Uptown Regional Bike Corridors Project
(Uptown Bikeways)

Alignment Analysis
Comprehensive Report

2014

Prepared for

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Table of Contents

List of Figures

List of Tables

List of Appendices

Executive Summary

The Uptown Regional Bike Corridors Comprehensive Report presents the process, analysis, and culmination of the initial planning phase for the Uptown Regional Bike Corridors Project (Uptown Bikeways) conducted primarily over the 2013 calendar year. The report follows the progression of the planning process, moving from evaluation of existing conditions to presentation of the refined results and recommended project alignments within the project area.

The Project

The Uptown Bikeway is a three-corridor, 12-mile project that will improve travel between the City of San Diego neighborhoods of Uptown, Old Town, Mission Valley, downtown, North Park, and Balboa Park. The Uptown Bikeway will create inviting and convenient bikeways that link key community destinations, including schools, parks, transit, and commercial centers. The bikeways will feature design elements that enhance the experience for people biking and walking, and will benefit all street users, residents, and neighborhood businesses.

Regional Planning Context

The San Diego Association of Governments (SANDAG), in partnership with the City of San Diego and members of the local community, has undertaken the Uptown Bikeway project as part of the Regional Bike Plan Early Action Program (Bike EAP), a 10-year effort to expand our regional bike network and complete high-priority bicycle projects approved in Riding to 2050: The San Diego Regional Bike Plan (Regional Bike Plan).

The Regional Bike Plan and Bike EAP are part of larger goals for the region to expand transportation choices and to make bicycling a viable, attractive transportation option. The region's principal planning documents, the 2050 Regional Transportation Plan and its Sustainable Communities Strategy, and the Regional Comprehensive Plan, identify development of alternative transportation choices throughout San Diego County as an important component of fulfilling the vision of San Diego as a sustainable, thriving region. The Uptown bike corridors were identified as priority projects in the Regional Bike Plan.

Project Area

The project area extends north to south in the City of San Diego from Mission Valley to downtown, and west to east from Old Town to University Heights. The project area includes portions of Old Town, Mission Valley, downtown, North Park, and Balboa Park and the Uptown neighborhoods of Five Points, Mission Hills, Middletown, Western Slopes, Hillcrest, Bankers Hill, Park West, and University Heights.

Alignment Analysis Process

The planning process for the Uptown Bikeway began with community outreach and the analysis of existing conditions and alignment alternatives in the Uptown project area and resulted in refined results and recommended project alignments.

Planning Process

Project Goals

The alignment alternatives and design concepts were evaluated using the following five goals, established with community input:

- **Mobility**: Increase choices; connect communities
- **Experience**: Improve travel safety for everyone, and create an exceptional biking experience
- **Community**: Build on and support related community initiatives
- **Placemaking**: Enhance community identity and public spaces
- **Economic Development**: Improve public infrastructure and strengthen opportunities for community and business development

Bicycle Connectivity Analysis

The fundamental attributes for a street network that will attract more people who are "interested but concerned" to ride a bike are direct routes and low traffic stress. In other words, providing routes between people's origins and destinations that do not require people to use streets that exceed their comfort level and tolerance for stressful traffic conditions and that do not involve an undue amount of detours, or out of direction travel.

Level of Traffic Stress Criteria

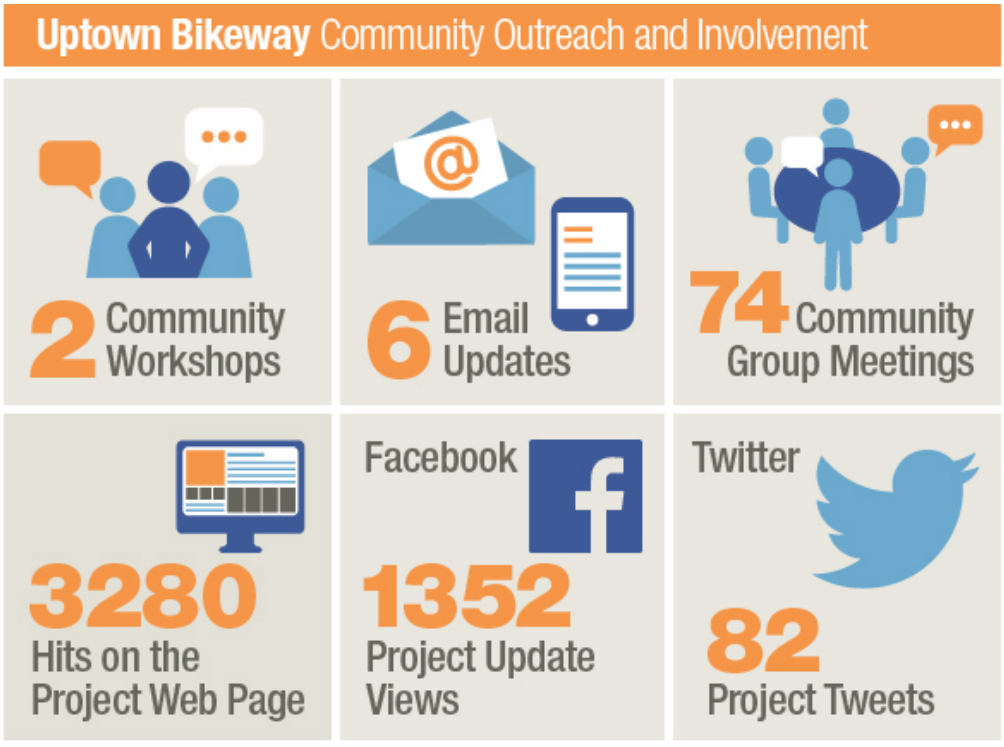
Traffic stress is determined by four basic factors, the average speed of vehicle traffic, the physical space and separation provided for people riding bikes, the average daily trips (ADT) of vehicles, and the slope of the street. Most people will tolerate a level of traffic stress (LTS) of 1 or 2. Only a small fraction of people will tolerate an LTS of 4.

	LTS ≥ 1	LTS ≥ 2	LTS ≥ 3	LTS ≥ 4
Speed limit	25 mph or less	26 mph - 34 mph	35 mph - 39 mph	40 mph or more
Street width (through lanes)	2	4, separated by a raised median	more than 4, or 4 without a separating median	-
Grade	5% or less	5%-10%	10%-15%	15% or more
Average Daily Traffic (ADT)	5,000 or less	5,000-10,000	10,000-15,000	15,000 or more
Population Served	All ages Interested but concerned	Most adults Interested but concerned	Anywhere Anytime	< 1%

Community Outreach

SANDAG worked closely with Uptown neighborhoods, neighboring communities, and the City of San Diego to study and refine the project alignments and design concepts. More than 30 community group and stakeholder meetings were held during 2013. A project Community Advisory Group was organized and provided in-depth input. The advisory group met with SANDAG and other community members four times at key analysis milestones. The community was also kept informed through email, web page updates, and social media. Community engagement efforts will continue through the next phases of the project, including direct outreach to residents and businesses along the project alignments as well as members of the broader community.

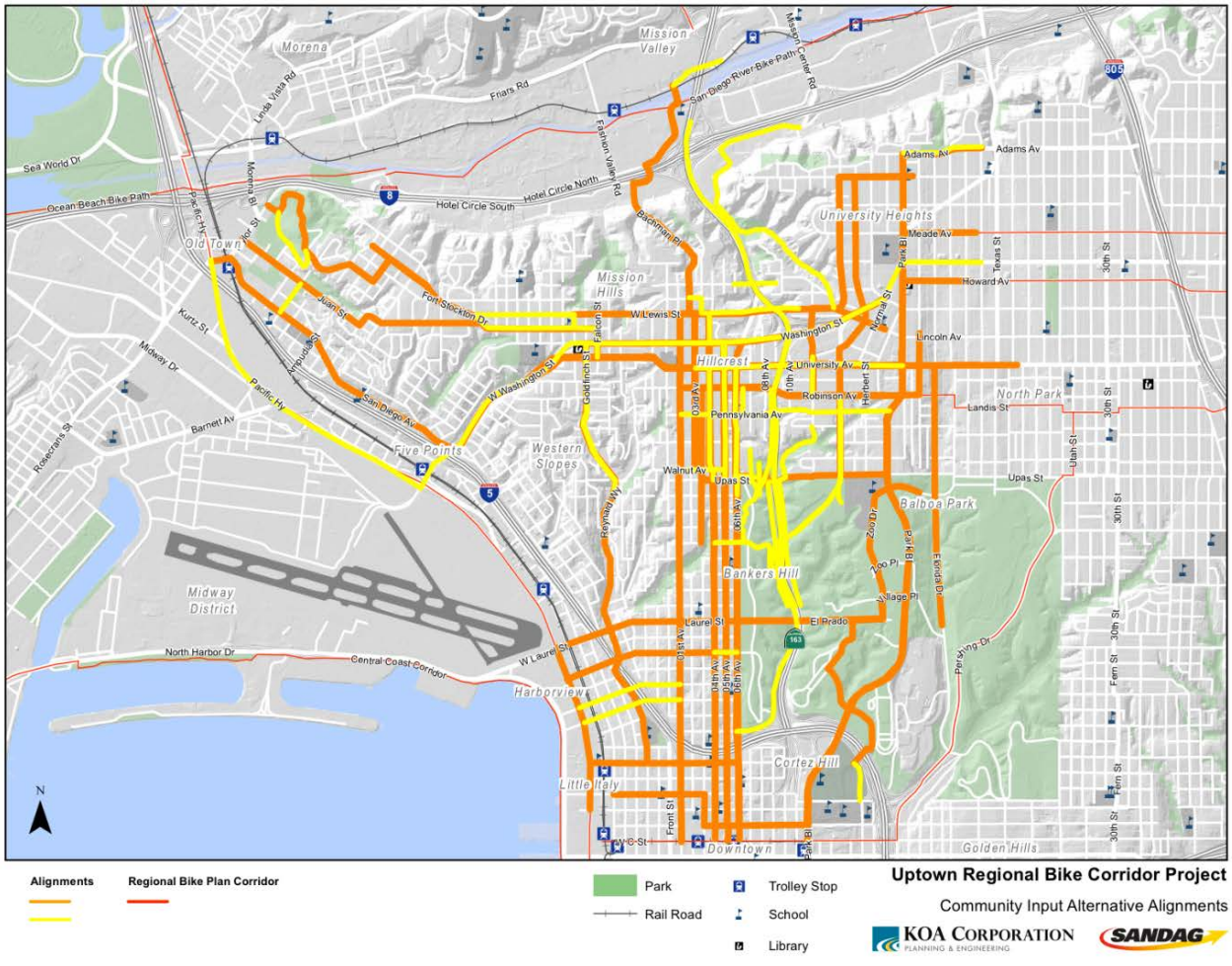
More detailed information can be found in the meeting summary reports available under the Community Involvement tab on the project webpage keepsandiegomoving.com/UptownBike.



Alternative Alignments Development

Participants of the project's first community meeting provided input on opportunities and issues related to the project and the communities within the project area. An outcome of the discussion pointed to the desire to have each of the distinct neighborhoods connected together through safe, convenient, comfortable, and direct connections. As identified in the existing conditions analysis, this community input reinforced the issue of neighborhoods within the project area being disconnected by barriers posed by streets with high speed, and high traffic volume, which prevent most people from feeling safe riding their bicycles between neighborhoods.

Three tiers of analysis were conducted to identify the most appropriate project alignments and potential conceptual designs. During the second Community Advisory Group meeting, community members identified potential neighborhood routes, for people who want to ride a bike for everyday trips, which connect neighborhood centers and destinations. Fifty-eight routes, or alignments, were identified during the second Community Advisory Group meeting and then analyzed as part of the Tier I Analysis.



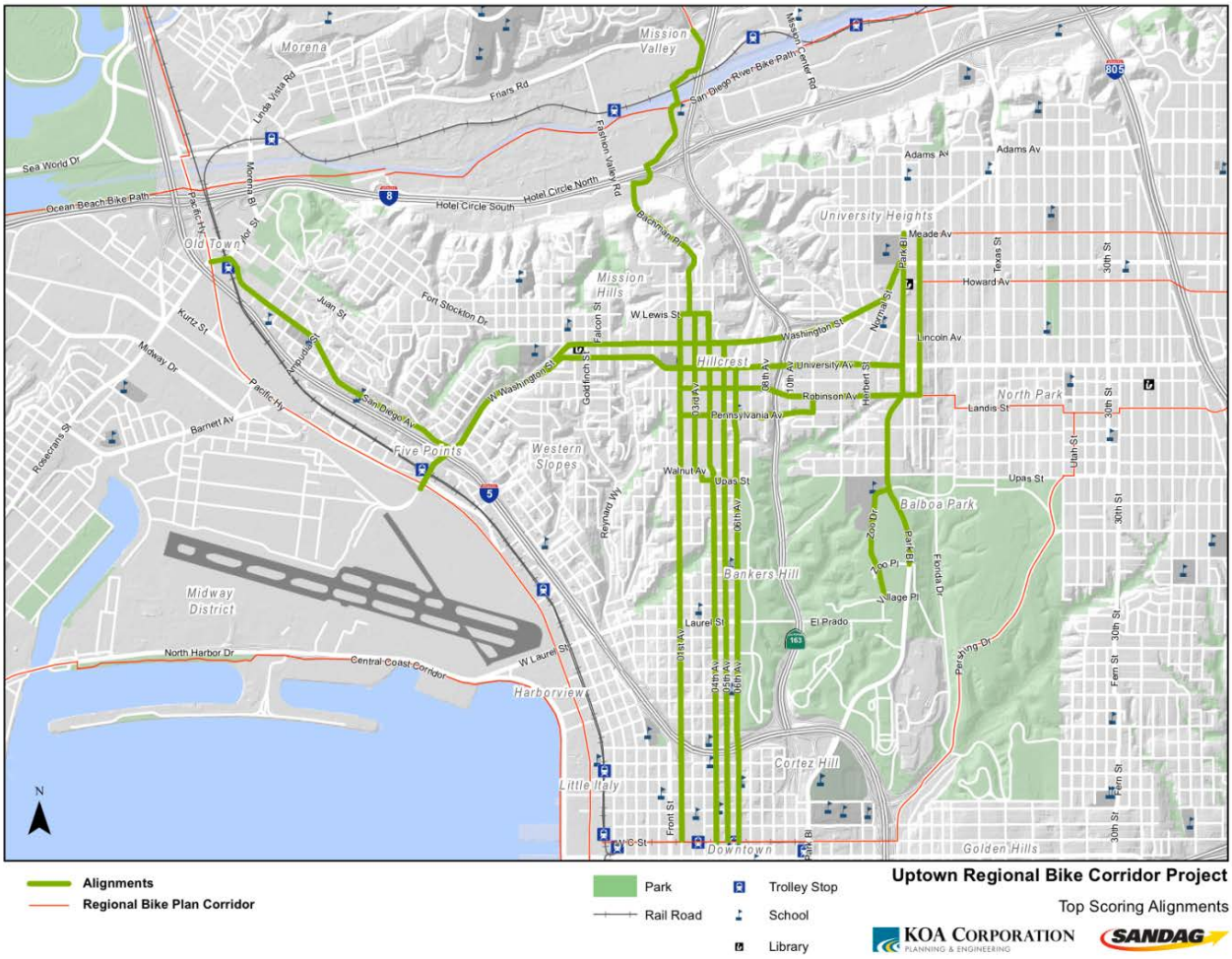
Tier I Analysis

The Tier I alignment analysis involved a qualitative evaluation of each of the 58 alignment alternatives identified. The criteria were developed based on the project goals, as refined with Community Advisory Group input. Five initial criteria were applied to each alignment. Each alignment was evaluated relative to other alignments within the same corridor. For example, the State Route 163 (SR 163) alignment from Mission Valley to downtown was compared to the Bachman, First, 4th, 5th, 6th, and Park Avenue alignments. However, the Park Boulevard alignment is not compared to Washington, University, or Robinson alignments.

Tier I Evaluation Criteria

Evaluation Criteria		
Criteria	**Description**	**Scoring Measure**
Regional Connectivity	Does the proposed alignment connect other regional corridors identified in the Bike Plan?	(Yes/No)
Neighborhood Connectivity	Does the proposed alignment connect to the project area neighborhood activity center nodes? Activity centers are concentrations of land uses such as commercial, mixed-use, schools, parks, or transit stations. An alignment that connects three nodes will be preferred to the alignment that connects only two.	(Yes/No)
Direct Connectivity	Is the proposed alignment a direct alignment to the regional or neighborhood connection? Directness relates to distance (a shorter distance between activity centers and or other regional corridors is preferred) and straight routes versus routes that jog or are circuitous are preferred. There is a positive, significant relationship between network connectivity, directness and the level of ridership; underscoring that trips by bike are more sensitive to distance than driving; internal connectivity provides increased route choice and decreased likelihood of having to choose significant detours to remain in the network.	(Yes/No)
Achievable LTS	Can we achieve a facility that provides for the typical person (i.e., an LTS of 1 or 2)? LTS is the level of tolerance that the "average person" will encounter on a given roadway. Stress factors include the prevailing speeds of vehicle traffic, the physical space and separation provided for bicyclists, and ADT of vehicles, and the slope of the street. LTS 1 presents little traffic stress and demands little attention from people to ride on. LTS 4 presents the highest traffic stress as it offers little or no bike facilities and higher speed vehicle traffic.	(Yes/No)
Existing Deficiency	Is there an existing deficiency that the alignment is addressing? Deficiency relates to the absence of adequate bicycle facilities and also relative to other variables that affect achievable LTS.	(Yes/No)

The Tier I analysis results for the 58 alternatives are summarized in Appendix F. The alignments that received the highest score (5) during the Tier I analysis were considered for the Tier II analysis. A total of 25 alignments received the highest score and were recommended for the Tier II analysis.



Tier II Analysis

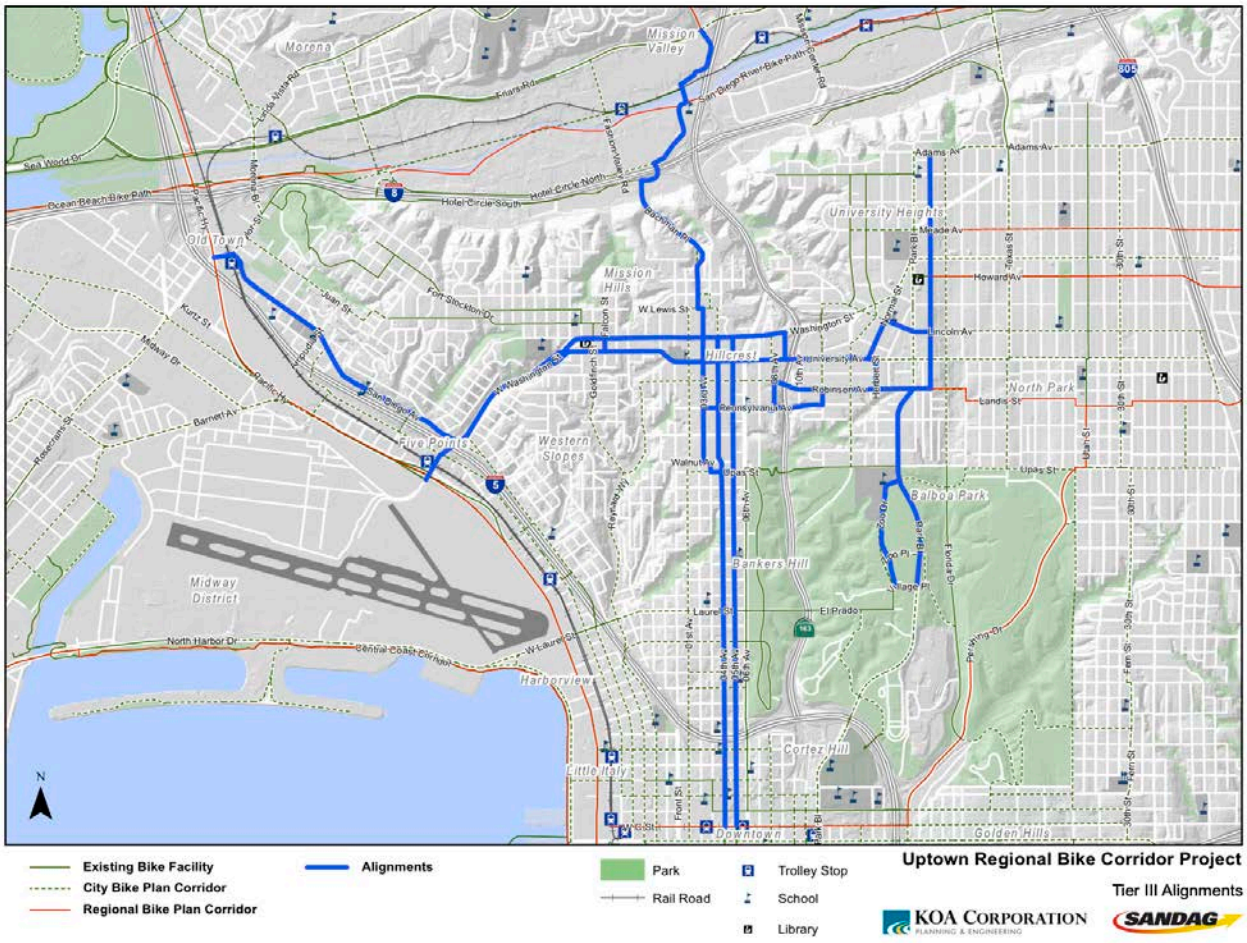
The purpose of the Tier II alignment analysis was to evaluate the 25 alignments resulting from the Tier I evaluation. The highest-ranking alignments from Tier II analysis are recommended for the Tier III analysis. More specific evaluation criteria were developed and were also based on the project goals.

The Tier II alignment analysis involved a quantitative evaluation of the potential alignments based on expanded Tier I evaluation criteria. The evaluation criteria and their corresponding performance measures were scored on a scale of zero to two. The evaluation criteria were applied to each alignment relative to other alignments in the same corridor. For example, the alignment on Washington Street in the Mission Hills–Hillcrest corridor was compared to the University Avenue alignment in the same corridor. However, it was not compared to the Pennsylvania Avenue alignment, which is in the Hillcrest–North Park corridor. A preliminary capacity analysis was performed to evaluate the potential effects of lane removal on the vehicular capacity for portions of two alignments, Fifth Avenue between Washington Street and C Street, and Robinson Avenue between Tenth Avenue and Park Boulevard.

Based on the Tier II analysis of the evaluated alignments, the highest ranked alignments for each corridor were advanced to the third tier of analysis, becoming the Tier III Alignments.

Tier II Evaluation Criteria

Evaluation Criteria	Tier II Performance Measures		
Category	**Criteria**	**Description**	**Scoring Measure**
System Connectivity	Regional Connectivity	Does the proposed alignment connect two or more regional corridors identified in the Regional Bike	(Yes/No)
	City Plan Connectivity	Does the proposed alignment compliment the City of San Diego Bike Plan?	(Yes/No)
	Neighborhood Connectivity	Does the proposed alignment connect two or more project area neighborhood nodes?	(Yes/No)
	Directness	Is the proposed alignment a direct alignment to the regional or neighborhood connection?	(Yes/No), or Distance in feet.
	Deficiency	Is there an existing deficiency that the alignment is addressing?	-Alignment has no facility. -Alignment has a facility, but facility doesn't serve average person, therefore, it is not adequate. -A parallel alignment has adequate facilities. -Alignment has adequate facilities.
	Independent Utility	Does the alignment have independent utility (i.e., does it make sense as a stand alone project)?	(Yes/No)
	Multimodal Connectivity	Ability to transfer to various transit modes (bus, trolley, train, shuttle service).	-High number of transit nodes connected to alignment. -Medium number of transit nodes connected to alignment.
Placemaking	Activity Center Proximity	Are there proximate activity centers along the alignment?	-High number of activity centers within 2 blocks of alignment. - Medium number of activity centers within 2 blocks of alignment.
	Population	Population served by connected LTS network.	-High number of people connected to LTS 1 & 2 streets and people on the alignment. -Medium number of people connected to LTS 1 & 2 streets and people on the alignment. -Low number of people connected to LTS 1 & 2 streets and people on the alignment.
Design Concept	Traffic Operations	How is the vehicular LOS affected by the alignment and facility type?	-High likelihood of LOS change. -Medium likelihood of LOS change. -Low likelihood of LOS change.
	Parking	How is on-street parking affected by the alignment and facility type?	-High number of parking spaces potentially displaced. -Medium number of parking spaces potentially displaced.
	Geometric Feasibility	Is the alignment/facility type feasible in the existing R/W?	(Yes/No)
Safety Considerations	Collisions	Would alignment reduce the number of existing collisions?	-High number of bike-collisions along alignment. -Medium number of bike-collisions along alignment. -Low number of bike-collisions along alignment.
	Achievable LTS	Can we achieve a facility that provides for the average person (i.e., an LTS of 1 or 2)?	(Yes/No)
Community Input	Alignments	Alignments that received high, medium-level, or low public support.	-High level of public support. -Medium level of public support. -Low level of public support.
	Facility Type	Facilitiy types that received high, medium-level, or low public support.	-High level of public support. -Medium level of public support. -Low level of public support.
Environment	Environmental Impacts	Potential environmental impacts caused by the alignment and facility type, not including traffic impact.	-High level of environmental impact. -Medium level of environmental impact. -Low level of environmental impact.
Financial	Cost	What is the alignment/facility overall cost (including engineering, environmental, planning, permits, etc)?	-High potential cost (not quantified). -Medium potential cost (not quantified). -Low potential cost (not quantified).



Tier III Analysis

The purpose of the Tier III analysis was to evaluate the alignments within the corridors where multiple potential alignment options still existed after the Tier I and Tier II analyses. The Tier III analysis consisted of further community and Advisory Group input and design feasibility analysis. Within the center of Hillcrest, both the north-south and east-west alignments had multiple potential alignments including 3rd Avenue, 4th Avenue, 5th Avenue, Washington Street, and University Avenue.

The community input provided at two community meetings held June and July 2013 described and affirmed the various opportunities and constraints associated with each segment of each alignment option. Full consideration of community input resulted in the prioritization of both the direct connectivity to the commercial businesses (activity centers) along University Avenue through Hillcrest, and traffic calming opportunities along University Avenue through Mission Hills. The different opportunities presented for these two segments of University Avenue, when combined, provided a more continuous and direct network connection through the center of the project area. For the north-south alignments the community input pointed to continuing the alignment along 4th and 5th Avenue through Hillcrest. As noted in the Tier I Evaluation Criteria, there is a positive, significant relationship between network connectivity, directness and the level of ridership; underscoring that trips by bike are more sensitive to distance than driving; internal connectivity provides increased route choice and decreased likelihood of having to choose significant detours to remain in the network (Schoner, J. 2012).

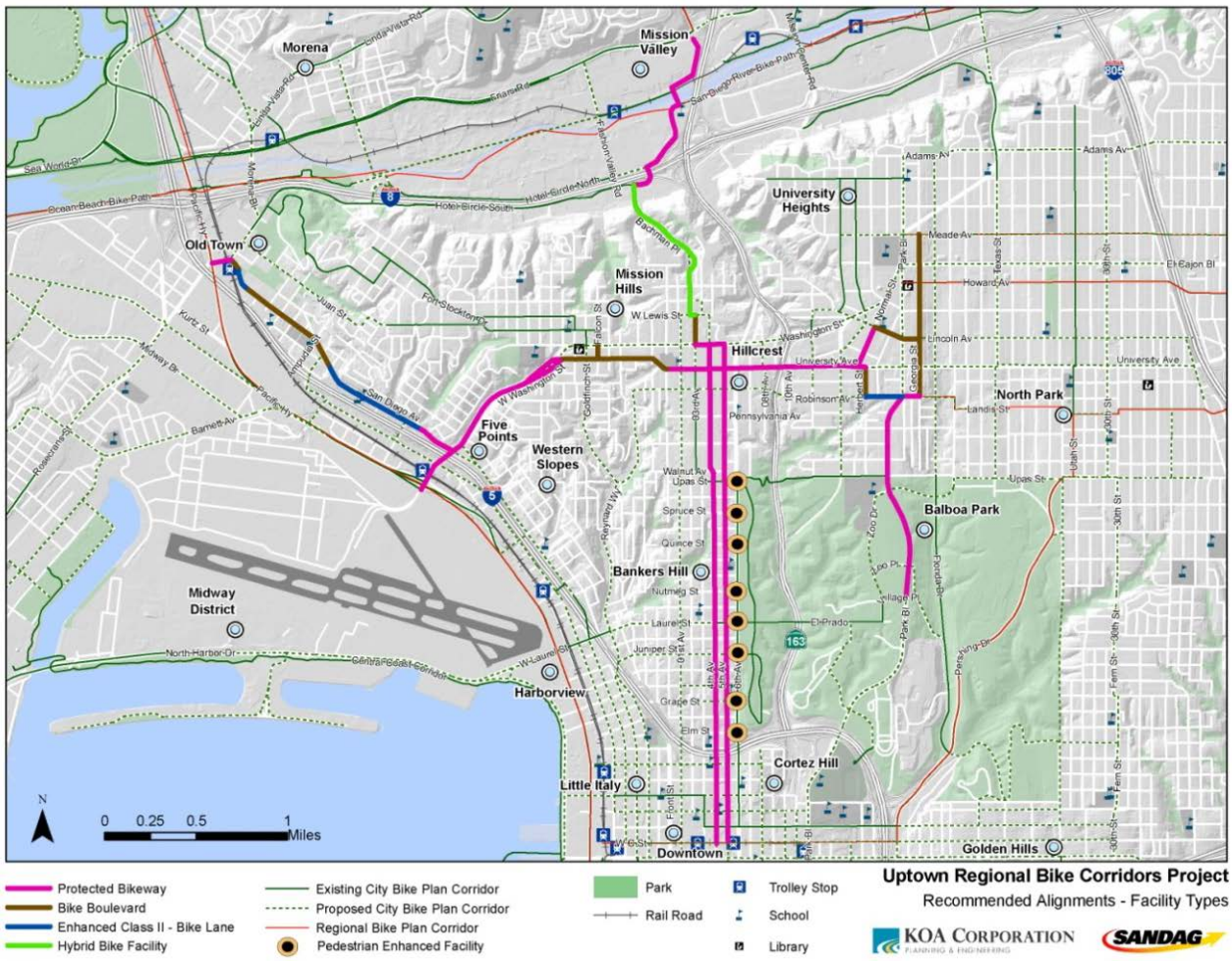
Additionally, the feasibility of the diversion concepts proposed to manage vehicle traffic volume along the proposed bike boulevard segment on University Avenue, from Ibis Street to Front Street was analyzed. Diverters are traffic calming design features that help manage vehicle traffic volumes on a street. In this case, the concept proposes partial diverters at Ibis Street, by closing the eastbound Washington-University ramp to vehicle traffic (on the west side of the proposed University Avenue bike boulevard), and at Front Street. The preliminary diversion analysis shows that the partial diverters would reduce the cut-through traffic on University Avenue on this section by 10,000 ADT, resulting in daily volumes in the desired range of 5,000 ADT or less to create an effective bike boulevard. Most of the cut-through traffic would redirect to the parallel route on Washington Street, which is a four lane arterial with a median and commercial fronting land uses. The study shows that Washington Street has enough capacity to accommodate the additional traffic in the peak hours. The study also analyzed vehicle traffic conditions 20 years into the future (year 2035) and the findings are the same; Washington Street has enough capacity to accommodate the additional traffic.

Design Concepts

Representative cross-sections for each alignment were used as the framework for the development of concept plans. While some of the more innovative conceptual designs proposed may not fully comply with the current national and local regulations, they have been proven to be effective designs in other cities around the world and their functionality, safety, and constructability have been extensively researched by the design team. A full listing of the design considerations relative to local standards, descriptions of each of the Bike EAP corridors and maps of the design concepts developed for the entirety of each recommended project alignment, in addition to design strategies and future design considerations can be found in the report appendices.

Outcomes

The final products of the 2013 planning process are recommended alignments and conceptual designs for each of the three corridors. These conceptual designs will be further analyzed given the relative opportunities and constraints of each during the subsequent preliminary engineering phase.



Recommended Phasing

Phase 1: The Bankers Hill to downtown on 4th and 5th Avenue alignment will serve the highest number of people (7,100 people) within the project area. This is the recommended Phase 1 of the Project.

Phase 2: From Bankers Hill, there is only one option to maintain network connectivity: Hillcrest to Bankers Hill on 4th and 5th Avenue alignment. This will serve 490 residents.

Phase 3: From Hillcrest, there are three options for network connectivity: north (Mission Valley to Hillcrest), east (Hillcrest to North Park) and west (Hillcrest to Mission Hills). While Hillcrest to Mission Hills serves the highest population of the three options, Hillcrest to North Park connects to the SANDAG North Park - Mid-City Regional Bike Corridors Project, concurrently scheduled for implementation. Therefore, Phase 3 is Hillcrest to North Park on University Avenue, which will serve approximately 3,200 residents.

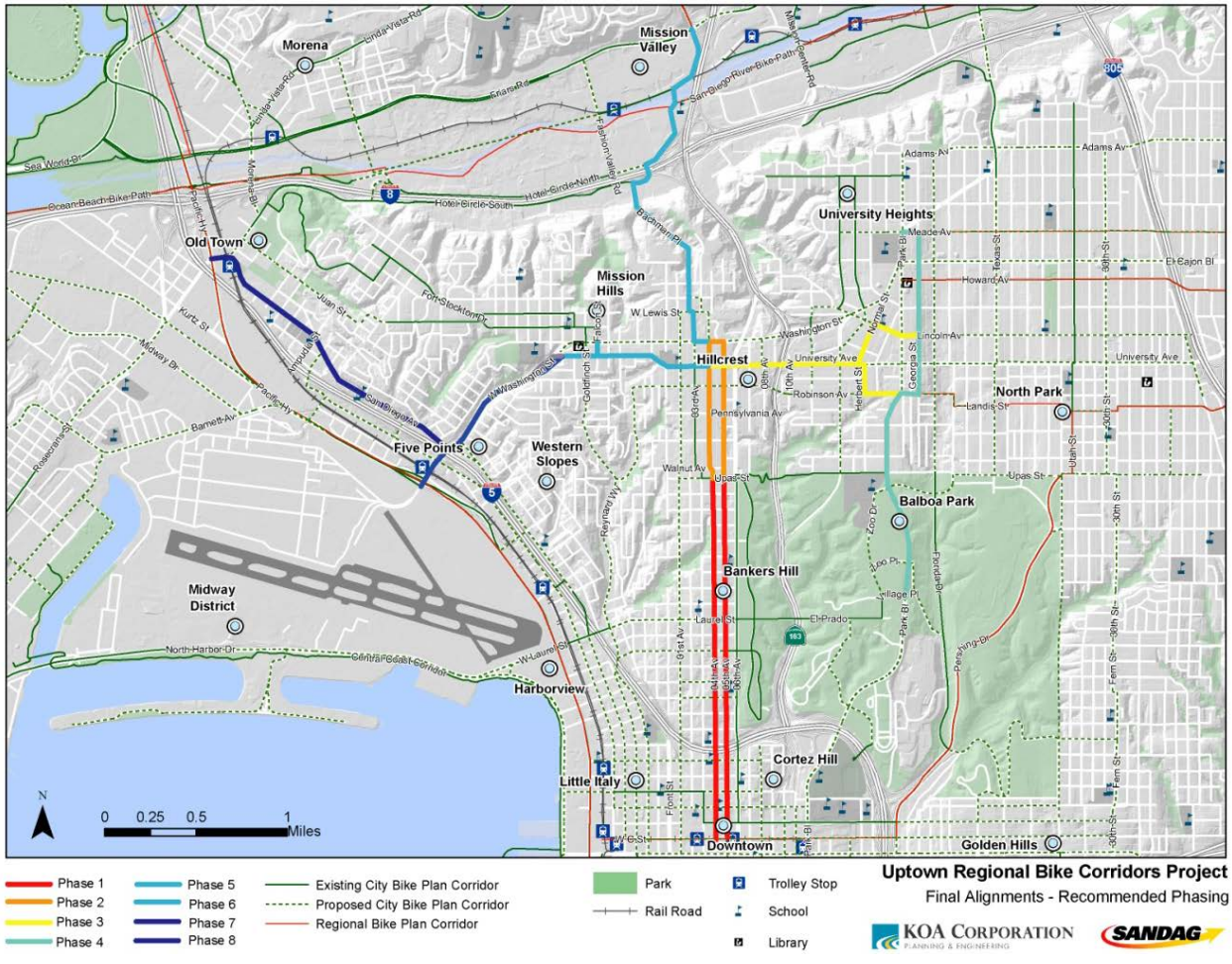
Phase 4: The next logical alignment, considering network connectivity, is the University Heights to Balboa Park. This alignment will provide connectivity to the larger regional bike network and will serve as a north-south corridor linking the alignments implemented during Phases 1 through 3 and the Mid-City projects to the east.

Phase 5: From Hillcrest, there are two options remaining, north and east. The alignment connecting Hillcrest to Mission Hills on University will serve the highest number of people, approximately 5,000.

Phase 6: Two of the three remaining alignments that provide connectivity to the prior phase alignments are Mission Valley to Hillcrest and Five Points to Mission Hills. However, both serve a small population. By evaluating the cost per capita, the alignment with the highest value is identified. The cost per capita of the remaining alignments is shown in Table 4.8. As shown, Mission Valley to Hillcrest costs an estimated $27,500 per capita, whereas Five Points to Mission Hills costs approximately $517,500 per capita. Therefore, Mission Valley is recommended as Phase 6.

Phase 7: Five Points to Mission Hills is the next alignment that connects to the network. It is recommended as Phase 7.

Phase 8: The Old Town to Five Points alignment is recommended to be implemented during the final phase of the Project.



Chapter 1: Introduction

Introduction

The Project

The alignments and conceptual designs presented in this Comprehensive Report are the culmination of the initial planning phase for the Uptown Regional Bike Corridors Project (Uptown Bikeway) conducted primarily over the 2013 calendar year. This three-corridor, 12-mile project will improve travel between the City of San Diego neighborhoods of Uptown, Old Town, Mission Valley, Downtown, North Park, and Balboa Park. The Uptown Bikeway will create inviting and convenient bikeways that link key community destinations, including schools, parks, transit, and commercial centers. The bikeways will feature design elements that enhance the experience for people biking and walking, and will benefit all street users, residents, and neighborhood businesses.

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Project Area

The project area extends north to south in the City of San Diego from Mission Valley to downtown, and west to east from Old Town to University Heights. The project area includes portions of Old Town, Mission Valley, downtown, North Park, and Balboa Park and the Uptown neighborhoods of Five Points, Mission Hills, Middletown, Western Slopes, Hillcrest, Bankers Hill, Park West, and University Heights.

Alignment Analysis Process

The planning process for the Uptown Bikeway began with community outreach and the analysis of existing conditions and alignment alternatives in the Uptown project area. Three tiers of analysis were conducted to identify the most appropriate project alignments and potential conceptual designs. The alignment alternatives and design concepts were evaluated using the following five goals, established with community input:

- **Mobility**: Increase choices; connect communities
- **Experience**: Improve travel safety for everyone, and create an exceptional biking experience
- **Community**: Build on and support related community initiatives
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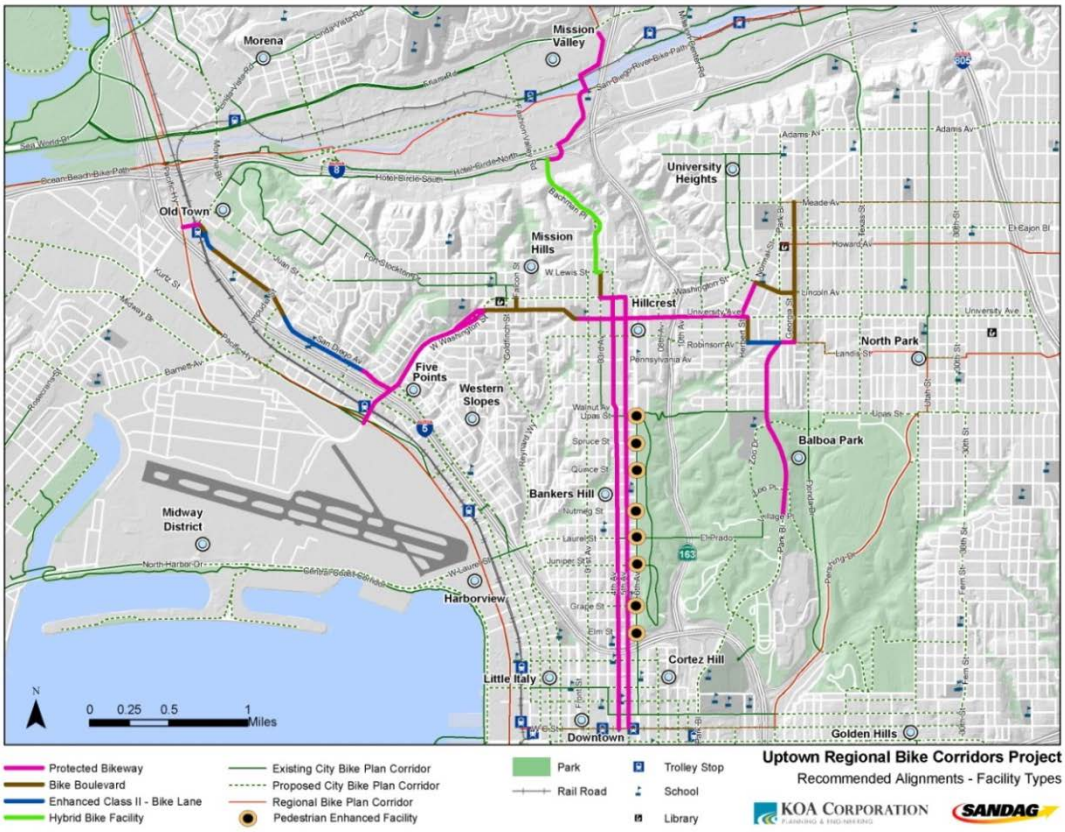
- **Economic Development**: Improve public infrastructure and strengthen opportunities for community and business development

Figure 1.1 – Alignment Analysis Process

Outcomes

The final products of the 2013 planning process are recommended alignments and conceptual designs for each of the three corridors. These conceptual designs will be further analyzed given the relative opportunities and constraints of each during the subsequent preliminary engineering phase.

Figure 1.2 – Recommended Alignments and Facility Type



Report Overview

This report follows the progression of the planning process, moving from evaluation of existing conditions to presentation of the recommended project alignments within the project area.

The second chapter, Existing Conditions, describes the study area in detail, covering existing plans, neighborhood characteristics, and transportation conditions. The third chapter, Community Outreach, reports the community involvement initiatives undertaken for this Project. The final chapter summarizes the Alternative Alignments Development process and includes the information used to develop the recommended project alignments, including a three-tier alternatives analysis, as well as community input and a description of the design process, cost, phasing of the recommended alignments.

Chapter 2:
Existing Conditions

Existing Document Review

The following existing regional, local, and community plans were reviewed as part of the Existing Conditions analysis:

- SANDAG Regional Bike Plan
- City of San Diego Bicycle Master Plan
- 2050 Regional Transportation Plan
- City of San Diego General Plan
- Mid-City Communities Plan
- Greater North Park Community Plan, including Update draft documents
- Uptown Community Plan, including Update draft documents
- University Ave Mobility Plan
- Hillcrest Corridor Mobility Strategy
- Five Points Commercial Neighborhood Parking and Circulation Design
- Old Town Community Plan, including Update draft documents
- The Draft San Diego River Park Master Plan
- Mission Valley Community Plan
- Downtown Community Plan
- Downtown Mobility Plan/Study (Civic San Diego Scope of Work)

An overview of each plan can be found in Appendix A.

Neighborhoods

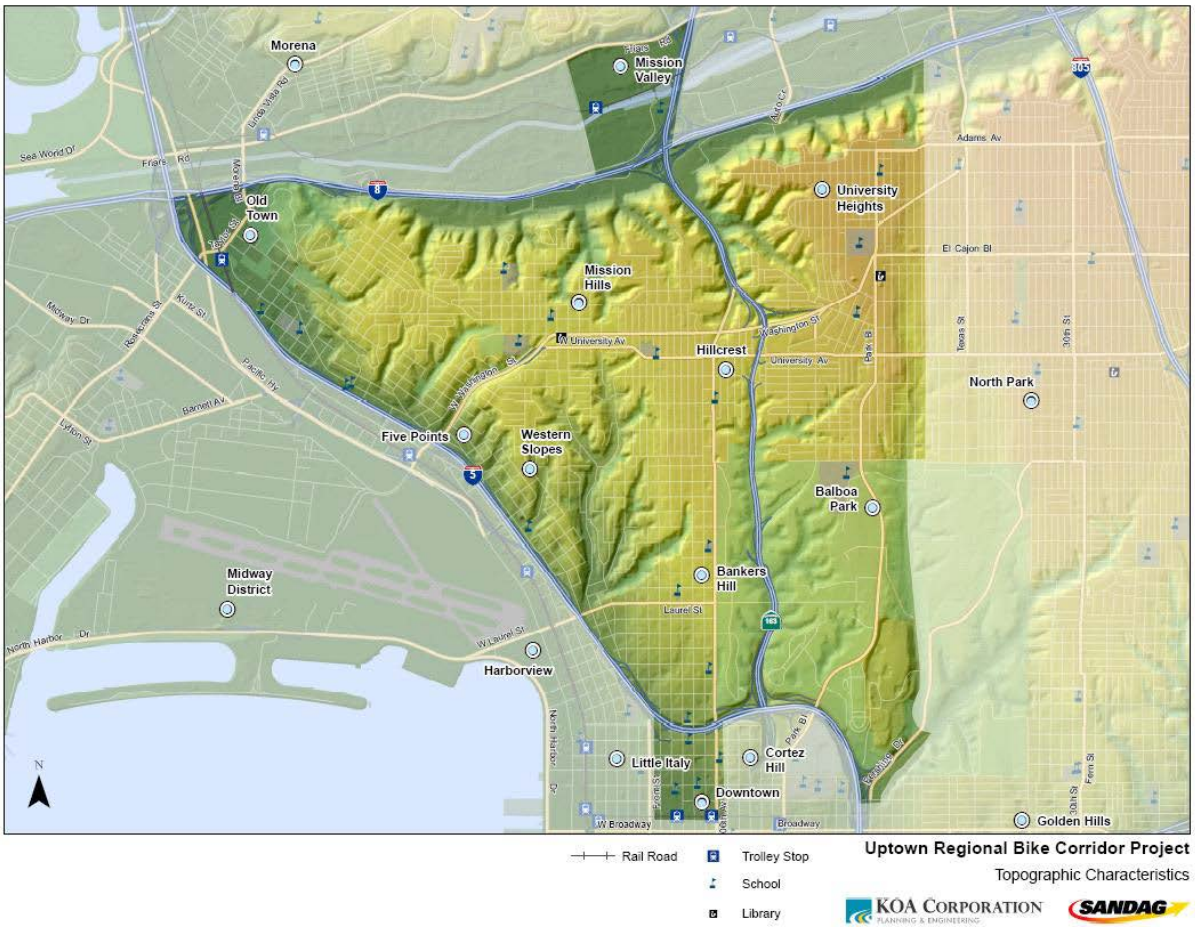
Project Study Area Characteristics

The project study area is comprised by numerous neighborhoods with distinct characteristics. A brief description of each neighborhood, in addition to an overview of the topography, land uses, and demographic characteristics of the project study area, is provided in this section.

Topographic Characteristics

The geographic features of the project area include valleys, canyons, and mesas. While the canyons create natural open spaces, they also separate various neighborhoods. The elevation in the project study area varies greatly with some neighborhoods located at sea level and others as high as 300 feet. Mission Valley, as its name implies, is a valley that runs east-west at sea level on the north end of the project study area. Uptown and Balboa Park are on the mesa on the south end of Mission Valley. Various canyons bisect Uptown and Balboa Park. The mesa slopes steeply on the western edge along the Interstate 5 alignment and the neighborhoods of Old Town, Five Points, and Little Italy. The mesa gradually slopes south to downtown, which is at sea level. Figure 2.1 shows the topographic characteristics of the project area in more detail.

Figure 2.1 – Topographic Characteristics



Land Use

The project study area has a wide range of land uses, including single-family residential, high-density residential, mixed-use, regional commercial, office, and other retail. Mission Hills and Western Slopes are predominantly single-family residential with some mixed-use commercial. University Heights, Hillcrest, and Mission Valley have a mix of office, retail, and higher density residential land uses. Downtown San Diego is the region's central business district and also has become a major residential area. Old Town is a major tourist attraction with a large number of commercial and hospitality land uses. Bankers Hill has a mix of residential, retail, and office land uses. The corridors with greatest variation of land use types are located along India Street, University Avenue, Washington Street, 4th Avenue, 5th Avenue, and around the southern portion of Bankers Hill. Figure 2.2 shows the land uses in more detail.

Figure 2.2 – Land Use

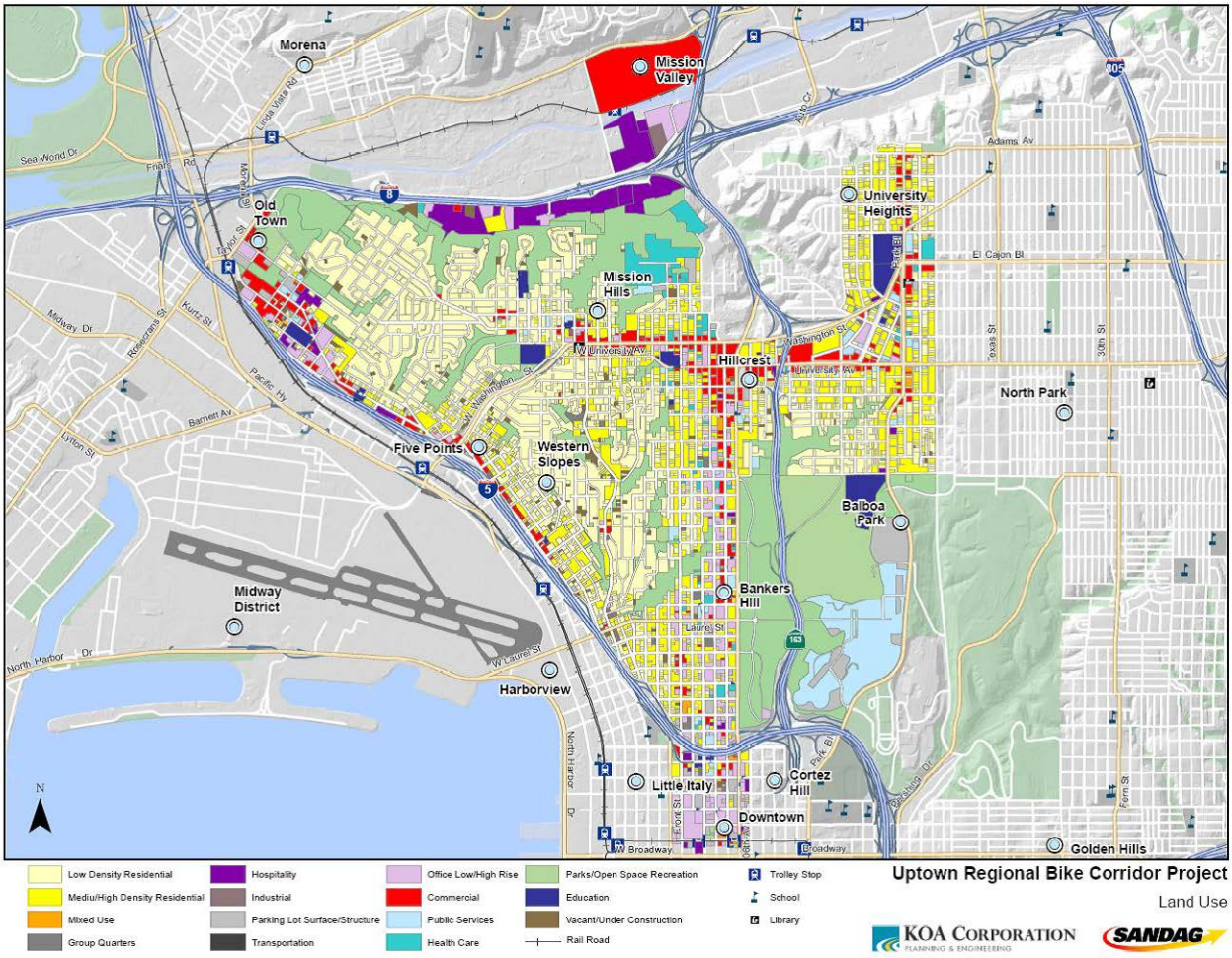
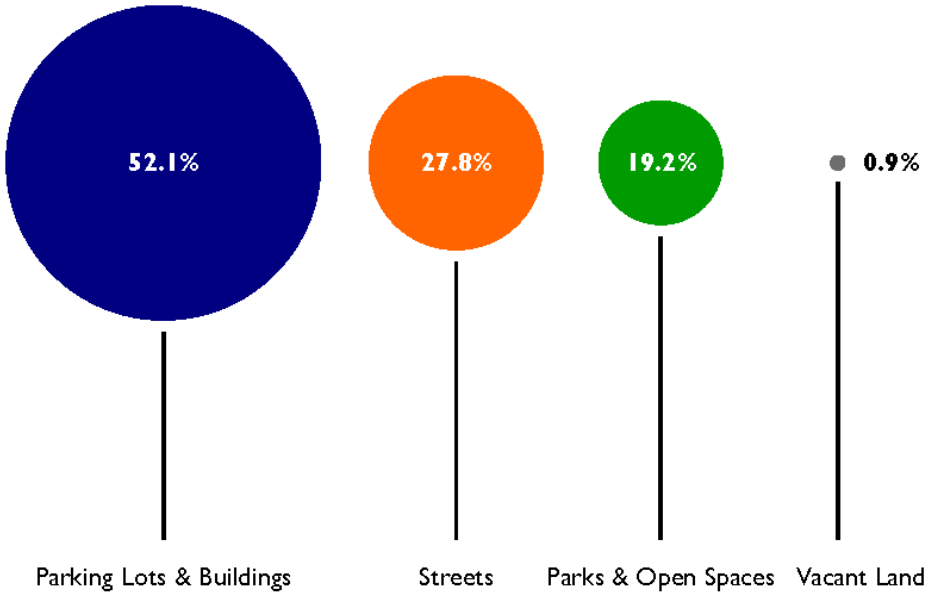


Figure 2.3 shows the percentage of land area by use allocated to parking lots and buildings, streets, parks and open spaces, and vacant land. Over half of the project study area is dedicated to parking lots and buildings and a small percentage (0.9%) consists of vacant land. Parks and open spaces occupy over 690 acres accounting for almost 20 percent of all land uses. Over a quarter of the project area, over 1,000 acres, which is the equivalent to 757 football fields, consists of streets.

Figure 2.3 – Percentage of Uptown Land by Use



Neighborhood Characteristics

The section below provides a brief overview of the various neighborhoods contained within the project area.

Mission Valley

- Located in the center of the City of San Diego and home to large regional shopping centers and high-density housing.
- 2,418 Acres
- Bounded by Interstate 5 (I-5) on the west, Friars Road on the northwest of State Route 163 (SR 163) and by the northern slopes of the valley east of SR 163, on the east by the eastern bank of the San Diego River, and on the south by a significant elevation change.
- Activity centers: Fashion Valley Center, Mission Valley YMCA, Fashion Valley Transit Station.

Old Town

- Historically significant community and home to Old Town San Diego State Park.
- 230 Acres
- Activity centers: Old Town Transit Center Station, which is adjacent to the Pacific Highway. The station is a major intermodal transportation hub providing transfers between city buses, the San Diego Trolley, the San Diego COASTER and the regional rail system of Amtrak. Also, the Old Town State Historic Park, Presidio Park, Heritage Park, and Fremont Elementary School.

Mission Hills

- Includes the areas west of Reynard Way, Curlew Street, and Dove Street.
- 711 Acres
- Primarily a residential community consisting of single-family residences interspersed with multifamily dwellings and some commercial.
- Due to the numerous canyons, the community is characterized by curvilinear, non-continuous streets.
- Activity centers: Mission Hills Library, Grant Elementary School, St. Vincent De Paul Elementary School, Mission Hills Park, Pioneer Park, business corridor along Washington Street, Goldfinch, and Fort Stockton Drive.

Downtown/Center City Communities

- Bounded by Laurel Street and Date Street on the north, 17th Street on the east, the San Diego Bay on the west, and Commercial Street on the south.
- 960 Acres
- In general, includes financial and central business district with numerous government buildings and commercial areas.
- Activity centers: Central Business District, Department of Justice Library, California Law Institute, Cal Western School of Law Library, City Tree Christian School.

University Heights

- Includes the area north of Washington Street and Lincoln Avenue and east of SR 163, south of the Mission Valley community plan area and west of Park Boulevard.
- 698 Acres
- In general, includes commercial and higher density residential uses along and near Park Boulevard, with residential densities decreasing west of Park Boulevard.
- Activity centers: Alice Birney Elementary School, San Diego City Schools Education Center, commercial corridors along Park Boulevard.

Hillcrest

- Bounded by Washington Street on the north, Curlew Street on the west, Upas Street on the south and Park Boulevard on the east.
- 821 Acres
- Contains a wide variety of multifamily residential developments, with some single-family homes located along the fringes of both the commercial and higher density residential areas.
- The commercial core generally consists of the area south of Washington Street, north of Robinson Street, east of 3rd Avenue, and west of 6th Avenue.
- Activity centers: Florence Elementary School, Fleur De Lis School, Unitarian Cooperative Preschool, UC San Diego Medical Center.

Middletown/Five Points/ Western Slopes

- Located between Old Town and Centre City, and historically includes areas to the west and south of I-5. Subdivisions of Mission Hills.
- See Mission Hills for acreage information.
- Mix of single-family and multifamily development, along with a variety of commercial uses on India Street.
- Activity centers: International Restaurant Row in the Five Points Neighborhood, Washington Street Trolley Station.

Bankers Hill

- Bounded by Upas Street on the north, Balboa Park on the east, I-5 on the south, and Curlew Street and Reynard Way on the west.
- 309 Acres
- Largely characterized by a historic grid street pattern and a variety of land uses ranging from older urban, single-family neighborhoods isolated by canyons to multifamily residential units and professional offices.
- Activity centers: Museum School, Beth Israel Park, Urban Discovery Academy, commercial corridors along Reynard Way, First Avenue, and on 5th Avenue.

Balboa Park

- Located east of Bankers Hill.
- 1,200 Acres
- Main entrance located on El Prado through the Cabrillo Bridge, over SR 163. Numerous entrances along Park Boulevard.
- Activity centers: San Diego Zoo, over 10 museums and many other regional cultural and entertainment facilities, walking paths, and gardens.

Project Area Residents

Based on the 2010 Census, the City of San Diego total population is 1,296,437; of those, 79 percent are adults (18 years and older) and 19 percent of the population is school age. Within the project area, the total population was 64,664 with 92 percent of adults and 5 percent of the population school age.

The average age of residents within the project area is higher than the City of San Diego average by about 5 years and the population of seniors is larger than the citywide by 4 percent. The project area has a much higher percentage of population ranging between 20 and 39 years of age than the city average, as shown in Figure 2.5. This segment of the population is the most physically active age group.1 Forty-four percent of the population in the project area is among the most physically active age group.

Figure 2.4 – Percentage of Adult and School Age Population

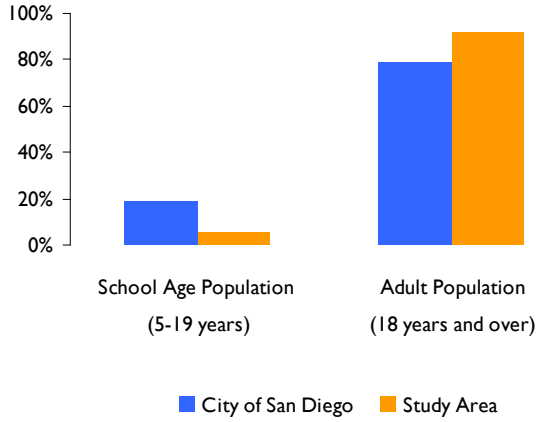
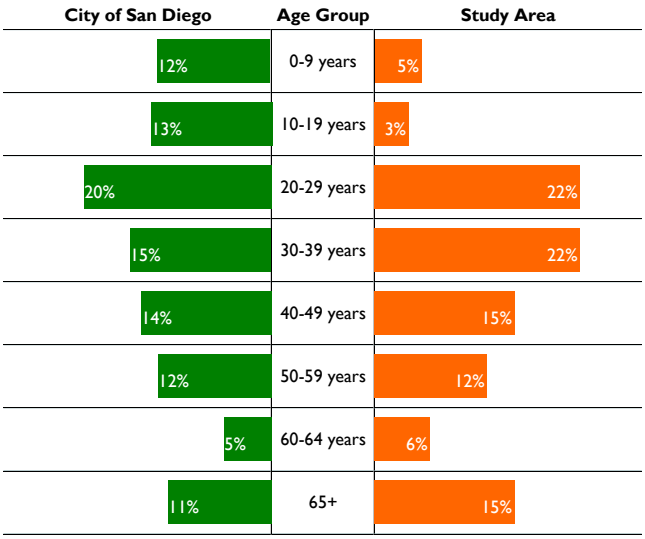


Figure 2.5 – Percentage of Population by Age Groups



44 percent of the population in the project area is among the most physically active age group.

[1] According to the International Journal of Behavioral Nutrition and Physical Activity, physical activity declines with age, at least a difference of 10 percent in the older adults (ages 40-65) compared to the younger age group (age 18-39).

Existing Bicycle Conditions

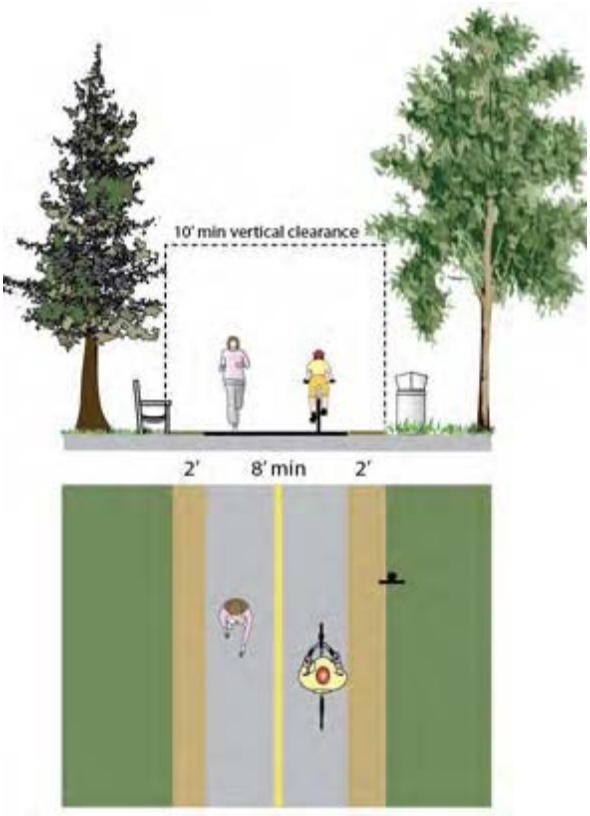
The existing bicycle conditions within the study area including bikeway classifications, existing bicycle facilities, census data on people riding bikes to work, where reviewed and a bicycle connectivity analysis was conducted to confirm previously identified gaps in the bikeway network and inform the alignment analysis and the development of design concepts.

Bicycle Classification

Bicycles can provide convenient transportation for destinations ranging between one and five miles. More experienced riders may be comfortable commuting up to 20 miles provided there are adequate bicycle facilities. The Regional Bike Plan identifies five Regional Corridor Classifications.

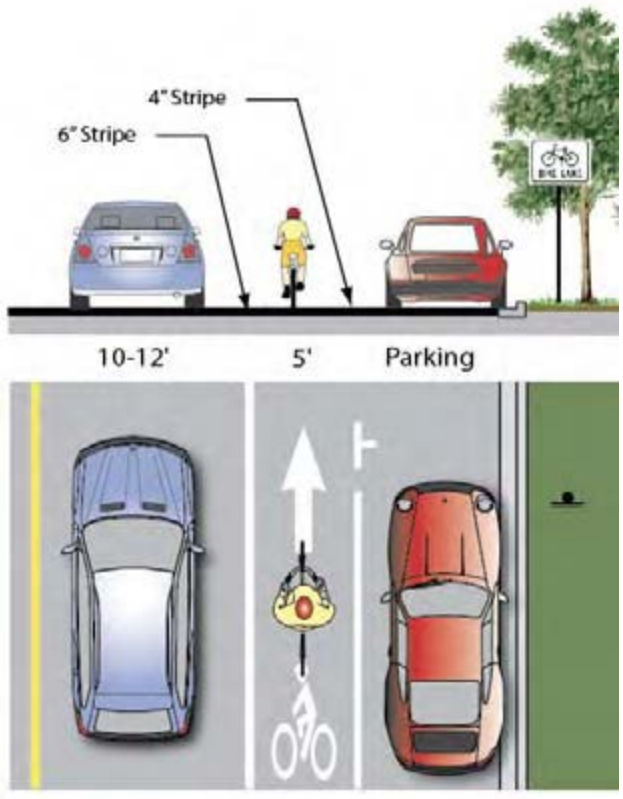
Class I – Bike Path

Bike paths are bikeways that are physically separated from vehicular traffic. Also termed shared-use paths, bike paths accommodate bicycle, pedestrian, and other non-motorized travel. Paths can be constructed in roadway right-of-way or independent right-of-way. Bike paths provide critical connections in the region where roadways are absent or are not conducive to bicycle travel.



Class II - Bike Lanes

Bike lanes are defined by pavement markings and signage used to allocate a portion of a roadway for exclusive or preferential bicycle travel. Within the regional corridor system, bike lanes should be enhanced with treatments that improve safety and connectivity by addressing site-specific issues. Such treatments include innovative signage, intersection treatments, and bicycle loop detectors.

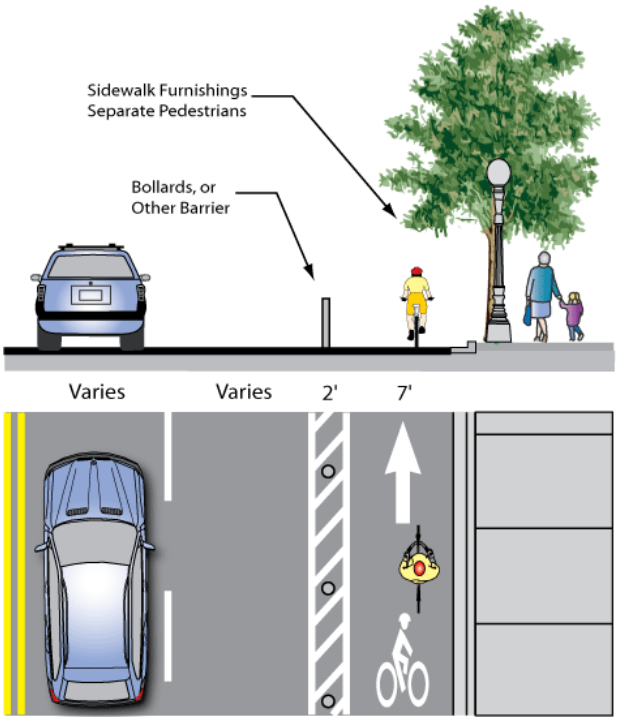


Class III - Bike Routes

Bike routes are located on shared roadways that accommodate vehicles and bicycles in the same travel lane. Established by signs, bike routes provide continuity to other bike facilities or designate preferred routes through corridors with high demand. Within the regional corridor system, bike routes should be enhanced with treatments that improve safety and connectivity by addressing site-specific issues.

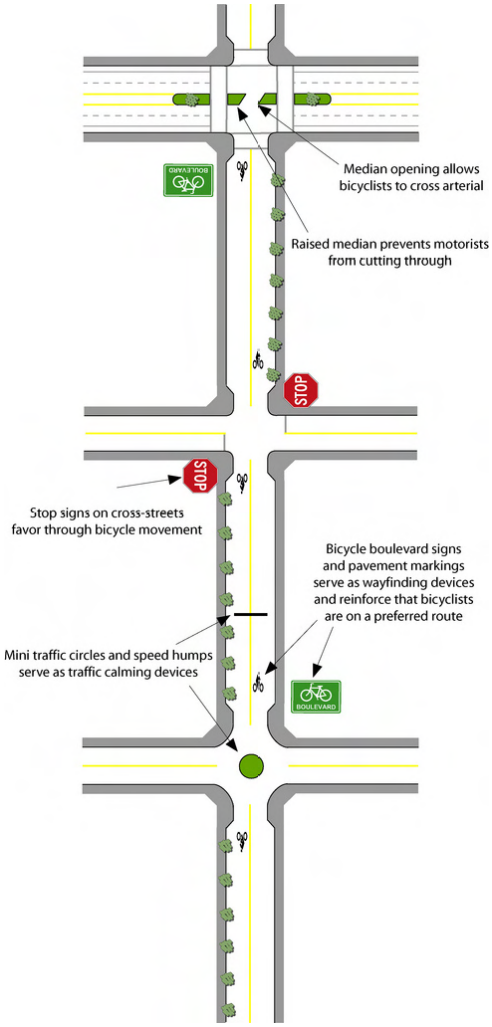
Cycle Tracks | Protected Bikeways

A cycle track, commonly referred to as a Protected Bikeway, or protected Bike Lane, is a hybrid-type bicycle facility that combines the experience of a separated path with the on-street infrastructure of a conventional bike lane. Cycle tracks are bikeways located in roadway right-of-way but separated from vehicle lanes by physical barriers or buffers. Cycle tracks provide for one-way bicycle travel in each direction adjacent to vehicular travel lanes and are exclusively for bicycle use. Cycle tracks are not recognized by Caltrans Highway Design Manual as a bikeway facility. Development of cycle track on segments of the regional corridor system is proposed through experimental, pilot projects.



Bicycle Boulevards

Bicycle boulevards are local roads or residential streets that have been enhanced with traffic calming and other treatments to facilitate safe and convenient bicycle travel. Bicycle boulevards accommodate bicyclists and motorists in the same travel lanes, typically without specific vehicle or bicycle lane delineation. These roadway designations prioritize bicycle travel above vehicular travel. The treatments applied to create a bike boulevard heighten motorists' awareness of bicyclists and slow vehicle traffic, making the boulevard more conducive to safe bicycle and pedestrian activity. Important considerations when determining treatments are vehicle speed and volume reduction along bicycle boulevards. Bicycle boulevard treatments include signage, pavement markings, intersection treatments, traffic calming measures, and can include traffic diversions. Bicycle boulevards are not defined as bikeways by Caltrans Highway Design Manual; however, the basic design features of bicycle boulevards comply with Caltrans standards.



Existing Bicycle Facilities

There is currently a combination of Class I, II, and III bicycle facilities in the project study area. The existing bicycle facilities within the study areas are listed below and shown in Figure 2.6.

Class I:

- Upas Street 7th Avenue to Vermont Street

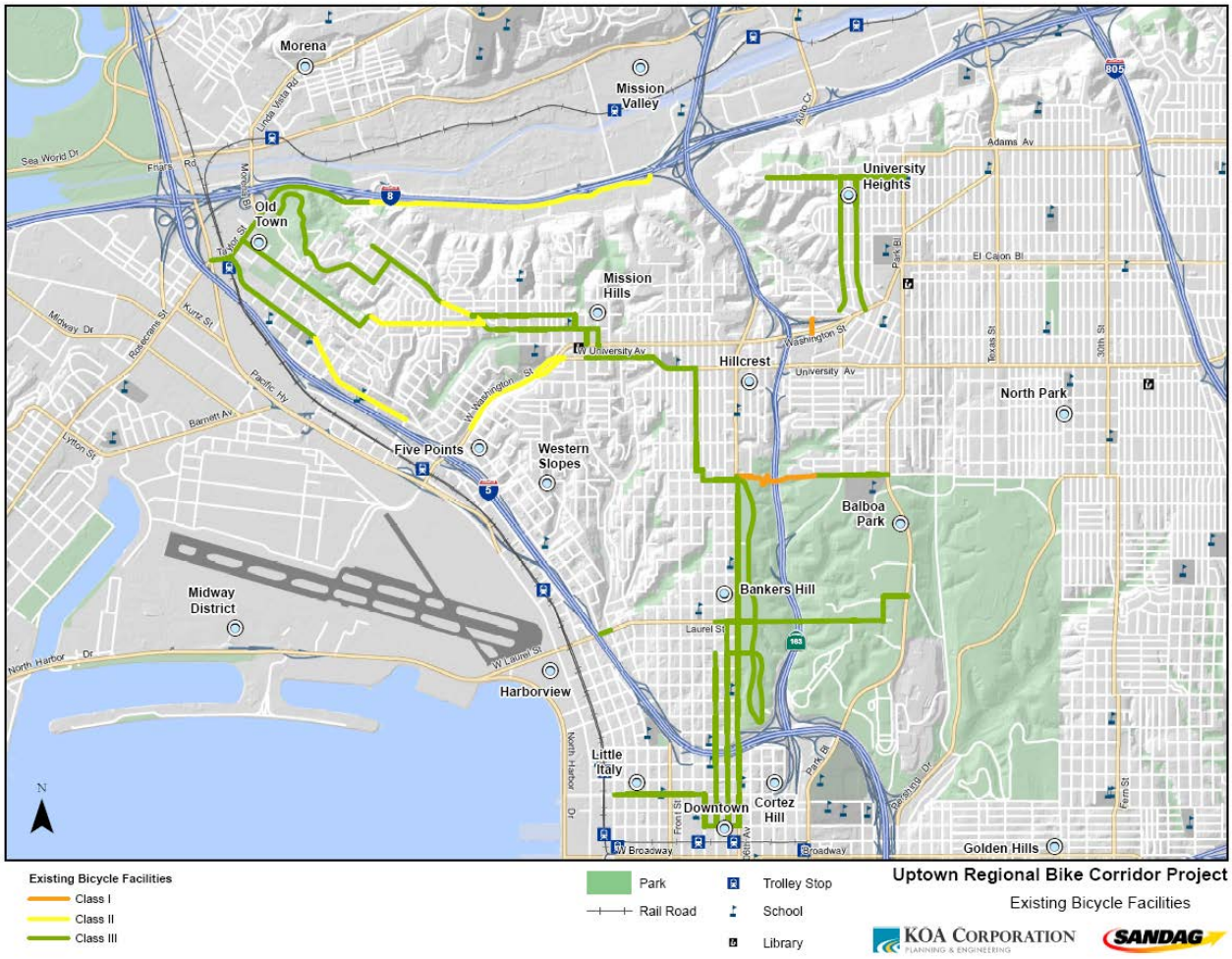
Class II:

- Fort Stockton Drive Witherby Street to Hermosa Way
- Sunset Boulevard from Fort Stockton Drive to Witherby Street
- Lewis Street west of Falcon Street
- San Diego Avenue from Ampudia Street to Sutherland Street
- Washington Street San Diego Avenue to University Avenue
- Hotel Circle South east of Hotel Circle Interstate 8 off ramp
- Madison Avenue New Hampshire Street to North Avenue
- Maryland Street Madison Avenue to Lincoln Avenue
- Cleveland Avenue Madison Avenue to Washington Street
- India Street Laurel Street to Olive Street

Class III:

- Fort Stockton Drive from Witherby Street to Arista Street
- Congress Street from Taylor Street to Ampudia Street
- Juan Street from Taylor Street to Sunset Boulevard
- Presidio Drive from Trias Street to Taylor Street
- Trias Street from Fort Stockton Drive to Presidio Drive
- Taylor Street from Sunset Street to Hotel Circle
- University Avenue from Falcon Street to 3rd Avenue
- 3rd Avenue from University Avenue to Upas Street
- Upas Street from 3rd Avenue to 7th Avenue
- Upas Street from Vermont Street to Park Boulevard
- 6th Avenue south of Upas Street
- 5th Avenue south of Laurel Street
- 4th Avenue south of Juniper Street

Figure 2.6 – Existing Bicycle Facilities



People Riding Bikes to Work

While the work trip is not the only daily trip that could be accommodated by riding a bicycle, it is the trip that has the most data collected. The U.S. Census Bureau provides data about the number of people riding bikes to work. The total number of adults in the City of San Diego categorized as commuters was 630,967, of those 5,679 or 0.9 percent of people commuted to work by bicycle. Within the project area, the total number of commuters was 37,127. Within the project area, the commuter mode share for bicycle ranges from 0 percent to as high as 5.7 percent.

Figure 2.7 shows the percentage of bike commuters in the various communities within the project area. Red indicates the areas of highest use of bike to work; yellow shows areas of moderate usage, while blue areas indicate the lowest percentage of people riding bikes to work. In general, the areas with the highest percentage of people riding bikes to work are University Heights, Hillcrest, and the southern portion of Bankers Hill followed by Middletown and some sections of Mission Hills and Hillcrest.

Figure 2.8 displays both the percentage of people riding bikes to work (represented by color) and the population density (represented by height) within the project area.

Figure 2.7 – Percentage of People Riding Bikes to Work

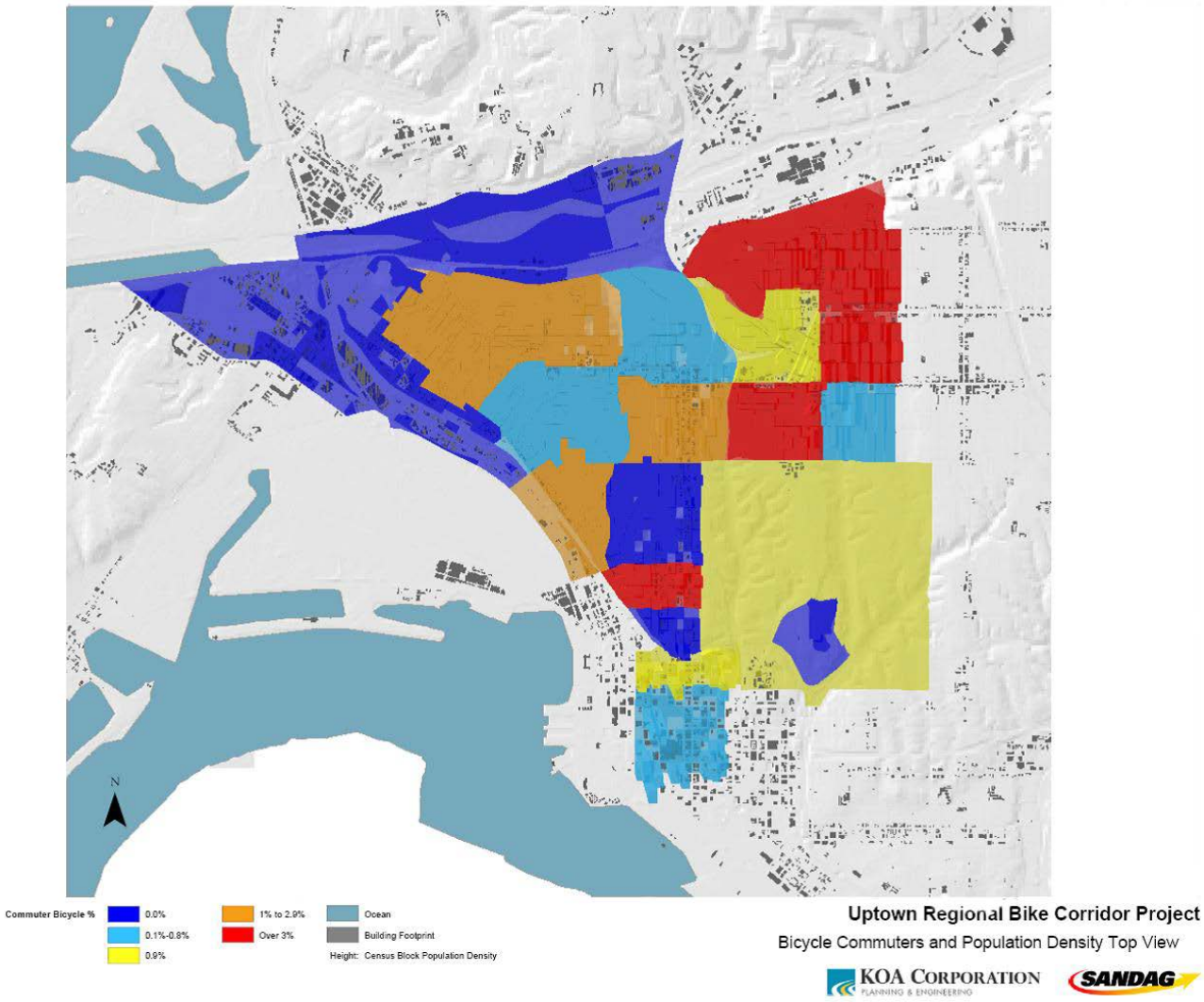
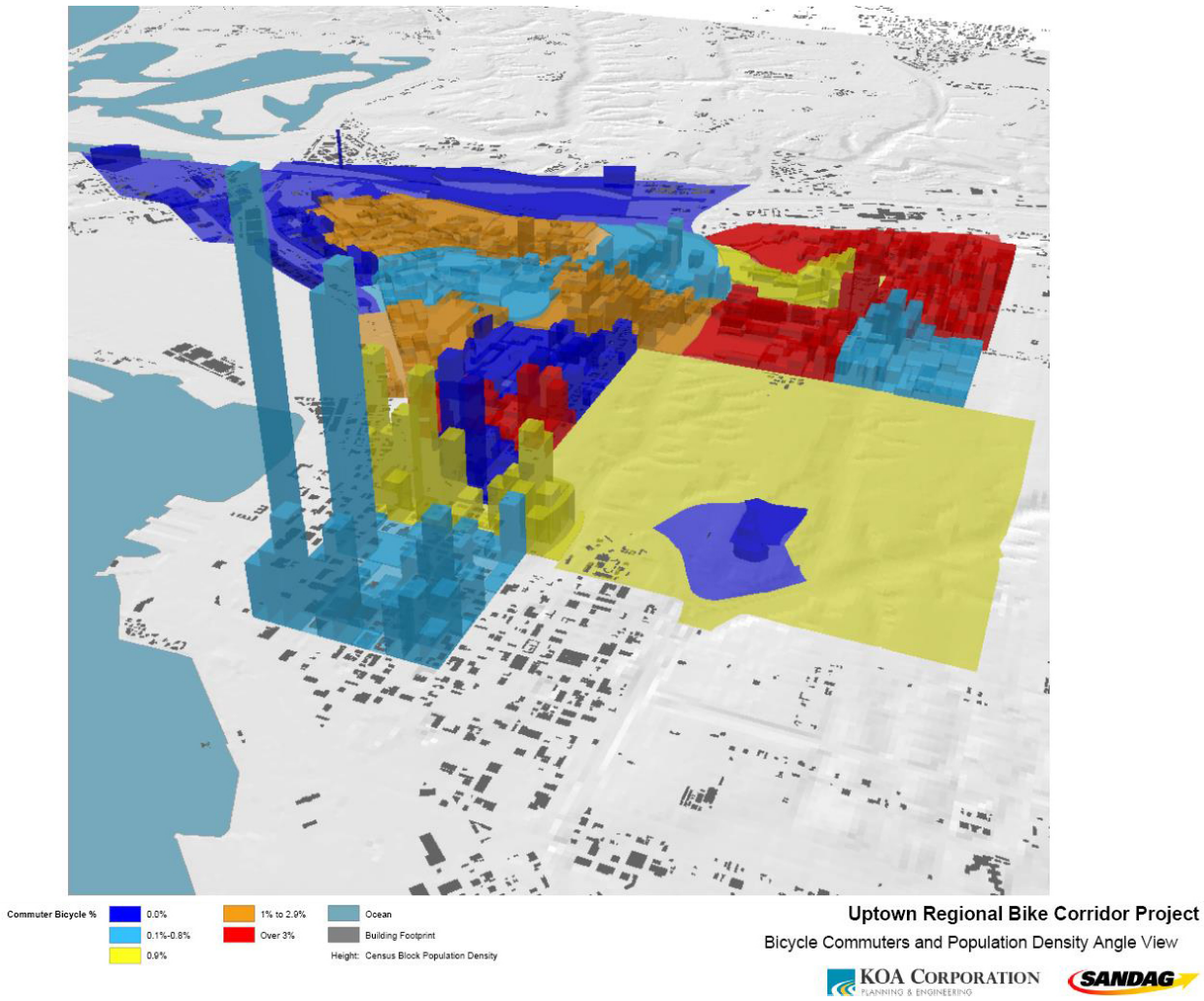
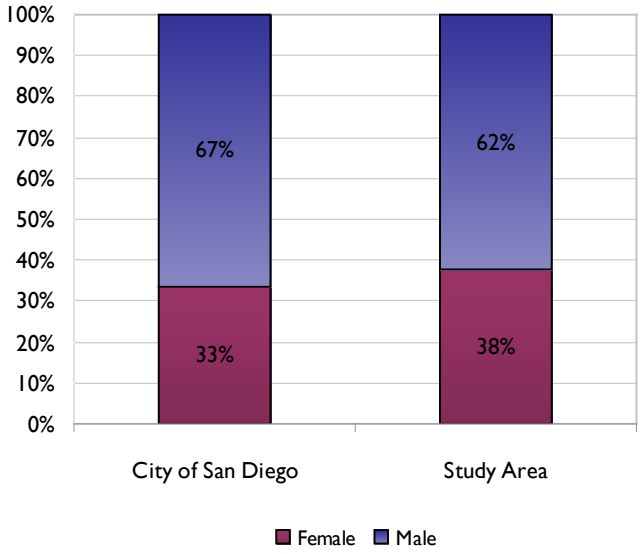


Figure 2.8 – Percentage of People Riding Bikes to Work and Population Density



According to the U.S. Department of Transportation 24 percent of all bicycle trips are made by women and 76 percent by men. When comparing the gender split of people riding bikes to work to the City of San Diego, the study area has a higher percentage of women who commute to work by bicycle. In the City of San Diego 33 percent of the people who bike to work are women and 67 percent are men; in the study area, 38 percent are women and 62 percent are men.

Figure 2.9 – People Riding Bikes to Work by Gender



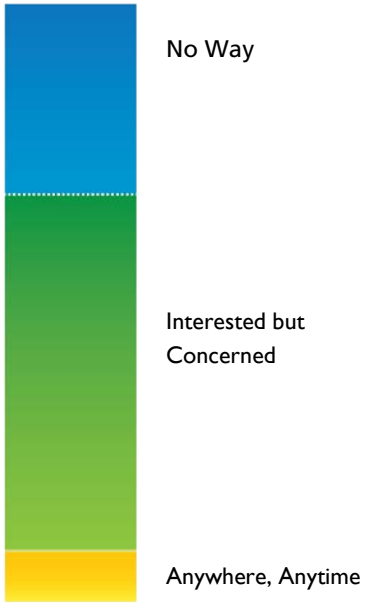
Willingness to Ride a Bike On-Street

City of Portland Bicycle Coordinator, Roger Geller, developed four categories of people's willingness to ride a bike based on a survey of residents' attitude and perception towards available bicycle facilities. Given that 71 percent of Americans say they would like to bicycle more than they do now (Royal, D., and D. Miller-Steiger, 2008), these categories are commonly referred to when planning and designing bikeway facilities and encourage more people to ride bikes for transportation.

1. "Strong and fearless," representing less than 1 percent of the population, are people who would ride on any street regardless of the roadway conditions.
2. "Enthusiastic and confident," representing about 7 percent of the population, are comfortable circulating on streets alongside automobiles, but would prefer to have their own facilities.
3. "Interested but concerned," the largest segment representing 60 percent of the population, are curious about bicycling, but afraid to ride.
4. "No way, no how," includes the segment of the population with no interest in bicycling for various reasons.

SANDAG refined the categories to better fit the local context. The "strong and fearless" and "enthused and confident" were combined and are described as people who are generally willing to ride "anywhere, anytime." The adaptation of Portland's categories to describe the general differences in people's relative propensity for biking, or willingness to ride a bike, is presented in Figure 2.10(a).

Figure 2.10(a) - Proportion of Population and Willingness to Ride



Bicycle Connectivity Analysis

The fundamental attributes for a street network that will attract more people who are "interested but concerned" to ride a bike are direct routes and low traffic stress. In other words, providing routes between people's origins and destinations that do not require people to use streets that exceed their comfort level and tolerance for stressful traffic conditions and that do not involve an undue amount of detours, or out of direction travel.

Traffic stress is determined by four basic factors, the average speed of vehicle traffic, the physical space and separation provided for people riding bikes, the average daily trips (ADT) of vehicles, and the slope of the street. Most people will tolerate a level of traffic stress (LTS) of 1 or 2. Only a small fraction of people will tolerate a level of traffic stress of 4.

Table 2.1 provides an overview of the characteristics of each LTS category, including the corresponding willingness to ride. For this analysis, every street in the project study area was classified by LTS based on the available data for the criteria presented in Table 2.1.

Table 2.1 - Level of Traffic Stress Criteria

	LTS ≥ 1	LTS ≥ 2	LTS ≥ 3	LTS ≥ 4
Speed limit	25 mph or less	26 mph - 34 mph	35 mph - 39 mph	40 mph or more
Street width (through lanes)	2	4, separated by a raised median	more than 4, or 4 without a separating median	-
Grade	5% or less	5%-10%	10%-15%	15% or more
Average Daily Traffic (ADT)	5,000 or less	5,000-10,000	10,000-15,000	15,000 or more
Population Served	All ages Interested but concerned	Most adults Interested but concerned	Anywhere Anytime	< 1%

Figure 2.10(b) illustrates the relationship between the LTS of a facility and the population willing to use that facility; generally, the lower the stress of the facility, the more people are willing to ride on it.

Figure 2.10(b) - Traffic Stress and Willingness to Ride

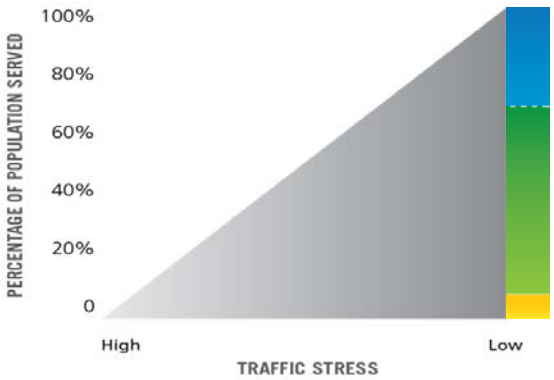


Figure 2.11, displays the overall roadways LTS classification and identifies the LTS hot spots in the street network within the project area. The green areas indicate low-stress streets, while red segments show higher levels of stress based on the LTS ranges listed in Table 2.1. Appendix B contains existing street design details within the project study area, as well as the existing bicycle conditions figures in a larger scale.

The bicycle connectivity analysis displays only the streets that currently serve the average person (LTS 1 or 2 streets) within the Uptown project study area. Roads that have high vehicle speeds, high vehicular traffic volumes, are wide, or have a steep grade, act as barriers (LTS 3 and 4 roads); therefore, bisecting the study area into separate islands of connected streets suitable for the average person.

Figure 2.11 – Roadways Classified by Overall Level of Traffic Stress

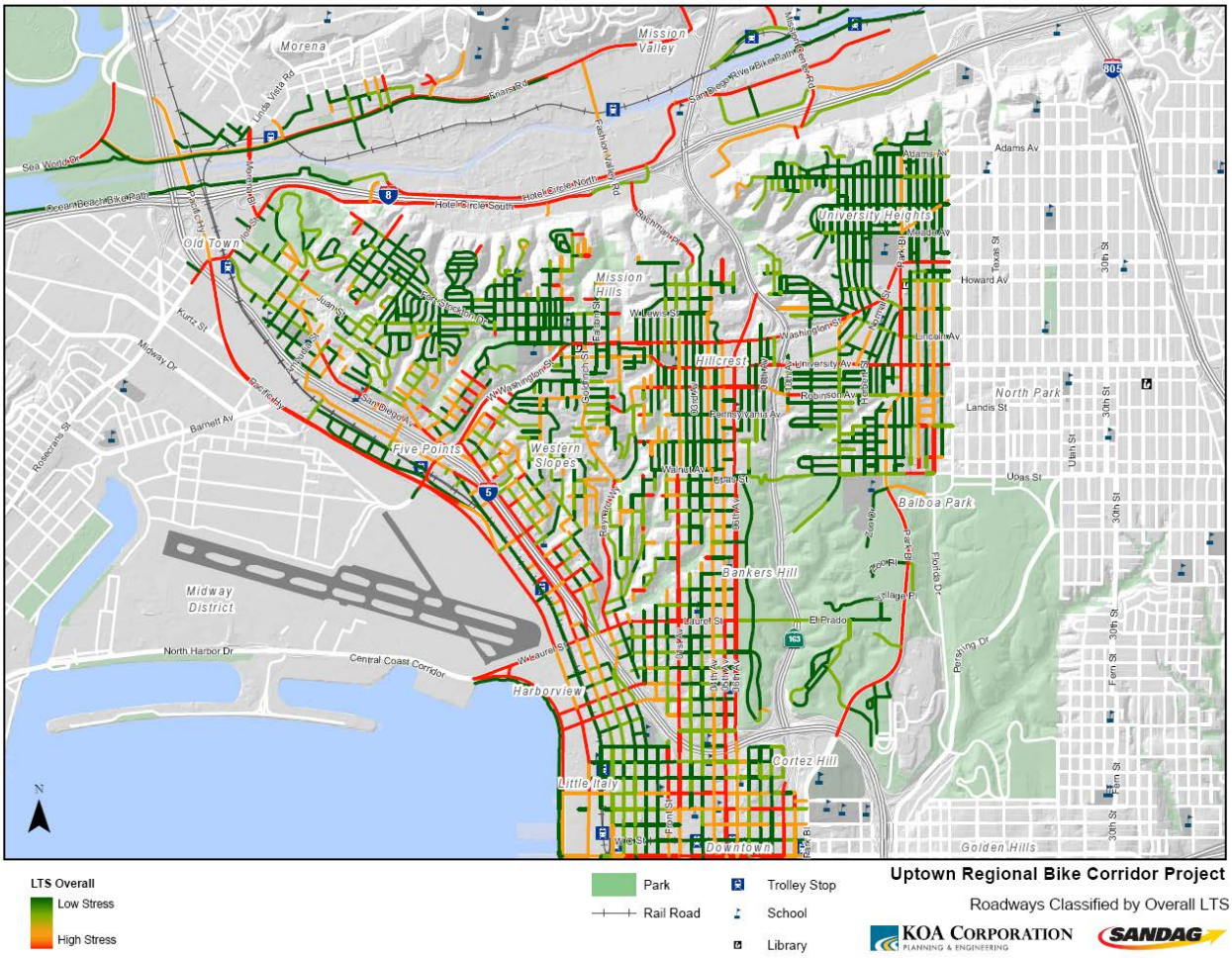
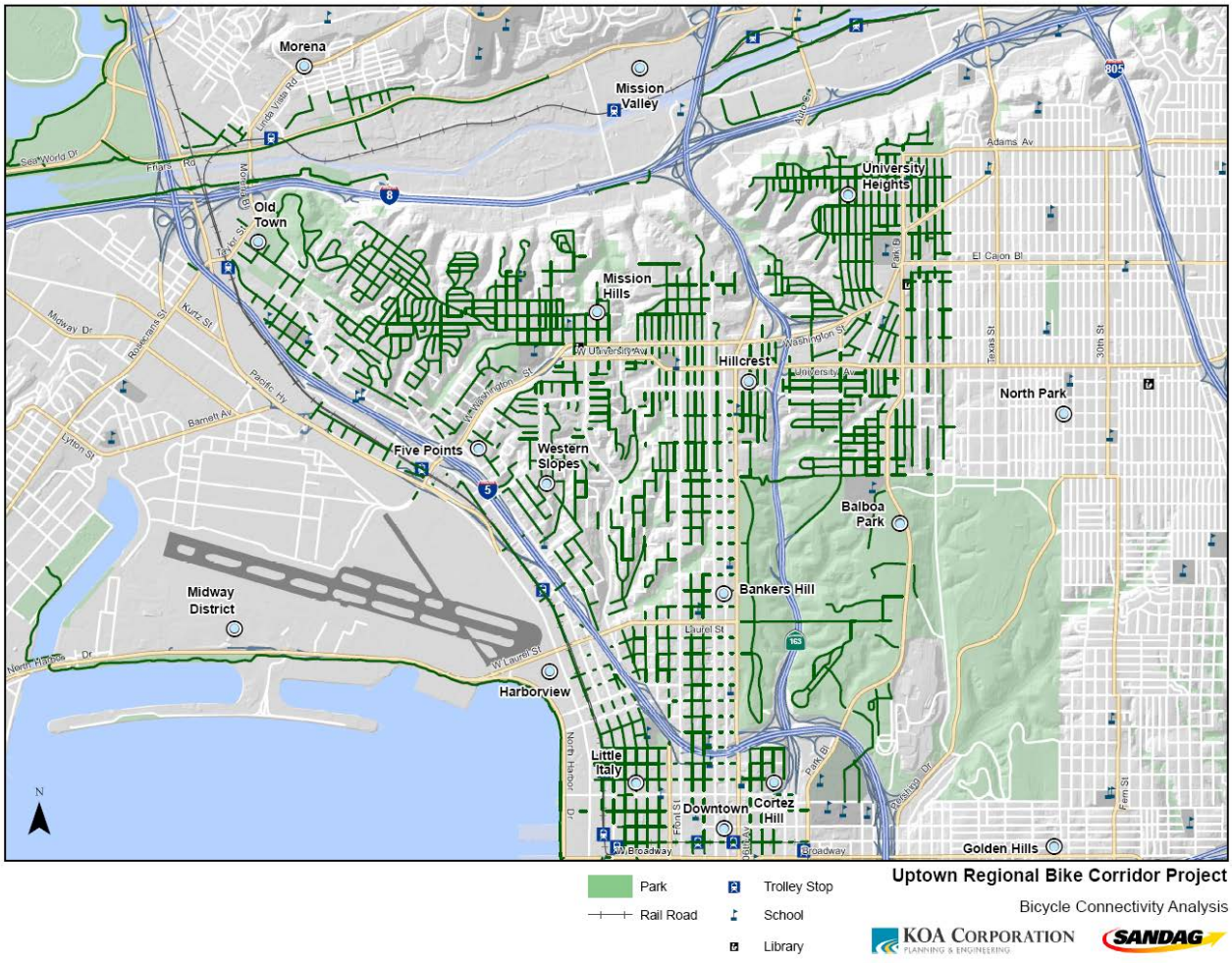


Figure 2.12 shows the clusters of streets where most people would feel comfortable riding a bike on the street. Each cluster, while providing internal connectivity, is disconnected from every other cluster, thereby creating islands within the community. If the entire community is connected by streets that most people feel comfortable riding on, then all streets would be green in color. The greater the number of islands in the network, the less connectivity there is in the community. There are 93 distinct islands of various sizes in the study area.

Figure 2.12 – Bicycle Connectivity Analysis



Pedestrian

Existing Pedestrian Conditions

Due to the design of the street network and the mix of office, retail, and residential land uses, Uptown experiences higher pedestrian activity than most communities in San Diego. Mission Valley has a similar mix of land uses, but has less pedestrian activity than Uptown due to long block lengths, large parcel development, and lack of connectivity between pedestrian-friendly streets found in newer residential developments. Old Town is a major tourist destination and, thus, has high pedestrian activity. Downtown San Diego is the region's central business district and has also become a major residential area as well. Downtown San Diego has a grid street network with short block lengths, is the region's central business district, and has also become a major residential area, resulting in one of the region's highest pedestrian activity areas.

As part of the Uptown Community Plan Update, peak-hour pedestrian counts for 52 intersections were collected in 2010. The weekday counts were collected between 7 and 9 a.m. and between 4 and 6 p.m. Figure 2.13 illustrates the pedestrian volumes at intersections in Uptown. The highest volume of pedestrian activity, for a typical weekday that included morning and evening peaks, in the Uptown community occurred at the intersections of 5th Avenue and University Avenue and at 5th Avenue and Robinson Avenue, with 665 and 558 pedestrians respectively.

Accessibility

An accessible pedestrian network includes contiguous, connected, and well-maintained sidewalks, curb ramps, and street crossings. These facilities should be designed to create a safe and comfortable walking environment for people of all ages and with different ranges of mobility.

Missing Sidewalks

- Washington Street west of Hawk Street and between the SR 163 on/off ramps and Richmond Street
- Richmond Street is missing sidewalks and/or curb ramps a few blocks north of Balboa Park (north of Myrtle Avenue)
- Fourth Street between Palm Street and Spruce Street is missing sidewalks and/or curb ramps

Missing Curb Ramps

- Lewis Street, west of Goldfinch Street
- Fort Stockton Drive, west of Goldfinch Street
- Various other isolated places

Sidewalk Amenities

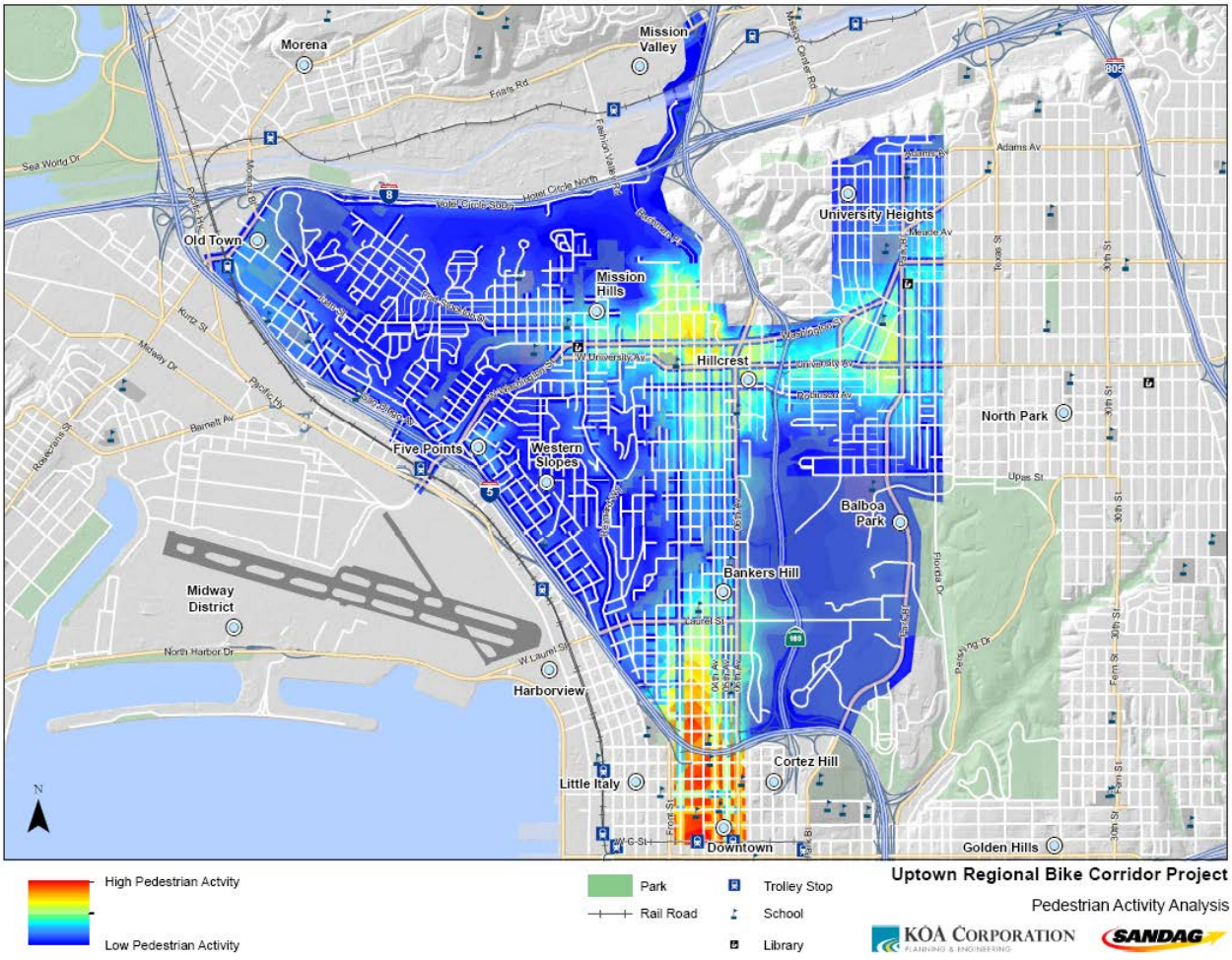
Sidewalk amenities such as street furniture and curb extensions, or pop-outs, improve conditions for walking and encourage pedestrian activity. Pop-outs exist at Washington Street at Goldfinch Street, University Avenue at Vermont Street, and University Avenue at Richmond Street, but few exist elsewhere in the study area.

Pedestrian Analysis

The basic attributes for a pedestrian network are adequate facilities that enable people to reach a number of destinations within proximity, measured by a walking distance commonly accepted as reasonable to most people, typically about a one-quarter mile. Pedestrian activity is usually concentrated around high-density areas, with a mix of residential, offices, and retail land uses. These areas also tend to have access to other community amenities and are typically served by transit. Therefore, the level of pedestrian activity in an area is indicated by the number and variety of destinations within walking distance. These locations within the project area were mapped based on land uses. The closer the activity centers are to one another, the higher the pedestrian activity and considered high opportunity areas.

Figure 2.13 shows the pedestrian activity analysis in the various communities within the study area. Red indicates the areas of highest pedestrian activity; yellow shows areas of moderate activity, while blue areas indicate the lowest pedestrian activity. In general, the areas with the highest pedestrian activity include downtown, Bankers Hill, Hillcrest, Five Points, and Old Town.

Figure 2.13 – Pedestrian Activity

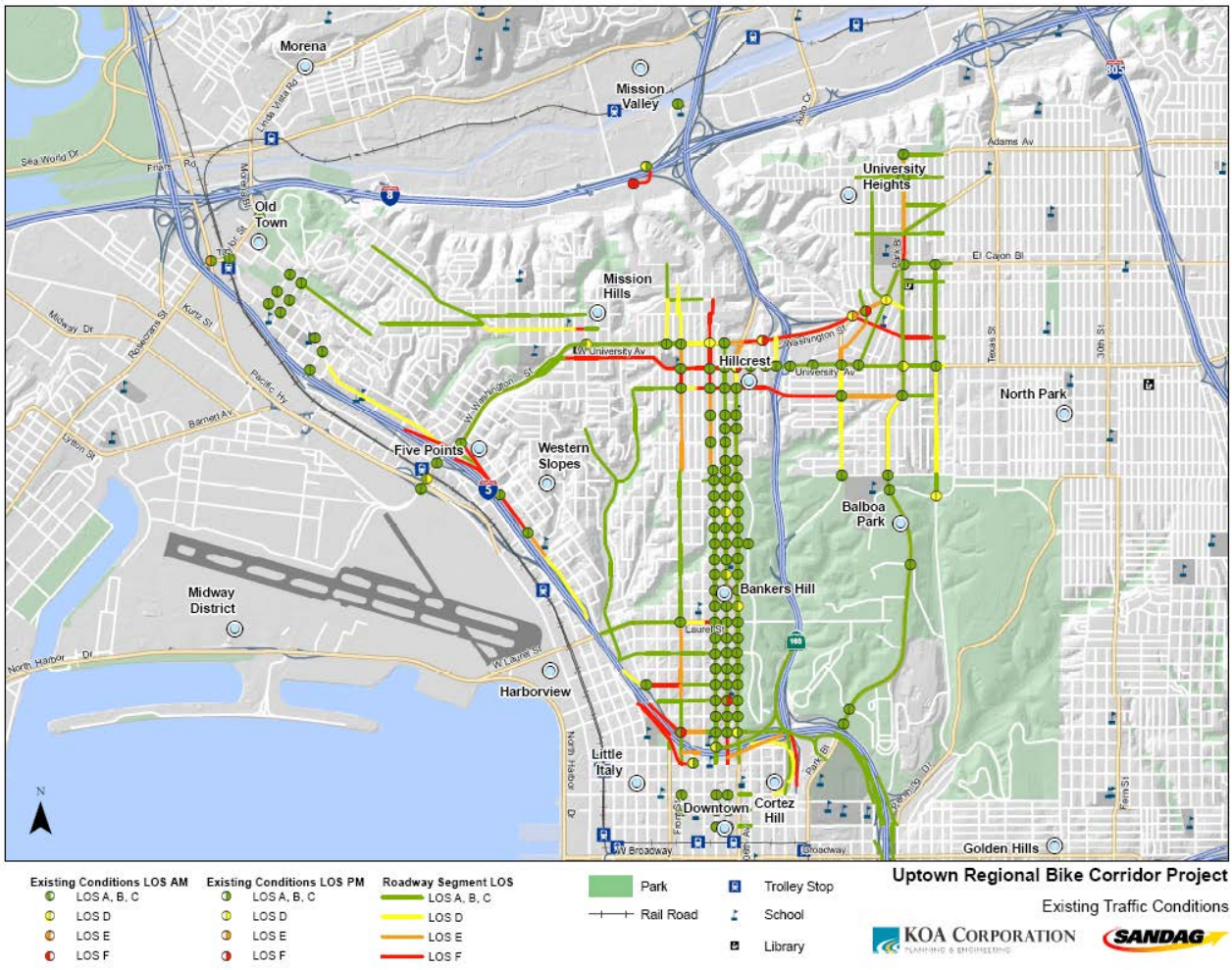


Traffic

Vehicular Traffic Analysis

Peak period turning movement traffic volumes, 24-hour daily traffic volumes, and volumes from ramp meters were analyzed in the study area. Figure 2.14 shows the existing traffic conditions for both intersections and segments. Appendix C contains the traffic analysis methodologies and concepts used in this analysis.

Figure 2.14 – Existing Traffic Conditions



Intersection and Roadway Segment Analysis

In general, the intersections and roadways segments operate between Level of Service A-D during both a.m. and p.m. peak periods throughout the study area. Traffic congestion tends to be localized near freeway ramps and along the east-west connections in Hillcrest across SR 163. A summary table with the intersection analysis can be found in Appendix D.

Screen Line Analysis

A screen line analysis illustrates total volumes and capacity of parallel routes between destinations. The purpose of a screen line analysis is to gain an understanding on the operational capacity of multiple parallel roadways within the project study area. The screen line analysis indicates that most of these roadways have excess available vehicular capacity. Only 35 percent of the available capacity is utilized between Bankers Hill and downtown. Table 2.2 summarizes the screen line analysis results for various neighborhoods in the project area.

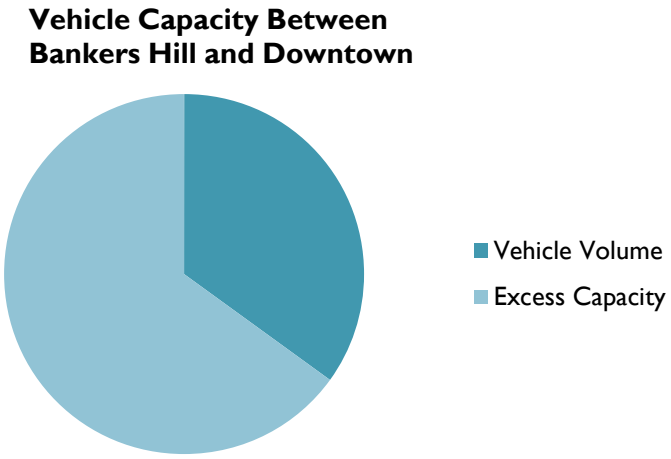


Table 2.2 – Screen Line Analysis Summary

Screenline	Roadway Functional Classification	LOS E Capacity	ADT	V/C
Old Town - Mission Hills: Sunset				
Sunset: India Street to University Avenue	2 Lane Collector (Multifamily, commercial, industrial fronting [MFCIF])	8,000	2,595	0.324
Total	**2 vehicle lanes**	**8,000**	**2,595**	**32%**
Old Town - Five Points: San Diego Ave				
San Diego: India Street to University Avenue	2 Lane Collector (MFCIF)	8,000	4,920	0.615
Total	**2 vehicle lanes**	**8,000**	**4,920**	**62%**
Five Points - Mission Hills: Washington				
Washington: India Street to University Avenue	4 Lane Major Arterial	40,000	27,929	0.698
Total	**4 vehicle lanes**	**40,000**	**27,929**	**70%**
Mission Hills - Hillcrest: University, Washington				
University: India Street to University Avenue	4 Lane Major Arterial	40,000	27,929	0.698
Washington: Ibis Street to Albatross Street	2 Lane Collector (MFCIF)	8,000	10,527	1.316
Total	**6 vehicle lanes**	**48,000**	**38,456**	**80%**
Hillcrest - Hillcrest: Washington - University - Robinson				
Washington: Sixth Avenue to Richmond Street	4 Lane Major Arterial	40,000	41,778	1.044
University: Sixth Avenue to Eighth Avenue	4 Lane Major Arterial	40,000	24,400	0.610
Robinson: Tenth Avenue to Richmond Street	2 Lane Collector (MFCIF)	8,000	21,298	2.662
Total	**10 vehicle lanes**	**88,000**	**87,476**	**99%**
Hillcrest - Bankers Hill: 1st, 4th, 5th, 6th				
1st: Walnut Avenue to Laurel Street	2 Lane Collector (MFCIF)	8,000	4,695	0.587
4th: Walnut Avenue to Laurel Street	3 Lane Major Arterial	25,000	8,492	0.340
5th: Walnut Avenue to Laurel Street	3 Lane Major Arterial	25,000	8,492	0.340
6th: Upas St to Laurel Street	4 Lane Collector	30,000	15,128	0.504
Total	**12 vehicle lanes**	**88,000**	**36,807**	**42%**
Bankers Hill - Downtown: 1st, 4th, 5th, 6th				
1st: Grape Street to Elm Street	2 Lane Collector (MFCIF)	8,000	3,285	0.411
4th: Grape Street to Elm Street	3 Lane Major Arterial	25,000	7,570	0.303
5th: Grape Street to Elm Street	3 Lane Major Arterial	25,000	9,220	0.369
6th: Grape Street to Elm Street	4 Lane Collector	30,000	10,650	0.355
Total	**12 vehicle lanes**	**88,000**	**30,725**	**35%**
Downtown: 1st, 2nd, 3rd, 4th, 5th, 6th				
1st: Elm Street to Cedar Street	5 lane Prime Arterial	50,000	31,475	0.630
4th: Elm Street to Cedar Street	3 lane Major Arterial	25,000	13,916	0.557
5th: Elm Street to Cedar Street	3 lane Major Arterial	25,000	35,959	1.438
6th: Elm Street to Cedar Street	3 lane Major Arterial	25,000	12,059	0.482
Total	**14 vehicle lanes**	**125,000**	**93,409**	**75%**

Transit

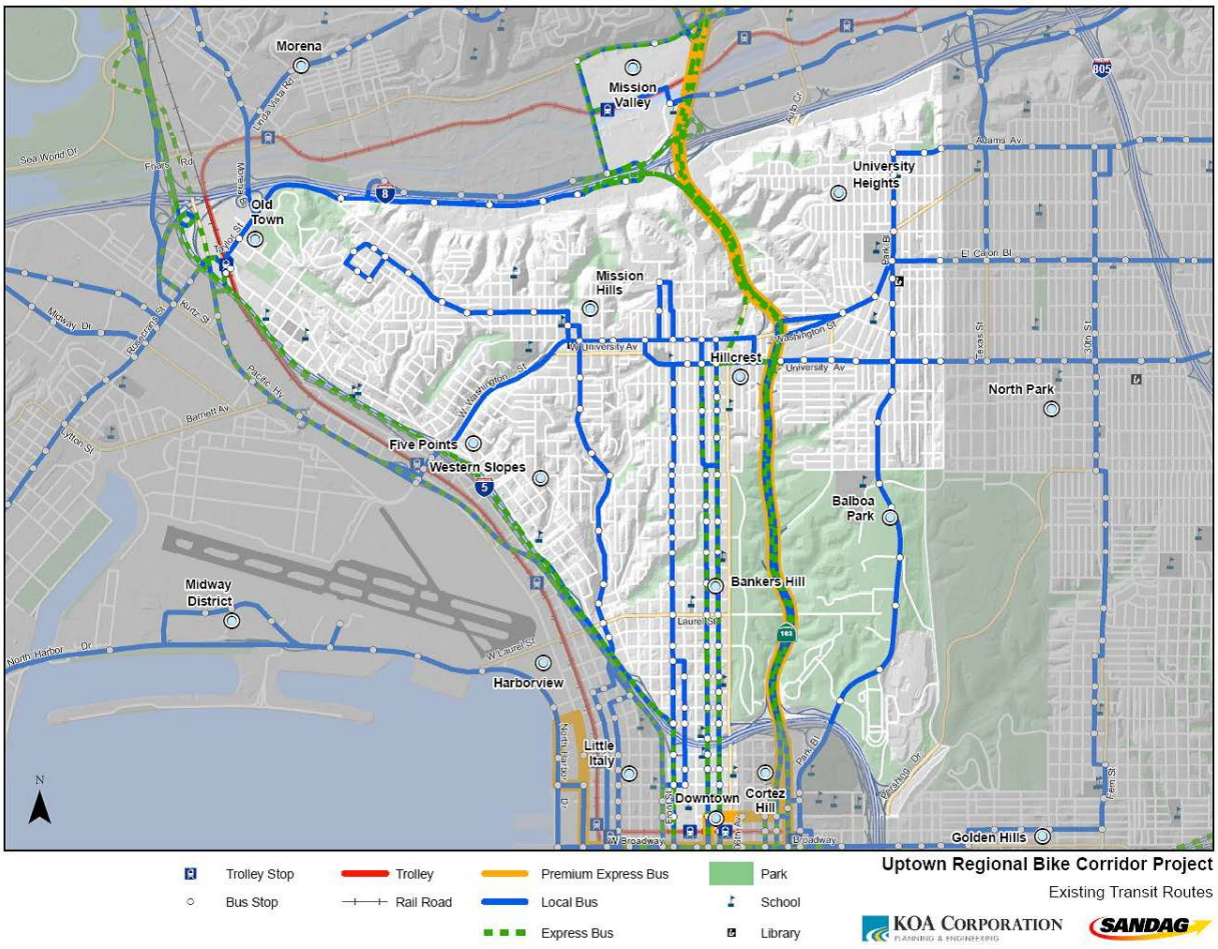
The project study area has a wide variety of transit services including public bus, public light-rail, commuter train, and private shuttles. Within the project study area, the commuter mode share for transit is as high as 17.8 percent, as compared to the city average of 4.1 percent. A brief description of the local, express, *Rapid*, UC San Diego shuttle, and COASTER Commuter Rail services is provided below. Additional information on transit routes serving the project area can be found in Appendix E.

Metropolitan Transit Service Bus Service

The project study area is served by eight local bus routes, two express routes, and one pending *Rapid* route operated by Metropolitan Transit Service (MTS). In general, local bus routes operate seven days a week with frequent stops along the service route. On express routes, the bus stops are often spaced farther apart to allow faster service. Express routes are only operational during the weekdays. Each route is described in more detail below.

Typically the vehicles used by MTS are low-floor with multiple entry/exit doors and utilize electrical lifter platforms to facilitate boarding of disabled riders. Some routes with high ridership, like Route 7, use articulated buses. Figure 2.15 shows existing bus routes.

Figure 2.15 – Existing Metropolitan Transit Service Bus Routes and Trolley Stops



Bus Stops

A typical bus stop will have, at a minimum, signage to indicate its location. In respect to more connectivity and amenities for people walking and biking, a stop also may have a bench or shelter with route information; however, most stops do not have designated bicycle parking or other supporting facilities. People who ride a bike to a bus stop are expected to ride to the bus stop location and walk their bike over the curb or to ride on the sidewalk to the bus stop. Figure 2.16 shows a typical bus stop in the project study area.

Figure 2.16 – Typical Bus Stop

The *Rapid* stops within in the project study area will be located in a large median with a designated bus lane guideway. The stations will have shelters and seating. They will be similar to local bus stops, in terms of accessibility for people walking or riding bikes. *Rapid* is expected to add additional stops and features in later phases of the Project, between the intersection of Park Boulevard and University Avenue to the downtown terminus.

Bicycles on Bus

Every MTS bus is equipped with a rack that can hold two bicycles. People riding bikes can put their bicycles on the buses free of charge.

Metropolitan Transit Service Light Rail (Trolley) Service

MTS operates the light rail system, called the Trolley, serving the project study area. The existing trolley is a fixed-guideway electric rail system that operates at street level and is elevated at some locations along the service line. The existing trolley system consists of three service lines: Blue, Green, and Orange. The existing trolley system uses multiple cars and can operate safely in high pedestrian activity areas linking activity centers throughout the region.

Trolley Stops

The existing MTS Trolley lines provide connectivity between key locations throughout the San Diego region including major centers of employment, retail, residential, and institutional zones. There are four trolley/train stations within or near the project study area.

- Fashion Valley Transit Center (Green Line Trolley/Amtrak/COASTER)
- Old Town Transit Center (Green Line)
- Washington Street (Green Line)
- 5th Avenue/C St (Blue/Orange Lines)

Most stations also serve as transfer points for some local bus routes, while others offer vehicular parking, connections to express bus routes, or other rail modes. The existing conditions of the stations are described individually in the Appendix.

Bicycles on Trolley

People with bicycles are allowed to board the last door of each Trolley car. One bike is allowed on board during rush hours and two bikes are allowed on board during all other times.

COASTER Commuter Rail

The COASTER commuter train provides service between Oceanside and Downtown San Diego. More than 20 trains run on weekdays, with additional service on the weekends. Within the project study area, the COASTER has a designated stop at Old Town Transit Station and passes by the Washington Street Trolley station.

UC San Diego Shuttle

The Hillcrest/Campus Shuttle is a service provided by UC San Diego to staff and students. The shuttle operates year-round between 5:50 a.m. and 9:45 p.m. weekdays (excluding university holidays) between UC San Diego Medical Center in Hillcrest, Old Town Transit Center, and Thornton Hospital in La Jolla.

Placemaking Opportunity Analysis

Placemaking refers to how a community collectively shapes public spaces to maximize shared value at the heart of each neighborhood. Placemaking involves planning, management, and design of public spaces within a given community.

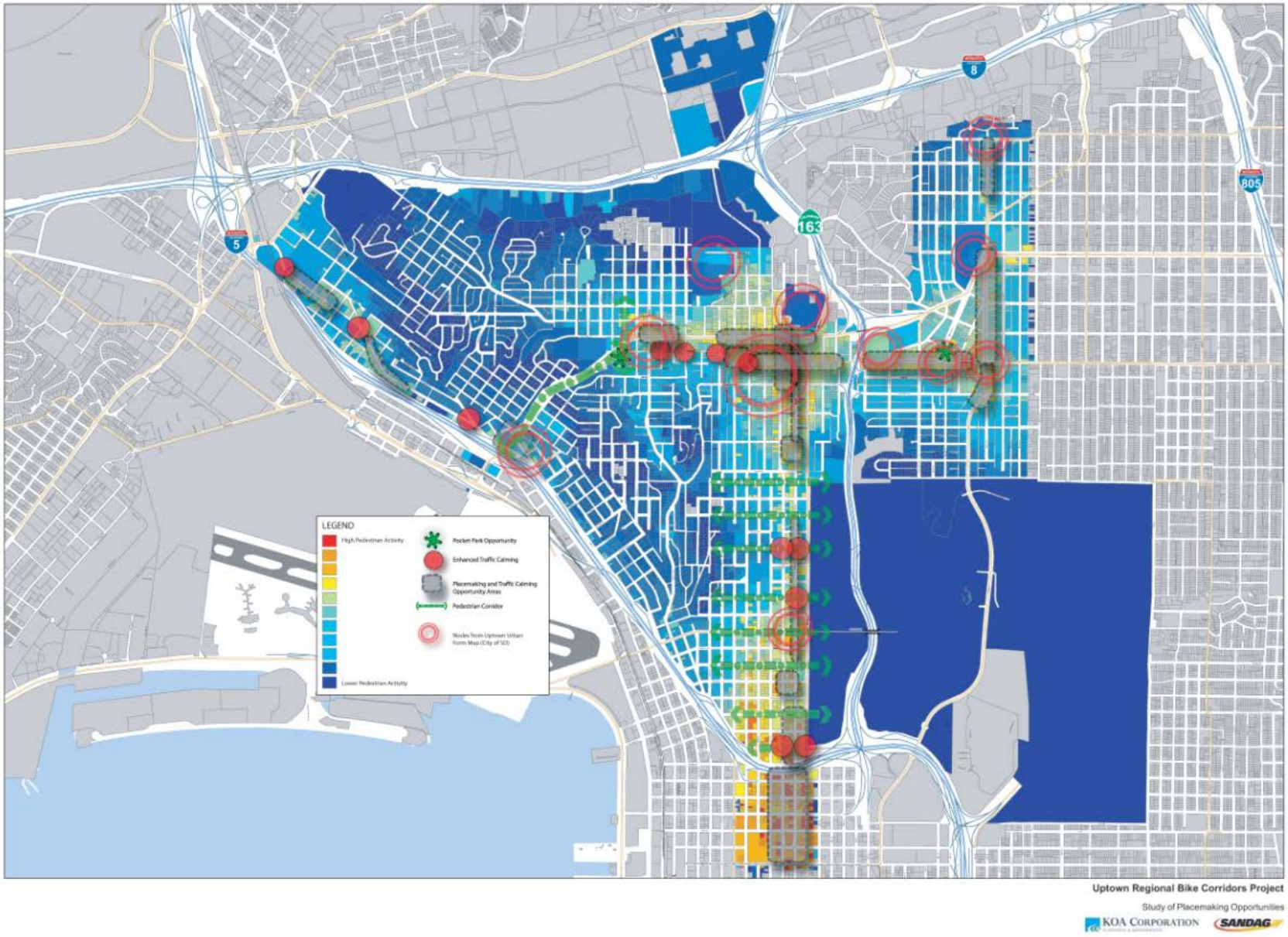
Where Placemaking is Needed Most

The placemaking analysis is similar to the pedestrian activity analysis, but refined in order to determine where opportunities for placemaking exist. The basic attributes for a pedestrian network are adequate facilities that enable people to reach a number of destinations within a close proximity, measured by a walking distance commonly accepted as reasonable to most people, typically about a one-quarter mile. Pedestrian activity is usually concentrated around high density areas, with a mix of residential, offices, and retail land uses. These areas also tend to have access to other community amenities and are typically served by transit. Therefore, the level of pedestrian activity in an area is indicated by the number and variety of destinations within walking distance. These locations within the project area were mapped based on land uses. The closer the activity centers are to one another, the higher the pedestrian activity and considered high opportunity areas. These high opportunity locations were then field verified and the results adjusted accordingly. Finally, other known capital investments and community initiatives were overlaid. Some of the community initiatives included in the analysis are: proposed enhanced traffic calming at various locations, including Washington Street and San Diego Avenue and 5th Avenue at Nutmeg, pedestrian corridors to Balboa Park, nodes identified in the Uptown Community Plan Update and pocket park opportunities, such as the Normal Street linear park concept.

Figure 2.17 shows the result of the analysis of placemaking opportunities in the various communities within the study area. Red indicates the areas of highest placemaking opportunity; yellow shows areas of moderate opportunity, while blue areas indicate the lowest placemaking opportunity. In general, the areas with the highest placemaking opportunity include the core areas of downtown, Bankers Hill, Hillcrest, Five Points, and Old Town.

Due to the design of the street network and the mix of office, retail, and residential land uses, Uptown experiences higher pedestrian activity than most communities in San Diego. Mission Valley has a similar mix of land uses, but less pedestrian activity than Uptown due to the long block lengths, large parcel development, and lack of connectivity between pedestrian-friendly streets found in newer residential developments. Old Town is a major tourist destination and, thus, has high pedestrian activity. Downtown San Diego has a grid street network with short block lengths, is the region's central business district, and also has become a major residential area, resulting in one of the region's highest pedestrian activity areas.

Figure 2.17 – Placemaking Opportunities



Safety

This section provides a snapshot of the safety conditions for people walking and biking within the project study area. Data related to collisions between people driving cars and people walking and people driving cars and people riding bikes was generated from the Statewide Integrated Traffic Records System for a five-year period from 2007 to 2011.

The No. 1 reason people do not ride bikes is concern for personal safety.

Source: City Cycling (Urban and Industrial Environments). Pucher, J.; Buehler, R. (2012)

People Riding Bikes Collision Analysis

There were a total of 179 collisions of people riding bikes reported in the study area during the five years between 2005 and 2011, or an average of 36 collisions per year. There was one fatality during the time period (2008). Three collisions resulted in a severe injury and an additional 83 collisions resulted in some other type of evident injury.

Figure 2.18 shows the corridors where five or more collisions between a person driving a car and a person riding a bike were reported. Between 2007 and 2011, the corridor with the highest incidents of collisions between persons driving a car and riding a bike is University Avenue, followed by 4th Avenue, Washington Street, and Park Boulevard. The high number of collisions along these corridors could be attributed to either safety deficiencies or due to higher numbers of people riding bikes.

Figure 2.18 - Summary of People Riding Bikes Collisions by Corridor

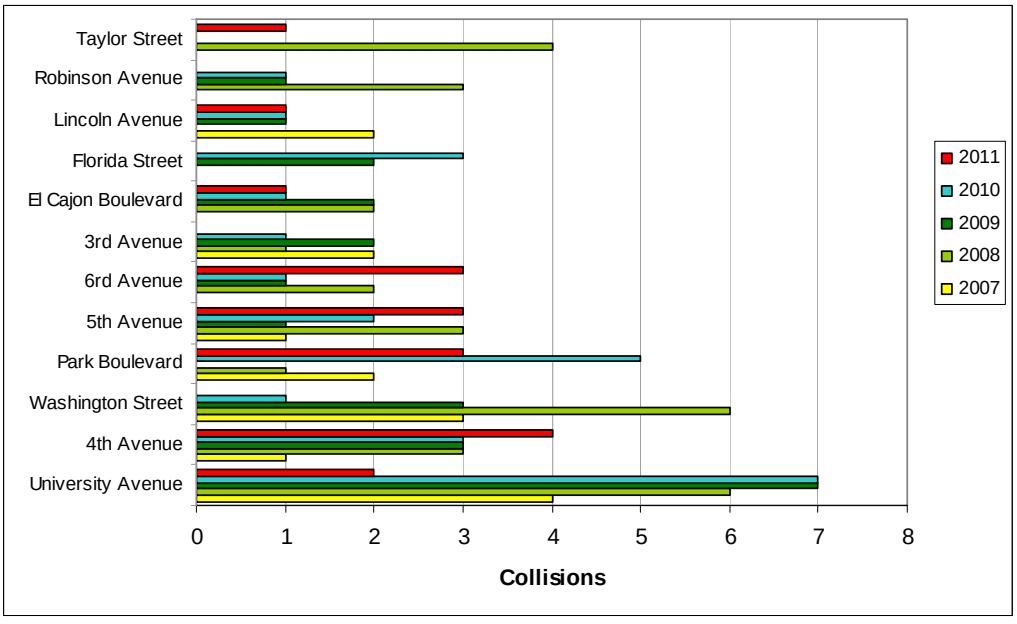
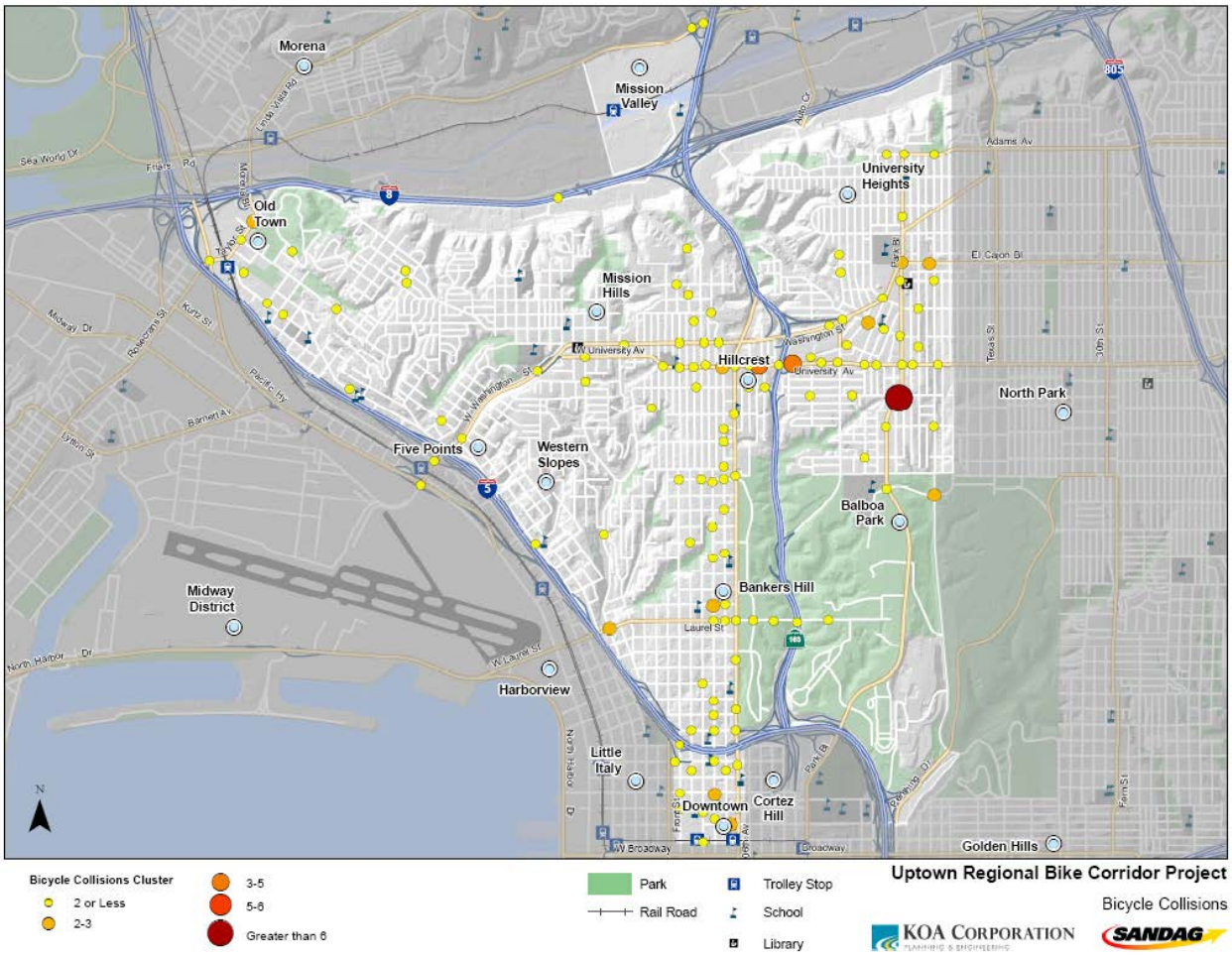


Figure 2.19 shows the locations and frequency of collisions. The biggest clusters of collisions involving people riding bikes are around Park Boulevard and on Washington Avenue between 4th Avenue and 6th Avenue.

Figure 2.19 - Collisions Involving People Riding Bikes



People Walking Collision Analysis

There were a total of 207 collisions involving people walking reported in the study area during the five years between 2007 and 2011, or an average of 42 collisions each year. In the same period, there were five fatalities, 19 severe injuries, and an additional 183 collisions resulted in some other type of evident injury.

Collisions involving people walking were recorded on the street along which the person was walking when the incident occurred. Figure 2.20 shows the corridors along which five or more collisions involving people walking were reported. Between 2007 and 2011, the corridor with the highest incidents of collisions involving people driving a car and people walking is University Avenue followed by 6th Avenue and Park Boulevard, then 4th Avenue. These corridors are commercial corridors where people walking are more likely to be present in higher numbers.

Figure 2.20 - Summary of Collisions Involving People Walking by Corridor

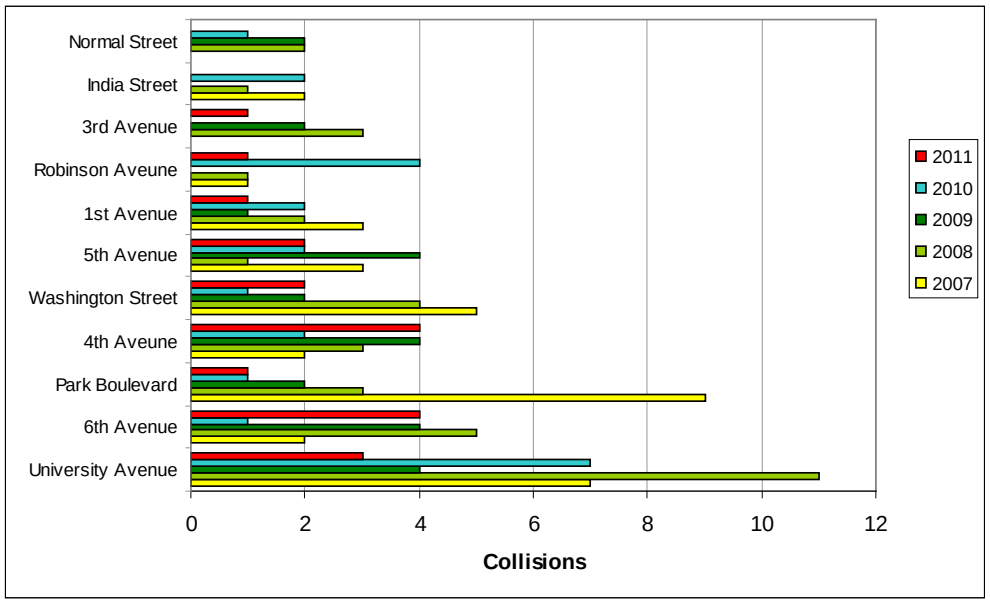
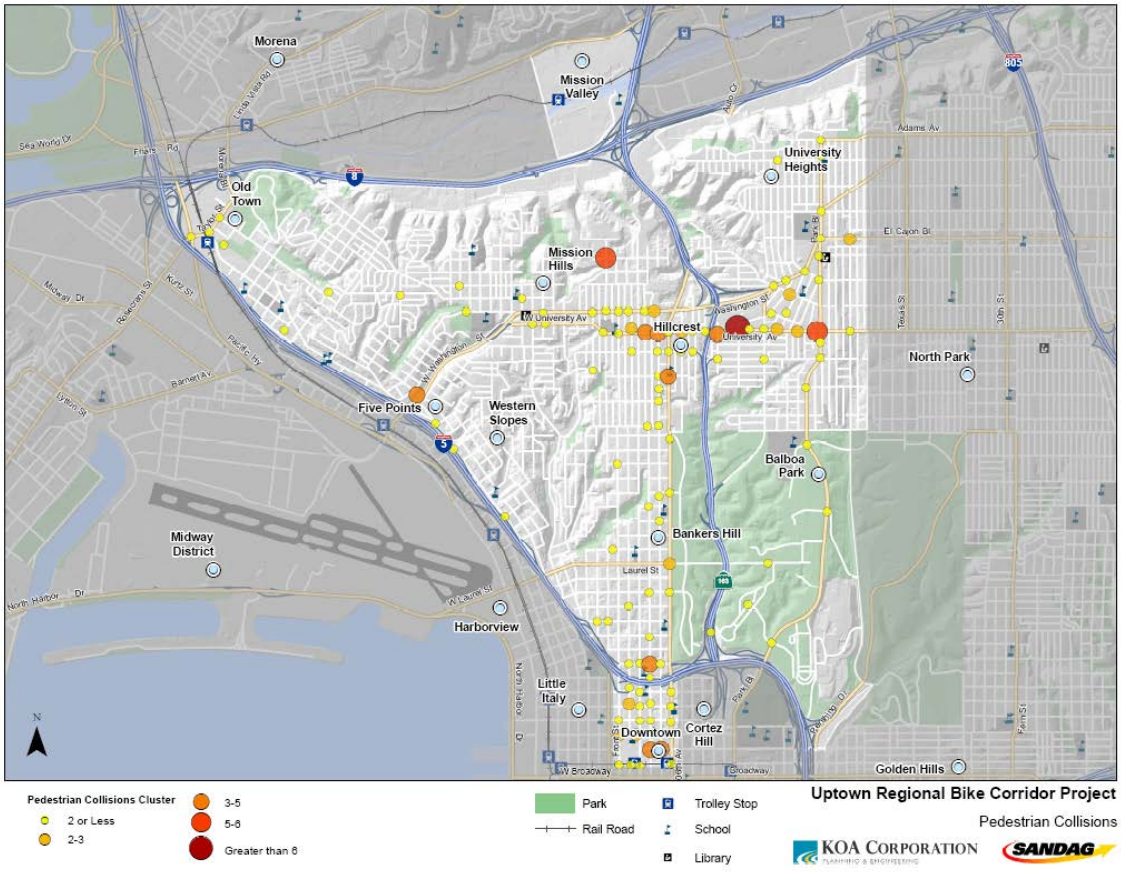


Figure 2.21 shows the collision locations and frequency within the study area. The biggest clusters of collisions involving people walking are on Washington Avenue between 4th Avenue and 6th Avenue and around Park Boulevard.

Figure 2.21 - Collisions Involving People Walking



Chapter 3: Community Outreach

Community Outreach

SANDAG worked closely with Uptown neighborhoods, neighboring communities, and the City of San Diego to study and refine the project alignments and design concepts. More than 30 community group and stakeholder meetings were held during 2013. A project Community Advisory Group was organized and provided in-depth input. The advisory group met with SANDAG and other community members four times at key analysis milestones. The community was also kept informed through email, web page updates, and social media. Community engagement efforts will continue through the next phases of the project, including direct outreach to residents and businesses along the project alignments, as well as members of the broader community.

The community input received throughout the community outreach effort helped shape the project goals (as noted in Chapter 1) and the alignment options considered during the alignment analysis process.

Community Advisory Group Meetings

An important part of the alignment analysis process was establishing a sounding board of people from the community who would take time to understand and discuss issues, and help develop alignment alternatives and design options to be shared with the larger community for feedback. The Uptown Regional Bike Corridors Project Community Advisory Group was formed for this purpose. Established community groups, such as town councils, resident groups, business associations, and non-profit groups, were asked to nominate a representative to participate as part of the project Community Advisory Group and share information with their respective community group throughout the process.

The Project Community Advisory Group met at each stage of the alignment analysis process to provide input to the design team. There were four Community Advisory Group meetings between December 2012 and February 2014. A brief outline of each meeting is provided below. More detailed information can be found in the meeting summary reports available under the Community Involvement tab on the project webpage keepsandiegomoving.com/UptownBike.

Meeting Date	Community Participation	Objectives
December 2012	49	• Project overview and process • Refine project's draft visions and goals • Discuss participants' visions, issues, and opportunities for the study area
February 2013	44	• Review key findings from Advisory Group Meeting 1 • Present initial findings from existing conditions analysis • Discuss potential routes between neighborhoods and destinations, including opportunities and challenges
June 2013	60	• Review key findings from Advisory Group Meeting 2 • Explain the alternative analysis process (Tiers 1-2) and resulting alignment options (e.g., Washington and University from Mission Hills to Hillcrest) • Discuss benefits and challenges of each alignment section related to the project goals and criteria

		• Solicit input regarding: - Additional benefits and considerations for each section with options - The most compelling benefit for each section - The most challenging consideration for each section - The design concept for each section
February 2014	80-100	• Present the results of the alignment analysis and associated design concepts for selection locations • Review potential placemaking opportunities and designs • Collect further community input regarding the potential design concepts and placemaking opportunities

Community Workshops

Two Community Workshops were held to reach a broader portion of the community. The first workshop was held on July 10, 2013, and was a companion to the June 13, 2013, Community Advisory Group meeting. The second Community Workshop was held jointly with the fourth Community Advisory Group meeting on February 6, 2014. Approximately 80-100 community members attended each Community Workshop. More detailed on the information presented can be found in the Community Involvement tab on the project webpage keepsandiegomoving.com/UptownBike.

Community Group and Stakeholder Meetings

More than 70 community group and stakeholder meetings were held during the project planning phase. In addition, the City of San Diego Council District 3 Office was kept updated in monthly project briefings.

Outreach Materials

Project outreach materials were prepared to inform and engage community stakeholders. These materials provided background on the Project, information on meetings, provided opportunities for community members to provide input and ideas for consideration in the project planning process. The outreach materials included:

- Fact Sheets
- Contact card
- Comment cards
- Corridor and Alignments maps
- Posters
- Best Practice examples
- PowerPoint presentation

Email, Web, and Social Media

A project webpage and social networks were utilized to disseminate the project information and connect with the online community. The SANDAG Facebook page and Twitter feed were used to provide information to followers. The project webpage at keepsandiegomoving.com was regularly updated with meeting summaries, supplemental project material, plans, concepts, and any printed material pertaining to the Project. A list of email addresses was added to throughout the alignment analysis process and project updates were distributed in conjunction with community meeting invitations.

Figure 3.1 – Community Outreach Overview

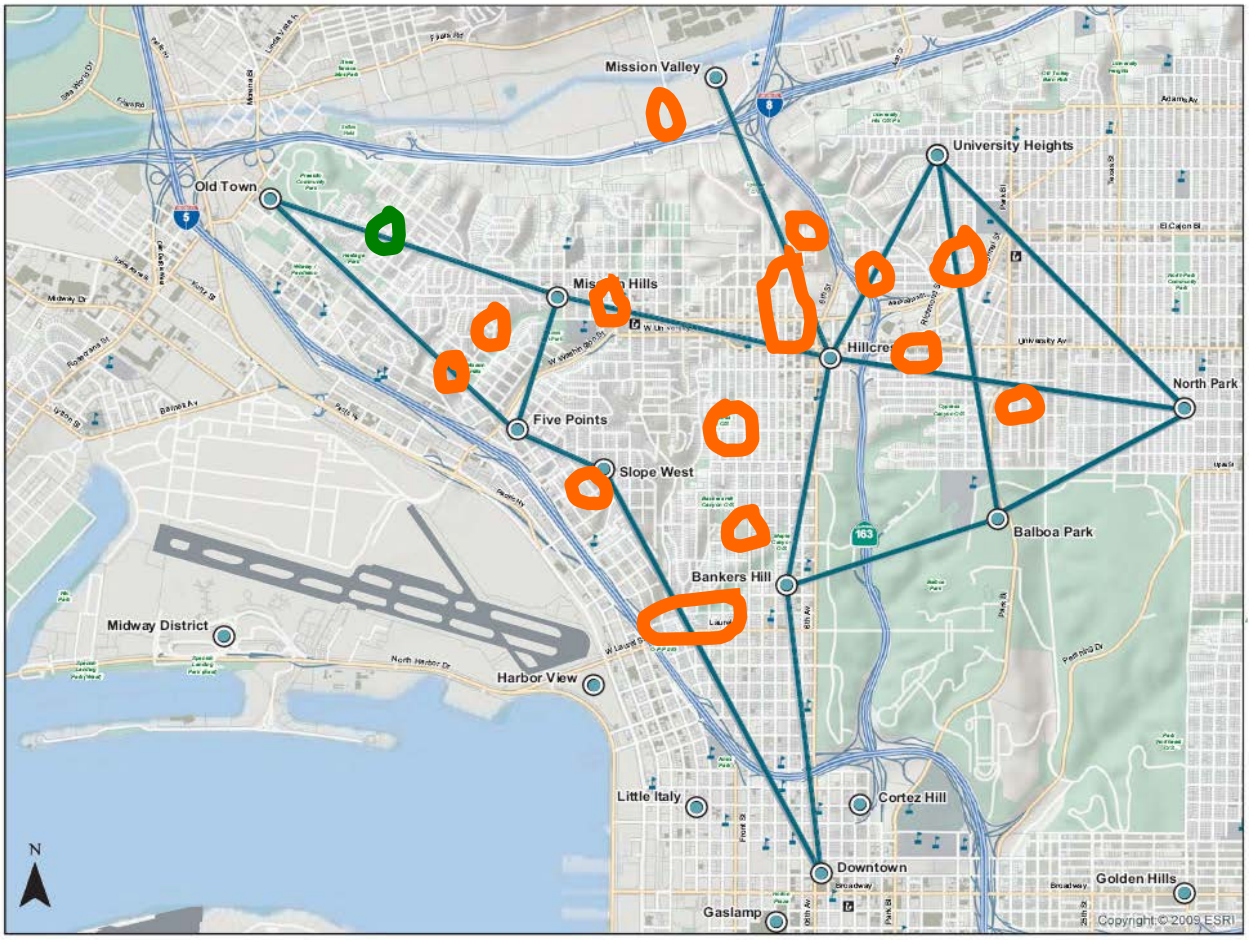
Chapter 4:
Alternative Alignments Development

Connectivity

Participants of the Project's first community meeting provided input on opportunities and issues related to the Project and the communities within the project area. An outcome of the discussion pointed to the desire to have each of the distinct neighborhoods connected together through safe, convenient, comfortable, and direct connections (Figure 4.1). The desired connections between each community (represented by blue lines) and how well connected those communities are with one another (represented by circles). The orange circles indicate where input indicated inadequate bicycle connections exist for the general population. The green circle indicates where input indicated an adequate connection exists between Old Town and Mission Hills.

As identified in the existing conditions analysis, this community input reinforced the issue of neighborhoods within the project area being disconnected by barriers posed by streets with high speed, and high traffic volume, which prevent most people from feeling safe riding their bicycles between neighborhoods.

Figure 4.1 – Desired Community Connections

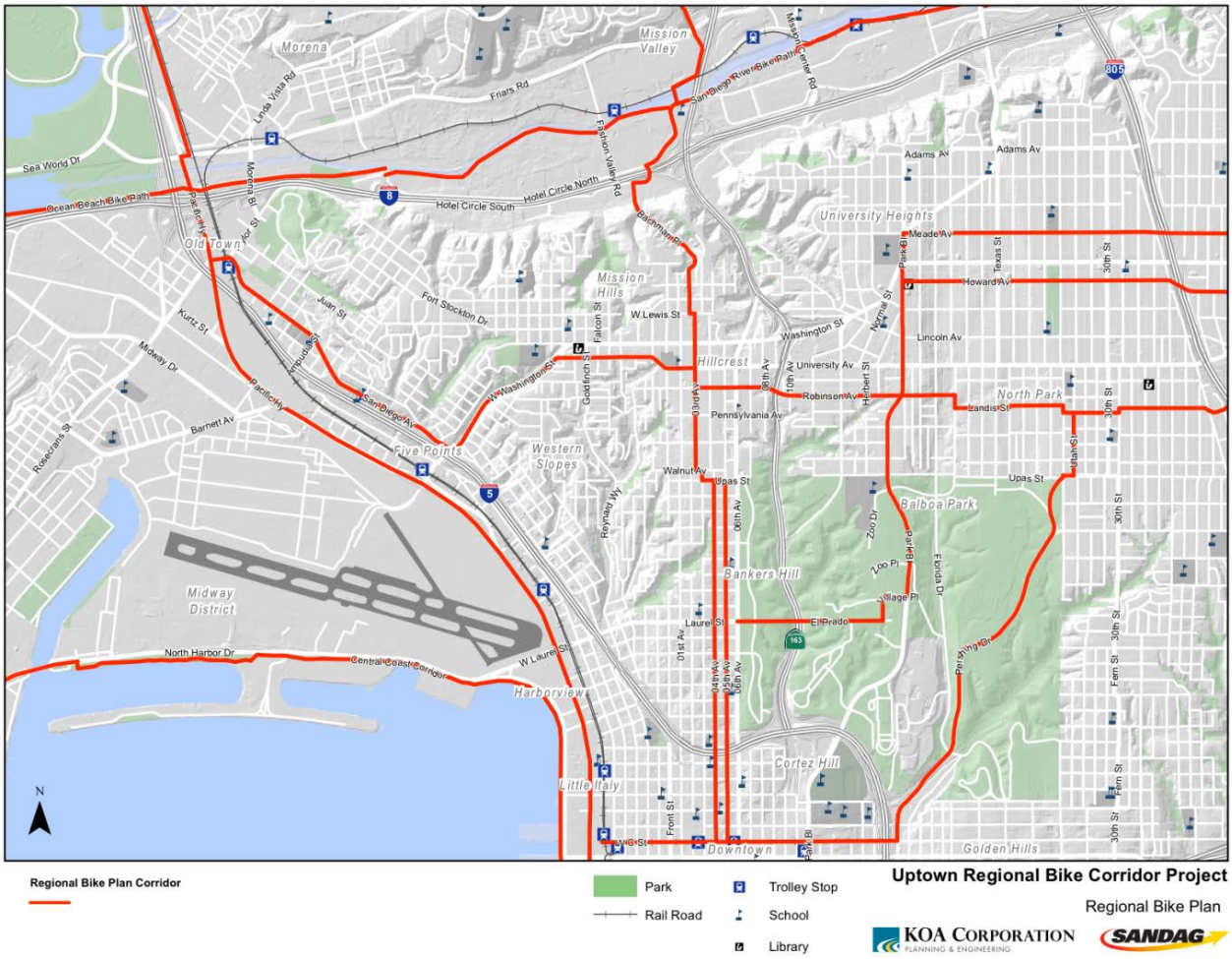


Alignment Alternatives Analysis

Alternatives Development

The alternatives for the Uptown Bikeway were developed using the corridors identified in the Regional Bike Plan as a general starting point and incorporating additional alignments for analysis based on community input. The corridors identified in the Regional Bike Plan are shown in Figure 4.2.

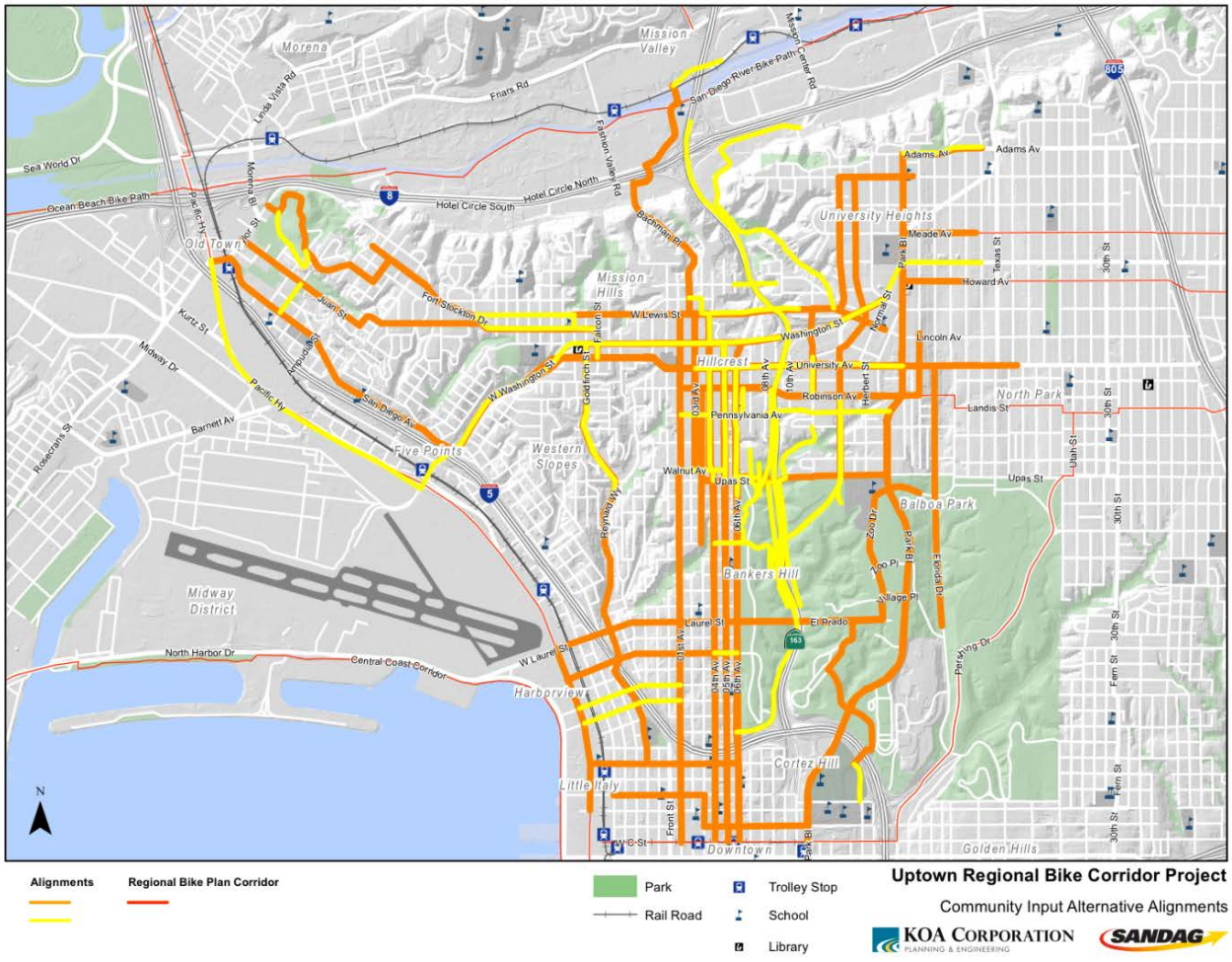
Figure 4.2 – SANDAG Regional Bike Corridors



During the second Community Advisory Group meeting, community members identified potential neighborhood routes, for people who want to ride a bike for everyday trips, which connect neighborhood centers and destinations.

Fifty-eight routes, or alignments, were identified during the second Community Advisory Group meeting and then analyzed as part of the Tier I Analysis. Figure 4.3 shows the alignments identified by the community.

Figure 4.3 – Community Input Alternative Alignments



Tier I Analysis

The Tier I alignment analysis involved a qualitative evaluation of each of the 58 alignment alternatives identified. The criteria were developed based on the project goals, as refined with Community Advisory Group input.

- **Mobility:** Increase choices, connect communities
- **Experience:** Improve travel safety for everyone, create an exceptional biking experience
- **Community:** Build on and support related community initiatives
- **Placemaking:** Enhance community identity and public spaces
- **Economic Development:** Improve public infrastructure and strengthen opportunities for community and business development

Five initial criteria were applied to each alignment. Each alignment was evaluated relative to other alignments within the same corridor. For example, the SR 163 alignment from Mission Valley to Downtown was compared to the Bachman, First, 4th, 5th, 6th, and Park Avenue alignments. However, the Park Boulevard alignment is not compared to Washington, University, or Robinson alignments. Table 4.1 summarizes the Tier I evaluation criteria, the description of each criteria, and scoring measure.

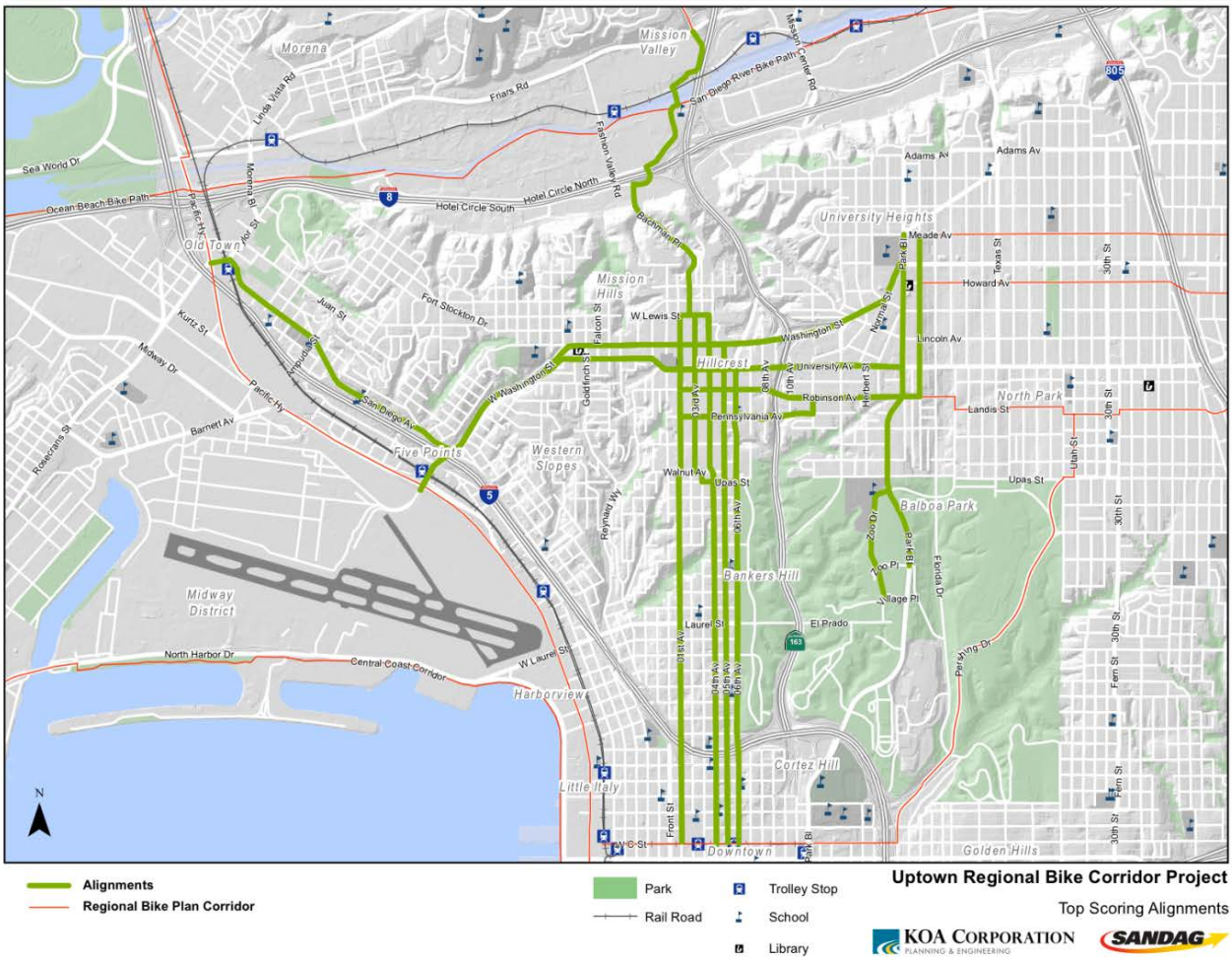
Table 4.1 – Tier I Evaluation Criteria

Evaluation Criteria		
Criteria	**Description**	**Scoring Measure**
Regional Connectivity	Does the proposed alignment connect other regional corridors identified in the Bike Plan?	(Yes/No)
Neighborhood Connectivity	Does the proposed alignment connect to the project area neighborhood activity center nodes? Activity centers are concentrations of land uses such as commercial, mixed-use, schools, parks, or transit stations. An alignment that connects three nodes will be preferred to the alignment that connects only two.	(Yes/No)
Direct Connectivity	Is the proposed alignment a direct alignment to the regional or neighborhood connection? Directness relates to distance (a shorter distance between activity centers and or other regional corridor is preferred) and straight routes versus routes that jog or are circuitous are preferred. There is a positive, significant relationship between network connectivity, directness and the level of ridership; underscoring that trips by bike are more sensitive to distance than driving; internal connectivity provides increased route choice and decreased likelihood of having to choose significant detours to remain in the network.	(Yes/No)
Achievable LTS	Can we achieve a facility that provides for the typical person (i.e., an LTS of 1 or 2)? LTS is the level of tolerance that the "average person" will encounter on a given roadway. Stress factors include the prevailing speeds of vehicle traffic, the physical space and separation provided for bicyclists, and ADT of vehicles, and the slope of the street. LTS 1 presents little traffic stress and demands little attention from people to ride on. LTS 4 presents the highest traffic stress as it offers little or no bike facilities and higher speed vehicle traffic.	(Yes/No)
Existing Deficiency	Is there an existing deficiency that the alignment is addressing? Deficiency relates to the absence of adequate bicycle facilities and also relative to other variables that affect achievable LTS.	(Yes/No)

Tier I Analysis Results

The Tier I analysis results for the 58 alternatives are summarized in Appendix F. The alignments that received the highest score (5) during the Tier I analysis were considered for the Tier II analysis. A total of 25 alignments received the highest score and were recommended for the Tier II analysis and are shown in Figure 4.4.

Figure 4.4 – Tier I Top Scoring (Tier II Alignments)



Tier II Analysis

The purpose of the Tier II alignment analysis was to evaluate the 25 alignments resulting from the Tier I evaluation. The highest ranking alignments from Tier II analysis are recommended for the Tier III analysis. More specific evaluation criteria, shown in Table 4.3, were developed and were also based on the project goals.

During the design concept process, which accompanied the alignment analysis process, Robinson Avenue and University Avenue alignments in the Hillcrest and Hillcrest-North Park corridors and Park Boulevard in the University Heights-Balboa Park corridor were further developed into constrained and unconstrained alternatives to assess potential issues related to traffic operations and on-street parking. This increased the number of alignments analyzed to 30. With the constrained alternatives, both existing on-street parking and vehicular travel lanes were preserved. With the unconstrained alternatives, on-street parking and/or vehicular travel lanes were reduced to accommodate dedicated bicycle facilities. Table 4.2 summarizes each alignment evaluated and its respective facility type.

Table 4.2 – Tier II Alignments and Facility Types Analyzed

Corridor	Alignment	Facility Description
Old Town - Five Points	Congress/San Diego Ave	Shared facility (Congress St)- Buffered bike lane (San Diego Ave)
Five Points - Mission Hills	Washington St	Buffered bike lane & bike/ped sidepath
Mission Hills - Hillcrest	Washington St	Buffered bike lanes
	University Ave	Bike Boulevard
Hillcrest - Hillcrest	Washington St	Cycle track
	University Ave	
	Constrained	Shared facility (Front-5th, Normal-Park) - bike lanes (5th-9th)
	Unconstrained	Cycle track (Front-3rd, 4th-9th)
	Robinson Ave	
	Constrained	Shared facility (1st-8th)
	Unconstrained	Cycle track (4th-8th)
	Pennsylvania Ave	Bike Boulevard
Hillcrest - North Park	Washington St	Cycle track
	University Ave	
	Constrained	Buffered bike lanes (9th-10th) - bike/ped sidepath (10th-Normal)
	Unconstrained	Cycle track (Vermont-Normal, Centre-Park) bike/ped sidepath (Normal-Centre, at Park)
	Robinson Ave	
	Constrained	Shared facility (SR-163 bridge WB) - Bike lane (SR-163 bridge EB) Buffered bike lanes (10th-Park)
	Unconstrained	Buffered bike lanes (SR-163 bridge)
	Pennsylvania Ave	Bike Boulevard
Hillcrest - Bankers Hill	1st	Bike lanes
	3rd/Upas	Shared facility
	4th	Two-way cycle track
	5th	Two-way cycle track
	6th	One-way cycle track & buffered bike lane
Bankers Hill - Downtown	1st	One-way cycle track
	4th	One-way cycle track
	5th	One-way cycle track
	6th	One-way cycle track
University Heights - Balboa Park	Park	
	Constrained	Shared facility (Adams-Meade, El Cajon-Lincoln) - Bike lanes (Meade-El Cajon)
	Unconstrained	Cycle track (Meade-Upas) - bike/ped sidepath (Upas-Zoo)
	Georgia St	Bike Boulevard
Mission Valley - Hillcrest	Hotel Circle/Bachman Pl	Multi-use path (Ulric) - Two-way cycle track (Cno de la Reina) - Two way buffered bike lanes (I-8 Underpass) - Sharrow/bike lane (Bachman NB/SB)

The Tier II alignment analysis involved a quantitative evaluation of the potential alignments based on seven evaluation criteria. The evaluation criteria and their corresponding performance measures were scored on a scale of zero to two. The evaluation criteria were applied to each alignment relative to other alignments in the same corridor. For example, the alignment on Washington Street in the Mission Hills–Hillcrest corridor was compared to the University Avenue alignment in the same corridor. However, it was not compared to the Pennsylvania Avenue alignment, which is in the Hillcrest–North Park corridor.

Table 4.3 summarizes the evaluation criteria that were used in the alignment analysis, the description of each criterion, and the associated scoring measures. Regional connectivity, neighborhood connectivity, and independent utility were also Tier I analysis criteria. If alignments scored "yes" for these initial criteria, during the Tier I analysis, those alignments were advanced to the Tier II analysis.

The route design concepts for each alignment analyzed in Tier II can be found in Appendix G. Preliminary capacity analyses was performed to evaluate the potential effects of lane removal on the vehicular capacity for portions of two alignments, Fifth Avenue between Washington Street and C Street, and Robinson Avenue between Tenth Avenue and Park Boulevard. The preliminary capacity analysis can be found in Appendix H.

Table 4.3 – Tier II Evaluation Criteria

Evaluation Criteria	Tier II Performance Measures		
Category	**Criteria**	**Description**	**Scoring Measure**
System Connectivity	Regional Connectivity	Does the proposed alignment connect two or more regional corridors identified in the Regional Bike	(Yes/No)
	City Plan Connectivity	Does the proposed alignment compliment the City of San Diego Bike Plan?	(Yes/No)
	Neighborhood Connectivity	Does the proposed alignment connect two or more project area neighborhood nodes?	(Yes/No)
	Directness	Is the proposed alignment a direct alignment to the regional or neighborhood connection?	(Yes/No), or Distance in feet.
	Deficiency	Is there an existing deficiency that the alignment is addressing?	-Alignment has no facility. -Alignment has a facility, but facility doesn't serve average person, therefore, it is not adequate. -A parallel alignment has adequate facilities. -Alignment has adequate facilities.
	Independent Utility	Does the alignment have independent utility (i.e., does it make sense as a stand alone project)?	(Yes/No)
	Multimodal Connectivity	Ability to transfer to various transit modes (bus, trolley, train, shuttle service).	-High number of transit nodes connected to alignment. -Medium number of transit nodes connected to alignment.
Placemaking	Activity Center Proximity	Are there proximate activity centers along the alignment?	-High number of activity centers within 2 blocks of alignment. - Medium number of activity centers within 2 blocks of alignment.
	Population	Population served by connected LTS network.	-High number of people connected to LTS 1 & 2 streets and people on the alignment. -Medium number of people connected to LTS 1 & 2 streets and people on the alignment. -Low number of people connected to LTS 1 & 2 streets and people on the alignment.
Design Concept	Traffic Operations	How is the vehicular LOS affected by the alignment and facility type?	-High likelihood of LOS change. -Medium likelihood of LOS change. -Low likelihood of LOS change.
	Parking	How is on-street parking affected by the alignment and facility type?	-High number of parking spaces potentially displaced. -Medium number of parking spaces potentially displaced.
	Geometric Feasibility	Is the alignment/facility type feasible in the existing R/W?	(Yes/No)
Safety Considerations	Collisions	Would alignment reduce the number of existing collisions?	-High number of bike-collisions along alignment. -Medium number of bike-collisions along alignment. -Low number of bike-collisions along alignment.
	Achievable LTS	Can we achieve a facility that provides for the average person (i.e., an LTS of 1 or 2)?	(Yes/No)
Community Input	Alignments	Alignments that received high, medium-level, or low public support.	-High level of public support. -Medium level of public support. -Low level of public support.
	Facility Type	Facilitiy types that received high, medium-level, or low public support.	-High level of public support. -Medium level of public support. -Low level of public support.
Environment	Environmental Impacts	Potential environmental impacts caused by the alignment and facility type, not including traffic impact.	-High level of environmental impact. -Medium level of environmental impact. -Low level of environmental impact.
Financial	Cost	What is the alignment/facility overall cost (including engineering, environmental, planning, permits, etc)?	-High potential cost (not quantified). -Medium potential cost (not quantified). -Low potential cost (not quantified).

Tier II Analysis Results

Based on the Tier II analysis of the evaluated alignments, the highest ranked alignments for each corridor and those recommended for further analysis are depicted in Figure 4.5. Table 4.4 provides the summary of analysis results and ranking of all alternatives. These alignments include:

1. Mission Valley-Hillcrest: Bachman
2. Hillcrest-Bankers Hill: 3rd Avenue
3. Hillcrest-Bankers Hill: 4th Avenue
4. Hillcrest-Bankers Hill: 5th Avenue
5. Bankers Hill-Downtown: 4th Avenue
6. Bankers Hill-Downtown: 5th Avenue
7. Old Town-Five Points: San Diego Avenue
8. Five Points-Mission Hills: Washington Street
9. Mission Hills-Hillcrest: Washington Street
10. Mission Hills-Hillcrest: University Avenue
11. Hillcrest-Hillcrest (east): Washington Street
12. Hillcrest-Hillcrest (east): University Avenue
13. Hillcrest-Hillcrest (east): Pennsylvania Avenue
14. Hillcrest (east)-North Park: University Avenue
15. Hillcrest (east)-North Park: Robinson Avenue
16. Hillcrest (east)-North Park: Pennsylvania Avenue
17. University Heights-Balboa Park: Georgia/Park
18. University Heights-Balboa Park: Georgia/Zoo Drive

It should be noted that system connectivity and directness scores are weighted higher than the other evaluation criteria. The individual scoring sheets and analysis for each performance measure are included in Appendix I. Alignments that were not geometrically feasible, or where proposed facilities did not provide adequate facilities for the average user are eliminated and are not recommended for the Tier III analysis. These eliminated alignments include:

- Hillcrest-Bankers Hill: First Avenue
- Hillcrest-Hillcrest: University Avenue (Constrained)
- Hillcrest-Hillcrest: Robinson Avenue (Constrained)
- Hillcrest-Hillcrest: Robinson Avenue (Unconstrained)
- Hillcrest-North Park: University Avenue (Constrained)
- Hillcrest-North Park: Robinson Avenue (Constrained)
- University Heights-Balboa Park: Park Avenue (Constrained)
- University Heights-Balboa Park: Park Avenue (Unconstrained)

The Tier II Alignment Results were advanced to the third tier of analysis, becoming the Tier III Alignments.

Figure 4.5 – Tier II Alignment Results (Tier III Alignments)

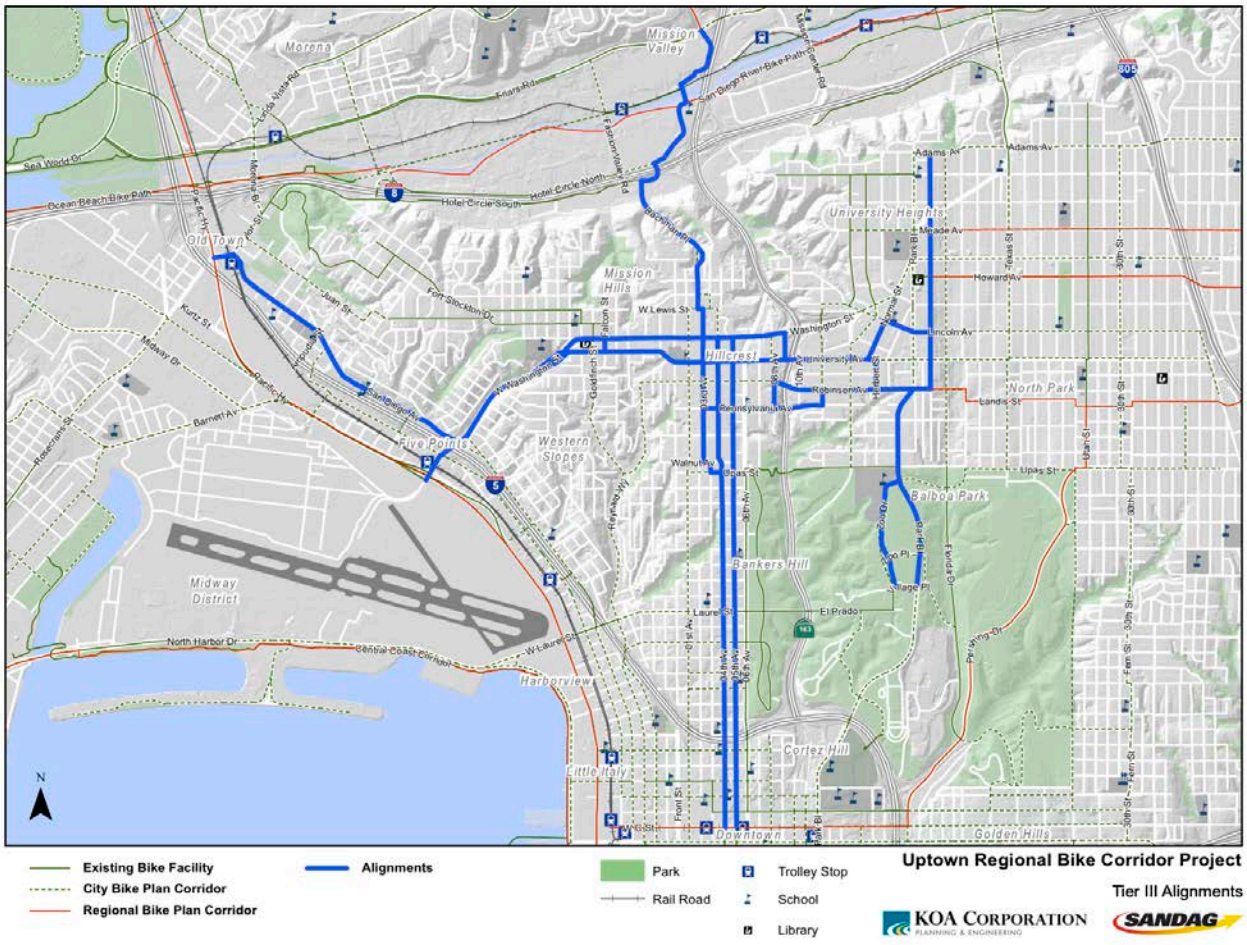


Table 4.4 – Tier II – Analysis Results and Rankings

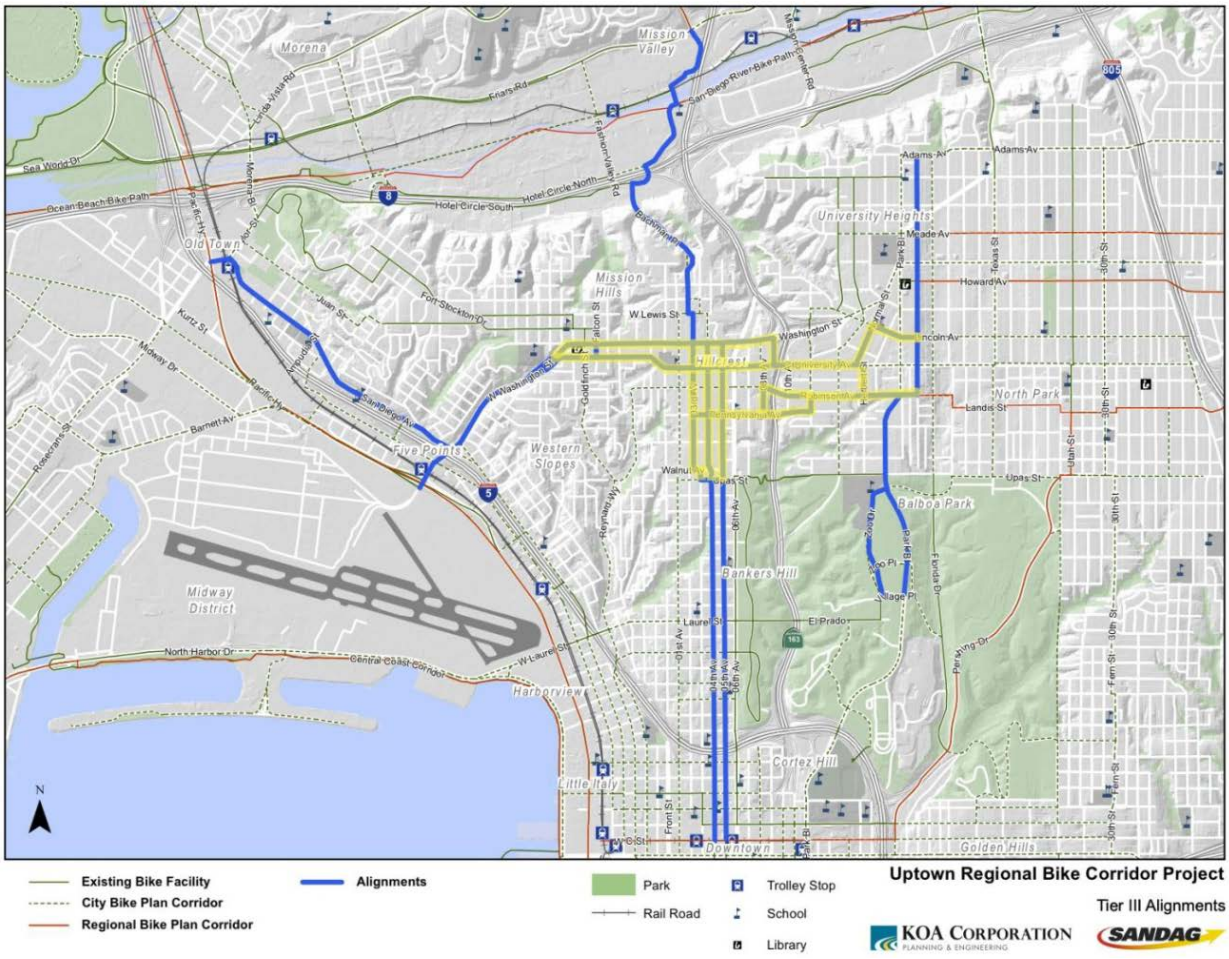
Corridor	Alignment	Total Score	Rank	Evaluation Criteria																									
				System Connectivity								Placemaking				Design Concept				Safety Considerations			Community Input		Environment		Financial	
				Regional Connectivity	City Plan Connectivity	Neighborhood Connectivity	Deficiency	Independent Utility	Couplet Closeness	Directness	Score	Multimodal Proximity	Activity Center Proximity	Population Served	Score	Traffic	Parking	Geometric Feasibility	Score	Collisions	Achievable LTS	Score	Alignments	Score	Environmental Impacts	Score	Cost	Score
Mission Valley - Hillcrest	Hotel Circle/Bachman Pl	53	1	Yes	Yes	Yes	No Facility	Yes	NA	Shortest	4.6	High	High	High	2	Low	Low	Yes	2	Low	Yes	1	High	2	High	0.0	High	0.0
Hillcrest - Bankers Hill	1st	0	5	Yes	Yes	Yes	No Facility	Yes	NA	Shortest	4.6	Low	Low	Medium	0.3	Medium	Low	Yes	1.7	High	No	0	High	2	Low	2.0	Low	2.0
Hillcrest - Bankers Hill	3rd/Upas	53	1	Yes	Yes	Yes	No Facility	Yes	NA	Shortest	4.6	Medium	Medium	Medium	1	Low	Low	Yes	2	High	Yes	2	High	2	Low	2.0	Low	2.0
Hillcrest - Bankers Hill	4th	53	1	Yes	Yes	Yes	No Facility	Yes	NA	Shortest	4.6	Medium	High	High	1.7	High	Low	Yes	1.3	Medium	Yes	1.5	High	2	Low	2.0	Medium	1.0
Hillcrest - Bankers Hill	5th	53	1	Yes	Yes	Yes	No Facility	Yes	NA	Shortest	4.6	High	High	Low	1.3	Low	Low	Yes	2	High	Yes	2	High	2	Low	2.0	Medium	1.0
Hillcrest - Bankers Hill	6th	38	4	Yes	Yes	Yes	No Facility	Yes	NA	Shorter	3.1	Medium	High	High	1.7	High	Low	Yes	1.3	High	Yes	2	High	2	Low	2.0	Medium	1.0
Bankers Hill - Downtown	1st	49	4	Yes	Yes	Yes	No Facility	Yes	Close	Shortest	4.3	High	Low	High	1.3	Low	Low	Yes	2	Low	Yes	1	High	2	Low	2.0	Low	2.0
Bankers Hill - Downtown	4th	52	1	Yes	Yes	Yes	No Facility	Yes	Closer	Shortest	4.4	Medium	High	High	1.7	Low	Low	Yes	2	High	Yes	2	High	2	Low	2.0	Medium	1.0
Bankers Hill - Downtown	5th	52	1	Yes	Yes	Yes	No Facility	Yes	Closest	Shortest	4.6	Medium	High	Low	1	High	Low	Yes	1.3	Medium	Yes	1.5	High	2	Low	2.0	Medium	1.0
Bankers Hill - Downtown	6th	50	3	Yes	Yes	Yes	No Facility	Yes	Closer	Shortest	4.4	Low	Medium	Low	0.3	Medium	Low	Yes	1.7	Medium	Yes	1.5	High	2	Low	2.0	Medium	1.0
Old Town - Five Points	Congress/San Diego Ave	54	1	Yes	Yes	Yes	No Adequate Facility	Yes	NA	Shortest	4.6	High	High	High	2	Low	Low	Yes	2	High	Yes	2	High	2	Low	2.0	Low	2.0
Five Points - Mission Hills	Washington	53	1	Yes	Yes	Yes	No Adequate Facility	Yes	NA	Shortest	4.6	High	High	High	2	Low	Medium	Yes	1.7	Low	Yes	1	High	2	Medium	1.0	High	0.0
Mission Hills - Hillcrest	Washington	54	1	Yes	Yes	Yes	No Adequate Facility	Yes	NA	Shortest	4.6	Medium	High	High	1.7	Low	Low	Yes	2	High	Yes	2	High	2	Medium	1.0	Medium	1.0
Mission Hills - Hillcrest	University Ave	52	2	Yes	Yes	Yes	No Adequate Facility	Yes	NA	Shortest	4.6	Low	Medium	Medium	0.7	Low	Low	Yes	2	Medium	Yes	1.5	High	2	Low	2.0	Low	2.0
Hillcrest - Hillcrest	Washington	24	2	Yes	Yes	Yes	No Facility	Yes	NA	Short	1.7	Low	Medium	Medium	0.7	Low	Low	Yes	2	High	Yes	2	High	2	Low	2.0	Medium	1.0
Hillcrest - Hillcrest	University Ave																												
	Constrained	0	4	Yes	Yes	Yes	No Facility	Yes	NA	Shortest	4.6	High	High	Low	1.3	Low	High	Yes	1.3	High	No	0	High	2	Low	2.0	Low	2.0
	Unconstrained	53	1	Yes	Yes	Yes	No Facility	Yes	NA	Shortest	4.6	High	High	Medium	1.7	Low	High	Yes	1.3	High	Yes	2	High	2	Low	2.0	Medium	1.0
Hillcrest - Hillcrest	Robinson Ave																												
	Constrained	0	4	Yes	Yes	Yes	No Facility	Yes	NA	Shortest	4.6	Low	Medium	Low	0.3	Low	Low	Yes	2	High	No	0	High	2	Low	2.0	Low	2.0
	Unconstrained	0	4	Yes	Yes	Yes	No Facility	Yes	NA	Shortest	4.6	Low	Medium	Medium	0.7	High	High	No	0	High	Yes	2	High	2	Low	2.0	Medium	1.0
Hillcrest - Hillcrest	Pennsylvania Ave	22	3	Yes	Yes	Yes	No Facility	Yes	NA	Short	1.7	Low	Low	High	0.7	Low	Low	Yes	2	Medium	Yes	1.5	Medium	1	Low	2.0	Low	2.0
Hillcrest - North Park	Washington St	24	4	Yes	Yes	Yes	No Facility	Yes	NA	Short	1.7	Medium	Medium	Medium	1	Low	Low	Yes	2	High	Yes	2	High	2	Low	2.0	Medium	1.0
Hillcrest - North Park	University Ave																												
	Constrained	0	5	Yes	Yes	Yes	No Facility	Yes	NA	Shortest	4.6	High	High	Low	1.3	Low	Low	Yes	2	High	No	0	High	2	Low	2.0	Low	2.0
	Unconstrained	53	1	Yes	Yes	Yes	No Facility	Yes	NA	Shortest	4.6	High	High	Medium	1.7	Low	High	Yes	1.3	High	Yes	2	High	2	Low	2.0	Medium	1.0
Hillcrest - North Park	Robinson Ave																												
	Constrained	0	5	Yes	Yes	Yes	No Facility	Yes	NA	Shorter	3.1	Low	Medium	Low	0.3	Low	Low	Yes	2	Medium	No	0	High	2	Low	2.0	Low	2.0
	Unconstrained	37	2	Yes	Yes	Yes	No Facility	Yes	NA	Shorter	3.1	Low	Medium	High	1	Medium	High	Yes	1	Medium	Yes	1.5	High	2	Low	2.0	Medium	1.0
Hillcrest - North Park	Pennsylvania Ave	35	3	Yes	Yes	Yes	No Facility	Yes	NA	Shorter	3.1	Low	Low	Medium	0.3	Low	Low	Yes	2	Low	Yes	1	Medium	1	High	0.0	High	0.0
University Heights - Balboa Park	Park Ave																												
	Constrained	0	3	Yes	Yes	Yes	No Facility	Yes	NA	Shortest	4.6	High	Medium	Low	1	Low	Low	Yes	2	Medium	No	0	High	2	Low	2.0	Low	2.0
	Unconstrained	0	3	Yes	Yes	Yes	No Facility	Yes	NA	Shortest	4.6	High	Medium	High	1.7	Low	High	No	0.7	Medium	Yes	1.5	High	2	Medium	1.0	Medium	1.0
University Heights - Balboa Park	Georgia St	23	1	Yes	Yes	Yes	No Facility	Yes	NA	Short	1.7	Low	Low	Medium	0.3	Low	Low	Yes	2	High	Yes	2	High	2	Low	2.0	Low	2.0
University Heights - Balboa Park	Zoo Dr	23	1	Yes	Yes	Yes	No Facility	Yes	NA	Short	1.7	Low	Medium	Medium	0.7	Low	Low	Yes	2	Medium	Yes	1.5	High	2	Low	2.0	Low	2.0

Tier III Analysis

The Tier II alignment analysis, combined with community input, resulted in 18 recommended alignments within the general project corridors identified in the Regional Bike Plan. These remaining alignments were advanced to the third and final round of analysis, Tier III. The purpose of the Tier III analysis was to evaluate the alignments within the corridors where multiple potential alignment options still existed after the Tier I and Tier II analyses. The Tier III analysis consisted of further community and Advisory Group input and design feasibility analysis. Within the center of Hillcrest, both the north-south and east-west alignments had multiple potential alignments (highlighted in yellow in Figure 4.6):

- North-South
  - 3rd Avenue
  - 4th Avenue
  - 5th Avenue
- East-West
  - Washington Street
  - University Avenue to Herbert Street and Normal Street
  - Pennsylvania Avenue to Robinson Avenue

Figure 4.6 – Tier III Alignment Alternatives (Yellow)



Tier III Community Input

The first step in the Tier III analysis was to solicit discussion and input from Advisory Group members and the community at two community meetings held June and July, 2013. Detailed information on the community input received can be found in the reports "Community Advisory Group Meeting 3 Summary" and "Community Workshop 1 Summary," available on the project webpage keepsandiegomoving.com/UptownBike.

The east-west alignment options through the center of the project area were more challenging to analyze, therefore, the community input provided at these meetings was synthetized for each of the east-west alignment segments. Tables synthesizing community input and related analysis of each segment can be found in Appendix J. The synthesis of community input is summarized here:

- University Avenue is noted as the alignment, for each of its three segments, as being more direct, central and providing access to more businesses while also meeting other community goals (such as traffic calming and placemaking). Some participants offered other design considerations to the Hillcrest – North Park segment to enhance safety and geometric feasibility.
- Washington Street, for the Mission Hills – Hillcrest segment, is noted by some participants as being a business corridor, close to activity centers, and would benefit from traffic calming and pedestrian-supportive design. The geometric constraints associated with Washington Street are noted.
- Pennsylvania Avenue received some acknowledgment for its low-cost design needs, but more often is recognized for not being direct, central, or close to activity centers.
- Robinson Avenue is acknowledged as currently being relatively calm for bike riding, except for the SR 163 ramps and very narrow right-of-way between 3rd Avenue and 6th Avenue. The segment is also noted as being not as direct, central, or close to activity centers as University Avenue.

The community input provided described and affirmed the various opportunities and constraints associated with each segment of each alignment option. Full consideration of community input resulted in the prioritization of both the direct connectivity to the commercial businesses (activity centers) along University Avenue through Hillcrest, and traffic calming opportunities along University Avenue through Mission Hills. The different opportunities presented for these two segments of University Avenue, when combined, provided a more continuous and direct network connection through the center of the project area. For the north-south alignments the community input pointed to continuing the alignment along 4th Avenue and 5th Avenue through Hillcrest. As noted in the Tier I Evaluation Criteria (Table 4.1), there is a positive, significant relationship between network connectivity, directness and the level of ridership; underscoring that trips by bike are more sensitive to distance than driving; internal connectivity provides increased route choice and decreased likelihood of having to choose significant detours to remain in the network (Schoner, J. 2012).

Tier III Diversion Concept Preliminary Traffic Analysis

The second step in the Tier III analysis was to determine the feasibility of the diversion concepts proposed to manage vehicle traffic volume along the of the proposed bike boulevard segment on University Avenue, from Ibis Street to Front Street. Partial diverters at either end of the bike boulevard segment reduce vehicle traffic currently using this segment of University Avenue as a cut-through route to the west end of Washington Street near the I-5 access ramps. Figure 4.7 shows the location of the proposed partial diverters.

Figure 4.7 – Diverter Locations

Diverters are traffic calming design features that help manage vehicle traffic volumes on a street. In this case, the concept proposes partial diverters at Ibis Street, by closing the eastbound Washington-University ramp to vehicle traffic (on the west side of the proposed University Avenue bike boulevard), and at Front Street, by installation of a diverter such as that shown in Figure 4.8 (on the east side of the proposed University Avenue bike boulevard). Alternatively, the east side partial diverter could be located at Albatross Street and achieve the same desired traffic calming result. Using this traffic volume management technique, it is expected that daily vehicle volumes of 5,000 ADT or less can be achieved and maintained along the bike boulevard section of University Avenue from Ibis Street to Front Street.

Figure 4.8 – Partial Diverter

The preliminary diversion analysis shows that the partial diverters would reduce the cut-through traffic on University Avenue on this section by 10,000 ADT, resulting in daily volumes in the desired range to create an effective bike boulevard. Most of the cut-through traffic would redirect to the parallel route on Washington Street, which is a four lane arterial with a median and commercial fronting land uses. The study shows that Washington Street has enough capacity to accommodate the additional traffic in the peak hours. The study also analyzed vehicle traffic conditions 20 years into the future (year 2035) and the findings are the same; Washington Street has enough capacity to accommodate the additional traffic. The diversion analysis can be found in Appendix K.

Tier III Concept Design Assessment

The design feasibility analysis evaluated numerous factors, including available right-of-way, minimum travel lane widths, medians, and parking lane widths, in addition to other features for the recommended Tier III alignment alternatives. Concept plans for the recommended alignments were created using aerial imagery, field data, and Computer Aided Drafting, and verified design feasibility. More information on the design feasibility, as well as the representative cross sections, can be found in Appendix L "Tier III Cross Section Design Assessment."

Figure 4.9 – Tier III Criteria and Scoring East-West Alignments

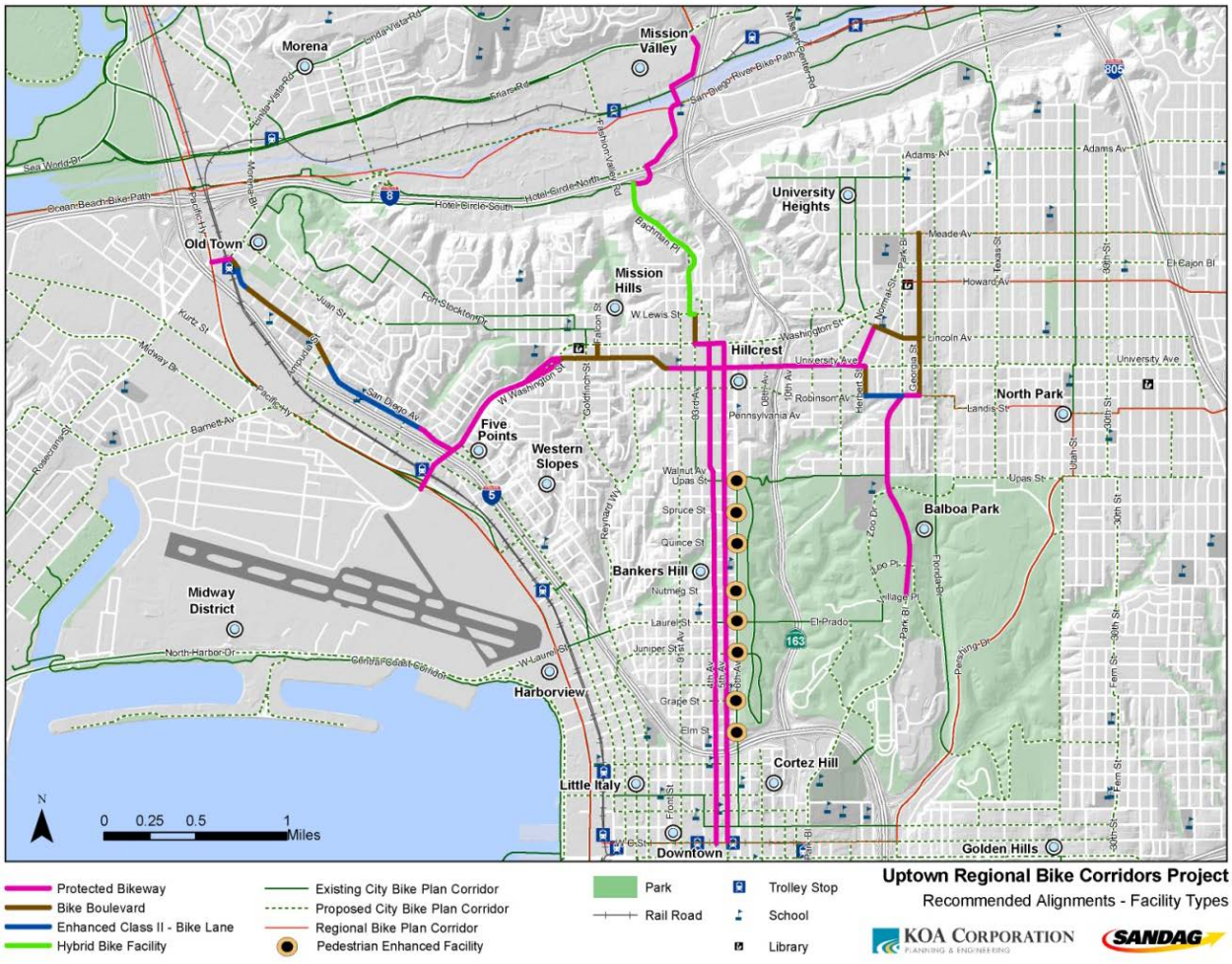
Segment	Alignment	Directness	Centrality	Activity Center Proximity	Achievable LTS	Geometric Feasibility	Segment Total
Mission Hills - Hillcrest	Washington St	1	0	1	0	0	2
Mission Hills - Hillcrest	University Ave	1	1	0	1	1	4
Hillcrest - Hillcrest	Washington St	1	0	1	0	0	2
Hillcrest - Hillcrest	University Ave	1	1	2	1	1	6
Hillcrest - Hillcrest	Robinson Ave	0	0	1	1	0	2
Hillcrest - Hillcrest	Pennsylvania Ave	0	0	0	1	1	2
Hillcrest - North Park	Washington St	0	0	1	0	0	1
Hillcrest - North Park	University Ave	1	1	2	1	1	6
Hillcrest - North Park	Robinson Ave	0	0	1	1	1	3
Hillcrest - North Park	Pennsylvania Ave	0	0	0	1	0	1
Segment	**Alignment**	**Directness**	**Centrality**	**Activity Center Proximity**	**Achievable LTS**	**Geometric Feasibility**	**Alignment Total**
Mission Hills - North Park	Washington St	2	0	3	0	0	5
Mission Hills - North Park	University Ave	3	3	4	3	3	16
Hillcrest - North Park	Robinson Ave	0	0	2	2	1	5
Hillcrest - North Park	Pennsylvania Ave	0	0	0	2	1	3

Directness refers to route continuity and efficency
Centrality is relative to within this section of the project area (the top of the mesa between Hawk St and Park Blvd)
2 - high, 1 - med, 0 - low

Tier III Analysis Results

Based on the Tier III alignment analysis, the routes that appear to best meet project objectives have been identified along all 12 miles of the three project corridors. The recommended alignments and proposed facility types are shown in Figure 4.10.

Figure 4.10 – Tier III Results - Recommended Alignments and Facility Type



Conceptual Design Development

Design Process

The descriptions of the project corridors provided in the Bike EAP were used as an initial design framework.

Representative cross sections were developed, for each alignment analyzed, based on curb to curb dimensions, which were established using available aerial photography, and augmented by limited field verification. Each alignment required design strategies based on national, state, and local standards. Several design documents provide standards and guidelines for on-street facility design to better accommodate people walking and biking:

- California Manual on Uniform Traffic Control Devices (MUTCD)
- National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide
- American Association of State Highway and Transportation Officials (AASHTO) Green Book
- California Vehicle Code
- Caltrans Highway Design Manual

Representative cross-sections for each alignment can be found in Appendix G. These initial cross-sections were then used as the conceptual framework for the development of concept plans. While some of the more innovative conceptual designs proposed may not fully comply with the current national and local regulations, they have been proven to be effective designs in other cities around the world and their functionality, safety, and constructability have been extensively researched by the design team. A full listing of the design considerations relative to local standards can be found in Appendix L. Descriptions of each of the Bike EAP corridors and maps of the design concepts developed for the entirety of each recommended project alignment can be found in Appendix M. Design strategies and future design considerations can be found in Appendix N and O, respectively.

Recommended Phasing

Phasing Methodology

The process for determining a recommendation for phasing the implementation of the project alignments used three factors in order of significance:

1. Bike network connectivity

Network connectivity is the most significant factor and considers: (a) how the alignment connects to other alignments within the Uptown Bikeway project area to create a comprehensive and continuous network overtime, and (b) connectivity with other regional bike projects currently in the planning or design process, such as the North Park - Mid-City Regional Bike Corridors Project.

2. Population served

Population served is the second most significant factor and considers the population that would be served by each alignment using population data from the Census.

3. Value (cost/capita)

Where network connectivity and population does not provide enough information to determine the phasing of the next alignment, value, as defined by population served/estimated cost of the alignment, is used.

Recommended Phasing

The recommended phasing of the alignments is listed below.

Phase 1. Banker Hill – Downtown: 4th Avenue and 5th Avenue

Phase 2. Hillcrest – Bankers Hill: 4th Avenue and 5th Avenue

Phase 3. Hillcrest – North Park: University Avenue

Phase 4. University Heights – Balboa Park: Georgia Street/Park Boulevard

Phase 5. Mission Hills – Hillcrest : University Avenue

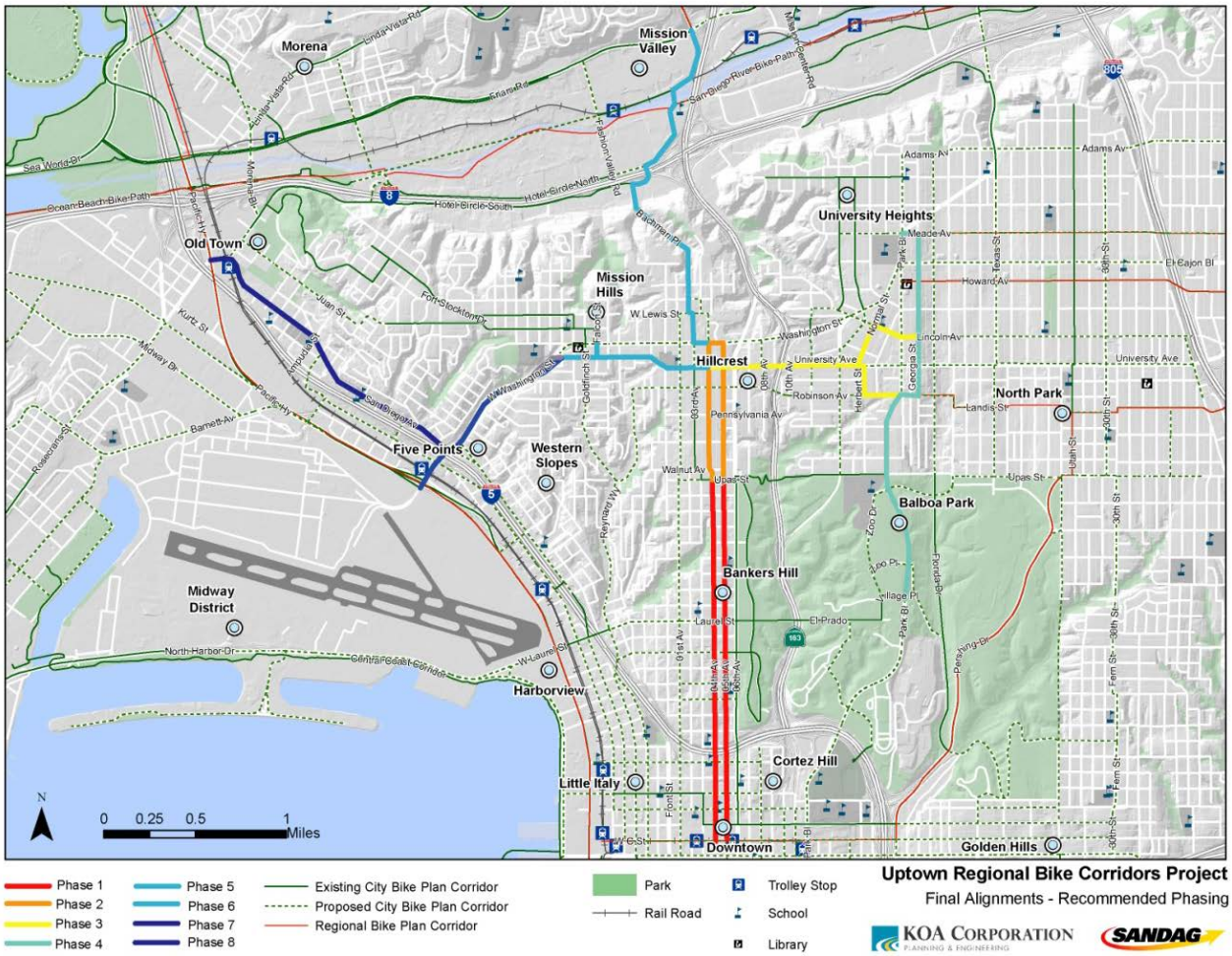
Phase 6. Mission Valley – Hillcrest: Hotel Circle/Bachman Place

Phase 7. Five Points – Mission Hills: Washington Street

Phase 8. Old Town – Five Points: Congress/San Diego Avenue

Figure 4.11 maps the recommended alignments by phase.

Figure 4.11 – Recommended Alignments by Phase



Phasing Analysis

Phase 1: The Bankers Hill to downtown on 4th and 5th Avenue alignment will serve the highest number of people (7,100 people) within the project area. This is the recommended Phase 1 of the Project.

Phase 2: From Bankers Hill, there is only one option to maintain network connectivity: Hillcrest to Bankers Hill on 4th and 5th Avenue alignment. This will serve 490 residents.

Phase 3: From Hillcrest, there are three options for network connectivity: north (Mission Valley to Hillcrest), east (Hillcrest to North Park) and west (Hillcrest to Mission Hills). While Hillcrest to Mission Hills serves the highest population of the three options, Hillcrest to North Park connects to The SANDAG North Park - Mid-City Regional Bike Corridors Project, concurrently scheduled for implementation. Therefore, Phase 3 is Hillcrest to North Park on University Avenue, which will serve approximately 3,200 residents.

Phase 4: The next logical alignment, considering network connectivity, is the University Heights to Balboa Park. This alignment will provide connectivity to the larger regional bike network and will serve as a north-south corridor linking the alignments implemented during Phases 1 through 3 and the Mid-City projects to the east.

Phase 5: From Hillcrest, there are two options remaining, north and east. The alignment connecting Hillcrest to Mission Hills on University will serve the highest number of people, approximately 5,000.

Phase 6: Two of the three remaining alignments that provide connectivity to the prior phase alignments are Mission Valley to Hillcrest and Five Points to Mission Hills. However, both serve a small population. By evaluating the cost per capita, the alignment with the highest value is identified. The cost per capita of the remaining alignments is shown in Table 4.8. As shown, Mission Valley to Hillcrest costs an estimated $27,500 per capita, whereas Five Points to Mission Hills costs approximately $517,500 per capita. Therefore, Mission Valley is recommended as Phase 6.

Phase 7: Five Points to Mission Hills is the next alignment that connects to the network. It is recommended as Phase 7.

Phase 8: The Old Town to Five Points alignment is recommended to be implemented during the final phase of the Project.

Table 4.5 – Population Served by Alignment

Alignment Population Served		
Corridor	**Alignment**	**Population**
Mission Valley - Hillcrest	Hotel Circle/Bachman Pl	150
Hillcrest - Bankers Hill	4th Ave & 5th Ave	490
Bankers Hill - Downtown	4th Ave & 5th Ave	7,110
Old Town - Five Points	Congress St/San Diego Ave	810
Five Points - Mission Hills	Washington St	20
Mission Hills - Hillcrest	University Ave	5,070
Hillcrest - North Park	University Ave	3,220
University Heights - Balboa Park	Georgia St/Park Blvd	2,740

Table 4.6 – Per Capita Cost by Alignment

Alignment Cost per Capita					
Corridor	**Alignment**	**Population**	**Alignment Cost**	**Cost per Capita**	**Value**
Mission Valley - Hillcrest	Hotel Circle/Bachman Pl	150	$4,150,000	$ 27,500	2
Old Town - Five Points	Congress St/San Diego Ave	810	$1,150,000	$ 1,500	1
Five Points - Mission Hills	Washington	20	$10,350,000	$ 517,500	3