

APPENDIX A: RELEVANT DOCUMENT REVIEW

Kumeyaay Corridor

Kumeyaay Corridor Plan Overview

CMCP Description

Comprehensive Multimodal Corridor Plans (CMCP) are data-driven plans that offer solutions to reduce congestion, support climate action initiatives, generate transportation choices, and increase access for residents, commuters, visitors, and goods movement. A CMCP evaluates all travel modes and transportation facilities in a defined corridor – highways and freeways, parallel and connecting roadways, transit options (local bus, rapid bus, commuter rail, light rail, intercity rail, etc.), pathways and bikeways.

CMCPs are required in order to apply for certain state and federal funds, including SB 1 funding, which can be leveraged to support regional transportation projects. CMCPs are designed to reduce congestion in highly traveled and highly congested corridors through performance enhancements that balance transportation improvements with community impacts.

SANDAG and Caltrans are developing a CMCP for the area surrounding Interstate 8 (I-8). This project, referred to as the Kumeyaay Corridor, is one of several CMCP projects being undertaken by the region. These CMCPs will serve as integral components that further the vision set forth in SANDAG's 2021 Regional Plan, centered around the 5 Big Moves.

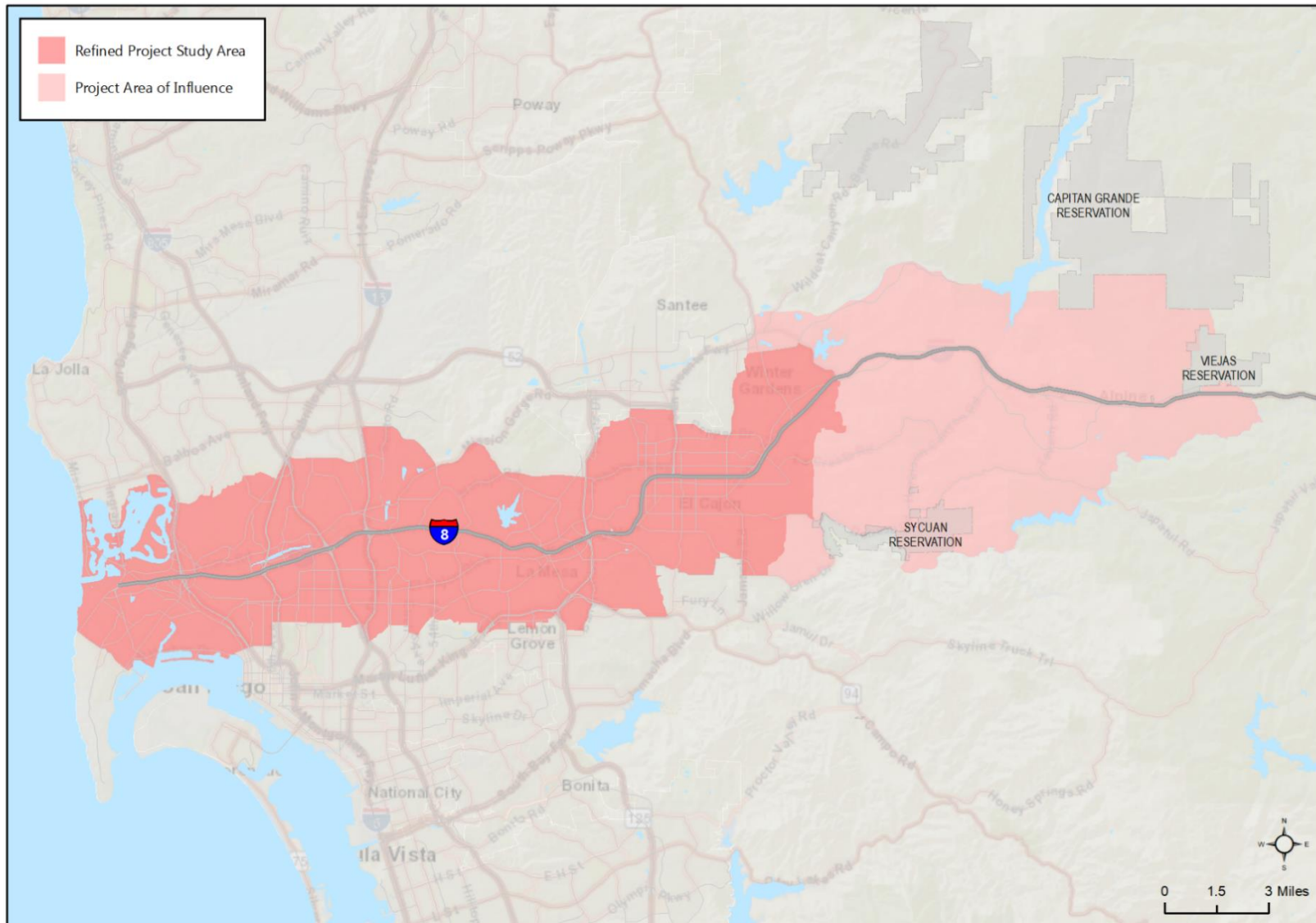
The Kumeyaay Corridor will provide multimodal mobility analyses to identify key issues and opportunities and develop recommendations within the project area. The project will take into consideration the findings and recommendations identified in previous studies and planning documents, and will be shaped by input from community members, public agency staff, and other project stakeholders at all project phases.

Study Area

The Kumeyaay Corridor study area generally spans a 2-mile buffer of I-8 between its western terminus and Lake Jennings Park Road in the unincorporated community of Lakeside to the east, a length of approximately 24 miles. The study area is diverse in terms of the topography, transportation infrastructure, and land use patterns. The corridor is a historically significant trade route and remains critical to interregional goods movement today. Figure 1.1 displays the study area and area of influence.

The west end of the Kumeyaay Corridor abuts the Pacific Ocean, San Diego Bay, and Mission Bay, features that create community edges and limit local access. Some of the major destinations in this area include the ocean, bays, marinas, San Diego Airport, Pechanga Arena, and Sea World. Just east of Mission Bay, I-5 and a rail corridor serving Amtrak, Coaster, Blue Line Trolley, and freight run north-south. A linear valley runs east-west, formed by steep grades to the north and south. I-8, the San Diego River, and Green Line Trolley all follow the valley floor. SR-163, I-805, and I-15 are additional north-south running freeways traversing the western half of the study area. Communities north of the valley generally exhibit post-war suburban development patterns formed around the natural canyons, resulting in a circuitous street network with limited alternative connections. Destinations in these areas include University of San Diego, Old Town San Diego, Presidio Park, Fashion Valley Mall, Westfield Mission Valley Mall, future San Diego State University West site, Kaiser Permanente Zion Medical Center, and Mission Basilica San Diego de Alcalá. A significant complex of medical facilities is sited just south of where I-805 and SR-163 converge.

Figure 1-1: Kumeyaay Corridor Study Area and Project Area of Influence



A relatively flat mesa with intermittent canyons is present south of the valley. The older communities in this area established a grid street pattern with mixed use environments along major corridors surrounded by residential neighborhoods. Balboa Park abuts the south side of the study area and is a major destination attracting trips from across the region and beyond. Scripps Mercy San Diego and University of California San Diego Medical Center are both located just west of SR-163, south of I-8. Additionally, the vibrant communities in these areas can be destinations in themselves.

To the east, the mesa south of I-8 becomes less flat, and roadways deviate from the grid pattern to follow the contours of canyons. San Diego State University is centrally located in this area. It includes a dedicated transit station served by the Green Line Trolley and multiple bus routes. The entirety of La Mesa and northernmost part of Lemon Grove are also within the Kumeyaay Corridor study area, each with Orange Line Trolley Stations. SR-94 and SR-125 also enter the study area in La Mesa and Lemon Grove. Downtown La Mesa, Lake Murray, Grossmont Center, and Sharp Grossmont Hospital are additional destinations in this part of the study area.

The valley floor widens east of SR-125, which enabled El Cajon to develop in a traditional grid pattern. El Cajon is the easternmost urbanized city in the study area, with unincorporated San Diego County communities further east and to the south. The Green Line Trolley ventures away from I-8 in El Cajon, heading to its terminus at the Santee Town Center just north of the study area. The southern terminus of SR-67 is at I-8 in El Cajon, providing connections to Santee and unincorporated communities to the north. Destinations in this area include Grossmont College, Main Street, and Gillespie Field. The Sycuan and Viejas Bands of Kumeyaay Indians have reservations just east of the study area, within the project area of influence, along with the unincorporated community of Alpine. The casinos, shopping, and resort facilities present at the reservations are regional destinations and regional employment centers.

It is important to note that the projects and programs recommended by the Kumeyaay Corridor effort will benefit not only the people that live and work directly in the study area, but also those that commute, visit, shop, or move goods through and within the corridor. The study area includes, and facilitates access to, major destinations which attract people from throughout the region. This includes people from social equity focus communities¹ that may be more reliant on alternative transportation modes. This effort will include analyses of travel patterns to better understand what types of improvements are needed and where they should be focused with the intent of enhancing travel options and the travel experience for all.

Relationship to Other CMCPs

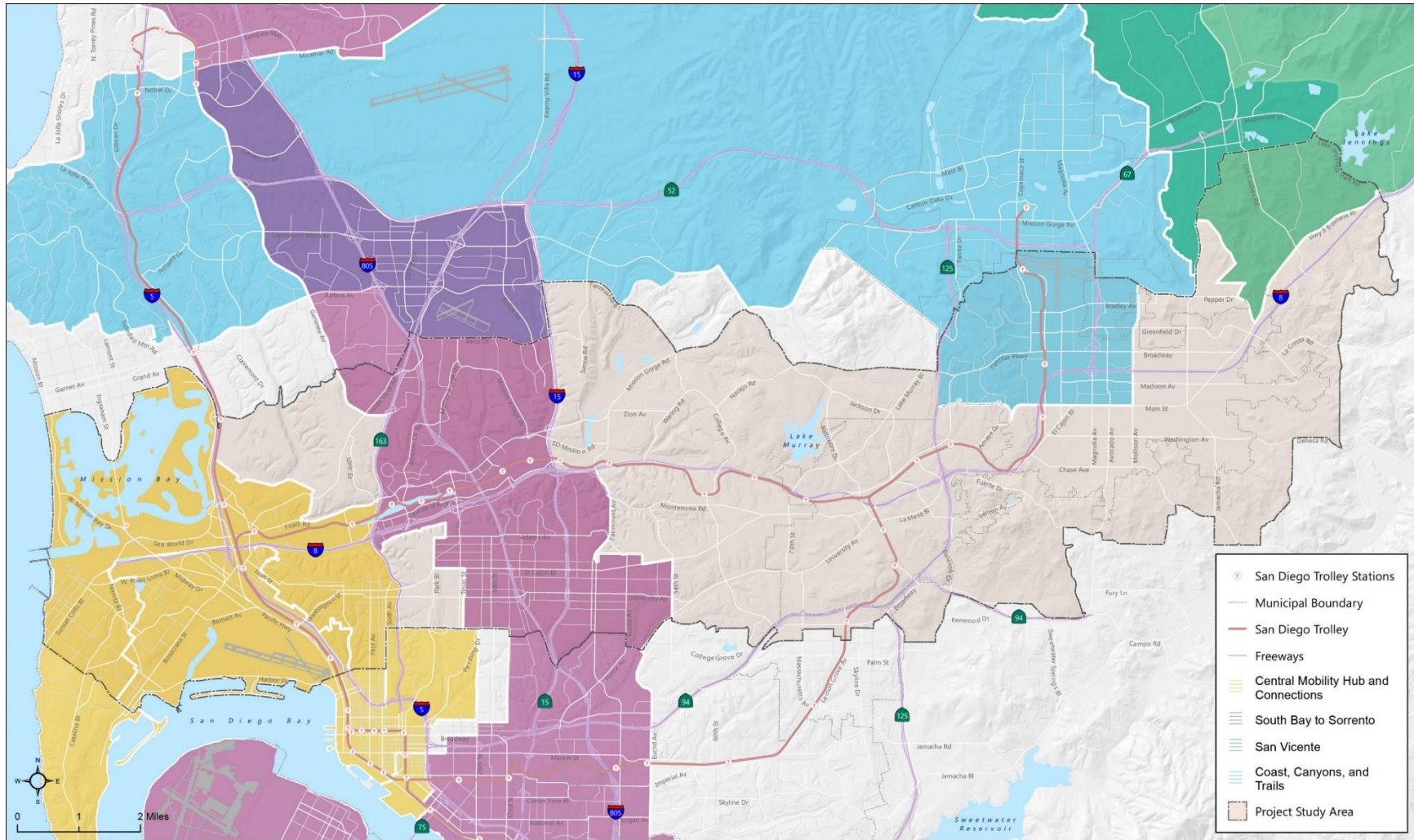
SANDAG and Caltrans are currently developing CMCPs in coordination with agency partners and local city governments. As of May 2022, the Kumeyaay Corridor is the sixth CMCP effort in the region, with an additional five corridors to be studied. Figure 1.2 displays the Kumeyaay Corridor study area in relation to the other ongoing CMCPs. As shown, there is overlap from the Central Mobility Hub and Connections, South Bay to Sorrento, San Vicente, and Coast, Canyons, and Trails CMCPs. These four efforts are all in stages ahead of the Kumeyaay Corridor. Recommendations from these CMCPs within the Kumeyaay Corridor study area will be brought forward for consideration.

¹ Social equity focus communities may include, but not limited to, low income, minority, senior, and other traditionally underrepresented communities.

Purpose of this Report

This report serves to document the issues, opportunities, and planned improvements as identified in previous planning efforts. These findings, combined with data-driven analyses and community input, will serve as a starting point from which transportation solutions will be developed. Previously identified recommendations will be reviewed for relevance with the greater transportation network and land use forecasts and may be carried forward or altered as Kumeyaay Corridor recommendations. The literature review may also reveal planning gaps. For example, areas governed by older documents may warrant an additional focus for one or more modes or recommendation categories.

Figure 1-2: Kumeyaay Corridor Study Area and Adjacent CMCPs



Source: SANDAG, 2022

Relevant Documents

Review Approach

The first step in the process involved identifying the relevant documents to be reviewed. In addition to SANDAG and Caltrans, local agencies and partners were engaged at the project onset to provide expertise related to a particular topic or jurisdiction. These entities, including the Project Management Team, Project Development Team², and Agency Coordination Team³, were relied upon for their local knowledge to develop the list of relevant documents to review.

A summary matrix was created to aid in capturing and organizing pertinent information specific to potential categories for which recommendations will be made. Table 2.1 illustrates the matrix format and fields. Note, not all documents touched on every discipline field. Additionally, not all documents included an identification of needs and planned improvements. The populated matrix was used to develop writeups and maps summarizing the trends and key findings throughout the corridor. These summaries are provided in Chapter 2.

Table 2-1: Document Review Matrix Format

Document Review Matrix Format								
Document	Year	Agency	Summary	Key Corridors	Key Destinations	Discipline	Constraints, Challenges, Needs	Opportunities, Planned Improvements
						Active Transportation		
						Transit		
						Mobility Hubs		
						Flexible Fleets		
						Roadways		
						Freeways/Ramps/ Interchanges		
						Freight & Goods Movement		
						ITS & Next OS		
						Climate Change & Resilience		

² Includes representatives from SANDAG, Caltrans, MTS, and the City of San Diego.

³ Includes all representatives from the Project Development Team with the addition of the City of El Cajon, City of La Mesa, City of Santee, County of San Diego, Port of San Diego, San Diego Airport Authority, San Diego Gas & Electric, San Diego State University, and Tribal Representatives.

Documents Reviewed

Table 2.2 lists the 80 documents identified and reviewed, including the agency and year.

Table 2-2: Documents Reviewed

Documents Reviewed		
Document	Agency	Year
Adaption Priorities District 11	Caltrans	2020
Climate Change Vulnerability Assessments District 11	Caltrans	2019
I-8 Interchange at Via Las Cumbres Alternatives Feasibility Study Report	Caltrans	2017
Transportation Concept Report Interstate 8	Caltrans	2016
El Cajon Active Transportation Plan	City of El Cajon	2022
El Cajon General Plan	City of El Cajon	1991
La Mesa Bicycle Facilities and Alternative Transportation Plan	City of La Mesa	2012
La Mesa General Plan	City of La Mesa	2012
Lemon Grove Bikeway Master Plan Update	City of Lemon Grove	2006
Lemon Grove General Plan	City of Lemon Grove	1996
Transportation Unfunded Needs List (TUNL)	City of San Diego	on-going
Alvarado Canyon Road Realignment Project Study Report	City of San Diego	2021
Balboa Avenue Station Area Specific Plan	City of San Diego	2021
Clairemont Community Plan DRAFT	City of San Diego	2021
Climate Change Vulnerability Assessment	City of San Diego	2020
Kearny Mesa Community Plan	City of San Diego	2020
Riverwalk Specific Plan	City of San Diego	2020
University Avenue Mobility Project (UAMP)	City of San Diego	2020
Vision Zero Strategy 2020	City of San Diego	2020
Mission Valley Community Plan	City of San Diego	2019
Morena Corridor Specific Plan	City of San Diego	2019
Sea Level Rise Vulnerability Assessment	City of San Diego	2019
State Lands Sea Level Rise Vulnerability Assessment	City of San Diego	2019
Midway-Pacific Highway Community Plan	City of San Diego	2018
Old Town Community Plan	City of San Diego	2018
Linda Vista Comprehensive Active Transportation Strategy (CATS)	City of San Diego	2016
North Park Community Plan	City of San Diego	2016
Uptown Community Plan	City of San Diego	2016
El Cajon Blvd Complete Boulevard Planning Study	City of San Diego	2015
San Diego General Plan	City of San Diego	2015
Ocean Beach Community Plan	City of San Diego	2015

Pedestrian Master Plan - Core Urban Communities - Volume 2a	City of San Diego	2015
Bicycle Master Plan	City of San Diego	2013
SR-15 Mid-City Station Area Planning Study Mobility Analysis Final Report	City of San Diego	2013
Hillcrest Corridor Mobility Plan	City of San Diego	2009
Pedestrian Master Plan - Phase 4 Communities	City of San Diego	2009
Pedestrian Master Plan - Volume 1	City of San Diego	2006
Linda Vista Community Plan	City of San Diego	1999
Mid-Cities Community Plan	City of San Diego	1998
Mission Bay Park Plan	City of San Diego	1994
Clairemont Community Plan	City of San Diego	1989
College Area Community Plan	City of San Diego	1989
Navajo Community Plan	City of San Diego	1987
Peninsula Community Plan	City of San Diego	1987
Tierrasanta Community Plan	City of San Diego	1982
Serra Mesa Community Plan	City of San Diego	1977
Mission Beach Community Plan	City of San Diego	1974
Active Santee Plan	City of Santee	2021
Santee Mobility Element	City of Santee	2016
Active Transportation Plan	County of San Diego	2018
General Plan - Mobility Element	County of San Diego	2018
Multi-jurisdictional Hazard Mitigation Plan – City of El Cajon	County of San Diego	2018
Multi-jurisdictional Hazard Mitigation Plan – County of San Diego	County of San Diego	2018
Multi-jurisdictional Hazard Mitigation Plan – City of Santee	County of San Diego	2018
Multi-jurisdictional Hazard Mitigation Plan – City of San Diego	County of San Diego	2018
Multi-jurisdictional Hazard Mitigation Plan – City of La Mesa	County of San Diego	2018
Community Trails Master Plan	County of San Diego	2005
Elevate SD 2020	MTS	2019
Mission Valley West Environmental Impact Report - SDSU	San Diego State University	2020
2021 Regional Transportation Plan	SANDAG	2022
Military Installation Resilience Transportation Corridor Report	SANDAG	2021
Emerging Technologies	SANDAG	2018
Final Purple Line Conceptual Planning Study	SANDAG	2017
Mid-Coast Mobility Hub Implementation Strategy - Outreach Memo	SANDAG	2017
Regional Mobility Hub Implementation Strategy - City Heights Transit Plaza	SANDAG	2017
Regional Mobility Hub Implementation Strategy - Clairemont Drive Station	SANDAG	2017
Regional Mobility Hub Implementation Strategy - Equity Considerations	SANDAG	2017
Regional Mobility Hub Implementation Strategy - Grossmont Transit Center	SANDAG	2017
Regional Mobility Hub Implementation Strategy - Implementation Memo	SANDAG	2017
Regional Mobility Hub Implementation Strategy - Mobility Hub Features Catalog	SANDAG	2017
Regional Mobility Hub Implementation Strategy - Tecolote Road Station	SANDAG	2017

Freight Gateway Study Update	SANDAG	2016
Early Action Program	SANDAG	2013
Riding to 2050 Regional Bike Plan	SANDAG	2013
San Diego and Imperial Valley (Freight) Gateway Study	SANDAG	2010
Preliminary Draft Report Interstate 8 Corridor Study	SANDAG, Caltrans	2016
Comprehensive Multi-Species Connectivity Assessment and Planning for the Hwy 67 Region	SANDAG, San Diego State University	2017
UCSD Hillcrest Long Range Development Plan and EIR	University of California, San Diego	2019
NAVWAR Revitalization EIS	US Dept of the Navy	2021

Summary of Findings

The following summary of findings is organized into subsections dedicated to active transportation; transit, mobility hubs, and flexible fleets; freeways, freight and goods movement, roadways, and ITS & Next OS; and climate change and resilience. An additional section touches on policies and programs related to transportation demand management (TDM), parking management, curb management, autonomous vehicles, and electric vehicle charging.

It is important to note that transportation functions as an interconnected system. The opportunities and challenges discussed for one are likely not exclusive and have general relevance to other modes/topics. Consistent with the 5 Big Moves vision set forth in SANDAG's 2021 Regional Plan, the Kumeyaay Corridor strategy development will consist of a system approach that leverages these interrelationships and seeks to enhance options for multimodal trips.

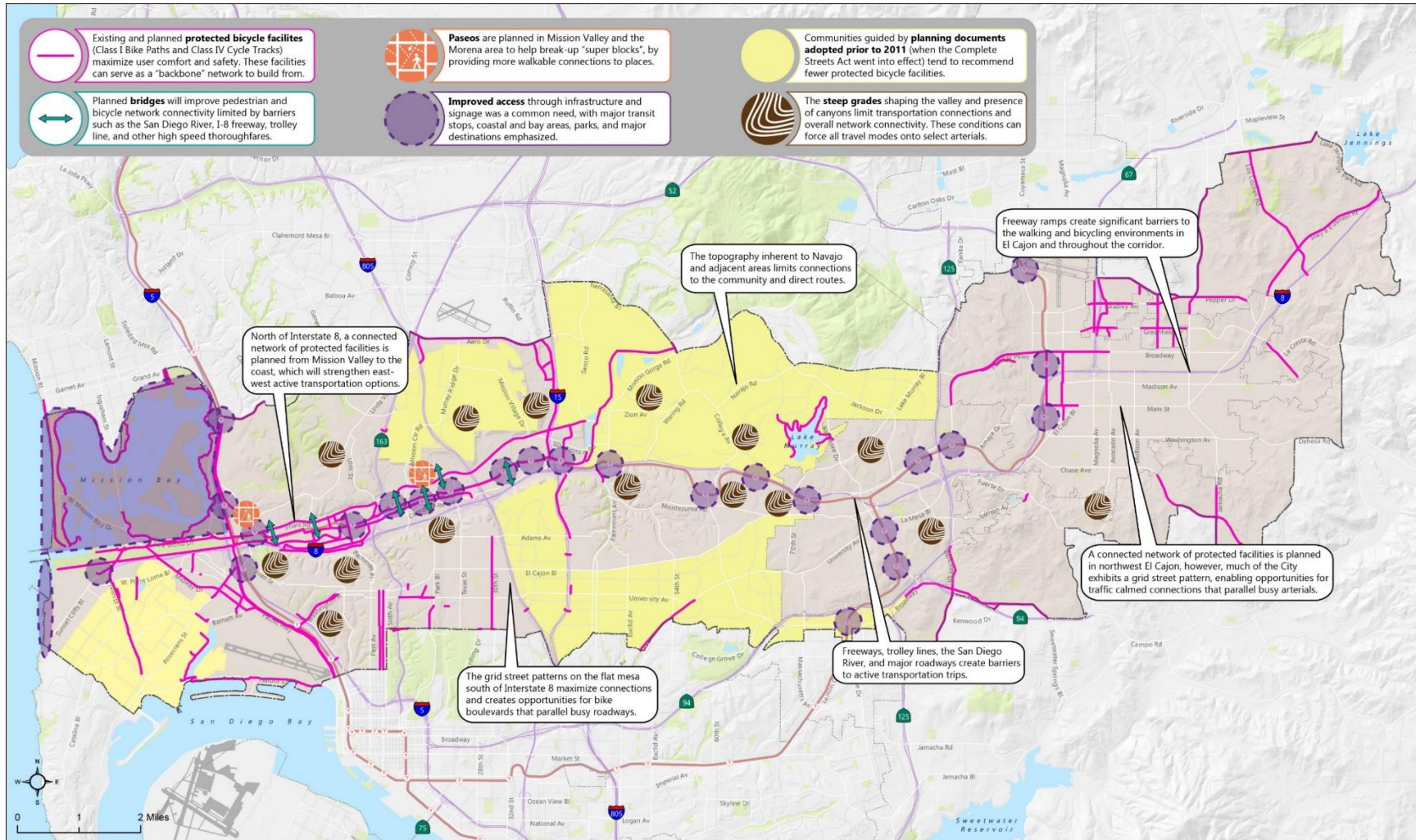
Active Transportation

Existing documents related to active transportation come in the form of active transportation plans, bicycle master plans, pedestrian master plans, general plan and community plan mobility elements, specific plans, and corridor studies. Newer planning documents tend to have a greater focus on pedestrian and bicycle facilities in response to Assembly Bill 1358, the Complete Streets Act which went into effect in 2011. Further, the Class IV separated bikeway or cycle track was not a formal classification until approval of the Separated Bikeways Act (AB 1193) in 2013. These bills set the stage for more ambitious pedestrian and bicycle infrastructure plans.

Examples of areas lacking newer active transportation plans or mobility elements include the City of Lemon Grove and City of San Diego communities of Mission Beach, Serra Mesa, Tierrasanta, Navajo, Peninsula, Normal Heights, City Heights, and Eastern Area. The City of San Diego adopted a citywide Bicycle Master Plan in 2013 which does include recommendations within the previously mentioned communities, however, this was performed at a citywide level as opposed to a community-focused effort. These areas may warrant supplemental focuses during the recommendation development phase.

Figure 3.1 summarizes the key active transportation issues and opportunities identified through the literature review.

Figure 3-1: Active Transportation Opportunities & Constraints



Source: CR Associates, 2022

The corridor exhibits both natural and constructed impediments to pedestrian and bicycle travel. The east-west running linear valley is formed by steep grades to the north and south, making active transportation trips physically challenging and the expansion of transportation infrastructure difficult. Additional barriers to active transportation trips are presented by the Green Line Trolley corridor, high volume arterials, San Diego River, and large block sizes and developments. Freeways and on-/off-ramps, including Interstate 8, were commonly identified as major obstacles and locations where improvements are needed.⁴

The need for access improvements to transit stations was a commonly noted deficiency and recognized as an area to focus improvements.⁵ In addition to improved walkways and bicycle facilities, pedestrian- and bicycle-oriented wayfinding signage and bicycle parking – including racks, corrals, and lockers – were recommended to improve access and facilitate transit trips.⁶

In addition to major transit stations, destinations in need of access improvements include the coast, Mission Bay, Pechanga Arena, Old Town, San Diego River Trail (ex., Camino Del Este, Qualcomm Way), Robb Field, and Balboa Park.⁷

Additional pedestrian improvements are recommended in the form of completing gaps in the sidewalk network, curb ramps, lighting, shade, seating, and intersection crossing enhancements such as high visibility crosswalks, advance stop bars, curb extensions, pedestrian countdown signal heads, lead pedestrian intervals, and protected left-turns.⁸

New pedestrian/bicycle bridges and roadways are planned throughout Mission Valley to circumvent barriers and improve access to transit stations and major destinations. These locations include Riverwalk Street “J”, Fenton Parkway, Hazard Center Trolley Station, Friars Road/Frazee Road intersection, Mission Valley Center Trolley Station, Friars Road west of Qualcomm Way, along I-15 to the Stadium Trolley Station, and from the YMCA to Sefton Field. Pedestrian walkways or paseos are identified as solutions to the impediments created by large blocks and private developments.⁹

When planning for bicycle improvements, a recognition must be made that bicyclists can and will use all city streets, necessitating a system that is continuous, safe, and serves major destinations and local activity centers. Bicycle facilities should be context appropriate with considerations for all ages and abilities.¹⁰ An emphasis was placed on providing separated facilities where feasible, especially along high-speed high-volume roadways, to maximize user comfort and safety, while also recognizing the associated implementation challenges.¹¹

⁴ Preliminary Draft Report Interstate 8 Corridor Study (2016); Mission Valley Community Plan (2019); Midway – Pacific Highway Community Plan (2018); Serra Mesa Community Plan (1977); Uptown Community Plan (2019); La Mesa General Plan (2012); El Cajon Active Transportation Plan (2022); Morena Corridor Specific Plan (2019)

⁵ Preliminary Draft Report Interstate 8 Corridor Study (2016); Mission Valley Community Plan (2019); 2021 Regional Plan (2021)

⁶ Preliminary Draft Report Interstate 8 Corridor Study (2016); Ocean Beach and Local Coastal Program (2015); North Park Community Plan (2016); Morena Corridor Specific Plan (2019); La Mesa Active Transportation Plan (2012)

⁷ Peninsula Community Plan and Local Coastal Program Land Use Plan (1987); Old Town Community Plan (2018); Midway – Pacific Highway Community Plan (2018); Preliminary Draft Report Interstate 8 Corridor Study (2016); North Park Community Plan (2016)

⁸ City of San Diego General Plan (2015); North Park Community Plan (2016); City of San Diego Pedestrian Master Plan (2015); City of San Diego Vision Zero Strategic Plan 2020 – 2025 (2020)

⁹ Mission Valley Community Plan (2019); Morena Corridor Specific Plan (2019)

¹⁰ City of San Diego Bicycle Master Plan (2013); La Mesa Active Transportation Plan (2012); 2021 Regional Plan (2021)

¹¹ Serra Mesa Community Plan (1977); SR-15 Mid-City Station Area Planning Study Mobility Analysis (2013); La Mesa Active Transportation Plan (2012)

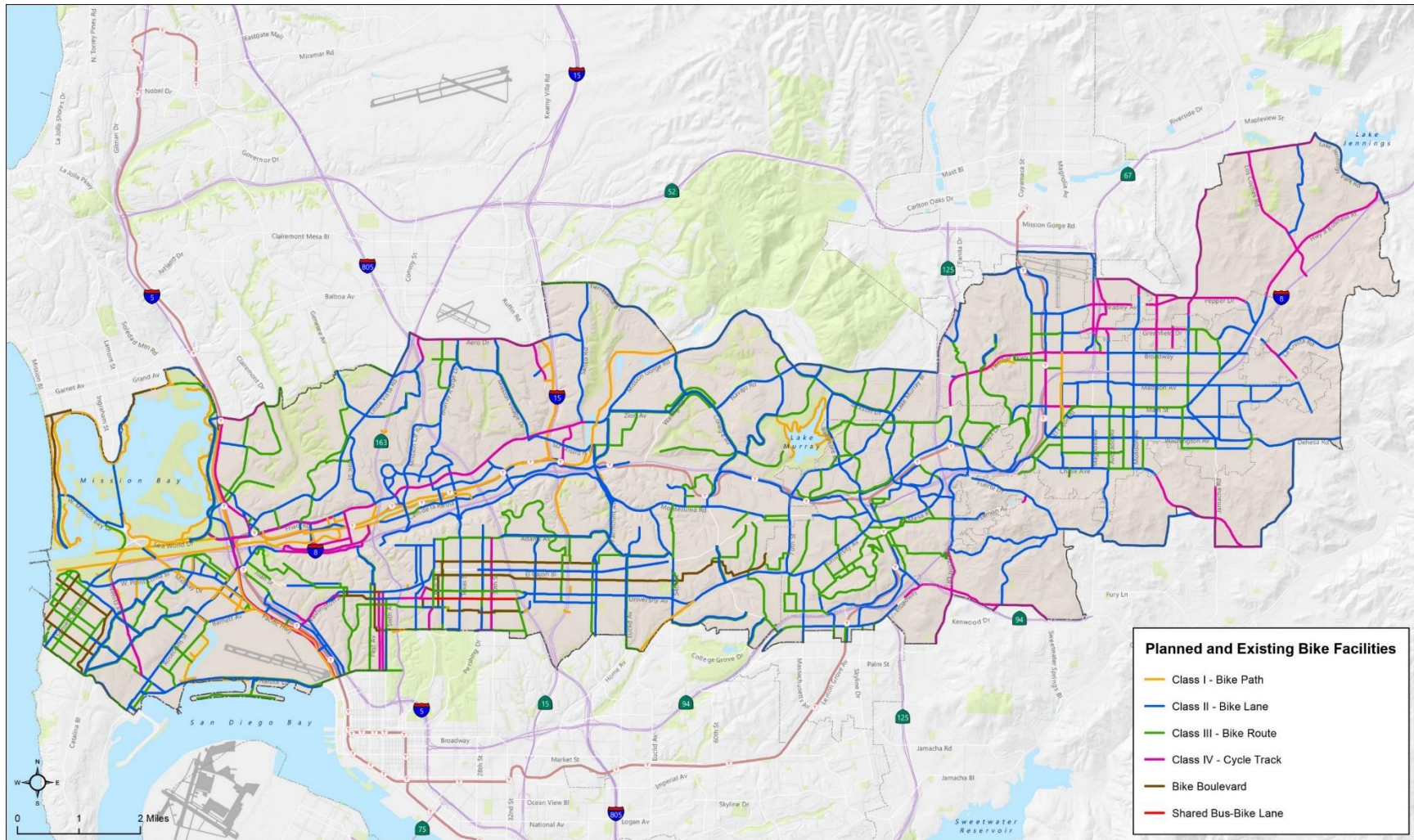
The culmination of existing and planned bicycle facilities within the Kumeyaay Corridor study area are depicted in Figure 3.2.¹² The Class I San Diego River Trail and Class IV along Friars Road help establish strong east-west connectivity north of Interstate 8, west of the Navajo community (Mission Gorge Road). South of Interstate 8 and west of the City of La Mesa, protected bicycle facilities (Class I Bike Paths and Class IV Separated Bikeways) will run east-west along Midway Drive, Pacific Highway, Washington Street, Hotel Circle South, Montezuma Road, and El Cajon Boulevard in the College Area. Bike Boulevards are intended to provide comfortable environments through traffic calming on Meade Avenue, Orange Avenue, and Landis Street through North Park and Mid-Cities as an alternative to the constrained major arterials.

Separated north-south running connections will be provided via Sunset Cliffs Boulevard and Mission Bay Drive across the San Diego River, Nimitz Boulevard, the Coastal Rail Trail near Interstate 5, 4th Avenue, 5th Avenue, 30th Street, and Interstate 15/State Route 15 Bikeway. Additional north-south facilities across the valley and connecting to adjacent communities are further hindered by the topography, the presence of Interstate 8, the San Diego River, and Green Line Trolley. Planned Class I and IV facilities along Fletcher Parkway, Marshall Avenue, Johnson Avenue, and Main Street will establish a small, connected network of protected facilities in El Cajon, with reduced posted speed limits planned to improve comfort and safety along remaining arterials throughout the City. Existing and planned protected bicycle facilities are lacking in the communities guided by older planning documents.

Many major destinations and transit stations are planned to be served by separated facilities (Class I Bike Paths or Class IV Cycle Tracks), such as the San Diego Sports Arena, Mission Bay, Old Town Transit Center, Mission Valley Mall, Fashion Valley Mall, San Diego State University, San Diego State West, and El Cajon Transit Center. Planned facilities within Mission Valley also help address the lack of San Diego River crossings. The planned facilities from the reviewed documents will serve as a base to build from and ensure a well-connected, safe, and comfortable network is provided.

¹² Includes recommendations from the draft College Area and Clairemont Mesa Community Plan Updates.

Figure 3-2: Existing and Planned Bicycle Facilities



Source: SANDAG, City of San Diego, City of La Mesa, City of El Cajon, City of Santee, City of Lemon Grove, County of San Diego, 2022

Transit, Mobility Hubs, Flexible Fleets

Many of the documents reviewed for the Kumeyaay Corridor identify new or improved transit service as an opportunity to reduce congestion, support sustainability goals, and give people more convenient and reliable travel options. For decades the focus has been on making the most of existing systems and reducing reliance on the car, while emphasis in recent years has been on multimodal transportation options and supporting first/last mile connections.¹³

Figure 3.3 illustrates key opportunities and constraints related to transit and mobility hubs.

Transit expansion is planned throughout the Kumeyaay Corridor. For example, existing MTS routes like Line 10, 11, 120, and 35 are targeted for potential upgrade to Rapid service with increased frequencies and (potentially) reduced numbers of stops.¹⁴ Other documents are considering improving existing routes by increasing operation to 24/7 service and/or adding stops.¹⁵ Other transit opportunities include major infrastructure proposals, such as the proposed Purple Line.¹⁶ This project in particular would provide new high-capacity north-south service that would directly connect to the strong east-west service of the Green Line, supporting regional connectivity.

A challenge for transit in the corridor is the steep topography of Mission Valley and a lack of transit-supportive land-uses and street configurations.¹⁷ Where existing transit routes do not currently travel, Mobility as a Service (MaaS) is often identified as a way to address travel needs.

By integrating multiple travel options through smartphone apps, public-private partnerships, and unified fare payment systems, MaaS reduces friction between modes and allows flexibility in one's travel.¹⁸ Because most of the area along the I-8 corridor has already been identified as a mobility hub, it is a natural fit as an area of focus for deployment of MaaS coordinated with planned rollouts of mobility hubs.¹⁹ For example, the Tecolote Road and Clairemont Drive Stations were identified in San Diego Forward as strong candidates for mobility hub treatments and have already received more specific recommendations and conceptual plans for implementation.²⁰

¹³ Peninsula Community Plan, 1987; Mission Bay Park Plan, 1994; Regional Mobility Hub Implementation Strategy- Mobility Hub Features Catalog, 2017; Kearny Mesa Community Plan, 2020.

¹⁴ MTS Transit Ballot Measure Planning (2019); North Park Community Plan, 2016; Uptown Community Plan, 2016.

¹⁵ Navajo Community Plan, 1987; 2021 Regional Plan (2021).

¹⁶ Final Purple Line Conceptual Planning Study, 2017.

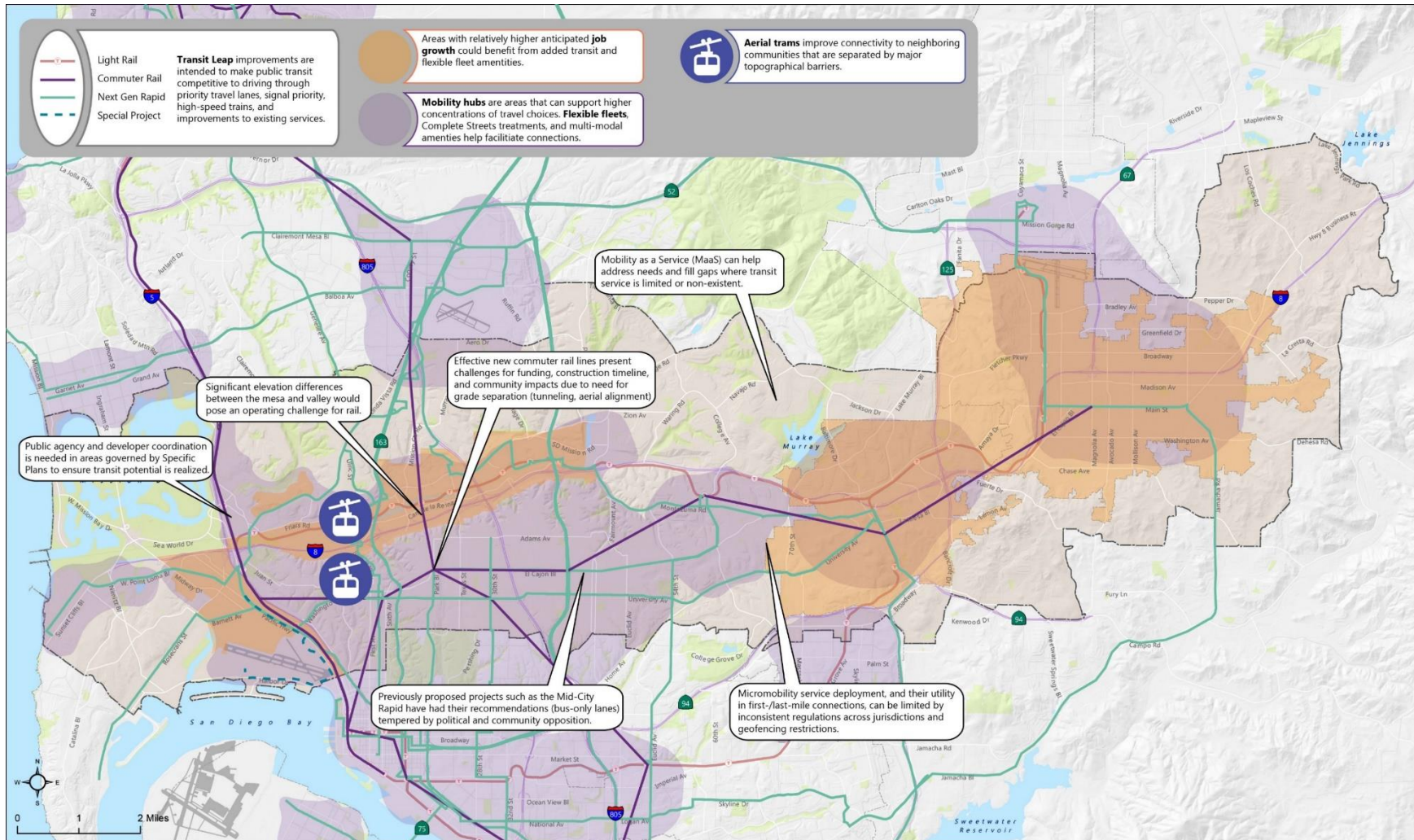
¹⁷ Mission Valley Community Plan, 2019; Balboa Avenue Station Area Specific Plan, 2021; Morena Corridor Specific Plan, 2019.

¹⁸ Emerging Technologies, 2018.

¹⁹ Regional Mobility Hub Implementation Strategy – Grossmont Transit Center, 2017; Regional Mobility Hub Implementation Strategy –City Heights Transit Plaza, 2017.

²⁰ Regional Mobility Hub Implementation Strategy – Clairemont Drive Station, 2017; Regional Mobility Hub Implementation Strategy – Tecolote Road Station, 2017.

Figure 3-3: Transit, Mobility Hubs, & Flexible Fleets Opportunities & Constraints



Source: SANDAG, 2021; CR Associates, 2022

These opportunities are further underscored by integrated transit and land use planning. New and planned developments along the corridor are expected to rely on transit and mobility hubs to create a sense of place and connect people to the greater region. Transit-oriented development is used as a leading design principle in the planned Riverwalk Project and SDSU campus expansion.²¹ There are also several areas of forecasted job development/growth that could benefit from added transit/flex fleet amenities such as the Midway District, University of San Diego, Mission Valley East, San Diego State University, the City of La Mesa, and the City of El Cajon.²² Utilizing transportation demand management (TDM) strategies to incentivize and share alternative mobility options, as seen in SDSU's TDM program, is an opportunity worth exploring in these economic hubs.²³

Given high vehicle ownership rates along the corridor and existing high numbers of single occupancy vehicle trips, transit needs to be time-competitive with personal vehicles to encourage mode shift.²⁴ Previously proposed projects such as the Mid-City Rapid have had their recommendations (such as bus-only lanes) tempered by political and community opposition.²⁵ Public agencies will need to expand their efforts to coordinate with each other, with communities, and with key stakeholders to ensure that people understand the tradeoffs and legal constraints inherent in projects and to find solutions that support fast, frequent, and reliable transit. In addition to service parameters, robust transit amenities are needed including shade structures, benches, Wi-Fi, bicycle infrastructure, and real-time arrival and departure data.²⁶ Agencies may also do well to identify pilot projects that can help demonstrate the value of improvements in the near-term while more advanced projects (such as expanded Trolley service) are still decades away. For instance, various Intelligent Transportation Solutions (ITS) like transit signal priority and dynamic transit lanes can improve the service of transit more readily than large capacity improvements.²⁷

In order to support flexible fleets—whether through shared micromobility, Personal Mobility on Demand, or personally-owned travel devices—coordinated urban design improvements will also be needed. Identified needs include wider sidewalks to support scooter-share and walkability, electric vehicle charging stations to support carshare, flexible curb space to support drop-off and pick-up of both people and goods.²⁸ A history of delayed action on infrastructure developments and regulatory challenges has pushed leading companies like Car2Go out of San Diego entirely.²⁹ The same in-depth engagement exercises needed for improved transit service and understanding the tradeoffs involved in reallocating space between uses will also be necessary to support first/last mile connectivity. Public agencies will need to do extensive coordination with private developers in Specific Plan areas (e.g. Morena Corridor, Balboa Avenue) and Mobility Hub areas to ensure that projects maximize potential of transit investments.³⁰ The patchwork of regulations on micromobility devices between jurisdictions may also need to be addressed, as these travel options can help overcome the challenging topography of the area and support near-term travel improvements.

²¹ Riverwalk Project, 2020; Mission Valley West Environmental Impact Report – SDSU, 2020.

²² Mission Valley West Environmental Impact Report – SDSU, 2020; La Mesa General Plan, 2012; Mission Valley Community Plan, 2019; Mid-Way/Pacific Highway Community Plan, 2019.

²³ Mission Valley West Environmental Impact Report – SDSU, 2020; Preliminary Draft Report Interstate 8 Corridor Study, 2016.

²⁴ Regional Mobility Hub Implementation Strategy – Grossmont Transit Center, 2017.

²⁵ Pedestrian Master Plan – Core Urban Communities – Volume 2a, 2015.

²⁶ Regional Mobility Hubs Implementation Strategy – Mobility Hub Features Catalog, 2017.

²⁷ Emerging Technologies, 2018; Preliminary Draft Report Interstate 8 Corridor Study, 2016.

²⁸ Regional Mobility Hubs Implementation Strategy – Mobility Hub Features Catalog, 2017.

²⁹ Emerging Technologies, 2018; San Diego Tribune, Car2go ceases San Diego operations, 2016.

³⁰ Morena Corridor Specific Plan, 2019; Balboa Avenue Station Area Specific Plan, 2021.

Freeways, Freight & Goods Movement, Roadways, ITS & NextOS

Freeways

Existing documents related to freeways, ramps, and interchanges come in the form of general plans, community plans, transportation plans, corridor studies, Environmental Impact Reports, and Feasibility Study Reports. Figure 3.4 summarizes the key freeways, ramps, and interchanges issues and opportunities identified through the literature review. The figure also touches on freight topics, further discussed in the following section.

Current traffic volumes along the corridor result in constrained traffic flows, associated travel delays, and congestion along the freeway. Several freeway segments, merge and diverge segments, weave segments, and on- and off-ramps were identified as operating at LOS “E” or “F”. Locations where capacity is reduced due to lane drops, termination of auxiliary lanes, and deficient spacing between entry and exit ramps were found to be a particular problem. With the region’s population rapidly increasing along the corridor, a solution is needed to improve traffic flow and reduce congestion on I 8.³¹

Ideal mitigation of the constrained traffic flows and congestion along the freeway would involve the widening of the freeway facility itself. However, there are several constraints that impede the ability to do so. Widening mainline freeway segments is challenging for the I-8 due to adjacent land uses and numerous topographic features that limit opportunities to widen or expand the footprint of the freeway, along with other requirements including the modification of interchanges and maintenance of adjacent building structures and roadways. Therefore, infrastructure investments to alleviate bottlenecks are identified as a main strategy for improving the corridor’s transportation system.³²

Major improvements identified to alleviate traffic congestion along the corridor are managed lanes. New managed lanes and managed lane connectors are planned to offer priority access along I-8 to people using transit, carpooling, or vanpooling along with emergency vehicles and low-emission vehicles.

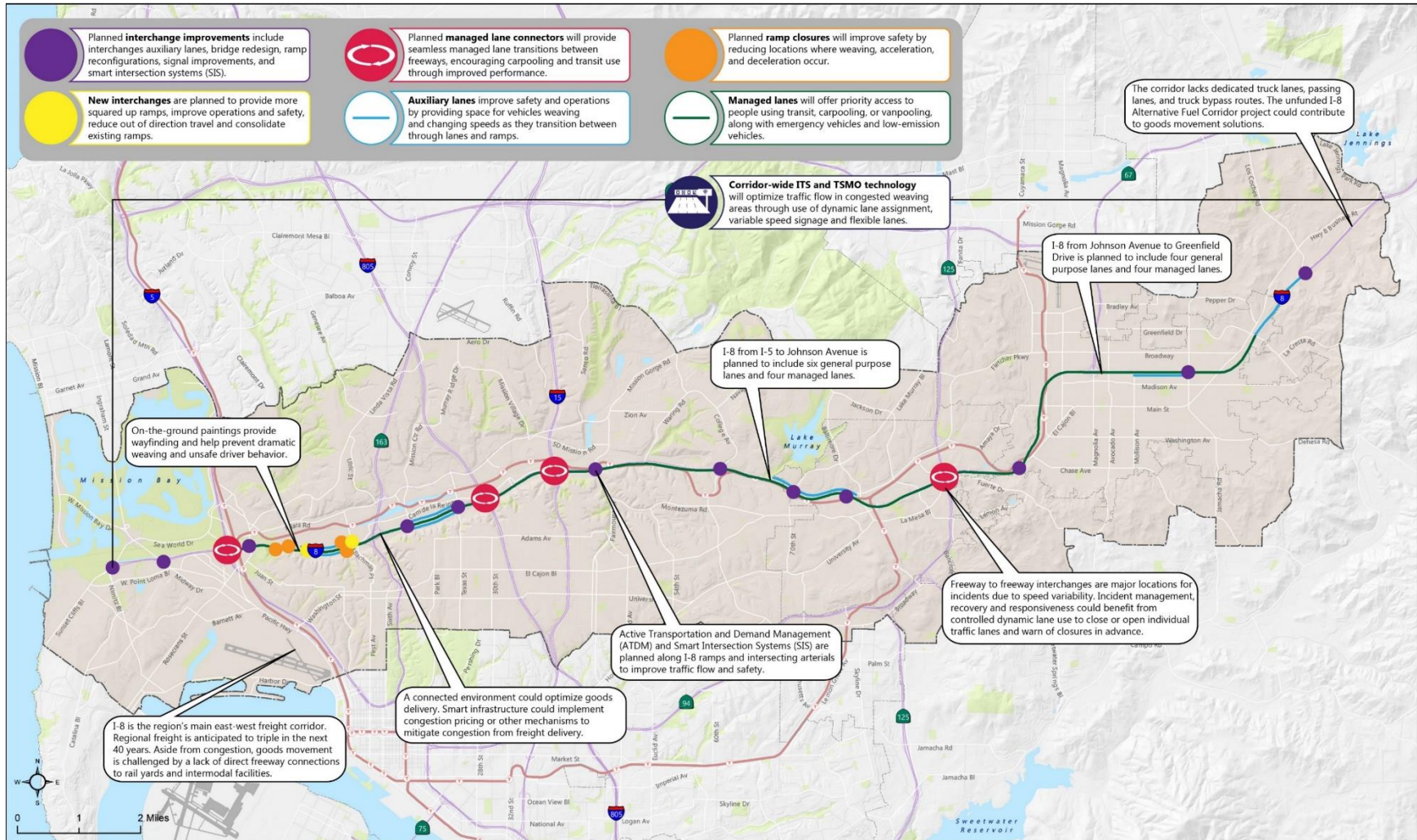
The existing highway infrastructure is maximized by repurposing shoulders or existing travel lanes to create managed lanes where shoulders, high-occupancy vehicle travel lanes, or general-purpose travel lanes exist today. Proposed improvements include the I-8 Managed Lanes/Goods Movement project from I-805 to Greenfield Drive (2035), the I-8 Managed Lanes/Goods Movement project from I-5 to I-805 (2050), the I-8 to I-805 Managed Lane Connector projects (2035 and 2050), and the I-8 to SR-125 Managed Lane Connector projects (2035).³³

³¹ Preliminary Draft Report Interstate 8 Corridor Study (2016).

³² Freight Gateway Study Update (2016); Mission Valley West Environmental Impact Report – SDSU (2020).

³³ 2021 Regional Transportation Plan DRAFT (2021).

Figure 3.4 - Freeways & Freight Opportunities & Constraints



Source: CR Associates, 2022

Reducing freeway and local street congestion through freeway access improvements is the most-commonly identified need for the corridor.³⁴ Along with the proposed addition of the I-8 to I-5 connectors (2050), planned interchange improvements include addition of auxiliary lanes between interchanges, new interchange construction, interchange removal, reconfiguration of freeway on- and off-ramps, bridge redesign, signal improvements, and implementation of smart intersection systems (SIS). Intersections where these improvements have been planned include Mission Bay Drive, Taylor Street, Via Las Cumbres, Mission Center Road, Texas Street, Fashion Valley Road, College Avenue, Mission Gorge Road, Fairmount Avenue, Chase Avenue, 70th Street, Greenfield Drive, Fletcher Parkway, Lake Murray Boulevard, 2nd Street, and Los Coches Road.³⁵

In an effort to identify and assess available alternatives and mitigation of impacted segments and interchanges of I-8, project study reports (PSR) have been identified as a need for several planned improvements to the corridor. Most notably, PSRs have been recommended for the I-8 to I-5 connector project, the new interchange at Via Las Cumbres, and the construction of San Diego State University's Mission Valley campus.³⁶

Other miscellaneous planned improvements have been identified to combat various challenges such as rising temperatures due to climate change and a reduced amount of safety due to outdated design standards. These improvements include pavement rehabilitation, rural interchange upgrades, guardrail upgrades, slab replacement, and bridge preservation efforts.³⁷

Freight & Goods Movement

Existing documents related to freight and goods movement come in the form of community plans, transportation plans, corridor studies, and gateway studies. The documents' identified challenges and opportunities are summarized below.

I-8 is the main freight east-west corridor for San Diego and the region. Trucks will continue to be the dominant mode of freight and goods movement, carrying over 96 percent of total freight volume. Current traffic volumes result in constrained traffic flows, associated delays, and congestion along the freeway that affects commercial vehicles as well as passenger vehicles. Over the coming four decades, three times the amount of current freight will channel into the region, and inefficiency in the movement of freight threatens the rate of growth in economic productivity.³⁸

³⁴ Old Town Community Plan (2018); Preliminary Draft Report Interstate 8 Corridor Study (2016); Mission Valley Community Plan Update (2019); Mission Bay Park Plan (1994); Midway-Pacific Highway Community Plan (2018); I-8 Interchange at Via Las Cumbres Interchange Alternatives Feasibility Study Report (2017)

³⁵ Old Town Community Plan (2018); Preliminary Draft Report Interstate 8 Corridor Study (2016); Mission Valley West Environmental Impact Report – SDSU (2020); Mission Valley Community Plan Update (2019); College Area Community Plan (2019); 2021 Regional Transportation Plan (2021); I-8 Interchange at Via Las Cumbres Interchange Alternatives Feasibility Study Report (2017); Transportation Concept Report Interstate 8 (2016)

³⁶ Mission Valley West Environmental Impact Report – SDSU (2020); Mission Bay Park Plan (1994); I-8 Interchange at Via Las Cumbres Interchange Alternatives Feasibility Study Report (2017)

³⁷ Climate Change Vulnerability Assessments District 11 (2019); Military Installation Resilience Transportation Corridor Report (2021); Transportation Concept Report Interstate 8 (2016); 2021 Regional Plan (2021)

³⁸ Preliminary Draft Report Interstate 8 Corridor Study (2016); Emerging Technologies (2018); San Diego and Imperial Valley (Freight) Gateway Study (2010)

To address the challenges associated with the projected number of trucks on the region's roadways, additional freight capacity is needed for I-8. However, there are several constraints that impede the ability to do so. Funding solutions for freight projects often involve private interests, and therefore complex funding partnerships must be invented or crafted. In addition, facilitating the demand for freight transportation can bring high project costs accompanied by environmental and other social costs that pose community issues that must be managed. There is also competition from non-freight projects for public funds, and limited community support in the freight planning process.³⁹

The highway system carries the vast majority of freight flows, but the system is strained at key bottlenecks. Deficiencies identified to cause freight bottlenecks along the Kumeyaay Corridor include a lack of the following: direct freeway connections to rail yards, connections to intermodal facilities, dedicated truck lanes, dedicated passing lanes, and truck bypass routes across the region.⁴⁰ No improvements were stated with regard to these deficiencies; however, some potential opportunities were identified with relation to emerging technologies.

A connected and autonomous environment was identified as being able to optimize delivery of goods and services. In this environment, smart infrastructure was noted to be able to implement congestion pricing or other pricing mechanisms that will be crucial to mitigating congestion from additional freight delivery. SANDAG states that there is a continued need for prioritization of smart infrastructure to achieve congestion and safety goals.⁴¹ Additionally, the I-8 Alternative Fuel Corridor project (corridor from San Diego to Imperial County border) has not yet been funded; however, it is identified as a potential future goods movement project by SANDAG.⁴²

Roadways

Roadway opportunities identified throughout the Kumeyaay Corridor come in the form of planned road diets and new connections. Wide roadways (4-lanes or more) can be barriers to alternative transportation modes but may also offer opportunities to repurpose space for more sustainable transportation modes or desired community features. Conversely, road widenings are also planned in some locations to accommodate anticipated increases in vehicular traffic. Figure 3.5 illustrates the locations of planned road diets, road widening, new roadways, and two-way to one-way roadway conversions, along with areas in the valley prone to flooding.

Roadways are increasingly viewed as public assets that are spaces for people as opposed to conveyers of vehicles. Communities throughout the corridor are seeking to repurpose the public right of way for pedestrian, bicycle, and transit improvements, and even park space, especially where excessive capacity exists.⁴³ Documents acknowledge new strategies are needed to replace the trend of planning for single occupant vehicles, which is characterized as degrading the environment and biased against those without vehicle access, including low-income, aging, youth, and mobility challenged populations.⁴⁴

³⁹ San Diego and Imperial Valley (Freight) Gateway Study (2010); Freight Gateway Study Update (2016)

⁴⁰ San Diego and Imperial Valley (Freight) Gateway Study (2010)

⁴¹ 2021 Regional Plan (2021); Emerging Technologies (2018)

⁴² 2021 Regional Transportation Plan DRAFT (2021)

⁴³ Old Town Community Plan (2018); Mid-Cities Community Plan (1998); Ocean Beach Community Plan (2015); North Park Community Plan (2016); Uptown Community Plan (2016); Clairemont Community Plan DRAFT (2021); La Mesa General Plan (2012); City of San Diego General Plan (2015); El Cajon Blvd Complete Boulevard Planning Study (2015); Hillcrest Corridor Mobility Plan (2009); University Avenue Mobility Project (UAMP) (2020)

⁴⁴ Navajo Community Plan (1987); 2021 Regional Plan (2021)

There is limited potential for new roads and road widening in the Kumeyaay Corridor due to built out environments and topography challenges such as canyons.⁴⁵ The planned new roads are intended to fill gaps between two existing links to improve overall network connectivity (ex., Santo Road and Franklin Ridge Road) or support master planned developments (ex., Riverwalk and San Diego State University West developments).⁴⁶ New roadways, or non-vehicular connections such as paseos, are also encouraged as a means to break up superblocks that reduce multimodal connectivity.⁴⁷ Similarly, maintaining or further strengthening existing street grid patterns is encouraged to maximize connectivity and shorten trip distances for all travel modes.⁴⁸

Congestion was associated with roadways connecting to freeway ramps, as well as cut through traffic that utilizes community roadways to avoid congested freeways.⁴⁹ Operational improvements at intersections, such as enhanced signal coordination and new signalized intersections, and ITS solutions are frequently favored over widening streets to accommodate traffic increases.⁵⁰ However, roadway widening is still recommended in select locations, generally to match adjacent cross-sections and alleviate bottlenecks caused by a sudden drop in through lanes.⁵¹

There is a need to improve multimodal safety at intersections all throughout the corridor, through traffic calming treatments, improved signal technology, and pedestrian enhancements.⁵² Additionally, documents recognized roundabouts as an opportunity to improve both intersection operations and multimodal safety while also contributing to reduced vehicular idling and greenhouse gas emissions.⁵³ Safety can also be improved by restricting new curb cuts or consolidation/removal of existing driveways.⁵⁴ Emergency vehicles must be accommodated in any design considerations to ensure response times are suitable.⁵⁵

Maintaining existing on-street parking or offsetting any losses nearby is a need in commercial corridors. Centralized parking structures or converting parallel parking to angled parking were identified as options that could be used when parking removal is necessitated to accommodate multimodal improvements.⁵⁶

⁴⁵ Old Town Community Plan (2018); Mission Valley Community Plan (2019); La Mesa General Plan (2012); UCSD Hillcrest Long Range Development Plan and EIR (2019)

⁴⁶ Mission Valley West Environmental Impact Report – SDSU (2020); Mission Valley Community Plan (2019); Riverwalk Specific Plan (2020)

⁴⁷ Morena Corridor Specific Plan (2019); Clairemont Community Plan DRAFT (2021); Mission Valley Community Plan (2019)

⁴⁸ Old Town Community Plan (2018); Mission Valley West Environmental Impact Report – SDSU (2020); Morena Corridor Specific Plan (2019); North Park Community Plan (2016); I-8 Interchange at Via Las Cumbres Interchange Alternatives Feasibility Study Report (2017)

⁴⁹ College Area Community Plan (1989); Linda Vista Community Plan (1999); Midway-Pacific Highway Community Plan (2018); NAVWAR Revitalization EIR (2021)

⁵⁰ Old Town Community Plan (2018); Ocean Beach Community Plan (2015); Serra Mesa Community Plan (1977); La Mesa General Plan (2012)

⁵¹ Mid-Cities Community Plan (1998); El Cajon General Plan (1991); Midway-Pacific Highway Community Plan (2018)

⁵² Ocean Beach Community Plan (2015); North Park Community Plan (2016); Uptown Community Plan (2016); Clairemont Community Plan DRAFT (2021); La Mesa General Plan (2012); City of San Diego General Plan (2015); Hillcrest Corridor Mobility Plan (2009); Balboa Avenue Station Area Specific Plan (2021); Morena Corridor Specific Plan (2019); NAVWAR Revitalization EIR (2021)

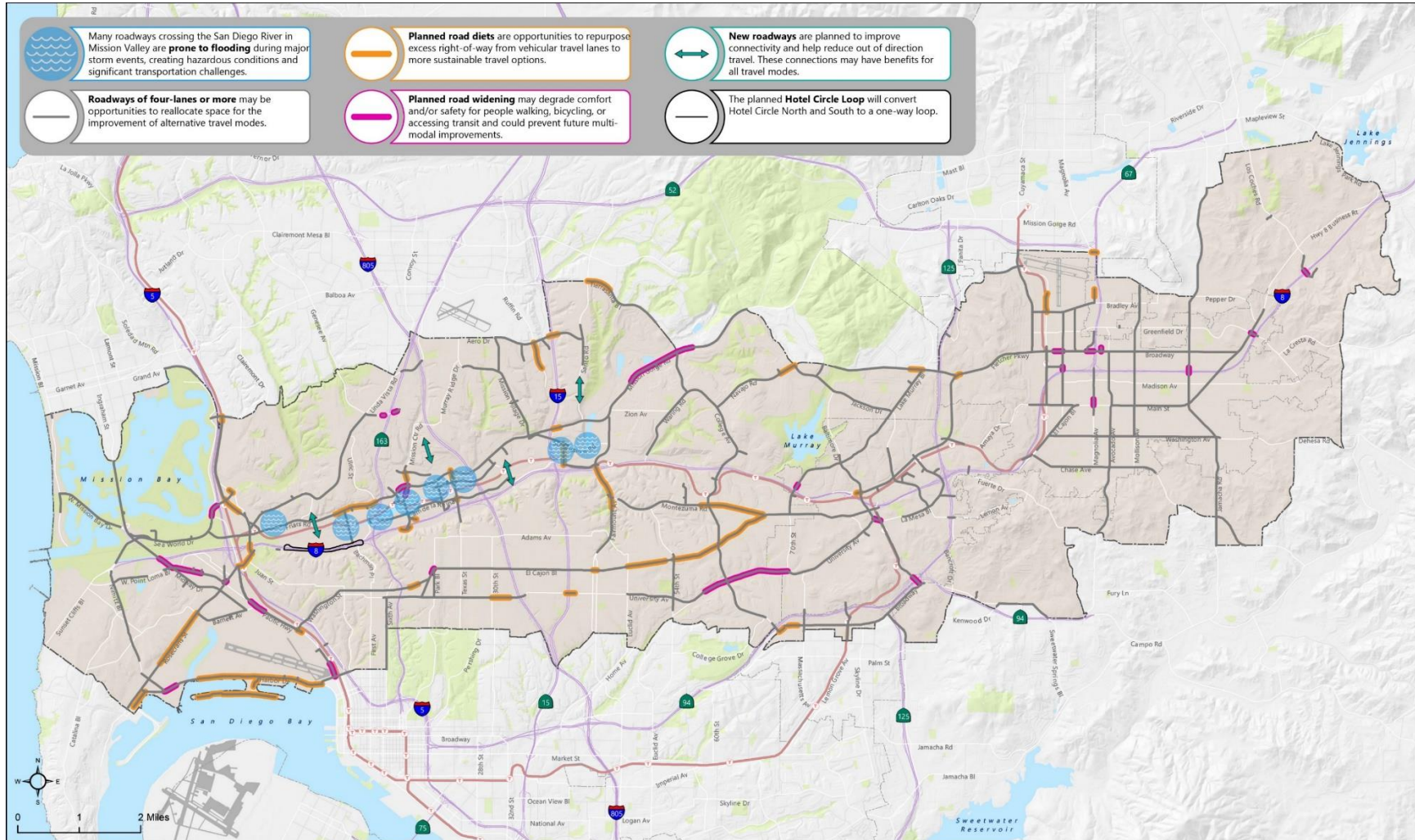
⁵³ Old Town Community Plan (2018); Midway-Pacific Highway Community Plan (2018); North Park Community Plan (2016); Clairemont Community Plan DRAFT (2021); Hillcrest Corridor Mobility Plan (2009)

⁵⁴ Uptown Community Plan (2016); Balboa Avenue Station Area Specific Plan (2021); Morena Corridor Specific Plan (2019)

⁵⁵ Multi-jurisdictional Hazard Mitigation Plan – All (2018); UCSD Hillcrest Long Range Development Plan and EIR (2019)

⁵⁶ Old Town Community Plan (2018); Morena Corridor Specific Plan (2019); Uptown Community Plan (2016); El Cajon Blvd Complete Boulevard Planning Study (2015)

Figure 3.5 - Roadway Opportunities & Constraints



Source: CR Associates, 2022

ITS & Next OS

Documents pertaining to ITS and Next OS consisted of corridor and regional plans, conceptual and feasibility studies, and community plans. Within the Kumeyaay Corridor, existing plans and documentation point to two concepts to inform improvements in transportation system design, connectivity, and innovation, namely Active Traffic Management (ATM) and Active Transportation Demand Management (ATDM). Both concepts relieve congestion and improve safety by using real-time, dynamic systems to distribute demand, speeds, and increase travel time reliability.

As a major east-west connection, I-8 intersects several north-south freeways and could benefit from ATM services. The corridor is susceptible to speed variability at the many interchanges, impacted by congestion and incidents within the corridor and throughout the region. ITS and Next OS strategies are needed to improve the regional coordination between I-8 and other freeways as well as major arterials that intersect the corridor. In particular, dynamic routing techniques that use variable destination messaging to make better use of roadway capacity and balance traffic between multiple routes is one ITS solution that can better regional coordination.⁵⁷ This can be especially useful for incident management, recovery, and responsiveness especially when used alongside dynamic lane use to close or open individual traffic lanes, dynamic signage to warn of closures in advance, and adaptive ramp metering to identify bottlenecks and optimize system-wide conditions. Technology investments like this can often be a better and more sustainable option than increasing roadway capacity projects.⁵⁸

Real-time traffic monitoring and congestion data is also needed, so travelers can adjust to current roadway conditions. I-8 is in a flood plain which can severely limit transportation during extreme flooding events.⁵⁹ Real-time data regarding weather and traffic conditions can deploy incident response techniques, including route management, lane management, and dynamic wayfinding to guide traffic during environmental emergencies. ATM strategies informed by speeds, congestion, and incidents have been proven to improve traffic flow and the connectivity of the freeway network. Regional consistency and collaboration are critical to the success of Next OS technologies, as improving the corridor and adjacent freeways cannot be done in isolation.⁶⁰

Concurrently, ATDM strategies should be utilized to encourage a transportation mode shift from single occupancy vehicles and/or small passenger vehicles to shared services and transit. There is an opportunity for dynamic messaging signs informed by changing roadway conditions to encourage transit ridership. Communities throughout the corridor are installing or considering implementing smart parking technology, such as dynamic parking reservation.⁶¹ This strategy allows travelers to reserve spots or see the number of available parking spots ahead of critical decision points.⁶² Travelers are more likely to use or switch to using transit if they know there is availability and space for their car. Examples of smart parking policies are seen in Kearny Mesa and North Park.⁶³

⁵⁷ Preliminary Draft Report Interstate 8 Corridor Study (2016)

⁵⁸ Emerging Technologies (2018)

⁵⁹ Preliminary Draft Report Interstate 8 Corridor Study (2016); La Mesa General Plan (2012); Climate Change Vulnerability Assessment (2020)

⁶⁰ Emerging Technologies (2018)

⁶¹ Regional Mobility Hubs Implementation Strategy – Mobility Hub Features Catalog (2017)

⁶² Preliminary Draft Report Interstate 8 Corridor Study (2016)

⁶³ Kearny Mesa Community Plan (2020); North Park Community Plan (2016)

ITS technologies that prioritize transit can further encourage a mode shift. Implementation of transit signal priority measures, smart intersections, and compatible bus infrastructure is planned in locations like Kearny Mesa, North Park, and the Uptown Community. This technology improvement is planned along major corridors like El Cajon Boulevard, Park Boulevard, 30th Street, Clairmont Avenue, Balboa Avenue, Aero Drive, Ruffin Road and within Mission Valley.⁶⁴ Dynamic Lane use control, which reserves lanes for transit, shuttles or HOV, can also increase the competitiveness of transit and shared mobility modes.

Navigating roadways or new transit systems can be a challenge for travelers. Static wayfinding messaging along I-8 has improved travel flow and predictability. Painted lanes that mark I-5, I-8, I-15 etc., ahead of exits prevent weaving thereby decreasing the likelihood of incidents. While static messaging is successful, dynamic wayfinding techniques can adjust to current conditions and coincide with dynamic routing for better use of the regional roadway system. Similarly interactive wayfinding can be a useful ATDM tool to help people navigate through alternative travel modes.⁶⁵ Such technology is being considered at Mobility hubs across the region.

Next OS and ITS systems often depend on reliable internet connections. The eastern side of the corridor experiences internet connectivity challenges. Beyond El Cajon, broadband service is more expensive, fewer internet providers serve the area, and the population is historically disadvantaged.⁶⁶ Low-income communities with limited access to smartphones and banking information may experience barriers to accessing the benefits of the Next OS information dissemination.⁶⁷ This can present an equity challenge and constraint to Next OS which should be seriously considered and mitigated.

The literature and plans of the corridor indicate an important role for ITS and Next OS to seamlessly connect destinations, inform travelers, prevent incidents, respond to changing conditions, and increase access to a variety of mobility options.

Climate Change & Resilience

This section identifies climate challenges for communities in the San Diego region, including temperature, precipitation, wildfire, sea level rise, storm surge, and cliff retreat. These hazards may impact both the structural integrity of transportation assets and maintenance and operations.

Flooding

The Kumeyaay Corridor faces high exposure to inland flooding as parts of the corridor lie within FEMA flood zones (floodway, 100-year, and 500-year) or are close to bodies of water such as Alvarado Creek. This may require implementation of site-specific erosion and runoff control measures to reduce flooding impacts.⁶⁸ Many communities also have transportation assets, such as highways and freeways, that lie within FEMA floodplains.⁶⁹ Assets that lie in proximity to rivers and creeks also face flooding, runoff, and drainage issues.⁷⁰ Bridge, culvert, and storm drain exposure to inland flooding are considered hazards of interest due to the high sensitivity of these assets to flooding.⁷¹

⁶⁴ Kearny Mesa Community Plan (2020); North Park Community Plan (2016); Uptown Community Plan (2016); Preliminary Draft Report Interstate 8 Corridor Study, (2016)

⁶⁵ Regional Mobility Hubs Implementation Strategy – Mobility Hub Features Catalog (2017)

⁶⁶ SANDAG, The Digital Divide in the San Diego Region (2021)

⁶⁷ Regional Mobility Hub Implementation Strategy – Equity Considerations (2017)

⁶⁸ Preliminary Draft Report Interstate 8 Corridor Study (2016); La Mesa General Plan (2012)

⁶⁹ Ocean Beach Community Plan (2015); City of San Diego Climate Vulnerability Assessment (2020)

⁷⁰ Mission Valley West Environmental Impact Report – SDSU (2020); La Mesa General Plan (2012)

⁷¹ Balboa Avenue Station Area Specific Plan (2021); Uptown Community Plan (2016)

Flood risk is a primary concern to transportation assets across San Diego, and with climate change driving rising seas, worsening storms, and increasing variability of precipitation in the region, current flood hazards are projected to worsen in future years. As such, the City of San Diego and several surrounding communities have established a range of planned improvements to transportation infrastructure to decrease its susceptibility to damage from flooding. These improvements include upgrades to and better maintenance of existing assets to better fortify them against flood waters, updates to future design standards to account for climate change-driven increases in flooding, and identification of possible future projects to aid in flood mitigation.

Existing documents related to climate change outline a range of strategies for upgrading and ensuring proper maintenance of current transportation assets across San Diego to better fortify them against floodwaters. An example includes upgrading old roadway drainage systems to decrease flood hazards. Additionally, documents outline the need to consider floodplain management and safety ordinances in current systems to avoid significant risk of loss, injury, or death involving flooding.⁷² The documents also emphasize the need for better maintenance of current flood control systems, such as channels and storm drains, as well as the benefits of undertaking preventative maintenance on floodway structures to prevent significant damage.⁷³

Existing documents also discuss the need for updates to future design standards to account for climate change-driven increases in flooding. Examples include requiring drainage studies for major new projects, designing new critical facilities to minimize potential flood damage,⁷⁴ and elevating roadway features in future project-level design guidelines to account for rising floodwaters.⁷⁵

Finally, documents related to climate change emphasize the need to identify possible future projects to aid in flood mitigation. These projects may include creating green streets and increasing landscaping and urban forestry projects to address stormwater runoff.^{76,77} Future projects may leverage bioretention and bio-infiltration facilities and porous paving/low-impact development to supplement storm drain systems.⁷⁸

Sea Level Rise

Sea levels at La Jolla have risen at a rate of 6 inches over the last century. Flooding and sand and bluff erosion is already causing damage to coastal areas during storms and extreme high tides.⁷⁹ Sea level rise projections for California south of Cape Mendocino range from 2-12 inches by 2030, 5-24 inches by 2050, to 17-66 inches by 2100.⁸⁰ Coastal flooding from sea level rise could result in loss of beaches, coastal habitats, and coastal developments, as well as street flooding.

⁷² Preliminary Draft Report Interstate 8 Corridor Study (2016)

⁷³ Multi-jurisdictional Hazard Mitigation Plan – La Mesa (2018)

⁷⁴ Multi-jurisdictional Hazard Mitigation Plan - City of San Diego (2018)

⁷⁵ Preliminary Draft Report Interstate 8 Corridor Study (2016)

⁷⁶ Kearny Mesa Community Plan (2020)

⁷⁷ Clairemont Community Plan DRAFT (2021)

⁷⁸ Kearny Mesa Community Plan (2020); Balboa Avenue Station Area Specific Plan (2021); Morena Corridor Specific Plan (2019)

⁷⁹ Multi-jurisdictional Hazard Mitigation Plan – City of San Diego (2018)

⁸⁰ Ocean Beach Community Plan (2015)

The Kumeyaay Corridor faces less exposure to coastal flooding compared to inland flooding; according to hazard maps, the corridor will not face inundation until 2 meters of sea level rise, or 1.5 meters with storm surge, which is expected to occur by 2100. Still, sea level rise, storm surge, and coastal erosion pose a significant risk to transportation assets in the region. The City of San Diego Vulnerability Assessment found that 2% of freeway assets and 20% of highway assets in the City may be exposed to sea level rise.⁸¹ This is concentrated in coastal neighborhoods, which could face high local exposure concerns. Particularly concerning hazards include exposure of bridges, culverts, at-grade roadways to sea level rise, storm surge, and coastal cliff retreat.⁸²

Amongst the documents, one commonly mentioned method to reduce sea level rise and coastal erosion risk is to reduce new development along the shoreline.⁸³ For existing developments, managed retreat or relocation of at-risk infrastructure can also reduce safety hazards from coastal erosion. Coastal managers may decide the degree to which property owners assume risks for their properties.⁸⁴

Documents also recommended methods that protect coastal resources, public beach access, coastal-dependent infrastructure, and transportation infrastructure. For example, sand berms are regularly installed at Ocean Park Beach to prevent tide-induced erosion and flooding.⁸⁵ Other recommendations include increasing adaptive capacity to flooding of development, such as by designing developments to withstand periodic flooding.⁸⁶

A beach erosion management plan, such as the one SANDAG is carrying out, may also combat risks from sea level rise and coastal erosion. Examples include ensuring an adequate supply of sand and sediment to the beach and studying any potential cliff alterations with the goal of minimizing erosion.⁸⁷

Wildfire Risk

The Kumeyaay Corridor does not lie in a Very High Fire Hazard Severity Zone; however, much of the San Diego region is high risk to wildfire.⁸⁸ In the City of San Diego, about 63% of state highway segments and 48% of freeway segments face “high exposure” to wildfire due to their proximity to native vegetation and 100-foot setback zones.⁸⁹ Proximity to native vegetation and open, undeveloped canyons drives high wildfire risk due to increased ignition potential.⁹⁰ Wildfires pose a threat to human lives, property, and ecosystems, and the region’s high wildfire risk is expected to increase in the future under climate change.⁹¹

Wildfire risk reduction is another primary concern to transportation assets in San Diego County; as such, many of the climate change-related documents propose planned improvements to address increasing fire risk, including increasing fire defense zones, fortifying structures, adhering to California fire codes, and increasing vegetation management.

⁸¹ City of San Diego Climate Vulnerability Assessment (2020)

⁸² Balboa Avenue Station Area Specific Plan (2021)

⁸³ Mission Valley Community Plan (2019); Ocean Beach Community Plan (2015); Balboa Avenue Station Area Specific Plan (2021)

⁸⁴ Ocean Beach Community Plan (2015)

⁸⁵ Ocean Beach Community Plan (2015)

⁸⁶ Balboa Avenue Station Area Specific Plan (2021)

⁸⁷ Mission Valley Community Plan (2019); Ocean Beach Community Plan (2015)

⁸⁸ Preliminary Draft Report Interstate 8 Corridor Study (2016); Uptown Community Plan (2016)

⁸⁹ City of San Diego Climate Vulnerability Assessment (2020)

⁹⁰ Mission Valley West Environmental Impact Report – SDSU (2020); La Mesa General Plan (2012)

⁹¹ Multi-jurisdictional Hazard Mitigation Plan – City of San Diego (2018)

Increasing defensible spaces and ensuring that street widths are adequate to accommodate emergency vehicles represent two strategies commonly referred to across the documents to widen – or ensure adequate wideness of – defense zones or routes.⁹² The documents also recommend using fire-resistant construction materials in all regions of the County to fortify new development in cases where fire is able to break through defense zones.⁹³ In order to decrease fire risk in all areas, the documents highlight the importance of increasing vegetation and brush management and maintaining weed abatement ordinances.⁹⁴ These strategies mitigate available fire fuel, decreasing potential for burning. Finally, on a state level, the documents discuss requiring the application of California fire code (related to fire protection planning) and participating in the California fire mutual aid agreement, which establishes a cooperative agreement that encourages extending voluntary aid to communities affected by fire.

Drought & Heat Risk

Under climate change, warming temperatures and increased dryness could result in reduced water supply for the San Diego region. This may result in additional watering requirements for transportation construction sites and landscapes.⁹⁵ Heatwaves, which already occur throughout the county, are also projected to increase in frequency and duration, increasing evapotranspiration, snowpack loss, and exacerbating drought.⁹⁶ Urban heat islands have also expanded in San Diego and may continue to do so under climate change.⁹⁷

In addition to discussing strategies related to flooding, wildfire, and sea level rise, the documents touch upon potential approaches to mitigate the impacts of drought and high heat on transportation infrastructure and communities.

One such approach suggests installing a mix of drought-tolerant tree types to maintain vegetation in areas prone to drought. Regions with steep slopes may benefit especially from this technique, as plant and tree root systems hold slopes in place and decrease the chance of landslides, which have the potential to damage transportation structures.⁹⁸ Additionally, the documents recommend that communities reduce their water use and capture rainwater to decrease potential for drought-driven water shortages.⁹⁹

The climate change-related documents also deliver several recommendations for decreasing the negative impacts of extreme heat to transportation assets and communities across San Diego. Primarily, the documents recommend leveraging natural solutions, such as maximizing the effects of sea breezes to lower temperatures in outdoor spaces,¹⁰⁰ especially those near the ocean, and implementing urban forestry and green streets to decrease impacts of the urban heat island.¹⁰¹ Additionally, the documents recommend adopting sustainable building designs to minimize heat uptake in structures during high or prolonged extreme heat events.¹⁰²

⁹² 2021 Regional Plan (2021); Mission Valley West Environmental Impact Report (2020)

⁹³ Multi-jurisdictional Hazard Mitigation Plan – La Mesa (2018)

⁹⁴ Uptown Community Plan (2016); Multi-jurisdictional Hazard Mitigation Plan – La Mesa (2018)

⁹⁵ Multi-jurisdictional Hazard Mitigation Plan – City of San Diego (2018); Preliminary Draft Report Interstate 8 Corridor Study (2016)

⁹⁶ Multi-jurisdictional Hazard Mitigation Plan – City of San Diego (2018)

⁹⁷ Ocean Beach Community Plan (2015)

⁹⁸ Ocean Beach Community Plan (2015); Clairemont Community Plan DRAFT (2021); La Mesa General Plan (2012)

⁹⁹ Clairemont Community Plan DRAFT (2021)

¹⁰⁰ Ocean Beach Community Plan (2015)

¹⁰¹ Kearny Mesa Community Plan (2020); Uptown Community Plan (2016); Clairemont Community Plan DRAFT (2021)

¹⁰² Uptown Community Plan (2016); Clairemont Community Plan DRAFT (2021); Morena Corridor Specific Plan (2019)

Wildlife Corridors

Climate change will also have impacts on wildlife corridors, which help facilitate wildlife movement in areas with major roadways. Wildlife corridors enhance climate resilience by providing connectivity that will be critical for species' survival as climate change results in range shifts and landscape changes. The corridor resiliency study found that much of the center of the study area has high resilience to climate change and better connectivity. Corridors in the northeast and southeast of the study have less resilience and connectivity.¹⁰³

Emerging Transportation Policies & Programs

The literature review also identified innovative policies and programs related to topics such as Transportation Demand Management, parking management, curb space management, autonomous vehicles, and electric vehicle charging.

Transportation Demand Management

Transportation Demand Management (TDM) is a general term for strategies that assist in reducing single-occupant vehicle demand to increase the efficiency of existing transportation resources.¹⁰⁴ It often refers to marketing, incentive programs, and measures that encourage transportation options. TDM programs are typically planned for citywide and regional levels; however, implementation can be very localized.¹⁰⁵

Most of the plans that include this concept recommend utilizing TDM techniques to increase the efficiency of the street network, reduce trips and improve the air quality impact of existing and future development.¹⁰⁶ Recommended policies include encouraging employers, as well as residential and commercial developments, to incentivize car-sharing and the use of other transportation modes by offering transit subsidies, flexible work schedules, vanpool services, and additional charges for parking spaces.¹⁰⁷

Other recommended strategies are increased marketing and promotion of public transit systems, evaluating opportunities to coordinate community circulator routes, developing and implementing an approved TDM Plan, encouraging participation in Safe Routes to School programs and SANDAG's TDM programs, implementing bike share and car share programs, and considering dedicated bus lanes.¹⁰⁸

¹⁰³ Comprehensive Multi-Species Connectivity Assessment and Planning for the Highway 67 Region of San Diego County, California (2017)

¹⁰⁴ City of San Diego General Plan – Mobility Element (2015)

¹⁰⁵ Clairemont Community Plan DRAFT (2021)

¹⁰⁶ La Mesa General Plan (2012)

¹⁰⁷ City of San Diego General Plan – Mobility Element (2015); Old Town Community Plan (2018); Preliminary Draft Report Interstate 8 Corridor Study (2016); Mission Valley Community Plan (2019); Midway-Pacific Highway Community Plan (2018); North Park Community Plan (2016); Uptown Community Plan (2016); Clairemont Community Plan DRAFT (2021); Santee Mobility Element (2016); County of San Diego General Plan - Mobility Element (2018)

¹⁰⁸ City of San Diego General Plan – Mobility Element (2015); Old Town Community Plan (2018); Preliminary Draft Report Interstate 8 Corridor Study (2016); Mission Valley Community Plan (2019); Midway-Pacific Highway Community Plan (2018); North Park Community Plan (2016); Clairemont Community Plan DRAFT (2021);

Parking Management

The concept of parking management includes strategies that help achieve mobility, environmental, and economic development goals. Recommendations on parking management programs and strategies are aimed toward increasing turnover and parking availability and supporting the economic vitality of small businesses.¹⁰⁹ Some of the strategies are tightly related to TDM measures, in terms of incentivizing car-sharing, ridesharing, and other transportation alternatives to single-occupancy vehicle use to reduce parking demand.

To maximize parking areas, angled parking is encouraged as well as opportunities to share parking among various uses. Utilization of tandem parking is suggested for mixed-use developments in some cases. Another strategy is to encourage motorists to park and walk or take transit to multiple destinations within the community. Therefore, recommendations include to locate larger parking facilities strategically in relation to transit stops and considering placing time limits on parking.¹¹⁰

Recommendations based on technology can be found in the documentation as well. Smart parking technology that indicates in real-time when a parking supply can be used by different individuals is recommended to help achieve shared parking goals.¹¹¹ Demand-based pricing that can be updated in real-time to improve the availability of parking and reduce congestion generated by people looking for a place to park is encouraged.¹¹²

Curb Management / Flexible Curb Space

Curb management policies include enhancing existing curb space for passenger loading/unloading to streamline on-demand rideshare activity while accommodating mobile retail services.¹¹³ Effective and visible signage is encouraged, which can indicate which portions of curb space are designated for pick-up/drop-off and when they may be occupied by mobile retail services.¹¹⁴ These can include dynamic signs and mobile app alerts to let people know in real time how curbs are being used.¹¹⁵ Shared mobility services can efficiently use flexible curb space if passenger loading is restricted to hours when transit service is light and excess space is available.¹¹⁶

¹⁰⁹ Clairemont Community Plan DRAFT (2021)

¹¹⁰ Old Town Community Plan (2018); North Park Community Plan (2016); Kearny Mesa Community Plan (2020); Uptown Community Plan (2016); Mid-Cities Community Plan (1998); Midway-Pacific Highway Community Plan (2018); Preliminary Draft Report Interstate 8 Corridor Study (2016)

¹¹¹ Old Town Community Plan (2018); North Park Community Plan (2016); Regional Mobility Hub Implementation Strategy - Mobility Hub Features Catalog, Grossmont Transit Center, Clairemont Drive Station, Tecolote Road Station (2017)

¹¹² Kearny Mesa Community Plan (2020); Uptown Community Plan (2016); Preliminary Draft Report Interstate 8 Corridor Study (2016); Regional Mobility Hub Implementation Strategy - Mobility Hub Features Catalog (2017); City of San Diego General Plan – Mobility Element (2015); 2021 Regional Plan (2021)

¹¹³ Regional Mobility Hub Implementation Strategy – Grossmont Transit Center (2017)

¹¹⁴ Old Town Community Plan (2018); Regional Mobility Hub Implementation Strategy – Grossmont Transit Center (2017); Mission Valley West Environmental Impact Report (2020); Mission Valley Community Plan (2019); Clairemont Community Plan Update DRAFT (2021)

¹¹⁵ Regional Mobility Hub Implementation Strategy - Mobility Hub Features Catalog (2017)

¹¹⁶ Kearny Mesa Community Plan (2020); Regional Mobility Hub Implementation Strategy - Mobility Hub Features Catalog, Grossmont Transit Center (2017); Mission Valley West Environmental Impact Report (2020); Mission Valley Community Plan (2019); Clairemont Community Plan Update DRAFT (2021)

Autonomous Vehicles

Advancing autonomous and connected vehicles is discussed in newer plans. These technologies are encouraged to reduce GHG emissions from gas-powered vehicles. Several plans recommend the evaluation of infrastructure for autonomous vehicles when designing right-of-way infrastructure projects and operational improvements based on future demand and changes in technology.¹¹⁷ Other recommendations include to leverage the San Diego Regional Proving Ground as a testbed for innovative pilots and public-private partnerships that support shared, electric, connected, and autonomous mobility, and Smart Cities initiatives.¹¹⁸

Electric Vehicle Charging

Establishing electric vehicle (EV) infrastructure is encouraged, including vehicle charging stations for multifamily residential, commercial, and industrial uses based on future demand and changes in technology. EV charging is intended to be supported by a variety of smartphone applications and websites that provide information on how to locate charging stations. This could be integrated with other trip planning websites, applications, and kiosks to encourage EV charging at mobility hubs. Universal transportation accounts could be also expanded to allow users to pay for charging fees. Funding opportunities to support the purchase of charging stations for some types of installations were identified, including the San Diego Gas & Electric program - Power Your Drive, Electrify America - and a regional charging program SANDAG is developing.¹¹⁹

¹¹⁷ Old Town Community Plan (2018); Midway-Pacific Highway Community Plan (2018); Mission Valley Community Plan (2019); Riverwalk Specific Plan (2020); Balboa Avenue Station Area Specific Plan (2021); Morena Corridor Specific Plan (2019)

¹¹⁸ Emerging Technologies (2018)

¹¹⁹ Old Town Community Plan (2018); Regional Mobility Hub Implementation Strategy – Mobility Hub Features Catalog, City Heights Transit Plaza, Clairemont Drive Station, Tecolote Road Station (2017); Midway-Pacific Highway Community Plan (2018); Kearny Mesa Community Plan (2020); Balboa Avenue Station Area Specific Plan (2021); Morena Corridor Specific Plan (2019); Santee Mobility Element (2016); Mission Valley West Environmental Impact Report (2020); Mission Valley Community Plan (2019); Ocean Beach Community Plan (2015); North Park Community Plan (2016); Uptown Community Plan (2016); 2021 Regional Plan (2021); NAVWAR Revitalization (2021); Emerging Technologies (2018)

Next Steps

This Relevant Document Review summarized the opportunities and challenges identified in previous literature. These findings will be supplemented by additional analyses conducted as part of the Task 3.2 deliverable. Task 3.2 will examine travel patterns, safety issues, demographics, housing, employment, and land uses to understand current and future needs. Additional insight will be drawn from representatives of the various public agencies with jurisdictions or services within the Kumeyaay Corridor, as well as community members. This needs analysis phase will be used to determine areas or topics to focus transportation solution strategy development.