2021:** presented the initial Flexible Fleets Implementation Strategic Plan goals and objectives and received feedback and input on these elements
- **August 19, 2021:** introduced the Social Pinpoint workshops and the intended outcomes
- **September 16, 2021:** summarized the findings from the workshops, recruited for one last follow-up workshop, received feedback on the findings

The CBO meetings were used to create four separate online mapping workshops with smaller sub-groups of the 12 CBOs roughly organized by geographic sub-region in August and September 2021.

Social Pinpoint Workshops

SANDAG and the consultant team conducted the four workshops using the online engagement tool Social Pinpoint (https://engagekh.com/ffip/map#/). Social Pinpoint was used to map geographically focused input on key destinations in each community, physical barriers that impede travel, and areas where transit or other transportation options could be improved with Flexible Fleets services. **Figure 3-5** shows a screenshot of the Social Pinpoint website used for the CBO workshops.

Figure 3-5: Social Pinpoint Online Web Mapping Tool



Several comments and feedback were consistent across the CBO workshops. Accessibility for those with disabilities, seniors, farmworkers, and other residents in rural areas was discussed at length. There was also considerable discussion about how the pilot projects should tie into rail and other transit centers throughout San Diego County. CBOs expressed that the pilot programs should support sub-regional trips, as well as trips with multiple stops to accommodate people with limited mobility who need to visit multiple destinations such as grocery stores, medical appointments, and community-gathering spaces. Several CBO workshop attendees explained they would need additional support in getting their clients to use a new service, as many residents are not familiar with Flexible Fleets and app-based mobility technologies.

Several barriers were discussed throughout the workshops. Mobility services, such as Uber and Lyft, can be difficult to use for seniors and those under 18 because they may not be familiar with smartphone apps, or they may be too young to use the service. Language was stated as another barrier, as the County has a high percentage of English limited communities. Flexible Fleet service information, apps, and marketing resources will require translation services into several languages to be effective.

Major Findings

The summaries below, organized by sub-region, highlight where there are areas of convergence in transportation needs and where there are differences between the sub-areas. The workshop

feedback was largely qualitative and captures a rich diversity of mobility needs in these communities.

North County

In North County, the CBOs noted that intra-regional travel options within North County should be a focus of Flexible Fleet pilot programs. The CBOs raised the need to focus on connections between rural and agricultural areas given the lack of transit alternatives and the greater distances between communities in the eastern portion of the County.

NCTD Sprinter platforms at the Escondido Transit Center in Escondido, CA.

There is also an interest in providing enhanced connectivity to help students access SPRINTER transit stations. Given the large North County area and its auto-oriented environment, there is a need for more connectivity and increased travel options within and between cities, especially for seniors and transit dependent populations. Important locations to consider for Flexible Fleets pilot programs include: CSUSM, Palomar College, Escondido Library, the Vista Civic Center, San Marcos Civic Center, various social service centers, medical centers, and shopping centers throughout North County. Policy and program recommendations suggested by the CBOs in North County are listed below:

- Consider intra-regional programs with a focus on all users and trip types:
  - Focus on senior mobility needs
  - Connecting Cities along the SR 78 Corridor
- Consider Flexible Fleet programs connecting rural and agricultural areas to major cities within North County to serve workers from targeted communities of concern and employment and recreational destinations west of Escondido.
- Consider a micromobility or microtransit program providing connections to SPRINTER stations in Vista as well as San Marcos for college and university students.

Central County

In Central County, CBOs expressed a strong interest in implementing a range of microtransit shuttle programs at transit centers to improve connectivity as many of the stations are not centrally located and there are safety concerns for pedestrians and bicyclists accessing these stations. CBOs highlighted key destinations in locations such as El Cajon including Parkway Plaza, Main Street, civic and government buildings, and local schools. In City Heights, CBOs expressed a desire to have better connections to transit centers and enhance the safety of pedestrian and bicycling facilities. Important key destinations include parks, schools, and neighboring communities such as Barrio Logan and Chollas Creek. In Linda Vista, there was a strong desire for microtransit or micromobility programs connecting key destinations such as Old Town, San Diego Health and Human Services facilities, and Kearny Mesa shopping and health care centers.

Main Street in El Cajon, CA contains a wide variety of employment and retail destinations.

Policy and program recommendations suggested by the CBOs of Central County are listed below:

- Consider Flexible Fleet programs connecting central San Diego destinations including essential services, schools, transit centers, and community gathering spaces, as well as connections to downtown San Diego.
- Consider e-bike or microtransit shuttle pilot programs connecting key destinations in more topographically challenged areas, such as Paradise Hills and City Heights. However, representatives of the City Heights community expressed a desire for active transportation upgrades to 54th street to ensure safe operations of Flexible Fleets.

South County

In South County, the CBOs noted the lack of safe infrastructure and amenities, including pedestrian and bicycling connections to transit stations and amenities such as bus shelters and lighting. The CBOs mentioned numerous destinations at the workshops, including Kimball Park, Pepper Park, Southwestern College, Emerald Hills, Barrio Logan, Lincoln Acres, and grocery stores and other locations that serve healthy food and essential services. There also was a strong desire that Flexible Fleet programs were deployed to serve less frequent activities such as annual music and cultural festivals, Swap Meets, and other community events.

A concern amongst San Ysidro residents was traffic and parking congestion resulting from cross-border trips. There is also a need for more transportation services near the border, as there are no longer any jitney services available. In addition to these needs, there is also a desire there for safer pedestrian infrastructure, especially for residents using the Beyer Trolley station.

Kimball Park in National City, CA provides a wide range of civic and recreational activities and is surrounded by residential and senior centers.

Policy and program recommendations suggested by the CBOs of Southern San Diego are listed below:

- Consider Flexible Fleet programs connecting key destinations including essential services, transit centers, and community gathering spaces in National City, Chula Vista, and San Ysidro.
- Expand services of the City of San Diego's current micromobility, which currently covers most urban communities, like Downtown and North Park, into southeastern San Diego communities such as Chollas Creek and Emerald Hills.

Other Considerations

The following are policy and program elements that were identified during the workshops that should be considered regardless of where the Flexible Fleet programs are implemented:

- Coordinate with CBOs to help market and implement Flexible Fleets pilot programs to ensure broad access to local residents by leveraging local resources to share information across multiple languages and tailor the messaging to the local market.
- Infrastructure investments should be addressed along with Flexible Fleet deployments to ensure that barriers to access are not an issue. These investments could include quick build improvements to nearby bike lanes and paths, sidewalks, signage and lighting, corrals for micromobility bikes and scooters, and station amenities such as shelters or lighting for microtransit.
- Microtransit pilot programs will require that pick-up and drop-off locations are identified on streets and at transit stations. For each location, the curb space allocation should be assessed as well as vehicle ingress and egress to ensure safe circulation.
- Flexible Fleets programs should make available wheelchair accessible vehicles (WAVs) that are ADA accessible and can accommodate larger items such as strollers and large packages.
- The Flexible Fleets program should offer a cash option and phone scheduling in addition to using technology-based applications to ensure access for lower income and senior populations.
- The Flexible Fleets program should consider using electric vehicles and other advanced clean technology where appropriate.

Stakeholder Interviews

Operator Interviews

Several Flexible Fleet operators across the different service types were interviewed for the study to understand the following:

- Current state of the industry, including impacts of the COVID-19 pandemic and growth projections
- Current state of their business and partnership models
- High-level considerations on applicability to various land use contexts and service design parameters
- Upcoming technology innovations to their mobility systems and service delivery processes

The interviews provided a means to test if these mobility services could align closely with the specific outcomes of the local transportation needs assessments and the use cases described below. The operator interviews were successful at validating the CBO needs assessments against the capabilities of Flexible Fleet services. This indicated that these mobility services would provide a strong range of options to improve transportation access and mobility for a wide range of trip types.

City/Jurisdiction Interviews

Cities and local jurisdictions play a critical role in the planning and implementation of Flexible Fleet pilot programs. A series of interviews were held with staff from planning, transportation, public works, and other related departments at several local jurisdictions across San Diego County to understand how they envision implementing potential Flexible Fleet services to serve their communities, along with the potential challenges and opportunities for Flexible Fleet deployments. The interviews provided SANDAG with information on upcoming development and transportation projects, ongoing coordination and partnerships with local employers and educational institutions, and opportunities for grant funding.

Use Case Development

A “use case” is a term used in product development that details how a user will interact with a service or product. Use cases for new and emerging products and services, such as Flexible Fleets, help identify who the users are, what their needs and expectations are from the product or service, and how they are likely to utilize the product or service. Use cases are developed through surveys and interviews and incorporate a feedback loop that allows for further refinement of the service. This information is valuable in the planning and design of new technologies and services where historic data and case studies could be limited.

For Flexible Fleets, there is a sizeable and growing body of case studies where shared on-demand mobility systems have been deployed in a variety of operating environments with varying geographic size, demographic characteristics, and trip types and lengths. However, there is a strong need to focus on specific use cases for communities in San Diego County, which have unique issues and challenges. The CBO and jurisdiction outreach described above and input from the PDT early in the Strategic Plan process provided critical detail on potential use cases for Flexible Fleets and how these could be applied across San Diego County. There is no “one size fits all” use case that resolves the multitude of mobility challenges in San Diego County. Flexible Fleet technologies can be applied in a variety of ways to fill mobility gaps and serve the diverse communities in the San Diego region. Three primary use cases were developed after the workshops and consultation with the project stakeholders. These use cases are described below.

Transit Access

The Transit Access use case supports high-frequency transit ridership by providing a Flexible Fleet solution that helps to bridge the first/last-mile (and beyond) around transit. This use case focuses on commute trips but can also capture short non-work trips that are made in the dense urban areas around major transit stations. The objective of the Transit Access use case is to extend the reach of underlying fixed-route transit services and increase ridership. NCTD+, a pilot program with Uber and Lyft, is an example of a transit access use case which offers subsidized ridehail trips to provide first and last mile connections for specific service areas near the Sorrento Valley and Carlsbad Poinsettia COASTER stations.

Carlsbad Poinsettia COASTER Station in Carlsbad, CA.

The specific Flexible Fleet technologies can be deployed around major high frequency transit stations to provide transit riders with additional options to access the transit stop across longer distances. The Transit Access use case can extend well beyond the transit station and commute trips to provide all day service to a wide range of trip types such as shopping, school, and recreation. The CBOs across the County stressed the need for more convenient options to access the transit system.

User Benefits

- Enhance the reach of existing transit services
- Improve mobility for social equity focused populations
- Provide more convenient access to transit for all

Operator Benefits

- Replace underperforming, infrequent transit routes by extending the reach of existing high-frequency routes
- Support existing high-frequency routes by connecting users to stations

Areawide Service

The Areawide Service use case supports short trips within a higher density service area to provide additional mobility options for residents, workers, and visitors to local destinations. The objective of the Areawide Service use case is to facilitate mobility within communities that have a high concentration of residential and commercial activity but have limited local transit service or multiple activity nodes that are spaced too far apart.

Santa Fe Avenue in Vista, CA.

The CBOs stressed the need to provide frequent and convenient access to a large number of retail, medical, recreational, and other civic destinations that are not typically clustered along major transit routes.

User Benefits

- Provide alternative modes of transportation for short trips
- Localized air quality benefits by reducing single-occupancy vehicle trips

Operator Benefits

- Create mobility in localized hard-to-serve areas
- Prioritize fixed-route transit services in more suitable areas

Gateway Connector

The Gateway Connector use case focuses on connecting lower density suburban and rural communities to communities on the periphery of urban San Diego that have access to a high-frequency transit gateway. This use case envisions creative ways to use technology to connect smaller communities with a service designed to provide limited fixed stops along with pre-scheduling of rides. Connectors could operate along corridors such as SR 76 and SR 78 or smaller corridors connecting Pala, Pauma Valley, Rincon, Valley Center, Ramona, Barona, Lakeside, Alpine, and other areas. Flexible Fleets could benefit these areas that either have major activity centers such as casinos or are gateways to agricultural or Tribal communities.

Gateway connectors would provide critical links from lower density areas to major transit centers such as Escondido, El Cajon, or Oceanside.

The Gateway Connector aims primarily to provide alternative transportation options to rural communities and connect them to high-frequency transit stops and the regional transit network. Rural transit corridors typically are underperforming due to lower demand and longer driving distances. Specific Flexible Fleet technologies can be used to provide a greater connection between rural communities and urban San Diego.

User Benefits

- Increased mobility to recreation areas and between rural communities
- Increased connection to the Regional Transportation Network
- Demand-based services provide a more convenient option than existing "lifeline services", which often run once or twice per day

Operator Benefits

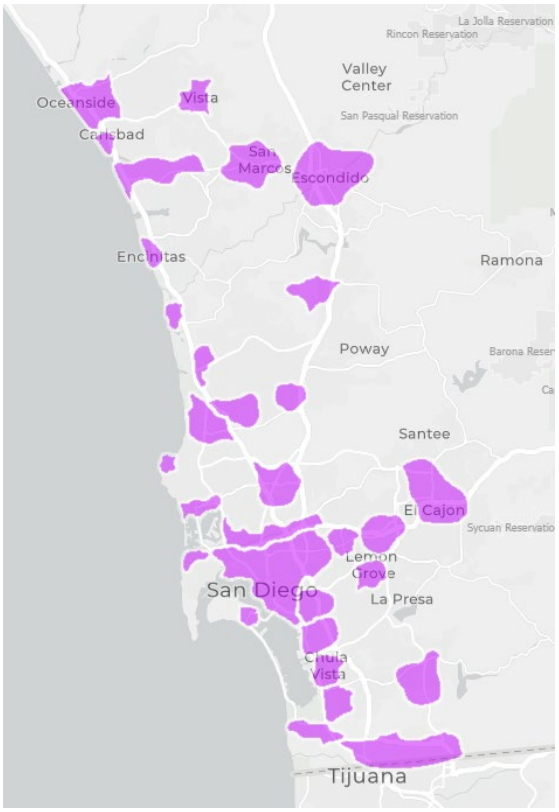
- Supplement/replace existing lifeline services with app-based, on-demand mobility
- Cost and efficiency savings by only serving areas where services are requested
- Improve reach of service for mobility-constrained populations in rural communities and Tribal Nations

Chapter 04
Regional Scan Evaluation

Chapter 04: Regional Scan Evaluation

Flexible Fleets offer a range of adaptable and scalable on-demand mobility services that can be deployed in various geographic areas to serve a wide range of users and trip types. A critical component of the Strategic Plan is to identify the most promising geographic areas for Flexible Fleet services, create a transparent process for prioritizing the service areas, and then support the implementation of pilot projects in those areas.

For the 2021 Regional Plan, SANDAG developed a strategy for planning and implementing Mobility Hubs across San Diego County. Mobility Hubs are places of connectivity where different modes of travel – walking, biking, transit, and shared mobility options such as Flexible Fleets – come together in one place to help people make connections quicky and get to where they need to go. The 2021 Regional Plan identified 31 Mobility Hub investment areas that are located around dense population and employment centers and major transit hubs. Flexible Fleet services integrate closely with Mobility Hub assets.



2021 Regional Plan Mobility Hub/Flexible Fleet hub areas. Source: SANDAG

The 31 regional Mobility Hubs represent a starting place for identifying and prioritizing potential Flexible Fleet pilot program service areas. The Regional Scan starts with these 31 Mobility Hub areas and incorporates a more detailed regional analysis of San Diego County to identify opportunity areas that are the best "fit" for Flexible Fleet. The Regional Scan also utilizes the Goals and Objectives developed by the PDT and the findings and use cases derived from the outreach to the CBOs. This allows the analysis to reflect both data-driven quantitative results and qualitative assessments from stakeholders and the public.

The Regional Scan utilizes an evaluation framework that considers several socioeconomic and travel demand data to identify and prioritize potential Flexible Fleet pilot areas into higher priority ("Tier 1") versus lower priority ("Tier 2") opportunities based on several factors that assess their potential for success. This section provides a summary overview of the Regional Scan evaluation metrics and the process to develop the Tier 1 and Tier 2 Flexible Fleet service opportunity areas. **Appendix C** provides the detailed methodology for the Regional Scan, including information on the evaluation framework, the socioeconomic and travel demand metrics, the selection of the Tier 1 and 2 opportunity areas, and the Flexible Fleet service use case best situated for the identified opportunity area. The Gateway Connector use case was

not included in the data-driven portion of the Regional Scan analysis, because the communities suitable for this use case have lower population and employment densities and would have been excluded from findings of the Regional Scan. However, a different approach to identify potential opportunity areas for Gateway Connector services were defined by obtaining other quantitative and qualitative information from land use data, stakeholders and CBOs.

Factors for Success

The Flexible Fleet service types are effective at enhancing mobility for the Transit Access, Areawide Service, Gateway Connector use cases described in the previous section. The effectiveness of a Flexible Fleet deployment depends on a series of demand and service design factors. The Regional Scan utilizes metrics that align with the demand factors described below, while the implementation strategy in **Chapter 5** incorporates a series of service design factors such as service area, wait time, and fare.

Demand Factors

- **High Density:** A high density of residents and workers (people per sq mi) is a strong indicator of concentrated trip making. Higher density areas are likely to have a higher concentration of all trip types (e.g. work, shopping) and trip lengths, which are strong candidates for Flexible Fleet services.
- **High-Frequency Transit:** The presence of high frequency transit stations is typically a strong indicator for Flexible Fleet success as the station serves as the origin or destination point for a large number of transit trips that require an additional first/last-mile travel connection to their ultimate destination. Flexible Fleets provide a convenient option for this first/last-mile connection.
- **Transit "Deserts":** The lack of high-frequency fixed-route transit service in a community – a transit "desert" – can also serve as an indicator for Flexible Fleet success. Flexible Fleets can provide an on-demand transit option that helps fill gaps in a transit agencies network.
- **Demographics:** Demographic characteristics such as age, income and the availability of a car also play a role in the success of various Flexible Fleet options. Younger students tend to drive the success of micromobility services such as scooters, while seniors (older than 65 years) without access to cars prefer microtransit.
- **Multiple Trip Types:** Flexible Fleets work best in areas with multiple trip types that serve work, shopping, and recreation. Focusing on multiple trip types across a service area helps eliminate the reliance on specific user types and time periods. This smooths out demand throughout the day and helps distribute vehicles across the network.

Evaluation Framework and Metrics

The Regional Scan incorporates several socioeconomic and travel demand data to identify geographic areas with the highest "propensity" or "likelihood" for Flexible Fleet services. These data-driven approach was developed based on the demand factors identified in the previous section and were aggregated into a series of "likelihood factors" that align with the Transit Access and Areawide Service use cases described in **Chapter 3**. An assessment of the Gateway Connector use case utilizes a different approach and is summarized at the end of this Chapter.

The Regional Scan considers five likelihood factors:

- **Ridership / Demand –** This factor considers population and employment density, which are indicators of higher ridership demand for Flexible Fleet services.
- **Mobility Needs –** This factor considers various social equity-related demographic metrics. These metrics describe concentrations of people with no access to vehicles, minority populations, low-income households, and seniors. These population groups have traditionally been underserved by transportation investments and would benefit greatly from the implementation of Flexible Fleet services.
- **Proximity to Transit –** This factor considers areas that are in close proximity (within 2-miles) of existing or future high-frequency transit. These areas are good candidates for first/last-mile connections to improve access to transit.
- **Short Trip Density –** This factor considers areas with a high percentage of short trips under 3 miles. Short trips by all travel modes are good candidates for Flexible Fleet services.
- **Limited Transit Access –** This factor considers areas with limited transit access or "transit deserts". These areas either have no transit access or the existing service is slow and infrequent. Areas with low access to high quality transit indicate a need for Flexible Fleet services to provide greater mobility options.

Table 4-1 below summarizes the specific data variables for each of the propensity factors and the source. The factors are used as indicators of success for the Transit Access and Areawide Service use cases.

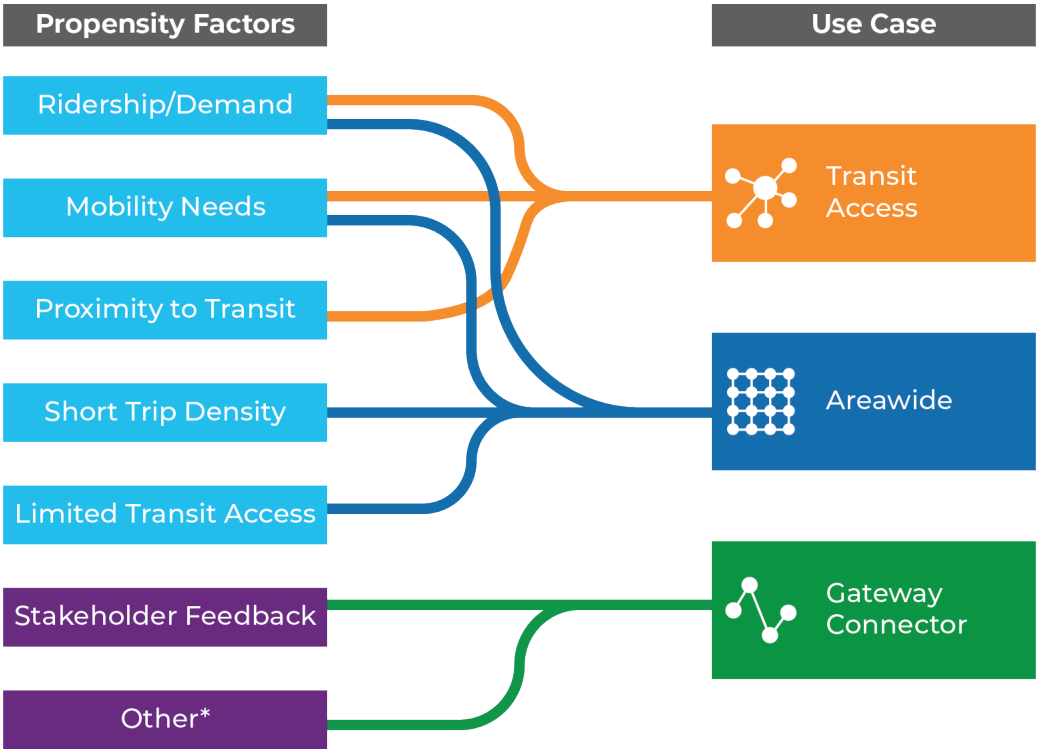
Table 4-2: Regional Scan Data Sources and Likelihood Factors

Likelihood Factor	Metric	Source
Ridership/Demand	Population Density Employment Density	American Community Survey, 5-Year Estimates, 2019 Census LODES 2019
Mobility Needs	Percent Zero Car Households Percent Low-Income Households Percent Minority (Non-White) Communities Percent Senior Communities	American Community Survey, 5-Year Estimates, 2019
Proximity to Transit	2-Mile Buffer of Existing High-Capacity Transit Stations	SANGIS
Short Trip Density	Percentage of Short Trips	Replica
Limited Transit Access	Transit Shed Area	Open Street Map, NCTD GTFS, MTS GTFS

The Transit Access and Areawide Service use cases utilize different combinations of these propensity factors. This reflects the differences in the underlying target markets for each use case – Transit Access is focused on first/last-mile commute connections around high frequency transit while the Areawide Service is focused on shorter trips in areas that are transit deserts.

Figure 4-1 shows how the propensity factors align with each of the use cases. The Transit Access use case utilizes the Ridership/Demand, Mobility Needs, Proximity to Transit, and Short Trip Density factors as indicators. The Areawide Service utilizes the Ridership/Demand, Mobility Needs, Short Trip Density, and Limited Transit Access as indicators.

Figure 4-6: Propensity Factors Map to Use Cases



**The Gateway Connector used other factors such as land use, locations of interest for Rural Communities and the location of Gateways into Urban San Diego.*

Regional Scan Process

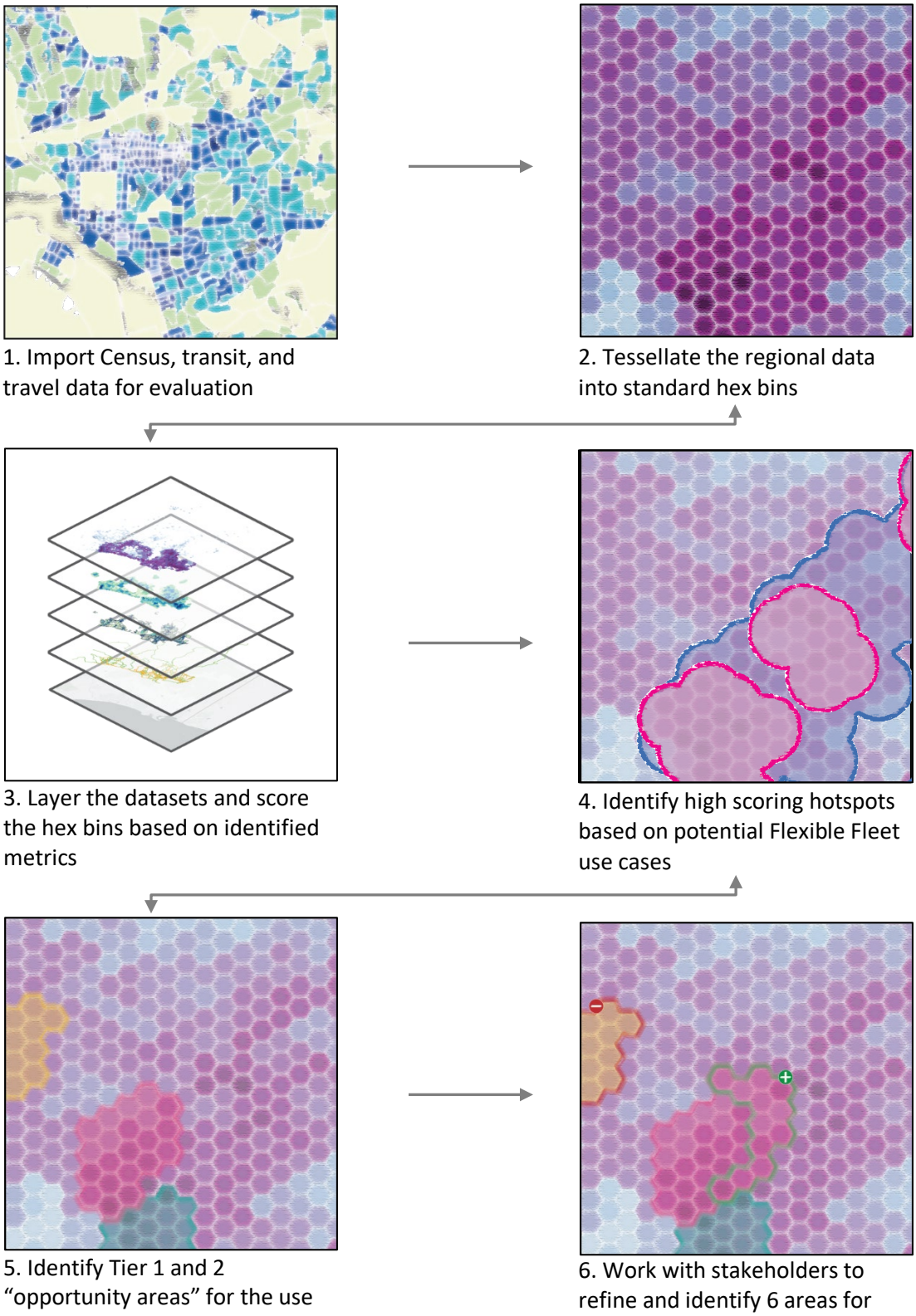
The Regional Scan utilizes the data and propensity factors listed above to identify optimal geographic areas for deploying Flexible Fleets. The analysis generates a series of scores for common geographic units that then allow for clustering and grouping of areas to identify service areas with the greatest potential or opportunity. The objective of the Regional Scan is to narrow down the very large number of possible Flexible Fleet pilot areas into a focused set of the "best" locations to test pilot programs initially.

Figure 4-3 illustrates the key steps of the Regional Scan process. The steps are summarized below.

1. **Collect data:** all socioeconomic and travel data for the factors listed in Table 4-1 were imported from Census, SANDAG, Replica, and other sources and stored at the most detailed geography (Census block, block group, or smaller).

3. **Tessalate data:** this step "tessalates" or proportionally groups all of the datasets into a small 0.5-mile hexbins. This process allows for scoring geographic areas on a much more detailed scale, which is useful for identifying the limits of service area boundaries and ensuring that key destinations are included in pilot program areas.
4. **Layer and score:** this step overlays the hexbin values and creates composite scores for each factor. The scores were developed for each factor and aggregated for each use case type (Transit Access and Areawide Service).
5. **Identify "hotpots":** scan the region to identify clusters of exceptionally high scoring "hotspots" that meet certain sizing and location criteria associated with the two primary use case types (Transit Access and Areawide Service). The sizing criteria are aligned with the case studies and these use cases.
6. **Develop Tier 1 and 2 "opportunity areas":** use the hotspot scoring results to identify feasible "opportunity areas" for Flexible Fleet services. Each area is scored and evaluated against a "cut-off" criteria established to filter the highest performing areas into Tier 1 (higher priority) and Tier 2 (lower priority) opportunity areas. The Tier 1 areas are the focus of the remainder of the report as they score the highest during the Regional Scan. However, the Tier 2 and other Mobility Hubs represent promising geographic areas for Flexible Fleet services.
7. **Refine the Tier 1 areas and select "pilot implementation areas":** the Tier 1 opportunity areas were reviewed with the PDT to determine the most promising six (6) areas for further evaluation as "pilot implementation areas". The service area boundaries and other key characteristics of each area were reviewed and refined. The pilot implementation areas represent the initial set of recommended areas for implementing Flexible Fleet pilot programs.

Figure 4-7: Regional Scan Process



Regional Scan Results

The Regional Scan process resulted in a series of identified Tier 1 and 2 opportunity areas and Gateway Connectors use case areas across San Diego County. These areas represent the best fit for deploying near-term Flexible Fleets services.

The top ten highest scoring opportunity areas as well as top priority locations identified by the PDT were set as Tier 1 (highest priority) with the next eight set as Tier 2. All of the Tier 1 locations scored highly on the Regional Scan and the areas with the highest scores as well as top priority locations from the PDT such as Imperial Beach, City Heights, and Pacific Beach were moved to Tier 1 due to the major investments and planned developments in the area that were not captured as part of the data-driven Regional Scan. A number of lower priority areas of interest identified from the PDT were also moved into the Tier 2 List.

Each of these priority areas overlap with one of the 31 Mobility Hubs identified in the 2021 Regional Plan. While Tier 1 and Tier 2 areas are identified as priority for near-term implementation, other Mobility Hub areas underwent a propensity analysis as part of the development of the 2021 Regional Plan and are also considered suitable for a range of Flexible Fleet service deployments. Based on the evaluation of likelihood factors from the regional scan, Transit Access or Areawide Service use case was assigned to each opportunity area with the exception of opportunity areas that overlapped with a NCTD/MTS Point of Interest. **Table 4-2** lists the Tier 1 and 2 opportunity areas and the use case for each opportunity area. **Figure 4-8** presents the Tier 1 and Tier 2 opportunity areas with their service area boundaries. **Figure 4-9** shows the overlap between Tier 1, 2 and Mobility Hubs.

Additional information for Tier 1 opportunity areas and Gateway Connectors use case is included at the end of this section.

Table 4-2: List of Tier 1 and 2 Opportunity Areas

Tier No.	Opportunity Areas	Use Case
Tier 1	Chula Vista	Transit Access
	Imperial Beach	Areawide Service
	National City/Paradise Hills	Transit Access
	Linda Vista	Transit Access/ PDT Point of Interest
	Pacific Beach	Areawide Service/PDT Point of Interest
	El Cajon	Areawide Service
	Escondido	Transit Access/PDT Point of Interest
	Vista	Areawide Service/ PDT Point of Interest
	Oceanside	Transit Access/PDT Point of Interest
	City Heights	Areawide Service/ PDT Point of Interest
Tier 2	Otay East and San Ysidro	Transit Access/PDT Point of Interest
	Encanto/Southeast San Diego	Transit Access/PDT Point of Interest
	Rancho Bernardo	PDT Point of Interest
	Carlsbad Village	Transit Access/PDT Point of Interest
	La Mesa/San Diego State University	Transit Access
	North UC/Sorrento Valley	Transit Access
	Palomar Airport Employment Center	Transit Access/PDT Point of Interest
	San Marcos	Transit Access/PDT Point of Interest

Figure 4-8: Tier 1 and 2 Opportunity Areas

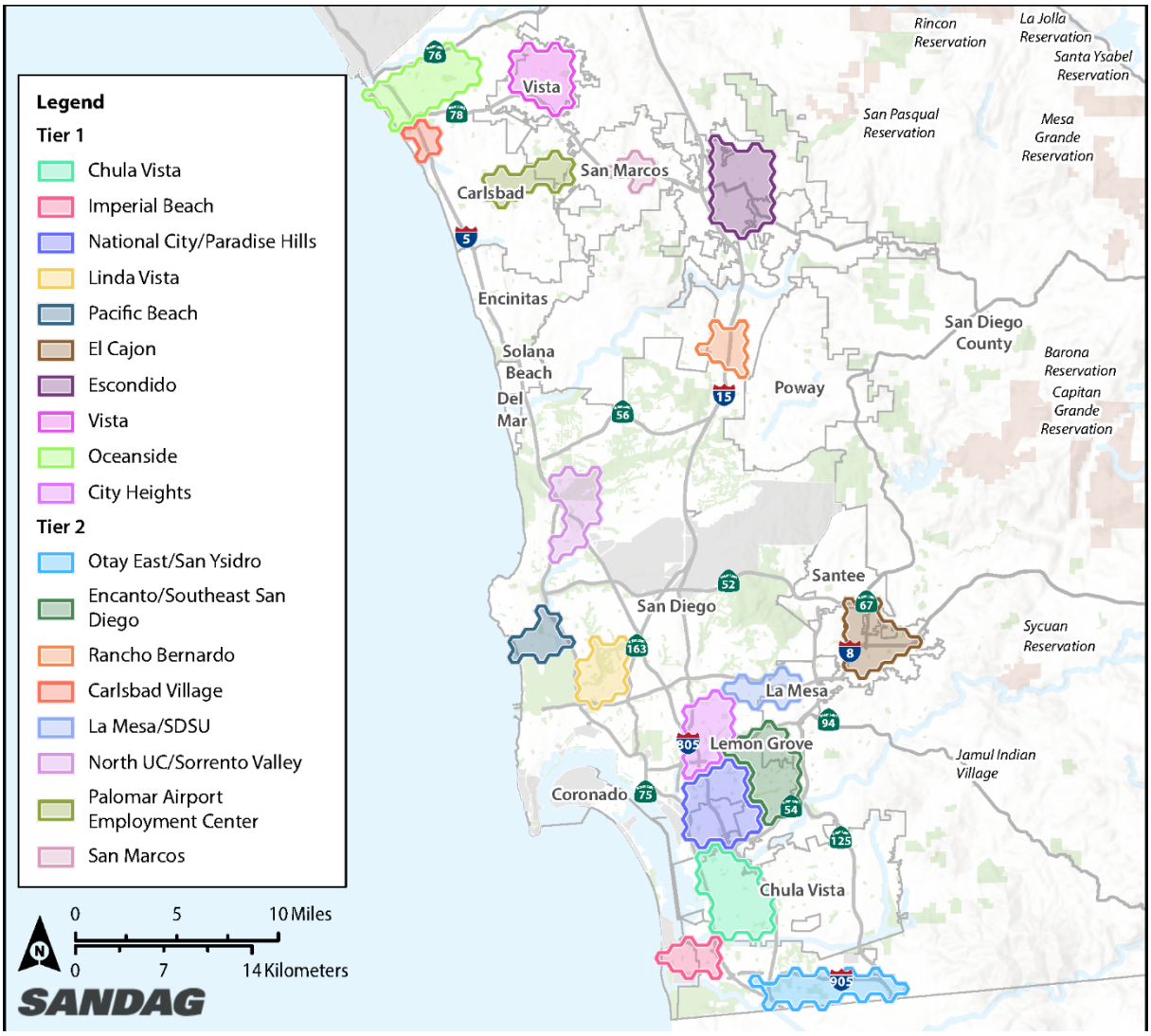
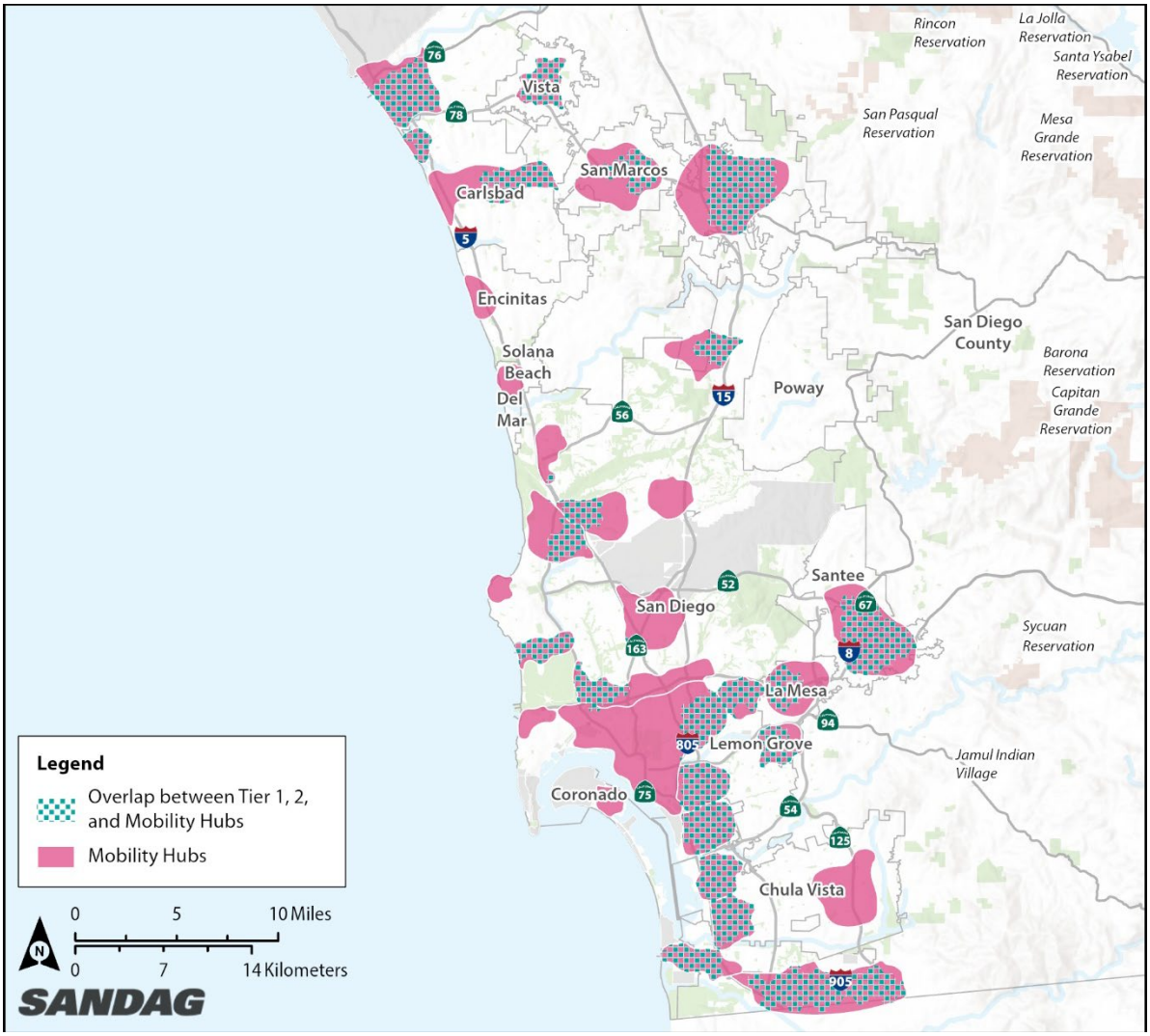


Figure 4-9: Overlap between Tier 1 and 2 Opportunity Areas and Mobility Hub Opportunity Areas

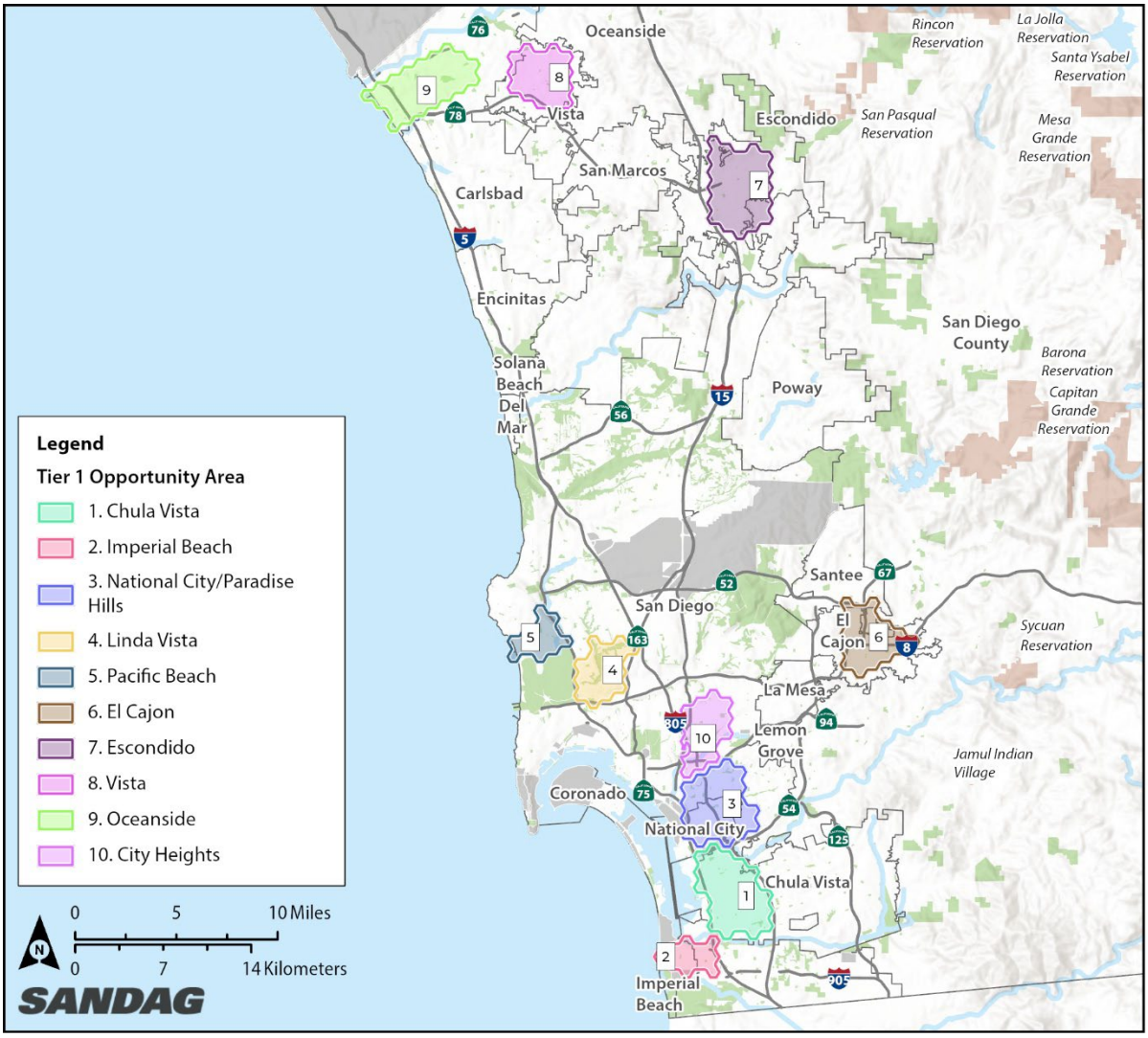


Regional Scan Result: Tier 1 Opportunity Areas

The Tier 1 opportunity areas, shown in **Figure 4-10,** were selected due to their high propensity for Flex Fleet services through the data-driven regional scan process described above, along with validation from key project stakeholders. Due to their high propensity, Tier 1 opportunity areas received additional research and analysis to help with the prioritization and implementation of Flex Fleet services. Additional maps, information and community input on the Tier 1 opportunity areas are provided in **Appendix C**.

These areas were reviewed with the PDT to determine the (6) most promising areas to advance as high priority "pilot implementation areas." The PDT came to a consensus on the final 6 locations based on a combination of decision factors such as the Regional Scan scores, social equity considerations, existing mobility, and planned near-term development or infrastructure projects. The community needs identified by local jurisdictions and transit agencies are outlined in the pilot implementation area profiles in **Chapter 5**. These areas are intended to serve as the initial areas to deploy Flexible Fleet pilots due to their viability for Flexible Fleet services and ability to scale up should the initial deployed operations be successful.

Figure 4-10: Tier 1 Opportunity Areas



Regional Scan Result: Gateway Connectors

The objective of the Gateway Connector use case is to improve mobility options with Flexible Fleet services for residents and workers on the periphery of urbanized San Diego. The Gateway Connectors can provide shared on-demand travel between lower density suburban and rural communities and access to high-frequency transit gateways in cities such as Escondido, El Cajon, and Oceanside. In the 2021 Regional Plan, these three communities have been identified as Gateway Mobility Hubs. Many of these communities lack adequate fixed-route transit service, which is challenging to provide in more rural parts of the County because of the area's size, low density, and long distances between destinations.

To make Flexible Fleet services successful in these areas, the service design would likely require establishing designated pick-up/drop-off zones near major trip generators. Concentrating pick-ups and drop-offs at designated zones would make vehicle routing more efficient, which would help reduce the number of vehicles in service and cost. The designated pick-up/drop-off areas should be located near population centers and large trip generators such as casino resorts.

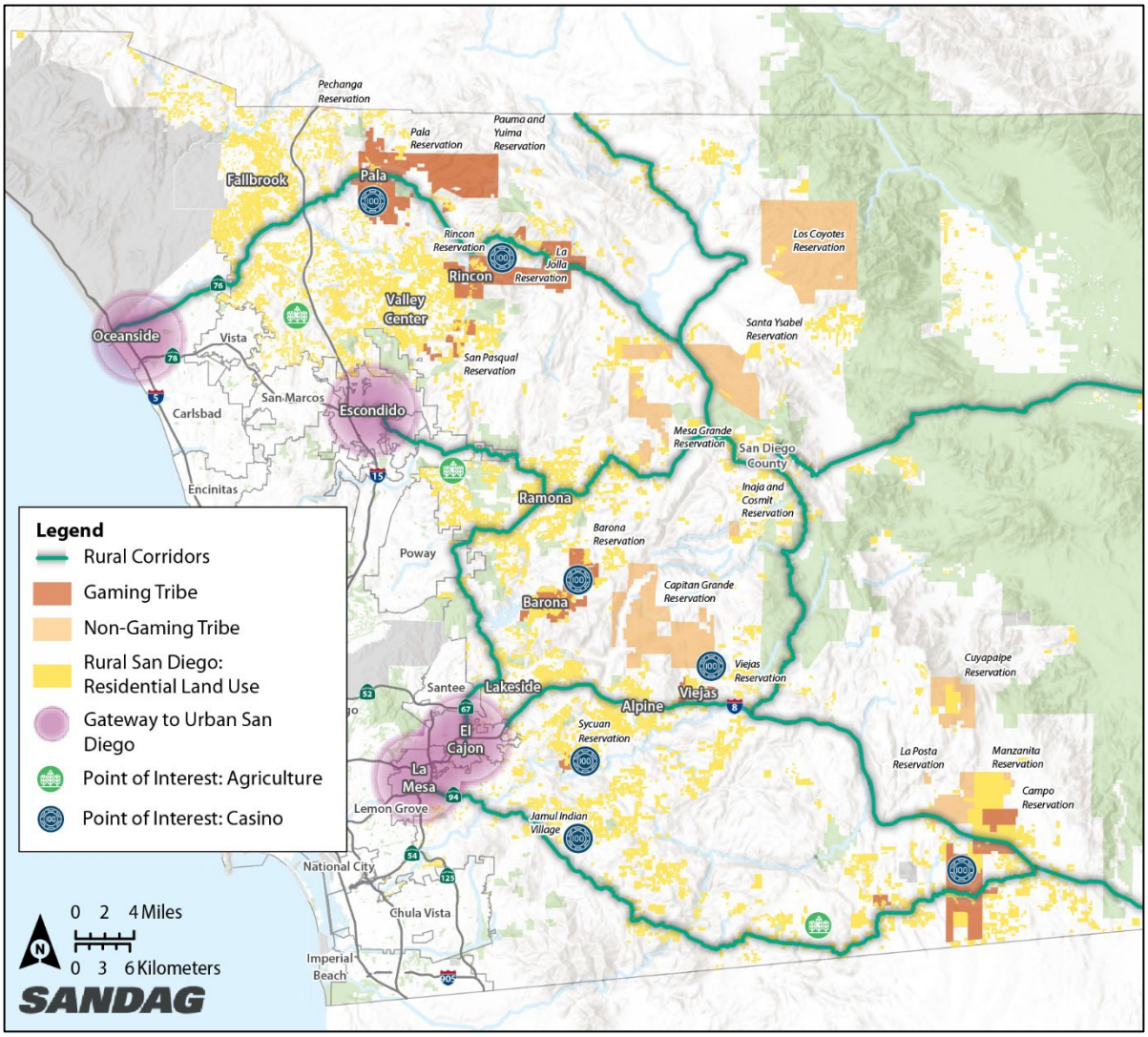
In addition, Gateway Connector services would also need to implement some level of pre-scheduling of rides to provide more certainty for riders and operators. For operators, scheduling provides a better indicator of demand and allows operators to adjust the number of vehicles they need to have in service. The combination of designated zones and pre-scheduling would result in Flexible Fleet services having less on-demand characteristics but would help to ensure higher vehicle occupancy and efficient routing between multiple origins and destinations. These factors help to keep services cost effective.

The Gateway Connector use case would focus on longer distance trips serving concentrations of work, shopping, and school-related destinations and connecting these activity centers with regional Mobility Hubs where transit and other Flexible Fleet services converge. Microtransit, ridehail, and rideshare services such as vanpools are a good fit to serve these trips. Operators in these service types have the technology to provide the designated zones and pre-scheduling of rides to provide a successful service. However, there is still considerable uncertainty regarding the viability and location of specific Gateway Connector travel markets when compared to the Transit Access and Areawide Service use cases described above. While Flexible Fleet operators have advanced and customizable technological solutions, case studies in rural settings are still emerging, and limited data exists to show the outcomes of these types of services. This makes implementing a Gateway Connector use case riskier when compared to the Transit Access or Areawide use cases.

For these reasons, the Strategic Plan suggests first considering pilots in Tier 1/2 opportunity areas, which are nearly guaranteed to offer promising results and successful operations. Implementations for Gateway Connectors should be explored after testing some initial Tier 1 and 2 pilots as they will require more careful planning, targeted outreach, and strong partnerships. However, there are several markets with a high degree of potential that should be considered and studied further for potential pilots to test the viability of the concept.

Figure 4-11 highlights some of the potential destinations and residential clusters for deploying a Gateway Connector service along the urban/rural edge of San Diego County.

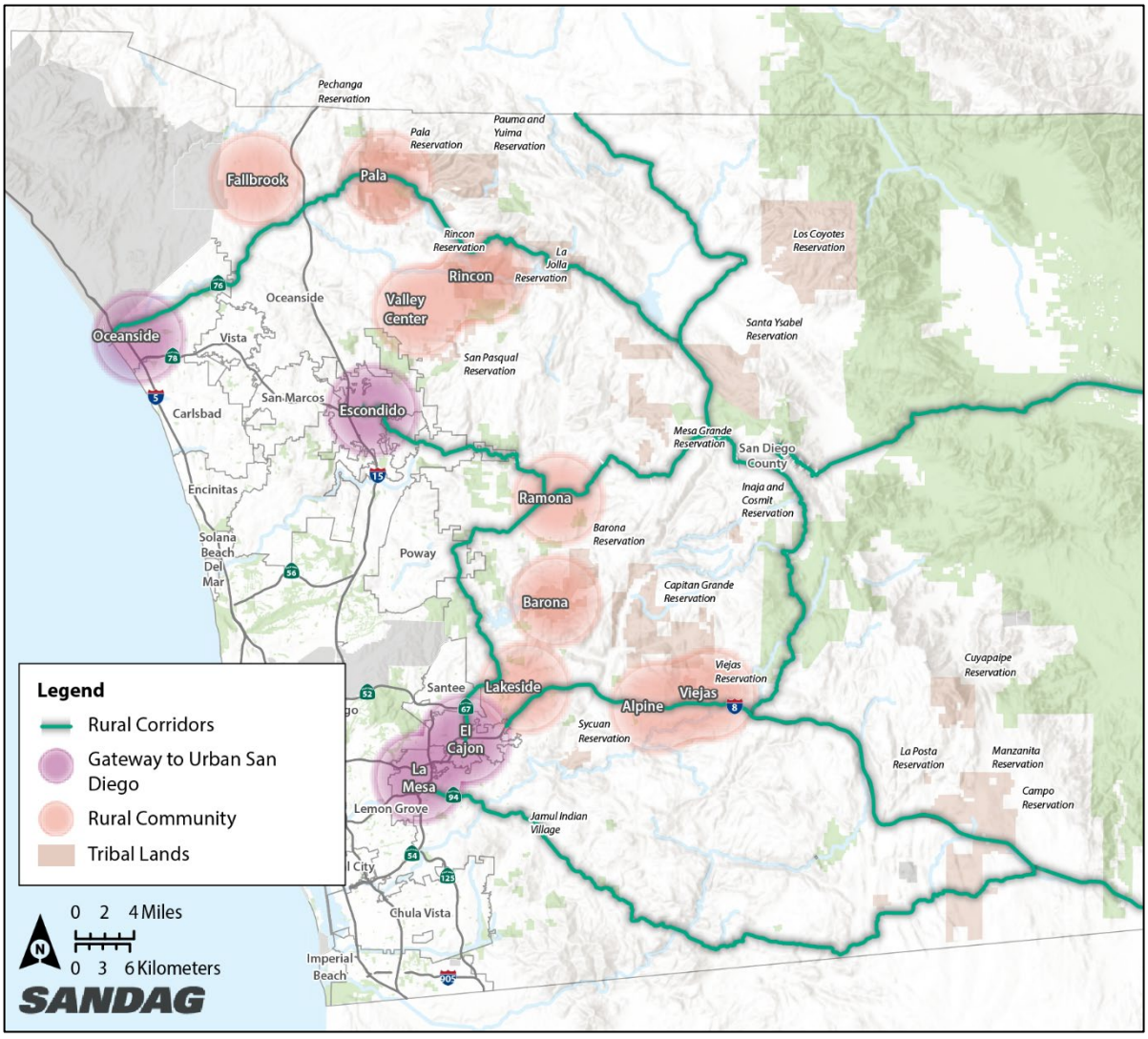
Figure 4-11: Gateway Connectors Potential Destinations



The potential Gateway Connector areas include residential areas in unincorporated communities such as Lakeside, Ramona, and Valley Center. They include large Tribal areas with casinos in Barona, Pala, and Viejas and various agricultural and winery regions.

Using these destinations and activity centers as a guide, a series of potential operating zones can be developed for future consideration for microtransit, ridehail, and rideshare services. **Figure 4-12** presents potential service areas that could serve as Gateway Connector network.

Figure 4-12: Potential Gateway Connector Service Areas



Chapter 05
Strategic Plan

Section 05: Strategic Plan

Chapter 4 presented the Regional Scan, which utilized a series of demand factors to identify areas within the San Diego region with a high propensity for successful Flexible Fleet service implementation. **Chapter 5** focuses on the service design factors and the implementation actions required of various stakeholders to deploy Flexible Fleet services.

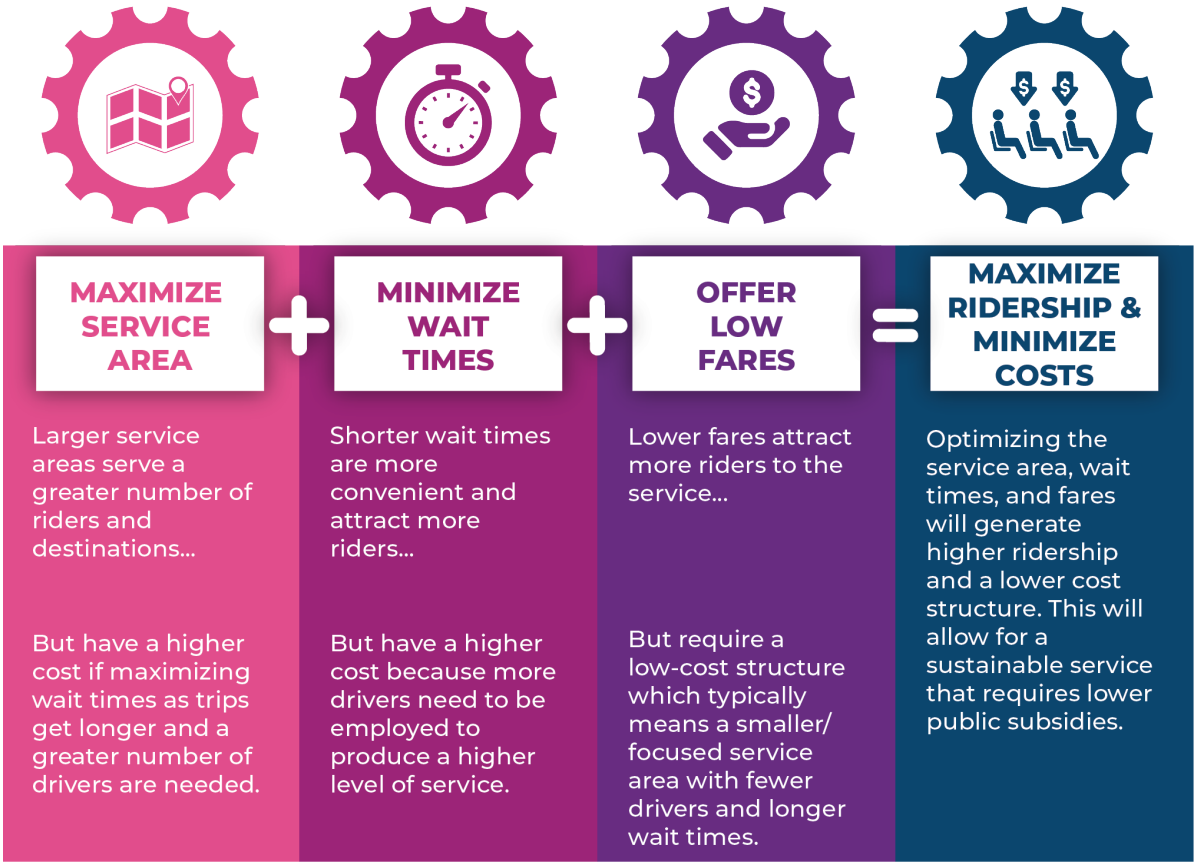
The service design factors describe the specific features and characteristics of Flexible Fleet operations that are required for a successful deployment.

Service Design Factors

- **Focused Service Areas:** Service areas are the virtual geofenced areas defined by operators where most types of Flexible Fleet services – microtransit, NEV microtransit, micromobility, and some ridehail models – can operate. Rideshare and carshare typically do not have a service area geofence, although some one-way carshare systems do have zones where cars can be picked up and dropped off. Service areas need to be large enough to capture enough target users and trips. However, larger service areas can result in longer wait times unless more vehicles are deployed, which can then lead to higher costs.
- **Convenient:** Flexible Fleet operators should provide a convenient travel option that a achieve high service levels with minimal wait times and plentiful vehicle supply. For microtransit and ridehailing services, these Flexible Fleet services are requested with a GPS-enabled smartphone app and a nearby driver is dispatched to the pick-up location. The wait time is the duration from when the ride is requested until the vehicle arrives at the pick-up location. Shorter and more reliable wait times make the service more convenient and attractive to users. The number of drivers and vehicles needs to be high enough to keep wait times convenient and to attract enough riders to the service. However, more drivers and vehicles can lead to higher costs. For micromobilty, the availability of vehicles in close proximity to a user impacts the convenience and attractiveness of the service.
- **Low Trip Fares:** the cost to the user is a major factor in the attractiveness of a Flexible Fleet service. There are a number of fare structures that can be implemented, from a free fully subsidized model to a partially subsidized fare. For the service to be accessible for lower income and disadvantaged populations, a lower fare with higher subsidies or a free service is required. The subsidy can come from a number of funding sources including community parking districts. Lower trip fares are more attractive to riders but require higher subsidies, which can increase the overall costs for deploying the service.
- **Low-Cost Structure:** the structure of the Flexible Fleet operation, including the size of the service area, number of vehicles, and fares impacts the overall cost structure and burden on the operator and funding partners. For a service to be financially sustainable and generate sufficient ridership, these factors must be kept in balance.

Figure 5-13 shows how balancing Flexible Fleet access (the size of the service area), wait times, and fares align to maximize ridership and minimize system costs.

Figure 5-13: Flexible Fleet Service Design Factors



Flexible Fleets Implementation Strategic Plan Elements

The Flexible Fleets Implementation Strategic Plan consists of four primary elements:

- **Implementation Toolbox:** summarizes key implementation steps and considerations that should be addressed as part of a rollout of a Flexible Fleet service by public agencies. This Toolbox can serve as a checklist when beginning to plan for implementing a Flexible Fleet pilot program.
- **Pilot Project Implementation Area Profiles:** provides maps and tables addressing various Toolbox elements for the six pilot implementation areas recommended in the Regional Scan. These sections provide a starting place for conversations with the local jurisdictions, CBOs, and Flexible Fleet operators.
- **Flexible Fleets Task Force**: outlines the initiation of a Flexible Fleets Task Force under SANDAG's Mobility Working Group to progress the implementation of Flexible Fleet Services throughout the region.
- **Action Plan:** defines the actions that SANDAG along with the Task Force, local jurisdictions, transit agencies, implementation partners, and operators should take at various stages of

the process of implementing Flexible Fleet pilots to achieve Flexible Fleet service goals and objectives throughout the region.

The four sections work together to provide a set of tools for implementing agencies to utilize when deploying potential Flexible Fleet services in their communities. The sections provide guidance on various planning, operational, and regulatory elements to ensure Flexible Fleet services achieve program objectives and ridership and cost targets.

Implementation Toolbox

The implementation toolbox serves as a checklist for agencies and organizations implementing Flexible Fleets with a list of items that need to be considered prior to implementing a service. The toolbox consists of the following 16 major categories that are critical in the implementation of Flexible Fleet services: Figure 5-14: Implementation Toolbox Components

Service Area

- Refine the virtual geofence service area to align operator requirements with goals and objectives of the Implementation Strategic Plan
- Verify key land uses, transit infrastructure and routes, and points of interest that should be included in the geofence and are good candidates for infrastructure

Service area map, Source : Ride Circuit

Public Agency Coordination/Governance

- Execute a coordination plan between local cities, the County (for unincorporated areas), other stakeholders (e.g., Caltrans) who have jurisdiction over the street and parking resources, and other state and federal agencies (if appropriate) to help streamline implementation

- Discuss permit procedures for encroachment permits or other related permits
- Confirm governance requirements with local jurisdictions, including topics such as data standards and labor laws
- Identify a "local implementation team" to support the project planning, design, and implementation

Infrastructure

- Assess curb requirements for pick-up/drop-off (PUDO) passenger loading zones (i.e., "white curb") on public streets
- Assess parking space requirements in publicly owned lots for PUDO, staging, or vehicle storage
- Assess the location and design of docking stations and corrals
- Assess EV charging infrastructure and requirements in off-street parking lots
- Assess curb needs at pick-up/drop-off (PUDO) passenger loading "white curb" space at rail and bus stops for microtransit, NEV microtransit, and ridehail
- Review circulation patterns to ensure there is sufficient space for Flexible Fleet vehicles to access the curb or parking spaces
- Identify vehicle / pedestrian conflicts that need to be addressed
- Identify space requirements within the public right-of-way (R/W) – on-street, sidewalk, public plazas, etc. – for infrastructure such as docking stations, corrals, and other supporting infrastructure

Bike dock infrastructure, Source: KBPS

Transit Coordination/Governance

- Specify coordination and level of integration with transit – service planning, operations, marketing, infrastructure, and station/real estate planning
- Identify ways for Flexible Fleets to complement/supplement existing fixed-route transit service and how best to design transfers between modes
- Identify Park & Ride facilities that can be leveraged for the implementation of Flexible Fleet services
- Explore integration of Flexible Fleet deployment with MTS and NCTD's PRONTO transit app

Operator Facilities / Storage Infrastructure

- Assess the operator infrastructure needs for short and long-term vehicle storage, maintenance, charging, and local customer service. This space could be co-located with other public or private facilities

EV charging stations, Source: iStock

Marketing and Outreach

- Assess the marketing needs for the Flexible Fleet service
- Conduct outreach events and/or workshops with community members prior to the launch of the service to increase awareness and collect input to inform service design
- Develop a marketing and outreach plan that adequately informs community members of Flexible Fleet services
- Customize the marketing and outreach plan based on the demographics of the community
- Develop methods for obtaining community feedback before, during, and after the services
- Evaluate the signage and wayfinding needs throughout the service area
- Conduct a marketing campaign using tools such as brochures, social media, email advertising, etc.
- Engage CBOs and other non-profit partners to help market the Flexible Fleet services in a way that is tailored to the community's unique needs and demographics
- Ensure that marketing and outreach materials are accessible to Limited-English Proficiency individuals and users without access to smartphones, internet access, etc.

EV signage, Source: West Coast Green Highway

Partnerships

- Explore partnerships with local employers and business parks, Business Improvement Districts, Chambers of Commerce, other civic organizations and non-profits, residential developments, senior centers, colleges and universities, school districts, hospitals, and other entities
- Identify partners that may want to directly fund or subsidize Flexible Fleet services such as universities/institutions, large employers, or organizations such as Transportation Management Agencies (TMAs) that assist with marketing and coordination with transit and other Transportation Demand Management (TDM) efforts

Data Standards/Privacy

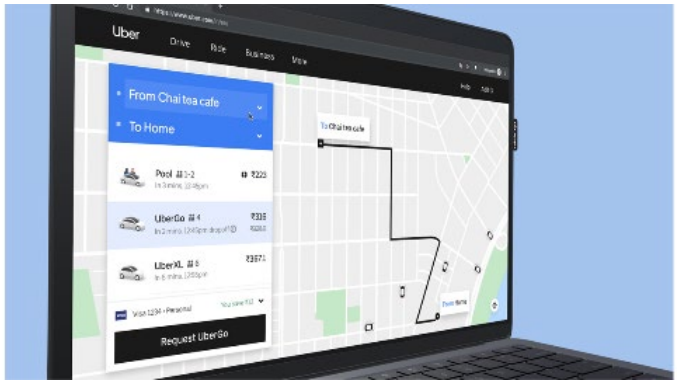
- Assess the best methods for coordination with SANDAG's Mobility Data Clearinghouse
- Assess available Application Programming Interface (API) options for exchanging data between operators, local jurisdiction, and SANDAG
- Assess the data privacy needs required to protect and safeguard sensitive user data

Performance Monitoring

- Identify monitoring measures such as completed trips, trip patterns, travel time per trip, wait times, cancellations, etc.
- Establish a frequency that KPIs will be reported (monthly, quarterly, annually, etc.)
- Establish a format that will be used to generate reports on performance

Technology Integration and Smartphone Apps

- Assess any gaps in smartphone adoption for local residents
- Assess the needs for the mobile smartphone apps
- Identify key features for all Flexible Fleet deployment apps such as estimated wait time, approximate cost, points to access service



Technology and data analytics tools, Source: Uber Engineering Blog

Other Costumer Service Options

- Assess if there are other needs for booking rides through alternative methods such as a phone call center, online through a web application, or in-person kiosks

Vehicle Configurations

- Assess the demographics of the service area and determine if services should be supplemented with vehicle configurations/adaptable vehicles such as wheelchair accessible vehicles (WAV) or larger minibuses
- Assess how services like rideshare, NEVs, or microtransit can be leveraged in combination with micromobility

Wheelchair Accessible Vehicle with ramp, Source: City of Roseville

Financial Models

- Assess the availability of funding and the recommended fare type for rides
- Identify if there are financial programs for certain populations to receive discounted or free rides
- Identify the payment terms and financial reporting requirements
- Explore Public-Private Partnerships to implement and fund Flexible Fleet services

Labor

- Confirm with the operators how they are staffing Flexible Fleet services to ensure consistency with state labor laws
- Identify whether drivers will be public sector employees or private sector employees or independent contractors to ensure that appropriate regulations and testing protocols are followed

Service Models

- Identify the preferable service model (turnkey or hybrid)
- Identify the level of integration and responsibility for the public / private operator

Pilot Project Implementation

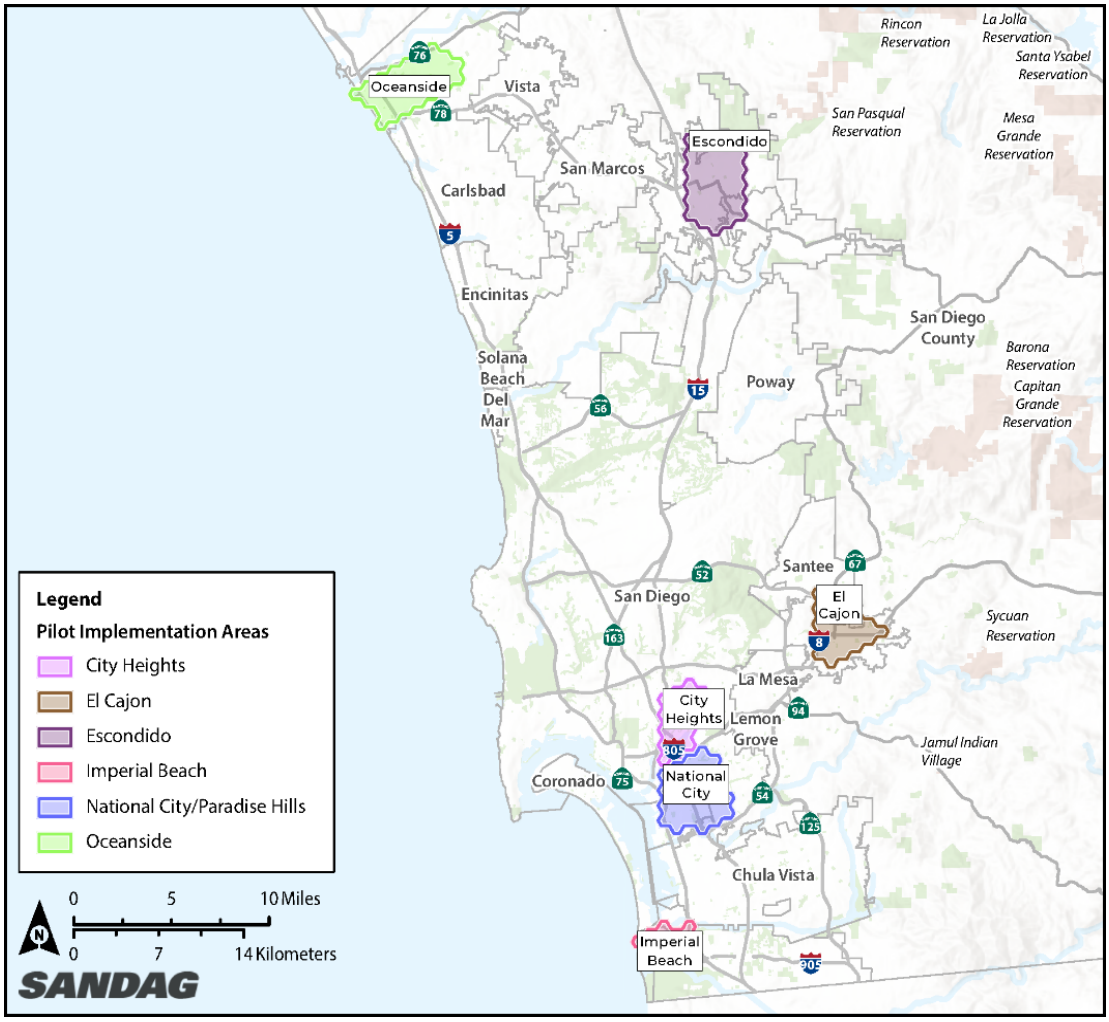
The Regional Scan presented in Section 4 identified six pilot implementation areas that all contain an optimal mix of factors for the successful deployment of Flexible Fleet services. Each of these six areas scored high in the Regional Scan analysis and feature the following:

- High density population and employment centers that generate a large number of short trips by all trip purposes;
- Located in areas with disadvantaged and underserved communities;
- Located in areas with either high frequency transit or gaps in existing fixed-route service ("transit deserts").

All six of these pilot implementation areas were identified as areas with a high degree of transportation need by the PDT and CBOs during the outreach portion of the study. For the reasons above, the six pilot implementation areas are all excellent candidates for the initial deployment of Flexible Fleet services. These areas will provide opportunities to implement and test a variety of Flexible Fleet services, monitor performance, and then scale and/or apply these services to other parts of San Diego County.

Most of the Flexible Fleet service types are well suited to each of these six pilot implementation areas. However, to help narrow the focus for implementation in each area, two Flexible Fleet service types were selected based on local travel patterns, existing transportation conditions, and a wide range of opportunities and constraints.

Figure 5-15: Pilot Implementation Areas



The decision process for the two Flexible Fleets services in each pilot implementation area includes the following considerations:

- **The size of the service area geofence:** Microtransit and ridehail provide the greatest range for longer trips because of their use of standard autos or minivans/minibuses that typically utilize gas or hybrid powered engines. NEV microtransit and micromobility bikes or scooters are more limited in range because of their batteries.
- **Types of trips and users:** Flexible Fleets typically serve shorter trips or first/last-mile connections to transit. The Regional Scan showed that these service areas have a concentration of these types of trips. In addition, the CBO surveys and workshops indicated that many of their users have health-related mobility issues. Microtransit, NEV microtransit, ridehail, and rideshare are good options for trips for users with mobility issues. Micromobility bikes and scooters are a good fit in areas with very short trips and a higher number of young users, such as Imperial Beach.

- **Carshare and rideshare can act as an overlay in most areas:** Traditional round-trip carshare and rideshare options such as carpools or vanpools typically do not require a geofenced area to operate.

Table 5-1 presents the recommendations for each of the pilot areas.

Table 5-3: Flexible Fleet Recommendation by Pilot Implementation Area

	Priority Recommendation #1	Priority Recommendation #2
Oceanside	Ridehail	Microtransit
Escondido	Microtransit	Micromobility
City Heights	Carshare	Ridehail
El Cajon	Microtransit	NEVs
National City/Paradise Hills	Microtransit	NEVs
Imperial Beach	Micromobility	NEVs

Each of the six pilot implementation areas are summarized below including the following:

- Key statistics
- Opportunity and Constraint Maps
- Existing Transportation Conditions
- Trip Types and Patterns
- Implementation Considerations

These sections highlight the rationale for selecting the two Flexible Fleet service types and implementation considerations. The following section provides a starting place for conversations with the local jurisdictions, CBOs, and Flexible Fleet operators. For the six pilot implementation areas, the maps identify various network and geographic opportunities and constraints for deploying Flexible Fleet services in these geographies.

Oceanside

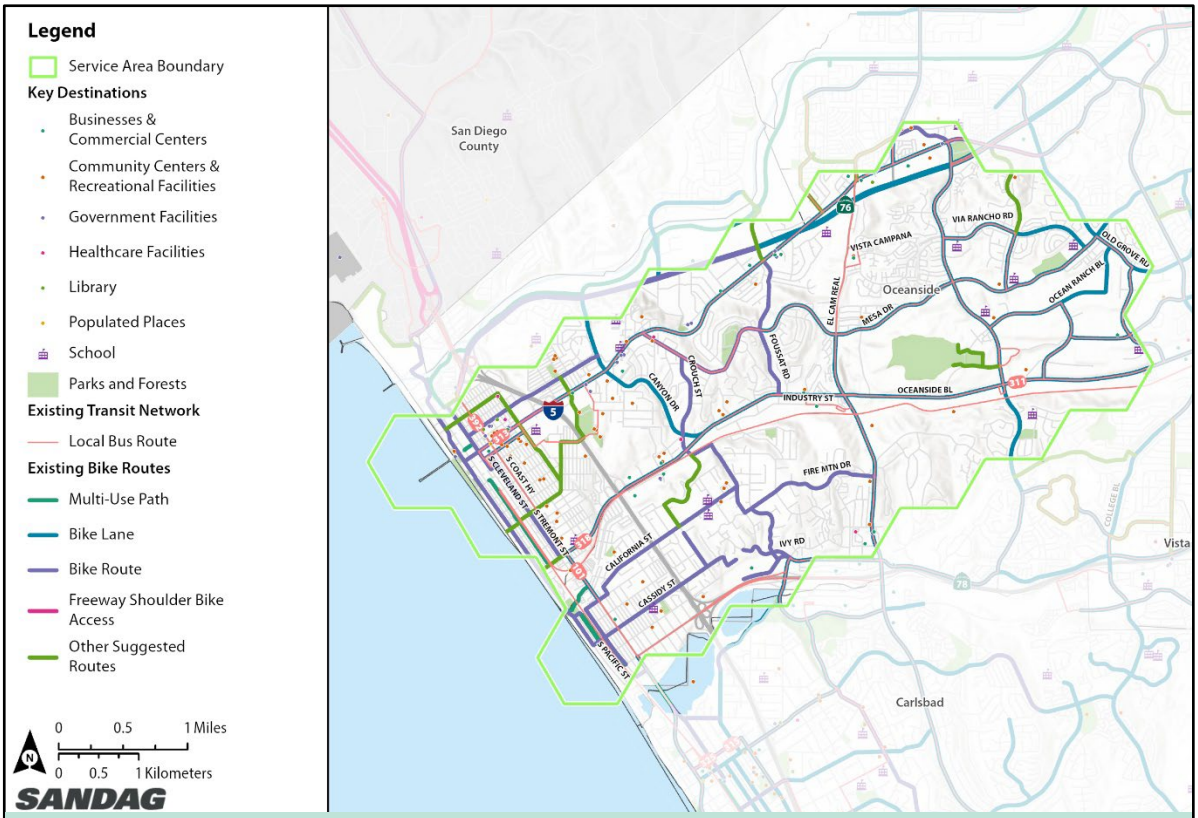
The Oceanside service area encompasses a 14.0 square mile area within the City of Oceanside. The City is a popular tourist destination with access to the beach and historical landmarks. Development in the service area is primarily residential with industrial and commercial uses concentrated along Oceanside Boulevard, SR 76, and Coast Highway. The Oceanside Transit Center is a major intermodal hub in downtown that serves NCTD's COASTER and SPRINTER rail, Metrolink's Orange County and Inland-Empire lines, Amtrak's Pacific Surfliner and several bus lines.

SERVICE AREA DEMOGRAPHICS

Population	Jobs	Households
58,669	23,450	22,472

SOCIAL EQUITY CONSIDERATIONS

Low-Income Households	**36.7%** of Service Area
Minority	**52.0%** of Service Area
Senior	**6.6%** of Service Area
SB 535 Community	**0%** of Service Area



The Oceanside Transit Center makes the city a large inter-regional transit hub. Bus routes travel along the main downtown corridor and into the eastern portion of the city, allowing for public transit access to many of the residential neighborhoods. Several bike routes traverse the city, but the steep topography presents challenges towards the implementation of micromobility.

ACS 5-Year Estimates (2019), CalEPA (2022)

OCEANSIDE TRIP PATTERNS

1,007,874 Total Trips

9.5% of Regional Trips

Median Trip Length: **4.6 miles**

~ 45.7% of Trips < 4 Miles

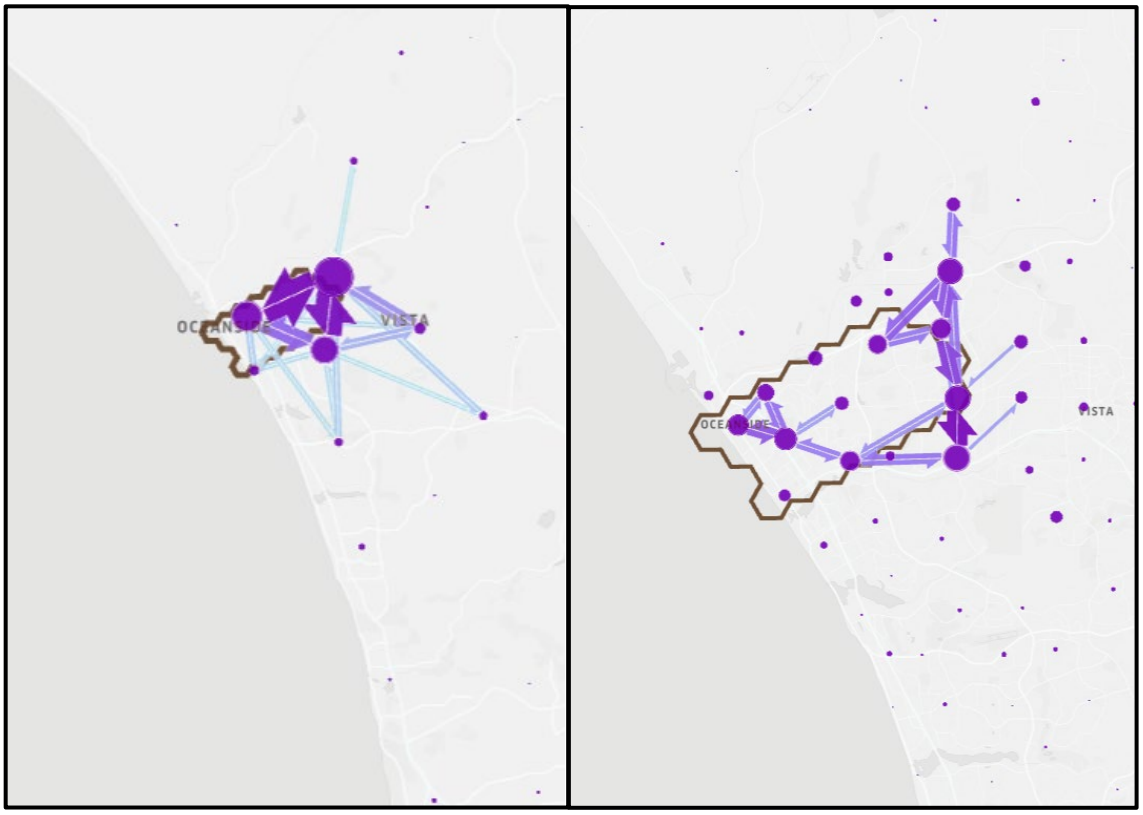
21.6%
Trips Into

21.7%
Trips Out Of

56.6%
Trips Within

Top Origins & Destinations

- Carlsbad
- Vista
- Unincorporated SD County
- San Marcos
- Camp Pendleton



OCEANSIDE MODE SHARE

85.1% Auto

10.1% Walk

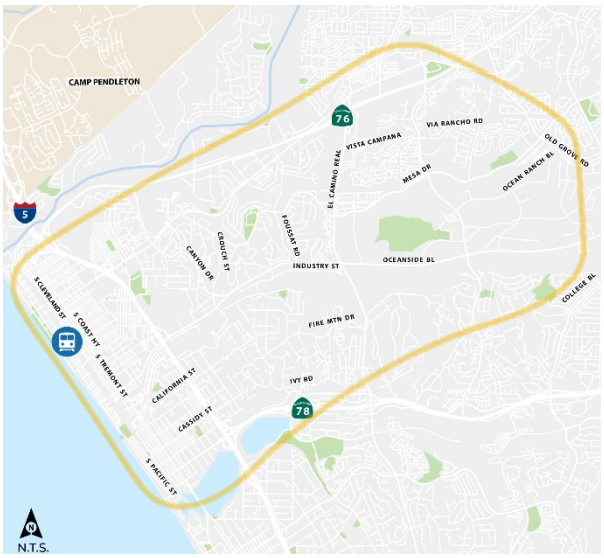
0.9% Transit

0.4% Bike

Due to the lower densities that exist east of the I-5 and the existing NCTD+ program, ridehail is a good fit for Oceanside. The major transit center and large service area with diverse trip types would also be served well by microtransit, as it will be able to cover east-west connections that cannot be served by smaller Flexible Fleet services.

Replica, Average Weekday, 2019

SERVICE BOUNDARY



COMMUNITY NEEDS

The CBOs, City, and NCTD identified the following needs:

- Support inter- and intra-regional connections to Oceanside Transit Center as well as SPRINTER, COASTER, Metrolink, and BREEZE services.
- TOD investments planned by NCTD to be implemented near station areas.
- Better first/last mile connections for employers east of I-5 in Rancho Del Oro.
- Late-night services to supplement transit when it is not available
- Difficult to serve suburban hubs with fixed-route transit.

OCEANSIDE IMPLEMENTATION CONSIDERATIONS

Service Area Opportunities	**Ridehail** and **Microtransit** have a high propensity for success in Oceanside. • The area west of I-5 is well served by a seasonal NEV shuttle service, transit, and the City is exploring a bikeshare program. An expansion of NCTD's existing ridehail program, NCTD+, would leverage resources already in place and extend east of I-5 to areas such as the Rancho Del Oro Employment Center. • Data shows strong origin and destination patterns from east to west trips across I-5. Implementation of an on-demand microtransit service could support NCTD's Multimodal Strategic Plan and serve east-west trips across I-5 and throughout the service area despite topographic challenges.
Partnerships	Explore potential partnerships with Alliance for Regional Solutions, TOD developers, MiraCosta College, Oceanside Chamber of Commerce, and other large employers in the area such as Genentech Pharmaceuticals and the Tri-City Medical Center.
Infrastructure	Assess implementation of pick up/drop off infrastructure in areas with higher concentration of employment and destinations such as beachside areas, MiraCosta College, Employment Centers in Rancho Del Oro, etc.
Example Trip Types	Ridehail and microtransit could both support connections to the Oceanside Transit Center which provides great inter-regional connections. Ridehail could serve first/last mile connections to the SPRINTER in employment centers such as Rancho Del Oro. The services could also provide late-night operations to fill in gaps when transit service is not operating. Microtransit could support a connection to MiraCosta College, schools and pockets of residential areas that are more difficult to serve with fixed-route service. A higher senior population also indicates a need for WAV vehicles and a smaller walkshed of access.

Escondido

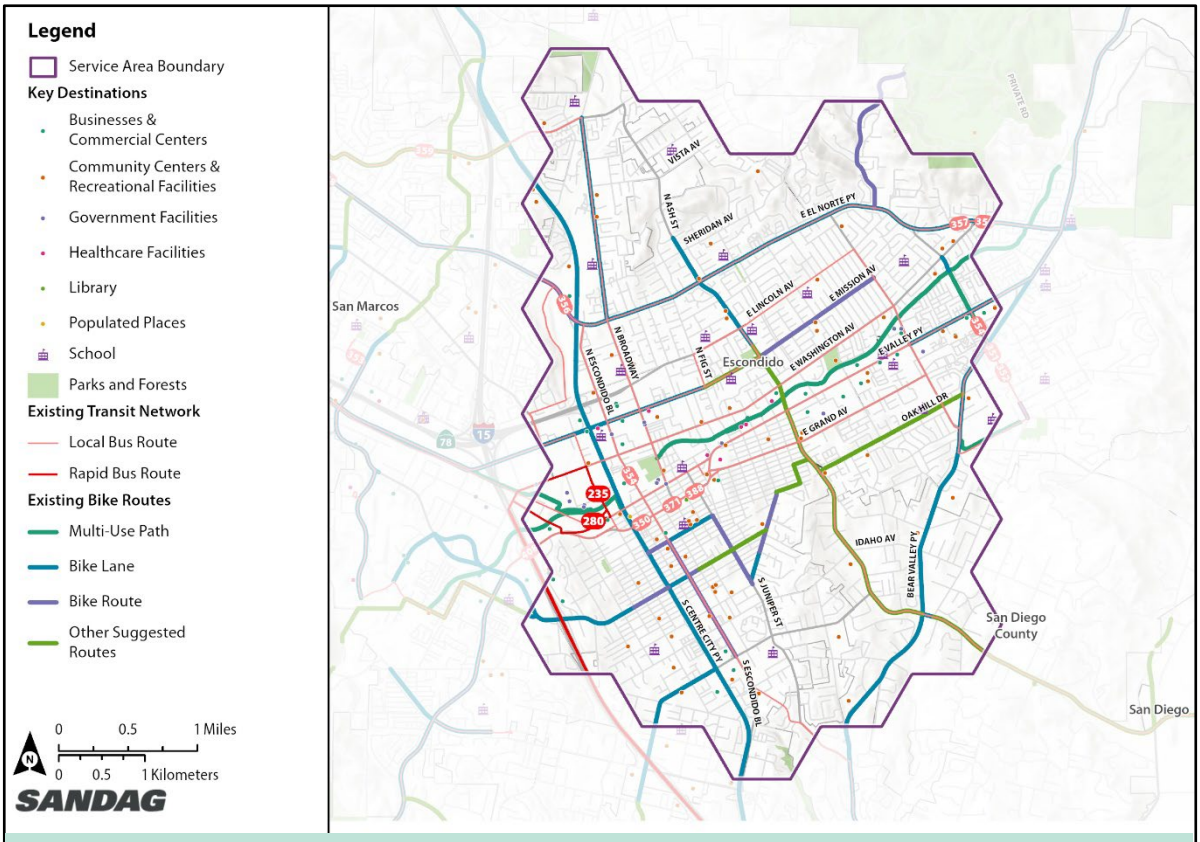
The Escondido service area encompasses a 14.5 square mile area within the City of Escondido, located in San Diego County's North County region. Development in the service area is primarily single-family housing with mixed-use, higher density residential, industrial, and other commercial uses concentrated in downtown. The Escondido Transit Center, which is located near the western edge of downtown, is the last stop on NCTD's SPRINTER rail route. Most connector bus routes operate along east-west arterials.

SERVICE AREA DEMOGRAPHICS

Population	Jobs	Households
104,391	26,476	31,044

SOCIAL EQUITY CONSIDERATIONS

Low-Income Households	**39.7%** of Service Area
Minority	**70.7%** of Service Area
Senior	**4.7%** of Service Area
SB 535 Community	**0%** of Service Area



The Escondido Creek Bike Path is an east-west connection across the city, providing access to the major downtown activity centers. The bus routes and the transit center allow for movement in denser areas and for trips outside of the city; however, pockets of neighborhoods remain with limited access.

ACS 5-Year Estimates (2019), CalEPA (2022)

ESCONDIDO TRIP PATTERNS

892,861 Total Trips

8.5% of Regional Trips

Median Trip Length: **3.2 miles**

~ 55.3% of Trips < 4 Miles

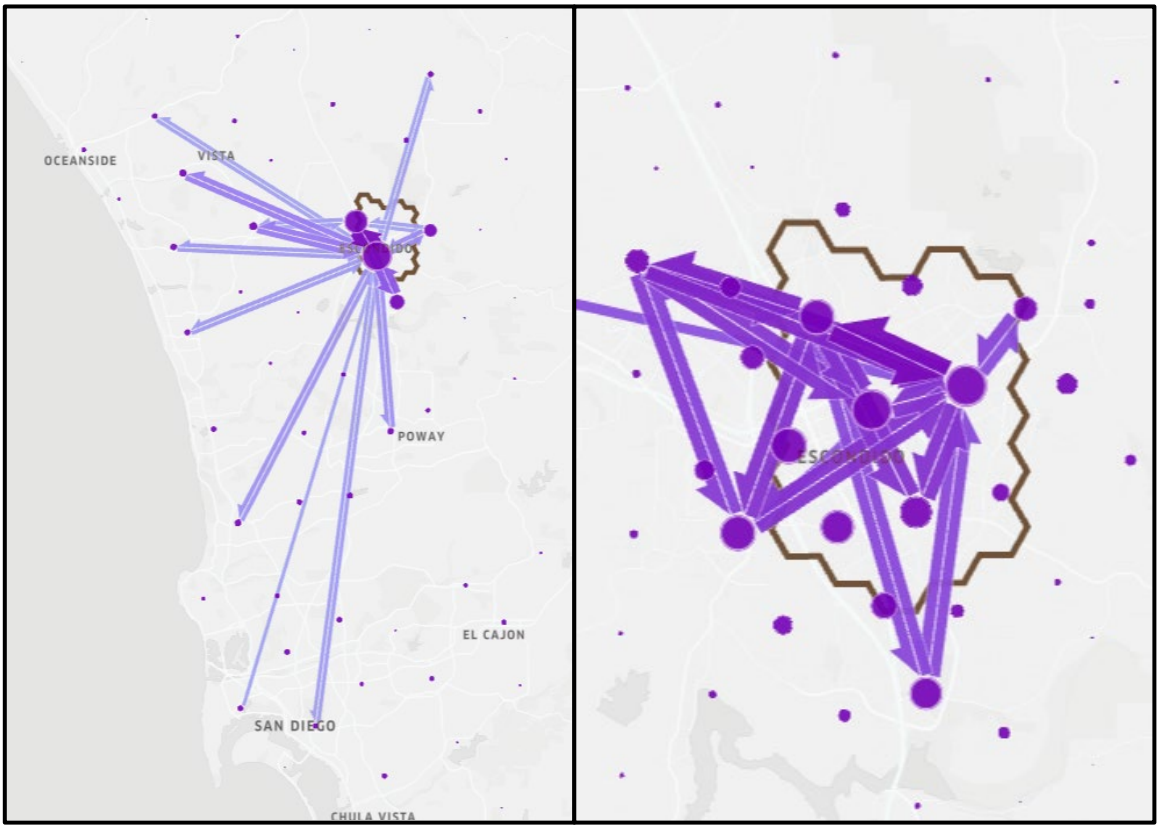
21.0%
Trips Into

21.1%
Trips Out Of

57.9%
Trips Within

Top Origins & Destinations

- San Marcos
- Unincorporated SD County
- Oceanside
- Vista
- Carlsbad



ESCONDIDO MODE SHARE

80.1% Auto

13.8% Walk

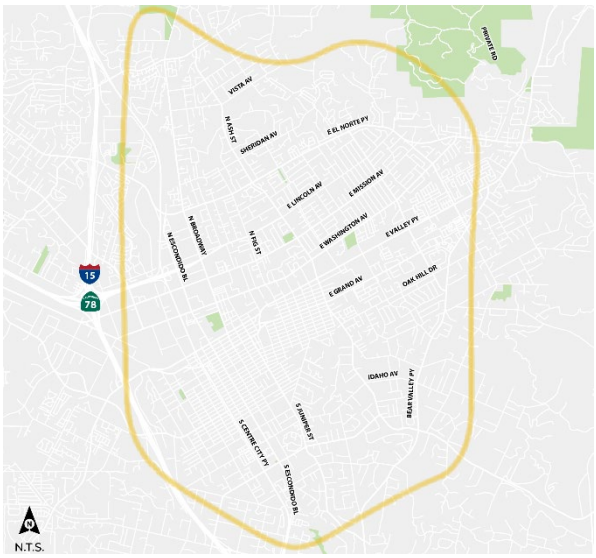
2.8% Transit

0.4% Bike

Microtransit can focus operations on connecting north-south destinations to transit and activity centers due to the presence of high-speed east-west arterial roads that would disrupt the travel of lower speed Flexible Fleet options. Micromobility can take advantage of the dense contiguous downtown area as well as the Escondido Creek Bike Path which feeds into the transit station.

Replica, Average Weekday, 2019

SERVICE BOUNDARY



COMMUNITY NEEDS

The CBOs, City and NCTD identified the following needs:

- Connections to Escondido Transit Center, major employement and commericial activity centers in Downtown Escondido.
- Service large residential areas north of SR 78 as well as to southern activity centers like the Escondido Mall.
- Alignment with the North County CMCP and developments planned by the City and NCTD.
- Desire to connect to more rural communities and agricultural employment centers

ESCONDIDO IMPLEMENTATION CONSIDERATIONS

Service Area Opportunities	**Microtransit** and **Micromobility** have a high propensity for success in Escondido. • The City has a strong interest in implementing microtransit service which would be the most suitable service for serving dispersed pockets of residential areas than fixed-route service focusing on the northern and southern areas of the service boundary that are difficult to serve with fixed-route service • Implementing a micromobility would leverage the Escondido Creek Bike Path and flatter topography to provide a better connection to the Escondido Transit Center.
Partnerships	Explore potential partnerships with the National Latino Research Center, Westfield Escondido Mall, Plaza Civic Center and the Vineyard Square Shopping Mall.
Infrastructure	Assess implementation of pick up/drop off (PUDO) infrastructure (particularly in areas with a higher concentration of seniors), quick build active transportation facilities, and micromobility corrals or docking stations in areas with a higher concentration of employment and destinations such as the Escondido Transit Center, California Center for the Arts, and the Vineyard Shopping Center.
Example Trip Types	An on-demand microtransit service could serve commute trips to/from the major employment center west of the service boundary and could even serve non-typical 9 to 5 commute trips between dispersed residential neighborhoods and the Escondido Mall as well as other employers. Additionally, concentrating service south of Grand Ave, an area with less transit service, would provide greater connectivity for users and serve short local residential trips and connect to transit. Micromobility could serve short trips to transit and to connect to commercial centers.

City Heights

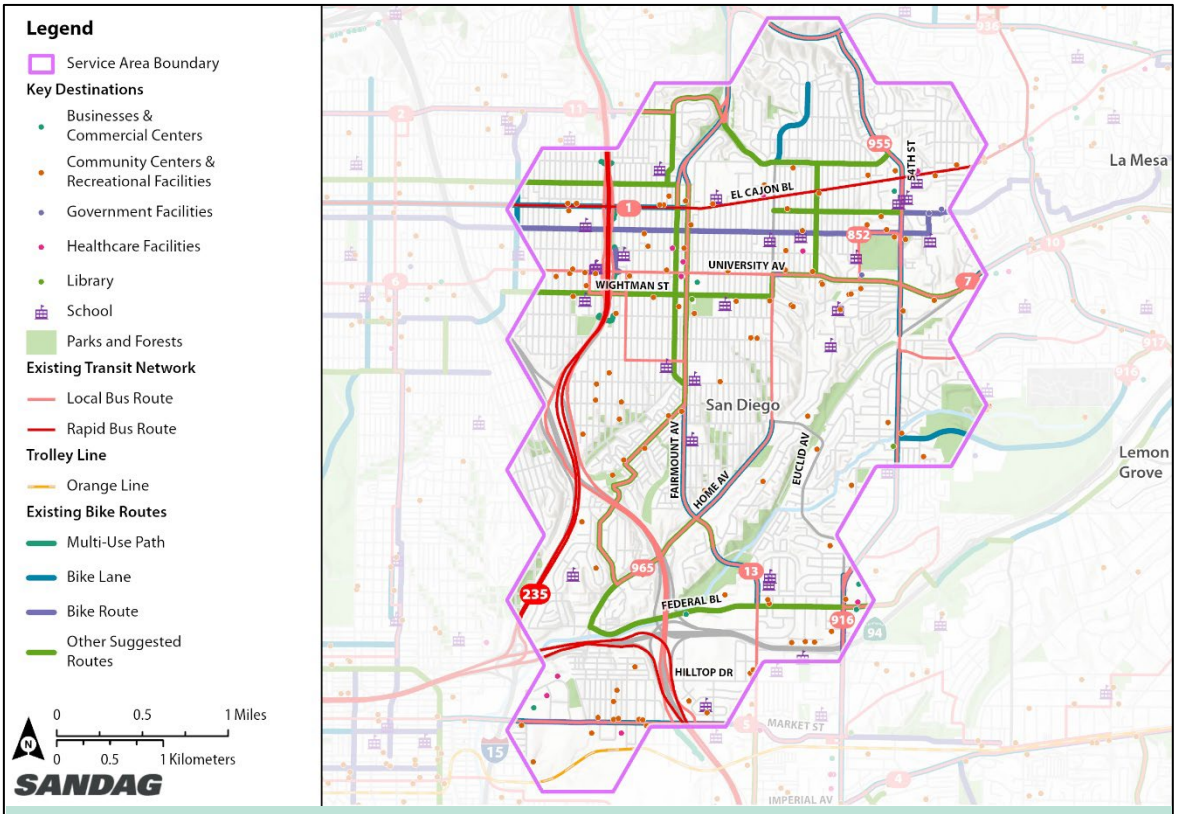
The City Heights service area encompasses a 9.0 square mile district within the City of San Diego. City Heights is located in the central Mid-City Community Planning Area and is divided by a number of small canyons. Development in City Heights is a mixture of single-family and multi-family residential with commercial and other non-residential development concentrated along major arterials such as University Ave and El Cajon Blvd. There are no Trolley stations in this service area, but there are connections to several high-capacity transit routes, including the 215 and 235 *Rapid* routes.

SERVICE AREA DEMOGRAPHICS

Population	Jobs	Households
113,867	14,814	36,826

SOCIAL EQUITY CONSIDERATIONS

Low-Income Households	**48.8%** of Service Area
Minority	**81.0%** of Service Area
Senior	**4.2%** of Service Area
SB 535 Community	**32.7%** of Service Area



There are a number of Class II bikeways throughout the community and a concentration of activity in the Northern region of the proposed service area. The community has strong east-west and north-south transit routes such as the 215 and 235 BRT and several other bus routes. However, existing active transportation facilities are not protected and present safety challenges within the community.

ACS 5-Year Estimates (2019), CalEPA (2022)

CITY HEIGHTS TRIP PATTERNS

477,169 Total Trips

4.2% of Regional Trips

Median Trip Length: **4.3 miles**

~47.4% of Trips < 4 Miles

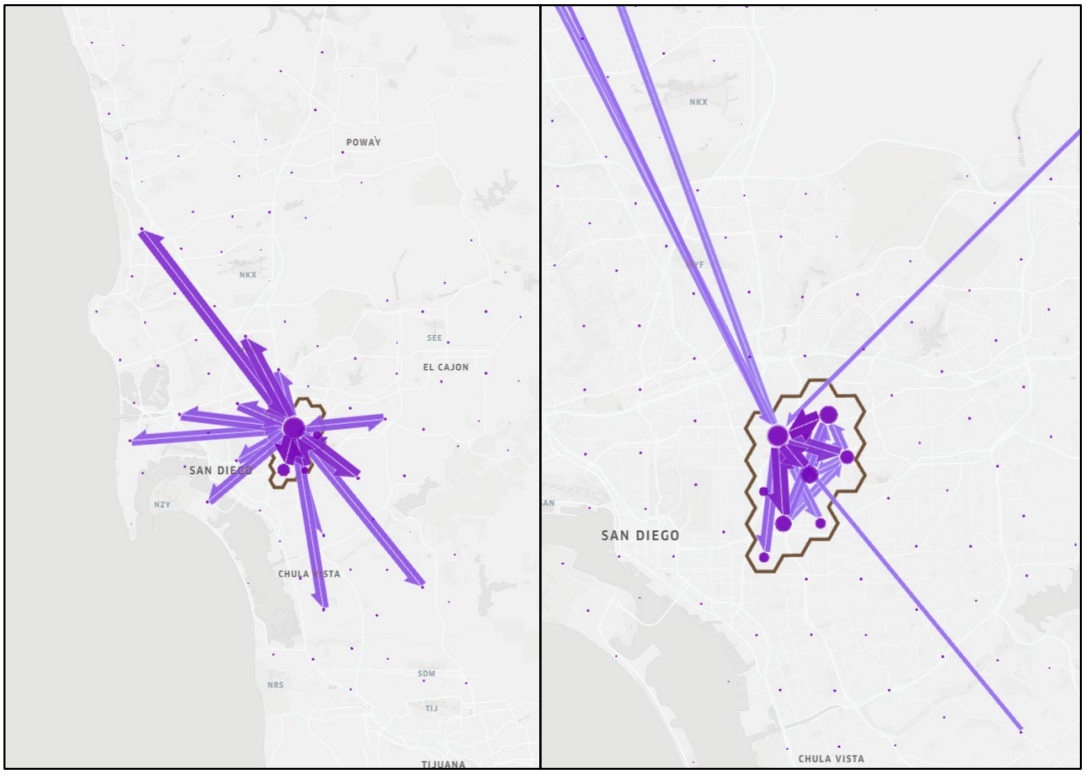
32.8%
Trips Into

32.8%
Trips Out Of

34.4%
Trips Within

Top Origins & Destinations

- National City
- Mid City
- Greater North Park
- SDSU Area
- Chula Vista



CITY HEIGHTS MODE SHARE

79.3% Auto

13.4% Walk

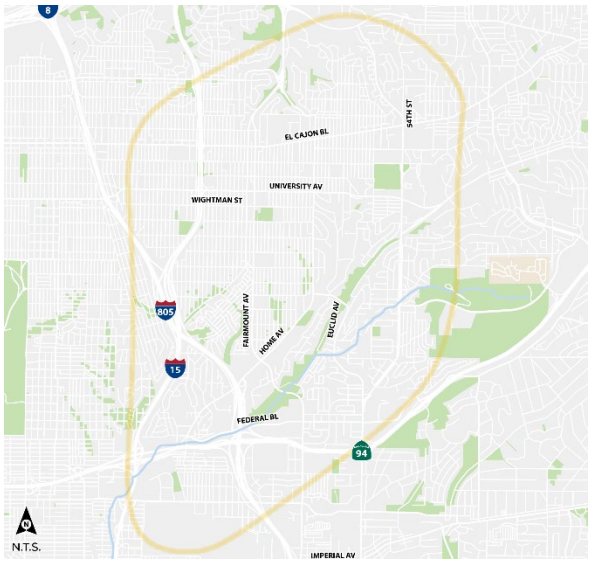
3.8% Transit

0.4% Bike

The City Heights community's topography and lack of protected active transportation facilities pose a challenge to the implementation of micromobility. Additionally, the higher concentration of zero car households is a target market for Flexible Fleet services such as carshare. Compared to other service areas, there are more trips connecting outside of the service area, indicating a need for ridehail services that can serve longer distance trips.

Replica, Average Weekday, 2019

SERVICE BOUNDARY



COMMUNITY NEEDS

The CBOs, City, and MTS identified the following needs:

- Connection to MTS Rapid services along El Cajon Blvd and I-15.
- Late night options as many routes reduce frequency after 8pm.
- SB 535 community and higher number of transit trips indicate a more transit-reliant population
- High concentration of zero and one vehicle households
- Lack of safe bike facilities
- Freeways create a major barrier for active transportation

CITY HEIGHTS IMPLEMENTATION CONSIDERATIONS

Service Area Opportunities	**Carshare** and **Ridehail** both have a high propensity for success in City Heights. • Carshare would be the best fit to serve the City Heights community as some of the top origin-destination pairs fall outside of the service boundary (e.g., National City, SDSU). Additionally – carshare would serve equity populations without access to personal vehicles. • Subsidized ridehail would also serve the community well as it would better connect communities to east-west transit connections and the subsidy would improve mobility for equity populations without access to personal vehicles.
Partnerships	Explore potential partnerships with City Heights Community Development Corporation, the Urban Collaborative Project, San Diego College of Continuing Education and other City Heights organizations.
Infrastructure	Assess whether existing MTS facilities have the capacity for carshare at various park and rides or community destinations. Conduct feasibility analysis for installation of pick/up drop off facilities in areas with a higher concentration of employment and destinations along University Ave, El Cajon Blvd, Fairmont Ave, and Euclid Ave.
Example Trip Types	Flexible Fleet services such as ridehail could serve residential communities surrounded by barriers such as Interstates or Chollas Creek Canyon. Additionally, zero car households would be able to utilize carshare options for short local trips including errands, or recreation.

El Cajon

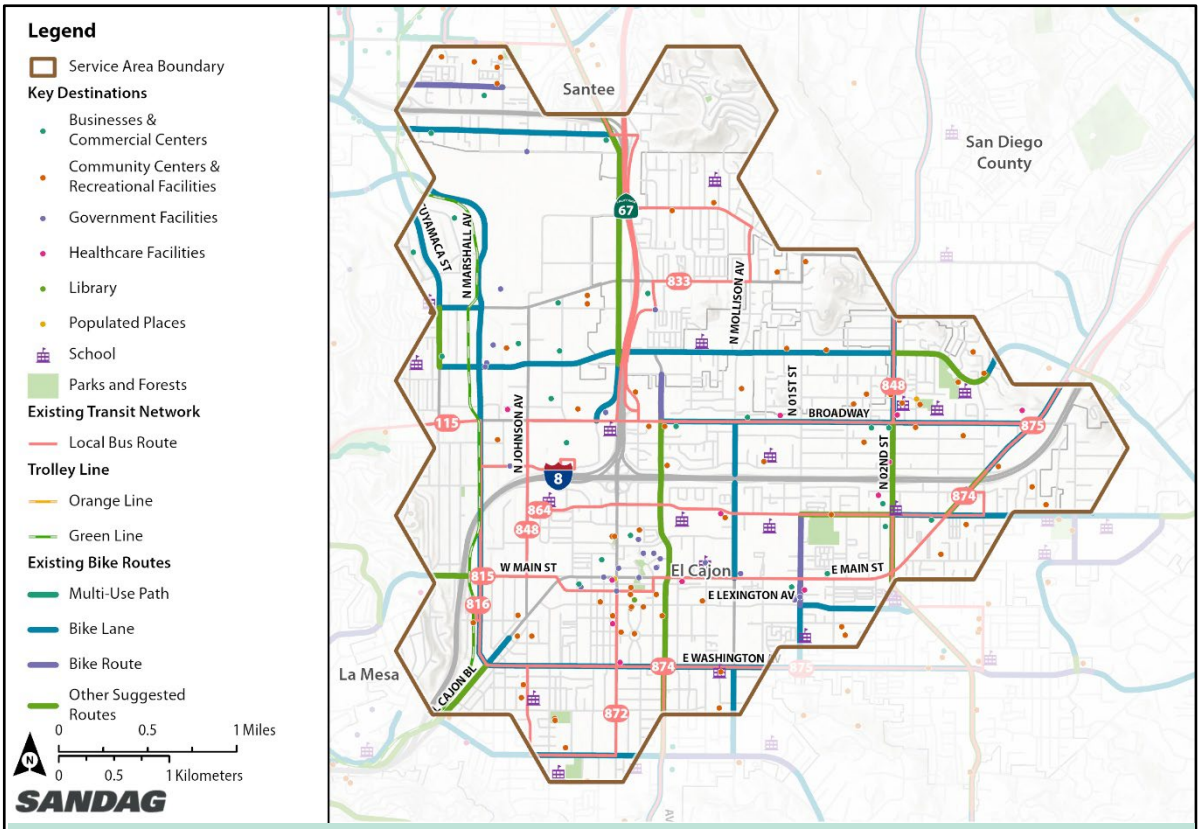
The El Cajon service area encompasses a 10.5 square mile district that includes downtown and industrial/employment centers in the City's northwest area near Gillespie Field. The service area is part of the City's Downtown Master Plan. Development in the service area is a mixture of multi-family and single-family residential with mixed-use concentrated along major arterials. The El Cajon and Arnele Avenue Trolley Stations along the western edge of the service area connects the service area to the Orange and Green Trolley lines.

SERVICE AREA DEMOGRAPHICS

Population	Jobs	Households
87,857	38,604	28,259

SOCIAL EQUITY CONSIDERATIONS

Low-Income Households	**46.3%** of Service Area
Minority	**45.2%** of Service Area
Senior	**4.6%** of Service Area
SB 535 Community	**33.9%** of Service Area



Activity is concentrated on main thoroughfares like Broadway and Main St with a number of bus routes serving those areas and the presence of trolley lines provides access to travel outside of the city. There is a lack of bike lanes and many freeways, presenting challenges for the implementation of micromobility and NEVs.

ACS 5-Year Estimates (2019), CalEPA (2022)

EL CAJON TRIP PATTERNS

737,161 Total Trips

7% of Regional Trips

Median Trip Length: **3.8 miles**

~ 50.9% of Trips < 4 Miles

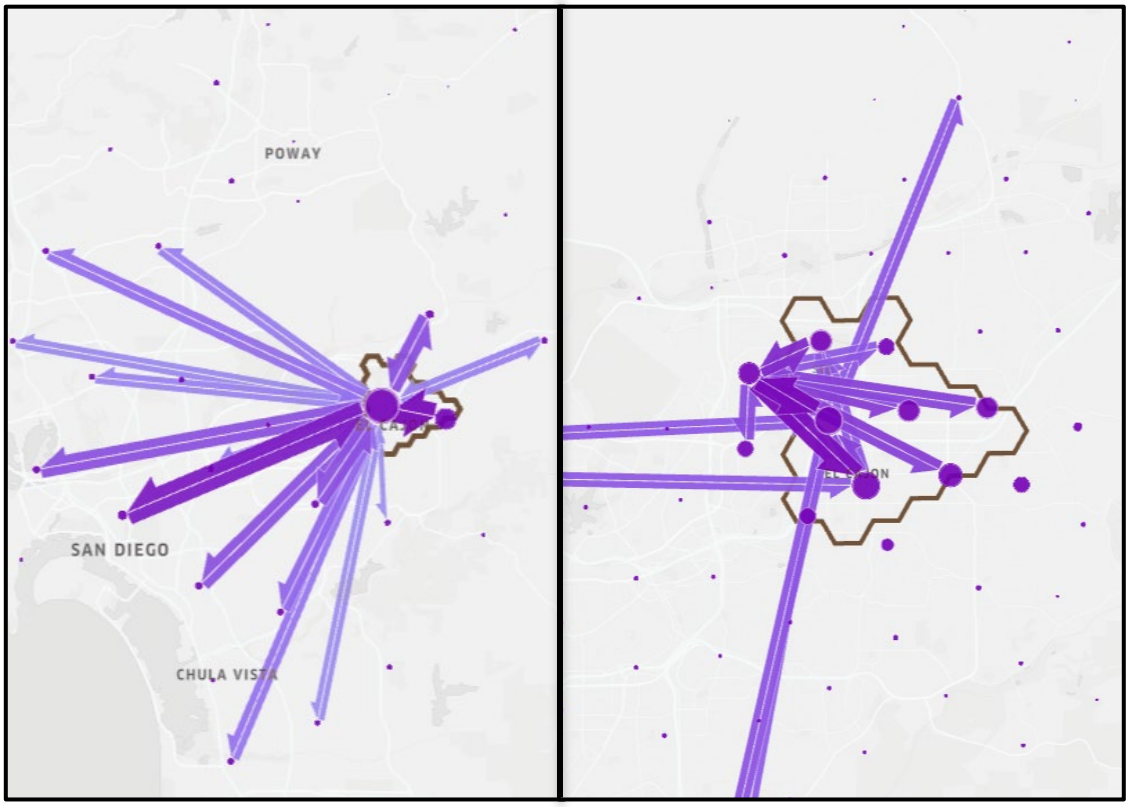
27.4%
Trips Into

27.3%
Trips Out Of

45.3%
Trips Within

Top Origins & Destinations

- Santee
- La Mesa
- Rancho San Diego
- Lakeside
- Unincorporated SD County



EL CAJON MODE SHARE

82.7% Auto

11.3% Walk

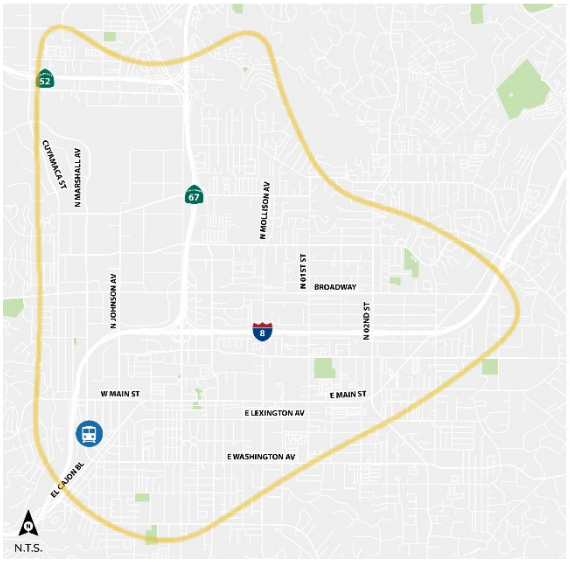
1.5% Transit

0.4% Bike

Microtransit, with its ability to travel at higher speed limits, will be a good fit for the large and dispersed city that has lots of freeway interchanges to cross. NEVs will be ideal for short trips between transit centers and Downtown El Cajon, but there is a need to either reduce speed limits or plan around higher speed roads.

Replica, Average Weekday, 2019

SERVICE BOUNDARY



COMMUNITY NEEDS

The CBOs, City, and MTS identified the following needs:

- Connections to Orange/Green Line trolley stations at El Cajon and Arnele Ave
- Service connecting to the El Cajon commercial district
- More north-south transit connectivity across I-8
- Service to dispersed employment areas near Gillespie Field and to Santee

EL CAJON IMPLEMENTATION CONSIDERATIONS

Service Area Opportunities	**Microtransit** and **NEVs** both have a high propensity for success in El Cajon. • While there is a decent amount of east-west transit service, microtransit can fill the North/South transit gap within the service boundary. The existing configuration of freeway interchanges and higher speed roads make it difficult to implement other Flexible Fleet services. • There is a high number of short trips occurring within the service boundary and there is opportunity for NEVs to support travel between residential neighborhoods and the downtown commercial district.
Partnerships	Explore potential partnerships with El Cajon Collaborative, Parkway Plaza, Cajon Valley Union School District, and future TOD developers.
Infrastructure	Identify the potential for the conversion of infrastructure such as pick-up/drop off and vehicle storage space at the El Cajon Transit Center and Arnele Ave Trolley Station. Assess whether traffic calming measures or posted speed limits need to be reduced to support NEV microtransit. Determine whether additional infrastructure for microtransit would be needed at key destinations, employment centers, Main Street Plaza Shopping Center, and Parkway Plaza.
Example Trip Types	Microtransit could connect nearby commercial corridors to community resources across the freeway. Additionally, the service could serve the Gilespie Field employment center in the northern area of the proposed service boundary. These connections would provide a more viable first/last mile solution to connect to the two major trolley routes. NEV microtransit could connect to transit, commercial centers, and employment south of I-8 focusing in the Downtown area. Additionally, El Cajon is a Gateway Connector and these services could connect visitors from more rural areas to the Regional Transportation Network. Fixed-route services connecting to Alpine and Borrego Springs could be considered for replacement with Flexible Fleets.

National City/ Paradise Hills

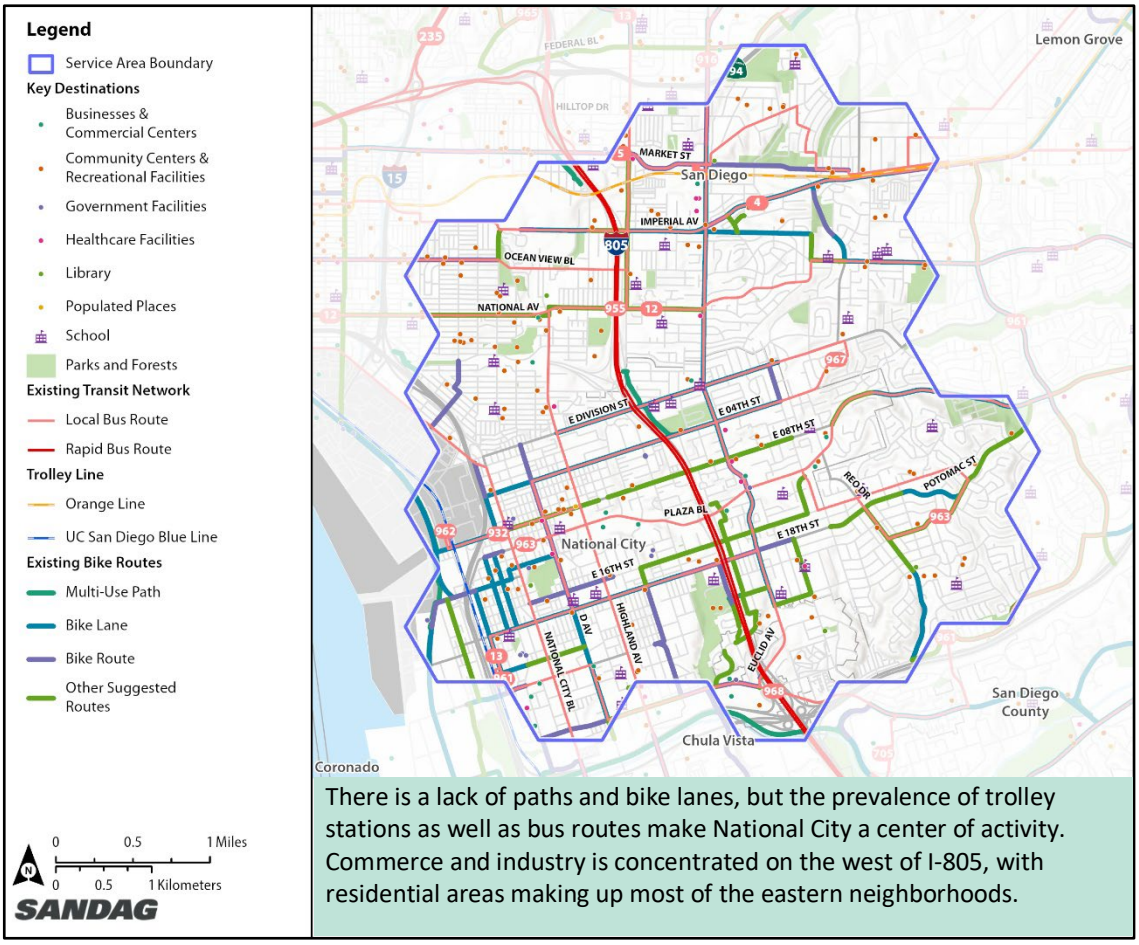
The National City / Paradise Hills service area encompasses a 13.0 square mile area within the City of National City and southeastern communities of the City of San Diego, including Paradise Hills. The area is served by two RTD Blue Line Trolley stations, three RTD Orange Line Trolley Stations, and several bus lines. There is a wide diversity of land use types in the city, with mixed-use commercial corridors located along National City Blvd, Highland Ave, and Plaza Blvd. Kimball Park has a collection of public and civic buildings and surrounded by Senior Centers.

SERVICE AREA DEMOGRAPHICS

Population	Jobs	Households
133,867	29,258	36,350

SOCIAL EQUITY CONSIDERATIONS

Low-Income Households	**45.5%** of Service Area
Minority	**91.6%** of Service Area
Senior	**6.0%** of Service Area
SB 535 Community	**53.5%** of Service Area



There is a lack of paths and bike lanes, but the prevalence of trolley stations as well as bus routes make National City a center of activity. Commerce and industry is concentrated on the west of I-805, with residential areas making up most of the eastern neighborhoods.

ACS 5-Year Estimates (2019), CalEPA (2022)

NATIONAL CITY/PARADISE HILLS TRIP PATTERNS

760,750 Total Trips

7% of Regional Trips

Median Trip Length: **4.1 miles**

~ 48.5% of Trips < 4 Miles

29.5%
Trips Into

29.6%
Trips Out Of

40.9%
Trips Within

Top Origins & Destinations

- Chula Vista
- Southeastern San Diego
- City Heights
- Downtown
- Otay Mesa

NATIONAL CITY/PARADISE HILLS MODE SHARE

80.3% Auto

11.8% Walk

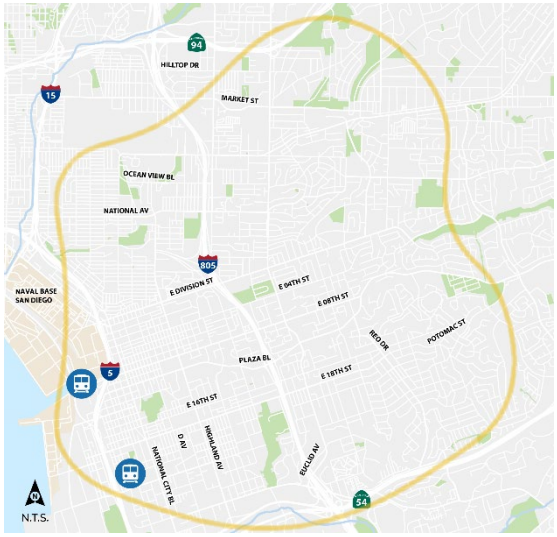
4.3% Transit

0.3% Bike

National City has a large service area with very high ridership demand and difficult topography, making the area perfect for microtransit. Also, there may be a future opportunity to complement the FRANC service with more NEV microtransit in the southwestern part of the city.

Replica, Average Weekday, 2019

SERVICE BOUNDARY



COMMUNITY NEEDS

The CBOs, City, and MTS identified the following needs:

- Investments needed at Orange Line stations in southeastern San Diego.
- Leverage investments already in place for the FRANC shuttle.
- Services needed for major corridors on Market, Plaza Blvd, E 30th St, National City Blvd, and destinations around Kimball Park.
- Desire for greater connections to Naval Base
- Lack of safe active transport

NATIONAL CITY/PARADISE HILLS IMPLEMENTATION CONSIDERATIONS

Service Area Opportunities	**Microtransit** and **NEVs** have a high propensity for success in National City and southeastern San Diego • Due to topography challenges, microtransit is the most suitable service in National City. Additionally, the service area is quite large and microtransit has the greatest range, allowing the service to include southeastern San Diego, a disadvantaged community where better first/last mile connections are needed. • The City is implementing a NEV shuttle and there is an opportunity to leverage resources and expand the service to serve a larger portion of the service area.
Partnerships	Explore potential partnerships with Naval Base San Diego, Olivewood Gardens, Samahan Health Centers, future TOD developers, Bay Plaza, and Paradise Valley Hospital.
Infrastructure	Assess whether MTS or other public facilities have capacity for NEV microtransit storage and/or charging. The implementation of pick up/drop off would also require infrastructure in areas with a higher concentration of employment and destinations such as National City Blvd, Kimball Park, Plaza Blvd, Market St, and Euclid Ave.
Example Trip Types	National City is a major employment center in the region and a gateway to Naval Base San Diego. The implementation of microtransit and NEVs could serve commuters and connect them to the Trolley. Connections to the Trolley will allow for greater regional connectivity and support inter-jurisdiction travel between cities in south county for commuters and residents.

Imperial Beach

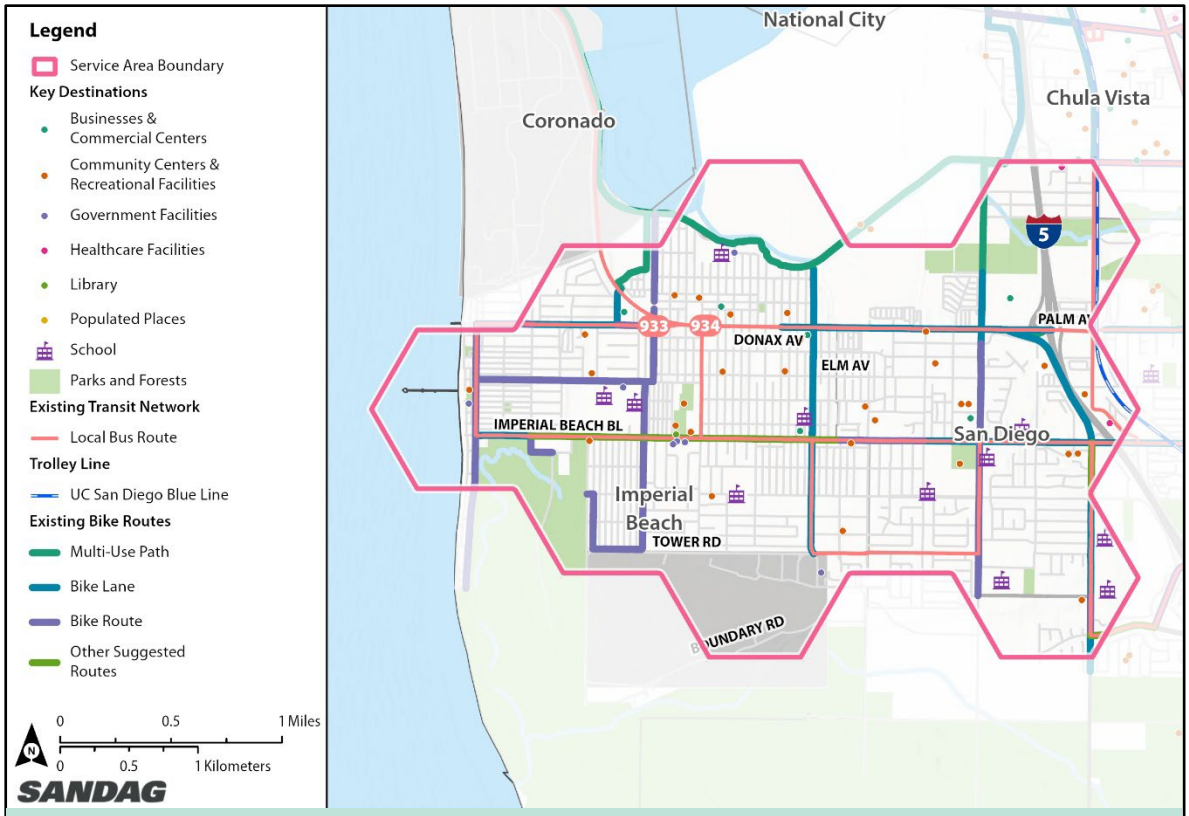
The Imperial Beach service area encompasses a 5.5 square mile area in San Diego's South Bay region, inclusive of some of Naval Base Coronado's facilities, and five miles north of the Mexico border. Imperial Beach is a residential beach city and development includes primarily single-family homes with commercial development focused along Palm Ave and Imperial Beach Blvd. The Palm Avenue Blue Line Trolley station is located along the eastern edge of the service area. The City has been actively pursuing funding to improve active transportation facilities.

SERVICE AREA DEMOGRAPHICS

Population	Jobs	Households
44,037	6,465	14,228

SOCIAL EQUITY CONSIDERATIONS

Low-Income Households	**46.3%** of Service Area
Minority	**77.1%** of Service Area
Senior	**4.3%** of Service Area
SB 535 Community	**2.4%** of Service Area



The Bayshore Bikeway, Class II, and Class III facilities provides an east-west micromobility connection along the northern region of the service boundary. Lower speed limits exist along the coast, and while existing speed limits on Palm Ave are higher, the City envisions Palm Ave as a major commercial corridor and has plans to increase safety and create an environment more conducive for active transportation.

ACS 5-Year Estimates (2019), CalEPA (2022)

IMPERIAL BEACH TRIP PATTERNS

222,196 Total Trips

2.1% of Regional Trips

Median Trip Length: **3.5 miles**

~ 52.9% of Trips < 4 Miles

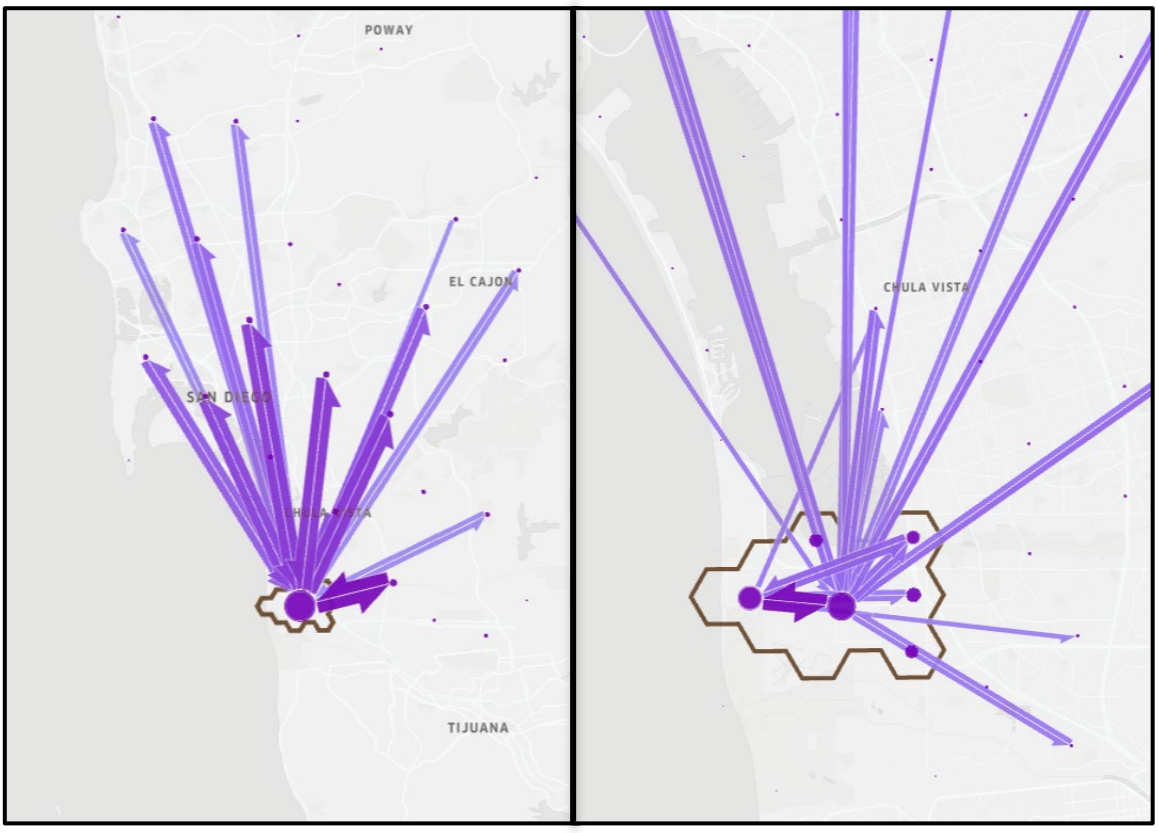
28.2%
Trips Into

28.8%
Trips Out Of

43.0%
Trips Within

Top Origins & Destinations

- Chula Vista
- Otay Mesa
- Coronado
- National City
- San Ysidro



IMPERIAL BEACH MODE SHARE

80.1% Auto

13.8% Walk

2.8% Transit

0.4% Bike

The small, dense service area is a good fit for NEV, but the implementation of such services requires reviewing speeds and function class on Palm St as well as other east-west arterials. Because trip types and users in the area are conducive to bikes and scooters, Bayshore Bikeway infrastructure should be leveraged for micromobility.

Replica, Average Weekday, 2019

SERVICE BOUNDARY

COMMUNITY NEEDS

The City and MTS identified the following needs:

- Desire for Flexible Fleet services to provide point to point connections
- Need to relieve parking congestion on local streets
- Future Palm Ave station TOD will constrain parking creating a need for alternative transportation to service the transit station
- Support alternative inter-jurisdictional travel between South Bay communities
- Initial early deployment of dockless micromobility resulted in the misuse and cluttering of sidewalks throughout the City.

IMPERIAL BEACH IMPLEMENTATION CONSIDERATIONS

Service Area Opportunities	**Micromobility** and **NEV Microtransit** both have a high propensity for success in Imperial Beach. • Micromobility service areas are a good fit along the dense retail and tourist areas closer to the beach where streets have lower speed limits. • While higher speed limits on Palm Ave limit operations of Flexible Fleet Services like NEV microtransit, the City is exploring street improvements such as road diets and additional active transportation facilities to provide a slower environment for this important commercial corridor. Given the high number of short trips and destinations along the corridor, the implementation of flexible microtransit should complement Route 933/934 service to provide more convenient and on-demand service.
Partnerships	Explore potential partnerships with Imperial Beach Neighborhood Center, South Bay Union School District, Imperial Beach Promenade Shopping Center, Naval Base Coronado (NBC) and future TOD developers.
Infrastructure	Assess implementation of pick up/drop off (PUDO) infrastructure and micromobility corrals or docking stations in areas with a higher concentration of employment and destinations such as at beachfront destinations, Palm Ave, Imperial Beach Blvd, and the Palm Ave Trolley Station. Explore quick build infrastructure to fill gaps in the active transportation network and leverage upcoming Iris *Rapid* improvements, which include priority lanes and transit signal improvements.
Example Trip Types	Flexible Fleet services such as NEV microtransit could serve commute trips between the Palm Avenue Trolley Station to NBC's Front Gate and other employers. Additionally, connecting to the Palm Ave Station and leveraging upcoming Iris *Rapid* improvements promotes alternative transportation for inter-jurisdictional travel to connect to retail, restaurants, and the beach. The service could also serve short local residential trips for recreation purposes, errands, medical appointments and more.

Flexible Fleets Task Force

SANDAG will create a Flexible Fleets Task Force under the Mobility Working Group to provide a platform for operators, local jurisdictions, transit agencies, and partner agencies to convene and implement Flexible Fleet services throughout the region. The Task Force will engage various stakeholders to prioritize the pilots presented as part of the Strategic Plan and determine the best funding structure and service model to implement each pilot service.

In addition to the implementation of the pilots, the Task Force will also pursue the following activities:

- **Develop, Maintain, and Grow Partnerships** – Continue to review partnerships and relationships with universities, major employers, military facilities, Tribal groups, and tourist communities.
- **Monitor and Evaluate Performance** – Review performance monitoring requirements established by the task force. Performance metrics could include, but should not be limited to:
  - Completed trips
  - Origins and destinations for each completed trip
  - Travel time per trip
  - Wait times (time between request and pick-up)
  - Trip Fare (including subsidy)
  - Cancellations
  - Customer service interactions
  - Vehicle supply (number of vehicles in service)
  - Vehicle-miles traveled (VMT) and revenue VMT
  - Mode replacement
- **Identify Service and Technology Requirements** – Review system requirements, which could include:
  - Identify protocols for customer service monitoring, data management, and web-based performance visualizations through dashboards or other software products
  - Develop an Operations & Maintenance inspection plan, which allows for perioding checks of vehicles, audits of drivers and customer service, and the operation of the smartphone app and back-end processes.
- **Pursue Grant Funding** – There are several grant programs that transportation agencies, jurisdictions, CBOs and other stakeholders can pursue to build infrastructure to support or implement Flexible Fleet services. See **Appendix E** for potential grant funding opportunities.
- **Evaluate Alternative Funding Sources** – Evaluate the feasibility of alternative funding sources such as the establishment of Community Parking Districts to fund Flexible Fleet pilots. Feasibility Study should include mapping the proposed area, verifying data, developing a conceptual plan, collecting community input, analyzing the potential parking revenues and operating costs, and identifying how district funds can be allocated to the funding and launch of Flexible Fleet pilots.

- **Continue Research on Flexible Fleet Technologies and Innovations** – Continue research into Flexible Fleet implementations and collaborate with transportation research groups such as the Shared Use Mobility Center.
- **Assess Local Policies and Recommend Actions** – Coordinate with the local jurisdictions, transit operators, and other public agencies to identify any existing policy gaps that could hinder the implementation of Flexible Fleets and recommend actions to remedy this. Policy gaps could include:
  - Review of speed limits, roadway functional classifications, and other designations such as the Strategic Highway Network (STRAHNET) within the service areas that could restrict or limit the use of NEVs and micromobility vehicles. California Assembly Bill 43 (AB43) permits local authorities to reduce local speed limits by 5 miles per hour (mph) to provide a safer environment for pedestrians and bicyclists.
  - Identify gaps in the bicycle network within the service areas and recommend changes to streets to implement dedicated bicycle infrastructure, including quick-build improvements.
  - Identify if parking benefits districts, such as the City of San Diego's Community Parking Districts, can provide a policy and funding mechanism to support Flexible Fleet deployments.
- **Advance the Gateway Connector Concepts** – Further refine the Gateway Connector concepts described in the Regional Scan and identify planning level metrics needed to identify key pick-up and drop-off zones at population and employment centers, casino resorts, Tribal Nations, and agricultural areas. Additionally, the Task Force will explore developing partnerships with San Diego County, Tribal Nations, and other major employers in rural San Diego.

Action Plan

The Action Plan serves as a roadmap for how SANDAG, local jurisdictions, and transit agencies can best plan and implement Flexible Fleet pilot projects throughout the region. The Action Plan consists of two phases: Phase I focuses on the initial steps to engage operators, prioritize pilots, and develop initial service plans, while Phase II focuses on finalizing the operating agreements, launching the service, and monitoring operations.

Table 5-2 describes Phase I plan to strategize initial pilots within the region and includes the following actions:

- Initiate a Flexible Fleets Task Force
- Prioritize Pilots and Determine Implementation Structure
- Initial Service Plan and Operating Agreement

SANDAG will work with the Task Force to identify the lead implementing agency and establish roles and responsibilities for other partnering agencies and local jurisdictions.

Table 5-3 describes Phase II of the action plan to implement initial pilots within the region and includes the following actions:

- Finalize Operations Plan
- Develop and Execute Launch Strategy
- Launch Pilot
- Ongoing Operations and Future Planning

The following tables provide a detailed series of steps as well as the roles that SANDAG, the Task Force, lead implementation agency, local jurisdictions, transit agencies, stakeholders, and operators will play in the implementation of Flexible Fleet services.

Table 5-4: Phase I: Pilot Prioritization and Initial Service Planning

	Initiate Flexible Fleets Task Force	Select Pilots and Determine Implementation Structure	Initial Service Plan and Operating Agreement
SANDAG	• SANDAG will create a task force including members from local jurisdictions, transit agencies, and invite other implementing partners from the region • Present findings from the Flexible Fleets Implementation Strategic Plan • Coordinate early-action pursuit of funding for Flexible Fleets • Explore potential partners to bring to the task force for initial pilot implementation	• Conduct a workshop with local jurisdictions and transit agencies to discuss and prioritize the six pilot implementation areas • Compile funding resources for Flexible Fleet implementation from each jurisdiction • Present the funding opportunities available to jurisdictions, community-based organizations, or other Flexible Fleet partners (e.g., Military, Universities, etc.) • Host workshop with task force to discuss potential implementation structure for each pilot implementation area • Determine the approach and required documentation for a "mini-Request for Proposal (RFP)" process with the operators	• Work with individual jurisdictions, appropriate transit agency, and/or partner agencies to outline high level service goals, performance measures, and develop a mini-RFP for operator on-calls • Issue a mini-RFP to the operator on-calls for one or more of the six pilot implementation areas requiring an initial service plan and draft inputs for an eventual operating agreement. • The mini-RFP could include the following: description and map of the proposed service area; proposed service model identifying who will provide drivers, vehicles, and technology; provide a service plan with an assessment of how the service criteria will be met; and costs and fare structure.
Local Jurisdiction	• Appoint a City staff member to the task force • Define high level service goals for Flexible Fleets implementation within the City • Review key users and communities Flexible Fleet services should serve • Identify any barriers to the implementation of Flexible Fleets and develop a work plan to address them	• Provide task force with information on the jurisdiction's funding resources for Flexible Fleet implementation • Communicate service goals, preferences, and key user groups with task force • Work with task force to determine best lead agency for implementing pilots	• Work with SANDAG, the appropriate transit agency, and/or partner agencies to outline high level service goals and develop a mini-RFP for operator on-calls
Transit Agency	• Appoint an agency staff member to the task force • Collect information on existing route performance in each of the pilot implementation areas • Define high level service goals for Flexible Fleets implementation within agency service boundary • Identify any barriers to the implementation of Flexible Fleets and develop a work plan to address them • Identify any upcoming service changes	• Provide task force with information on the agency's funding resources for Flexible Fleet implementation • Communicate service goals, preferences, and key user groups with task force • Work with task force to determine best lead agency for implementing pilots	• Work with SANDAG, the appropriate jurisdiction, and/or partner agencies to outline high level service goals and develop a mini-RFP for operator on-calls
Other Partner Agencies	• Indicate interest in joining task force	• Work with task force to determine best lead agency for implementing pilots	• Work with SANDAG, the appropriate jurisdiction, and transit agency to outline high level service goals and develop a mini-RFP for operator on-calls
Operators	• Appoint staff to the task force on an as-needed basis • Provide the task force with an overview of technology innovations, infrastructure needs, and user interfaces	• Review mini-RFP process with the task force and provide comments	• Submit proposals to the task force that respond to the mini-RFP

Table 5-5: Phase II: Finalizing Service Plan and Launching Pilot

	Finalize Operations Plan	Develop and Execute Launch Strategy	Launch Pilot	Ongoing Operations and Future Planning
SANDAG	• Provide Task Force members with any lessons learned in developing operations plan from initial pilots	• Provide education and communication resources to lead implementing agency • Coordinate with SANDAG's Social Equity Working Group to help market service to Social Equity Focused Population • Assist testing of smartphone apps, vehicles, and customer service applications prior to launch	• Provide operations and marketing support • Assist in communication of needs to operators and task force members • Assist disseminating materials for regional education of Flexible Fleet pilots	• Provide a platform to review performance measures, discuss lessons learned and provide information to task force members implementing Flexible Fleet services • Conduct a customer satisfaction survey to understand service quality for pilot services • Determine phasing plan and funding opportunities for future pilots

Lead Implementing Agency	• Review proposal with implementation team and provide consolidated comments to operators on initial service plan
	• Meet with operators to review comments and finalize operations plan including:
	  ○ Service cost, fares, and subsidies
	  ○ KPI reporting mechanism
	  ○ User interface/infrastructure requirements
	  ○ Implementation timeline
	• Execute operating and maintenance agreement
		• Work with agencies, jurisdictions, and partners to meet infrastructure requirements necessary for service implementation
		• Schedule testing of user interface
		• Develop marketing materials, timeline, and coordinate with transit agency, other partners, and operator to assist with marketing pilots
		• Identify a dedicated rapid response team to manage resources throughout the launch
			• Evaluate initial launch and determine whether modifications to service need to be made
			• Identify additional staff to provide launch support to the operator and partner agencies
			• Implement any quick build improvements necessary to provide infrastructure for launch
				• Assess staffing needs and organizational structure
				• Evaluate the service based on data provided by operators

Transit Agency	• Review proposal with implementation team and provide comments to lead implementing agency • Determine timeline for supporting any transit infrastructure needs • Define any service changes needed to support pilot implementation	• Assist lead agency with marketing prior to pilot launch	• Explore implementing near-term transit improvements (e.g., transit stop infrastructure, charging infrastructure, vehicle storage, service changes) needed to support service • Identify staff to support launch of service	• Assess additional station and stop infrastructure needs and implement changes as the service matures • Explore service refinements based on performance measures and feedback from transit stakeholders
Local Jurisdiction / Other Partner Agencies	• Review proposal and operating agreements with implementation team and provide comments to lead implementing agency • Determine whether funding support can be provided and determine amount of support	• Jurisdiction to support infrastructure design, permitting, construction, and inspection • Assist lead agency with marketing prior to pilot launch	• Provide marketing and educational support during pilot launch	• Continue marketing and education on the service and provide input on community needs and new partnership opportunities
Operators	• Meet to discuss revisions with implementing agency, transit agency, and other partner agencies to incorporate any modifications • Execute operating agreements	• Assist lead agency with marketing prior to pilot launch • Assist with testing of user interface for Flexible Fleet service	• Provide technical and customer service support for riders • Provide marketing support through social media accounts, mail, and other advertising channels • Operate the service	• Provide ongoing assessments of the service against the criteria • Provide a reporting tool or performance data agreed upon with the lead operating agency • Recommend changes to the service including modifications to the service area, vehicle requirements, and the fare/subsidy strategy

Long Term Planning Actions

In addition to the near-term implementation actions detailed above, there are a series of medium to long-term planning actions that should be pursued by SANDAG, local jurisdictions, and other agencies to prepare for future Flexible Fleet projects in San Diego County. These actions include the following:

1. Develop a plan to extend the Flexible Fleets task force
    - The task force, led by SANDAG, serves an important coordinating role across multiple stakeholders
2. The task force can continue to support, performance monitoring,data management, and coordination on various implementation needs. Study extending the pilot programs into permanent programs.
    - Identify opportunities for extending the service area and contract period based on demand, customer service input, and other factors.
3. Implement a Gateway Connector pilot program.
    - Utilize the on-calls or a separate RFP program to procure a pilot.
    - Further explore potential service types and variations on some of the service types, such as providing demand responsive vanpools.
4. Update the Flexible Fleets Implementation Strategic Plan to incorporate the results of the pilot programs and emerging Flexible Fleet service types, such as last-mile delivery, urban air mobility, and autonomous Flexible Fleet services.
    - Utilize the KPIs from the pilot programs to understand trip patterns, wait times and service levels, and cost effectiveness.
    - Update the Regional Scan to reflect the KPIs and updated demographics and travel demand data.
5. Coordinate Flexible Fleet service implementation with the implementation of the 5 Big Moves. Flexible Fleet services can benefit from the various infrastructure improvements, technologies, and amenities that are envisioned as part of Transit Leap, Mobility Hubs, Next OS, and Complete Corridors.
6. Review the performance of the Flexible Fleets on-calls procurement and recommend enhancements for another round.
7. Identify other project delivery methods, including design-build and pre-development agreements (PDAs).

FLEXIBLE FLEETS

Implementation Strategic Plan

APPENDICES

Photo Credit: Circuit, FREE, Little Italy

Appendix A

Case Studies

Appendix A: Case Studies

This Appendix contains a series of examples that provide a selection of Flexible Fleet programs that have been implemented in various regions of the United States. The case studies provide an overview of implemented service models, where they are located, the benefits and challenges, as well as a link to the program. The case studies analyzed helped inform the evaluation criteria for the Regional Scan (**Appendix C**) as well as the overall Strategic Plan (**Chapter 5**).

The following service types were defined as follows and case studies associated with each service type are described in **Table 1**.

- **Microtransit and NEV Microtransit** – Smaller transit vehicles that can carry anywhere between 5 to 20 passengers and use technology to provide the most efficient route between your doorstep and destination. Microtransit can include smaller, all electric vehicles known as neighborhood electric vehicle (NEV) shuttles, which are sustainable and convenient for short trips within a community.
- **Micromobility** – Small, low-speed vehicles and services support short trips around a community and are a healthy alternative to driving. Micromobility can be personally owned or part of a shared fleet and can include bikes, scooters, and other rideables.
- **Ridehail** – single occupant or single party "for hire" vehicles operated by Transportation Network Companies (TNCs) such as Uber and Lyft. Rides are typically requested through a smartphone app or website that match riders with available drivers. Pricing which can be subsidized by public agencies, is determined by the length of the trip and level of demand when the ride is requested.
- **Rideshare** – Services that pool multiple riders into a single vehicle that are traveling between a set of closely spaced origins and destinations**.** Carpools, vanpools, and pooled ridehailing services such as UberPool and Lyft Shared are included. These vehicles typically make multiple stops along a route to pick up and drop off passengers reducing the need for multiple cars on the road.
- **Carshare** – Vehicles that are available for people who want to rent cars from either private owners or a Peer-to-Peer car rental company for short periods of times. Users can pay for the usage of the shared vehicle by the amount of time used but can be limited based on the number of cars available.
- **Last Mile Delivery** – Semi- or fully automated vehicles, e-bikes, drones, and bots could deliver a range of goods to homes and smart lockers at Mobility Hubs. Shared vehicles can make efficient trips by carrying passengers and goods at the same time.

Table 1: Case Studies by Service Type

Microtransit and NEV Microtransit				
Name & Location	**Mode**	**Description**	**Benefits**	**Limitations**
Carlsbad Connector, Carlsbad[1]	*Transit extension service (last mile only)*	*Multi-agency pilot program provided a solution to the challenge of transporting commuters to and from major transit hubs to their final destinations. Pilot program temporarily suspended July 31, 2020 due to the COVID pandemic.*	• *App based system* • *Riders can secure/request trips up to 3 days in advance* • *12 vehicles in the fleet, 1 of which is ADA-friendly* • *Concentrated service area* • *Inexpensive: $2.50 or free for coaster monthly pass or Region Plus daily pass users* • *Opportunity for business partnerships for discounted rides*	• *Booking trips in advance may reduce the opportunity for riders to have flexibility to request rides* • *Service area is smaller*
Micro Metro, Los Angeles[2]	*Area-based on-demand microtransit*	*Micro is Metro's new on-demand rideshare service, offering trips within several zones in LA County. The new service is for short local trips and uses small vehicles (seating up to 10 passengers).*	• *Rides can begin and end anywhere in service area* • *Service areas include access to major transit centers & LAX airport* • *Inexpensive: First two rides free, then $1 per ride* • *Significant deployment of vehicles to meet demand* • *Shared with up to 9 other passengers*	• *Vehicle availability and wait time may vary* • *Limited service area* • *Limited operating hours*

Microtransit and NEV Microtransit				
Name & Location	**Mode**	**Description**	**Benefits**	**Limitations**
OC Flex, Orange County[3]	*Area-based on-demand microtransit*	*App-based on demand neighborhood shuttle service. Operates on fixed day rates and provides connections/transfers to other transit options.*	• *Rides can begin and end anywhere in service area* • *Service areas include access to major transit centers* • *Inexpensive: OCTA fares accepted and free transfers from rail*	• *Limited service area* • *Limited operating hours* • *Reduced fare passes not valid* • *Long wait times (15-30 minutes)*
SmaRT Ride , Sacramento[4]	*Area-based on-demand microtransit*	*SmaRT Ride is similar to other ride-share services where customers can use a smartphone app to request a ride that will pick up and drop off passengers within the service boundaries. Partnered with Via to power a smartphone app to request the transit vehicle pick-up.*	• *Significant service area (many cities in the Sacramento region)* • *Access to many transit centers* • *Point-to-point service in some areas* • *Rides can begin and end anywhere in service area* • *Inexpensive* • *Free for groups of 5 or more* • *Free for students K-12* • *Reduced fare applies*	• *Vehicle/driver availability may affect wait time* • *Some zones require riders to walk to designated pickup points* • *Limited service hours* • *No travel on this service between zones*
Flexride, Denver[5]	*Transit extension service (last mile only)*	*FlexRide provides extended bus service in specific Denver metro areas, delivering first- and last-mile connections to other RTD Park-n-Rides and stations, medical centers, and business parks. Similar to a ride share, FlexRide is available to the general public on a first-come, first-served basis.*	• *Reduced fare applies If eligible* • *RTD Denver passes accepted* • *Advanced scheduling available* • *Access to transit centers*	• *Limited service areas* • *Limited driver/vehicle availability* • *Trips must begin or end at transit centers or specific points*

Microtransit and NEV Microtransit				
Name & Location	**Mode**	**Description**	**Benefits**	**Limitations**
FRED San Diego, San Diego[6]	*Area-based on-demand microtransit*	*App-based on-demand neighborhood shuttle service. Provides service within downtown San Diego only. Uses Neighborhood Electric Vehicles to deliver service. Subsidized by the City of San Diego using downtown parking revenue.*	• *Inexpensive (Free)* • *Can be hailed from app or street (provides access without smartphone)* • *Can begin or end trip anywhere within service area*	• *Limited service area* • *Limited operating hours* • *Challenges around driver/vehicle availability during peak times*
SamTrans OnDemand, Pacifica, CA[7]	*Transit extension service (both first and last mile)*	*12-month pilot program from SamTrans, to convert a neighborhood circulator bus route (FLX Pacifica) into on-demand microtransit. Program ended May 2020.*	• *App-based* *Regular SamTrans fares (incl. reduced fare)* *Call center available for riders without smartphones* • *Pickup or dropoff anywhere within service area*	• *Limited Service Area* • *App/software challenges* • *Limited vehicle/driver availability* • *Many trip denials ("no seats available")* • *Reduced ridership, more mileage, and increased cost compared to previous fixed-route service*
Via to Transit, Seattle[8]	*Transit extension service (both first and last mile)*	*Partnership with Via to provide on-demand shuttle service within specific neighborhood areas. Primarily serves major transit centers in south Seattle area.*	• *'Pricing follows King County Metro bus ride pricing (i.e. reduced-fare eligibility applies)* • *Opportunity to start a ride anywhere within service area*	• *Limited service area - only a portion of a city* • *Trips for non-'Access' passengers must begin or end at a 'hub' (transit center or major destination)* • *Trips for non-'Access' passengers may require a walk* • *Long wait times (up to 15-20 minutes)*

Microtransit and NEV Microtransit				
Name & Location	**Mode**	**Description**	**Benefits**	**Limitations**
Via, Jersey City[9]	*Area-based on-demand microtransit*	*Partnership with Via to provide an on-demand bus service across Jersey City which compliments existing transit services and provides access to popular destinations and residentail areas. . Utilizes the Via app to hail a shared ride.*	• *Operates at adjusted rates based on wether rides are in the central city or not* • *Partners with Meals on Wheels to deliever food*	• *Long wait times(over 24 minutes)* • *Limited service area*
FRAN, Anaheim, FL[10]	*Area-based on-demand microtransit*	*NEV microtransit services can be accessed through an app with pick-ups and drop-offs occuring at 16 stations. The service is funded through various government agencies, grants, and property assessments.*	• *Inexpensive (free)* • *Electric vehicles provide clean transportation* • *Also operates as a free food delivery service for local vendors*	• *Challenges around driver/vehicle availability during peak times due to there only being 6 shuttles* • *Limited access with only 16 stations*

Source

[1] *https://gonctd.com/carlsbad-connector-temporarily-suspends-service/*

[2] *https://micro.metro.net/*

[3] *http://www.octa.net/OCFlex/Overview/*

[4] *https://www.sacrt.com/apps/smart-ride/*

[5] *https://www.rtd-denver.com/services/flexride*

[6] *https://www.ridecircuit.com/fred*

[7] *https://www.samtrans.com/Planning/Planning_and_Research/SamTrans_Pacifica_Microtransit_Pilot.html , https://www.coastcommute.org/2020/05/21/samtrans-pilot-ondemand-ends/*

[8] *https://kingcounty.gov/depts/transportation/metro/travel-options/on-demand/via-to-transit.aspx*

[9] *https://ridewithvia.com/news/jersey-city-and-via-launch-first-on-demand-public-bus-service-in-the-state*

[10] *https://commercial.polaris.com/en-us/news/gem/anaheim-debuts-unique-all-electric-microtransit-service/*

Micromobility				
Name & Location	**Mode**	**Description**	**Benefits**	**Limitations**
Citi Bike, New York City/New Jersey[1]	*Docked Bikeshare*	*App-based docked bikeshare. Trips must start and end at a docking station.*	• *Know where the starting and ending destination is* • *Inexpensive*	• *Fixed Origin Destination (OD) + walking to true OD* • *Challenges regarding rebalancing bikes so they aren't only located in popular drop-off locations.* • *Resource heavy in the beginning* • *Docks usually take curb space/parking space* • *Vandalism*
Biketown, Portland[2]	*Dockless/Docked Bikeshare*	*App-based bikeshare*	• *Opportunity to start a ride wherever there is a bike* • *Easy to find* • *Inexpensive*	• *No designated parking spots, leading to bike cluttering in busy areas* • *Challenges regarding rebalancing bikes so they aren't only located in popular drop-off lcoations* • *Typically don't travel far and have service boundaries* • *Vandalism*
E-Scooter Pilot, Portland[3]	*Dockless Scooter share*	*Portland Bureau of Transportation created a four-month pilot period from July through November of 2018*	• *Opportunity to start a ride wherever there is a scooter* • *Easy to find* • *Inexpensive*	• *No designated parking spots, leading to scooter cluttering in busy areas* • *Challenges regarding rebalancing scooters so they aren't only located in popular drop-off locations* • *Typically don't travel far and have service boundaries* • *Vandalism*
E-Scooter Pilot, Chicago[4]	*Dockless Scootershare*	*The City of Chicago granted permission to three shared e-scooter companies to operate in the 2020 e-scooter pilot: Bird, Lime and Spin. The 2020 pilot ran four months*	• *Opportunity to start a ride wherever there is a scooter* • *Easy to find* • *Inexpensive*	• *No designated parking spots, leading to scooter cluttering in busy areas.* • *Challenges regarding rebalancing scooters so they aren't only located in popular drop-off locations.* • *Typically don't travel far* • *Vandalism* • *Limited Service Area*

Micromobility				
Name & Location	**Mode**	**Description**	**Benefits**	**Limitations**
		from mid-August to mid-December.		
DecoBike, San Diego[5]	*Docked Bikeshare*	*Pilot program for docked bikeshare in San Diego. Partnership between the City of San Diego and a private bike sharing program provider (DecoBike). Non app-based - payment must be done at kiosks.*	• *Opportunity to start a ride wherever there is a docking station* • *Easy to find* • *Inexpensive* • *Bikes may be returned to any docking station*	• *Expensive ($5/30 mins)* • *Requires payment at kiosk* • *Mechanical reliability challenges with docks and vehicles* • *Must be returned to designated docking station* • *Challenges regarding rebalancing scooters so they aren't only located in popular drop-off locations.* • *Typically don't travel far and have service boundaries* • *Vandalism*
BayWheels, San Francisco Bay Area, CA[6]	*Dockless/Docked Bike Share*	*Lyft provides a hybrid system of docked bikes as well as docked/dockless e-bikes. All bikes are located and reserved through the Lyft app.*	• *Convenient parking locations as they can be locked at any physical docking station, but also at any bike rack or light pole* • *Wide service area* • *Easy to find*	• *Expensive* • *No designated parking spots, leading to scooter cluttering in busy areas* • *Challenges regarding rebalancing scooters so they aren't only located in popular drop-off locations* • *Vandalism*
SPIN, Bird, Link, Lime San Diego[7]	*Dockless Scootershare*	*City of San Diego granted permission to three e-scooter operators: Bird, SPIN, and Link brand e-scooters. Dockless scootershare, via app, throughout most of the City of San Diego. Incorporates app-based incentives for parking in designated corrals, and GPS tracking to prevent vehicles from exiting the service area.*	• *Opportunity to start a ride wherever there is a scooter* • *Easy to find* • *Inexpensive*	• *No designated parking spots, leading to scooter cluttering in busy areas* • *Rebalancing challenge* • *Typically don't travel far and have service boundaries* • *Vandalism*

Micromobility				
Name & Location	**Mode**	**Description**	**Benefits**	**Limitations**

Source

[1] *https://www.citibikenyc.com/how-it-works*

[2] *https://www.biketownpdx.com/how-it-works*

[3] *https://learn.sharedusemobilitycenter.org/overview/2018-e-scooter-findings-report-portland-oregon-2019/*

[4] *https://www.chicago.gov/city/en/depts/cdot/supp_info/escooter-share-pilot-project.html*

[5] *https://www.sandiegouniontribune.com/news/environment/story/2019-04-08/decobike-rolls-out-of-the-san-diego-city-as-dockless-alternatives-proliferate*

[6] *https://www.lyft.com/bikes/bay-wheels*

[7] *https://www.link.city/ , https://www.bird.co/ , https://www.spin.app/ , https://www.li.me/*

Ridehailiing				
Name & Location	**Mode**	**Description**	**Benefits**	**Limitations**
Lyft, General[1]	*On-demand Ridehail*	*App-based on-demand ridehailing. Available in most major markets, and 24/7.*	• *Rides can begin and end anywhere within service area* • *Available in most areas, 24/7*	• *Expensive* • *Variable cost depending on driver availability and demand* • *Variable availability depending on drivers, locations, time of day* • *Limited vetting of drivers*
GoMonrovia – Lyft, Monrovia, CA[2]	*Public-private on-demand ridehailing program partnership*	*Public-private transit program through Lyft to take a ride anywhere in the service area at a reduced rate. Carries up to 4 passengers can be requested/fulfilled for $3 (subsidized rides as a transit replacement and temporary termination of Lyft Line due to COVID).*	• *Rides can begin and end anywhere within service area and to select destinations outside of service area* • *Available 24/7*	• *Variable availability depending on drivers, locations, time of day* • *Limited service area* • *Non-shared rides*
Uber, General[3]	*On-demand Ridehail*	*App-based on-demand ridehailing. Available in most major markets, and 24/7.*	• *Opportunity to start a ride in most locations* • *Easy to find*	• *Expensive* • *Variable cost depending on driver availability and demand* • *Variable availability depending on drivers, locations, time of day* • *Limited vetting of drivers*
Voyage, Orlando[4]	*On-demand driverless ridehail*	*Free neighborhood transportation option for 125,000 residents of The Villages retirement community. Provides door-to-door service. Still in development.*	• *Rides can begin and end anywhere within service area* • *Available in most areas, 24/7*	• *Price, program, still in development*

Ridehailiing				
Name & Location	**Mode**	**Description**	**Benefits**	**Limitations**
NCTD+, San Diego, CA[5]	*Public-private on-demand ridehailing program partnership*	*Partners with Lyft, Uber, and TripShot to provide first and last mile connections between two major transit stations. Rides are booked through the company's apps, with a coupon, or with a QR code.*	• *Program runs for most hours of the day* • *Much cheaper than typical ridehailing services* • *Easy to find*	• *Variable availability depending on drivers, locations, time of day* • *Limited service area*

Source

[1] *https://www.lyft.com/blog/posts/how-does-lyft-work*

[2] *https://gomonrovia.com/*

[3] *https://www.uber.com/us/en/about/how-does-uber-work/*

[4] *https://news.voyage.auto/self-driving-cars-in-a-city-like-no-other-c9b38807a9a6*

[5] *https://gonctd.com/services/nctdplus/*

Rideshare				
Name & Location	**Mode**	**Description**	**Benefits**	**Limitations**
Hoot Rides, Oceanside, CA[1]	*Neighborhood on-demand service*	*App-based on-demand neighborhood shuttle service. Provides service within downtown Oceanside only. Uses Neighborhood Electric Vehicles to deliver service.*	• *Rides can begin and end anywhere within service area* • *Electric vehicles*	• *Limited service area* • *Limited operating hours (only Thursday - Sunday)* • *Challenges around driver/vehicle availability during peak times* • *Expensive ($3 per ride) for service area*
Marin Transit Connect, Marin Country, CA[2]	*On-demand shuttle service*	*Multi-agency pilot program providing a solution to first-last-mile challenge of transporting commuters to and from major transit hubs to their final destinations.*	• *Rides can begin and end anywhere within service area (significant discount given to trips that begin or end at transit centers)* • *Connects to rail and major transit centers*	• *Very limited service area* • *Wait times vary based on vehicle/driver availability* • *Fares high if not going to/from transit center*
Via, Los Angeles[3]	*On-demand rideshare*	*Partnered with Via to provide shared low-cost transportation to and from rail and bus lines in El Monte, Compton, and North Hollywood areas. Allowed participants of Metro's Low-Income Fare is Easy (LIFE) to use Via for free. Pilot ended January 25, 2021.*	• *Rides can begin and end anywhere within service area* • *Inexpensive ($1)*	• *Not point-to-point: riders may have to walk* • *Limited service areas* • *Limited operating hours* • *Wait times vary based on vehicle/driver availability*
SANDAG Vanpool Program, San Diego, CA[4]	*Pre-organized rideshare groups*	*SANDAG organizes vanpool groups amongst people with similar commutes. Provides a $400 monthly subsidy to each group to alleviate the cost of gas and van maintenance.*	• *Can be organized to accommodate those who don't live in dense areas.* • *Inexpensive (Vans are leased at a discounted price through pre-arranged vendors)*	• *Does not allow for day-to-day flexibility* • *Relies on consistancy amongst users*

Rideshare				
Name & Location	**Mode**	**Description**	**Benefits**	**Limitations**
Rideshare Technology [5]	*Various software platforms*	*Platforms such as RideAmigos aim to enable more efficient commutes by consolidating information about various transit options.*	• *Usually inexpensive* • *Can be used at various levels (company-wide, individual, etc)*	• *May be inaccessible to certain demographic groups*

Source

[1] *https://www.hootrides.com/*

[2] *https://marintransit.org/routes/cxt*

[3] *https://www.metro.net/projects/mod/*

[4] *https://www.icommutesd.com/vanpool/vanpool*

[5] *https://rideamigos.com/* , *https://www.waze.com/carpool/* , *https://www.metropia.com/*

Carshare				
Name & Location	**Mode**	**Description**	**Benefits**	**Limitations**
Car2Go, San Diego[1]	*App-based carsharing*	*International company: round-trip car sharing - reservable via app. Fuel and insurance included. May be returned to other designated 'Car2Go' parking areas within the service area. Service in San Diego ended 2016.*	• *All electric fleet* • *Available 24/7* • *One-way trips allowed*	• *Limited service area* • *Limited range of electric vehicles* • *Fleet/vehicle availability limited at peak hours*
Zipcar, San Diego[2]	*App-based carsharing*	*Round-trip car sharing - reservable via app. Fuel and insurance included. Must be returned to the same place as picked up.*	• *Fuel and insurance included* • *No service area limit* • *Inexpensive: $9-15 per hour* • *Available 24/7*	• *No one-way trips* • *Monthly or annual membership fees* • *Requires driver license* • *Per-day mileage limits* • *Fleet/vehicle availability limited at peak hours*
Getaround, General[3]	*Peer-to-peer carsharing service*	*Connects those who are looking to share their car with those that are looking for car rentals. Cars are booked through the Getaround app and can be rented for as little as an hour or for full days.*	• *Allows for users to make money off of unused cars* • *Provides short-term flexible transport*	• *Variable availability depending on drivers, locations, time of day* • *Variable prices*
Innova EV, General[4]	*One-way car rentals*	*Allows users to reserve 2 seat Dash electric vehicles via an app and operate them in a designated geofenced area.*	• *Zero-emissions electric vehicles* • *Easy to find*	• *Limited service area*
Our Community Carshare, Sacramento[5]	*Membership-based car sharing*	*A membership-based service where residents of certain low-income communities can reserve electric vehicles.*	• *Targets an underserved demographic* • *Zero-emissions electric vehicles* • *Short-term flexible transport*	• *Limited service area* • *Variable availability depending on locations and time of day*

Carshare				
Name & Location	**Mode**	**Description**	**Benefits**	**Limitations**
			• *Free*	
BlueLA, Los Angeles[6]	*Membership-based car sharing*	*A membership-based service where residents of certain low-income communities can reserve electric vehicles.*	• *Targets an underserved demographic* • *Zero-emissions electric vehicles* • *Short-term flexible transport* • *Inexpensive: $1 a month for residents of low-income communitites*	• *Limited service area* • *Variable availability depending on locations and time of day*

Source

[1] *https://www.sandiegouniontribune.com/news/politics/sd-me-car2go-leave-20161230-story.html*

[2] *https://www.zipcar.com/how-it-works*

[3] *https://www.getaround.com/?wpsrc=Google+Organic+Search*

[4] *https://www.innovaevcarshare.com/*

[5] *https://www.airquality.org/Our-Community-CarShare/Apply-for-Our-CarShare*

[6] *https://blinkmobility.com/*

Last Mile Delivery				
Name & Location	**Mode**	**Description**	**Benefits**	**Limitations**
Urban Freight Lab, Seattle[1]	*Freight microhub*	*Multi-agency and company pilot program in the dense Uptown neighborhood of Seattle for last-mile urban freight delivery. Uses common carrier parcel locker systems and electric-assist cargo bike trikes for delivery.*	• *Reduced emissions and congestion from delivery vehicles* • *Reduces missed deliveries (locker)* • *Microhub to consolidate freight activity* • *Reduce freight truck activity in neighborhoods*	• *Challenges associated with bike delivery/pickup of large or heavy parcels* • *Replaces some door-to-door delivery with residents having to pickup packages from locker*
Nuro/FedEx, Houston[2]	*Autonomous delivery service*	*Pilot program partnership with DOT/FedEx/Nuro. Multi-stop and appointment-based deliveries with Nuro's self-delivery vehicle.*	• *Opportunity for extended delivery operating hours*	*N/A*
Amazon Drone Delivery, Lockeford, CA[3]	*Autonomous delivery service*	*Pilot program that experiments with utilizing drones to deliever high-value lightweight packages short distances.*	• *Reduces environmental impact of delivery* • *Decreases reliance on manpower*	• *Privacy issues* • *Permitting regulations* • *Vandalism* • *Limited situations in which technology could be used*

Source

[1] *https://www.seattleneighborhoodhub.com/*

[2] *https://www.nuro.ai/service*

[3] *https://www.aboutamazon.com/news/transportation/amazon-prime-air-prepares-for-drone-deliveries*

Photo Credit: Circuit, FREE, Little Italy

FLEXIBLE FLEETS

Implementation Strategic Plan

Appendix B

CBO Needs Assessment

Photo Credit: The CapMetro WAV (2)

Appendix B: Community Based Organizations Needs Assessment

A Needs Assessment was conducted for each of the three areas of CBOs in the San Diego region. The Needs Assessment includes the stakeholder survey results as well as a summary of areas identified through the Regional Scan for Flexible Fleet implementation.

North County

North County includes the cities of Oceanside, Carlsbad, Vista, San Marcos, Escondido, Encinitas, and other unincorporated parts of northern San Diego County. The North County Transit District (NCTD) serves the region with the COASTER commuter rail line between Oceanside and San Diego, SPRINTER hybrid rail between Escondido and Oceanside, and BREEZE bus service. Major destinations include Marine Corps Base Camp Pendleton, CSU San Marcos, Palomar College, the Del Mar Fairgrounds, Coastal beaches and lagoons, and casinos and reservations further to the east.

Needs Assessment

The CBO participants in North County include the Alliance for Regional Solutions (ARS) and Vista Community Clinic (VCC), and National Latino Resource Center. All three CBOs supported SANDAG in conducting CBO Community Needs Mobility Assessment. The survey was administered online using SurveyMonkey. **Table B-1** and **Table B-2** provide a summary of the survey results. Almost half of respondents have a medical condition that makes it difficult to travel. Many new mobility users also face challenges using services due to a lack of a smartphone, driver's license, and/or a credit card.

Figure B-1: North County CBO's

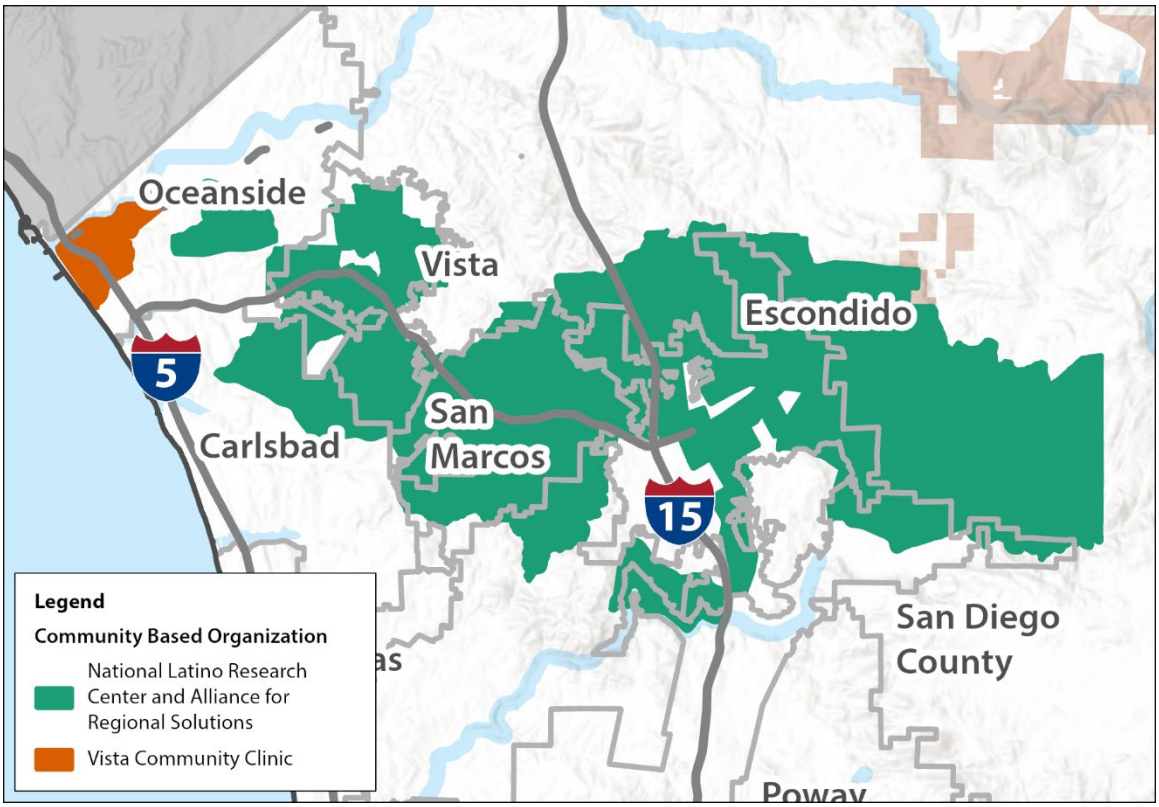


Table B-1: North County Community Mobility Needs Assessment Survey Results

	• **56%** ARS respondents who use public transit daily • **39%** VCC respondents who use public transit once a month, 2-3 times a week, or 4-5 times a week
	• **15%** ARS respondents who use food vouchers or stamps as forms of payment for services • **30%** VCC respondents who use food vouchers or stamps as forms of payment for services
	• **39%** of VCC respondents don't use smartphones
	• **20%** are zero-car households

SANDAG conducted interactive workshops with CBO working group participants to map areas of focus to inform the selection of potential Flexible Fleet pilots. CBO participants in North County included ARS, VCC, the National Latino Research Center, and Samahan Health Center. Using Social Pinpoint, they were asked to map key destinations in their community, physical barriers that impede travel, and areas where transit or other transportation options could be improved with Flexible Fleets services. The following summarizes major takeaways from the workshops that helped to inform the selection of proposed pilot locations.

Table B-2: North County CBO Focus Group and Social Pinpoint Key Themes

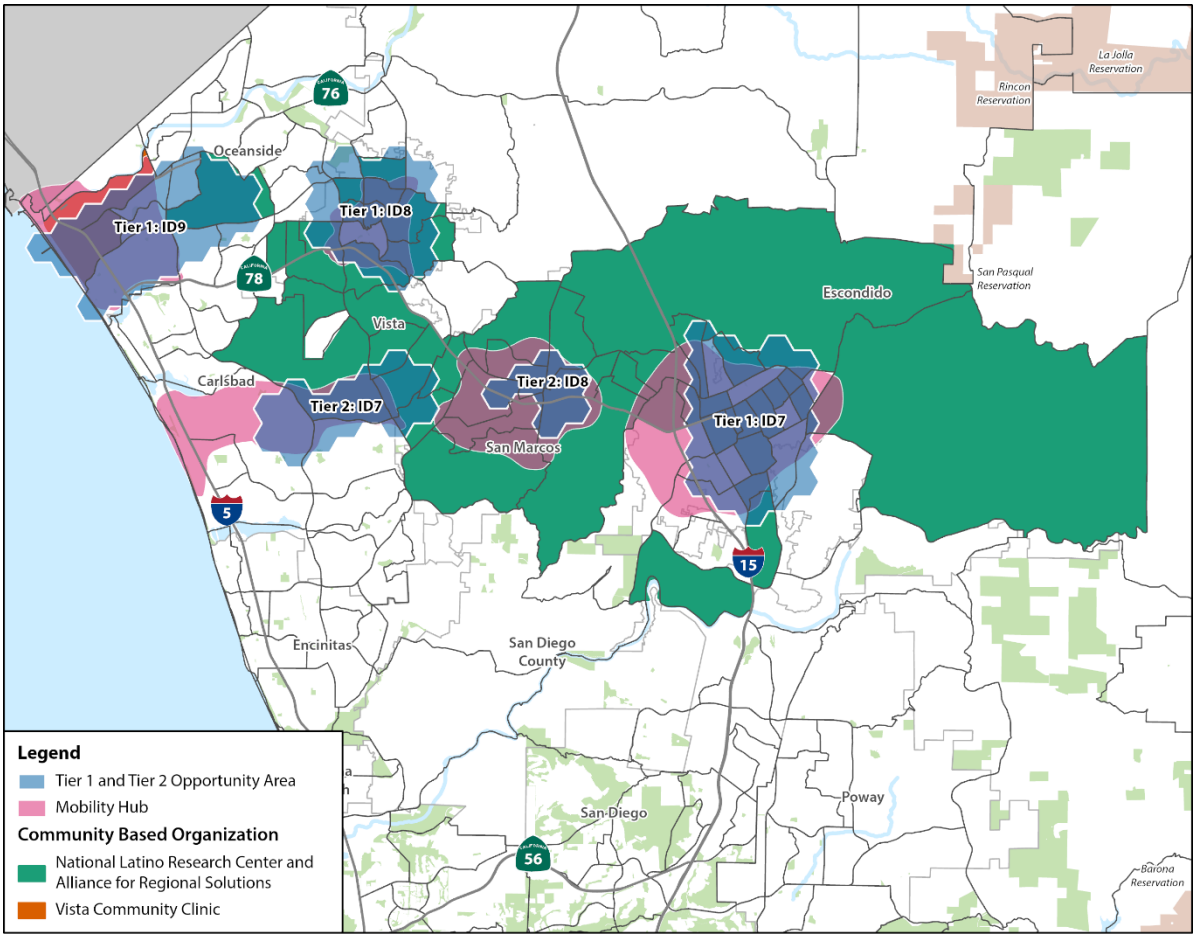
County-Wide	North County
• Consider **socio-economic barriers** (age, technology/digital divide, language, banking, geography) to inform pilot selection and implementation • **Infrastructure improvements,** particularly for pedestrians and bicyclists, are needed in underserved areas to compliment pilot • **Partner with CBOs** and other organizations to inform and support clientele in using new Flexible Fleet services • **Connect** to existing transit services, community destinations, social services, and shopping centers • Offer **clean-energy** technology and **flexible scheduling** including off-peak and night service for shift workers	• There is a need for **better intra-regional travel** within North County (Oceanside-San Marcos-Escondido) • There is a need for **better connections to rural and agricultural communities** • There is **an interest in microtransit and micromobility**, especially around transit centers and key destinations such as CSUSM, Palomar College, Escondido Library and Civic Centers, various social services, medical centers, and malls.

Opportunity for Flexible Fleet Implementation

Table B-3: North County Opportunity Areas and Partnerships

ID	Opportunity Area	Potential Partnerships
Tier 1, ID 7	Escondido	Alliance for Regional Solutions, National Latino Research Center
Tier 1, ID 9	Oceanside	Alliance for Regional Solutions, National Latino Research Center, Vista Community Clinic
Tier 2, ID 7	Palomar Airport Employment Center	Alliance for Regional Solutions, National Latino Research Center
Tier 2, ID 8	San Marcos	Alliance for Regional Solutions, National Latino Research Center
Tier 1, ID 8	Vista	Vista Community Clinic, Alliance for Regional Solutions, National Latino Research Center

Figure B-2: North County Opportunity Areas



Central San Diego

Central County includes the cities of San Diego, El Cajon, City Heights, and Linda Vista. San Diego Metropolitan Transit System (MTS) operates a trolley and bus system throughout this area. Major destinations include downtown San Diego, Mesa College, UC San Diego, and Barrio Logan.

Needs Assessment

The CBO participants in Central County include the Bayside Community Clinic (BCC), City Heights CDC, El Cajon Collaborative (ECC), and the Samahan Health Center, and Nile Sisters Development Initiative & Newcomers Support and Development. ECC supported SANDAG in conducting CBO Community Needs Mobility Assessment. The survey was administered online using SurveyMonkey. Figure I provides a summary of the survey results. Some respondents face challenges accessing new mobility services due to lack of smartphones and/or digital payment methods.

Figure B-3: Central San Diego CBO's

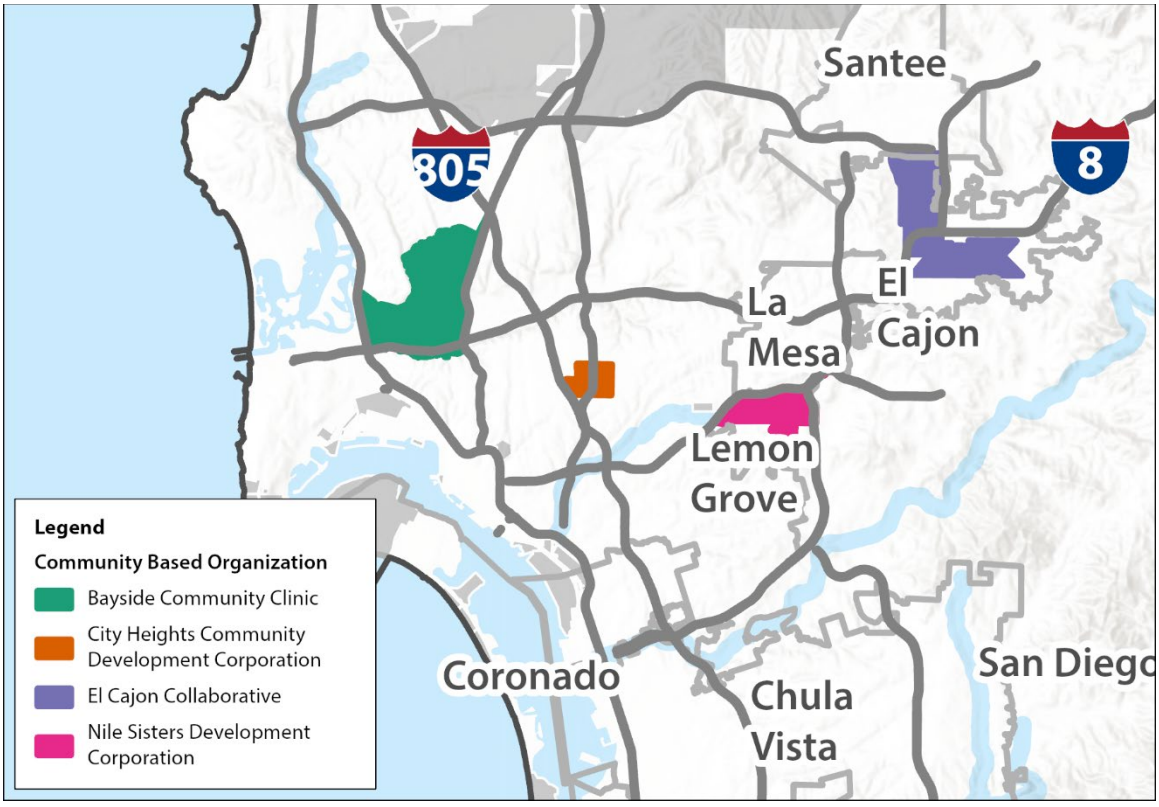


Table B-4: Central San Deigo Community Mobility Needs Assessment Survey Results

	• **8%** ECC Respondents who use public transit at least one a week
	• **22%** ECC Respondents who use food vouchers or stamps as forms of payment for services • **6%** VCC respondents who use cash cards as a form of payment for services
	• **13%** of VCC respondents don't use smartphones
	• **6%** are zero-car households

Table B-5: Central San Diego CBO Focus Group and Social Pinpoint Key Themes

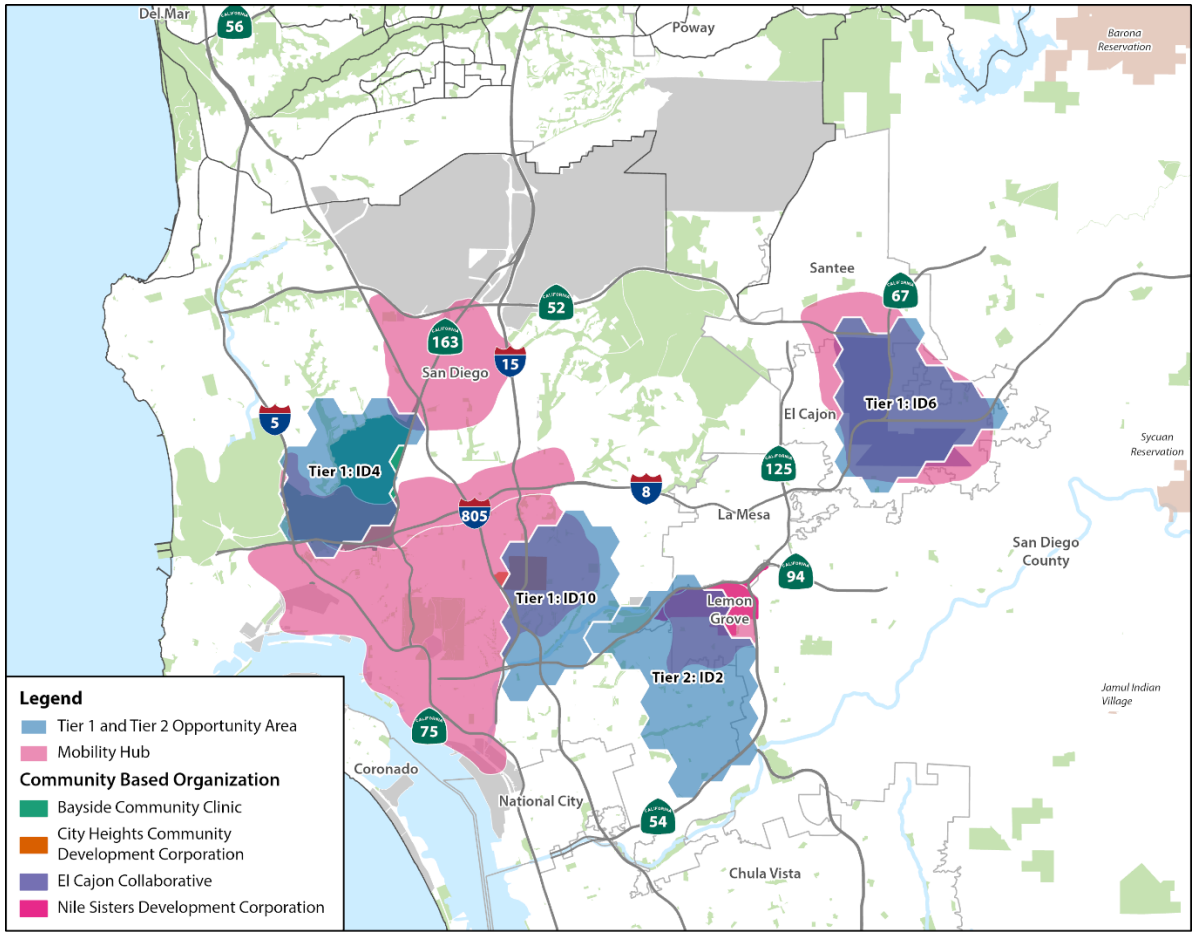
County-Wide	Central County
• Consider **socio-economic barriers** (age, technology/digital divide, language, banking, geography) to inform pilot selection and implementation • **Infrastructure improvements,** particularly for pedestrians and bicyclists, are needed in underserved areas to compliment pilot • **Partner with CBOs** and other organizations to inform and support clientele in using new Flexible Fleet services • **Connect** to existing transit services, community destinations, social services, and shopping centers • Offer **clean-energy** technology and **flexible scheduling** including off-peak and night service for shift workers	• Communities across the region share **a desire for shuttle and/or micromobility service paired with multi-lingual outreach** to potential users who are uncomfortable or unfamiliar with these types of transportation services • There is a need to **improve connections to existing transit centers**, which are not centrally located or are difficult to access • There is a need for **better active transportation infrastructure and first/last mile transit connections**, which are currently unsafe

Opportunity for Flexible Fleet Implementation

Table B-6: Central San Diego Opportunity Areas and Partnerships

ID	Opportunity Area	Potential Partnerships
Tier 1, ID 10	City Heights	City Heights CDC, Urban Collaborative Project
Tier 1, ID 6	El Cajon	El Cajon Collaborative
Tier 2, ID 2	Encanto	Nile Sisters Development Corporation, Samahan Health Centers
Tier 1, ID 4	Linda Vista	Bayside Community Clinic

Figure B-4: Central San Diego Opportunity Areas



South County

South County includes the cities of San Diego, Chula Vista, National City, Paradise Hills, San Ysidro, and the unincorporated area of Lincoln Acres. San Diego MTS operates a trolley and bus system throughout the region. Major destinations include Barrio Logan, Balboa Park, San Diego Zoo, and Waterfront Park.

Needs Assessment

The CBO participants in South County include Casa Familiar, Chula Vista Community Collaborative (CVCC), Olivewood Gardens Learning Center (OLG), Samahan Health Centers (SHC), and the Urban Collaborative Project (UCP). OLG and UCP supported SANDAG in conducting CBO Community Needs Mobility Assessment. The survey was administered online using SurveyMonkey. Figure I provides a summary of the survey results. Many respondents face mobility challenges due to lack of private vehicles, smartphones, and digital payment methods.

Figure B-5: South County CBO's

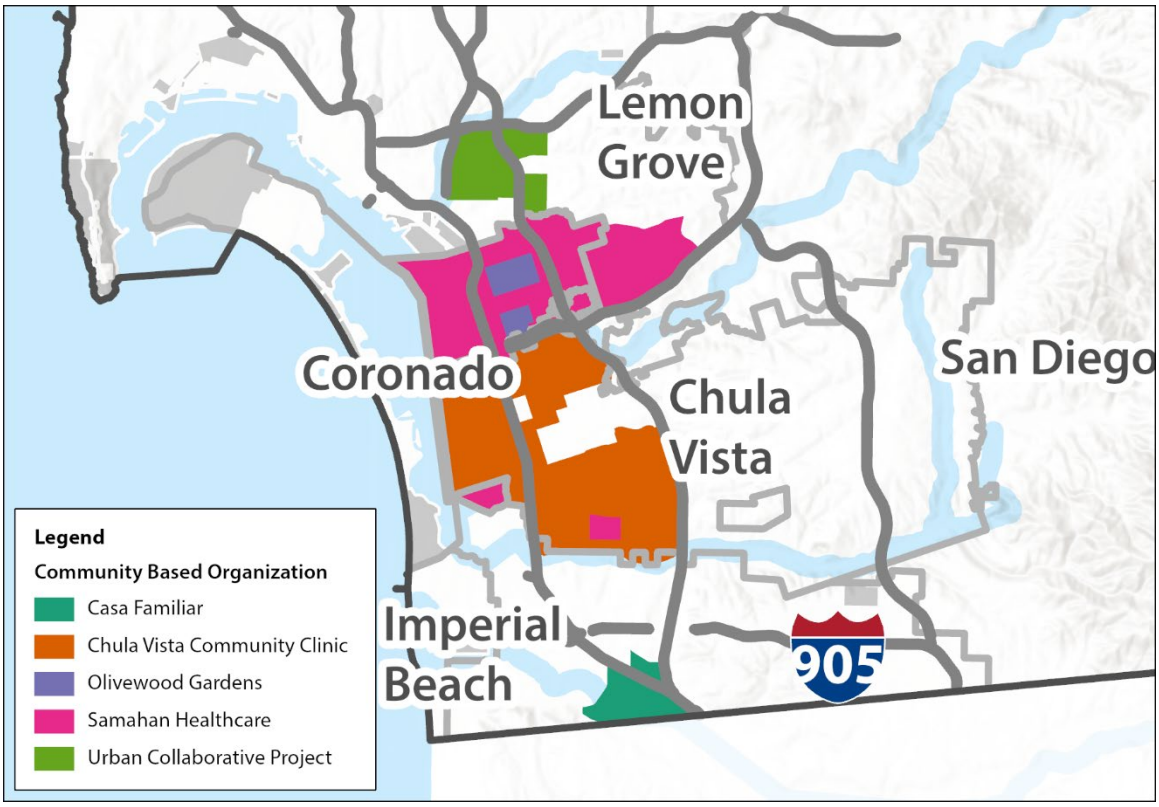


Table B-7: South County Community Mobility Needs Assessment Survey Results

	• **20%** UCP respondents who use public transit at least one a week
	• **47%** OLG respondents who use food vouchers or stamps as forms of payment for services • **38%** UCP respondents who use cash cards as a form of payment for services
	• **32%** of UCP respondents don't use smartphones
	• **16%** of UCP respondents are zero-car households

SANDAG conducted interactive workshops with CBO working group participants to map areas of focus to inform the selection of potential Flexible Fleet pilots. CBO participants in South County included Casa Familiar, CVCC, OLG, SHC, UCP, the National Latino Research Center, and the Nile Sisters Development Initiative & Newcomers Support and Development. Using Social Pinpoint, they were asked to map key destinations in their community, physical barriers that impede travel, and areas where transit or other transportation options could be improved with Flexible Fleets services. The following summarizes major takeaways from the workshops that helped to inform the selection of proposed pilot locations.

Table B-8: South County CBO Focus Group and Social Pinpoint Key Themes

County-Wide	South County
• Consider **socio-economic barriers** (age, technology/digital divide, language, banking, geography) to inform pilot selection and implementation • **Infrastructure improvements,** particularly for pedestrians and bicyclists, are needed in underserved areas to compliment pilot • **Partner with CBOs** and other organizations to inform and support clientele in using new Flexible Fleet services • **Connect** to existing transit services, community destinations, social services, and shopping centers • Offer **clean-energy** technology and **flexible scheduling** including off-peak and night service for shift workers	• There is a need for **better infrastructure and amenities for pedestrians and transit users**, who do not currently feel safe and would benefit from upgrades such as lighting and shelters • There is a need for improved **first/last mile access to transit stations** • New programs should **coordinate with the SANDAG-led San Ysidro Mobility Hub**

Opportunity for Flexible Fleet Implementation

Table B-9: South County Opportunity Areas and Partnerships

ID	Opportunity Area	Potential Partnerships
Tier 1, ID 1	Chula Vista	Chula Vista Community Clinic, Olivewood Gardens, Samahan Healthcare
Tier 1, ID 10[1]	City Heights	City Heights Community Development Corporation, Urban Collaborative Project
Tier 2, ID 2	Encanto	Nile Sisters Development Corporation, Samahan Healthcare
Tier 1, ID 2	Imperial Beach	Chula Vista Community Clinic, Olivewood Gardens, Samahan Healthcare, Urban Collaborative Project
Tier 1, ID 3	National City	Chula Vista Community Clinic, Olivewood Gardens, Samahan Healthcare, Urban Collaborative Project
Tier 2, ID 1	Otay East	Casa Familiar

[1]*The City Heights opportunity area overlaps with both the South County and Central San Diego CBOs and has been included here as there is a potential for partnership between the Urban Collaborative Project and the City Heights Community Development Corporation.*

Figure B-6: South County Opportunity Areas

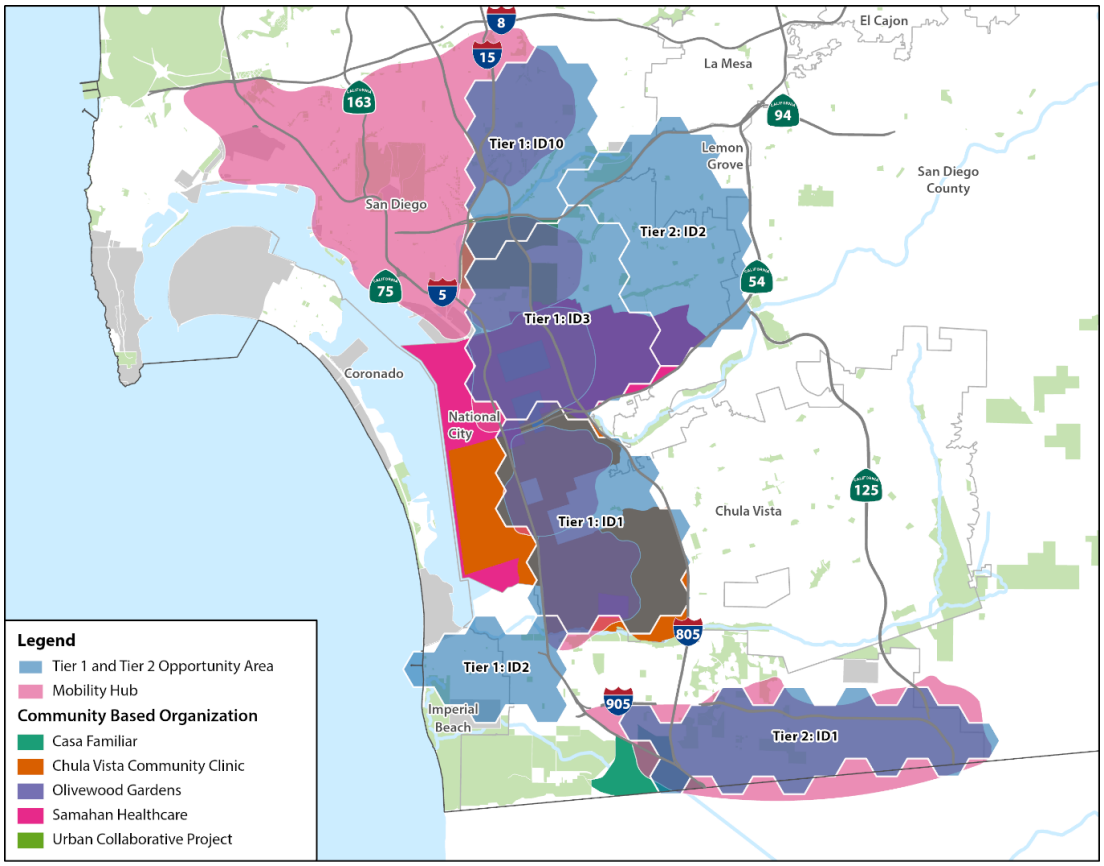


Photo Credit: Circuit, TREC, Little Italy

Appendix C

Regional Scan Methodology and Findings

Appendix C: Regional Scan Methodology & Results

Regional Scan Methodology

Flexible Fleets offer a range of adaptable and scalable on-demand mobility services that can be deployed in a range of geographic service areas and trip types. A critical component of the Strategic Plan is to identify the most promising geographic areas for Flexible Fleet services and then creating a transparent process for prioritizing the service areas and implementing pilot projects in those areas. SANDAG has already developed a map of potential mobility hub service areas as part of the 2021 Regional Plan. The mobility hub service areas represent parts of the County with high population and employment densities and access to high frequency transit. These areas represent an initial "first pass" at potential Flexible Fleet service areas.

To further refine this analysis, the Flexible Fleets Regional Scan provides a more detailed and comprehensive regional analysis of San Diego County to identify areas of San Diego County that are the best "fit" for Flexible Fleet services. The Regional Scan incorporates a comprehensive analysis of demographic and travel demand data for all of San Diego County to identify geographic areas with the highest "propensity" for Flexible Fleet services. The Regional Scan considers a broad range of socioeconomic data such as population, employment, and income, as well as travel demand data such as length and type of trip. These data are all strong indicators of Flexible Fleet success and align closely with the transportation needs assessments, use cases, and objectives identified for the services. The Regional Scan then prioritizes the markets into higher priority ("Tier 1") versus lower priority ("Tier 2") opportunities based on their potential.

The Regional Scan groups variables into five key categories:

- **Ridership/Demand** – Areas with higher densities of population and employment are typically indicators of higher travel demand.
- **Mobility Needs** – Areas with concentrations of people with no access to vehicles, minority populations, low-income households, and seniors are equity indicators of populations that are typically underserved and would benefit greatly from implementation of Flexible Fleet services.
- **Proximity to Transit** – Areas that are less than 3 miles away from existing or future transit indicate areas where Flexible Fleets can provide a first-/last-mile connection and connect riders to transit facilities.
- **Short Trip Density** – Areas with a high density of short trips indicate areas where Flexible Fleet services could replace auto trips.

- **Limited Transit Access** – Areas with low access to high quality transit indicate a need for Flexible Fleet services to provide greater mobility options.

Data Sources & Scoring Methodology

The Regional Scan utilized various data sources to analyze five major factors that indicate a propensity for Flexible Fleet implementation as well as consider social equity communities and communities that may be facing mobility challenges:

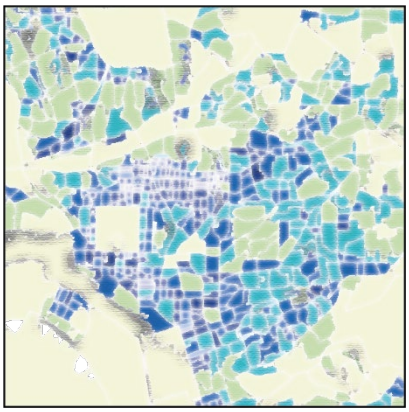
Table C-1: Regional Scan Data Sources and Likelihood Factors

Likelihood Factor	Metric	Source
Ridership/Demand	*Population Density* *Employment Density*	*American Community Survey, 5-Year Estimates, 2019* *Census LODES 2019*
Mobility Needs	*Percent Zero Car Households* *Percent Low-Income Households* *Percent Minority (Non-White) Communities* *Percent Senior Communities*	*American Community Survey, 5-Year Estimates, 2019*
Proximity to Transit	*3-Mile Buffer of Existing High-Capacity Transit Stations*	*SANGIS*
Short Trip Density	*Trips Under 4 Miles Per Square Mile*	*Replica*
Limited Transit Access	*Transit Shed Area*	*Open Street Map, NCTD GTFS, MTS GTFS*

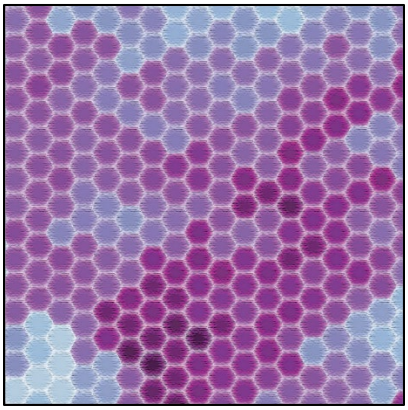
Regional Scan Framework

The Regional Scan included multiple points for feedback and iteration with the Project Development Team and resulted in a list of Tier 1 and Tier 2 Use Cases – areas with a high propensity for implementing Flexible Fleets as well as a list of 6 areas for pilot project implementation.

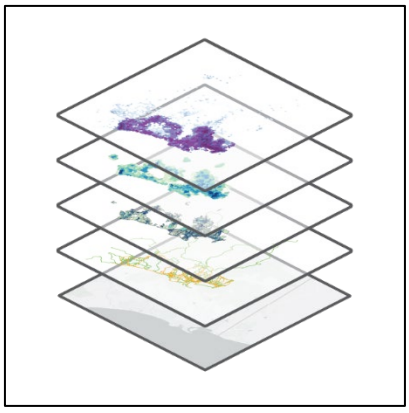
Regional Scan Analysis Process



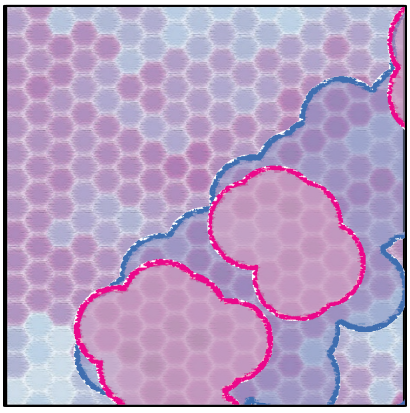
Pull regional census and transit data for evaluation



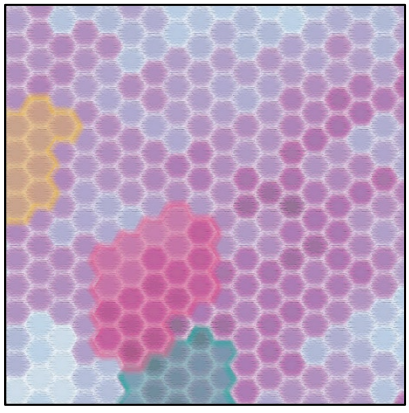
Tessellate the regional data into standard hex bins



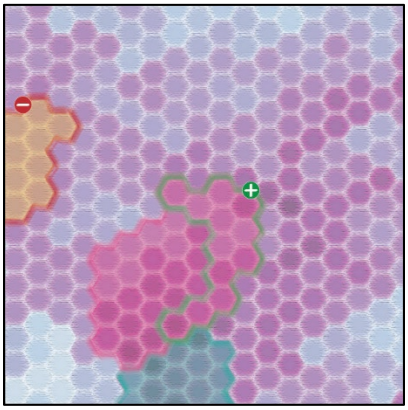
Layer the datasets and score the hex bins based on identified metrics



Identify high scoring hotspots based on potential Flexible Fleet use cases



Identify Tier 1 and 2 areas with propensity for Flexible Fleet implementation



Work with stakeholders to refine and identify 6 areas for pilot project implementation

The following section details the data sources and scoring methodology used for each category of analysis.

Ridership/Demand

The following data sources were used to analyze the socioeconomic likelihood factor for the region:

- US Census, American Community Survey, 5-Year Estimates (2019)
  - Population (Calculated by Population per Square Mile)
  - LODES Data 2019 (Calculated by Jobs per Square Mile)

The following method was used to score the socioeconomic likelihood factor:

- Quintiles were generated for population density based on Block Group data
- Quintiles were generated for the number of jobs within a hex bin grid generated for San Diego County
- The block group data for population density was joined to a hex bin representing the max score of the intersecting block groups.
- The scores for both layers were joined and summed for a composite score from 0 (Low) to 8 (High)
- Areas with higher employment and population density were scored higher

Mobility Needs

The following data sources were used to analyze the mobility needs likelihood factor for the region:

- US Census, American Community Survey, 5-Year Estimates (2019)
- Low-Income Households (Calculated by Percent of Total Population in Census Block Group)
- Senior Population (Calculated by Percent of Total Population in Census Block Group)
- Minority Population (Calculated by Percent of Total Population in Census Block Group)
- Zero Vehicle Households (Calculated by Percent of Total Population in Census Block Group)

The following method was used to score the mobility needs likelihood factor:

- Quintiles were generated for each mobility need characteristic and each characteristic was scored from 0 (lowest density) to 4 (highest density)
- Scores for both layers were joined and summed for a composite score from 0 (Low) to 8 (High)
- The block group data was then joined to a hex bin representing the max score of the intersecting block groups
- Areas with higher percentages of low-income households, zero car households, seniors, and minorities were given a higher score

Proximity to Transit Stops and Stations

The following data sources were used to analyze the proximity to transit likelihood factor for the region:

- High Frequency Transit Stops (MTS/NCTD)
- Transit Leap Stops (2025)

The following method was used to score the proximity to transit likelihood factor:

- 3-mile buffer from high capacity transit stops and transit leap stations (2025) was generated
- The buffered area was then joined to a hex bin that intersected the buffer
- Areas not within the 0-3 mile buffer were given a score of 0, and areas that were within the 0-3 mile buffer were given a score of 8
    - Score – 0
        - Not within 0–3-mile buffer of existing High-Frequency Transit Stops or Transit Leap Stations
    - Score – 8
        - Within 0–3-mile buffer of existing High-Frequency Transit Stops or Transit Leap Stations

Short Trip Density

The following data sources were used to analyze the short trip density likelihood factor for the region:

- Replica O-D Data for short trips by Census Tracts (0 to 4 miles)

The following method was used to score the short trip density likelihood factor:

- Quintiles were generated for short trip density by block group and was scored from 0 (lowest density) to 8 (highest density)
- The block group data was then joined to a hex bin representing the max score of the intersecting block groups
- Areas with higher concentrations of short trips scored higher

Limited Transit Access

The following data sources were used to analyze the limited transit access likelihood factor for the region:

- Isochrone Sheds developed using:
- Open Street Map
- MTS and NCTD GTFS Data

The following method was used to score the limited transit access likelihood factor:

- Isochrones were generated using the centroid of hex bins for the San Diego region

- Areas that were not 5 miles within transit stops and did not meet the lowest quintile for the employment and population density in the region were excluded from the analysis
- Quintiles were generated for isochrone reach for each hex bin and was scored from 0 (furthest reach) to 8 (smallest reach)

Hotspot Analysis

The following steps were taken to summarize the scores generated for the Transit Access and Areawide Service Types:

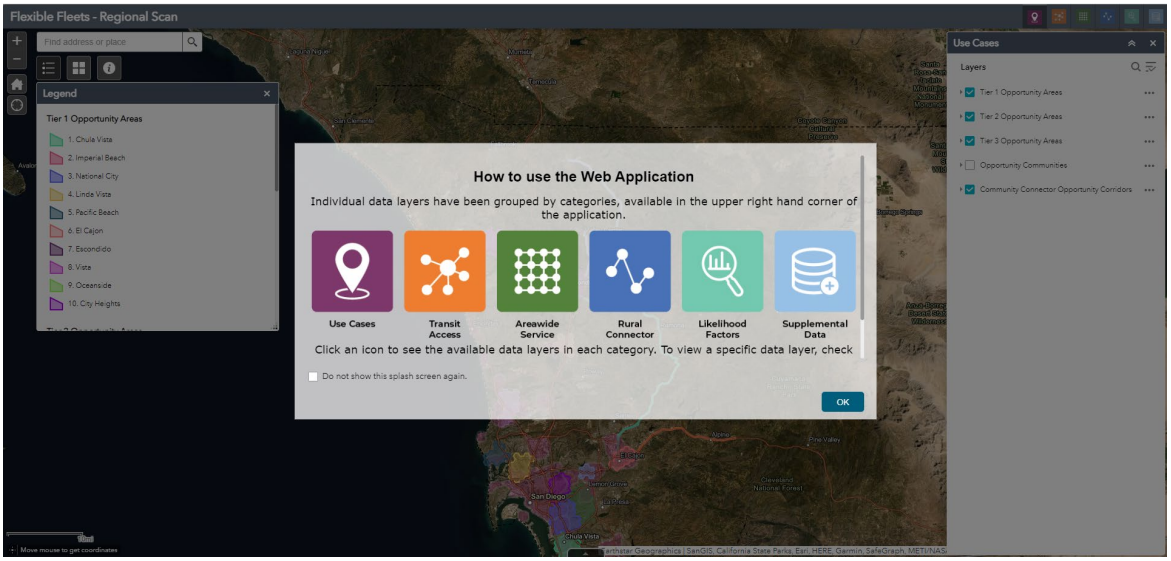
1. Hextiles that did not register a score in the socioeconomic likelihood factor were removed from the analysis
2. A 0.8-mile buffer for the centroid of each hextile was generated and spatially joined to the score of each hextile intersected by the buffer
3. The average scores of each buffer area were created using a Pivot Table in excel and the summary data was joined back to the spatial data in ArcGIS
4. The highest-scoring buffered areas were queried based on thresholds identified for Tier 1 and Tier 2 hotspots. These areas were then dissolved to identify a collection of high-scoring areas.

Identifying Opportunity Areas

The Kimley-Horn Team and the Project Development Team met to discuss the results of the hotspot analysis and identify points of interest to focus on. Through a combination of points identified by NCTD, MTS, and SANDAG and analysis of the underlying data, the Kimley-Horn Team identified three tiers of Opportunity Areas:

- Tier 1 Opportunity Areas – High scoring areas identified through the data and points of interest identified as the highest priority areas by the PDT
- Tier 2 Opportunity Areas - High scoring areas identified through the data and points of interest identified as high priority areas by the PDT
- Tier 3 Opportunity Areas – Areas being considered for Flexible Fleet and Mobility Hub implementation in SANDAG's 2021 Regional Plan

The Flexible Fleets Regional Scan metrics and other data were made available to the PDT and stakeholders through an ArcGIS Online webpage.



Opportunity Area Additional Analysis

Additional analysis was conducted for Tier 1 Opportunity Areas that included:

- Travel Patterns Analysis (See Appendix D)
- Additional Social Equity Analysis using SB 353 Data from the California Air Resources Board
- A comparison of scores generated through the Regional Scan scoring process

Regional Scan Results

The following Figures show the results for each of the likelihood factors analyzed as part of the Regional Scan.

Figure C-1: Ridership/Demand

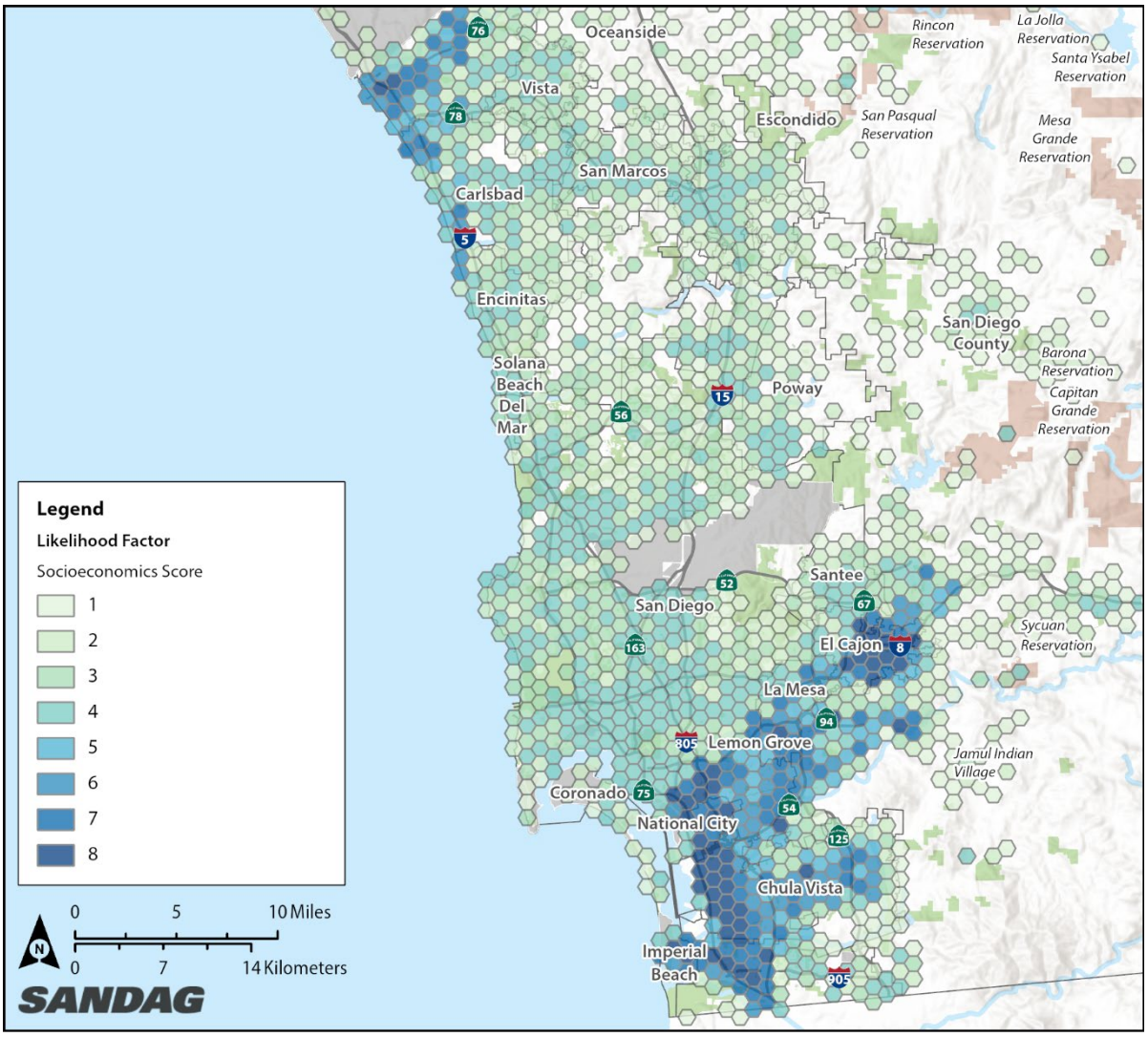


Figure C-2: Mobility Needs

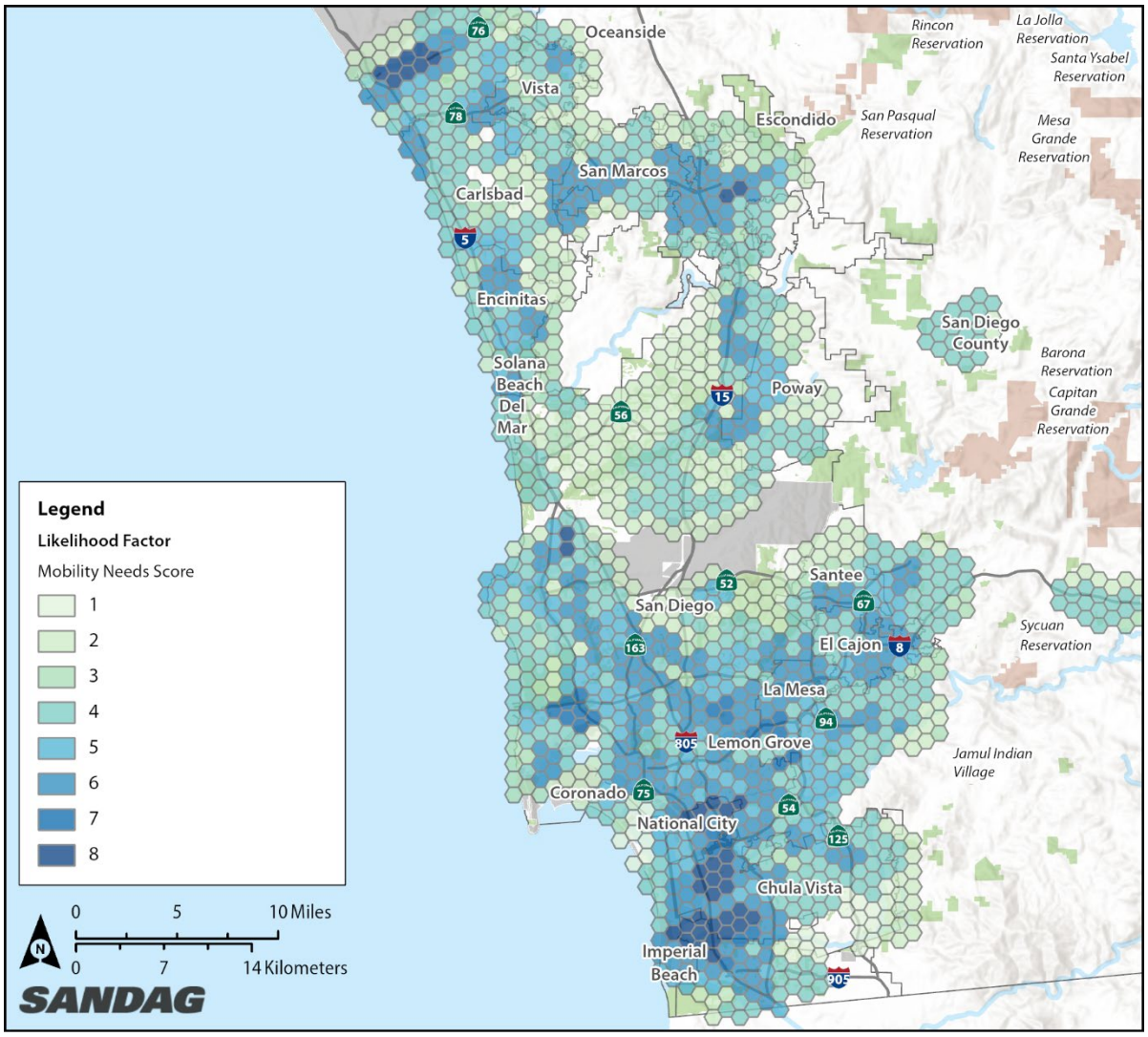


Figure C-3: Proximity to Transit

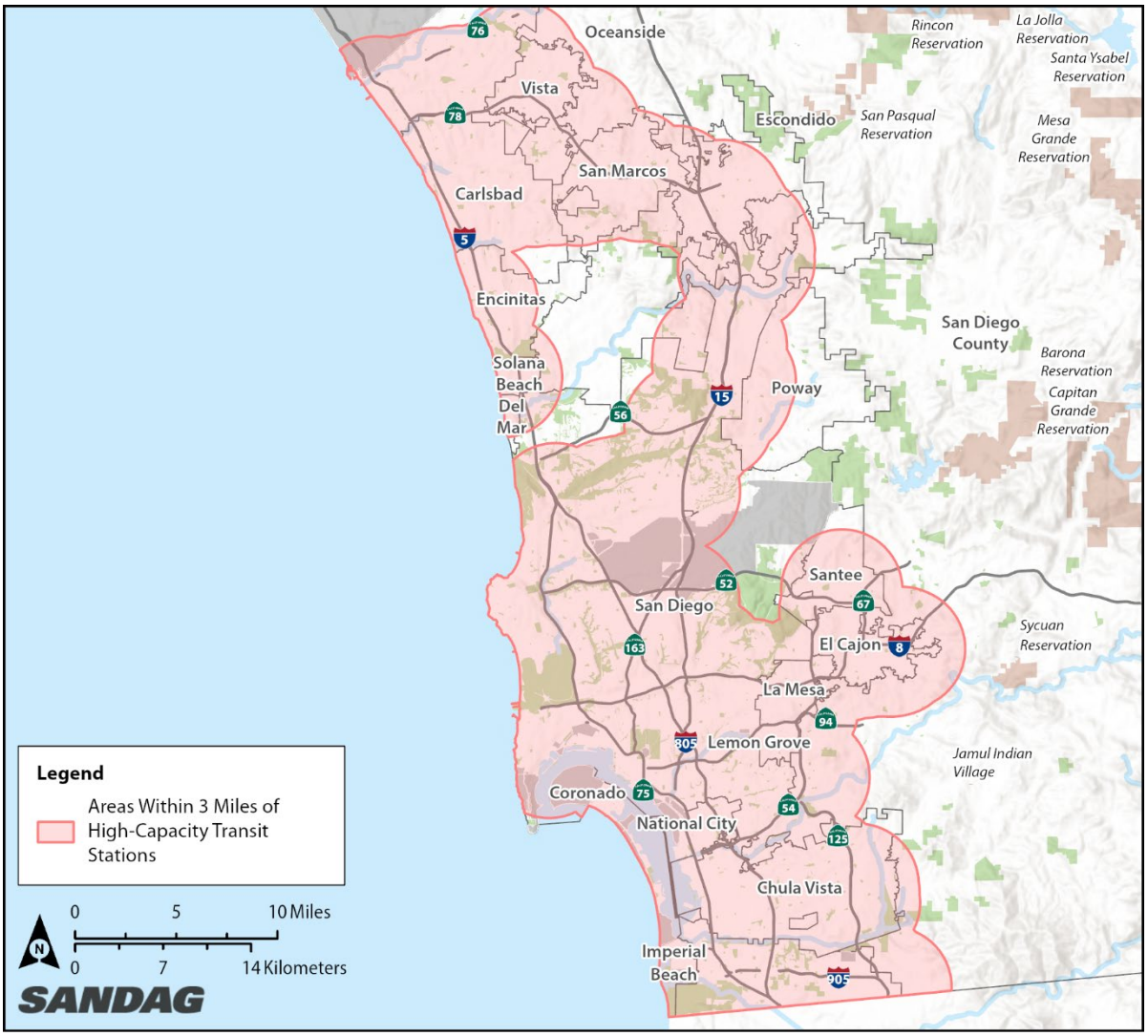


Figure C-4: Short Trip Density

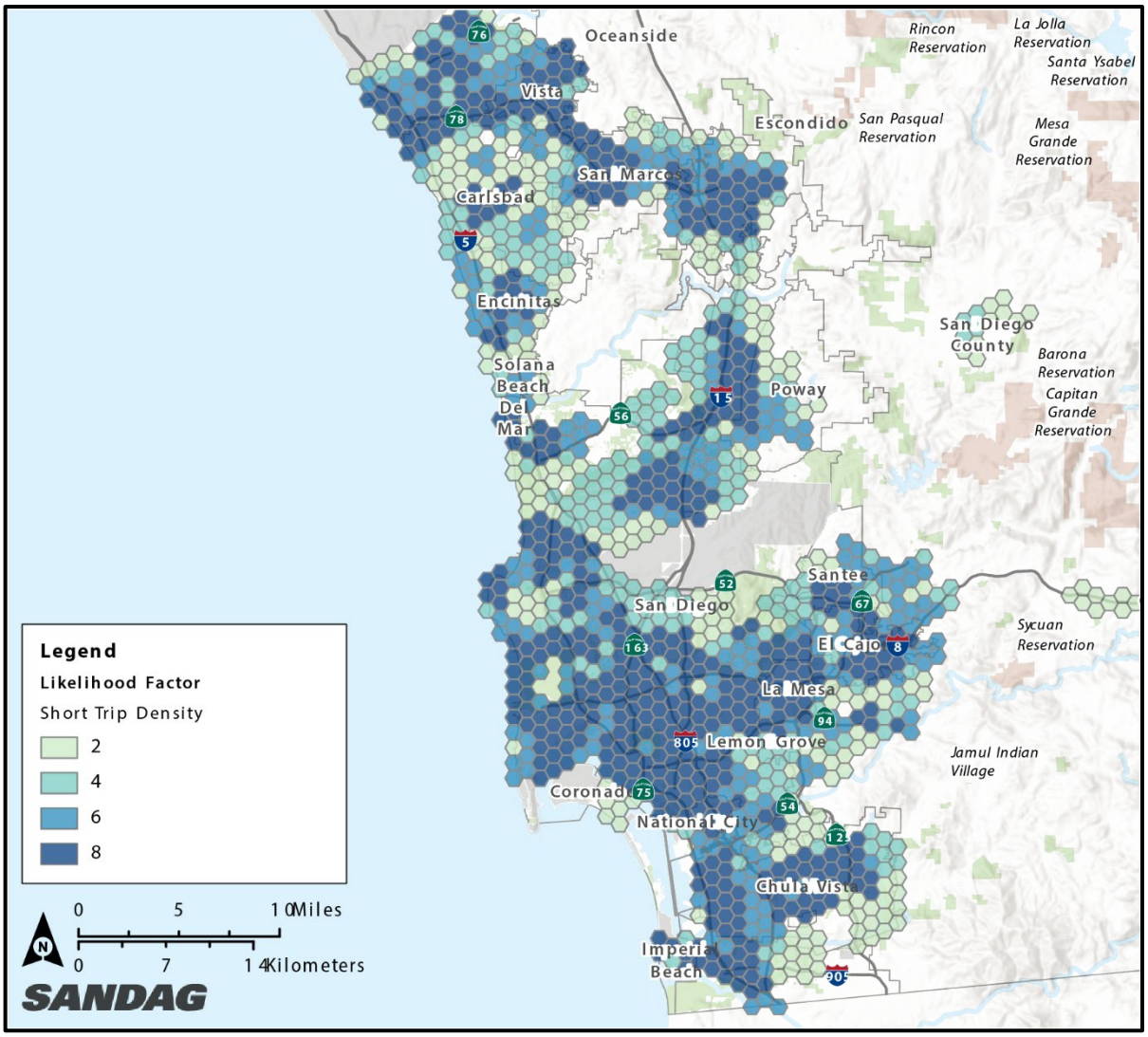
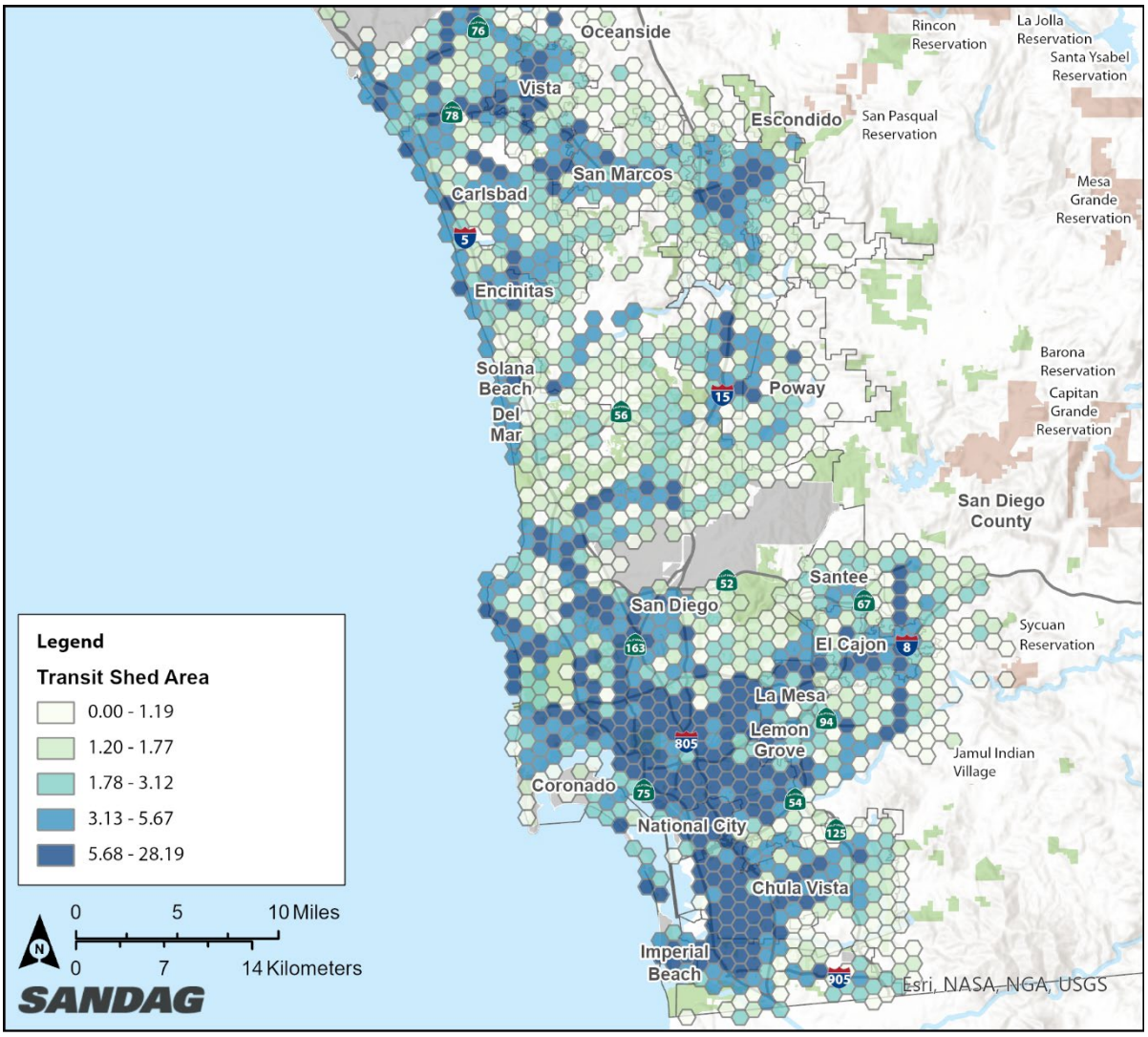


Figure C-5: Limited Transit Access



The Regional Scan identified hotspots for areawide service and transit access service. Areawide Service hotspots are areas with a larger need for mobility within the identified opportunity area. Transit Access Service hotspots are areas with a higher propensity for Flexible Fleet deployment as a first-mile/last-mile solution to connect individuals to the larger regional transportation network. While the analysis views the hotspots through these different lenses, Flexible Fleet services can be deployed in a manner that meets both the criteria for areawide service and transit access service. These hotspots are shown below in **Figure C-6** and **Figure C-7**.

Figure C-6:Transit Access Service Scoring Hospots

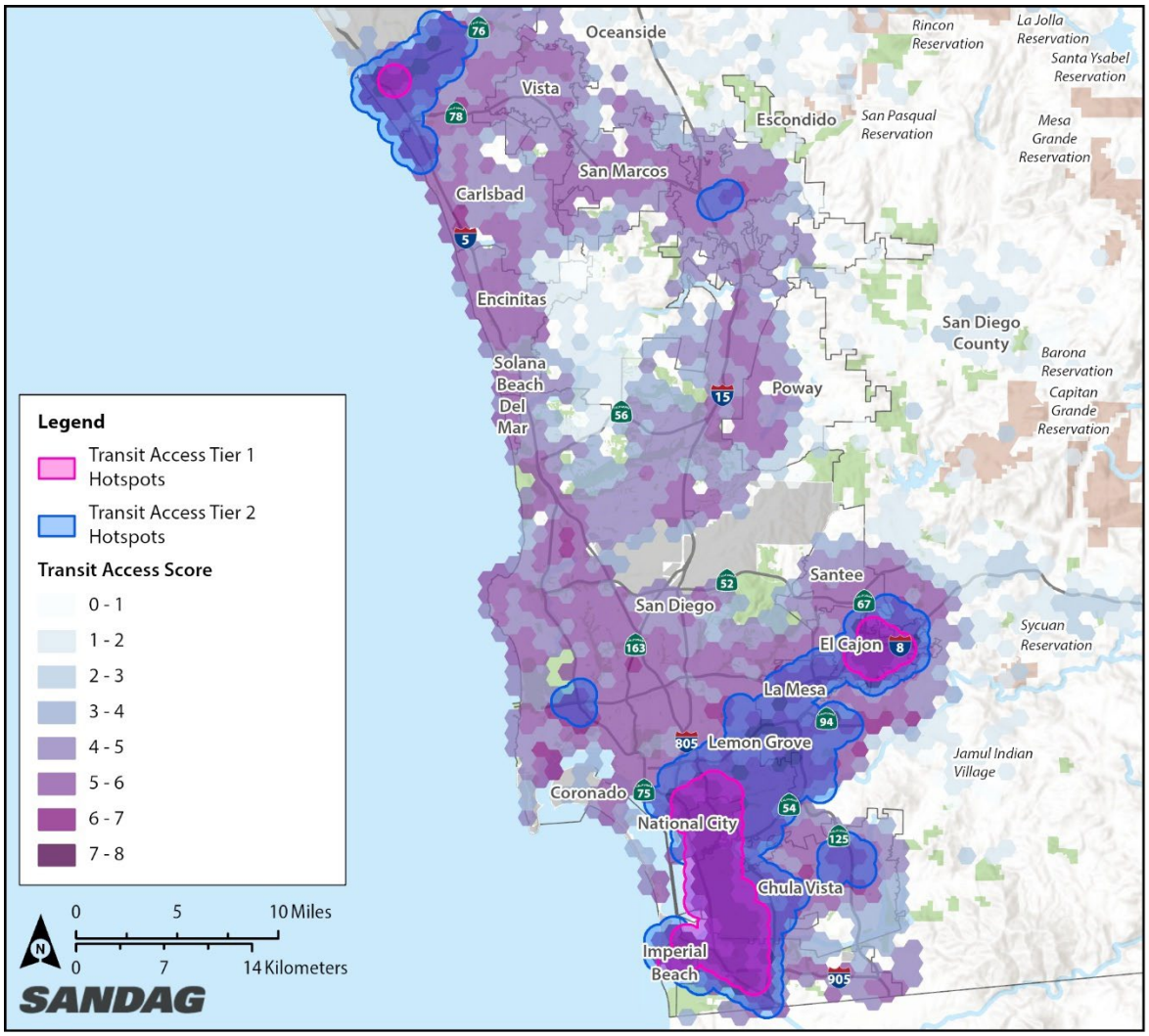
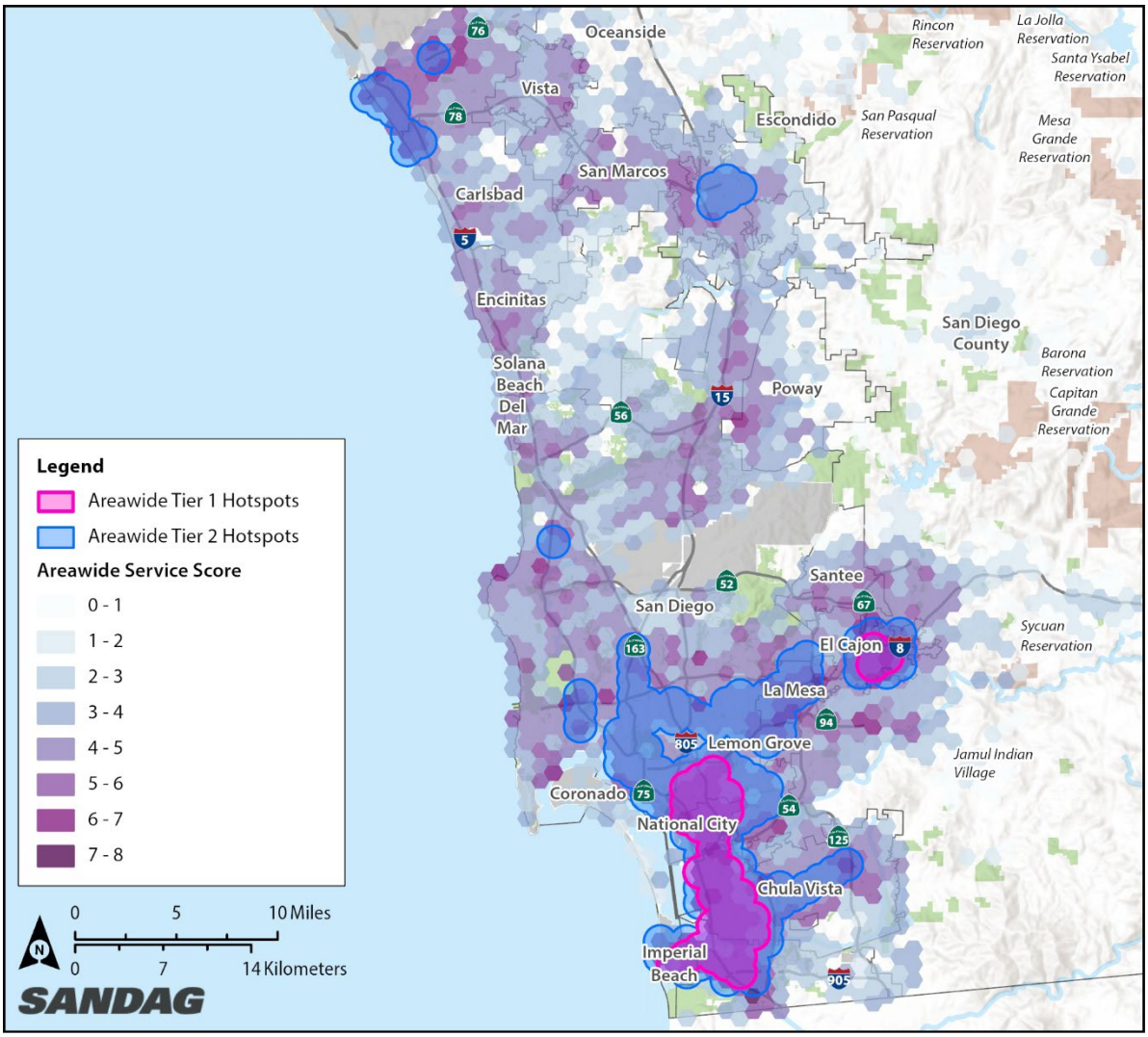


Figure C-7: Areawide Service Scoring Hotspots



The areas identified through the hotspot analysis were all located in the western third of the San Diego region as the population density in eastern San Diego was too low and does not provide a viable option for implementing areawide or transit access Flexible Fleet service.

Tier 1, 2, and 3 Opportunity Areas

With input from the PDT, stakeholders, and hotspots identified, these areas were refined into smaller geographic opportunity areas ranging from 5 to 15 miles in size. **Figure C-8** shows the Tier 1 and Tier 2 areas identified and **Figure C-9** shows the overlap between Tier 1 and 2 Opportunity Areas with SANDAG's Mobility Hubs.

Figure C-8: Tier 1 and 2 Opportunity Areas

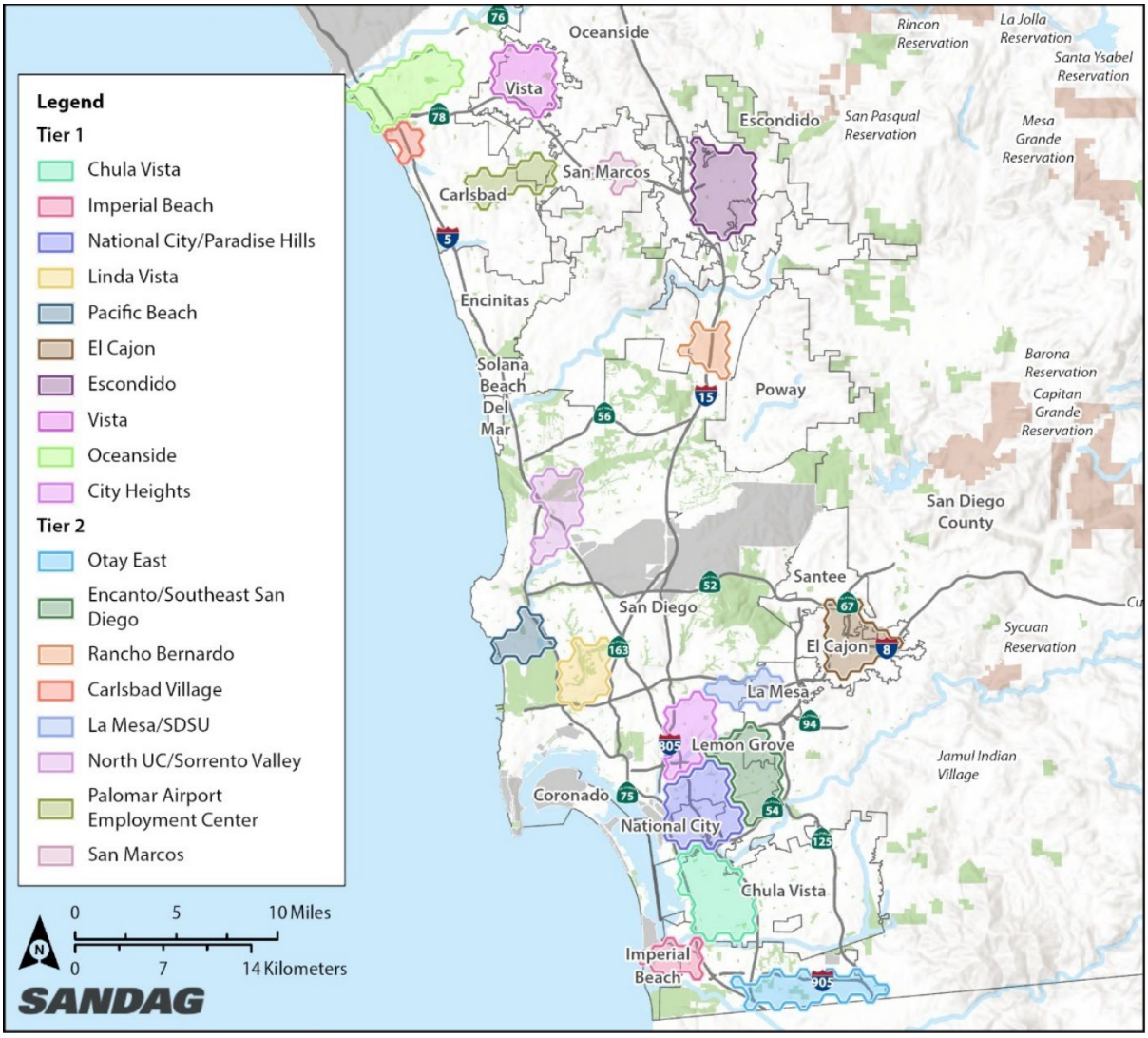
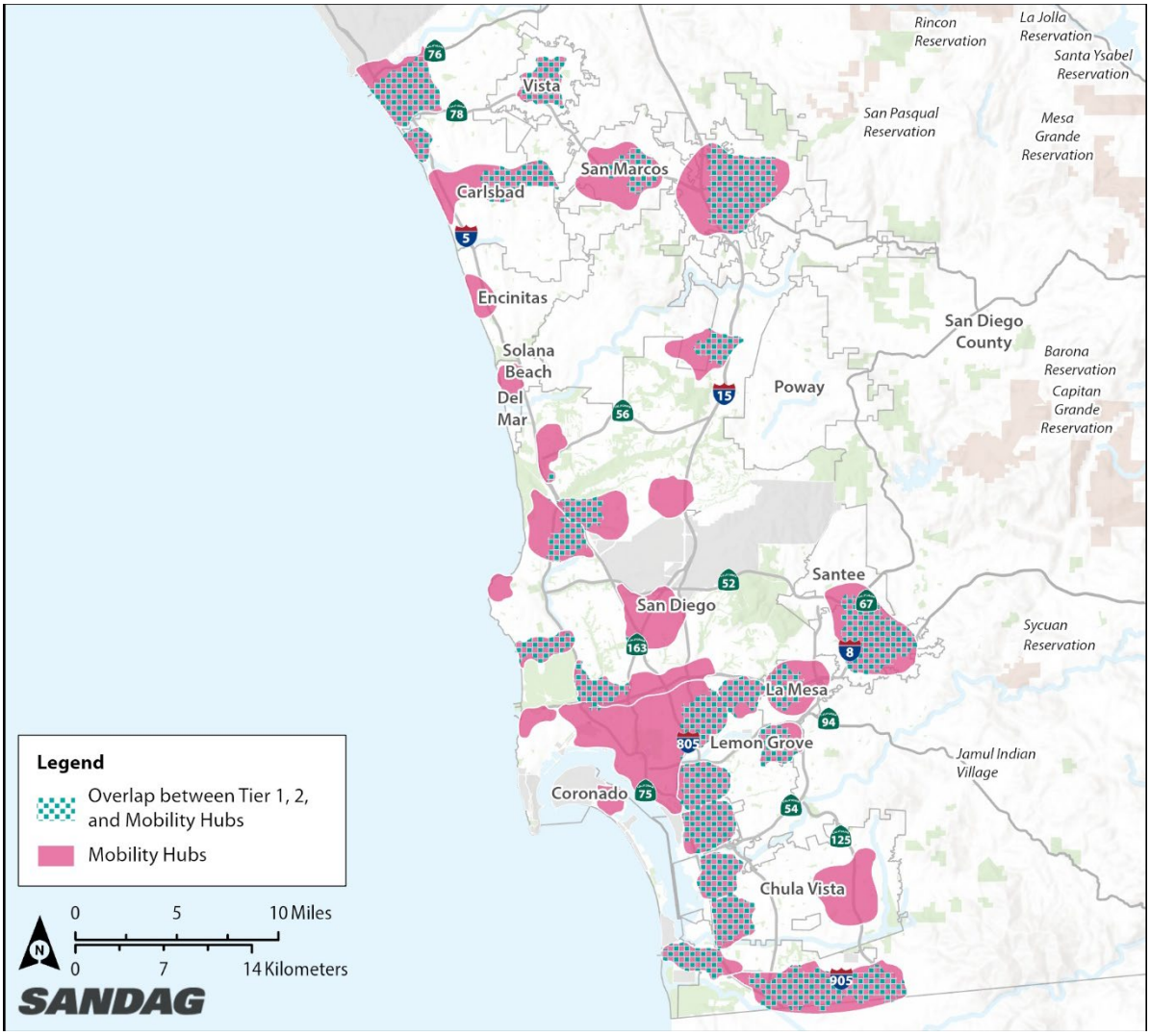


Figure C-9: Overlap between Tier 1 and 2 Opportunity Areas and Tier 3 Opportunity Areas



Tier 1 Opportunity Area Detailed Analysis

To identify Tier 1 Opportunity Areas that could provide the greatest mobility benefits to the region while ensuring propensity for successful implementation, a hotspot analysis to identify the highest composite scores based on various factors for each service type was conducted. The data-driven hotspots, along with stakeholder feedback to identify additional areas to meet social equity goals or leverage existing or near-term strategic investments, generated a list of Tier 1 Opportunity Areas as candidates for implementing pilot programs that can be modified during testing and scaled up and deployed in other areas.

Figure C-10: Tier 1 Opportunity Areas

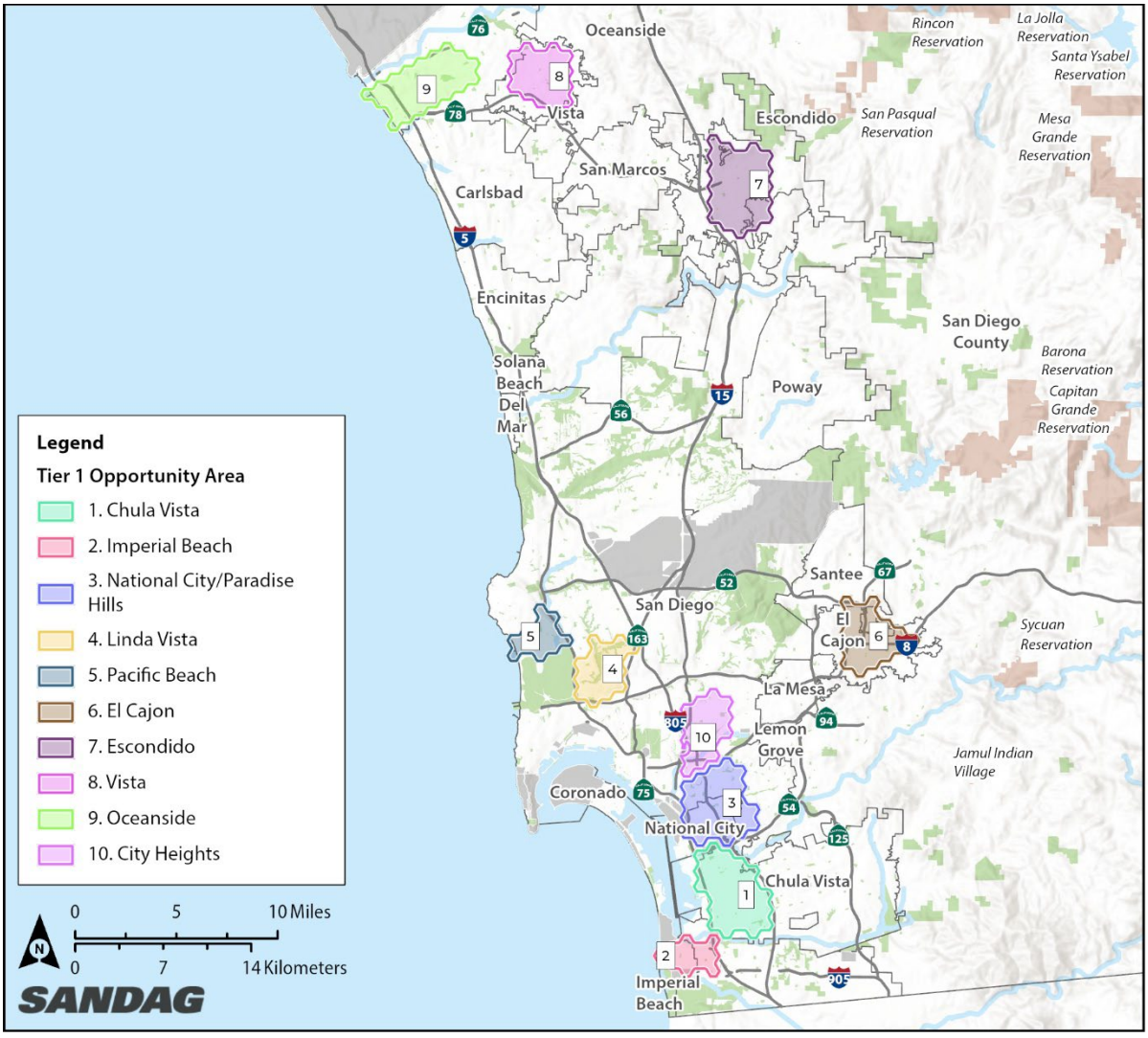
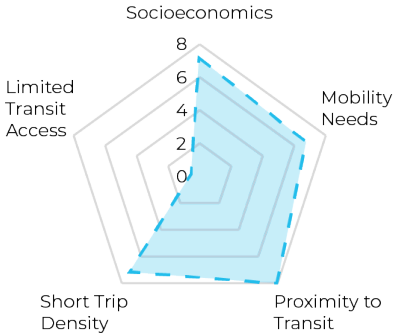
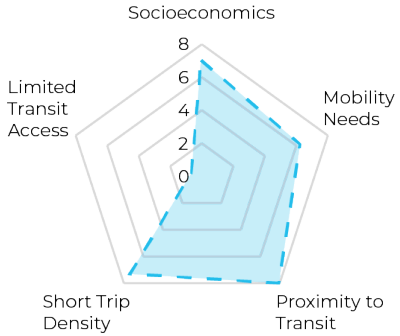
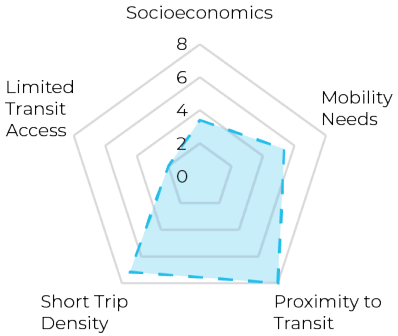
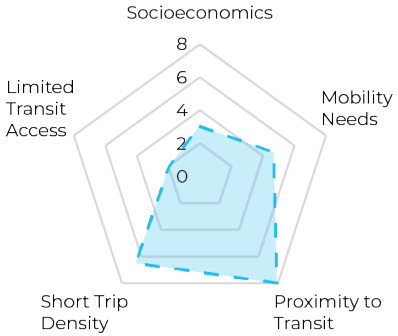
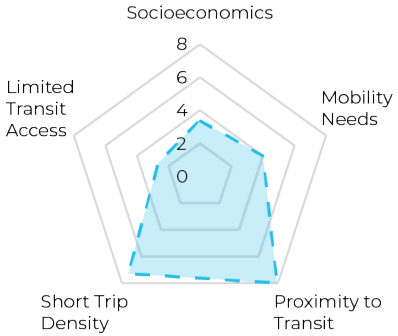
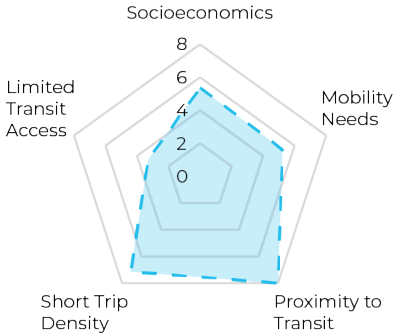


Table C-1: Transit Access Service Tier 1 Opportunity Area Analysis

Transit Access Service – Tier 1 Opportunity Areas		
ID	**1**	**3**
Service Area	**Chula Vista**	**National City/Paradise Hills**
Square Miles	14.00	13.00
Likelihood Factor Scoring		
Areawide Service Score	7.32	7.11
Population	124,224	152,127
Jobs	39,044	25,317
% Low-Income Household	41%	45%
% Senior	6.495%	5.763%
% Minority	84.1%	92.0%
Individuals in SB 535 Disadvantaged Community	18,980	72,798
Auto Commute Trips (<3 mi)	14,613	11,714
Auto Non-Commute Trips (<3 mi)	146,570	133,874

Transit Access Service – Tier 1 Opportunity Areas		
ID	**4**	**7**
Service Area	**Linda Vista**	**Escondido**
Square Miles	8.50	12.00
Likelihood Factor Scoring		
Areawide Service Score	5.59	5.26
Population	77,371	114,849
Jobs	38,675	21,987
% Low-Income Household	29%	40%
% Senior	6.155%	4.955%
% Minority	49.1%	69.2%
Individuals in SB 535 Disadvantaged Community	-	-
Auto Commute Trips (<3 mi)	6,238	13,132
Auto Non-Commute Trips (<3 mi)	66,611	122,701

Transit Access Service – Tier 1 Opportunity Areas		
ID	**8**	**9**
Service Area	**Vista**	**Oceanside**
Square Miles	10.00	14.00
Likelihood Factor Scoring		
Areawide Service Score	5.15	6.20
Population	77,488	71,537
Jobs	13,240	23,450
% Low-Income Household	29%	37%
% Senior	3.737%	6.886%
% Minority	64.9%	51.7%
Individuals in SB 535 Disadvantaged Community	-	-
Auto Commute Trips (<3 mi)	7,149	7,387
Auto Non-Commute Trips (<3 mi)	65,333	73,453

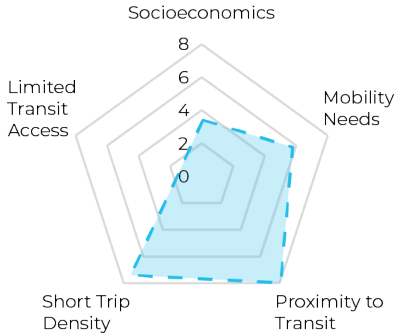
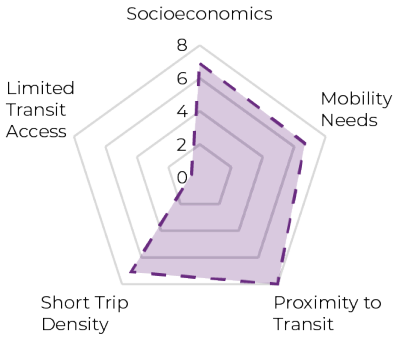
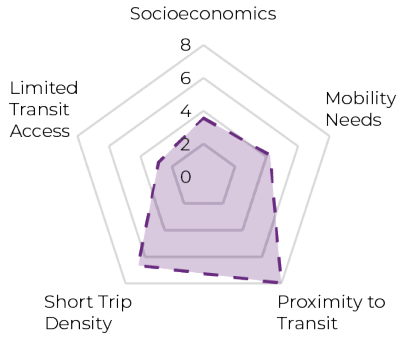
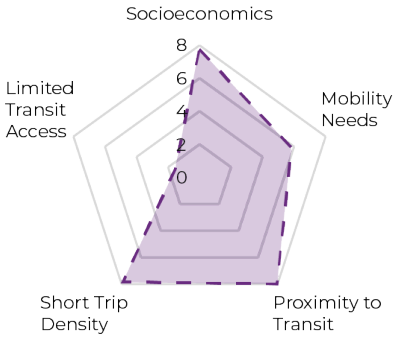
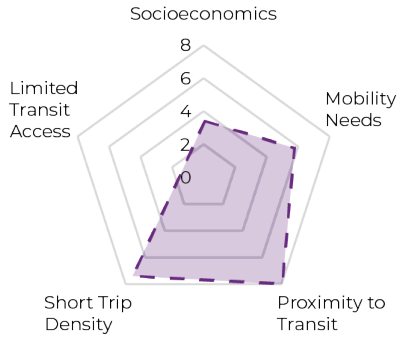
Transit Access – Tier 1 Opportunity Areas	
ID	10
Service Area	City Heights
Square Miles	8.50
Likelihood Factor Scoring	
Areawide Service Score	5.71
Population	127,753
Jobs	12,807
% Low-Income Household	47%
% Senior	4.353%
% Minority	79.5%
Individuals in SB 535 Disadvantaged Community	20,685
Auto Commute Trips (<3 mi)	9,532
Auto Non-Commute Trips (<3 mi)	83,252

Table C-2: Areawide Service Tier 1 Opportunity Area Analysis

Areawide Service – Tier 1 Opportunity Areas		
ID	**2**	**5**
Service Area	**Imperial Beach**	**Pacific Beach**
Square Miles	5.50	6.00
Likelihood Factor Scoring		
Areawide Service Score	5.31	4.33
Population	56,201	52,832
Jobs	6,465	13,840
% Low-Income Household	43%	24%
% Senior	4.194%	5.913%
% Minority	78.7%	26.7%
Individuals in SB 535 Disadvantaged Community	2,381	-
Auto Commute Trips (<3 mi)	4,960	4,988
Auto Non-Commute Trips (<3 mi)	49,554	47,850

Areawide Service – Tier 1 Opportunity Areas		
ID	**6**	**10**
Service Area	**El Cajon**	**City Heights**
Square Miles	6.50	8.50
Likelihood Factor Scoring		
Areawide Service Score	5.75	4.49
Population	90,063	127,753
Jobs	22,856	12,807
% Low-Income Household	47%	47%
% Senior	4.537%	4.353%
% Minority	45.2%	79.5%
Individuals in SB 535 Disadvantaged Community	6,787	20,685
Auto Commute Trips (<3 mi)	9,660	9,532
Auto Non-Commute Trips (<3 mi)	92,888	83,252

Tier 1 Opportunity Area – PDT Feedback

	Summary of Input
Chula Vista	• Blue Line stations at Palomar and H St and commercial corridors on H St, Broadway, and Third Ave generate activity and serve as potential connection opportunity areas • NEV microtransit, microtransit, carshare or rideshare services to serve Blue Line stations • Challenge posed by moderate density residential and commercial areas lacking clear nodes of activity • Opportunity for new connections include leveraging San Ysidro mobility project grant, serving the Bayfront Development
Imperial Beach	• Strong activity around coastal area • Significant transit connection to the Palm Ave. Trolley station in the east • NEV microtransit/microtransit services needed to connect Palm and Iris Ave. stations and serve coastal destinations • Dense street grid supports active transportation and micromobility use. • Existing MTS 933/934 services lack priority treatments
National City/ Paradise Hills	• Activity around Naval Base San Diego, 8th St. Blue Line station, Plaza Blvd, E 30th St, and National City Blvd • High percentage of short trips (0-2 miles) support use of microtransit or micromobility systems coordinated with NEV microtransit • NEV Microtransit FRANC shuttle to be funded by $1M CARB grant • Challenge posed by highway and topographic barriers that break up street grid
Linda Vista	• Strong activity around USD, Fashion Valley, and Blue Line stations at Tecolote, Clairemont, and Morena • Need for transit connections along Camino De La Reina and Friars Rd • Opportunity for microtransit shuttle between transit stations, Riverwalk, Fashion Valley, and Old Town • Opportunity for micromobility at USD for housing/campus connections • Rideshare and carshare to provide first/last mile to bus stops and transit stations
Pacific Beach	• Strong activity at beach destinations, Mission Bay, Garnet and Grand Ave corridors, Balboa Trolley station • Young population and strong street grid support existing E-Bike and scooter micromobility programs • Opportunity for carshare and NEV microtransit (in progress) programs • Opportunity to make use of PB Parking District revenue

El Cajon	• Activity around Orange and Green Line Trolley stations, Parkway Plaza, Downtown El Cajon, Magnolia Ave and Broadway corridors • Strong employment centers in Downtown and areas near Gillespie Field provide service area expansion opportunities • Opportunity to serve Trolley stations with micromobility, NEV microtransit, and microtransit • Challenge posed by I-8 limiting north-south transit connections by diving the city
Escondido	• Activity generated around Transit Center and employment and commercial activity focused in Downtown around Centre City Pkwy, Valley Blvd, Washington Ave • Street grid supports opportunity for microtransit system • Opportunity for micromobility, rideshare, carshare, NEV microtransit, microtransit to serve activity centers and support high percentage of short trips (0-2 mile)
Vista	• Strong activity around Vista Transit Center, Civic Center SPRINTER Stations, Downtown, Santa Fe Ave, Vista Way • Need for travel options for seniors to reach local destinations • Low-density land uses create challenges for existing fixed route services • Opportunity for microtransit focused on SPRINTER stations
Oceanside	• Strong activity around Oceanside Transit Center, Coast Highway, SPRINTER stations, and Downtown along Mission Ave • Opportunities to provide first/last mile connections for employers east of I-5, and microtransit around SPRINTER stations • Opportunity for NEV microtransit, microtransit, carshare, and microbility west of I-5
City Heights	• Activity in commercial zones along El Cajon Blvd, University Ave, Fairmount Ave, and Home Ave with major bus transit corridors • Existing bus service on University Ave and El Cajon Blvd, existing City Heights Circulator 965 • Opportunity for carshare; microtransit to replace circulator

Gateway Connector

The Gateway Connector was not a part of the data-driven Regional Scan. Instead, the project team identified rural communities in San Diego County that could be served by Flexible Fleet services and the most convenient regional corridors to serve those areas. Oceanside, Escondido and El Cajon were identified as the major connection points to the greater regional transportation network. The project team also looked at rural residential communities, areas of interest, and tribal nation gaming facilities that would generate a higher number of trips.

Figure C-11 highlights some of the potential destinations and residential clusters for deploying a Gateway Connector service along the urban/rural edge of San Diego County. The potential Gateway Connector areas include residential areas in unincorporated communities such as Lakeside, Ramona, and Valley Center. They include large Tribal areas with casinos in Barona, Pala, and Viejas and various agricultural regions.

Figure C-11: Gateway Connector Trip Generators

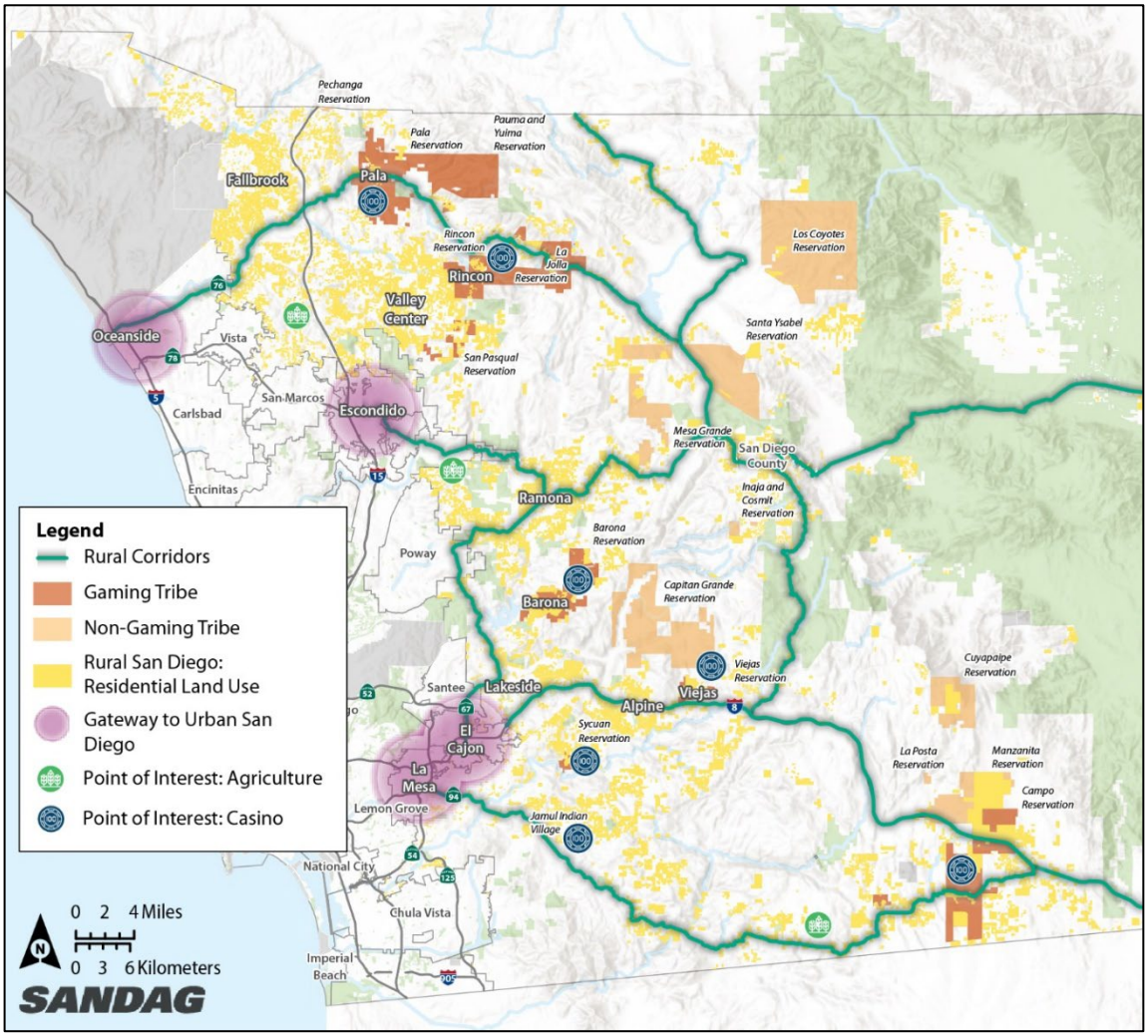
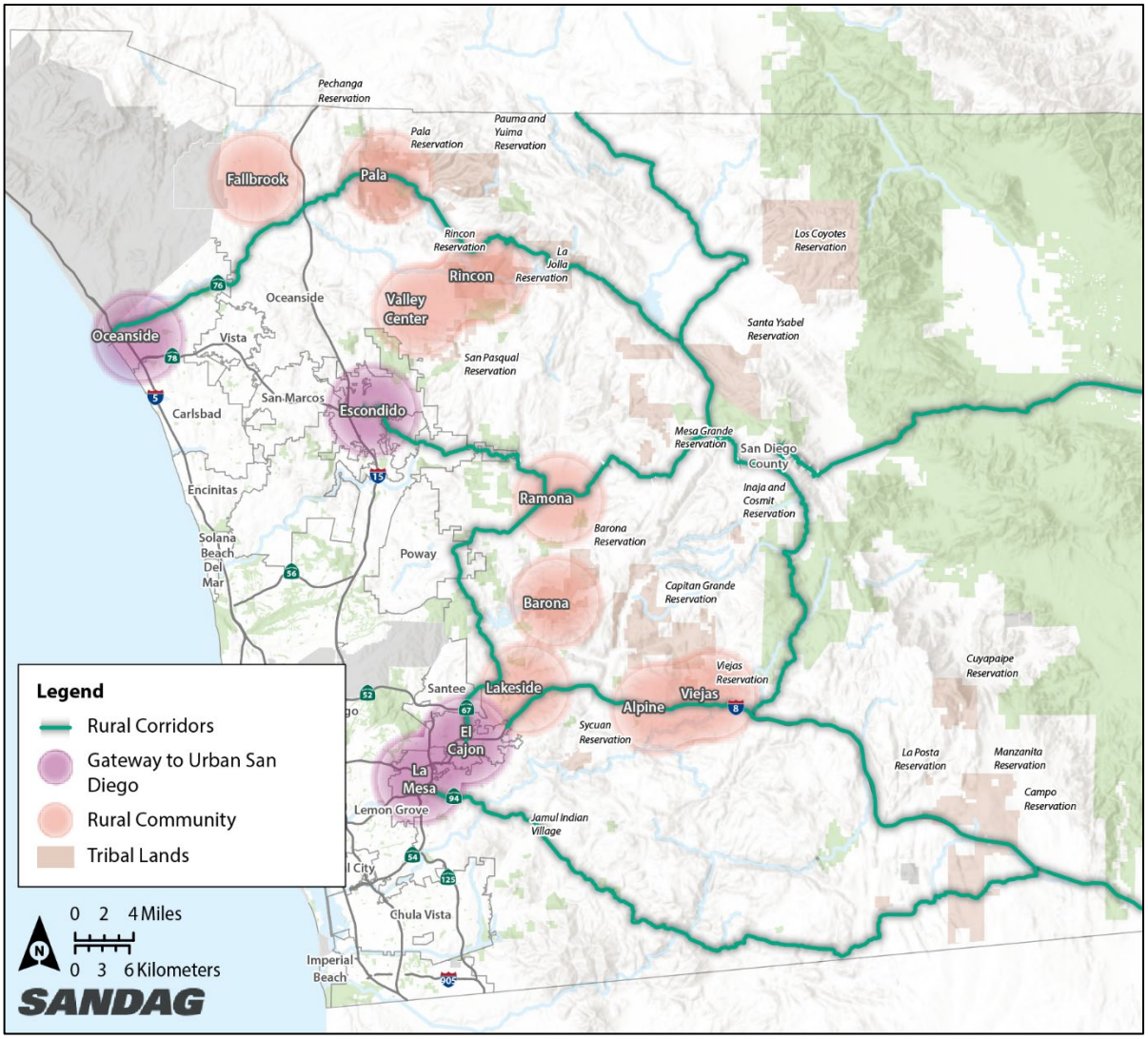


Figure C-12: Gateway Connector Opportunity Corridors



The Strategic Plan identifies refining the Gateway Connector concepts presented in **Figure C-12** as a short-term planning action. SANDAG will continue to work with partners to identify the most viable solutions between the microtransit, ridehail, and rideshare Flexible Fleet service types.

Photo Credit: Circuit, FREE, Little Italy

Appendix D

Replica Methodology and Findings

Appendix D: Replica Data Methodology and Findings

This appendix provides a summary of the methodology Replica – a mobility data platform – uses to generate trip patterns for the San Diego region. The data from Replica was used as input into the Regional Scan and to further analyze specific O-D trip patterns for areas within the Region identified as opportunities for Flexible Fleet Implementation.

technical documentation.

replica methodology

0. About Replica

Replica is a data platform for the built environment. By combining powerful data insights with an uncompromising approach to privacy, Replica provides a holistic view into the ways mobility, land use, and economic activity intersect. Our approach to delivering insights to our customers is rooted in using a composite of data sources to do advanced modeling and simulation of activity across time and space.

I. Executive Summary

At Replica, we understand that data is only valuable when you can trust it to inform analysis and decision-making. To that end, this document outlines data sources, data processing methods, and data outputs for Replica Places and Replica Trends, to help our customers[1] evaluate the quality and accuracy of our models, and assess data privacy implications.

Replica Places are high-fidelity activity-based travel models[2] that simulate the movements of residents, visitors, and commercial vehicles in a given area. Replica produces Places models as “megaregions,” each covering about 30 million people, for a typical weekday and typical weekend day in a given season. Data outputs can be queried down to the network link level.

Replica Trends is a nationwide activity-based model updated each week with near-real-time data on mobility, consumer spending, land use, and Covid-19 cases. Trends has census-tract-level fidelity with mobility data including origins and destinations, trip mode, and trip purpose, and consumer spending data in aggregate and across a number of sub-categories, including retail, grocery stores, restaurants, and travel.

Replica generates its data by running large-scale, computationally intensive simulations. These simulations allow us to deliver granular data outputs that match behavior in aggregate, but don’t surface the actual movements (or compromise the privacy) of any one individual.

Rather than simply cleansing, normalizing, and scaling individual data sources, Replica uses a composite of data sources to:

(1) Create a synthetic population that matches the characteristics of a given region

[1] Replica has served over 60 clients throughout the U.S., including Caltrans (the California DOT), the Metropolitan Transportation Authority in NYC, the NY State Division of the Budget, the Illinois DOT, New Jersey Transit, and the Office of the Chief Technology Officer (OCTO) in Washington, D.C.

[2] Activity-based models are transportation models in which travel demand is derived from people's daily activity patterns. Activity-based models represent which activities are conducted when, where, for how long, for and with whom, and the travel choices they will make to complete them.

(2) Train a number of behavior models specific to that region

(3) Run simulations of those behavior models applied to the synthetic population in order to create a "replica" of transportation and economic patterns

(4) Calibrate the outputs of the model against observed "ground-truth" to improve quality

In our data outputs, origin-destination pairs are consistent with human activities. Population demographics are accurate and correlate with appropriate movement. Recurring activities are coherent over time and capture a pattern of life. Routing between locations is consistent with local road networks and transportation options. And the scale of population and number of trips is appropriate for a given geographic extent.

In the following document, we outline our sources, methodology, and outputs, as well as detail regarding our uncompromising approach to protecting individual privacy.

II. Source Data

Replica builds its simulations using a diverse set of third-party data from public and private-sector sources. These sources include five categories of data:

Mobile location data: To create a representative sample of daily movement patterns within a place, Replica uses multiple types (currently five unique sources) of location data collected from personal mobile devices and in-dashboard telematics. Replica only acquires de-identified mobile location data.

Consumer resident data: Demographic data from public and private sources provides the basis for determining where people live and work, and the characteristics of the population, such as age, race, income, and employment status.

Land use / real estate data: Land use data (such as zoning regulations), building data (such as total square footage and use types), and transportation network data (such as road and transit networks) are used to determine where people live, work, and shop, and by what means it is possible to travel to each activity.

Credit transaction data: Credit transactions from financial companies are used to model consumer spending. With this input, Replica depicts the level and types of spending that occurred at a particular time and place.

Ground truth data: Ground truth data is used to calibrate and improve the overall accuracy of Replica outputs. The types of ground truth collected by Replica include auto and freight volumes, transit ridership, and bike and pedestrian counts. Ground truth is both acquired directly by Replica and provided by customers.

Each of Replica's data processing pipelines leverages a composite of these diverse data sets. This process minimizes the risk of sampling bias that exists in any single source on its own. For example, a product that relies more heavily on data from personal mobile devices risks failing to adequately simulate the portions of the population that do not have mobile devices or those

who opt out of device tracking technologies. Our composite approach also creates resiliency against data quality issues and protects against disruptions of individual data sources.

III. Replica Places Overview

Replica Places simulations reflect the complete activities and movements of residents, visitors, and commercial vehicle fleets in a region and season on a typical day. Places are delivered as megaregions, each covering between 10 and 50 million residents and multiple states, enabling the entire contiguous United States to be produced in a small number of megaregions.

The output of each simulation is a complete, disaggregate trip and population table for an average weekday and average weekend day in the subject season (e.g., Fall 2021). The model represents a 24-hour period with second-by-second temporal resolution, and point-of-interest-level spatial resolution. Each row of data in the simulation output reflects a single trip, with characteristics about both the trip (e.g, origin, destination, mode, purpose, routing, duration) and trip taker (e.g., age, race/ethnicity, income, home location, work location).

Each completed model also includes an associated quality report, which compares the outputs of the simulation to ground truth data, enabling customers to compare Replica's modeled outputs with observed counts.

Each year, Replica produces a spring simulation and a fall simulation for each megaregion.

IV. Replica Places Methodology

Replica's process to generate its Places simulations is best described in four steps:

Step 1: Create Synthetic Population. Each year, Replica generates a nationwide synthetic population, statistically equivalent to the actual population, for the entirety of the United States. Replica creates a synthetic population in order to overcome the limitations of census data, which is only provided at the aggregate level. Synthetic populations allow Replica to assign attributes to individuals and households while protecting privacy and preserving spatial fidelity.

The synthetic population is generated using census and consumer marketing data. Replica applies data science techniques to this data that allow for: (1) modeling the dependencies in socio-demographic parameters and structure of the households, and (2) generating individual households that match census information at the required level of aggregation, such as block groups or tracts.

Each synthetic household consists of people with an assigned set of attributes: age, sex, race, ethnicity, employment status, household income, vehicle ownership status, and resident or visitor status. Workplace locations for all employed individuals are assigned based on the combination of mobile location data aggregates and census information. These assignments are static in each seasonal model, but can and do change across seasons.

To begin each specific Places deployment, the population relevant for the specific megaregion and season is extracted from the nationwide population.

Step 2: Create Mobility Model. Modern machine learning techniques are then used to develop travel personas. Personas are based on the composite of mobile location data for the megaregion and specific season. Personas are an extraction of behavioral patterns from individual devices that live in, work in, travel to, travel from, or pass through a specific region during the modeled season. Each persona is composed of three underlying behavioral-choice models: activity planning and sequencing (e.g., at home -> drive to work -> at work -> drive to shop -> drive to home), destination location choice (i.e., the exact location people are traveling to and from), and travel mode (i.e., the chosen mode).

Replica's mobile-location data represents anywhere from 5% to 20% of a local population. Replica intentionally only acquires what data is necessary to build statistically representative models, another tenet of balancing model fidelity with user privacy.

Step 3: Generate Activity. To simulate activity, the outputs from Step 1 and Step 2 are joined. Each synthetic household is assigned one or more personas using home and work locations as a primary input, enhanced with matching by available socio-demographic attributes and by the role of the person in a household. In effect, with travel behavior models assigned, each synthetic person can now make choices about when, where, and how to travel.

Replica uses three models to assign movements to the individuals in the synthetic population. The **activity sequence model** determines the activities of a person's day, including recurring activities (e.g., travel to work, school drop off), and one-time activities (e.g., shopping, visiting a restaurant, social visit to a friend's residence). The **location choice model** determines the specific location of each discretionary activity (e.g., what restaurant is chosen for lunch, where grocery shopping gets done), assigning a location at the point-of-interest level. And the **mode choice model** determines how the trip will be made based on the state of the transportation network, accounting for available transit options and multiple driving routes.

Movement is then simulated with an agent-based approach that accounts for congestion and other interactions between individual travel itineraries.

Step 4: Calibrate. After each individual simulation is run, the modeled outputs are compared to aggregate control group data (i.e., observed counts, or "ground truth") for quality and reporting purposes. This calibration process involves solving a set of large-scale optimization problems with an objective function defined as "fit to observed ground truth." We strike a careful balance to ensure that the calibration algorithms do not overfit the modeled outputs to the calibration data, as both outliers and a certain level of noise are often present in every dataset.

To complete this iterative calibration process, Replica always holds out some of its own ground truth data from the initial mobility simulation. Replica can also incorporate additional ground truth provided by its customers for additional quality enhancement.

As noted earlier, when a completed model is published, customers also have access to an associated quality report.

V. Replica Places Data Outputs

Each simulation results in a complete trip, population, and routing table.

Population Attributes: Each trip is associated with a specific person in the simulation, for whom the following characteristics are available:

- Age
- Sex
- Race
- Ethnicity
- Employment status
- Household income
- Vehicle ownership status
- Resident or visitor status

Trip Attributes: Each trip is assigned the following attributes:

- Origin and destination points
- Trip distance
- Trip duration
- Start and end time
- Complete routing information for each trip
- Trip mode, including private auto driver, private auto passenger, public transit, walking, biking, freight, and transportation network companies (TNCs)
- Trips purpose, including home, work, errands, eat, social, shop, recreation, commercial, school

Location Detail: Replica models to specific real-world locations and points of interest (e.g., a specific office building, the Starbucks at a certain address) — trips are modeled from individual building footprint to individual building footprint, rather than zone to zone. We update our nationwide catalog of points of interest monthly, and we use the applicable set of locations for each simulation.

VI. Replica Trends Overview, Methodology, and Outputs

Replica produces its Trends dataset on a weekly basis[3], providing near-real-time insight into mobility and spending patterns. Customers have access to census-tract level origin-destination tables that represent average weekdays and average weekend days with hourly breakdowns, and which categorize trips by mode and purpose. Customers also receive a number of consumer spending metrics, which represent the total amount of consumer spend in each

[3] Each Thursday, data is released for the previous calendar week.

census tract in the country — both in aggregate and across a number of sub-categories including retail, grocery stores, restaurants, and travel.

In order to produce these outputs, Replica runs a modified version of its Places pipeline on a daily basis. The Trends pipeline leverages the same synthetic population and travel personas as described in the Places methodology above. However, there are three primary differences in the data processing pipeline:

- First, because the pipeline is run for the entire country on a daily basis, limitations in computing power mean that trip mode is modeled with a modified router that does not provide network link or transit line-level detail.
- Second, because weekly deliveries make it impossible to receive ground-truth data from customers for calibration, Trends outputs are calibrated internally from different sources (for example, comparing mobile location data to in-vehicle GPS data). We also compare our Trends data to previously released, calibrated Places models.
- Third, Trends does not currently model visitor or freight trips. We plan to add these trip estimates in a future update.

In effect, these differences in the pipeline reflect a trade-off of granularity and detail for speed of delivery, in order to maintain consistent quality. To that end, Trends data is best used for monitoring changes over time, and Places data is best used for in-depth point-in-time analysis that may benefit from the ability to do cross-tabular filtering and individual trip analysis.

VII. Complementary Datasets

In addition to the core Places and Trends datasets, Replica makes additional, complementary datasets available to its customers. These include:

- Nationwide synthetic population
- Parcel level land use, including both parcel area and building area data
- Nationwide on- and off-street parking (including capacity and occupancy where available)

VIII. Approach to Privacy

The approach outlined here reflects Replica's uncompromising belief that better insights should not come at the expense of personal privacy. Our methodological approach enables us to provide highly granular output data while remaining faithful to a series of privacy-first technical commitments. At Replica, we:

- Only procure de-identified data from our source vendors. We never receive, use, or output personally identifiable information.
- Never share raw locational data with our customers — or any other third-parties.

- Build models from different data sources independently so that we abstract out potentially identifying details of any individual before combining these models into our aggregate outputs.
- Never join data sources on keys containing sensitive data.
- Incorporate proven techniques, like statistical noise injection, into our algorithms to ensure that (1) it is impossible to ascertain if an individual's information is part of our source data by inspecting our modeled outputs; (2) it is impossible to learn which specific locations were visited by an individual whose information was part of our source data by inspecting our modeled outputs.

Simply put, Replica's methodology results in outputs that make it impossible to track or identify the movements of any individual.

If you have any questions about Replica's products or methodology, please contact support@replicahq.com.

Replica Analysis by Opportunity Area

Figure D-1: Tier 1 Opportunity Areas

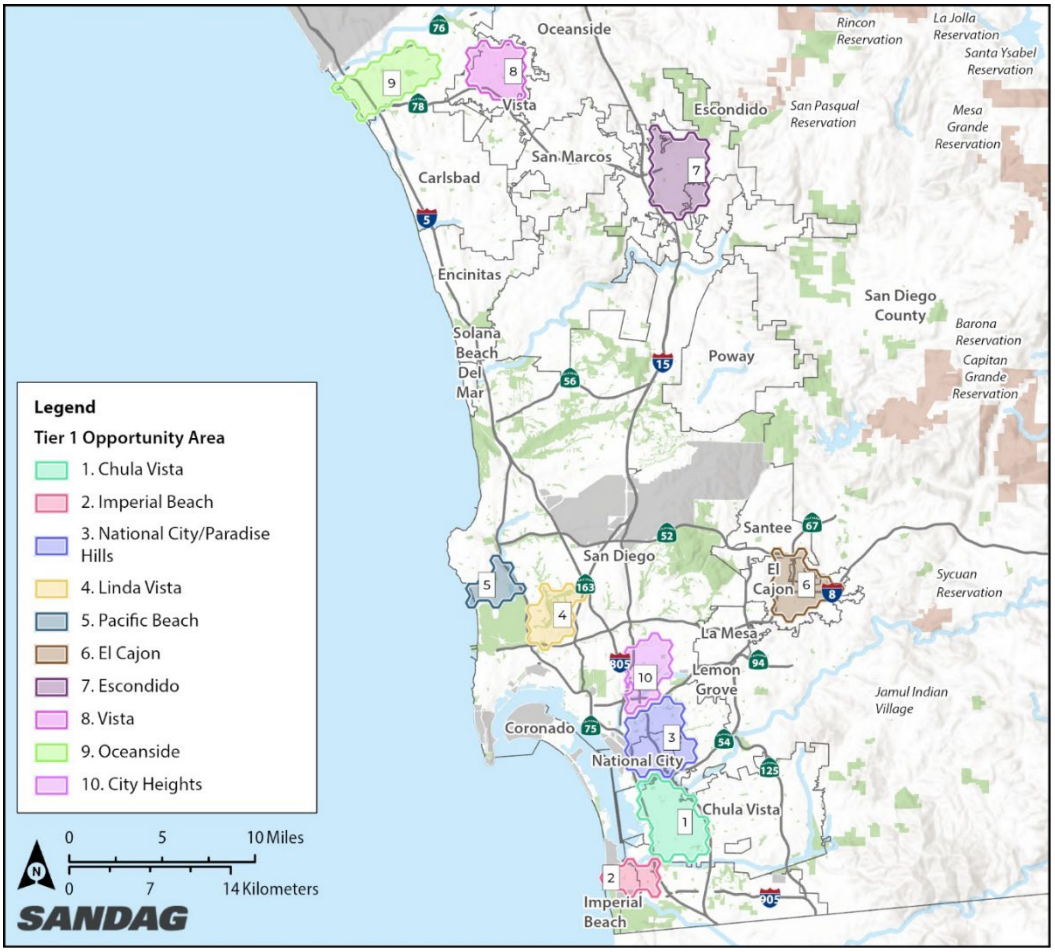


Table D-1: Total Trips by Opportunity Area

Total Trips	Population	Total Trips	Trips per Capita
Chula Vista	124,224	161,183	1.30
City Heights	127,753	92,784	0.73
El Cajon	90,063	102,548	1.14
Escondido	114,849	135,833	1.18
Imperial Beach	56,201	54,514	0.97
Linda Vista	77,371	72,849	0.94
National City	152,127	145,588	0.96
Oceanside	71,537	80,840	1.13
Pacific Beach	52,832	52,838	1.00
Vista	77,488	72,482	0.94

Table D-2: Trip Purpose by Opportunity Area

Trips by Purpose	HBO	HBW	NHB
Chula Vista	55%	9%	35%
City Heights	67%	10%	23%
El Cajon	59%	9%	32%
Escondido	58%	10%	32%
Imperial Beach	64%	9%	26%
Linda Vista	50%	9%	42%
National City	63%	8%	29%
Oceanside	54%	9%	37%
Pacific Beach	56%	9%	34%
Vista	60%	10%	30%

Figure D-2: Tier 1 Opportunity Areas (Commute Trips)

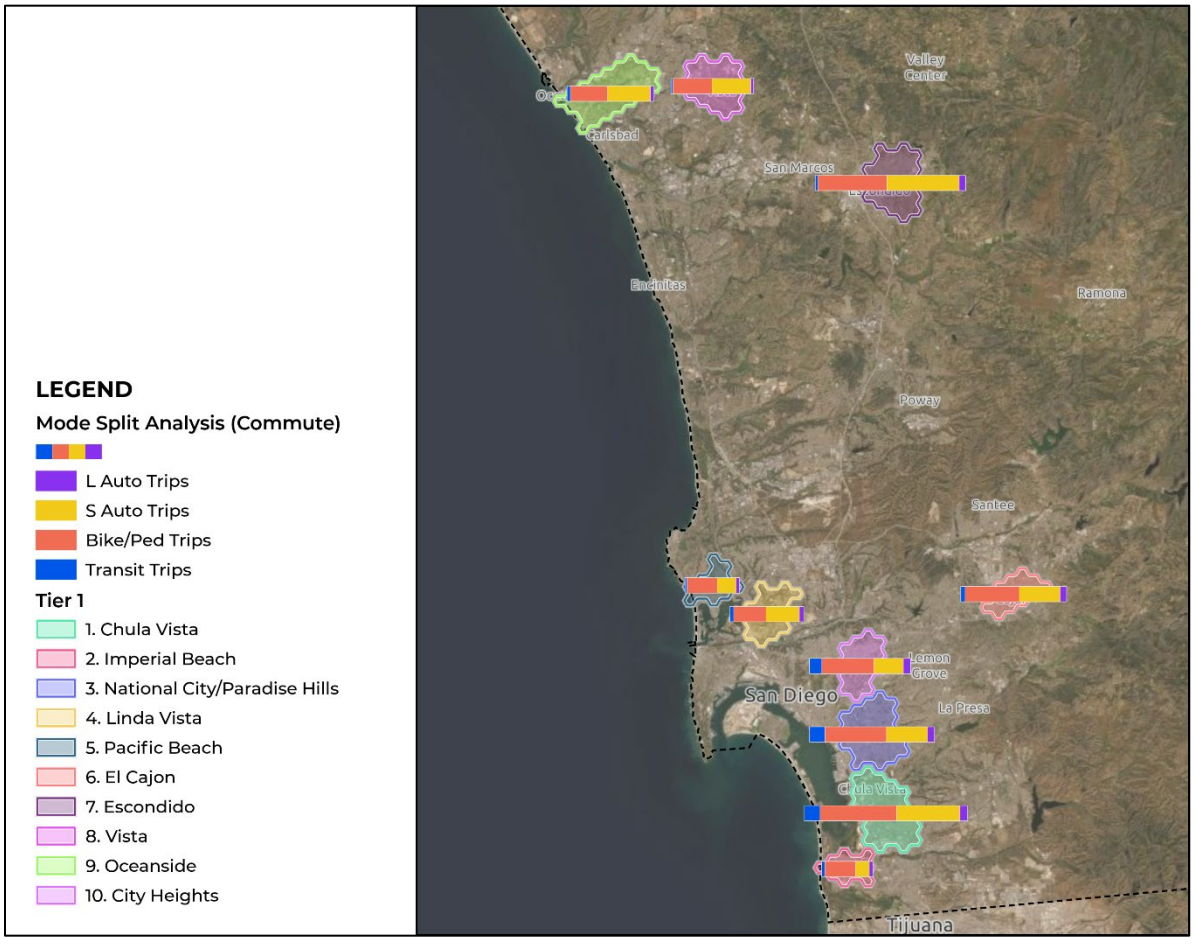


Figure D-3: Mode Split (Non-Commute Trips)

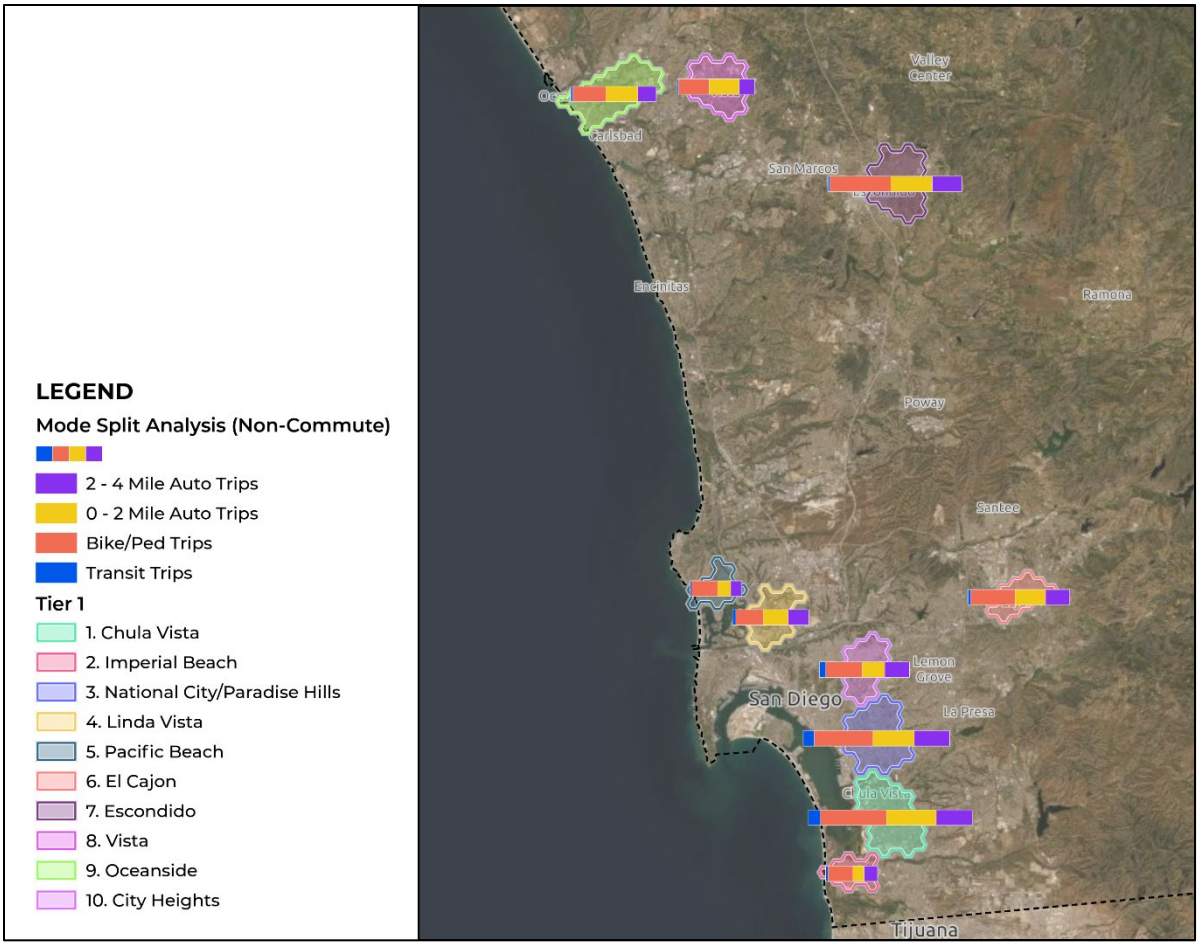


Table D-3: Trips by Mode

Trips by Mode	Auto	Bike/Ped	Transit	Total Trips	% Auto	% Bike/Ped	% Transit
Chula Vista	108,600	38,352	14,231	161,183	67%	24%	9%
City Heights	58,291	26,660	7,833	92,784	63%	29%	8%
El Cajon	73,147	25,894	3,507	102,548	71%	25%	3%
Escondido	102,121	31,463	2,249	135,833	75%	23%	2%
Imperial Beach	37,174	14,244	3,096	54,514	68%	26%	6%
Linda Vista	47,211	21,895	3,743	72,849	65%	30%	5%
National City	94,863	37,434	13,291	145,588	65%	26%	9%
Oceanside	58,485	19,760	2,595	80,840	72%	24%	3%
Pacific Beach	39,308	11,965	1,565	52,838	74%	23%	3%
Vista	54,763	16,242	1,477	72,482	76%	22%	2%

Table D-4: Trips by Mode and Purpose (Home Based Other)

Trips by Mode and Purpose	HBO Auto	HBO Bike/Ped	HBO Transit	HBO Total	HBO % Auto	HBO % Bike/Ped	HBO % Transit
Chula Vista	58,876	24,141	6,382	89,399	66%	27%	7%
City Heights	37,133	20,515	4,328	61,976	60%	33%	7%
El Cajon	40,736	17,957	1,520	60,213	68%	30%	3%
Escondido	55,902	22,019	1,077	78,998	71%	28%	1%
Imperial Beach	23,313	10,536	1,312	35,161	66%	30%	4%
Linda Vista	24,541	10,179	1,498	36,218	68%	28%	4%
National City	58,799	26,871	6,462	92,132	64%	29%	7%
Oceanside	31,347	10,867	1,063	43,277	72%	25%	2%
Pacific Beach	22,310	6,721	602	29,633	75%	23%	2%
Vista	32,532	10,575	701	43,808	74%	24%	2%

Table D-5: Trips by Mode and Purpose (Home Based Work)

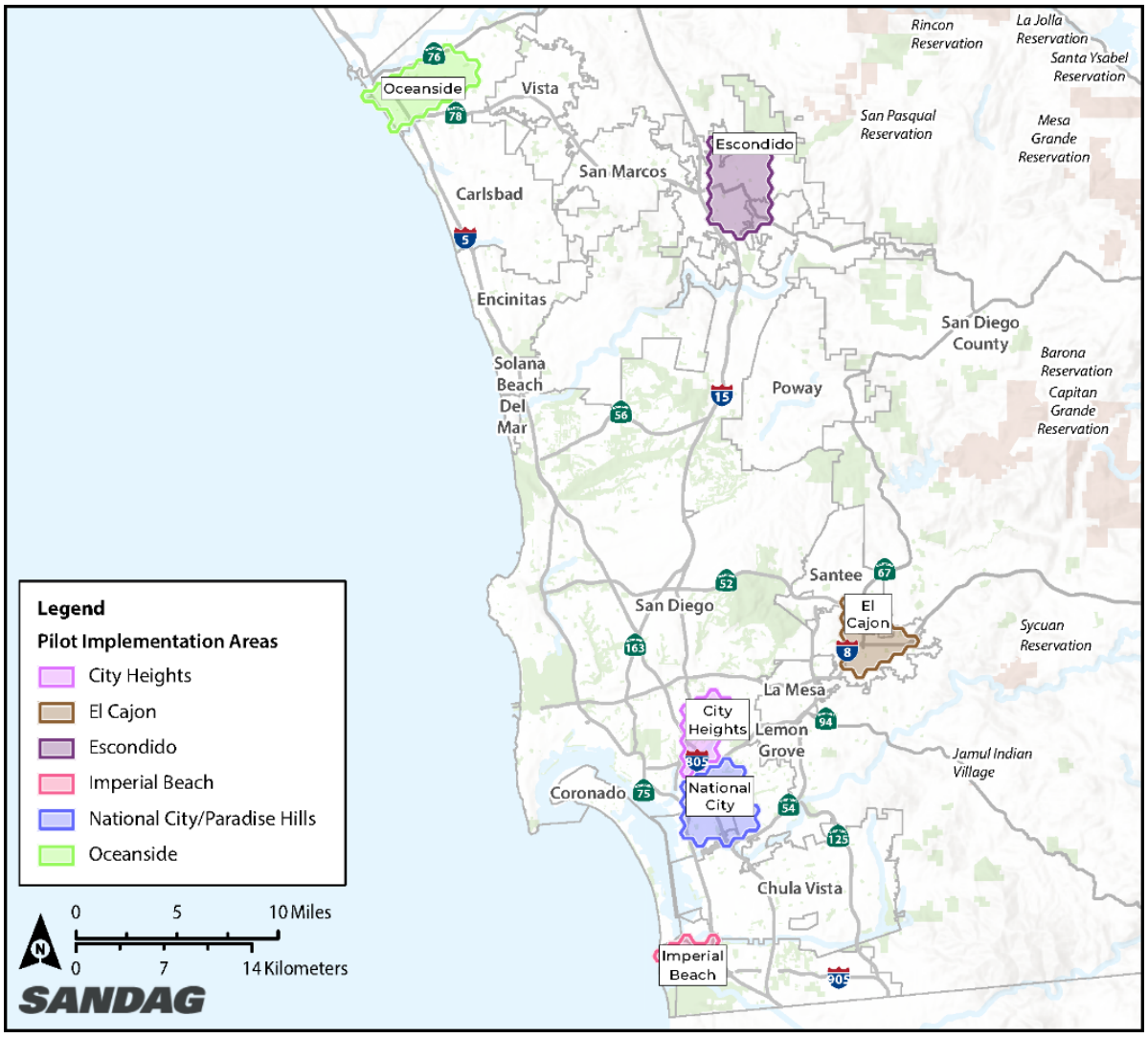
Trips by Mode and Purpose	HBW Auto	HBW Bike/Ped	HBW Transit	HBW Total	HBW % Auto	HBW % Bike/Ped	HBW % Transit
Chula Vista	12,073	816	1,724	14,613	83%	6%	12%
City Heights	7,372	812	1,348	9,532	77%	9%	14%
El Cajon	8,476	705	479	9,660	88%	7%	5%
Escondido	12,140	698	294	13,132	92%	5%	2%
Imperial Beach	4,204	385	371	4,960	85%	8%	7%
Linda Vista	5,361	471	406	6,238	86%	8%	7%
National City	9,261	745	1,708	11,714	79%	6%	15%
Oceanside	6,630	389	368	7,387	90%	5%	5%
Pacific Beach	4,401	367	220	4,988	88%	7%	4%
Vista	6,640	316	193	7,149	93%	4%	3%

Table D-6: Trips by Mode and Purpose (Non Home Based)

Trips by Mode and Purpose	NHB Auto	NHB Bike/Ped	NHB Transit	NHB Total	NHB % Auto	NHB % Bike/Ped	NHB % Transit
Chula Vista	37,651	13,395	6,125	57,171	66%	23%	11%
City Heights	13,786	5,333	2,157	21,276	65%	25%	10%
El Cajon	23,935	7,232	1,508	32,675	73%	22%	5%
Escondido	34,079	8,746	878	43,703	78%	20%	2%
Imperial Beach	9,657	3,323	1,413	14,393	67%	23%	10%
Linda Vista	17,309	11,245	1,839	30,393	57%	37%	6%
National City	26,803	9,818	5,121	41,742	64%	24%	12%
Oceanside	20,508	8,504	1,164	30,176	68%	28%	4%
Pacific Beach	12,597	4,877	743	18,217	69%	27%	4%
Vista	15,591	5,351	583	21,525	72%	25%	3%

Replica Analysis by Pilot Implementation Area

Figure D-4: Pilot Implementation Areas



Oceanside

Table D-7: Oceanside – Trip Characteristics

Trip Characteristics	Oceanside
Total Trips in Region	10,562,910
Percent of Regional Trips	9.5%
Trips Starting In Service Area (External Trips)	218,920
Trips Ending In Service Area (External Trips)	218,080
Trips Starting In or Ending In Service Area (Total Trips)	1,007,874
Trips Starting In and Ending In Service Area (Internal Trips)	570,874
Percent of External Trips	43.4%
Percent of Internal Trips	56.6%
Percent of Trips Into	21.6%
Percent of Trips Out Of	21.7%

Table D-8: Oceanside – Trip Mode

Mode	Oceanside	
	# Trips	% Trips
Auto	858,055.00	85.1%
Bike	3,932.00	0.4%
Walk	102,280.00	10.1%
Transit	9,020.00	0.9%
Other	34,587.00	3.4%
Total	1,007,874.00	100.0%

Table D-9: Oceanside – Origins and Destinations

Trip Distance	Origins	Destinations
Average Trip Distance (Miles)	14.5	14.4
Median Trip Distance (Miles)	4.6	4.5

Table D-10: Oceanside – Trip Distance Counts and Percentages

Trip Distance	Origin		Destination	
	Count	*Percentage*	*Count*	*Percentage*
Under 0.5mi	*21,110*	*9.6%*	*21,214*	*9.7%*
0.5-1mi	*14,202*	*6.4%*	*14,254*	*6.5%*
1-2mi	*24,840*	*11.3%*	*24,652*	*11.2%*
2-4mi	*40,153*	*18.2%*	*40,744*	*18.5%*
4-8mi	*44,818*	*20.3%*	*45,476*	*20.7%*
8-16mi	*31,406*	*14.3%*	*31,180*	*14.2%*
16-32mi	*19,599*	*8.9%*	*19,193*	*8.7%*
32-64mi	*17,876*	*8.1%*	*17,421*	*7.9%*
Over 64mi	*6,335*	*2.9%*	*5,603*	*2.5%*
Total	*220,339*	*100.0%*	*219,737*	*100.0%*
% of Trips < 4 Miles	*100,305*	*45.5%*	*100,864*	*45.9%*

Table D-11: Oceanside – 12Origins and Destinations

Top Destinations
Carlsbad
Vista
Unincorporated San Diego County
San Marcos
Camp Pendleton
Top Origins
Carlsbad
Vista
Unincorporated San Diego County
San Marcos
Camp Pendleton

Escondido

Table D-13: Escondido – Trip Characteristics

Trip Characteristics	Escondido
Total Trips in Region	10,562,910
Percent of Regional Trips	8.5%
Trips Starting In Service Area (External Trips)	188,355
Trips Ending In Service Area (External Trips)	187,918
Trips Starting In or Ending In Service Area (Total Trips)	892,861
Trips Starting In and Ending In Service Area (Internal Trips)	516,588
Percent of External Trips	42.1%
Percent of Internal Trips	57.9%
Percent of Trips Into	21.0%
Percent of Trips Out Of	21.1%

Table D-14: Escondido – Trip Mode

Mode	Escondido	
	# Trips	% Trips
Auto	754,348.00	84.5%
Bike	3,871.00	0.4%
Walk	99,402.00	11.1%
Transit	6,567.00	0.7%
Other	28,673.00	3.2%
Total	892,861.00	100.0%

Table D-15: Escondido – Origins and Destinations

Trip Distance	Origins	Destinations
Average Trip Distance (Miles)	11.6	11.8
Median Trip Distance (Miles)	3.2	3.2

Table D-16: Escondido – Trip Distance Counts and Percentages

Trip Distance	Origin		Destination	
	Count	Percentage	Count	Percentage
Under 0.5mi	29,614	9.4%	29,623	9.4%
0.5-1mi	31,211	9.9%	31,222	9.9%
1-2mi	51,151	16.2%	51,648	16.4%
2-4mi	61,664	19.6%	62,185	19.7%
4-8mi	43,036	13.7%	42,918	13.6%
8-16mi	38,528	12.2%	38,465	12.2%
16-32mi	38,356	12.2%	33,160	10.5%
32-64mi	16,710	5.3%	21,062	6.7%
Over 64mi	4,794	1.5%	4,588	1.5%
Total	315,064	100.0%	314,871	100.0%
% of Trips < 4 Miles	173,640	55.1%	174,678	55.5%

Table D-17: Escondido – Origins and Destinations

Top Destinations
San Marcos
Unincorporated San Diego County
Oceanside
Vista
Carlsbad
Top Origins
San Marcos
Unincorporated San Diego County
Oceanside
Vista
Carlsbad

City Heights

Table D-18: City Heights – Trip Characteristics

Trip Characteristics	City Heights
Total Trips in Region	10,562,910
Percent of Regional Trips	4.2%
Trips Starting In Service Area (External Trips)	146,707
Trips Ending In Service Area (External Trips)	146,466
Trips Starting In or Ending In Service Area (Total Trips)	447,169
Trips Starting In and Ending In Service Area (Internal Trips)	153,996
Percent of External Trips	65.6%
Percent of Internal Trips	34.4%
Percent of Trips Into	32.8%
Percent of Trips Out Of	32.8%

Table D-19: City Heights – Trip Mode

Mode	City Heights	
	# Trips	% Trips
Auto	354,743.00	79.3%
Bike	1,602.00	0.4%
Walk	59,979.00	13.4%
Transit	16,913.00	3.8%
Other	13,932.00	3.1%
Total	447,169.00	100.0%

Table D-20: City Heights – Origins and Destinations

Trip Distance	Origin	Destination
Average Trip Distance (Miles)	9.5	10.0
Median Trip Distance (Miles)	4.5	4.2

Table D-21: City Heights – Trip Distance Counts and Percentages

Trip Distance	Origin		Destination	
	Count	Percentage	Count	Percentage
Under 0.5mi	28,898	12.7%	28,880	12.7%
0.5-1mi	20,926	9.2%	20,973	9.2%
1-2mi	26,684	11.8%	26,456	11.7%
2-4mi	31,120	13.7%	30,959	13.6%
4-8mi	46,429	20.5%	47,034	20.7%
8-16mi	47,552	21.0%	46,552	20.5%
16-32mi	17,713	7.8%	18,658	8.2%
32-64mi	5,114	2.3%	4,603	2.0%
Over 64mi	2,419	1.1%	2,763	1.2%
Total	226,855	100.0%	226,878	100.0%
% of Trips < 4 Miles	107,628	47.4%	107,268	47.3%

Table D-22: City Heights – Top Origins and Destinations

Top Destinations
National City
Mid City
Greater North Park
SDSU Area
Chula Vista
Top Origins
National City
Mid City
Greater North Park
SDSU Area
Chula Vista

El Cajon

Table D-23: El Cajon – Trip Characteristics

Trip Characteristics	El Cajon
Total Trips in Region	10,562,910.00
Percent of Regional Trips	7.0%
Trips Starting In Service Area (External Trips)	201,435.00
Trips Ending In Service Area (External Trips)	202,160.00
Trips Starting In or Ending In Service Area (Total Trips)	737,161.00
Trips Starting In and Ending In Service Area (Internal Trips)	333,566.00
Percent of External Trips	54.7%
Percent of Internal Trips	45.3%
Percent of Trips Into	27.4%
Percent of Trips Out Of	27.3%

Table D-24: El Cajon – Trip Mode

Mode	El Cajon	
	# Trips	% Trips
Auto	609,680.00	82.7%
Bike	3,011.00	0.4%
Walk	83,426.00	11.3%
Transit	11,153.00	1.5%
Other	29,891.00	4.1%
Total	737,161.00	100.0%

Table D-25: El Cajon – Origins and Destinations

Trip Distance	Origin	Destination
Average Trip Distance (Miles)	11.0	11.2
Median Trip Distance (Miles)	3.8	3.8

Table D-26: El Cajon – Trip Distance Counts and Percentages

Trip Distance	Origin		Destination	
	Count	Percentage	Count	Percentage
Under 0.5mi	31,134	10.4%	31,211	10.4%
0.5-1mi	26,292	8.8%	26,357	8.8%
1-2mi	40,971	13.6%	40,792	13.6%
2-4mi	54,340	18.1%	54,614	18.2%
4-8mi	51,800	17.3%	53,164	17.7%
8-16mi	39,980	13.3%	38,262	12.7%
16-32mi	43,026	14.3%	43,826	14.6%
32-64mi	8,147	2.7%	7,915	2.6%
Over 64mi	4,597	1.5%	4,654	1.5%
Total	300,287	100.0%	300,795	100.0%
% of Trips < 4 Miles	152,737	50.9%	152,974	50.9%

Table D-27: El Cajon – Top Origins and Destinations

Top Destinations
Santee
La Mesa
Rancho San Diego
Winter Gardens
Unincorporated San Diego County
Top Origins
Santee
La Mesa
Rancho San Diego CDP
Winter Gardens CDP
Unincorporated San Diego County

National City

Table D-28: National City – Trip Characteristics

Trip Characteristics	National City
Total Trips in Region	10,562,910
Percent of Regional Trips	7.2%
Trips Starting In Service Area (External Trips)	225,276
Trips Ending In Service Area (External Trips)	224,606
Trips Starting In or Ending In Service Area (Total Trips)	760,750
Trips Starting In and Ending In Service Area (Internal Trips)	310,868
Percent of External Trips	59.1%
Percent of Internal Trips	40.9%
Percent of Trips Into	29.5%
Percent of Trips Out Of	29.6%

Table D-29: National City – Trip Mode

Mode	National City	
	# Trips	% Trips
Auto	610,564.00	80.3%
Bike	2,367.00	0.3%
Walk	89,678.00	11.8%
Transit	32,795.00	4.3%
Other	25,346.00	3.3%
Total	760,750.00	100.0%

Table D-30: National City – Origins and Destinations

Trip Distance	Origin	Destination
Average Trip Distance (Miles)	12.7	12.6
Median Trip Distance (Miles)	4.1	4.1

Table D-31: Naitonal City – Trip Distance Counts and Percentages

Trip Distance	Origin		Destination	
	Count	Percentage	Count	Percentage
Under 0.5mi	37,702	10.7%	36,951	10.9%
0.5-1mi	31,492	9.0%	30,940	9.1%
1-2mi	45,510	12.9%	43,911	13.0%
2-4mi	55,518	15.8%	52,383	15.5%
4-8mi	68,509	19.5%	65,307	19.3%
8-16mi	69,841	19.9%	67,658	20.0%
16-32mi	29,367	8.4%	28,702	8.5%
32-64mi	8,829	2.5%	7,989	2.4%
Over 64mi	4,734	1.3%	4,775	1.4%
Total	351,502	100.0%	338,616	100.0%
% of Trips < 4 Miles	170,222	48.4%	164,185	48.5%

Table D-32: National City – Top Origins and Destinations

Top Destinations
Chula Vista
Southeastern San Diego
City Heights
Downtown
Otay Mesa
Top Origins
Chula Vista
Southeastern San Diego
City Heights
Downtown
Otay Mesa

Imperial Beach

Table D-33: Imperial Beach – Trip Characteristics

Trip Characteristics	Imperial Beach
Total Trips in Region	10,562,910
Percent of Regional Trips	2.1%
Trips Starting In Service Area (External Trips)	63,979
Trips Ending In Service Area (External Trips)	62,757
Trips Starting In or Ending In Service Area (Total Trips)	222,196
Trips Starting In and Ending In Service Area (Internal Trips)	95,460
Percent of External Trips	57.0%
Percent of Internal Trips	43.0%
Percent of Trips Into	28.2%
Percent of Trips Out Of	28.8%

Table D-34: Imperial Beach – Trip Mode

Mode	Imperial Beach	
	# Trips	% Trips
Auto	177,993.00	80.1%
Bike	827.00	0.4%
Walk	30,678.00	13.8%
Transit	6,273.00	2.8%
Other	6,425.00	2.9%
Total	222,196.00	100.0%

Table D-35: Imperial Beach – Origins and Destinations

Trip Distance	Origins	Destinations
Average Trip Distance (Miles)	12.4	12.4
Median Trip Distance (Miles)	3.5	3.4

Table D-36: Imperial Beach – Trip Distance Counts and Percentages

Trip Distance	Origin		Destination	
	Count	Percentage	Count	Percentage
Under 0.5mi	13,756	12.2%	13,771	12.3%
0.5-1mi	13,300	11.8%	13,277	11.9%
1-2mi	17,748	15.7%	17,704	15.8%
2-4mi	14,643	12.9%	14,879	13.3%
4-8mi	15,843	14.0%	15,072	13.5%
8-16mi	16,753	14.8%	18,092	16.2%
16-32mi	15,972	14.1%	14,106	12.6%
32-64mi	3,028	2.7%	2,902	2.6%
Over 64mi	2,042	1.8%	2,149	1.9%
Total	113,085	100.0%	111,952	100.0%
% of Trips < 4 Miles	59,447	52.6%	59,631	53.3%

Table D-37: Imperial Beach – Top Origins and Destinations

Top Destinations
Chula Vista
Otay Mesa
Coronado
National City
San Ysidro
Top Origins
Chula Vista
Otay Mesa
Coronado
National City
San Ysidro

Photo Credit: Circuit, TREB, Little Italy

Appendix E

Flexible Fleet Funding Opportunities

Appendix E: Flexible Fleet Funding Opportunities

This Appendix contains a list of funding opportunities which various agencies may be eligible to apply for to implement Flexible Fleet services and infrastructure. These funding opportunities can be used to support the implementation of pilot programs as well as the long-term financial sustainability of Flexible Fleet service implementation.

Table E-1: Flexible Fleet Funding Opportunities

Grant Program	Administering Agency	Cycle	Grant Program Description	Application to Flexible Fleet Projects	Link to Grant Program
Local Highway Safety Improvement Program (HISP)	*Federal DOT*	*Annual*	*The HSIP is federally allocated to the state for roadway safety projects through a competitive program administered by Caltrans.*	*Decreasing regional VMT through alternate transit opportunities will lead to increased road safety.*	*https://www.grants.ca.gov/grants/local-highway-safety-improvement-program-hsip/*
Congestion Mitigation and Air Quality Improvement Program	*Federal DOT*	*Annual*	*The HSIP is federally allocated to the state for roadway safety projects through a competitive program administered by Caltrans.*	*Increased last-mile transit opportunities will decrease the VMT in the study areas.*	*https://www.grants.ca.gov/grants/solicitation-for-the-electric-bicycle-incentives-project/*
Charging and Fueling Infrastructure	*Federal DOT*	*Annual*	*This program provides funding to build electric vehicle charging infrastructure and other alternative fuel stations.*	*NEV Microtransit will need charging infrastructure.*	*https://highways.dot.gov/newsroom/president-biden-usdot-and-usdoe-announce-5-billion-over-five-years-national-ev-charging*
Metropolitan & Statewide Planning and Non-Metropolitan Transportation Planning: Sections 5303, 5304, 5305	*Federal DOT*	*Annual*	*This funding source provides procedural and funding requirements for multimodal transportation planning in metropolitan areas. Planning must be cooperative, continuous, and comprehensive leading to long-range plans and short-range programs that reflect transportation investment priorities. Funds are available*	*Flexible Fleets aims to implement short-range, multimodal transportation plans.*	*https://www.transit.dot.gov/funding/grants/metropolitan-statewide-planning-and-nonmetropolitan-transportation-planning-5303-5304*

Grant Program	Administering Agency	Cycle	Grant Program Description	Application to Flexible Fleet Projects	Link to Grant Program
			to states and Metropolitan Planning Organizations (MPOs) for planning activities.		
Urbanized Area Formula Program: Section 5307	*Federal DOT*	*Annual*	*This source supports capital, planning, engineering, design projects; preventative maintenance is also eligible. For urbanized areas with populations less than 200,000, operating assistance is an eligible expense.*	*Capital funding will be needed for services to be implemented.*	*https://www.transit.dot.gov/funding/grants/urbanized-area-formula-grants-5307#:~:text=The%20Urbanized%20Area%20Formula%20Funding,and%20for%20transportation%2Drelated%20planning.*
Enhanced Mobility of Seniors & Individuals with Disabilities: Section 5310	*Federal DOT*	*TBD*	*This source provides funding to states for the purpose of assisting private nonprofit groups in meeting transportation needs of the elderly and persons with disabilities.*	*The inclusion of Wheelchair Accessible Vehicles(WAV) in the microtransit plan supports the elderly and the disabled.*	*https://www.transit.dot.gov/funding/grants/enhanced-mobility-seniors-individuals-disabilities-section-5310*
Grants for Buses and Bus Facilities Formula Program: Section 5339(a)	*Federal DOT*	*Annual*	*This source provides funding to states and transit agencies through a statutory formula to replace, rehabilitate, construct and purchase buses, related equipment, and bus-related facilities. In addition to the formula allocation, this program includes two discretionary components: The Bus and Bus Facilities Discretionary Program and the Low or No Emissions Bus Discretionary Program.*	*Infrastructure that supports micromobility, ridehail, and carshare opportunities will be added to transit facilities in order to alleviate last-mile travel problems.*	*https://www.transit.dot.gov/bus-program*
Mobility on Demand (MOD) Sandbox Demonstration & Public Transportation	*Federal DOT*	*TBD*	*This program supports research activities that improve the safety, reliability, efficiency, and sustainability of public transportation by investing in the development, testing, and deployment of innovative technologies, business models, materials, and processes.*	*Many areas of the project, such as the last-mile delivery solutions, are innovative.*	*https://www.transit.dot.gov/funding/grants/grant-programs/mobility-demand-mod-sandbox-demonstration-program-5312*

Grant Program	Administering Agency	Cycle	Grant Program Description	Application to Flexible Fleet Projects	Link to Grant Program
Innovation Program: Section 5312					
Safe Streets and Roads for All	*Federal DOT*	*Annual*	*This program provides funding directly to local and tribal governments for improvements to reduce crashes and fatalities, especially for cyclists and pedestrians.*	*More infrastructure surrounding micromobility should lessen crash rates.*	*https://www.transportation.gov/grants/SS4A*
Strengthening Mobility and Revolutionizing Transportation (SMART)	*Federal DOT*	*Annual*	*This program provides competitive grants to states, local governments, and tribes for projects that improve transportation safety and efficiency.*	*Project sections that require connected vehicles, delivery/logistics, or coordinated automation could use this grant.*	*https://www.transportation.gov/grants/SMART*
Surface Transportation Block Grants	*Federal DOT*	*Annual*	*This program provides funding that may be used by states and local agencies for a wide range of projects to preserve and improve the condition and performance of surface transportation, including highway, transit, intercity bus, bicycle, and pedestrian projects.*	*Most of FF is based on surface transportation and could therefore take advantage of this grant.*	*https://www.fhwa.dot.gov/specialfunding/stp/*
Active Transportation Program (ATP)	*CA DOT*	*Annual*	*This program is intended to encourage increased use of active modes of transportation and funds bicycle and pedestrian improvement projects. Eligible projects include bicycle and pedestrian improvements and planning. SB 1 augmented the ATP with an extra $100 million annually to the program.*	*Micromobility services would increase the use of active transportation.*	*https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/active-transportation-program*
Solutions for Congested Corridors (SCCP)	*CA DOT*	*2 Years*	*Regional transportation authorities and Caltrans may nominate projects for funding to achieve a balanced set of transportation, environmental, and community access improvements to reduce congestion.*	*Increased last-mile transit opportunities will decrease the VMT in the study areas.*	*https://catc.ca.gov/programs/sb1/solutions-for-congested-corridors-program*

Grant Program	Administering Agency	Cycle	Grant Program Description	Application to Flexible Fleet Projects	Link to Grant Program
Clean Transportation Program	*CA Energy Commission*	*Annual*	*This program offers several grant programs for EV charging infrastructure to support passenger vehicles, freight, and buses. Zero-emission vehicle incentives are offered through California Air Resources Board (CARB).*	*EV microtransit services will need charging infrastructure.*	*https://www.energy.ca.gov/programs-and-topics/programs/clean-transportation-program*
City/County Local Gas Taxes	*City of San Diego*	*N/A*	*City/County Local Gas Taxes are subventions local agencies receive directly from the state gas tax and are used for transportation related purposes.*	*Tax revenues could be used for any of the Flex Fleet services.*	*https://www.sandiego.gov/sites/default/files/legacy/fm/annual/pdf/fy10/46v2gastax.pdf*
SANDAG Active Transportation Grant Program (ATGP)	*SANDAG*	*3 Years*	*Eligible projects for this program include those that support pedestrian and bike infrastructure.*	*Infrastructure funding will be needed for micromobility services.*	*https://www.sandag.org/index.asp?projectid=491&fuseaction=projects.detail#:~:text=13%2C%202022%20meeting.-,Active%20Transportation%20Grant%20Program,and%20other%20community%20gathering%20places.*
Transnet	*San Diego County*	*TBD*	*Half-cent sales tax for local transportation projects, such as public transit, highway, and local street and road improvements.*	*Tax revenues could be used for any of the Flex Fleet services.*	*https://www.keepsandiegomoving.com/transnet-about.aspx*
PeopleForBikes Community Grant Program	*People For Bikes*	*Annual*	*The PeopleForBikes Community Grant Program supports bicycle infrastructure projects and targeted advocacy initiatives that make it easier and safer for people of all ages and abilities to ride. PeopleForBikes focuses most grant funds on bicycle infrastructure projects, such as: bike paths, lanes, trails and bridges; mountain bike facilities; bike parks and pump tracks; BMX facilities; and end-of-trip facilities such as bike racks, bike parking, bike repair stations and bike storage.*	*Infrastructure funding will be needed for micromobility services.*	*https://www.peopleforbikes.org/grant-guidelines*