METRO ACTIVE TRANSPORTATION (MAT) PROGRAM

Redondo Beach Boulevard Active Transportation Corridor

FINAL
Alternatives Analysis

APRIL 2024

Prepared For

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1.0 Study Background & Purpose

1.1 Overview

The Redondo Beach Blvd Active Transportation Corridor Project will improve walking and biking opportunities in the cities of Redondo Beach and Lawndale and the unincorporated Los Angeles County community of El Camino Village. The project will improve safety and access for multiple transportation modes to travel around the community. The project corridor crosses several major streets, including Inglewood Ave, Grant Ave, Kingsdale Ave, and Artesia Blvd, connecting people walking and biking to neighborhoods, parks, schools, shopping centers, and existing and future transportation centers, including the planned C Line (Green) station, along Ripley Ave and Redondo Beach Boulevard.

The originally proposed alignment traversed 3.3 miles of Ripley Avenue and Redondo Beach Boulevard, connecting to schools on Ripley Avenue, the South Bay Galleria, the future C Line Extension to Torrance, Alondra Park, and concentrations of residential and commercial uses.

The study area (one-half mile from the originally proposed grant application alignment) and existing and planned bicycle facilities are shown in ***Figure 1*** below. Class II bicycle lanes exist on Grant Avenue between Kingsdale Avenue and Inglewood Avenue, and a short stretch of Class III facilities are on Ripley Avenue between Lilienthal Lane and Felton Lane.

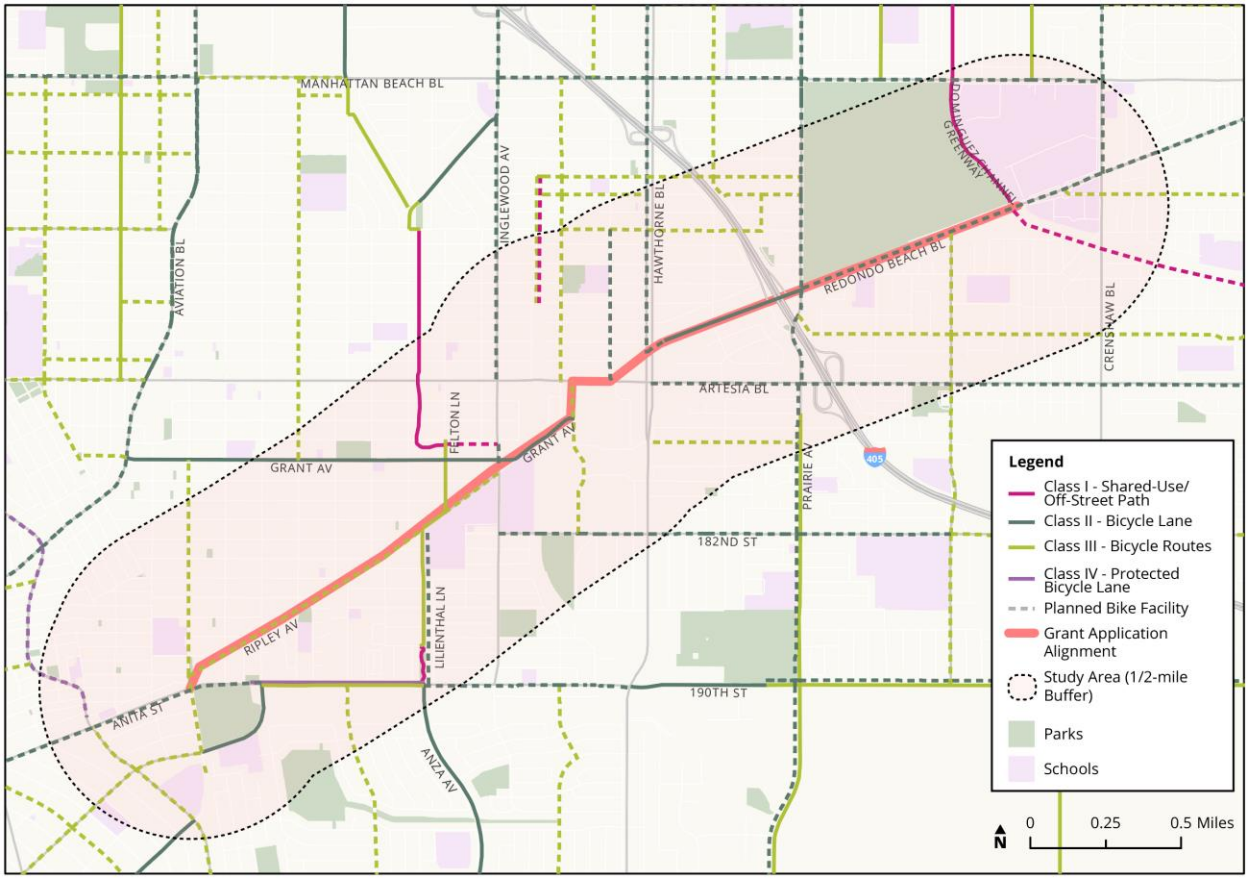

Figure 1 Study Area with Existing and Planned Bicycle Facilities

The Alternatives Analysis is one of the initial steps in the planning process. It serves to document the considered and preferred alternative alignments that will inform design development and engineering. Alignments were assessed based on community feedback, jurisdictional insight, right-of-way constraints, safety for all street users, connectivity, operations, and relative cost. This memo identifies recommended alignments to improve the travel environment and traffic safety for vulnerable groups, namely cyclists and pedestrians.

1.2 Planning Process

1.2.1 Multi-jurisdictional MAT Grant Application

The original multi-jurisdictional grant application for MAT Phase I funding was submitted by the City of Redondo Beach, the City of Lawndale, and the County of Los Angeles. The grant application identified Ripley Avenue and Redondo Beach Boulevard as the primary corridors. See ***Figure 2*** below.

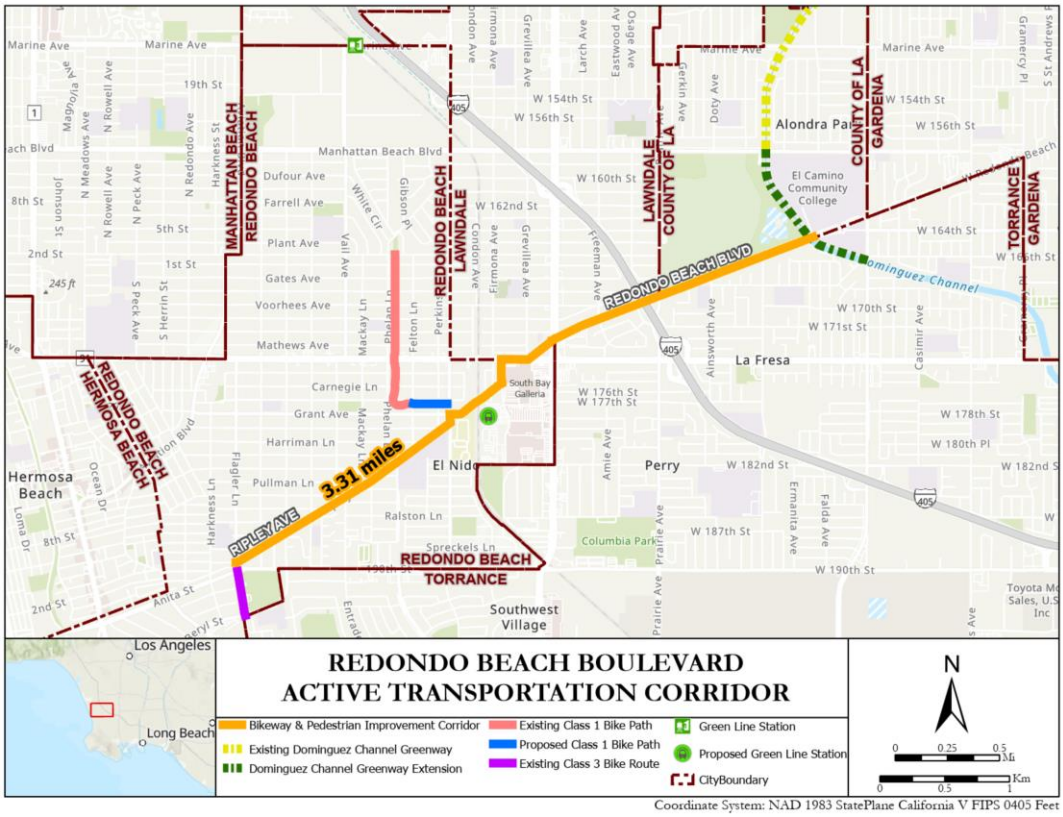

Figure 2 MAT Grant Application Alignment Map

1.2.2 Existing Conditions

The corridor is anchored by three nodes that have the highest propensity for attracting pedestrian and bicycle trip activity, including:

- Near Dominguez Park, at the southwestern end of the project area, there is a mix of housing, services, and schools.
- The central part of the project area surrounding the intersection of Artesia Boulevard and Hawthorne Boulevard, where South Bay Galleria, other commercial areas, and higher-density housing (over 40 residents/acre) are located.
- Near El Camino College, where 18,000 students are enrolled, in the northeastern end of the project area.

These high-propensity areas are revealed in the analysis of land use and destinations (***Figure 3***).

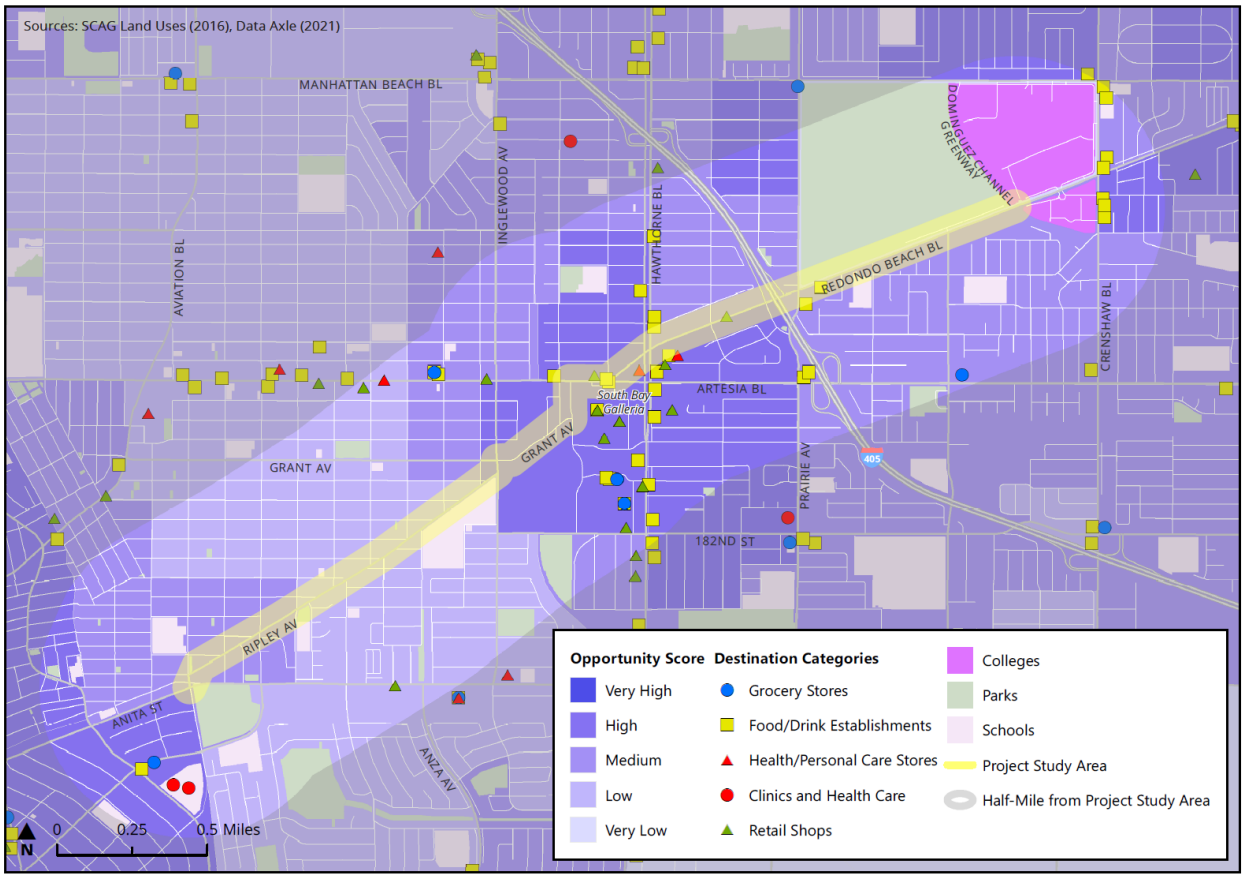

Figure 3 Land Uses and Destinations (Opportunity Score)

A safety assessment found that pedestrian and bicycle collisions, shown in ***Figure 4***, are more concentrated in the areas surrounding the three nodes; therefore, focusing pedestrian and bicycle improvements in these areas, as well as the routes that connect them, can enhance safety, comfort, and convenience for existing and future residents, employees, and visitors of the corridor.

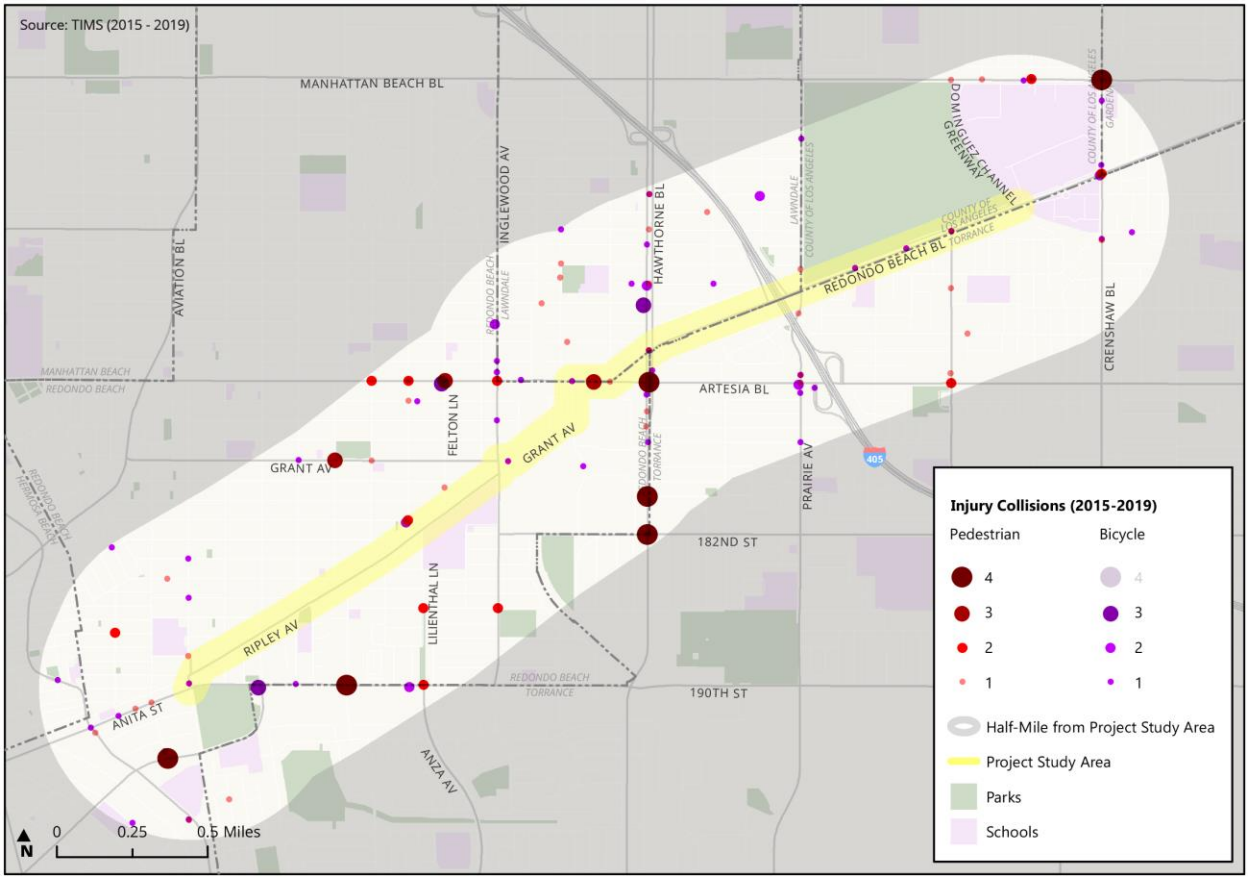

Figure 4 Pedestrian and Bicycle Collisions (2015-2019)

Complex intersections, such as Artesia Blvd at Redondo Beach Blvd and Hawthorne Blvd at Redondo Beach Blvd, are identified as areas of concern. Intersection approaches that include high-visibility crosswalks, leading pedestrian intervals and/or protected signal phases for bicyclists, restricted right turn on red for vehicular movements, and traffic signals with protected left turn phases are critical considerations for improving bicycling and pedestrian safety.

Pedestrian and Bicycle Access to Transit

From the central hub of the study area, at the South Bay Galleria, to the northeastern terminus of the study area, the corridor is well served by local bus services operated by Metro, Torrance Transit, Lawndale Beat, Beach Cities Transit, and Gardena GTrans. ***Figure 5*** shows the existing transit in and around the project study area.

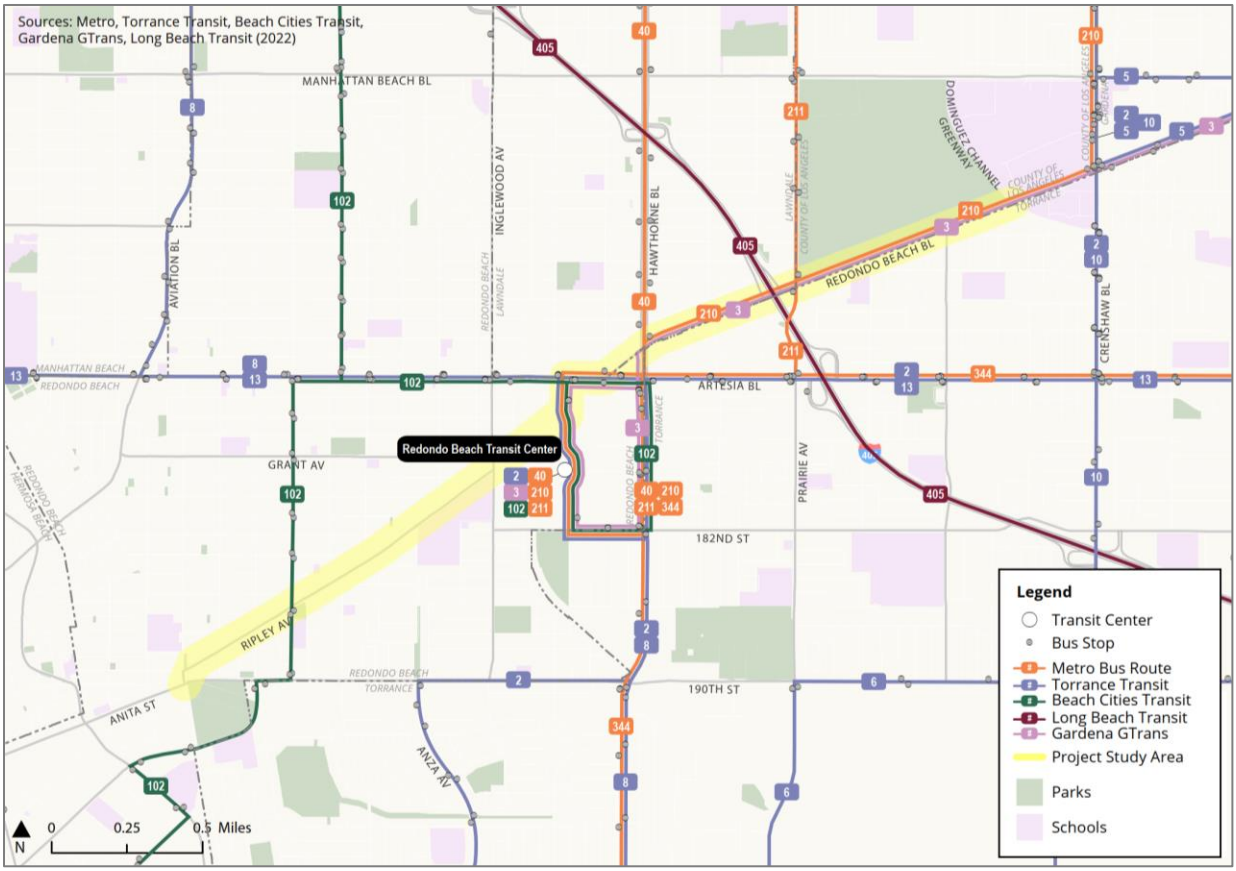

Figure 5 Existing Transit Services

Maintaining and enhancing the areas around existing bus stops can help improve access to the local destinations and connections to the regional transit network. Wider sidewalks can ensure sufficient space for bus shelters without inhibiting the ADA accessibility of the walkways.

The future C Line (Green) extension to Torrance is considering two alignment alternatives, both of which cross the project area either on the east or west side of the South Bay Galleria. The C Line will provide the project area with high-quality transit connectivity by enabling quicker journeys to local and regional destinations.

1.2.3 Community Engagement Overview

Phase 1

The first phase of community engagement collected comments from over 300 residents and identified equally high levels of walking, biking, and driving in the community. The community's most significant priorities within the study area are traffic and personal safety, addressing a lack of comfortable or separated bicycle facilities, improving connectivity to destinations and existing bike routes, and improving bicycle parking. The findings are summarized in the infographic below (***Figure 6***). The locations with the highest levels of challenges are Dominguez Park, the intersection of Inglewood Ave and Ripley Ave, and Redondo Beach Blvd between Hawthorne Blvd and Prairie Ave.

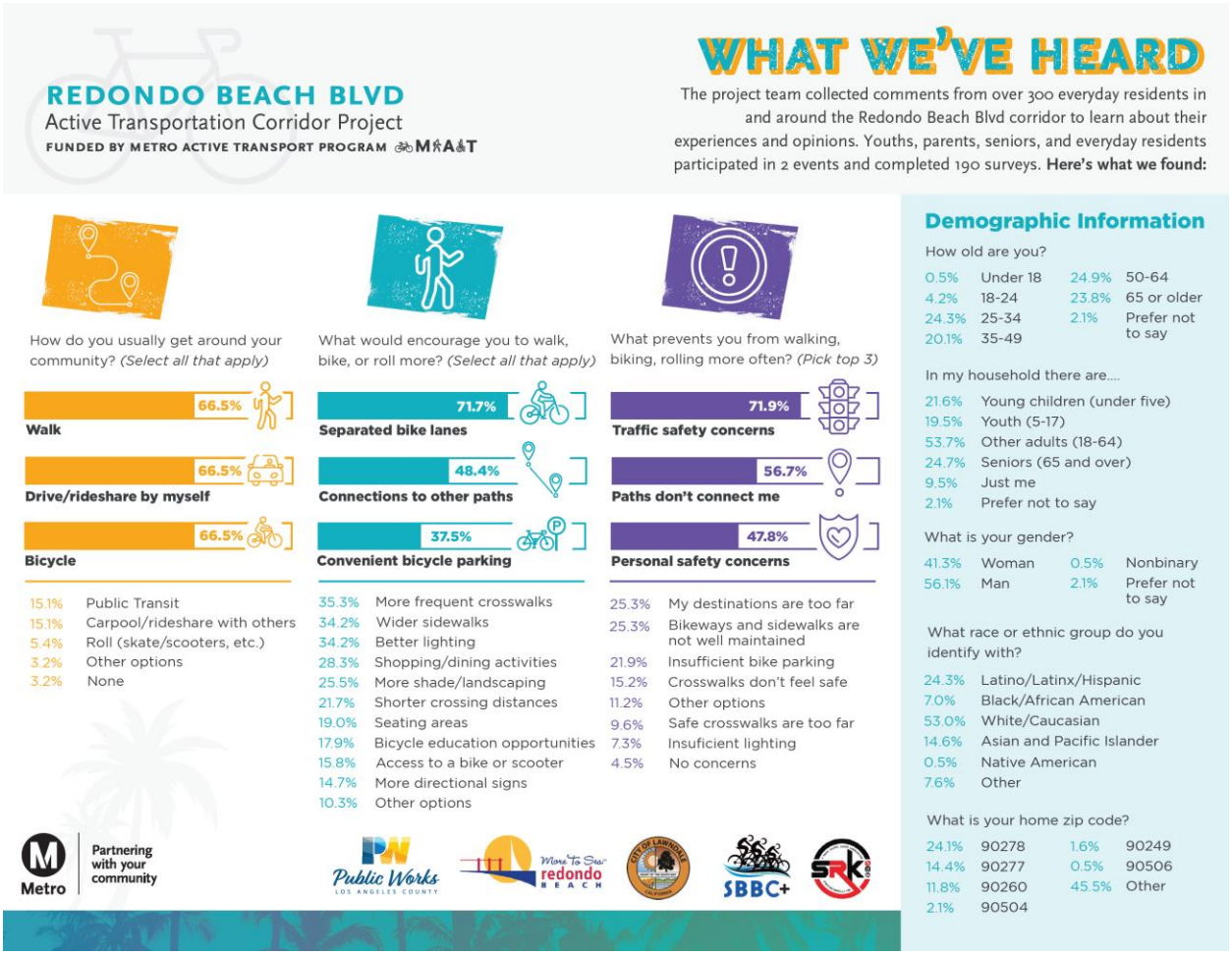

Figure 6 Phase 1 Community Outreach Summary

Community members also identified a number of alternative alignments that informed the routes assessed during the alternatives analysis. The community-identified routes, differentiated by the number of people who suggested the routes, are shown in ***Figure 7***.

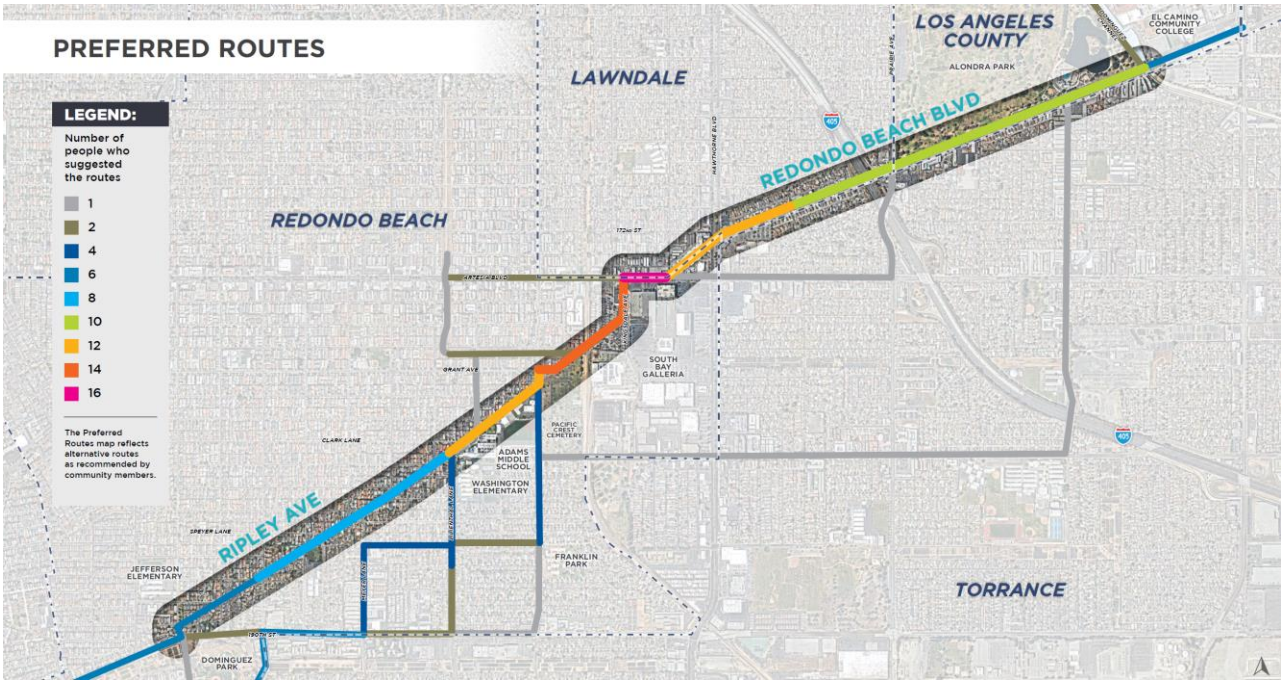

Figure 7 Community-Identified Preferred Routes

Phase 2

The second phase of community engagement collected comments from over 350 residents online and at in-person events that identified preferred alignments and bicycle facilities throughout the length of the corridor. Participants were provided with maps of alternative alignments, where considered, and sections illustrating proposed options for bicycle facilities.

The results from the survey informed the alignment and facility recommendations, such as the alignment on the westernmost segment between Dominguez Park and the Ripley Avenue/Lilienthal Lane intersection and the bicycle facilities on the easternmost segment. There was a general preference for protected facilities. Questions where there were more significant disparities in the level of safety – for instance, a protected, two-way cycle track versus unprotected Class II or Class III facilities – had the greatest difference in preferences. For the four survey questions that directly compared more protected against less protected facilities for specific segments, preferences ranged from 62% to 91% in favor of the more protected facilities.

In addition to the abovementioned engagement, the City of Redondo Beach and the Redondo Beach Unified School District contacted residents and school constituents around Lilienthal Lane and Ripley Avenue, where Washington Elementary School and Adams Middle School are located. The following general takeaways are based on survey responses and comments:

- Strong support for the project and wanting as much protection and safety as possible.
- Mixed opinions on signal/no signal at Inglewood/Ripley. Overall agreement is that careful design is needed at this location and that the left turns are already difficult.
- Concerns with path crossings at intersections and driveways. Who has the right-of-way, and will traffic be directed during busy times?

2.0 Alignment Assessments

Alternative alignments were studied within a half mile of the original grant application corridor based on the existing conditions along with community feedback, goals, and concerns. An overview of the studied alignments is exhibited in ***Figure 8***, which shows locations where single alignment and multiple alternative alignments were assessed.

The terrain and grade changes along Ripley Avenue west of Inglewood Avenue were identified as challenges to developing comfortable facilities for bicyclists of all abilities. Therefore, this portion of the study area had a higher number of alternative routes than any of the other segments of the study area east of Inglewood Ave.

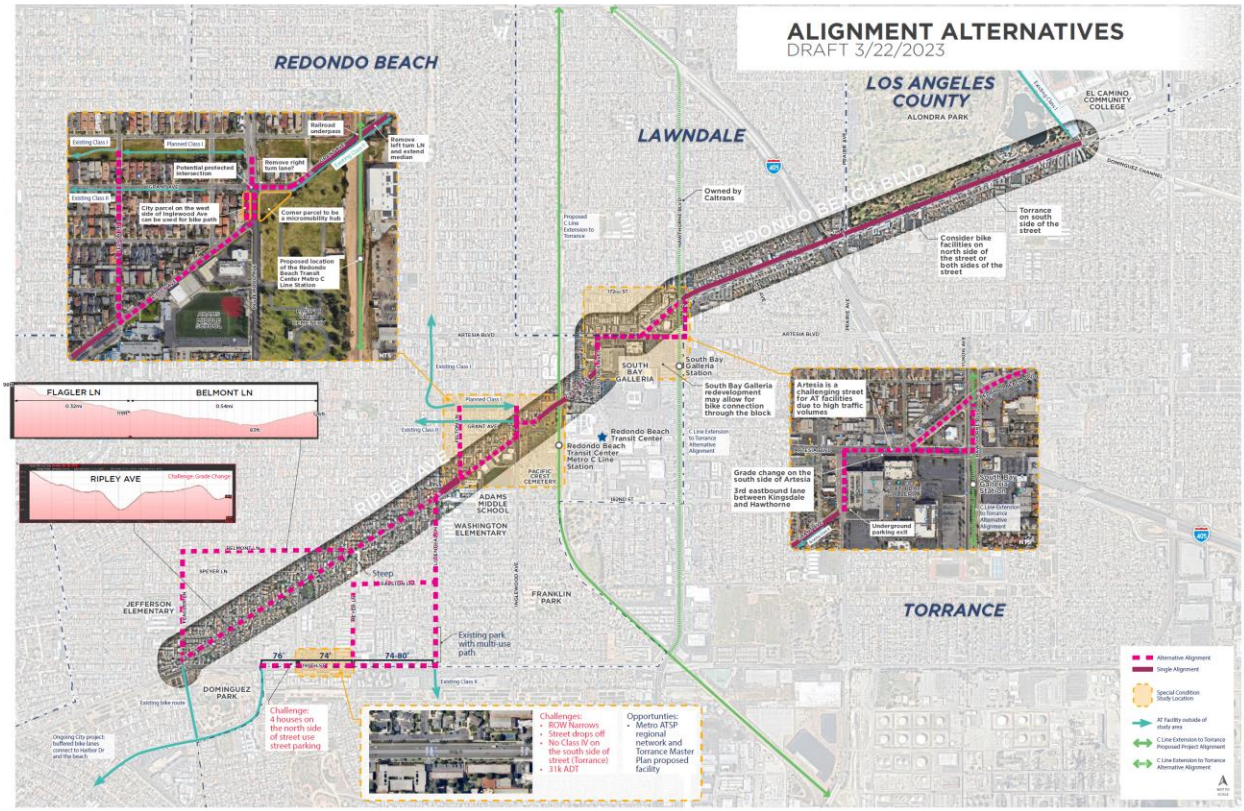

Figure 8 Alignment Assessments Overview

The alignment assessments are presented by segment from west to east (left to right) in the following sub-sections.

2.1 Dominguez Park to Ripley Avenue/Lilienthal Lane Intersection

The westernmost segment of the corridor connects Dominguez Park to the intersection of Ripley Avenue and Lilienthal Avenue, where Washington Avenue Elementary School and Adams Middle School are located. To create this connection, four alternative routes were assessed; these are labeled A through D from northwest to southeast, as illustrated in ***Figure 9***. Alternative B is the alignment initially proposed in the MAT application grant.

These alternative alignments were presented to the community for feedback. The community's response largely favored Alternatives B and D, as shown in ***Figure 10***.

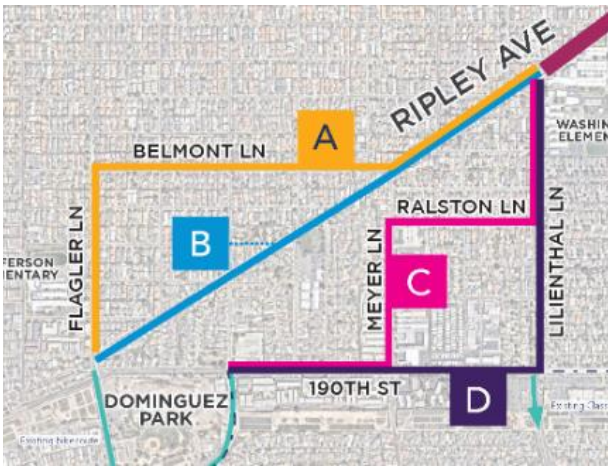

Figure 9 Alignment Options A through D for the route from Dominguez Park to the Ripley Avenue/Lilienthal Lane intersection as presented in the community survey

2.1.1 Alternative A: Flagler Lane and Belmont Ave

Alternative A, in yellow in Figure 9, traverses Flagler Lane from Ripley Avenue to Belmont Lane, Belmont Lane from Flagler Lane to Ripley Avenue, and Ripley Avenue from Belmont Lane to Lilienthal Lane. This route avoids the steep grades in the original route shown in the grant application, Alternative B. However, this alignment still faces challenging grades on the southern portion of Flagler, as shown in ***Figure 11***. Additionally, the community did not prefer this route. For these reasons, this alternative was not selected.

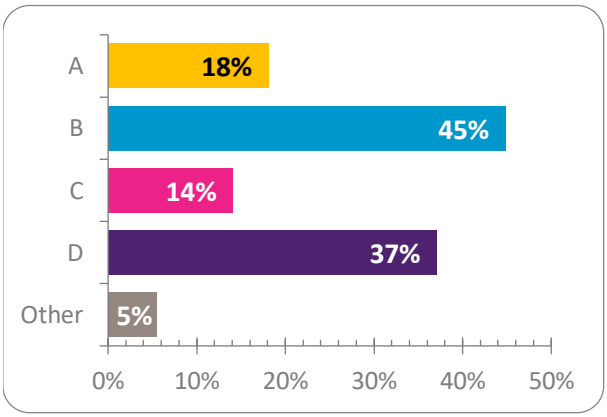

Figure 10 Community Survey Alignment Alternative Preferences

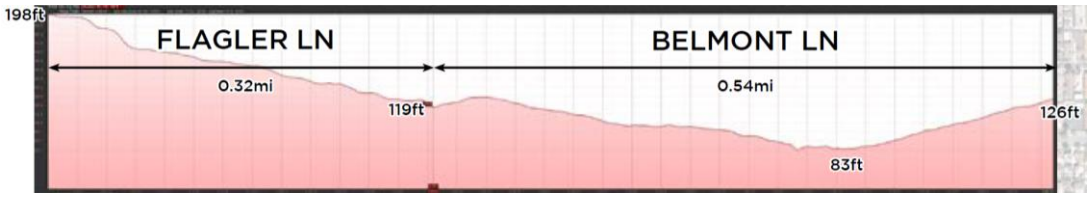

Figure 11 Elevations on Flagler Lane and Belmont Lane

2.1.2 Alternative B: Ripley Avenue

Alternative B, shown in blue in Figure 9, is the initial alignment pursued in the multi-jurisdictional grant application. This route is the most direct path between the two ends of this segment and was the top option preferred by the community (Figure 10). However, this alignment is challenged by extremely steep grades, especially around Rindge Lane with maximum slopes up to 23.8%, as shown in ***Figure 12***. These steep grades would prevent all but the most proficient bicyclists and those with e-bikes from being able to use any facilities constructed comfortably.

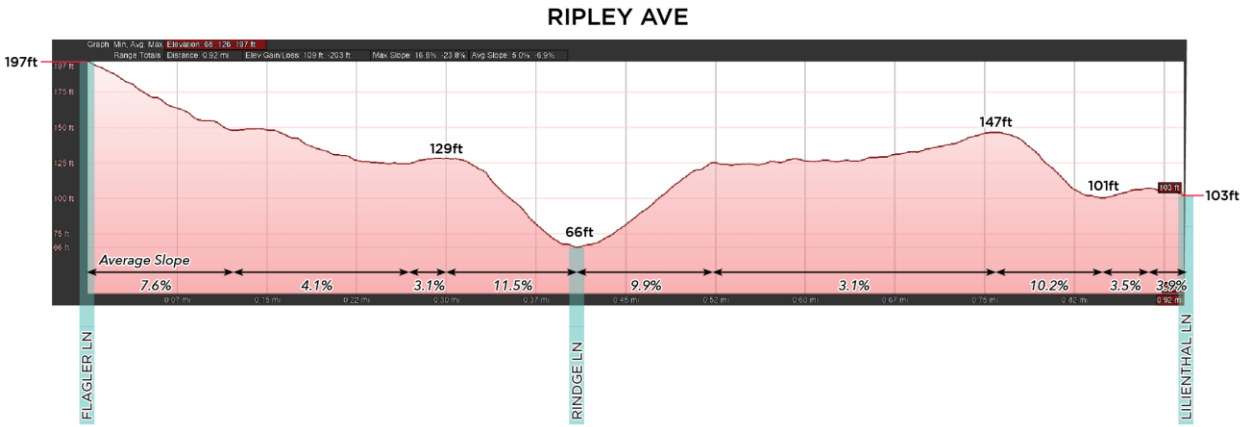

Figure 12 Elevations on Ripley Avenue from Dominguez Park to Lilienthal Lane

2.1.3 Alternative C: 190th, Meyer Lane, Ralston Lane, and Lilienthal Lane

Alternative C, shown in pink in Figure 9, traverses 190th Street, Meyer Lane, Ralston Lane, and Lilienthal Lane. This route avoids the steep grades of Alternatives A and B while connecting to several schools. However, while the community initially identified this route in Phase 1 of outreach, it was the least favored option for this segment when presented to the community in Phase 2.

There are additional challenges that face both Alternatives C and D. The first is that 190th Street has right-of-way limitations where portions are more narrow than others, which makes the design and implementation of safe bicycle facilities while maintaining space for moving or parked vehicles challenging. The limitations of the right-of-way are illustrated in ***Figure 13***. In order to overcome this challenge, the consultant team and the City of Redondo Beach, in consultation with targetted members of the community, developed a safe route that minimizes impacts to drivers, residents, and businesses.

Figure 13 Challenges on 190th Street

The second challenge is on Lilienthal Avenue, where coordination and approval by Washington Elementary will be required to implement protected bicycle lanes rather than Class III sharrows.

2.1.4 Alternative D: 190th St and Lilienthal Lane

Alternative D, shown in purple in Figure 9, is the southeasternmost alignment considered. The route goes east-west on 190th Street from the existing Class II facilities, which flank the east side of Dominguez Park, to the existing multi-use path within Lilienthal Park. The north-south route travels through the existing multi-use path in Lilienthal Park between 190th and Fisk Lane and on Lilienthal Lane between Fisk Lane and Ripley Avenue.

This route requires the same coordination efforts with the community and schools noted in Alternative C on 190th Street and Lilienthal Lane. The City of Redondo Beach has conducted extensive outreach with residents, the school districts, and students' parents to ensure that this portion of the project can be implemented successfully.

This was among the top two options widely preferred by the community, see Figure 10. Compared to the other top preference, Alternative B, the grading is navigable by bicyclists of all abilities and so is preferential. It has the further benefit of interfacing with Washington Elementary School.

Preferred Alignment for the Segment Between Dominquez Park and Ripley Avenue/Lilienthal Lane

The preferred alignment, Alternative D, follows 190th Street from Dominguez Park to Lilienthal Park and continues along Lilienthal Lane from Lilienthal Park/Fisk Lane to Ripley Avenue. The proposed cross-sections for this preferred alignment are presented later in *Section 3.0, Proposed Project*.

2.2 Ripley Avenue from Ripley Avenue/Lilienthal Lane Intersection to Grant Avenue/Inglewood Avenue Intersection

The next section of the corridor connects the intersection of Ripley Avenue and Lilienthal Avenue, where Washington Avenue Elementary School and Adams Middle School are located, to the intersection of Grant Avenue and Inglewood Avenue, shown in ***Figure 14***.

Figure 14 Ripley Avenue/Lilienthal Lane Intersection to Grant Avenue/Inglewood Avenue Intersection

The assessment for this section of the corridor primarily examined the options for Ripley Avenue as it provides the most direct route and was the alignment presented in the MAT Grant Application. This portion of Ripley Avenue does not face the grading challenges found in the westernmost section of the street. This friendly grading will allow a diverse range of cyclists with varying comfort levels and abilities to use the new bicycle facilities. Additionally, this route interfaces directly with Adams Middle School and can allow for movement between bicycle facilities on Lilienthal Lane and Ripley Avenue without crossing vehicle traffic.

Challenges facing this alignment are a constrained right-of-way on Ripley Avenue and crossing the intersection at Inglewood Avenue and Ripley Avenue, connecting to Grant Avenue. To address the constrained right-of-way, the team considered several design options and trade-offs, including Class II bicycle lanes that maintained parking and a protected two-way cycle track that removed parking. These options were presented to the community to help determine preference. The two-way cycle track was favored by a wide margin (69% of 359 respondents preferred the two-way cycle track). This tracks with the community's consistent preference for protected bicycling facilities.

Source: CRA

Figure 15 Raised Crosswalk in Solana Beach, CA

Ripley Avenue terminates at the currently unsignalized intersection of Inglewood Avenue and Ripley Avenue, which carries high volumes of vehicular traffic. In order to improve safety conditions for cyclists and pedestrians crossing from the south side of Ripley Avenue towards Grant Avenue, it is recommended that left-turns in the northbound and eastbound directions be prohibted at all times and bollards installed along Inglewood Avenue at the intersection. Redondo Beach staff and residents noted that these left-turns are already challenging to perform due to sight distance issues. These left-turns are already prohibited during weekday peak periods, and alternative routes with easier turns are available. Left-turn volumes at this intersection were found to be relatively low. Additionally, a raised crossing (speed table) will be constructed on the west leg of Inglewood Avenue at Ripley Avenue intersection. An example of a speed raised crosswalk is shown on the image to the right in ***Figure 15***. This would slow down turns and increase the profile of the crossing.

The City of Redondo Beach owns the vacant parcels on the western side of Inglewood Avenue between Ripley Avenue and Grant Avenue. The availability of this space will permit the development of off-street bicycle facilities on the western side of Inglewood Avenue, thus enhancing the connection with additional bike and pedestrian supporting amenities along Ripley Avenue between the intersection at Inglewood Avenue and Grant Avenue.

The proposed cross-sections are presented later in *Section 3.0, Proposed Project*.

In addition to Ripley Avenue, a Felton Lane connection to existing bicycle facilities on Grant Avenue was examined. Based on agency partner feedback, this alternative was not selected for deeper assessment. In the future, design features should be considered to slow down traffic, improve safety and comfort, and provide additional network connections.

Considerations for this segment of the corridor between Felton Lane and Grant Avenue are shown in ***Figure 16***.

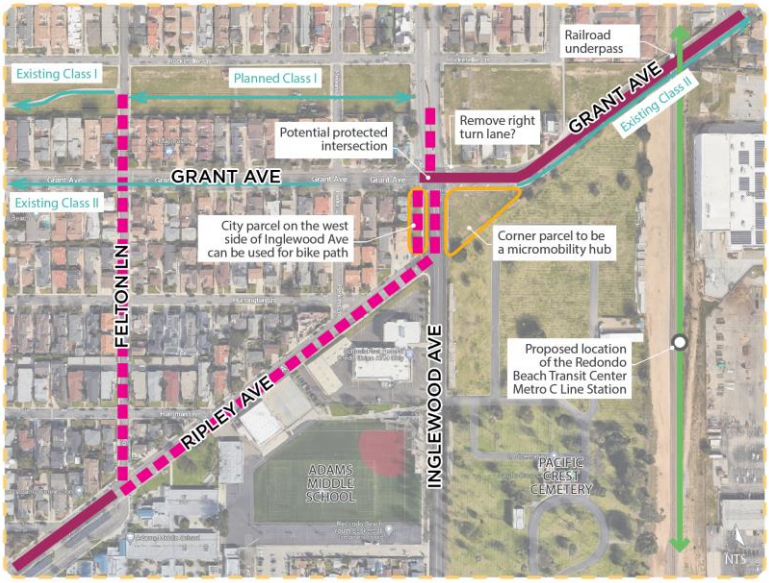

Figure 16 Considerations between the Ripley Avenue/Felton Lane Intersection and Grant Avenue/Inglewood Avenue Intersection

2.3 Grant Avenue, from Inglewood Avenue to Kingsdale Avenue

The section of the corridor on Grant Avenue from Inglewood Avenue to Kingsdale Avenue connects the Ripley Avenue corridor to the South Bay Galleria. This portion of the corridor is shown in orange in ***Figure 17***.

Figure 17 Grant Avenue from Inglewood Avenue to Kingsdale Avenue

This section has existing Class II bicycle facilities; however, this project recommends improving protection and safety for cyclists along the corridor with Class IV facilities, as well as improved intersections at Inglewood Avenue/Grant Avenue and at Grant Avenue/Kingsdale Avenue. The design is intended to incorporate the City of Redondo Beach's plans to improve bicycle facilities on Inglewood Avenue, connecting to the existing and proposed Class I facilities along the utilities easement. Grant Avenue east of Inglewood Avenue is also on the South Bay Cities Council of Governments' (SBCCOG) Local Travel Network (LTN), a network of lower speed streets available for slower speed vehicles such as neighborhood electric vehicles and bicycles. The design for upgraded Class IV facilities on this portion of the corridor would be compliant with the LTN.

The proposed Class IV facilities were supported by the community – 68% of 358 respondents stated that they were either "satisfied" or "very satisfied" with the proposal. The proposed cross-section is presented later in *Section 3.0, Proposed Project*.

2.4 South Bay Galleria Connection: Grant Avenue/Kingsdale Avenue Intersection to Artesia Boulevard/Redondo Beach Boulevard Intersection

The South Bay Galleria connection extends from the Grant Avenue/Kingsdale Avenue Intersection to the Artesia Boulevard and traverses the South Bay Galleria property. The project team met with the developers of the South Bay Galleria redevelopment project, also known as the South Bay Social District. The developers are planning to create an off-street connection from the Grant Avenue/Kingsdale Avenue intersection to Hawthorne Avenue through the property. The specifics of this plan are still being developed, along with Metro's plans for the C Line Extension. An approximated alignment is shown as a dashed orange line in ***Figure 18***.

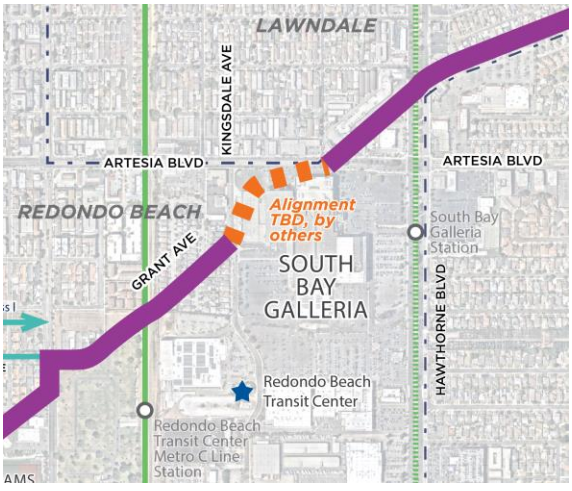

Figure 18 South Bay Galleria Connection

The project team assessed options to develop accompanying on-street facilities on Artesia Boulevard. However, the high traffic volumes on Artesia Boulevard and limited right-of-way widths impeded the development of safe bicycle facilities. Since this section will be served by safe, off-street bicycle connections in the future, it was determined that this was the preferred alternative. The design will need to account for vehicles exiting and entering the South Bay Galleria, South Bay Galleria redevelopment plans and coordination, high traffic volumes on Artesia Boulevard, and bus traffic on Kingsdale.

2.5 Artesia Boulevard/Redondo Beach Boulevard Intersection to Redondo Beach Boulevard/Hawthorne Boulevard Intersection

A key link in the overall route is how to connect Artesia Boulevard and the South Bay Galleria to the Redondo Beach Boulevard corridor east of Hawthorne Boulevard. From Artesia Boulevard at Redondo Beach Boulevard and the intersection of Hawthorne Boulevard and Redondo Beach Boulevard, there are two alternatives: (1) Redondo Beach Boulevard and (2) an east-west route on Artesia Boulevard connecting to a north-south route on Hawthorne Boulevard. These two alternatives are shown in orange (Alternative 1) and blue (Alternative 2) in ***Figure 19***.

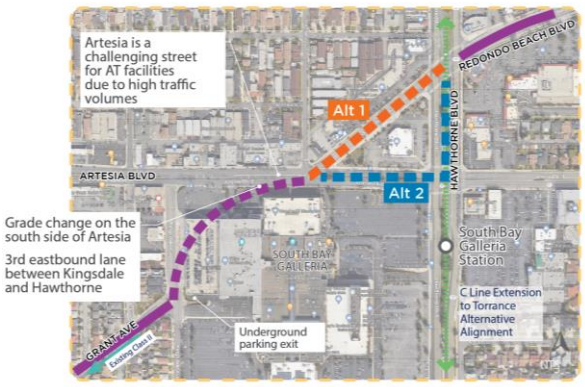

Figure 19 Artesia Boulevard/Redondo Beach Boulevard Intersection to Redondo Beach Boulevard/Hawthorne Boulevard Intersection Alternative Alignments

2.5.1 Alternative 1: Redondo Beach Boulevard

Alternative 1, which is consistent with the original grant alignment, was identified as the preferred route by the community in Phase 1 of outreach. This alternative allows for the development of a protected path as there is available right-of-way. A challenge with this alternative is that the intersection of Artesia Boulevard, Grevillea Avenue, and Redondo Beach Boulevard is operationally and geometrically challenging due to the complexity of the intersection and the angles at which the streets meet.

2.5.2 Alternative 2: Artesia Boulevard and Hawthorne Boulevard

Alternative 2 avoids crossing Artesia Boulevard at Redondo Beach Boulevard and is closer to the alternative station location for the C Line Extension to Torrance than Alternative 1. However, this alternative faces numerous challenges as both Hawthorne Boulevard and Artesia Boulevard have high traffic volumes. Furthermore, Hawthorne Boulevard is owned by Caltrans, and is a considered route for the C Line Extension to Torrance, so it will likely be constrained with competing priorities. Further complications are the operational challenges faced at the intersection of Artesia Boulevard and Hawthorne Boulevard.

2.5.3 Preferred Alignment

Due to the numerous challenges facing Alternative 2 and the opportunity to create a safe and protected bicycle facility on Redondo Beach Boulevard, the preferred alignment is Alternative 1: Redondo Beach Boulevard from Artesia Boulevard to Hawthorne Boulevard.

The proposed cross-section for this preferred alignment is presented in later in *Section 3.0, Proposed Project*.

2.6 Redondo Beach Boulevard, from Hawthorne Boulevard to Prairie Avenue

For this segment of the active transportation corridor, Redondo Beach Boulevard from Hawthorne Boulevard to Prairie Avenue, a single route was considered, shown in orange in ***Figure 20***. This section of Redondo Beach Boulevard is predominantly within the City of Lawndale, with the southern sidewalk within the City of Torrance.

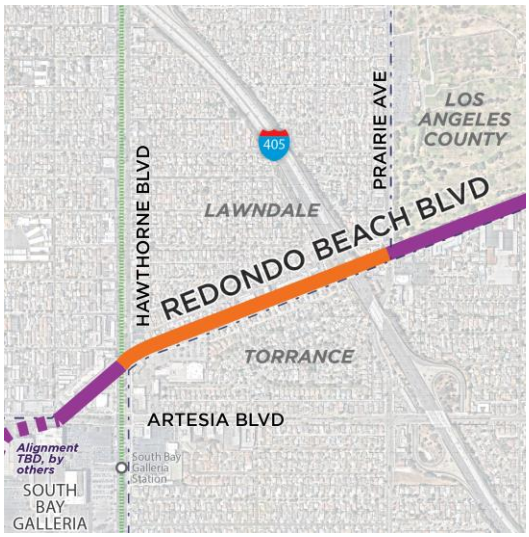

Figure 20 Redondo Beach Boulevard, from Hawthorne Boulevard to Prairie Avenue

The City of Lawndale recently restriped the street to include Class II facilities and raised medians on the north side (westbound). Due to the volume of vehicles on Redondo Beach Boulevard, the need to maintain as much on-street parking as possible for residents and businesses, and construction budget constraints, the study recommends maintaining the overall vision of Lawndale's recent street design as lane removal was not feasible to allow for protected bicycle facilities in most locations. An additional challenge of this corridor is the ramps on I-405, which can be intimidating for cyclists and pedestrians, and confusing for drivers entering or exiting the freeway.

Additional alignments that extended bicycle facilities on Artesia Boulevard and connected to Redondo Beach Boulevard via more easterly north-south routes were examined but were ultimately not moved forward due to political challenges.

The proposed project recommends refinements to the existing street configuration, including the installation of buffered facilities adjacent to the I-405 Freeway ramps and striping improvements at strategic intersections. The proposed cross-section is presented later in *Section 3.0, Proposed Project*.

2.7 Redondo Beach Boulevard, from Prairie Avenue to Dominguez Channel

The easternmost segment of the active transportation corridor, adjacent to Alondra Park, is shown in orange in ***Figure 21***. This alignment is on Redondo Beach Boulevard from Prairie Avenue, connecting to El Camino Community College and existing Class I facilities along Dominguez Channel.

Figure 21 Redondo Beach Boulevard, from Prairie Avenue to Dominguez Channel

This segment requires multi-jurisdictional coordination as the northwestern corner of the Redondo Beach Boulevard/Prairie Avenue intersection is within the City of Lawndale, the southern portion of the street, which includes parking and the sidewalk, is within the City of Torrance, and the remainder (northern portion of the street east of Prairie Avenue, including most of the travel lanes) is within the County of Los Angeles. Extensive and ongoing coordination with project partners has been conducted over the lifetime of the project to help resolve this complication.

This segment provides opportunities to create protected bicycle facilities that connect to existing Class I facilities (Dominguez Channel Bikeway), serve regional users of Alondra Park, and students and staff at El Camino Community College. Because of the configuration of the Alondra Park parking lot and access points, there are few driveways on the north side of the street; This allows for the development of uninterrupted bicycle facilities on the north side of the street, which can include a protected two-way cycle track. However, a challenge with installing the two-way cycle track is the transition from the Class II bike lanes to the west. The intersection of Redondo Beach Boulevard and Prairie Avenue carries high traffic volumes, and the westbound, channelized, right-turn lane is needed to maintain traffic operations. Therefore, the study examined alternative locations to cross; this examination determined that Ainsworth Avenue was an appropriate low-stress, signalized intersection where crossing between one-way Class II on the south side of the street and two-way Class IV on the north side of the street would be comfortable for bicyclists.

The assessment recommends that the project include two-way protected cycle tracks on the north side of Redondo Beach Boulevard, adjacent to Alondra Park, east of Ainsworth Avenue; Bicyclists will be able to avoid the numerous driveway intersections on the south side of the street and connect to the existing Class I facilities along Dominguez Channel and El Camino Community College. This was supported by the majority of public respondents (64% of 348 people) who preferred the configuration with two-way cycle tracks in comparison to buffered one-way Class II facilities (36%). To provide multiple bicycle facility options, depending on destination, and accommodate a request from the City of Torrance, it is recommended that Class II facilities be continued on the south side of the street between Ainsworth Avenue and the planned Dominguez Channel extension to the south.

The recommended configuration incorporates one-way Class II bicycle facilities from Prairie Avenue to Ainsworth Avenue and two-way, protected cycle tracks along with a one-way eastbound Class II bicycle facility from Ainsworth Avenue to Dominguez Channel. The recommended transition between

the one-way and two-way bicycle facilities is at Ainsworth Avenue, as this is a low-stress, signalized intersection with existing pedestrian crosswalks, so operations will not be impacted.

It is anticipated that cyclists connecting to the existing Dominguez Channel Bikeway will transition to the north side of the street at Ainsworth Avenue. It is further anticipated that the one-way eastbound Class II bicycle facility on the south side of the street will interface with the southern segment of the Dominguez Channel Bikeway, planned by others.

The proposed cross-sections are presented later in *Section 3.0, Proposed Project*.

3.0 Proposed Project

3.1 Recommended Alignment

Based on the outreach and assessment conducted, the alignment shown in ***Figure 22*** is recommended. This alignment will connect numerous residents, employees, and visitors to local schools and colleges, the South Bay Galleria, a keystone commercial and redevelopment site, Alondra Park, a regional recreational destination, and the Dominguez Channel Bikeway – an existing and planned active transportation corridor. It will also connect to existing bicycle facilities on the western and eastern ends of the corridor, providing access beyond the project limits.

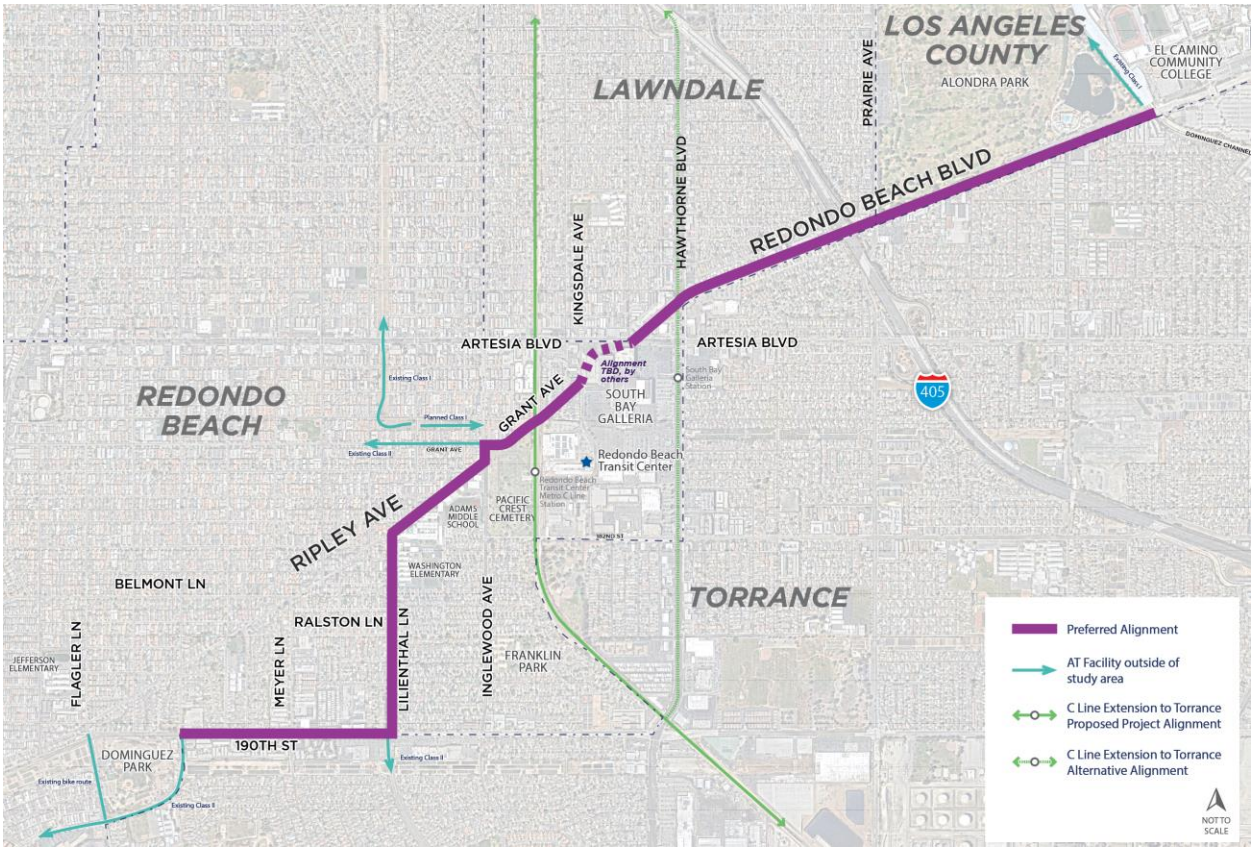

Figure 22 Recommended Alignment for the Redondo Beach Boulevard Active Transportation Corridor

The recommended alignment for each segment is listed in ***Table 1*** below, listed from west to east (left to right), as shown in Figure 22 on the previous page.

Table 1 Recommended Alignment(s) by Segment

Section Assessed	Recommended Alignment
Dominguez Park to Ripley Avenue/Lilienthal Lane Intersection	▪ 190th Street, from Dominguez Park to Lilienthal Lane/Lilienthal Park ▪ Lilienthal Lane, from Lilienthal Park/Fisk Lane to Ripley Avenue
Ripley Avenue/Lilienthal Lane Intersection to Grant Avenue/Inglewood Avenue Intersection	▪ South side of Ripley Avenue, from Lilienthal Lane to Inglewood Avenue ▪ West side of Inglewood Avenue, from Ripley Avenue to Grant Avenue
Grant Avenue/Inglewood Avenue Intersection to Grant Avenue/Kingsdale Avenue Intersection	▪ Grant Avenue, from Inglewood Avenue to Kingsdale Avenue
South Bay Galleria Connection: Grant Avenue/Kingsdale Avenue Intersection to Artesia Boulevard/Redondo Beach Boulevard Intersection	▪ Alignment to be determined by the South Bay Galleria development team
Artesia Boulevard/Redondo Beach Boulevard Intersection to Redondo Beach Boulevard/Hawthorne Boulevard Intersection	▪ South side of Redondo Beach Boulevard, from Artesia Boulevard to Hawthorne Boulevard
Redondo Beach Boulevard/Hawthorne Boulevard Intersection to Redondo Beach Boulevard Prairie Avenue Intersection	▪ Redondo Beach Boulevard, from Hawthorne Boulevard to Prairie Avenue
Redondo Beach Boulevard Prairie Avenue Intersection to Dominguez Channel	▪ Redondo Beach Boulevard, from Prairie Avenue to Dominguez Channel, transition from Class II bike lanes to Class IV two-way cycle track (north side of the street) at Ainsworth Avenue

3.2 Recommended Facilities

The following facilities are recommended based on the alternative alignments assessment and feedback from agency partners and community members. An overview of the facilities for the recommended alignments are shown in ***Figure 23*** below.

Figure 23 Recommended Facility Types for the Redondo Beach Boulevard Active Transportation Corridor

The details of the alignments, including proposed cross-sections, are presented from west to east (left to right) in *sections 3.2.1 through 3.2.7*.

3.2.1 Recommended Facilities for Dominguez Park to Ripley Avenue/Lilienthal Lane Intersection

The recommended alignment for this section is 190th Street from Dominguez Park to Lilienthal Lane and Lilienthal Lane from Lilienthal Park to Ripley Avenue. The recommended facilities for 190th Street and Lilienthal Lane are shown in the sections below.

For 190th Street, illustrated in ***Figure 24***, it is recommended that, where feasible, protected, one-way facilities be installed on the north side of the street and due to limited roadway width, unprotected one-way Class II facilities be installed on the north side of the street. Bicycle lane protection materials will be determined during engineering design.

Figure 24 Proposed Section of Recommended Facilities for 190th Street from Dominguez Park to Lilienthal Lane

On Lilienthal Lane, the right-of-way is wider on the southern segment between Lilienthal Park/Fisk Lane and Ives Lane when compared to the northern section between Ives Lane and Ripley Avenue.

The southern segment, shown in ***Figure 25***, has a median that will need to be accommodated and parking maintained.

Figure 25 Proposed Section of Recommended Facilities for Lilienthal Lane from Lilienthal Park/Fisk Lane to Ives Lane

The northern segment (***Figure 26***) is adjacent to Washington Elementary School. Washington Elementary has a landscaped setback on the school property that can be utilized to allow for a protected two-way cycle track or multi-use path despite the narrow right-of-way. This will create continuous protected facilities on the east side of Lilienthal Lane, allowing for safe, active transportation access for students. As design continues through development and construction, this segment will need to be developed in close coordination with the school district and parents of students. Existing utility poles on the east side of Lilienthal Lane would be moved and consolidated with other existing utility poles on the west side of the street.

Figure 26 Proposed Section of Recommended Facilities for Lilienthal Lane from Ives Lane to Ripley Avenue

3.2.2 Recommended Facilities for Ripley Avenue/Lilienthal Lane Intersection to Grant Avenue/Inglewood Avenue Intersection

The recommended alignment for this section is Ripley Avenue from Lilienthal Lane to Inglewood Avenue and Inglewood Avenue from Ripley Avenue to Grant Avenue. The recommended facilities include a protected two-way cycle track on the south side of Ripley Avenue, as shown in the section below, ***Figure 27***.

Figure 27 Proposed Section of Recommended Facilities for Ripley Avenue from Lilienthal Lane to Inglewood Avenue

3.2.3 Recommended Facilities for Grant Avenue, from Inglewood Avenue to Kingsdale Avenue

While Grant Avenue currently has Class II bicycle facilities, they are unprotected, offering limited comfort and safety to cyclists. To improve the experience of both bicyclists and pedestrians, it is recommended that buffered, protected Class IV facilities be installed, as shown in ***Figure 28***. Like other proposed Class IV facilities, the specific vertical elements that constitute a Class IV facility will be determined during engineering design.

Figure 28 Proposed Section of Recommended Facilities for Grant Avenue, from Inglewood Avenue to Kingsdale Avenue

3.2.4 Recommended Facilities for South Bay Galleria Connection: Grant Avenue/Kingsdale Avenue Intersection to Artesia Boulevard/Redondo Beach Boulevard Intersection

The developers of the South Bay Galleria site, also referred to as the South Bay Social District, will work with City staff to develop off-street bicycle and active transportation routes fronting the buildings on Kingsdale Avenue and Artesia Boulevard as well as through the site. The construction of these facilities is anticipated to be phased alongside the site's construction.

3.2.5 Recommended Facilities for Artesia Boulevard/Redondo Beach Boulevard Intersection to Redondo Beach Boulevard/Hawthorne Boulevard Intersection

For the recommended alignment for this section – Redondo Beach Boulevard from Artesia Boulevard to Hawthorne Boulevard – the bicycle facilities recommended are off-street, protected, two-way cycle tracks or multi-use path on the south side of the street. A typical section is shown in ***Figure 29*** below.

Figure 29 Proposed Section of Recommended Facilities for Redondo Beach Boulevard from Artesia Boulevard to Hawthorne Boulevard

3.2.6 Recommended Facilities for Redondo Beach Boulevard, from Hawthorne Boulevard to Prairie Avenue

For this section of the corridor, the recommendation is to refine the existing one-way Class II facilities, including the installation of protected facilities adjacent to the I-405 Freeway ramps and intersection improvements. A typical section of this segment is illustrated in ***Figure 30***.

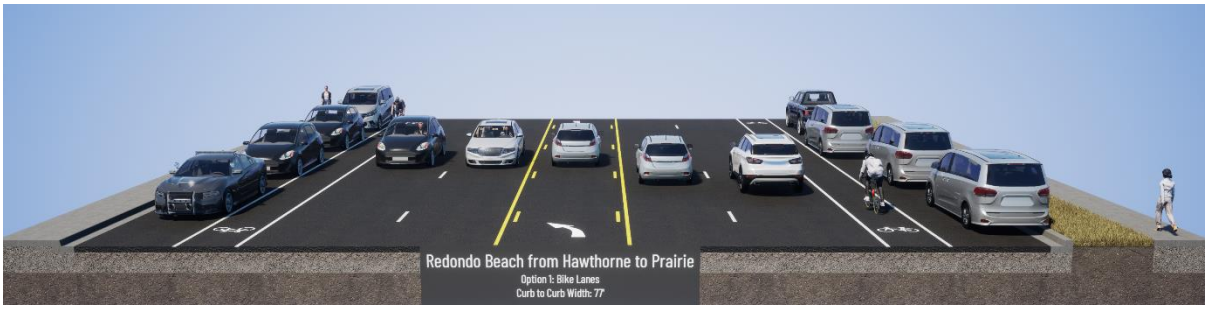

Figure 30 Proposed Section of Recommended Facilities for Redondo Beach Boulevard, from Hawthorne Boulevard to Ainsworth Avenue

3.2.7 Recommended Facilities for Redondo Beach Boulevard, from Prairie Avenue to Dominguez Channel

For the single alignment evaluated, the recommended facilities include a one-way Class II bicycle facility from Prairie Avenue to Ainsworth Avenue. From Ainsworth Avenue to Dominguez Channel, a regional active transportation corridor, a protected two-way cycle track on the north side of the street is recommended, as shown in ***Figure 31***. Additionally, the requested Class II facilities, which provide multiple choices of bicycle facility depending on the cyclist's final destination, are continued on the

south side of the street between Ainsworth Avenue and Dominguez Channel, this is also shown in ***Figure 31***.

Figure 31 Proposed Section of Recommended Facilities for Redondo Beach Boulevard, from Ainsworth Avenue to Dominguez Channel

3.3 Intersection Vehicle Operations Assessment

An operational assessment for drivers was conducted for the following seven (7) key intersections:

1. Inglewood Avenue & Ripley Avenue
2. Inglewood Avenue & Grant Avenue
3. Kingsdale Avenue & Grant Avenue
4. Redondo Beach Boulevard/Grevillea Avenue & Artesia Boulevard
5. Hawthorne Boulevard & Artesia Boulevard
6. Hawthorne Boulevard & Redondo Beach Boulevard
7. Prairie Avenue & Redondo Beach Boulevard

The operational assessment estimated potential driver delay and level of service (LOS) utilizing existing 2014[1] counts and forecasted year 2025 traffic volumes. The Near-Term Year 2025 traffic volumes were developed by applying an ambient growth rate of 0.38% per year to the existing traffic data. This is the same ambient growth rate utilized within the South Bay Galleria Improvement Project Transportation Impact Study. The ambient growth rate was based on the Southern California Association of Government's (SCAG) population growth forecast for the City of Redondo Beach.

These LOS analyses using adjusted counts from 2014 represent an estimate of traffic delay conditions to be experienced by drivers during weekday peak commuting periods only. They do not represent traffic conditions during other hours of the day, nor are they a measure of drivers' safety. LOS also does not consider the experience and safety of those who are walking, biking, or taking public transit. As mentioned before, the purpose of the MAT Project is to improve walking and biking

[1] Extracted from the South Bay Galleria Improvement Project Transportation Impact Study prepared by Fehr and Peers, July 2017.

connections and address multimodal safety concerns expressed by the community. Attempting to improve intersection LOS may increase speeds and worsen biking and walking conditions.

Table 2 displays the results of the peak hour intersection analysis under existing and Near-Term Year 2025 Conditions including delay, LOS, and key improvements at each intersection. Detailed analysis assumptions, existing traffic count worksheets, and LOS calculation worksheets, are provided in Appendix A.

Table 2 Peak Hour Intersection LOS Results

#	Intersection	Control	Existing Conditions				Near-Term Year 2025 with Project				Key Improvements
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		
			Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	
1	Inglewood Ave & Ripley Ave	SSSC	16.0	C	15.7	C	17.2	C	16.9	C	▪ Prohibit left-turns ▪ Bollards along Inglewood Ave ▪ Raised Crossing
2	Inglewood Ave & Grant Ave	Signal	33.0	C	50.5	D	37.0	D	62.1	**E**	▪ Lane configuration ▪ Signal Modifications ▪ Bike Signals
3	Kingsdale Ave & Grant Ave	Signal	22.1	C	20.9	C	23.9	C	25.9	C	▪ Lane configuration ▪ Signal Modifications ▪ Bike Signals
4	Redondo Beach Blvd/Grevillea Ave & Artesia Blvd	Signal	24.3	C	24.6	C	26.4	C	26.6	C	▪ Lane configuration ▪ Signal Modifications ▪ Bike Signal
5	Hawthorne Blvd & Artesia Blvd	Signal	48.2	D	42.9	D	Not Applicable[1]				
6	Hawthorne Blvd & Redondo Beach Blvd	Signal	52.9	D	43.6	D	59.7	**E**	49.9	D	▪ Prohibit redundant eastbound right-turn ▪ Bike Signals
7	Prairie Ave & Redondo Beach Blvd	Signal	64.5	**E**	70.9	**E**	Not Applicable[2]				

Notes:
SSSC = Side-Street Stop-Control. The delay shown is the worst delay experienced by the worst-performing movement for the intersection.
Bold indicates poor LOS.
[1] As discussed in Section 2.5.2, due to the numerous challenges, the alignment through this intersection was not selected and improvements are not proposed. See Appendix A for reviewed alternative improvements.
[2] As discussed in Section 2.7, due to operational challenges, improvements are not proposed at this intersection. Therefore, the transitions between existing and proposed bicycle facilities and between one-way and two-way bicycle facilities is proposed to take place at Ainsworth Avenue. See Appendix A for reviewed alternative improvements.

Appendix A - Operational Assessment – Detailed Analysis Assumptions, Existing Traffic Counts, LOS Calculation Worksheets

Detailed Analysis Assumptions

This section outlines all analysis assumptions for key study intersections for the Proposed Project including any traffic signal modifications, bike signal assumptions, and geometric changes. Summarized list of study intersections is shown below:

1. Inglewood Ave & Ripley Ave
2. Inglewood Ave & Grant Ave
3. Kingsdale Ave & Grant Ave
4. Redondo Beach Blvd/Grevillea Ave & Artesia Blvd
5. Hawthorne Blvd & Artesia Blvd
6. Hawthorne Blvd & Redondo Beach Blvd
7. Prairie Ave & Redondo Beach Blvd

Intersection #1: Inglewood Ave & Ripley Ave

Cyclists will need to cross from the south side of Ripley Ave to the north.

Preferred:

- Maintain intersection as unsignalized
- Prohibit left-turns for the northbound and eastbound direction
- Addition of bollards along Inglewood Ave at the intersection to prohibit left-turns
- Addition of a speed table for the west leg of the intersection

Alternative:

- Signalization (Couplet with Inglewood Ave & Grant Ave intersection)
- Bike signal for west leg
- Northbound left-turn will be prohibited during peak hours and possibly school dismissal with blank out sign (prohibited during peak hours under existing conditions)
- Eastbound left-turn will be allowed with signalization (restricted during peak hours under existing conditions)

Determined to be infeasible due to following:

- History of coordination issues for couplet/closely spaced intersections

Signal has potential to induce vehicular traffic and increase left-turns out of Ripley at the intersection

Intersection #2: Inglewood Ave & Grant Ave

Project Feature: Class IV one-way cycle tracks will be constructed on the north and south side of Grant Ave east of Inglewood Ave, which will require geometric changes for the east leg. Additionally, a bike signal(s) will be needed at intersection.

Preferred:

- Removal of merge lanes for east leg
- Incorporating the southbound stop-control right-turn pocket into the signal operations
- Conversion of westbound through lane to a shared through-right lane
- Bike signals for all approaches

Alternative:

- Coordinate signal with new signal at Inglewood Ave & Ripley Ave intersection

Determined to be infeasible due to following:

- History of coordination issues for couplet/closely spaced intersections

Intersection #3: Kingsdale Ave & Grant Ave

Class IV one-way cycle tracks will be constructed on the north and south side of Grant Ave west of Kingsdale Ave. The landscape triangle and the landscape on south side of Grant Ave west of Kingsdale Ave will be incorporated into design. Channelized southbound right-turn will be removed to remove the conflict point between vehicles and cyclists along Grant Ave.

Preferred:

- Bike signals for the north, south, and east leg
- Eastbound through-right lane converted to an exclusive right-turn lane
- Southbound approach extended to intersection
- Maintain permissive left-turn phasing for both the northbound and westbound approaches

Alternative:

- Bike signals for the north, south, and east leg
- Eastbound through-right lane converted to an exclusive right-turn lane
- Southbound approach extended to intersection
- Update permissive left-turn phasing for both the northbound and westbound approaches to protected left-turn phasing

Determined infeasible due to operational constraints at the intersections and affected intersections south of the intersection.

Intersection #4: Redondo Beach Blvd/Grevillea Ave & Artesia Blvd

Lane repurposing with removal of one eastbound vehicle lane to construct a class IV two-way cycle track. Additionally, cyclists will need to cross Arteria Blvd to continue onto Redondo Beach Blvd.

Preferred:

- Removal of eastbound through lane
- Bike signal on east leg of intersection

Intersection #5: Hawthorne Blvd & Artesia Blvd

This intersection was analyzed to determine the feasibility of alignment along Artesia Boulevard between Redondo Beach Boulevard and Hawthorne Boulevard.

Alternative:

Lane repurposing between Redondo Beach Blvd and Hawthorne Blvd = removal of eastbound right-turn pocket at intersection and convert through lane to an exclusive right-turn lane

- Bike signals for the south and east leg
- Conversion of northbound through-right lane to an exclusive right-turn lane.

Determined infeasible due to substantial increase in delay and degraded levels of service. With implementation of the improvements above, the intersection is projected to operate at 103.9 seconds of delay/LOS F during the AM peak hour and 77.9 seconds of delay/LOS E during the PM peak hour.

Intersection #6: Hawthorne Blvd & Redondo Beach Blvd

Cyclists will need to transition between the class IV two-way cycle track to the west of the intersection to the Class II facilities to the east.

Preferred:

- Maintain split signal phasing in eastbound and westbound directions
- Prohibit the eastbound right-turn
- Bike signals for the south and east leg

Alternative:

Lane repurposing (south side only along Redondo Beach Blvd west of intersection)

- Eastbound and westbound thru/left lanes converted to thru-lanes.
- Eastbound and westbound phasing updated from split phasing to protected left-turns.
- Addition of NBR Overlap.
- Bike signals for south and east legs.

Determined infeasible due to substantial increase in delay and degraded vehicular levels of service. With implementation of the improvements above, the intersection is projected to operate at 76.1 seconds of delay/LOS E during the AM peak hour and 76.2 seconds of delay/LOS E during the PM peak hour.

Intersection #7: Prairie Ave & Redondo Beach Blvd

Initially, the transitions between existing and proposed bicycle facilities and between one-way and two-way bicycle facilities is proposed to take place at this intersection

Alternative:

- Westbound approach lane configuration updated from WBL, Dual WBT, WBR (channelized) to WBL, WBT, WBTR (removal of WBR channelized lane).
- Bike signal for north, south, and east leg

Determined infeasible due to substantial increase in delay and degraded vehicular levels of service. With implementation of the improvements above, the intersection is projected to operate at 86.4 seconds of delay/LOS F during the AM peak hour and 92.7 seconds of delay/LOS F during the PM peak hour.

Existing Traffic Counts

LOS Calculation Worksheets