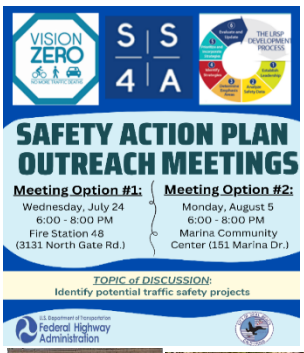
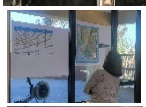
FINAL

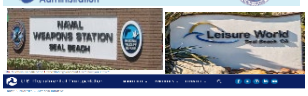
Citywide Comprehensive Safety Action Plan (SAP)

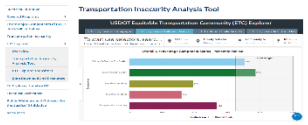
for the

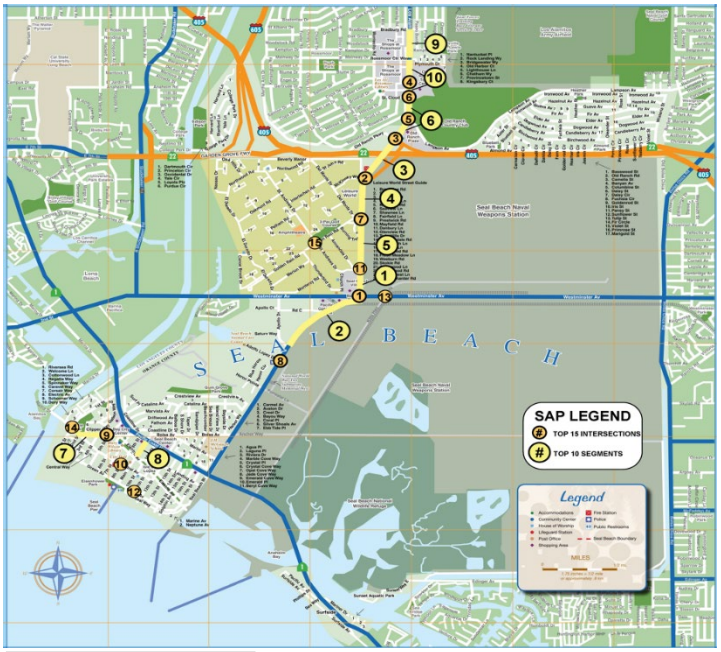
City of Seal Beach, CA

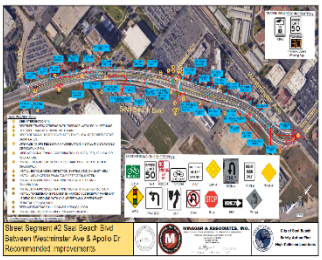


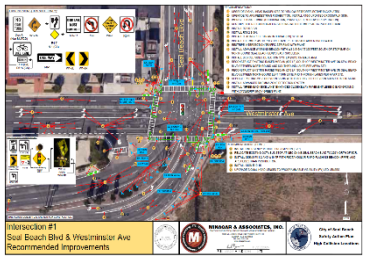


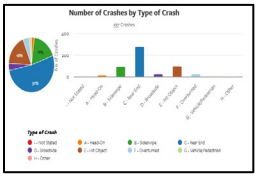


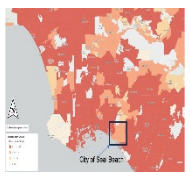


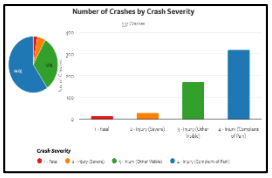




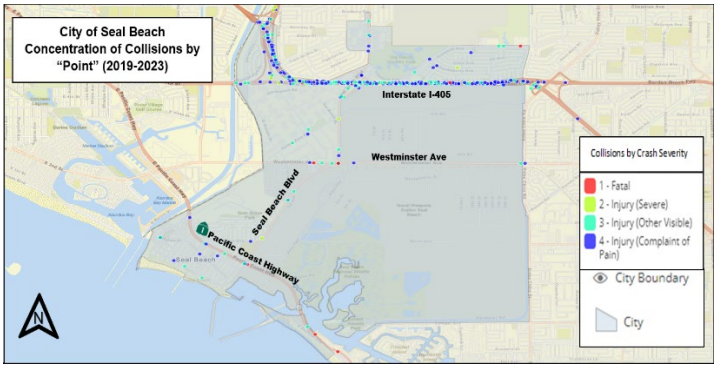








Regional High Injury Network for Seal Beach



PREPARED FOR:

City of Seal Beach

Department of Public Works
211 8th St.
Seal Beach, CA 90740

PREPARED BY:

MINAGAR & ASSOCIATES, INC.

Traffic/Civil/Electrical Engineering – ITS – Transportation Planning – Homeland Security – CEM
23282 Mill Creek Drive, East Tower, Suite 120
Laguna Hills, CA 92653
Tel: (949)707-1199

30 Years of Excellence

January 13, 2025

Table of Contents

List of Figures

List of Tables

Acknowledgements

CITY COUNCIL

Joe Kalmick

Council Member, 2021, 2022 Mayor

Lisa Landau

Council Member, 2024 Mayor Pro Tem

Nathan Steele

Council Member

Patty Senecal

Newly Elected Council Member, 2024

Ben Wong

Newly Elected Council Member, 2024

Thomas Moore

Former Council Member, 2019, 2023 Mayor

Schelly Sustarsic

Former Council Member, 2019, 2023 Mayor Pro Tem, 2020, 2024 Mayor

PARTNERS

City Departments: Administration, Community Development, Fire, Police & Public Works

Caltrans District 12

Los Alamitos Unified School District

Orange County Transportation Authority (OCTA)

Seal Beach Transit

Seal Beach Chamber of Commerce

Bicycle Advocates

General Public of the City of Seal Beach

Golden Rain Foundation

Leisure World Seal Beach

United States Naval Weapons Station Seal Beach – CNIC US Navy

United States Department of Defense – NWSSB Police Operations Division

Executive Summary

The objective of the City of Seal Beach Safety Action Plan (SAP) is to identify solutions and develop a holistic well-defined strategy to prevent and reduce the number of deaths and serious injuries on the local roadways across Seal Beach. The City of Seal Beach Safety Action Plan will look at local, state, and Federal data and peer research to identify safety solutions for **all users**, including those driving, walking, rolling, biking, riding a motorcycle, and/or other modes. The comprehensive plan will provide strategies to address changes to both roadway user behavior and infrastructure. It will be built on a foundation of partnership from stakeholders who strive to find solutions to make roads safer throughout the City of Seal Beach.

This Comprehensive SAP is prepared per Safe Roads and Streets For All (SS4A) requirements and also a Safe System Approach. In addition to the aforementioned program, a Local Roadway Safety Plan (LRSP) was also utilized to establish a safe transportation environment that has safer roads, safer people, safer speeds, and safer vehicles. As part of this safety plan for the City of Seal Beach, the Project Team and stakeholders identified, prioritized, and analyzed roadway safety improvements on the City of Seal Beach's intersections, roadway segments, corridors, and High Injury Network. This safety plan also provides the proposed countermeasures that address collision patterns for both intersections and roadway segments, to ultimately reduce collisions in the City's high collision locations. This Comprehensive SAP study also looked into the Federal Equity Considerations, Climate and Economic Justice, SS4A Underserved Communities Census Tracts (Historically Disadvantaged Communities), Transportation Insecurity & USDOT Equitable Transportation Community (ETC) Explorer. This SAP was prepared and developed in compliance with the State and Federal guidelines for eligibility to apply for the funding of Highway Safety Improvement Program (HSIP), Active Transportation Plan (ATP), California Senate Bill (SB1) as well as the next phase of SS4A. In addition to the provided countermeasures for collision patterns, this Safety Action Plan also provides the corresponding cost estimates and benefit to cost ratios, to support applications for the HSIP, next phase of SS4A as well as other funding sources and programs.

Ultimately, this Comprehensive SAP per the SS4A program supports the United States Department of Transportation's National Roadway Safety Strategy and their goal of zero (0) roadway deaths. This SAP which carefully considers safety for all modes of transportation, including pedestrian and bicycle, and identifies traffic safety upgrades with the goal to eliminate traffic-related fatalities and serious injuries by the year 2040.

The Seal Beach City Council by adopting this Comprehensive Safety Action Plan commits to a systemic approach to reducing transportation related serious injuries and deaths throughout the city's local roadways with a goal toward zero deaths and serious injuries on the transportation network by the year 2040 to build on Seal Beach's long-standing commitment to traffic safety.

Statement of Protection of Data From Discovery and Admissions

Per Section 148 of Title 23, United States Code [23 U.S.C. §148(h) (4)] REPORTS DISCOVERY AND ADMISSION INTO EVIDENCE OF CERTAIN REPORTS, SURVEYS, AND INFORMATION—Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for any purpose relating to this section, shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location identified or addressed in the reports, surveys, schedules, lists, or other data.

Per Section 409 of Title 23, United States Code [23 U.S.C. §409] DISCOVERY AND ADMISSION AS EVIDENCE OF CERTAIN REPORTS AND SURVEYS—Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway-highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

Acknowledgements

The Comprehensive Safety Action Plan was developed by City of Seal Beach, with support from the Minagar & Associates, Inc. team. This report documents a comprehensive set of projects and strategies to eliminate roadway fatalities and serious injuries within Seal Beach. The information presented herein is planning level only and is not meant to represent the support or commitment of any potential partners.

DISCLAIMER

This material was funded in part through grant(s) from the Federal Highway Administration of the U.S. Department of Transportation. The views and opinions of the authors expressed herein do not necessarily state or reflect those of the U.S. Department of Transportation or the California Department of Transportation (Caltrans).

List of Acronyms

AASHTO	American Association of State Highway and Transportation Officials
B/C Ratio	Benefit-Cost Ratio
Caltrans	California Department of Transportation
City	City of Seal Beach
CM	Countermeasure
CMF	Collision Modification Factor
CRF	Collision Reduction Factor
DUI	Driving Under the Influence
FHWA	Federal Highway Administration
HSIP	Highway Safety Improvement Program
HSM	Highway Safety Manual
KSI	Killed or Severely Injured
LRSM	Local Roadway Safety Manual (Version 1.7, April 2024)
LRSP	Local Roadway Safety Plan
MUTCD	Manual on Uniform Traffic Control Devices
PCF	Primary Collision Factor
PDO	Property Damage Only
SAP	Safety Action Plan
SBPD	Seal Beach Police Department
SHSP	Strategic Highway Safety Plan
SS4A	Safe Streets and Roads for All
SWITRS	Statewide Integrated Traffic Records System
TIMS	Transportation Injury Mapping System
5Es	The 5Es of Traffic Safety: Education, Engineering, Enforcement, Emergency Medical Services, Emerging Technologies

1. Leadership Commitment and Goal Setting

1.1 Introduction

The City of Seal Beach is taking the initiative to improve the City's traffic safety by implementing a Safety Action Plan that aims to reduce traffic collisions by analyzing the factors that previously impacted prominent intersections and roadway segments in the City. This report documents the City of Seal Beach's work to assess and improve transportation safety conditions with a Safety Action Plan in place.

The City of Seal Beach Safety Action Plan will look at local data and peer research to identify safety solutions for **all users**, including those driving, walking, rolling, biking, riding a motorcycle, and/or other modes. The plan will provide strategies to address changes to both roadway user behavior and infrastructure. It will be built on a foundation of partnership from stakeholders who strive to find solutions to make roads safer throughout the City of Seal Beach.

In this Safety Action Plan, a systemic approach was utilized to identify and analyze collision patterns that had impacted high collision intersections and roadway segments. For each high collision location, whether it was an intersection or a roadway segment, a table of number of collisions with the corresponding primary collision factor has been provided to understand the prominent collision factors. As part of the collision analysis, collision diagrams have been provided for high collision intersections and roadway segments in the City of Seal Beach.

Source: FHWA

Following the understanding and acknowledgement of collision patterns, countermeasures for each of the identified high collision intersections and roadway segments, were developed to potentially reduce traffic collisions in the future and ameliorate active transportation within the City. Furthermore, this Safety Action Plan includes collision data for high collision locations between January 1, 2019 and December 31, 2023, the analysis of collision data, and the proposed countermeasures for collision patterns. Depicted below in Figures 1-1 and 1-2 are the key aspects of the Safe System Approach provided by the Federal Highway Administration (FHWA).

On January 13, 2025, the Seal Beach City Council is slated to adopt Resolution 7599 on Seal Beach Safety Action Plan and authorize the City Manager, or designee, to act as the City's agent for negotiations, document execution, and submission of necessary applications for future implementation grants such as the next phase of SS4A, HSIP, ATP and SB1 and other related obligations, and all amendments thereto for the Plan.

Figure 1-1: FHWA's Safe System Principles

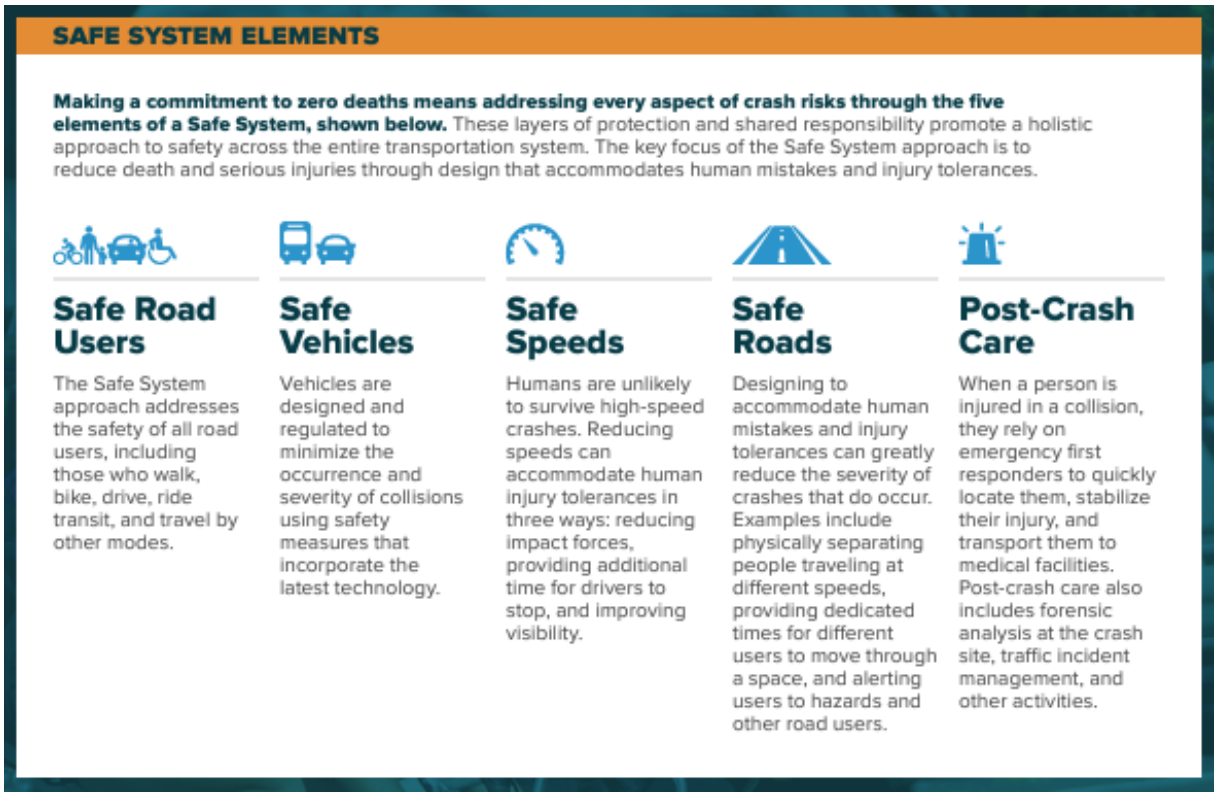


Figure 1-2: FHWA's Safe System Elements

1.2 Project Location

The City of Seal Beach, a coastal community is located in the westernmost corner of Orange County in Southern California. The City was incorporated in October 1915, over 100 years ago. As of the 2020 U.S. census, the population of the city was 25,242, up from 24,168 at the 2010 census. To the northwest, just across the border with Los Angeles County, lies the city of Long Beach and the adjacent San Pedro Bay. To the southeast are Huntington Harbour, a neighborhood of Huntington Beach, and Sunset Beach, also part of Huntington Beach. To the east lie the city of Westminster and the neighborhood of West Garden Grove, part of the city of Garden Grove. To the north lie the unincorporated community of Rossmoor and the city of Los Alamitos. Although the majority of the city's acreage is devoted to the Naval Weapons Station Seal Beach military base, Seal Beach is also home to a Leisure World retirement community and the Anaheim Bay National Wildlife Refuge. Most of the City's destinations are located in the downtown area or along Seal Beach Boulevard. The City of Seal Beach's maps (local, county, state and national) as shown on Wikipedia are listed below:

Location within Greater Los Angeles

Location in California

Location in the United States

1.3 Project Goals

As the City of Seal Beach has made a commitment to achieve zero fatalities and serious injuries by 2040, this SAP project evaluates the transportation network with five lenses:

- Goal #1: Identify areas with a high risk for crashes based on crash history and mode of transportation
- Goal #2: Craft a safety toolbox to align with the most current practices and open the opportunity for new initiatives in the future.
- Goal #3: Define safety improvements for the near-, mid-, and long-term with funding consideration.
- Goal #4: Prioritize emphasis areas based on crash analysis and City objectives.
- Goal #5: Propose list of countermeasure implementation based on cost, effort, and timeline.

On January 13, 2025, the Seal Beach City Council in addition to the signing and adopting Resolution 7599 on Seal Beach Safety Action Plan will also set a goal of eliminating traffic-related fatalities and serious injuries by 2040 by making the City of Seal Beach a Vision Zero City. This action Plan will assist with meeting this goal by using FHWA's safe Systems Approach to recommend proven countermeasures.

1.4 Existing Efforts

This section summarizes the review of various planning and engineering documents either prepared by the City of Seal Beach or others for the City of Seal Beach. The purpose of reviewing existing planning efforts is to ensure the SS4A's SAP & LRSP goals and objectives along with

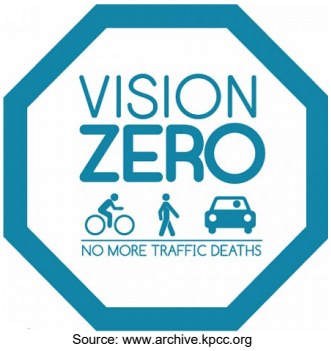
recommended improvements are aligned with recent planning efforts for transportation safety. The City of Seal Beach has identified several goals, policies in the following documents:

- City of Seal Beach Local Roadway Safety Plan (LRSP) (05/22)
- City of Seal Beach's Seal Beach Blvd Traffic Signal Synchronization Project (TSSP) (07/23)
- OCTA's Commuter Bikeways Strategic Plan (2009)
- OCTA's Commuter Bikeways Strategic Plan Implementation (2001)
- City of Seal Beach's Circulation Element pf the General Plan (12/03)
- Citywide Engineering & Traffic Survey (10/20)
- Caltrans District 12 Active Transportation Plan (06/22)
- State of California's Strategic Highway Safety Plan Bicycle & Pedestrian Challenge Area (09/21)
- SCAG's HIN (High Injury Network) (07/22)

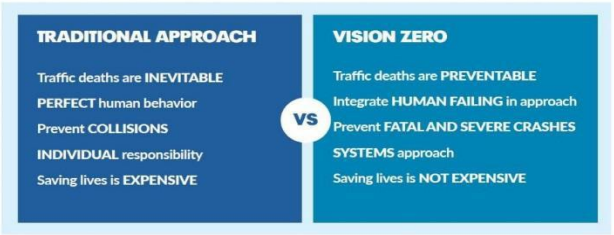
2. Planning Structure

The objective of this plan is to strive towards a safer transportation environment by eliminating traffic fatalities and severe injuries while assuring efficient and equitable mobility for all road users. The City of Seal Beach plans to implement systemic countermeasures to target factors affecting citywide prominent intersections and roadway segments. This safety plan aims to reduce the risk of tragedies by taking a proactive, preventative approach that prioritizes traffic safety.

Vision Zero is an initiative approach to eliminate traffic fatalities and severe injuries. Road users will sometimes make mistakes however, the road system, traffic control devices, and traffic laws should be designed to minimize those unavoidable mistakes and reduce their probability to result in severe injuries or fatalities. Transportation and traffic engineers are expected to improve the general traffic environment by ameliorating existing traffic geometries and laws based on a good engineering judgment. However, the roadway users of the City of Seal Beach are still responsible for their mistakes and should follow all traffic laws.



Source: www.archive.kpcc.org



Source: www.visionzeronetwrok.org

Vision Zero unifies diverse stakeholders who address the factors causing complexity when it comes to traffic safety. It recognizes that many factors contribute to safe mobility including roadway design, speeds, behaviors, technology, and enforced laws. As a result and as part of this safety plan, it sets goals to achieve zero fatalities and severe injuries.

One of the City's visions is to collaborate with local agencies to promote a culture of continuous transportation safety improvement by coordinating with the Seal Beach Police Department, Orange County Department of Public Health, Orange County Transportation

Authority (OCTA), California Department of Transportation (Caltrans District 12-Orange County) and Los Alamitos Unified School District.

The aforementioned Vision shall eliminate traffic fatalities and severe injuries by achieving the following goals:

- Obtain accurate collision databases. Systematically identify and prioritize the City's highest collision locations based on a 5-year collision history.
- Engage with the local community, stakeholders, and City management to better understand factors that are affecting the traffic safety within the City of Seal Beach.
- Utilize countermeasure strategies across all traffic safety disciplines, engineering, enforcement, education, emergency medical services, and emerging technologies.
- Strive to reduce the City's primary contributing factors in traffic collisions by ensuring the automobile right of way, maintaining a safe speed, and clear traffic signals and signs.

2.1 Project Tasks and Deliverables

The Major Tasks Summary is listed below:

- Traffic Safety Data Collection from Seal Beach PD, UC TIMS & CHP's SWITRS
- Analysis & Identification of High Risk Areas
- Engagement & Collaboration with Stakeholders/Community
- Review of Policy and Process Changes
- Strategy and Project Selection + Draft SAPs
- Development of Final SAP
- City Council Adoption

Project Management

- Numerous As-needed Continuous In-person & Virtual Team Meetings

Stakeholder Engagement & Public Outreach

- Stakeholder Working Group Meetings
- Two official well publicized in-person Public Outreach Meetings with extensive one-on-one Q/A sessions on:

  July 24, 2024 and

  August 5, 2024 both at 6-8 PM
- Field Meetings with Stakeholders

Safety & Data Analysis

- Comprehensive Crash & Safety Analyses
- Analysis of Existing Conditions and Historical Trends to Baseline the Level Crashes
- Analysis of Location where there are Crashes, the Severity, as well as Contributing Factors & Crash Types
- Analysis of Systemic & Specific Safety Needs
- Equity Analysis
- High Injury Network
- Risk Assessment/ High Risk Network
- High Risk Location Data

Solution Toolbox & Dashboard

- Prioritization Methodology
- Safety Data Dashboard
- Development of 25 Projects with corresponding Conceptual Engineering Plans and Construction Cost Estimates
- Solutions Toolbox
- Strategies & Countermeasures
- Draft & Final Report

3. Safety Analysis

This section summarizes the results of a citywide collision analysis for the time period between January 1, 2019 and December 31, 2023. The purpose of studying the collision patterns and trends is to identify the factors that caused collisions to occur within the study timeframe. The focus is to identify high collision locations in the city in order to target the factors that are affecting these prominent locations.

The following is a summary of the data sources used in this report:

SBPD - 783 Collisions (without I-405, I-605, SR 1 & SR 22 and the neighboring police Jurisdictions)
SWITRS - 1246 Collisions (with I-405, I-605, SR 1 & SR22)
TIMS - 537 Collisions (without I-405, I-605, SR 1 & SR 22 and PDOs)
All of TIMS is in SWITRS

It is important to note that the majority of in-jurisdiction crash reports came from SBPD data, which had been analyzed in conjunction with the TIMS data. For this reason, crash skeleton diagrams represent both SBPD and TIMS data over the time period of interest. As part of the City's Safety Action Plan & Local Roadway Safety Plan, data that displays collisions on State Routes or Interstate Freeways will not be part of the overall data analysis as well as collision data that does not occur within the City's boundaries. Therefore, data used and analyzed will be 100% within city boundaries and on local roads, with an exception to PCH/Route 1. PCH Route 1 will be excluded for countermeasure analysis as it is under the jurisdiction of Caltrans in the City of Seal Beach.

3.1 Overall Summary

The following summary schematics come from the TIMS database and as such are not representative of the analysis used in this report (i.e. compared to the SBPD data). This data consists of collisions occurring under the jurisdiction of Caltrans - and as such, are primarily for illustrative purposes.

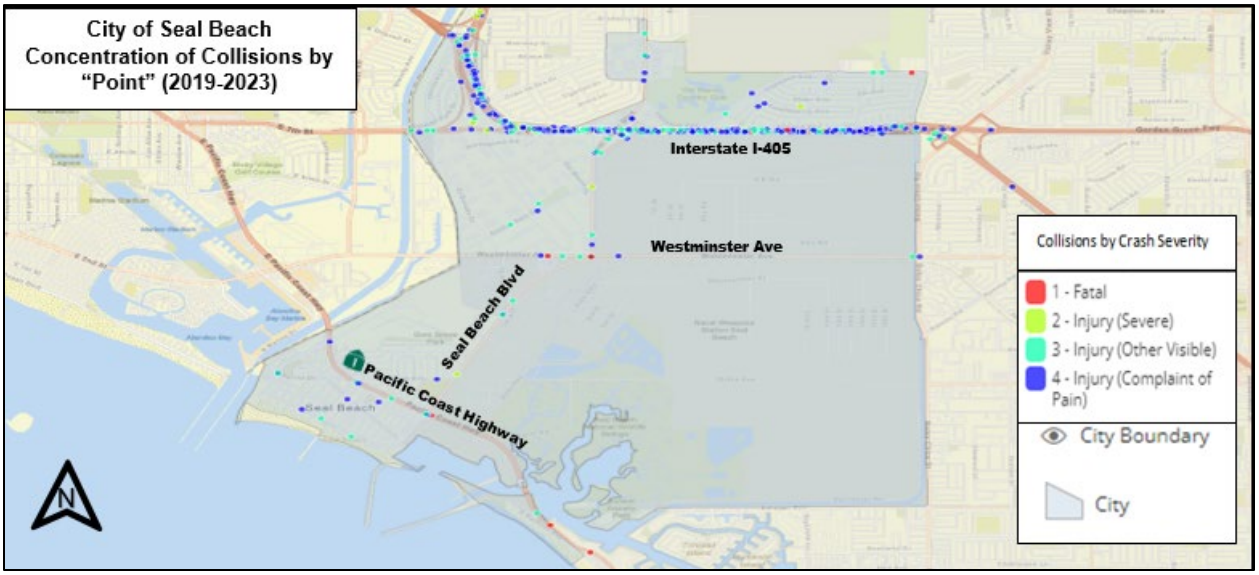


Figure 3-1: City of Seal Beach Display of Collisions by Point
(January 1, 2019 – December 31, 2023)

Figure 3-1 displays a map of the City of Seal Beach with collision points marked by symbols based on crash severity. The map covers the period from January 1, 2019 to December 31, 2023. The crash points are concentrated along the major roads, particularly in the Seal Beach and Surfside areas.

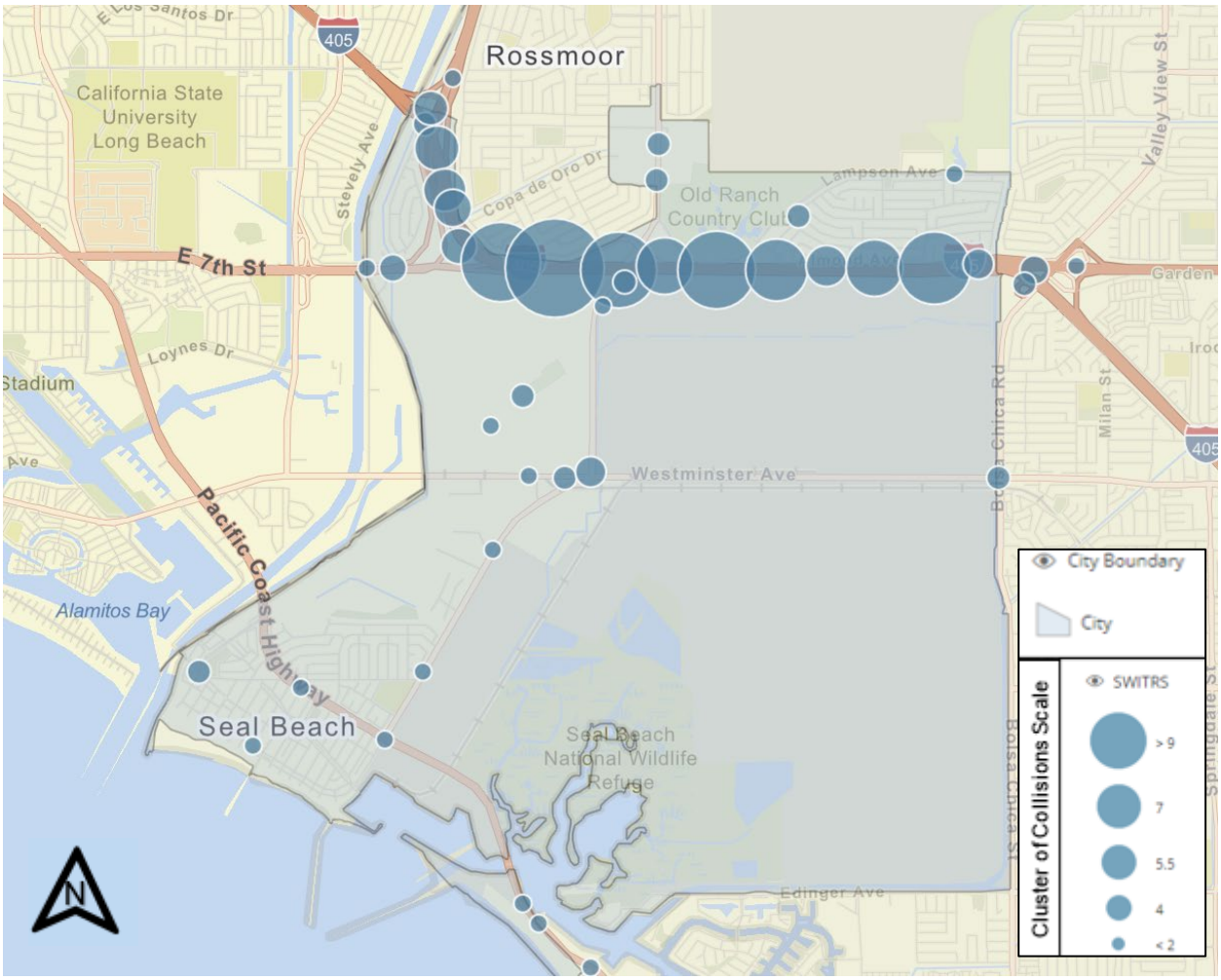
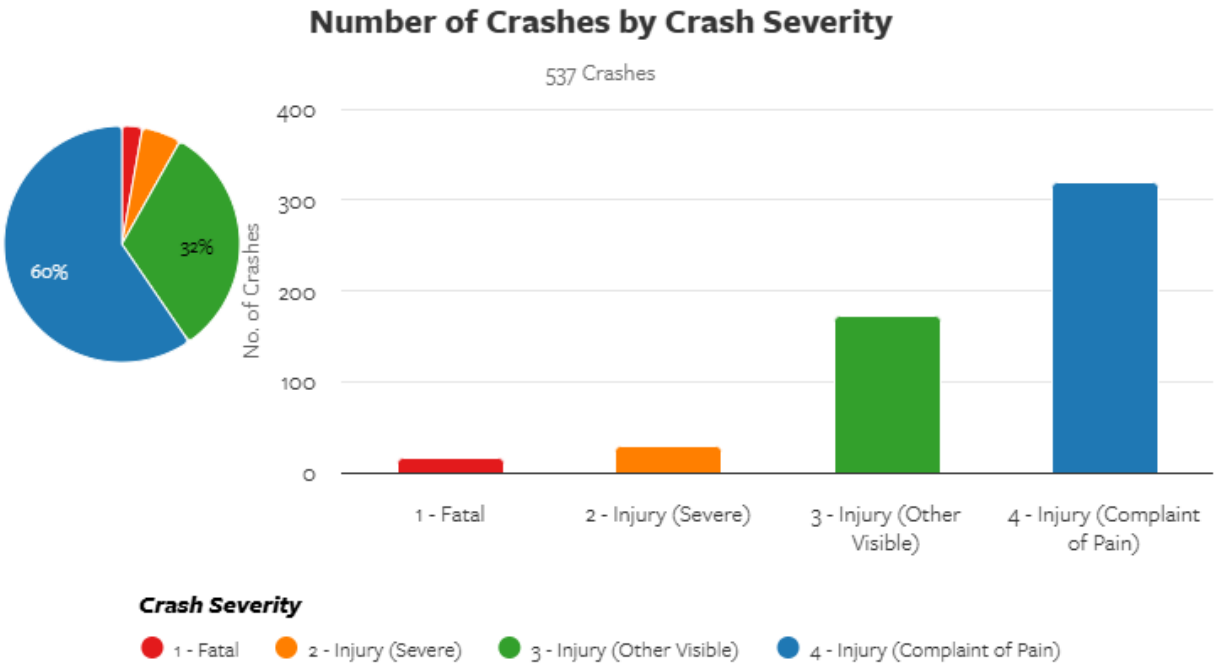


Figure 3-2 City of Seal Beach Display of Collisions by Cluster
(January 1, 2019 - December 31, 2023)

Figure 3-2 presents an alternative view of the collisions in Seal Beach by cluster from January 1, 2019 to December 31, 2023. The collisions are grouped into high-density clusters, with the largest cluster located near the intersection of Westminster Ave and Seal Beach Blvd. This visualization helps identify collision hotspots for further analysis and potential safety improvements.



Crash Severity	Count	%
1 - Fatal	15	2.79%
2 - Injury (Severe)	29	5.40%
3 - Injury (Other Visible)	173	32.22%
4 - Injury (Complaint of Pain)	320	59.59%

Figure 3-3: City of Seal Beach Number of Collisions by Collision Severity
(January 1, 2019 - December 31, 2023)

Figure 3-3 categorizes the 537 fatal and injury crashes in Seal Beach from January 1, 2019 to December 31, 2023 by collision severity. The vast majority of crashes (59.59%) resulted in a complaint of pain, while 32.22% caused other visible injuries. Severe injury crashes accounted for 5.40% of the total, and 2.79% of collisions were fatal. This breakdown highlights the need to prioritize safety measures that can reduce the frequency and severity of crashes.

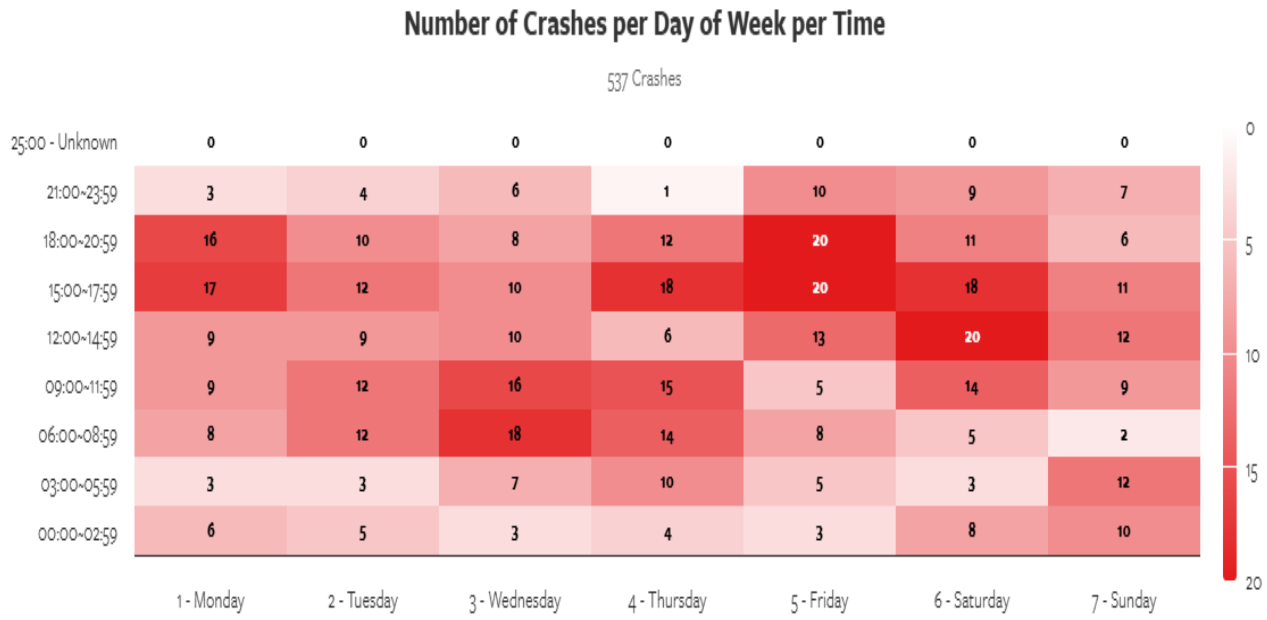


Table 3-1: Number of Crashes per Day of Week per Time
(January 1, 2019 - December 31, 2023)

Table 3-1 provides a heatmap of the number of crashes per day of week and time period in Seal Beach from January 1, 2019 to December 31, 2023. The darkest red cells indicate the highest collision frequencies. Both Friday and Saturday afternoon and Friday evenings show the highest concentrations of crashes. This information can guide targeted enforcement and public outreach efforts to improve safety during these high-risk periods.

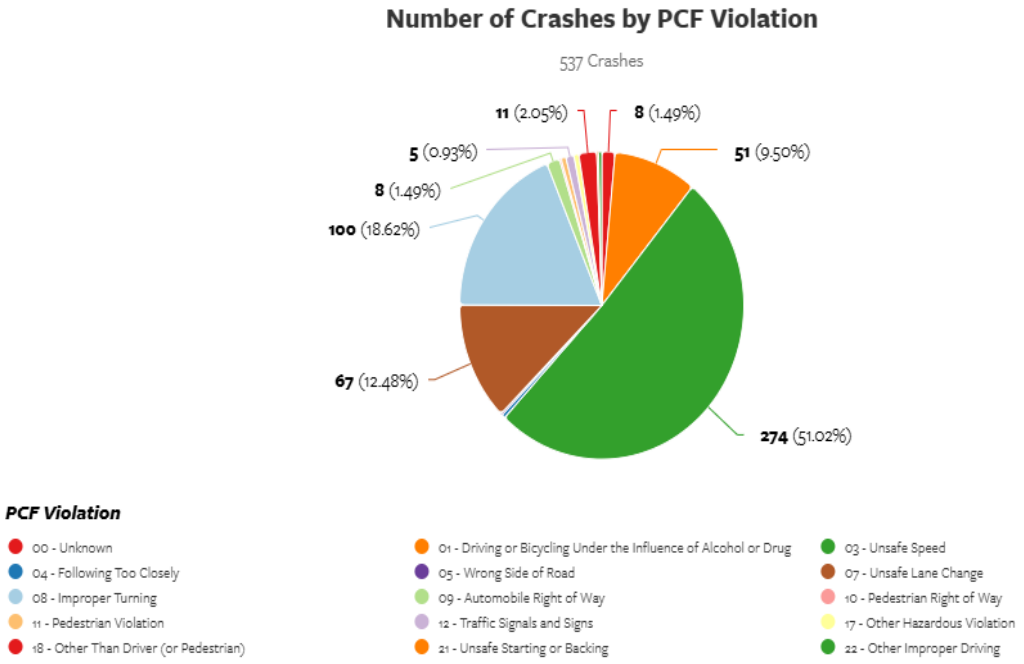
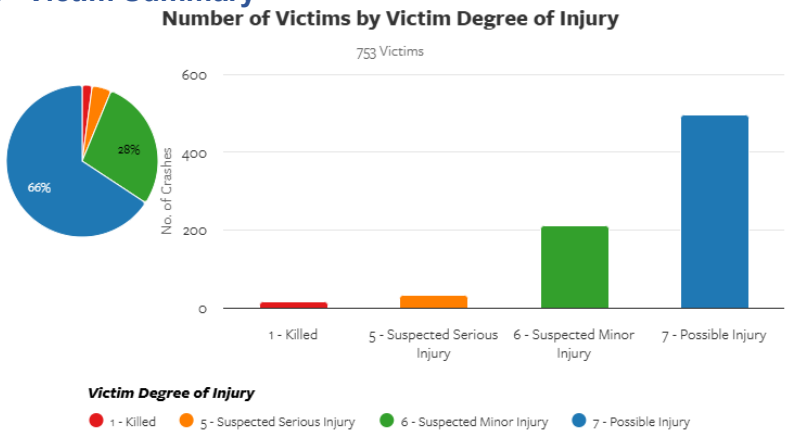


Figure 3-4: Number of Collisions by Primary Collision Factor (PCF) Violation
(January 1, 2019- December 31, 2023)

Figure 3-4 shows the number of collisions by primary collision factor (PCF) violation in Seal Beach from January 1, 2019 to December 31, 2023. The data reveals that unsafe speed is the leading cause of crashes at 51.02%. Other major contributing factors include improper turning, traffic signals and sign violations, and DUI. This breakdown highlights the need for targeted enforcement and education efforts to address speeding and right-of-way violations.

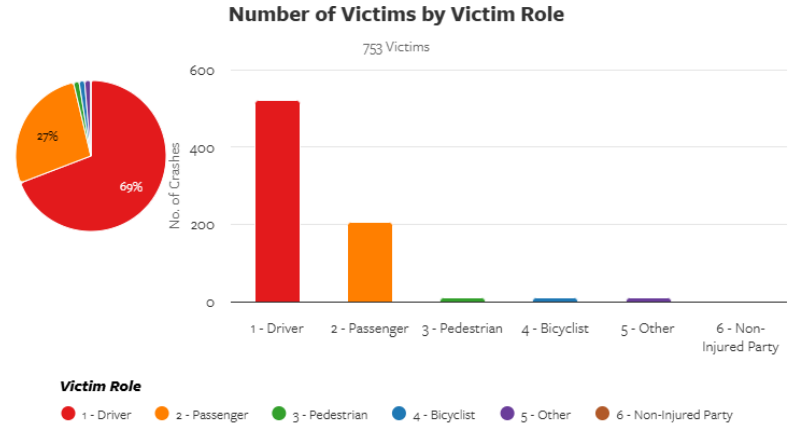
3.2 Victim Summary



Victim Degree of Injury	Count	%
1 - Killed	16	2.12%
5 - Suspected Serious Injury	31	4.12%
6 - Suspected Minor Injury	211	28.02%
7 - Possible Injury	495	65.74%

Figure 3-5: Number of Victims by Victim Degree of Injury
(January 1, 2019 - December 31, 2023)

Figure 3-5 categorizes the number of victims by the degree of injury sustained in collisions. The vast majority of victims (65.74%) experienced possible injuries, while suspected serious and minor injuries accounted for 4.12% and 28.02% respectively.



Victim Role	Count	%
1 - Driver	521	69.19%
2 - Passenger	204	27.09%
3 - Pedestrian	9	1.20%
4 - Bicyclist	9	1.20%
5 - Other	10	1.33%

Figure 3-6: Number of Victims by Victim Role
(January 1, 2019 - December 31, 2023)

Figure 3-6 presents the number of victims by their role in the collision. Drivers constitute the largest group at 69.19%, followed by passengers at 27.09%. Pedestrians, bicyclists, and other road users collectively represent a smaller but still significant 3.73% of victims. This data underscores the importance of focusing safety initiatives on driver behavior, while also ensuring adequate protection for vulnerable road users.

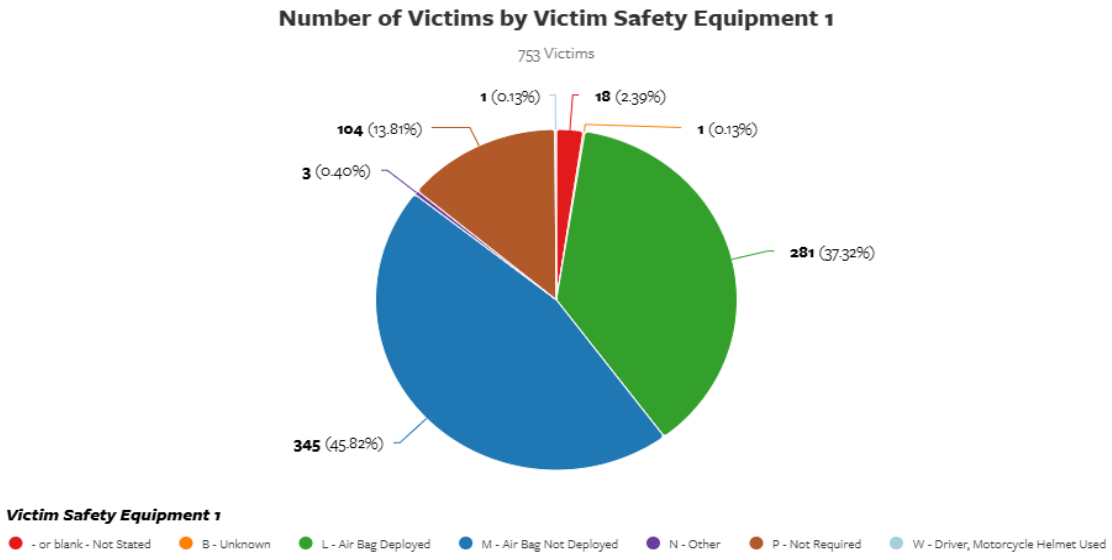


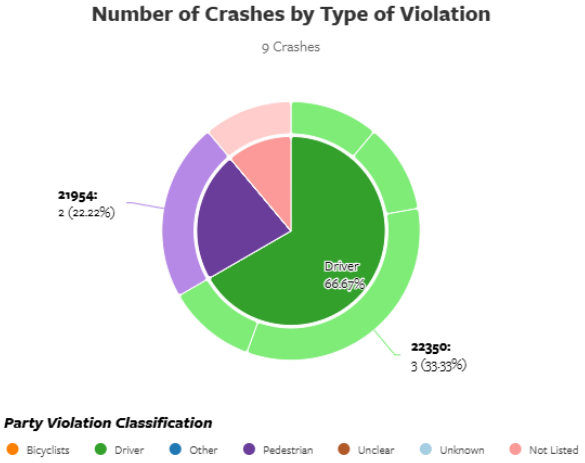
Figure 3-7: Number of Victims by Victim Safety Equipment
(January 1, 2019 - December 31, 2023)

Figure 3-7 displays the number of victims by the safety equipment used at the time of the collision. According to the data, 45.82% of victims had no air bags deployed while the other 37.32% had airbags deployed. However, not all victims used safety equipment, emphasizing the ongoing need for public awareness campaigns about the life-saving benefits of proper safety equipment usage.

Figure 3-8: Number of Victims by Victim Gender and Age
(January 1, 2019 - December 31, 2023)

Figure 3-8 shows the number of victims by age group and gender. The 25-29 age bracket had the highest number of victims for both males and females. Overall, males accounted for a larger proportion of victims across most age groups. This information can guide the development of age and gender-specific safety programs and interventions.

3.3 Pedestrian Collision Summary

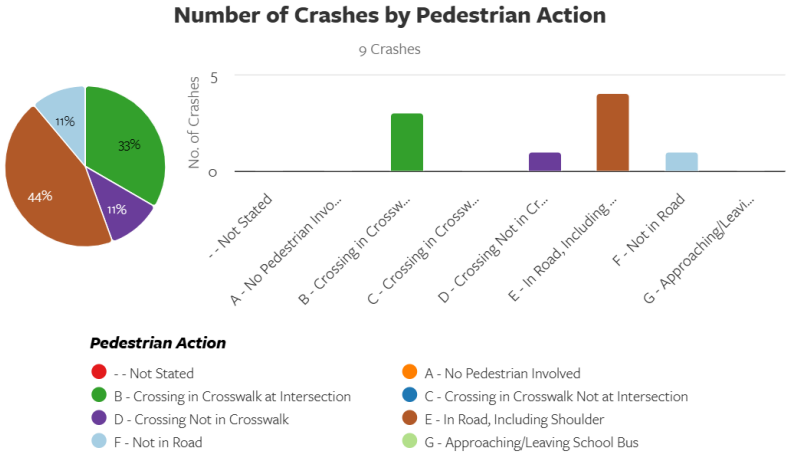


Show Zero

Party Violation Classification	Type of Violation	Description	Count	%
Driver	22350	Speeding on the highway / Driving at a dangerously high speed given highway conditions like weather, visibility, traffic, and highway measurements, or driving at a speed that endangers people or property	3	33.33%
Pedestrian	21954	Pedestrian failure to yield right-of-way to vehicles when crossing outside of a marked or unmarked crosswalk	2	22.22%
Driver	21453	Failure to stop at a limit line or crosswalk at a red light Failure to yield right-of-way to pedestrian when turning on a red light	1	11.11%
Driver	21950	Driver failure to yield right-of-way to pedestrians at a marked or unmarked crosswalk	1	11.11%
Driver	22450	Driver failure to stop at a stop sign before a limit line (a crosswalk or intersection entrance). Failure to stop at limit line before railroad	1	11.11%
Not Listed	Not Listed	Violation code was not included in the crash	1	11.11%

Figure 3-9: City of Seal Beach Number of Collisions by Type of Violation
(January 1, 2019 - December 31, 2023)

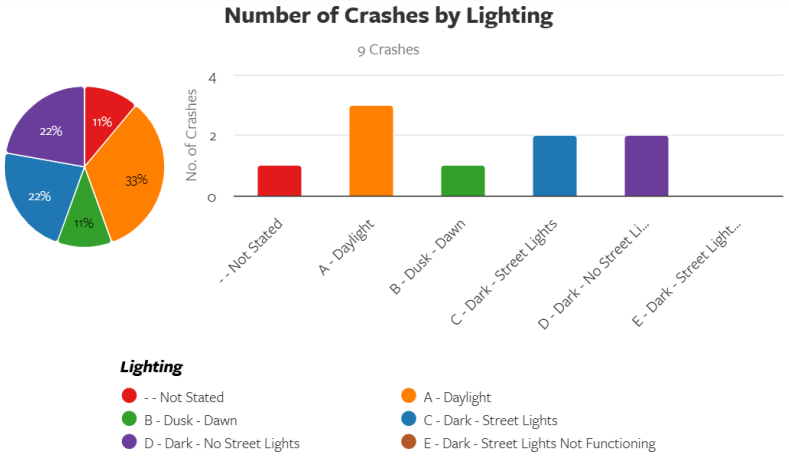
Figure 3-9 provides a breakdown of collisions by PCF violation type in Seal Beach. Unsafe speed and right-of-way violations are the top factors, mirroring the citywide data. However, the chart also reveals location-specific issues such as failure to stop at stop-controlled intersections which are common in local communities.



Pedestrian Action	Count	%
B - Crossing in Crosswalk at Intersection	3	33.33%
D - Crossing Not in Crosswalk	1	11.11%
E - In Road, Including Shoulder	4	44.44%
F - Not in Road	1	11.11%

Figure 3-10: City of Seal Beach Number of Collisions by Pedestrian Action
(January 1, 2019 - December 31, 2023)

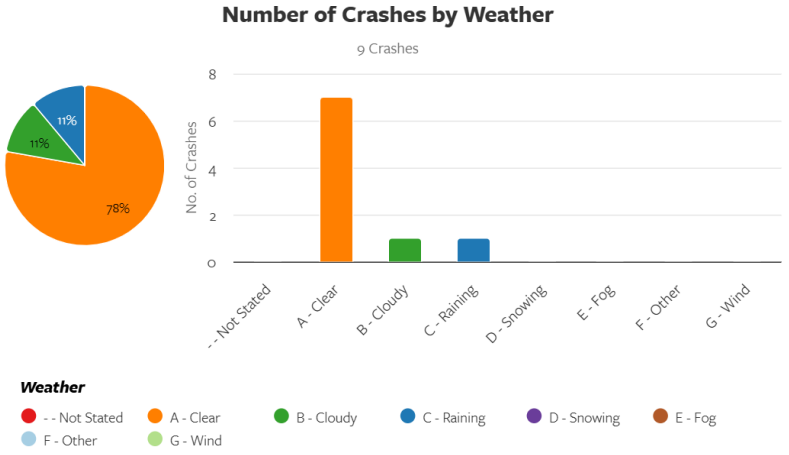
Figure 3-10 categorizes the number of collisions by pedestrian action. Notably, 66.66% of pedestrian-involved crashes occurred when the pedestrian was not in a crosswalk, underlining the need for improved pedestrian infrastructure and education on safe crossing practices. Other significant factors include pedestrians crossing in a crosswalk, indicating potential issues with driver awareness and yielding behavior at marked crossings.



Lighting	Count	%
- - Not Stated	1	11.11%
A - Daylight	3	33.33%
B - Dusk - Dawn	1	11.11%
C - Dark - Street Lights	2	22.22%
D - Dark - No Street Lights	2	22.22%

Figure 3-11: City of Seal Beach Number of Collisions by Lighting
(January 1, 2019 - December 31, 2023)

Figure 3-11 shows the number of collisions by lighting conditions in the City of Seal Beach from January 1, 2019 to December 31, 2023. Over 30% of collisions occurred during daylight, with dark - street lights and dark - no street lights making up the next largest categories at around 22% each. Dusk and dawn had negligible collision counts at approximately 11%.



Weather	Count	%
A - Clear	7	77.78%
B - Cloudy	1	11.11%
C - Raining	1	11.11%

Figure 3-12: City of Seal Beach Number of Collisions by Weather
(January 1, 2019 - December 31, 2023)

Figure 3-12 displays the number of collisions in Seal Beach by weather conditions from January 1, 2019 to December 31, 2023. The vast majority (over 70%) of collisions took place in clear weather. Cloudy weather and all other conditions (raining, snowing, fog, wind) had accounted for 11% each.

3.4 Active Transportation Program (ATP) Summary Data & Maps

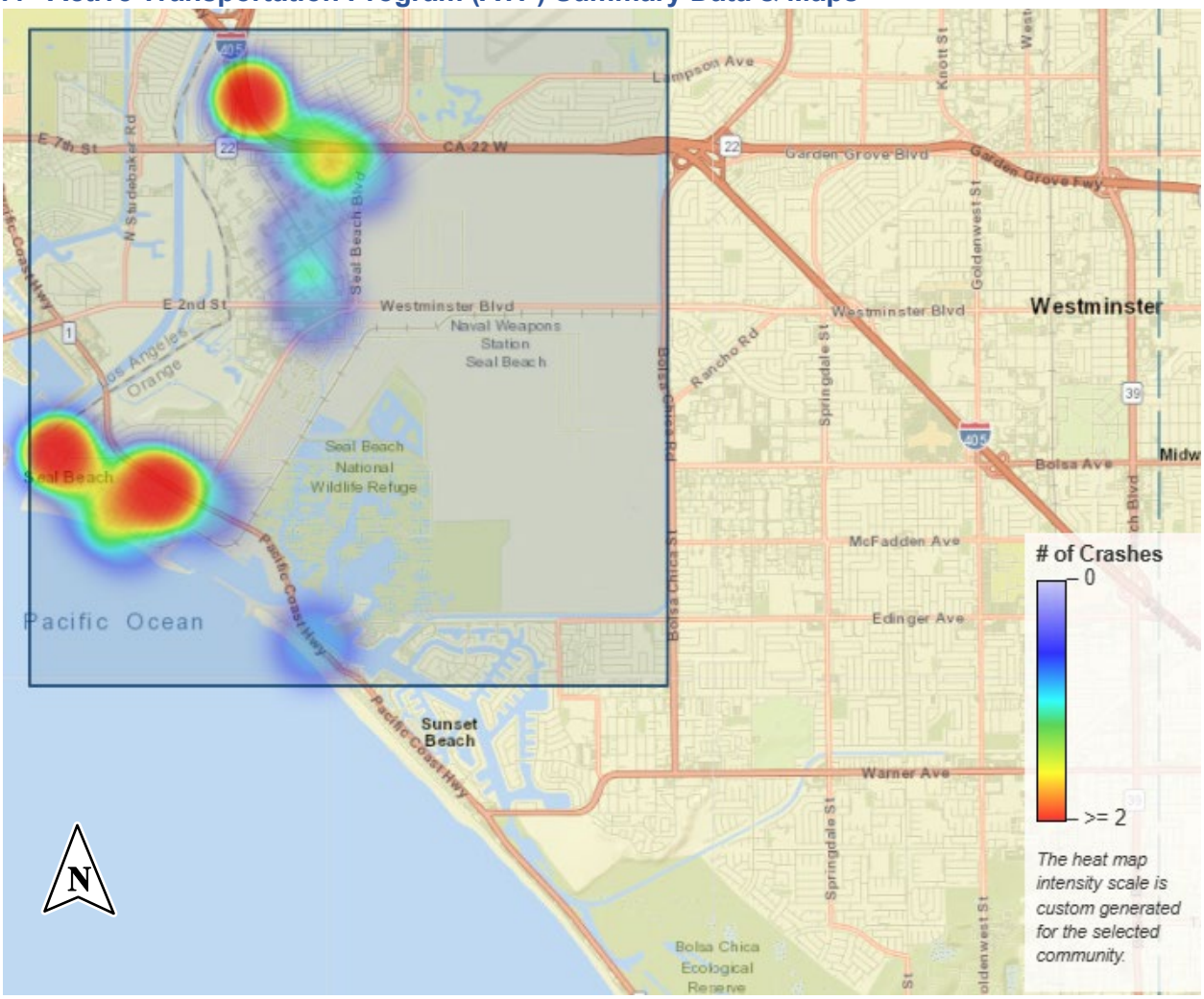


Figure 3-13: City of Seal Beach Active Transportation Program Heat Map (TIMS DATA)
(January 1, 2019 - December 31, 2023)

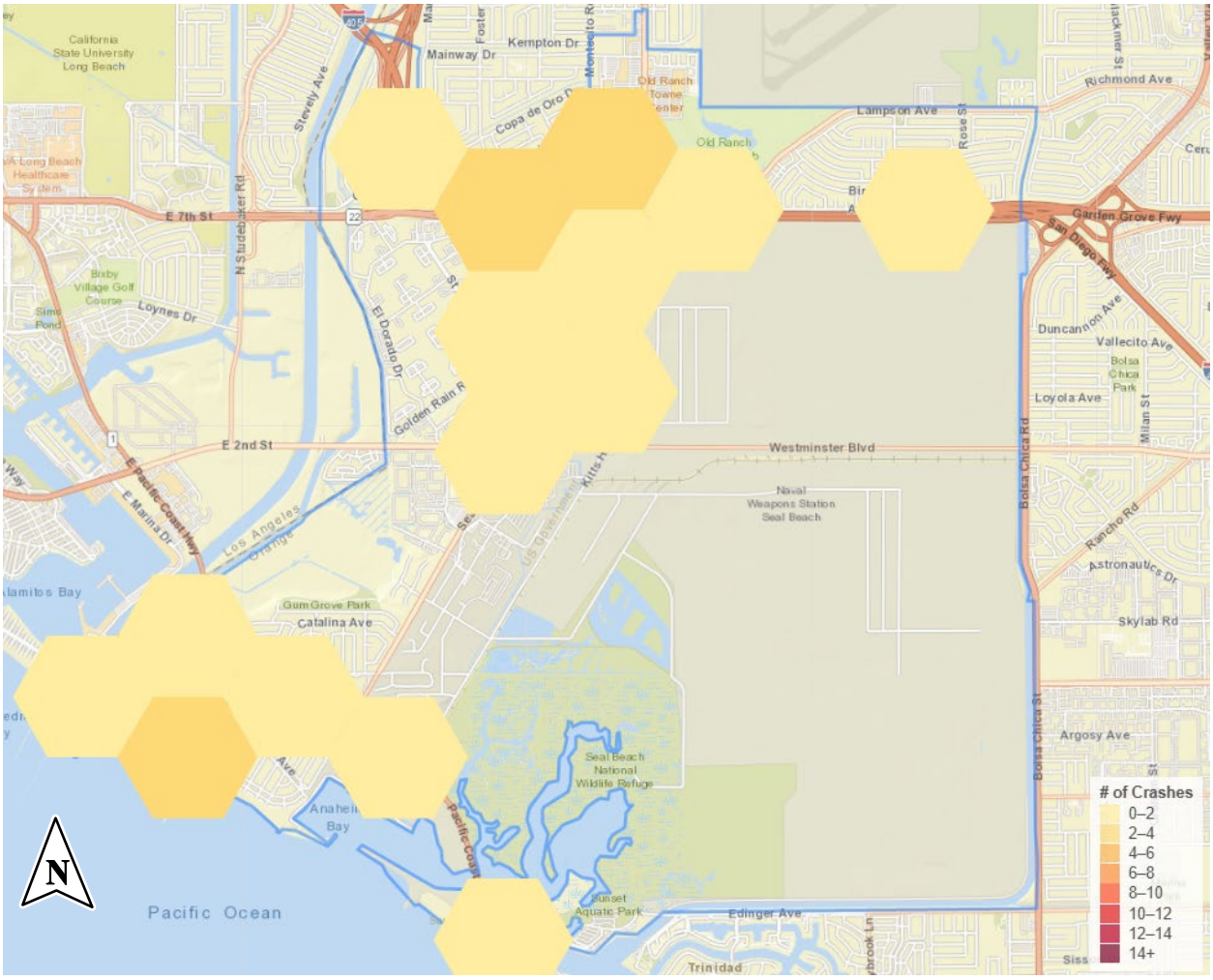
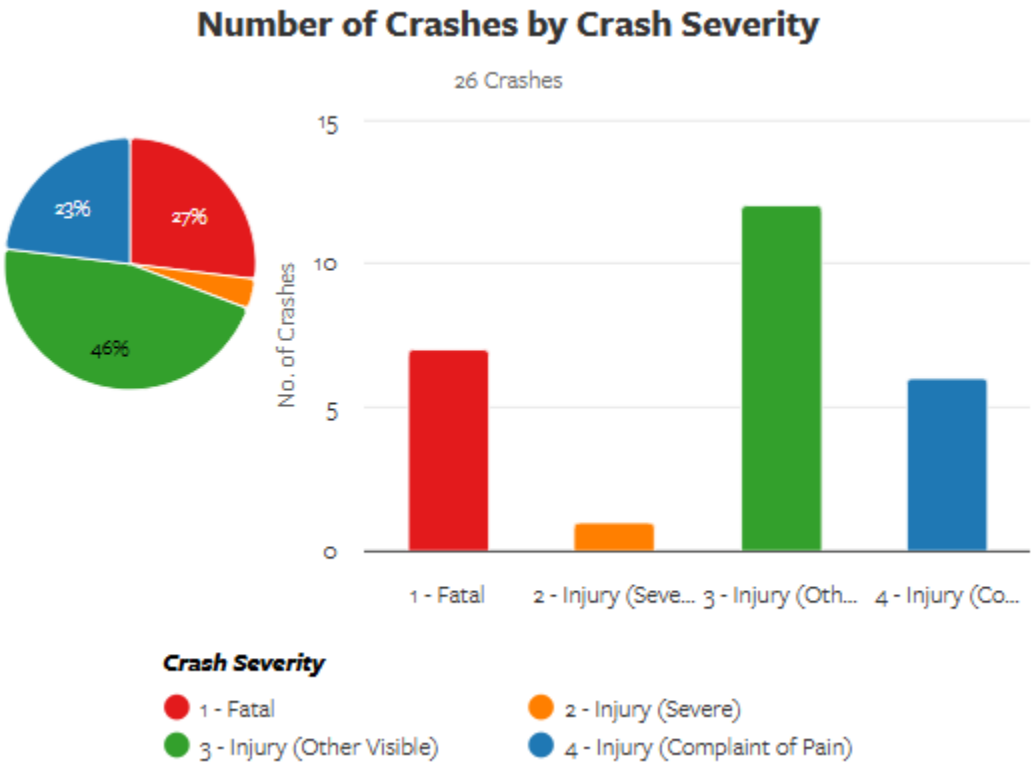


Figure 3-14: City of Seal Beach Active Transportation Program Hexagonal Grid Map
(January 1, 2019 - December 31, 2023)

Figure 3-13 is a heatmap showing the Active Transportation Program (ATP) for the City of Seal Beach from January 1, 2019 to December 31, 2023. Figure 3-14 provides a hexagonal grid map for the City of Seal Beach from January 1, 2019 to December 31, 2023.



Crash Severity	Count	%
1 - Fatal	7	26.92%
2 - Injury (Severe)	1	3.85%
3 - Injury (Other Visible)	12	46.15%
4 - Injury (Complaint of Pain)	6	23.08%

Figure 3-15: Active Transportation Program Number of Collisions by Collision Severity
(January 1, 2019 - December 31, 2023)

According to University of California, Berkeley Transportation Injury Mapping System (TIMS), from 2019 to 2023, there were 7 fatal collisions (26.92%), 1 severe injury collisions (3.85%), 12 visible injury collisions (46.15%), and 6 were identified as of complaint of pain which counted for 23.08% of the total collisions. This data was not inclusive of property damage only (PDO) related crashes.

Table 3-2: Fatal/Injury Crashes							
		2019	2020	2021	2022	2023	Average
STATE	CA	272,768	207,870	229,586	227,614	223,868	232,341.20
COUNTY	ORANGE	12,394	9,015	12,202	12,606	12,518	11,747.00
CITY	SEAL BEACH	250	136	117	127	123	150.6

Table 3-2 provides fatal/injury crash data for California, Orange County and Seal Beach from 2019-2023. California had an average of 232,341 fatal/injury crashes per year, Orange County had 11,747, and Seal Beach had 150.6. The data allows for comparison of crash severity at different geographic levels.

3.5 Collision Data Comparison and Analysis

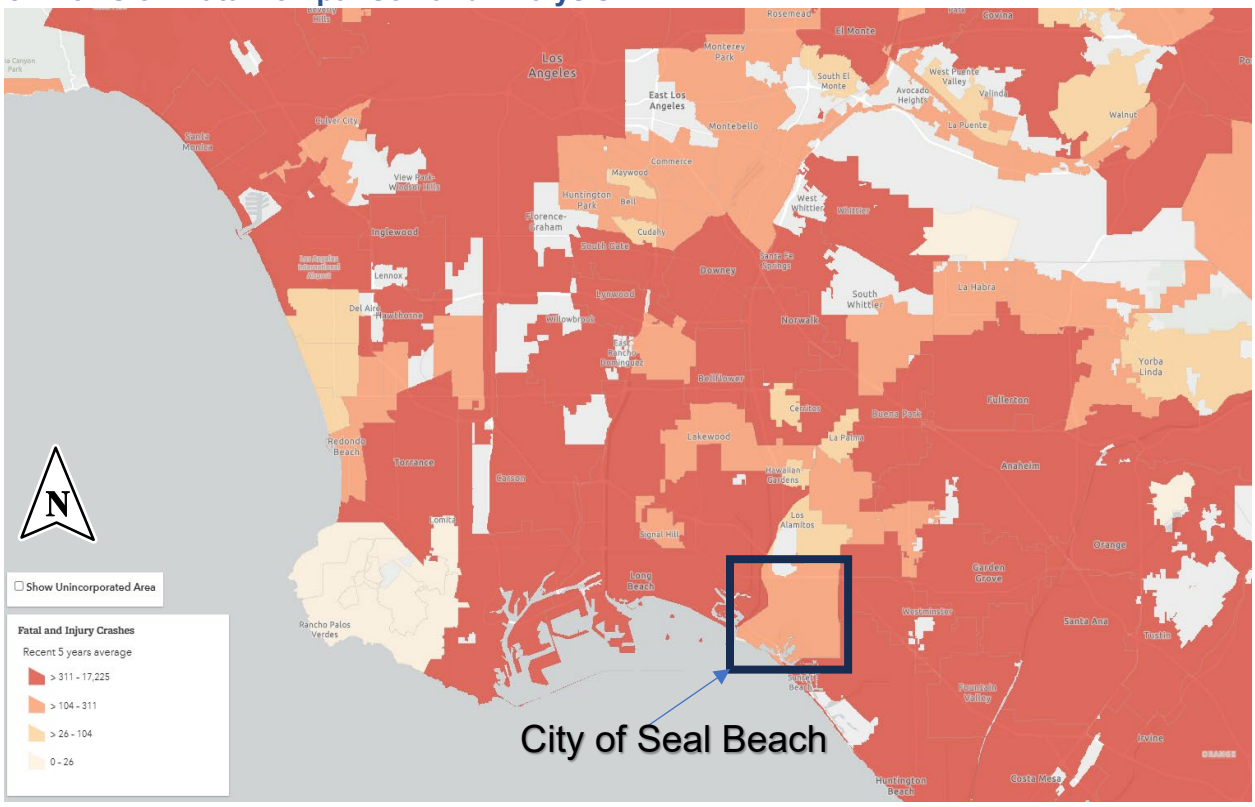


Figure 3-16: TIMS Number of Fatal and Injury Crashes relative to Neighboring Cities
(January 1, 2019 - December 31, 2023)

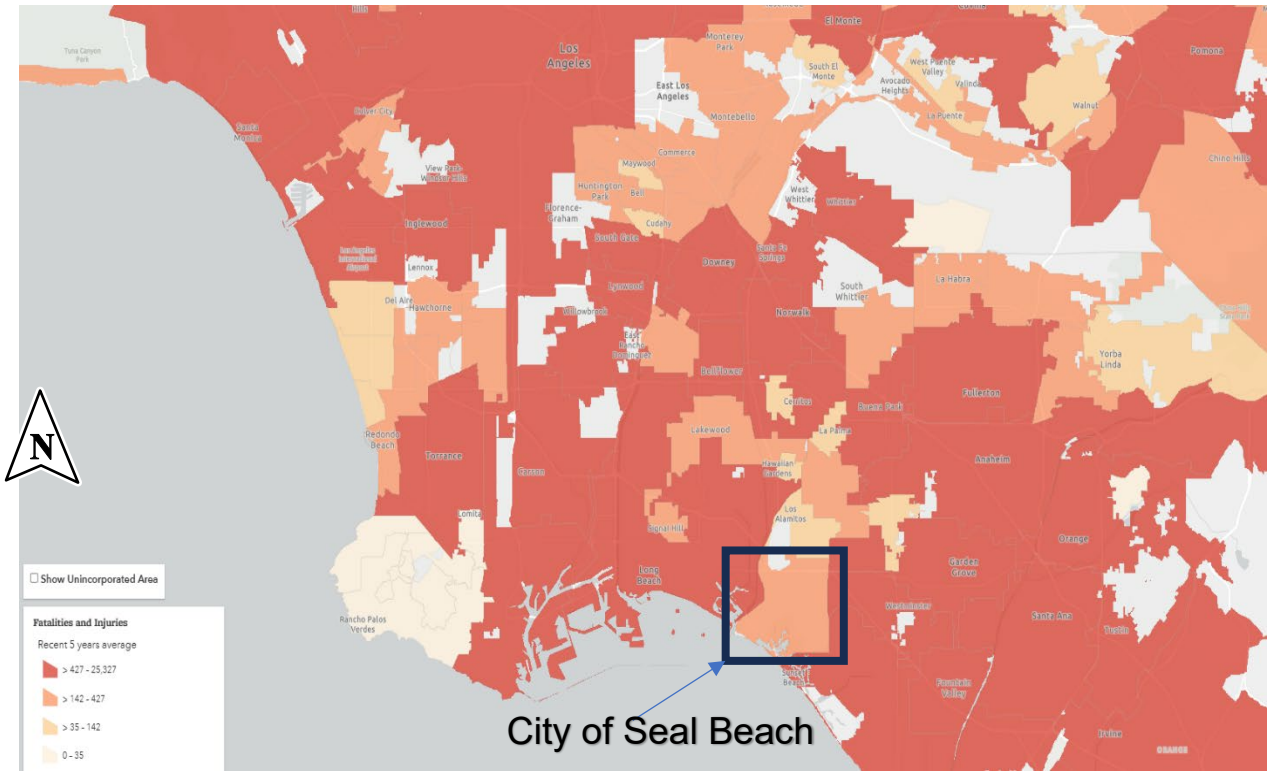


Figure 3-17: TIMS Number of Fatalities and Injuries relative to Neighboring Cities
(January 1, 2019 - December 31, 2023)

Figures 3-16 and 3-17 compare the TIMS number of collisions, fatalities, and injuries relative to the neighboring cities. Seal Beach has a lower percentage of fatal/injury crashes compared to Orange County and California averages over the 2019-2023 period as indicated by the lighter shaded region.

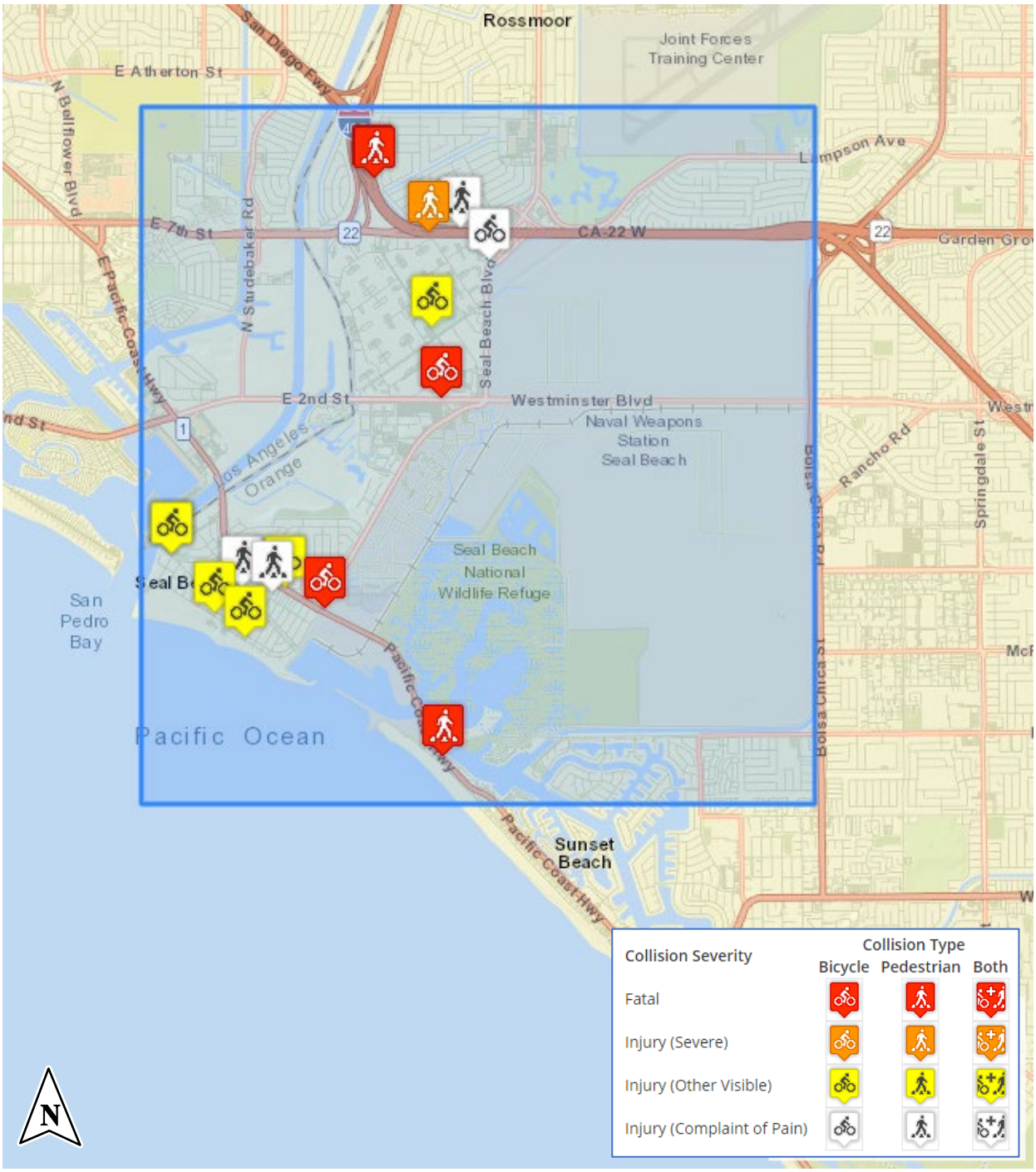


Figure 3-18: City of Seal Beach Active Transportation Program Specific Collision Map
(January 1, 2019 - December 31, 2023)

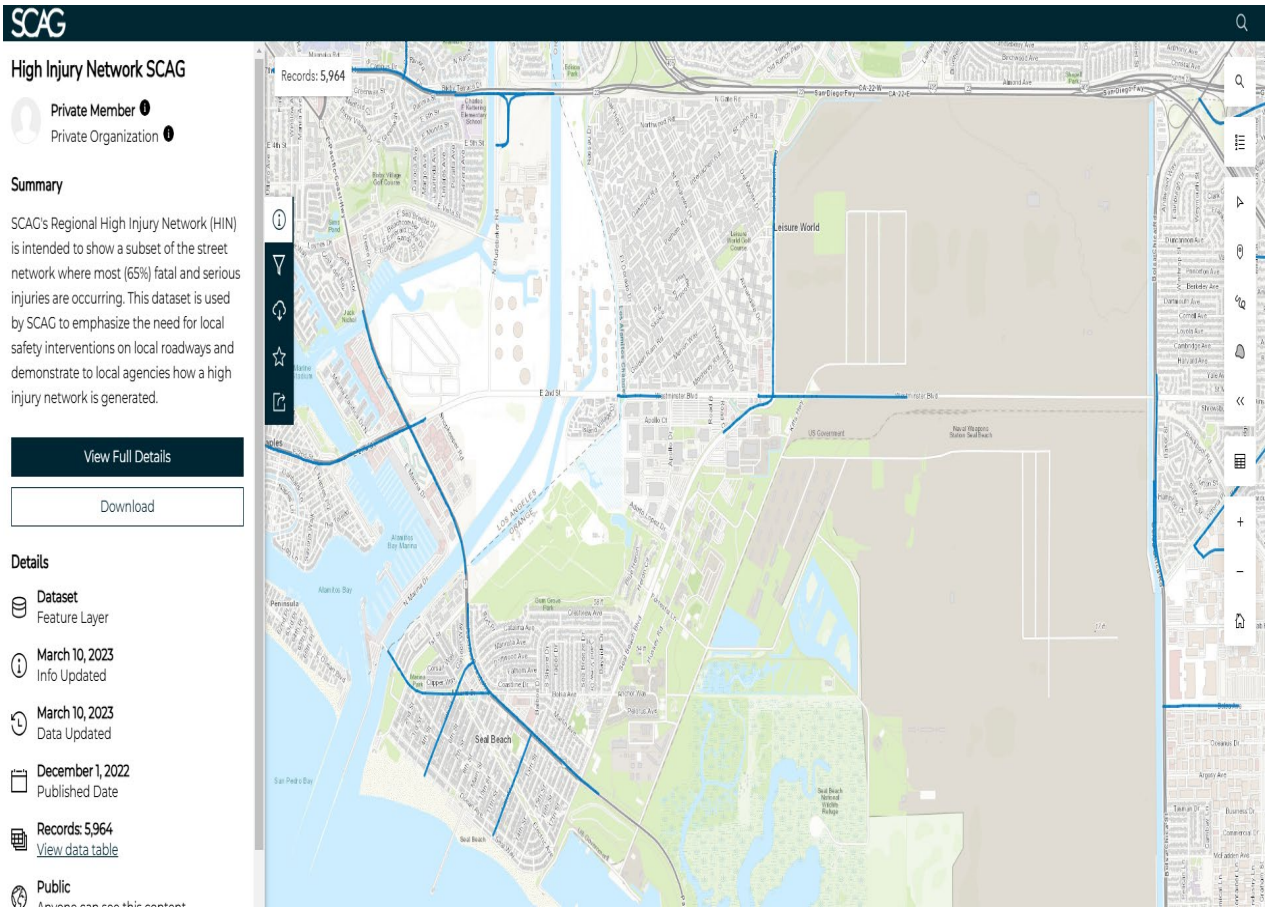


Figure 3-19: Regional High Injury Network (HIN) for Seal Beach
Source: Southern California Association of Governments (SCAG) Regional High Injury Network Map (2022)

According to SCAG,

> "High injury networks (HINs) are one of many strategies local agencies can use to begin addressing traffic fatalities and serious injuries. HINs identify stretches of roadways where the highest concentrations of collisions resulting in fatal or serious injuries occur on the transportation network."

In 2022, SCAG published a Regional HIN for Southern California based on available collision data from 2015 to 2019. While this HIN provides valuable insight into the trend of fatal and serious injury collisions in Seal Beach, more recent data has been made available from 2019 to 2023 which instead inform the rankings of intersections and segments developed for the SAP.

Source: scag.ca.gov/transportation-safety

Figure 3-20: SAP Focus Locations

4. Engagement and Collaboration

To promote and create a safe transportation environment, collaboration across agencies known as safety partners is a necessity. Safety partners are the agencies, departments, and organizations whose input and support are foundational to a successful Safety Action Plan.

The safety leadership team is primarily composed of City Departments that have key roles in the development, implementation, and operation of safety projects, programs, and policies. The safety leadership team is ultimately responsible for developing, adopting, and implementing the safety plan and program. The stakeholder team is distinguished from the leadership team. It comprises partner agencies and organizations who collaborate with the City and contribute to and assist with developing and implementing the plan. These agencies and their roles in the plan's development and implementation are provided below:

4.1 Safety Leadership

I. City Council

The legislative body which is ultimately responsible for approving and adopting the final plan, setting safety policies, and approving budget and funding levels.

II. Public Works Department

Public Works is the lead City Department in developing and producing the Safety Action Plan and its periodic updates. The Public Works Department is responsible for assembling other City Departments and collaborating with Stakeholders. Public Works is responsible for capital project implementation. The City's Public Works staff may also lead or collaborate in education campaigns.

III. Seal Beach Police Department

The Police Department maintains collision records and is responsible for carrying out enforcement practices and activities. The City's Police Department may also lead or collaborate in education campaigns.

IV. Orange County Fire Department

The City's Fire Department serves in a support role in developing and producing the plan.

4.2 Stakeholders

I. Los Alamitos Unified School District

Collaboration with the Los Alamitos Unified School District to maintain and promote safety for all students within the City of Seal Beach.

II. Seal Beach Police Department

Roadways and functional areas of intersections require communication and collaboration. Collaboration with the Seal Beach Police Department over the course of the safety plan is needed to ensure that local safety goals and policies are met.

III. Orange County Fire Department

The City's Fire Department serves in a support role in developing and producing the plan.

IV. Orange County Transportation Authority (OCTA)

OCTA is unique among the nation's transportation agencies. It serves as the transportation planner and coordinator, designer, builder, and operator for the county. More than 3 million people – live, work and play within their 794-square-mile service area.

V. Caltrans District 12

The California Department of Transportation (Caltrans) is responsible for planning, design, construction, maintenance and operation of the state highway system. District 12 encompasses the entirety of Orange County or 794 square miles, including 34 cities, over 3 million people, and 17 state highway routes with the large workforce in construction and maintenance. Others include the administration, environmental, design, program/project management, planning, traffic operations, external affairs and right of way divisions.

VI. Seal Beach Chamber of Commerce

The Seal Beach Chamber of Commerce coordinates engagement with City businesses. The Chamber of Commerce provides feedback on recommended strategies and countermeasures to address traffic safety issues. Feedback from the Business community can provide valuable insight on the benefits and impacts of safety measures.

VII. General Public of the City of Seal Beach

The general public provides feedback and insight on recommended emphasis areas, high incident locations, collision factors, countermeasures, and implementation. Although collision records and statistics are foundational to this plan, public feedback is a critical supplement to that data. This feedback provides the safety plan with a holistic view of safety issues and a recommendation for what types of countermeasures are and are not desired by the community.

VIII. Seal Beach and Seal Beach Public Works Department

In a joint effort, the City of Seal Beach and Seal Beach Public Works are to lead the City Department in developing and producing the Safety Plan and its periodic updates. Both respective city public works departments can benefit from each other in this joint effort.

IX. United States Naval Weapons Seal Beach/U.S. Department of Defense

Naval Weapons Station Seal Beach is a United States Navy weapons and munitions loading, storage and maintenance facility located in Seal Beach. It also encloses the Seal Beach National Wildlife Refuge.

X. Leisure World Seal Beach/Golden Rain Foundation

Leisure World is an active-seniors' retirement community opened in 1962 that introduce many innovations characterizing later senior property developments. Leisure World houses approximately 9,600 residents in 6,608 one- and two-bedroom apartments and condominiums. At its opening, it was the world's largest housing development for seniors, the United States' largest cooperative housing development, and the prototype for six other Leisure World communities across the United States

In a joint effort, the City of Seal Beach Public Works and Police Departments are the lead City Department in developing and producing the Safety Plan and its periodic updates. However, the Public Works Department manages the Safety Plan and administers the grant funds. Both respective city departments can benefit from each other in this joint effort.

4.3 Community Outreach Meetings

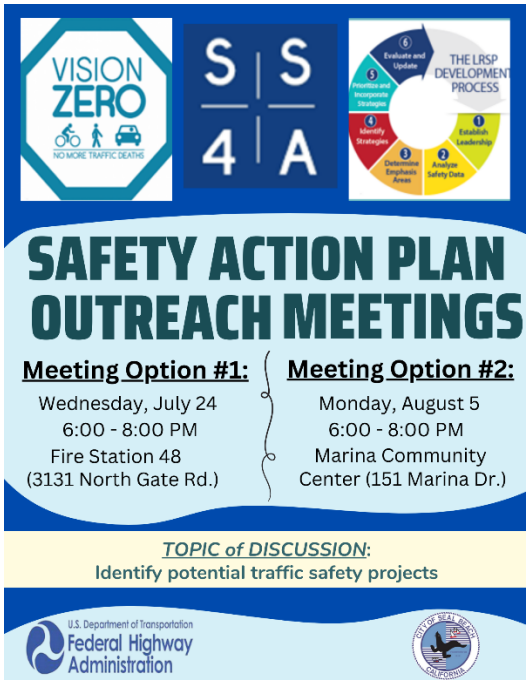


Figure 4-1: Safety Action Plan Outreach Meeting Flyer
Source: City Of Seal Beach Public Works, 2024

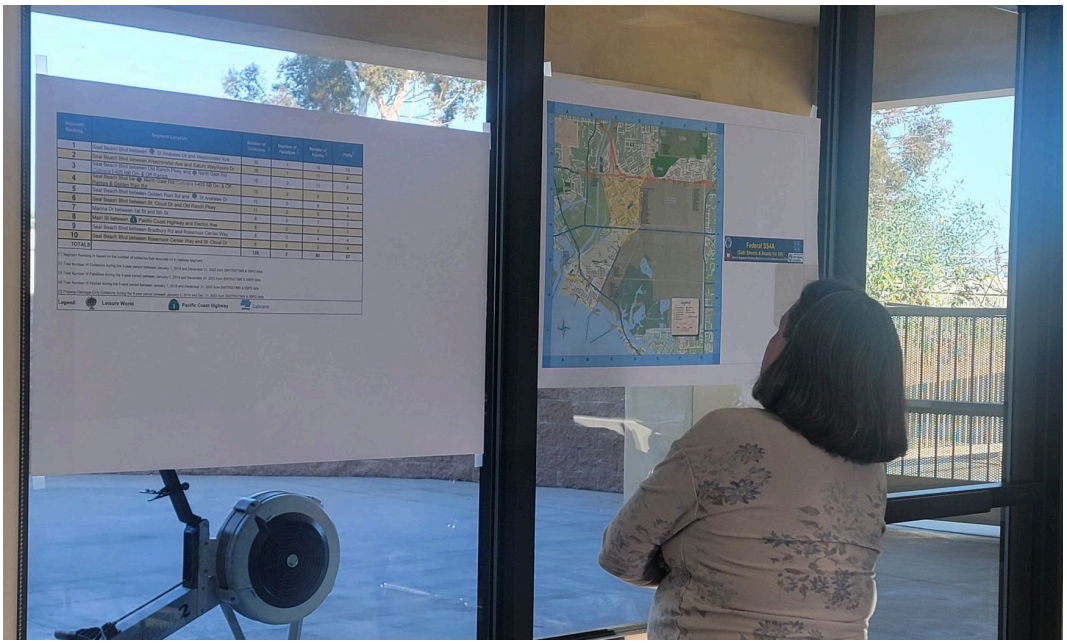


Figure 4-2: Safety Action Plan Outreach Meeting #1
July 24, 2024 6:00 – 8:00 PM

Figure 4-3: Safety Action Plan Outreach Meeting #1
July 24, 2024 6:00 – 8:00 PM

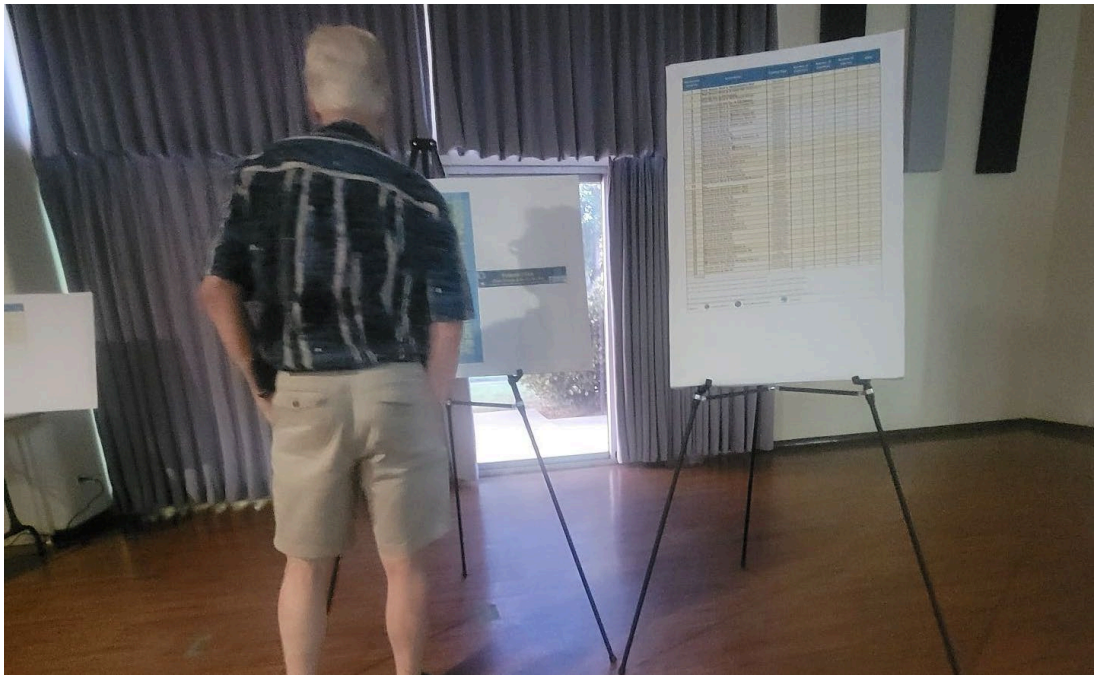


Figure 4-4: Safety Action Plan Outreach Meeting #2
August 5, 2024 6:00 – 8:00 PM

Figure 4-5: Safety Action Plan Outreach Meeting #2
August 5, 2024 6:00 – 8:00 PM

The previous figures, 4-1 to 4-5, showcase the effort made by the Public Works department to hear and honor the needs of the Seal Beach community. During these meetings, attendees were presented with the proposed intersections and roadway segments of interest for the SAP project and given the opportunity to ask questions and provide feedback. As pictured in Figures 4-3 and 4-5, Fred Minagar, Principal of Minagar & Associates Inc., led the presentation and fostered discussion.

The project team also participated in in-person meeting as well as field meeting with the representatives of the US Naval Weapons Station/USDOD, Leisure World/Golden Rain Foundation and bike advocates.

5. Equity Considerations

Within the SS4A program, equity is a guiding principle in the process of identifying the High Injury Network (HIN), working with stakeholders, and determining project priorities. Datasets provided by the FHWA and Census Bureau are crucial in locating disadvantaged populations in order to assess the support and safety solutions needed on a case-by-case basis.

California SB 535 (2012) directs investments of cap-and-trade funds towards “Disadvantaged Communities” (DACs). In 2022, the SB 535 Disadvantaged Communities map was established to identify DACs in California. None of the tracts in Seal Beach are classified as disadvantaged by SB 535.

In figures 5-2 through 5-10, the SS4A Underserved Communities Census Tracts (Historically Disadvantaged Communities) shown highlight the areas of disadvantage tracts in Seal Beach have. The orange highlighted areas indicate historically disadvantaged communities. The Disadvantage Layer table on the right is associated with the selected magenta area.

The Justice40 (2021) initiative is a similar program that strives to allocate 40 percent of certain Federal investments to disadvantaged communities that are marginalized, underserved, and overburdened by pollution. The USDOT Transportation Insecurity Tool, a part of the broader Equitable Transportation Community (ETC) Explorer, quantifies the burden of climate and disaster risk, the environment, health, social vulnerability, and transportation insecurity. Figures 5-11 through 5-13 highlight the relatively high disadvantage Seal Beach has in terms of transportation insecurity.

Figures 5-14 through 5-22 showcase the tracts of Seal Beach through the lens of Climate and Economic Justice, published by the Council on Environmental Equity. While none of the tracts in Seal Beach are identified as disadvantaged, the tract demographics are important to note.

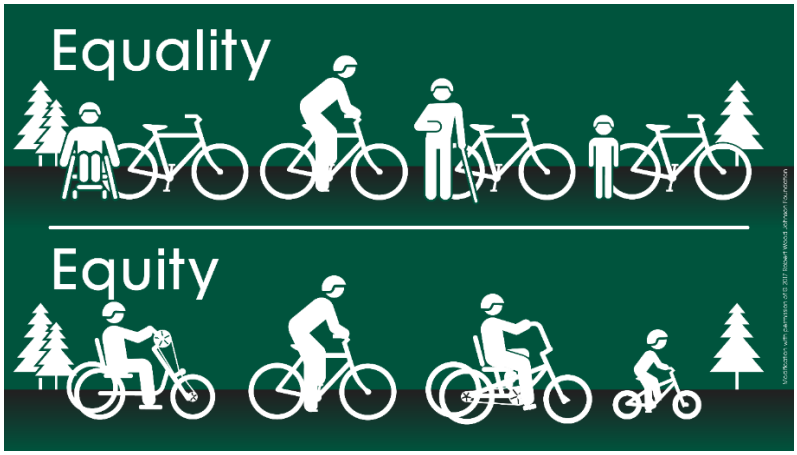


Figure 5-1: Equality Vs. Equity
Source: FHWA

SS4A Underserved Communities Census Tracts (Historically Disadvantaged Communities)

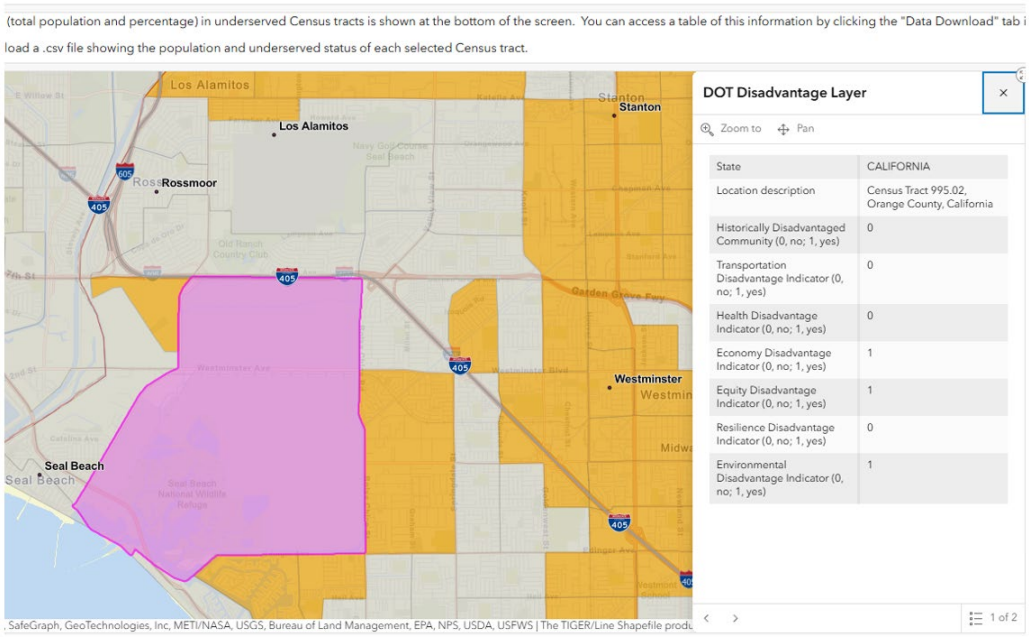


Figure 5-2: SS4A Underserved Communities Census Tract 995.02
Source: SS4A Underserved Communities Census Tract (Historically Disadvantaged Communities) Map (2020)

According to the SS4A Underserved Communities Census Tract Map, Tract 995.02 is disadvantaged in terms of economics, equity and the environment. As the focus locations were selected, this information was crucial to decision making.

SS4A Underserved Communities Census Tracts (Historically Disadvantaged Communities)

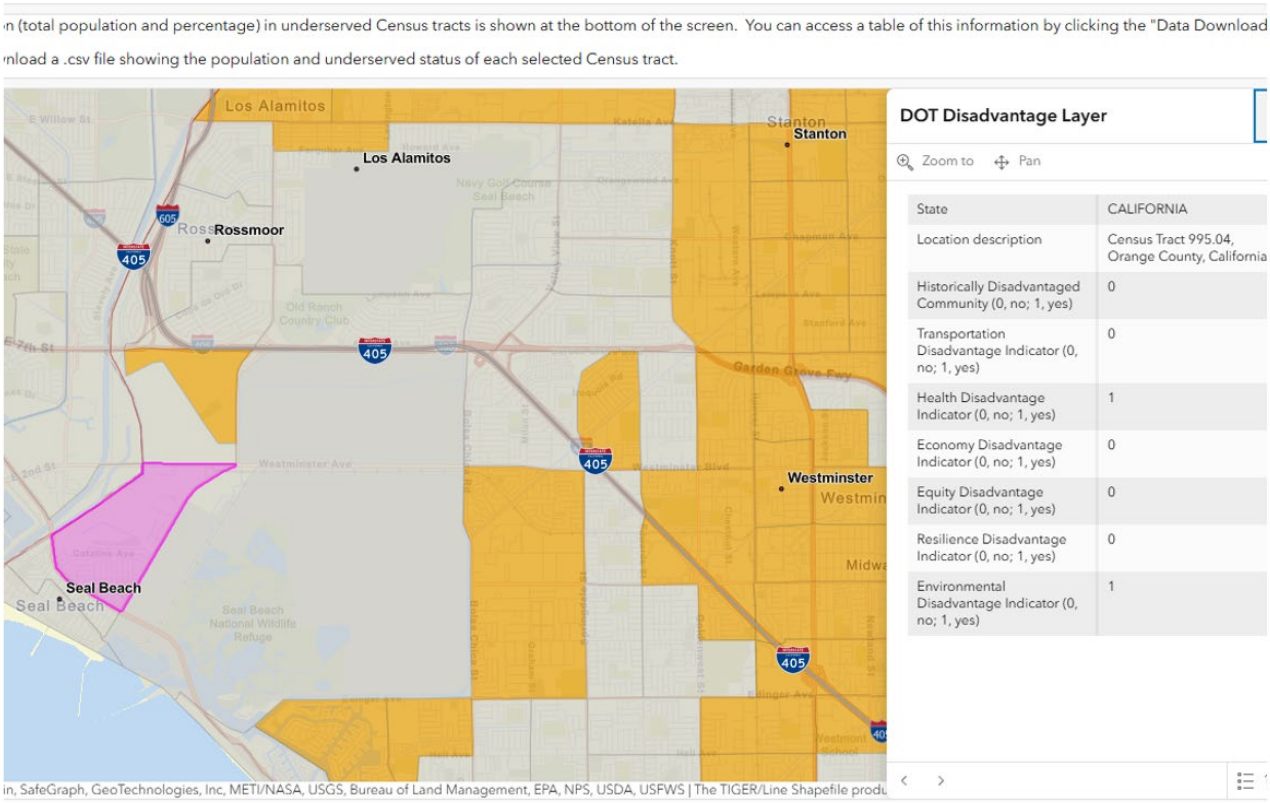


Figure 5-3: SS4A Underserved Communities Census Tract 995.04
Source: SS4A Underserved Communities Census Tract (Historically Disadvantaged Communities) Map (2020)

According to the SS4A Underserved Communities Census Tract Map, Tract 995.04 is disadvantaged in terms of health and the environment. As the focus locations were selected, this information was crucial to decision making.

SS4A Underserved Communities Census Tracts (Historically Disadvantaged Communities)

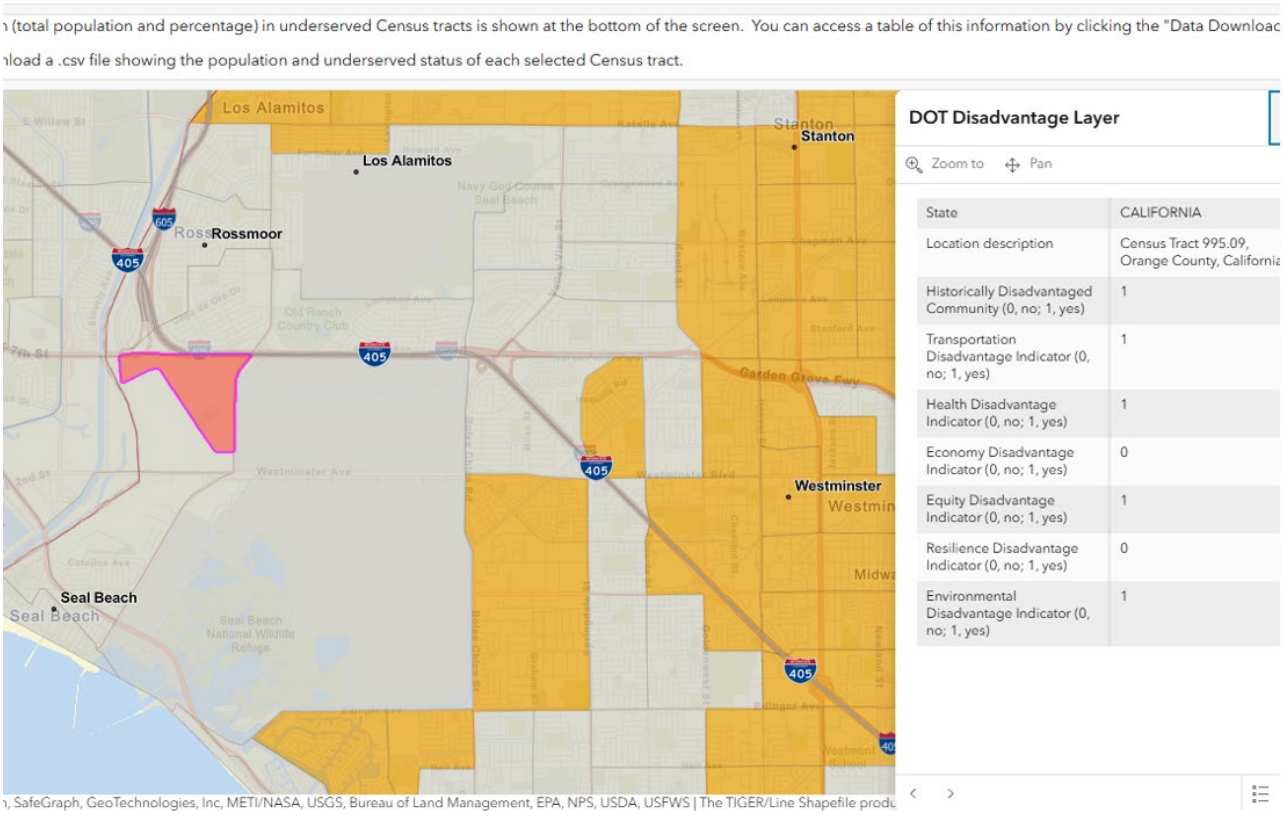


Figure 5-4: SS4A Underserved Communities Census Tract 995.09
Source: SS4A Underserved Communities Census Tract (Historically Disadvantaged Communities) Map (2020)

According to the SS4A Underserved Communities Census Tract Map, Tract 995.09 is a historically disadvantaged community with high transportation, health, and environmental barriers. As the only historically disadvantaged community in Seal Beach, roadways in and around Leisure World had special consideration.

SS4A Underserved Communities Census Tracts (Historically Disadvantaged Communities)

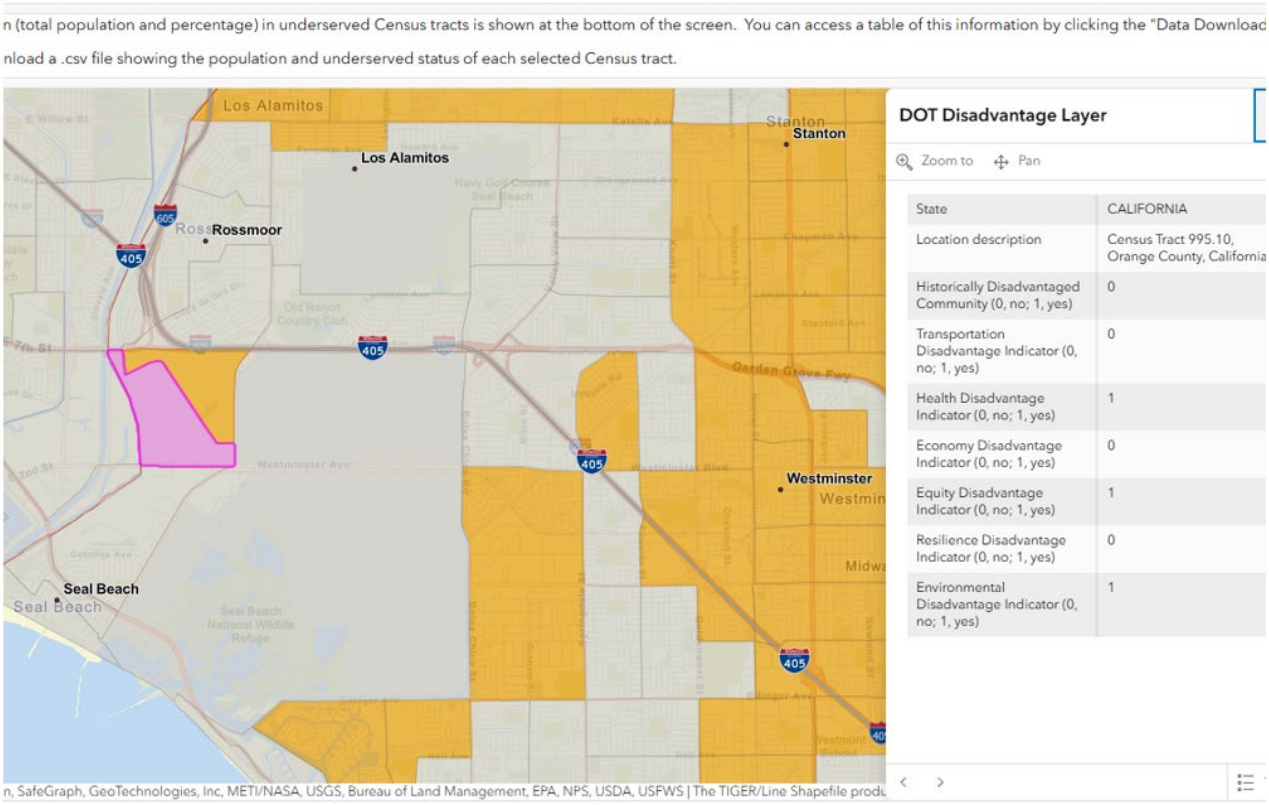


Figure 5-5: SS4A Underserved Communities Census Tract 995.10
Source: SS4A Underserved Communities Census Tract (Historically Disadvantaged Communities) Map (2020)

According to the SS4A Underserved Communities Census Tract Map, Tract 995.10 is disadvantaged in terms of health, equity, and the environment. As the focus locations were selected, this information was crucial to decision making.

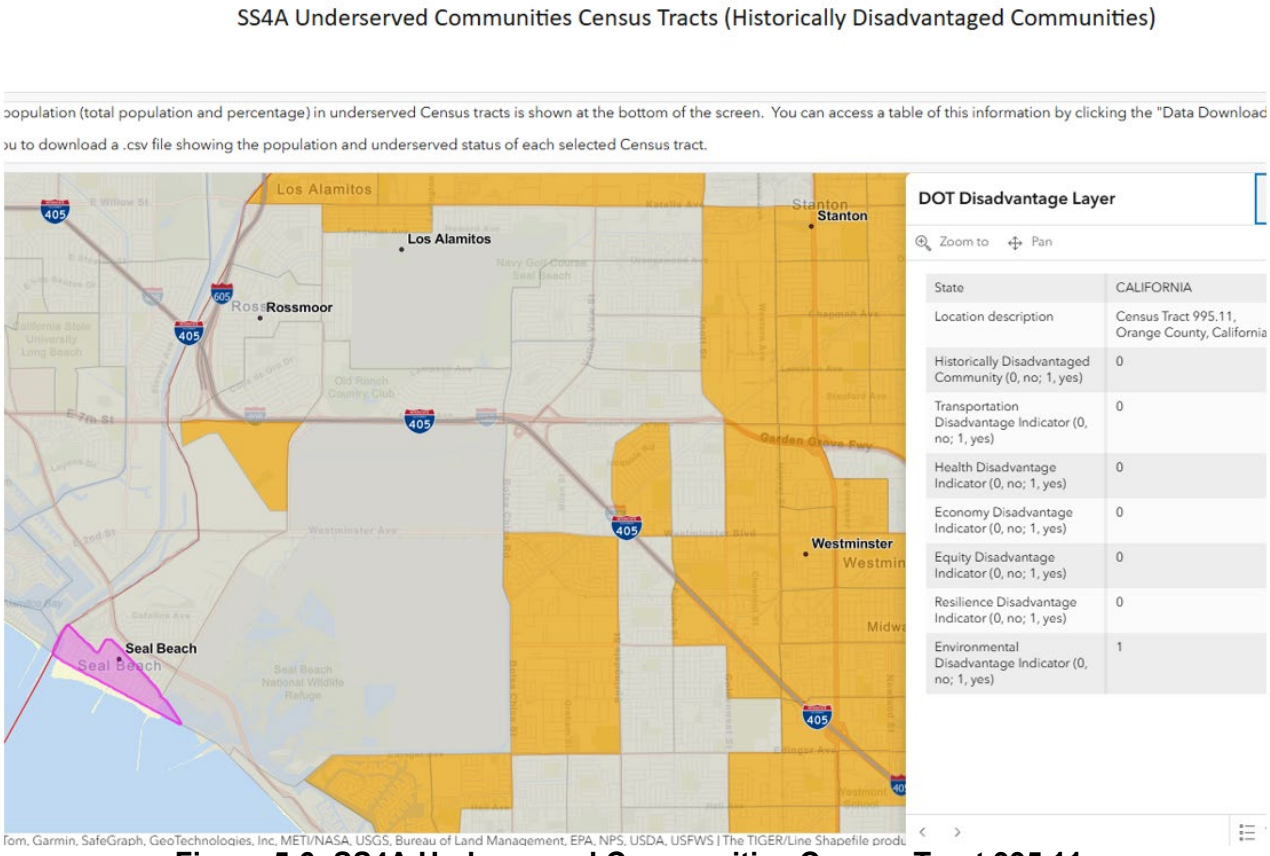


Figure 5-6: SS4A Underserved Communities Census Tract 995.11
Source: SS4A Underserved Communities Census Tract (Historically Disadvantaged Communities) Map (2020)

According to the SS4A Underserved Communities Census Tract Map, Tract 995.11 is disadvantaged environmentally. As the focus locations were selected, this information was crucial to decision making.

SS4A Underserved Communities Census Tracts (Historically Disadvantaged Communities)

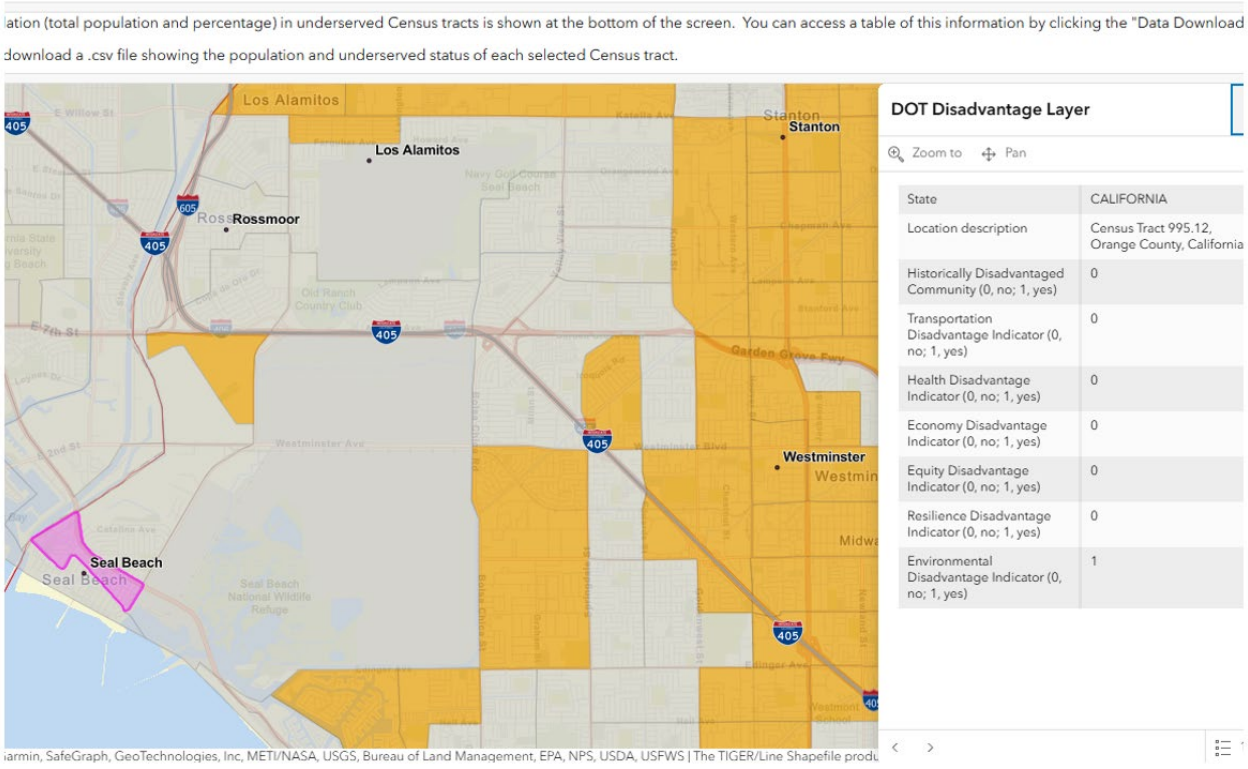


Figure 5-7: SS4A Underserved Communities Census Tract 995.12
Source: SS4A Underserved Communities Census Tract (Historically Disadvantaged Communities) Map (2020)

According to the SS4A Underserved Communities Census Tract Map, Tract 995.12 is disadvantaged environmentally. As the focus locations were selected, this information was crucial to decision making.

SS4A Underserved Communities Census Tracts (Historically Disadvantaged Communities)

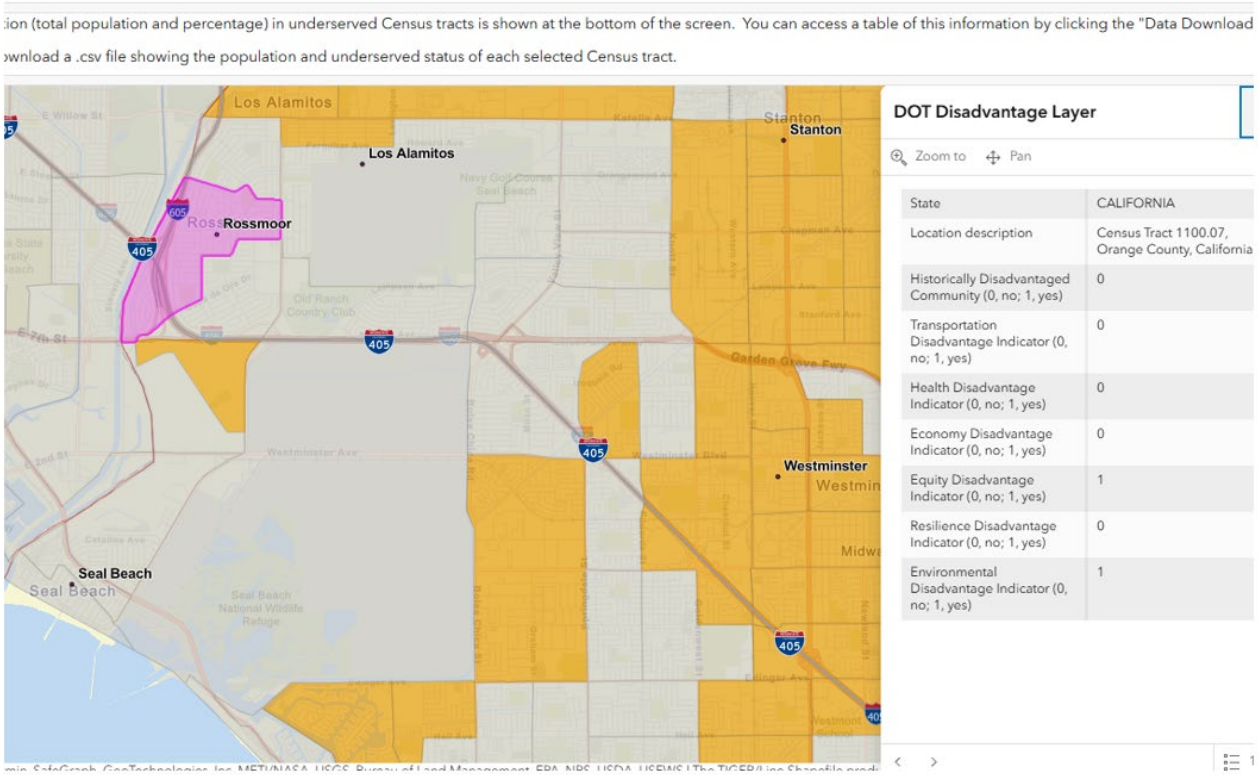


Figure 5-8: SS4A Underserved Communities Census Tract 1100.07
Source: SS4A Underserved Communities Census Tract (Historically Disadvantaged Communities) Map (2020)

According to the SS4A Underserved Communities Census Tract Map, Tract 1100.07 is disadvantaged in terms of equity and the environment. As the focus locations were selected, this information was crucial to decision making.

SS4A Underserved Communities Census Tracts (Historically Disadvantaged Communities)

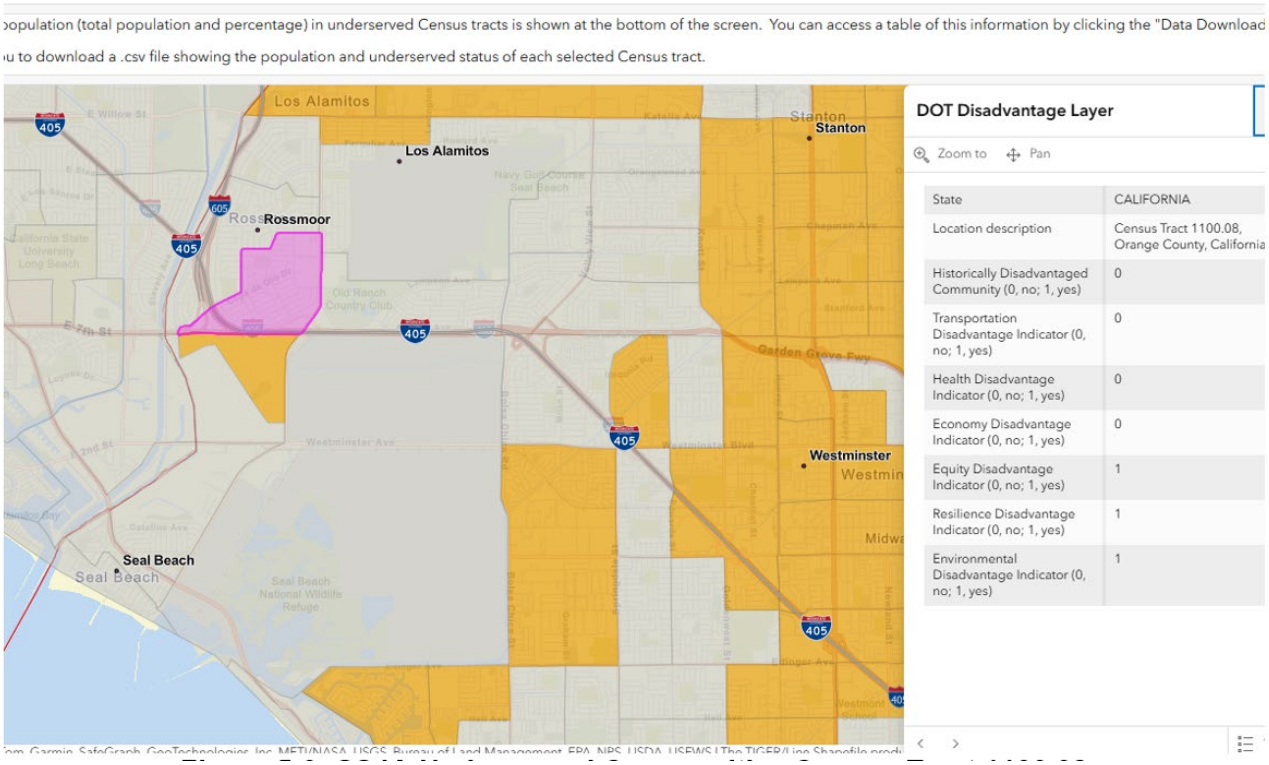


Figure 5-9: SS4A Underserved Communities Census Tract 1100.08
Source: SS4A Underserved Communities Census Tract (Historically Disadvantaged Communities) Map (2020)

According to the SS4A Underserved Communities Census Tract Map, Tract 1100.08 is disadvantaged in terms of equity, resilience, and the environment. As the focus locations were selected, this information was crucial to decision making.

SS4A Underserved Communities Census Tracts (Historically Disadvantaged Communities)

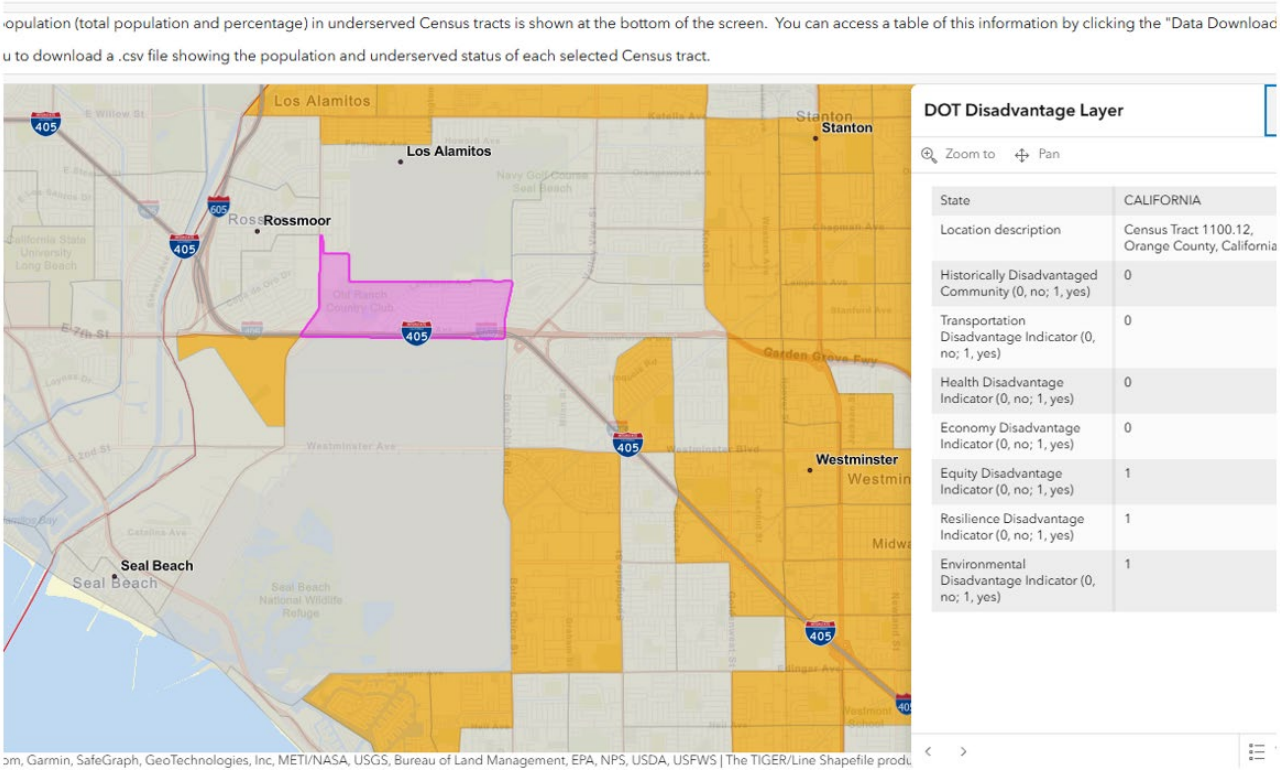


Figure 5-10: SS4A Underserved Communities Census Tract 1100.12
Source: SS4A Underserved Communities Census Tract (Historically Disadvantaged Communities) Map (2020)

According to the SS4A Underserved Communities Census Tract Map, Tract 1100.12 is disadvantaged in terms of equity, resilience, and the environment. As the focus locations were selected, this information was crucial to decision making.

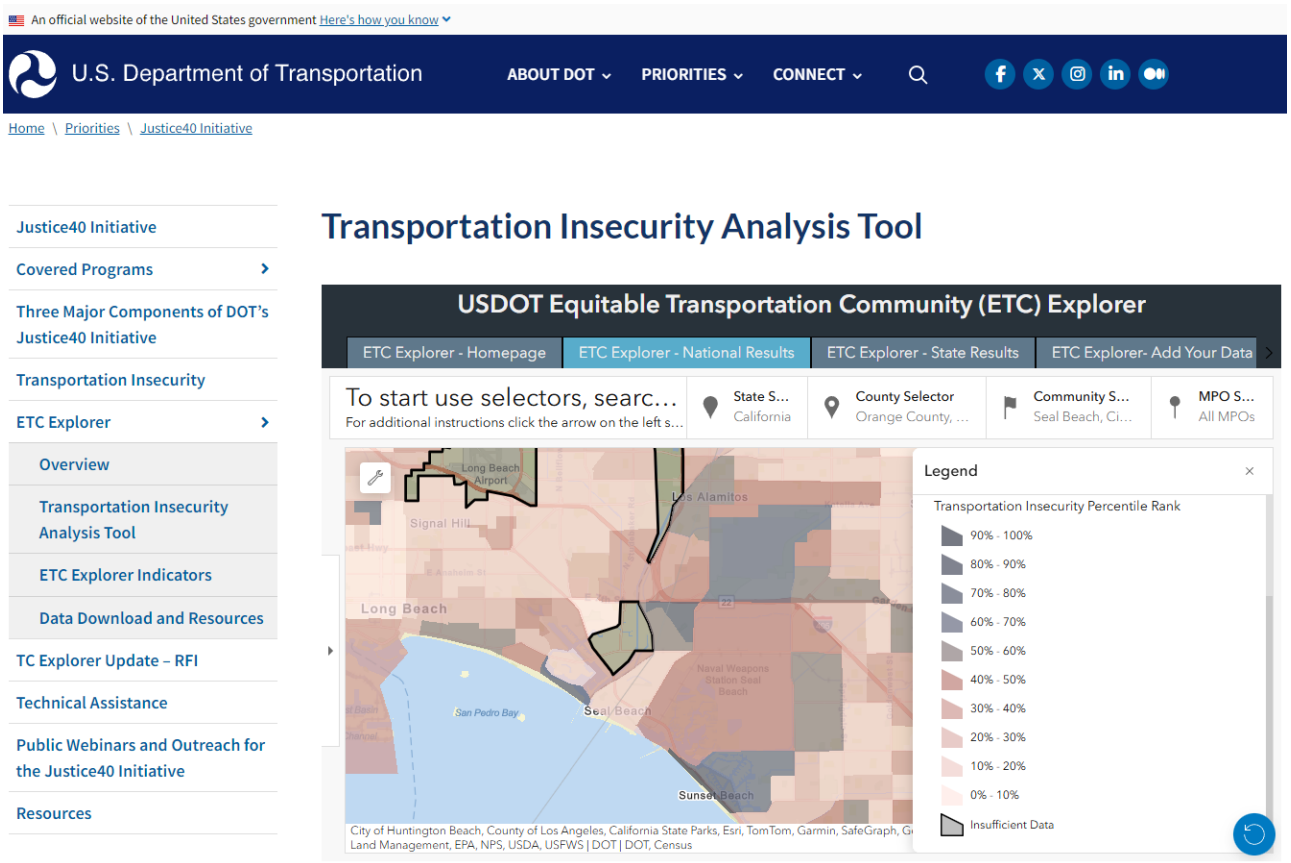


Figure 5-11: USDOT Transportation Insecurity Map
Source: U.S. Department of Transportation, Transportation Insecurity Analysis Tool (Last Updated 11/30/2023)

Figure 5-11 provides a heatmap of the percentile rank of transportation insecurity in and around Seal Beach, CA. As the color transitions from pale red to dark gray, the transportation insecurity percentile rank of the population increases. This information highlights the communities that require the most support from a transportation safety and access perspective.

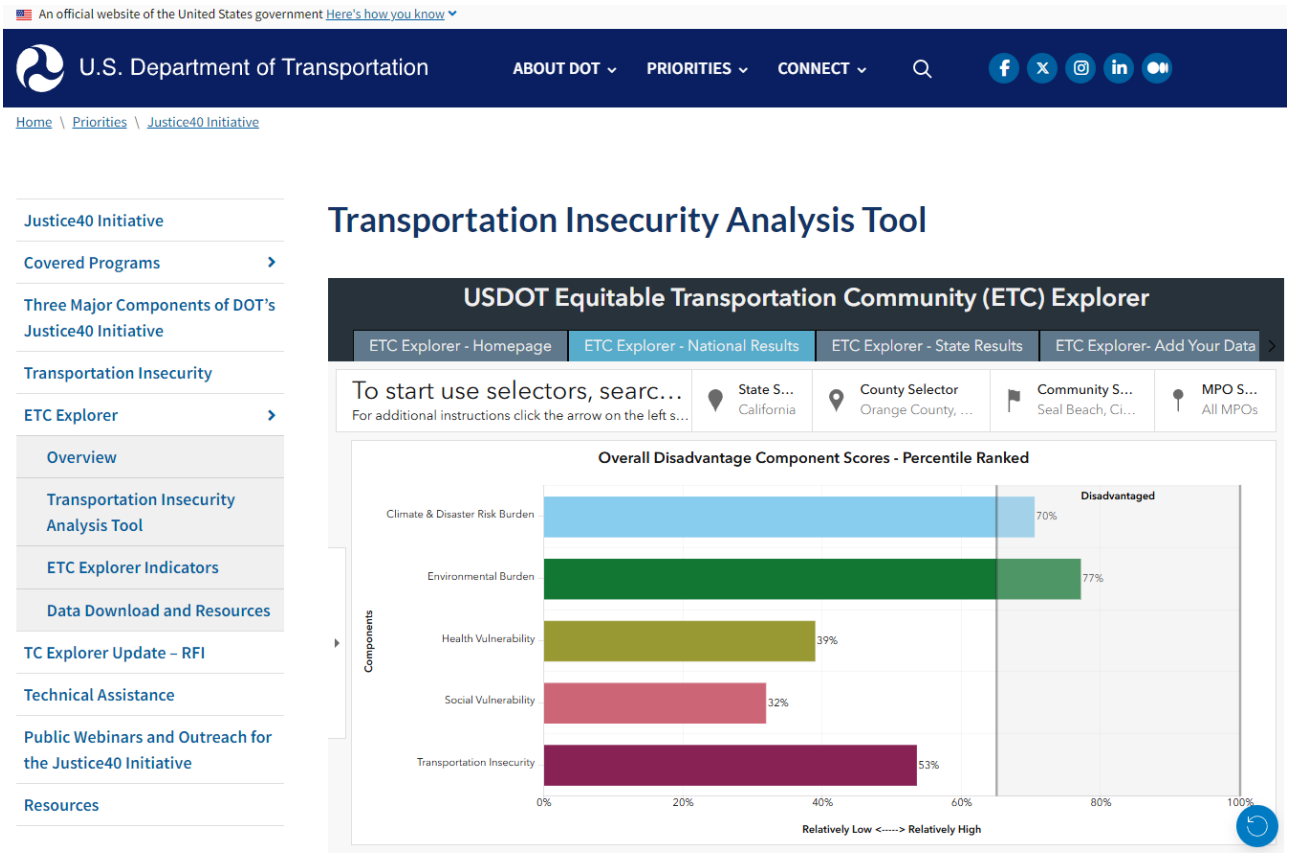


Figure 5-12: USDOT Overall Disadvantage Component Scores Graph
Source: U.S. Department of Transportation, Transportation Insecurity Analysis Tool (Last Updated 11/30/2023)

Figure 5-12 provides a bar graph of the overall areas of disadvantage that affect Seal Beach, CA. Most notably, the area carries a disadvantage in terms of climate an disaster risk, as well as the environment. This information was considered as focus locations were selected.

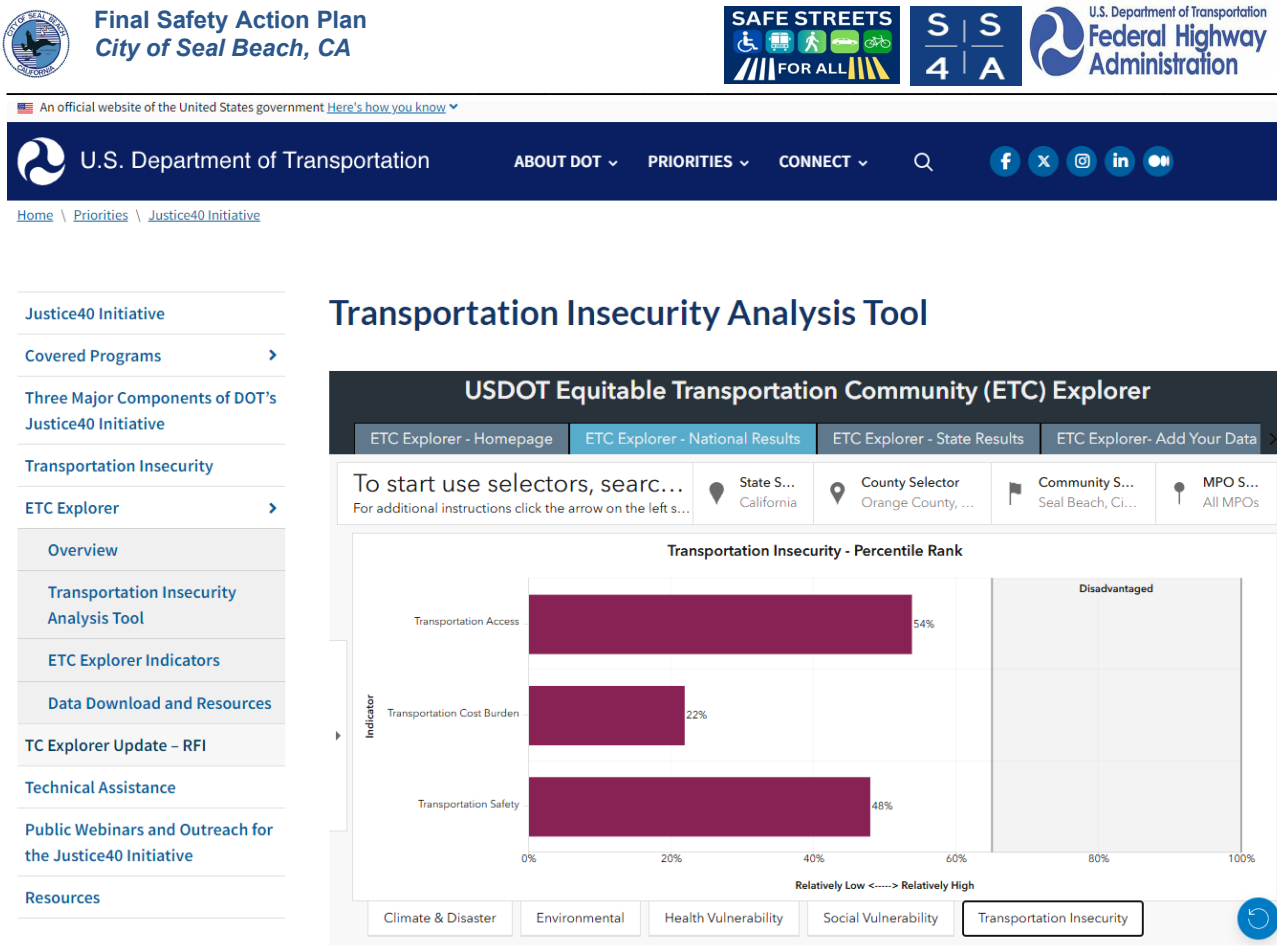


Figure 5-13: USDOT Transportation Insecurity Graph
Source: U.S. Department of Transportation, Transportation Insecurity Analysis Tool (Last Updated 11/30/2023)

Figure 5-13 provides a bar graph of the aspects of transportation insecurity in Seal Beach, CA. While none of the three categories classify as "Disadvantaged," the relatively high percentile rank of transportation access is noteworthy and further reason to consciously evaluate possible roadway improvements.

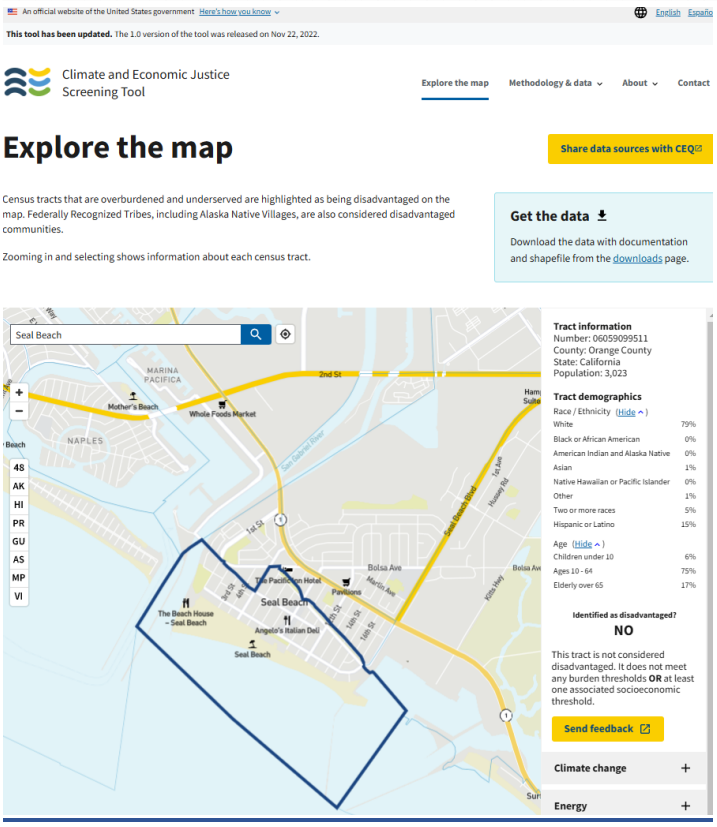


Figure 5-14: Climate and Economic Justice Screening Tool, Tract 995.11
Source: Council on Environmental Quality

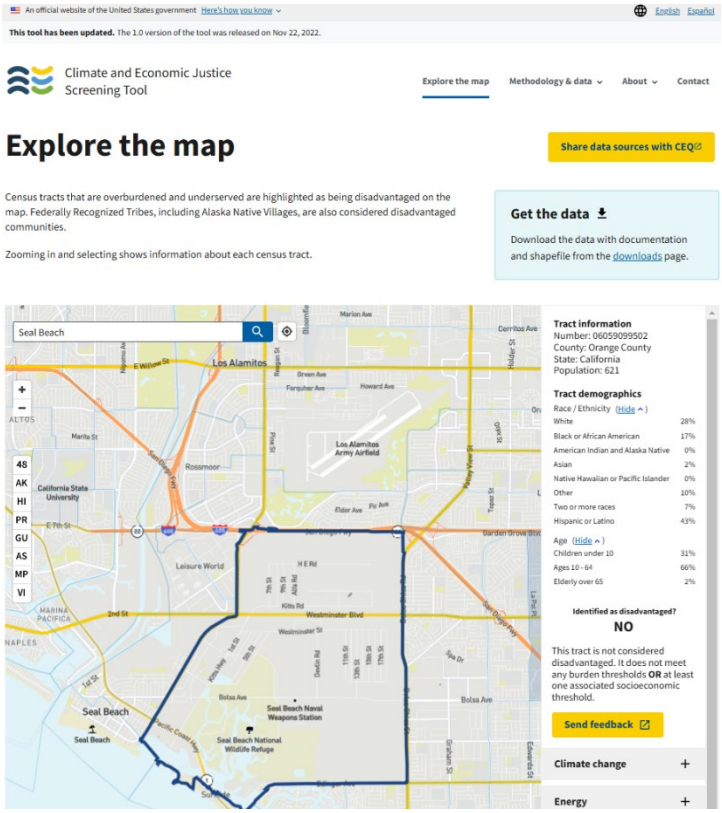


Figure 5-15: Climate and Economic Justice Screening Tool, Tract 995.02
Source: Council on Environmental Quality

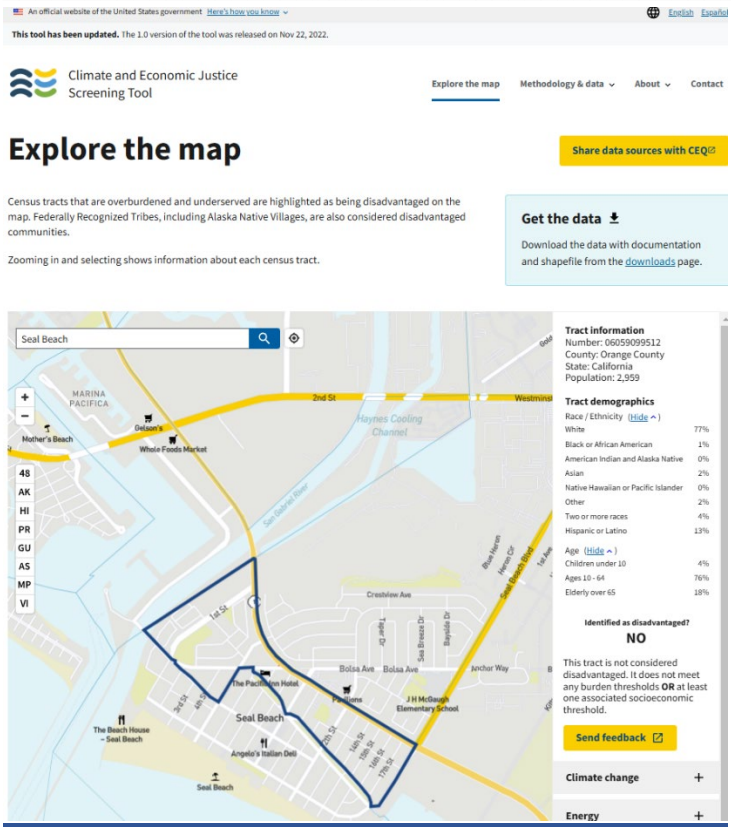


Figure 5-16: Climate and Economic Justice Screening Tool, Tract 995.12
Source: Council on Environmental Quality

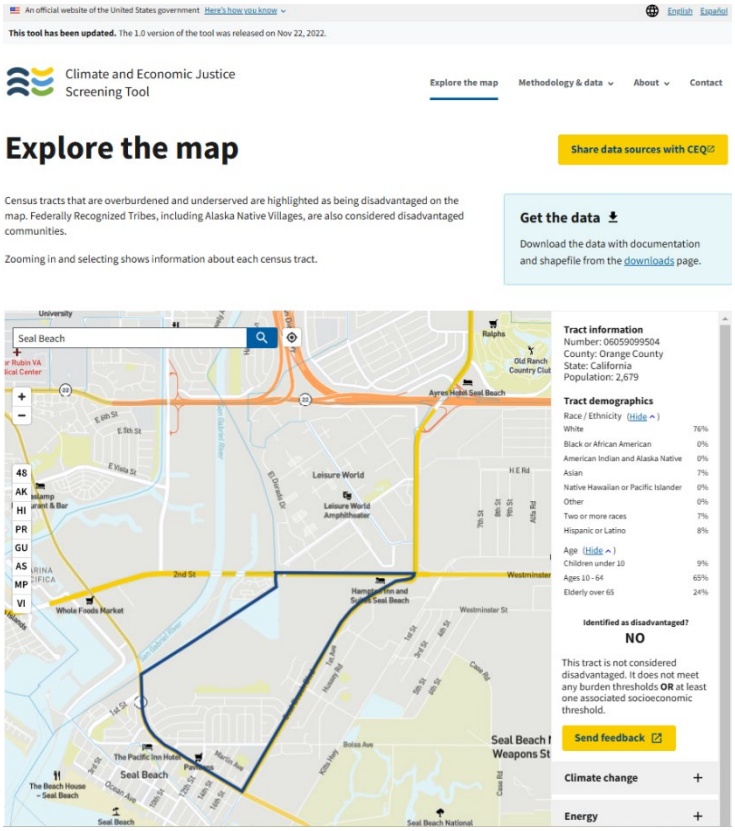


Figure 5-17: Climate and Economic Justice Screening Tool, Tract 995.04
Source: Council on Environmental Quality

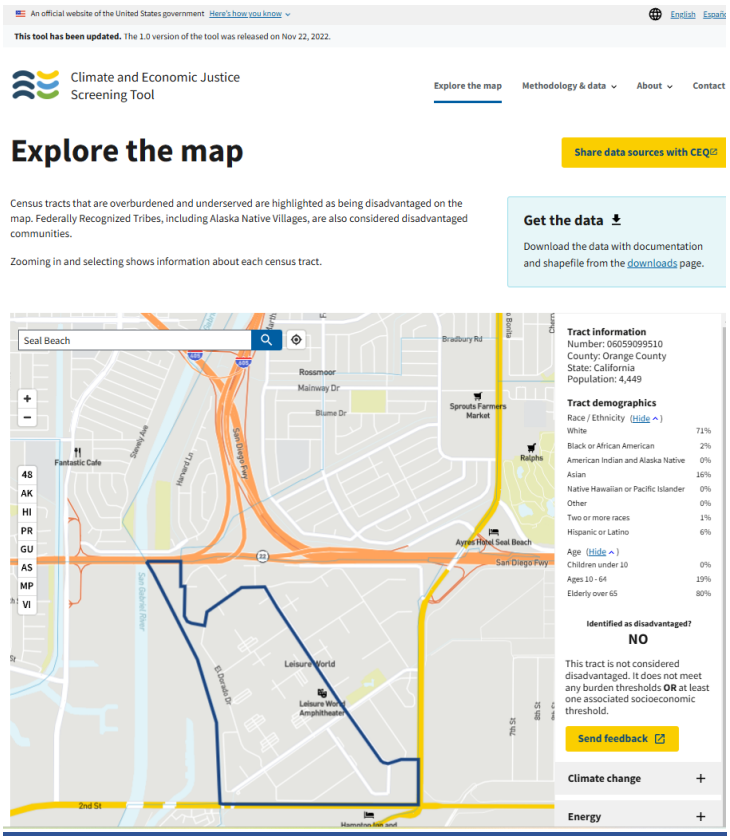


Figure 5-18: Climate and Economic Justice Screening Tool, Tract 995.10
Source: Council on Environmental Quality

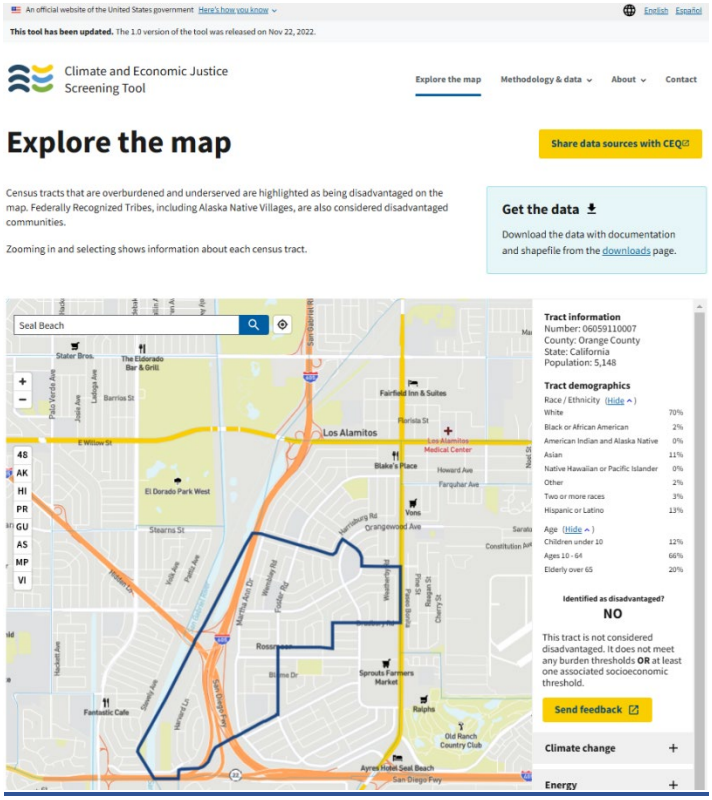


Figure 5-19: Climate and Economic Justice Screening Tool, Tract 995.07
Source: Council on Environmental Quality

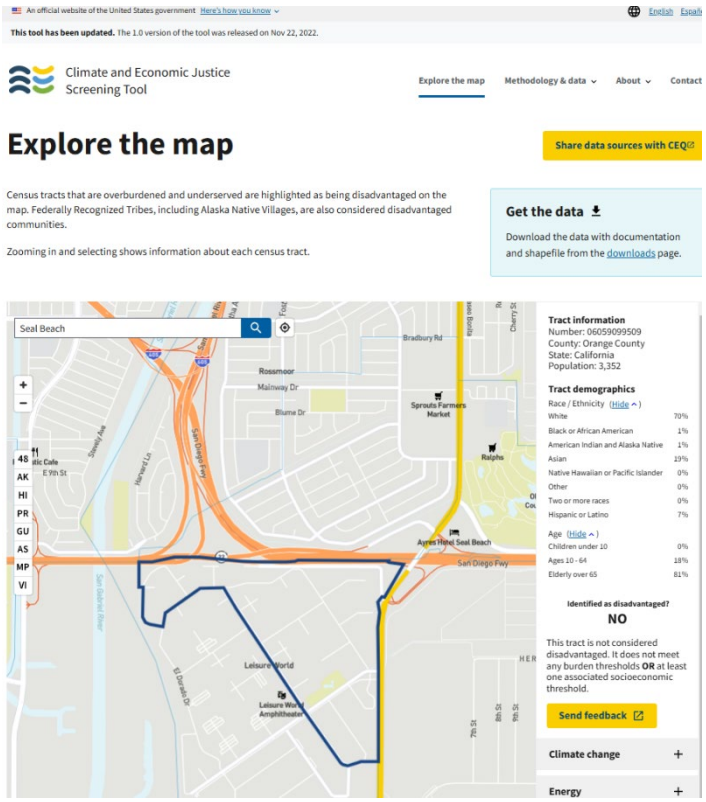


Figure 5-20: Climate and Economic Justice Screening Tool, Tract 995.09
Source: Council on Environmental Quality

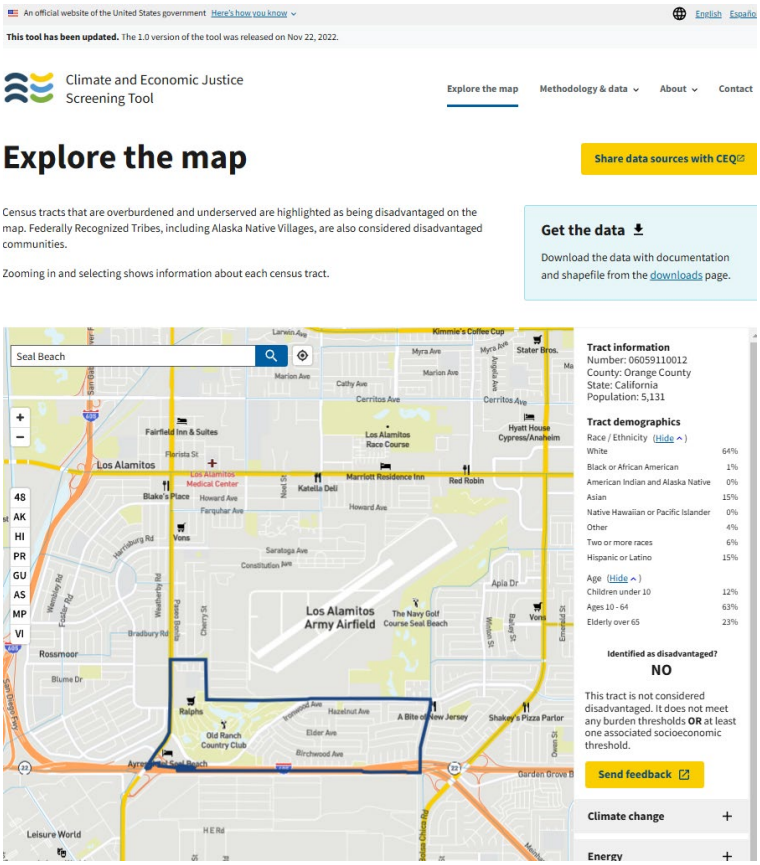


Figure 5-21: Climate and Economic Justice Screening Tool, Tract 1100.12
Source: Council on Environmental Quality

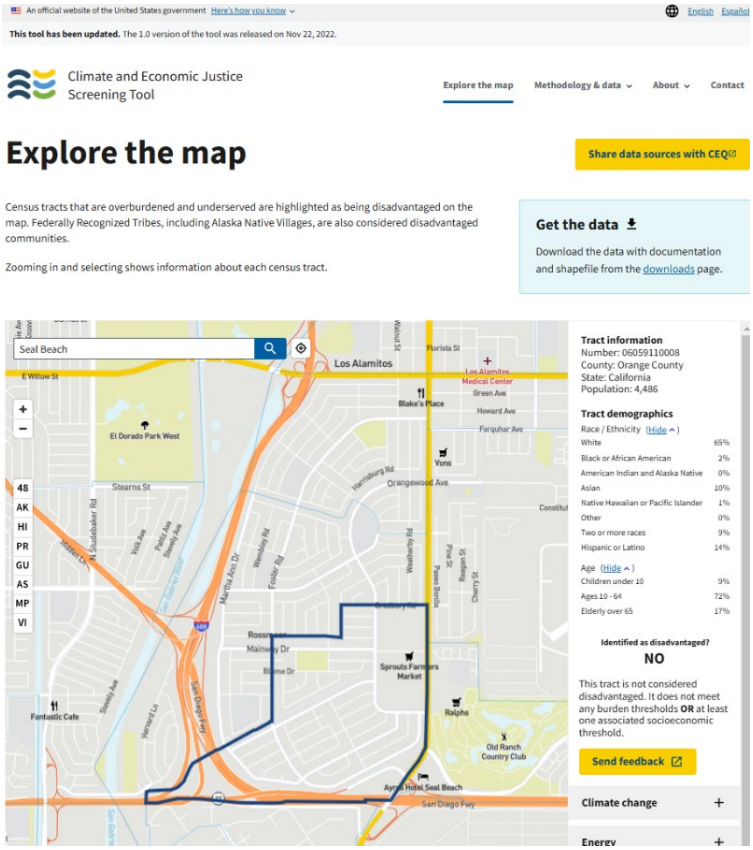


Figure 5-22: Climate and Economic Justice Screening Tool, Tract 1100.08
Source: Council on Environmental Quality

6. Policy and Process Changes

In the Seal Beach Safety Action Plan development, an assessment of current policies, plans guidelines, and/or standards to identify opportunities to improve how processes prioritize safety was conducted. Per the discussions with the Public Works and Police Departments staff, no specific policy and/or process changes are suggested during this cycle of review and assessment is suggested. However, the Public Works Department as the lead Department will continue exploring new funding opportunities form the County, regional MPO and Transportation Authority, the State DOT (Caltrans) and Federal agencies to implement plans and programs to increase public safety and in particular to reduce traffic related injuries and fatalities.

7. Strategy and Project Selections

The project team identified four major emphasis areas for the city by utilizing the aforementioned analysis that included primary collision factors. The Strategic Highway Safety Plan (SHSP) addresses the “5 Es” of traffic safety: Engineering, Enforcement, Education, Emergency Response, and Emerging Technologies. Each emphasis area utilizes the 5 Es addressed by SHSP, the following emphasis areas are discussed and analyzed in this section.

1. High Collision Intersections
2. High Collision Roadway Segments
3. Rear End Collisions Due to Unsafe Speeds
4. Broadside Collisions Due to Improper Turning or Automobile Right-of-Way

7.1 Traffic Safety For High Collision Intersections/Focus Locations

The most prominent emphasis area is high collision intersections since most of the collisions in the City of Seal Beach occurred on intersections. Each intersection has its own unique geometry, therefore, an analysis of each of the prominent fifteen (15) intersections in the City of Seal Beach was concluded to understand the factors leading to collisions.

Education

- Conduct public information and education campaigns for safety laws regarding a safe approach to an intersection.
- Raise awareness of the necessity of abiding by the traffic safety laws.

Engineering

- Identify and rank high collision intersections within the City every two to three years. Consider information obtained from public input and feedback regarding unreported collisions to supplement Collision data.
- Evaluate the primary factors leading to collisions at high collision intersections
- Develop and implement countermeasures to tackle those factors.

- Assess and report collision patterns before and after implementation of countermeasures and adjust as necessary.
- Maintain roadway signing and striping.
- Consider improving night time lighting.

Enforcement

- Prioritize patrol patterns at high-risk intersections to monitor traffic law violations which include right of way violations, traffic signals and signs, unsafe speed, and DUI.
- When laws are enforced and awareness of abiding by traffic safety laws is raised, intersection collisions will reduce abundantly.

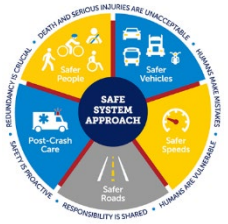
Emergency Medical Services

- Consider targeted training for responding to specific high collision intersections and immediate treatment of predominant injuries at those locations.

Emerging Technologies

- Develop new methods to integrate multi source transportation data for developing different measurements of traffic safety for road users and identify safety issues associated with emerging electrical and automated vehicles.

7.2 Traffic Safety For High Collision Roadway Segments/Focus Corridors



Applying safety improvements to high collision roadway segments is also a necessity. Each roadway segment has its own unique geometry therefore, an analysis of each of the prominent ten (10) roadway segments in the City of Seal Beach was concluded to understand the factors leading to collisions that occurred.

Education

- Conduct public information and education campaign for safety laws regarding safe speed, improper turning, unsafe lane change, and driving on the wrong side of the road.
- Raise awareness of the necessity of abiding by the traffic safety laws.

Source: Beverly Samperio, The Arrow

Engineering

- Identify and rank high collision roadway segments within the City every two to three years. Consider information obtained from public input and feedback regarding unreported collisions to supplement Collision data.

- Evaluate the primary factors leading to collisions at high collision roadway segments.
- Develop and implement countermeasures to tackle those factors.
- Assess and report collision patterns before and after implementation of countermeasures and adjust as necessary.
- Maintain roadway signing and striping.
- Consider improving night time lighting.

Enforcement

- Prioritize patrol patterns at high collision roadway segments to monitor traffic law violations which include unsafe speed and improper turning.
- When laws are enforced and awareness of abiding by traffic safety laws is raised, roadway segment collisions will reduce abundantly.

Emergency Medical Services

- Consider targeted training for responding to specific high collision roadway segments and immediate treatment of predominant injuries at those locations.

Emerging Technologies

- Develop new methods to integrate multi source transportation data for developing different measurements of traffic safety for road users and identify safety issues associated with emerging electrical and automated vehicles.

7.3 Traffic Safety For Broadside Collisions Due to Right-of-Way and Traffic Signals & Signs

Education

- Conduct public information and education campaigns for safety laws regarding the undesired risks of drinking and driving and as well as maintaining a safe speed.
- Raise awareness of the necessity of not drinking while driving and maintaining a safe speed to avoid many undesired tragic events such as rear end collisions.

Engineering

- Identify locations where overturned collisions due to unsafe speed, improper turning, and unsafe lane changes are occurring within the City every two to three years.

- Consider information obtained from public input and feedback regarding unreported collisions to supplement Collision data.
- Develop and implement countermeasures to tackle overturned collisions due to unsafe speed.
- Assess and report collision patterns before and after implementation of countermeasures and adjust as necessary.

Enforcement

- Prioritize patrol patterns at DUI and high-speed locations to monitor traffic law violations which include DUI not maintaining a safe speed while operating a vehicle.
- When laws are enforced and awareness of abiding by traffic safety laws and signs is raised, overturned collisions due to unsafe speeds will reduce.

Emergency Medical Services

- Consider targeted training for responding to high-speed locations and immediate treatment of predominant injuries at those locations.

Emerging Technologies

- Develop new methods to integrate multi source transportation data for developing different measurements of traffic safety for road users and identify safety issues associated with emerging electrical and automated vehicles.

7.4 Traffic Safety For Rear End Collisions Due to Unsafe Speeds

Education

- Conduct public information and education campaigns for safety laws regarding a proper turning.
- Raise awareness of the necessity of abiding by the traffic safety laws to avoid broadside collisions that occur mostly due to improper turning by not giving an automobile the right of way.

Engineering

- Identify locations where object collisions due to improper turning are occurring within the city every two to three years.
- Consider information obtained from public input and feedback regarding unreported collisions to supplement Collision data.
- Develop and implement countermeasures to tackle hit object collisions due to improper turning.
- Assess and report collision patterns before and after implementation of countermeasures and adjust as necessary.

- Maintain roadway signing and striping.

Enforcement

- Prioritize patrol patterns at high collision intersections where hit object collisions due to improper turning are occurring mostly to monitor traffic law violations which include the failure of stopping and waiting for a safe gap to approach the road.
- When laws are enforced and awareness of abiding by traffic safety laws and signs is raised, broadside collisions due to improper turning will reduce abundantly.

Emergency Medical Services

- Consider targeted training for responding to high collision intersections where hit object collisions due to improper turning are occurring mostly and immediate treatment of predominant injuries at those locations.

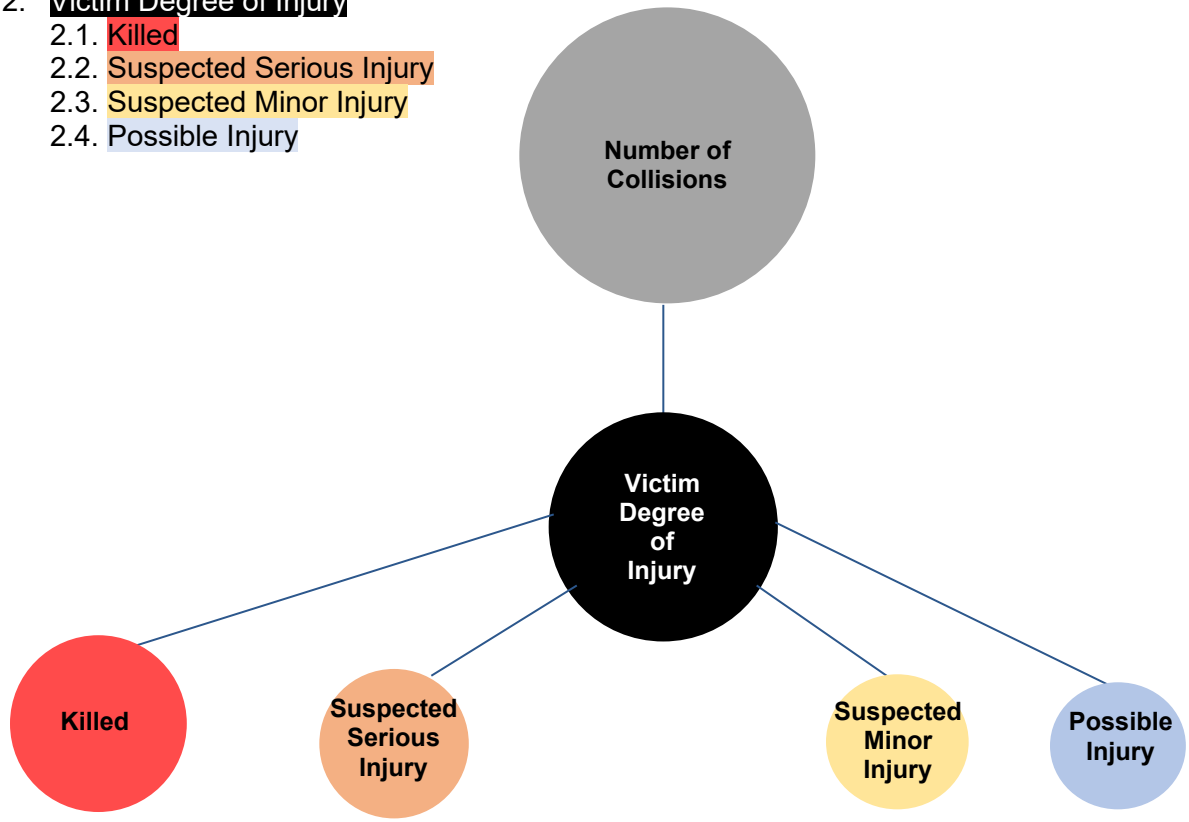
Emerging Technologies

- Develop new methods to integrate multi source transportation data for developing different measurements of traffic safety for road users and identify safety issues associated with emerging electrical and automated vehicles.

7.5 Focus Locations Identification, Pattern Analysis, and Recommended Improvements

As part of the quantitative analysis, focus high collision intersections and roadway segments/corridors were identified and prioritized using the Collision Frequency methodology. For each of the identified focus locations (intersections and roadway segments/corridors), prominent locations in the city were identified and ranked based on the following criteria:

1. Number of Collisions
2. Victim Degree of Injury
   2.1. Killed
   2.2. Suspected Serious Injury
   2.3. Suspected Minor Injury
   2.4. Possible Injury



Upon identifying and ranking prominent intersections and roadway segments, collisions were analyzed by identifying the Primary Collision Factor (PCF) that led to the occurrence of each collision and the pattern. Upon completion of the analysis, recommendations were developed as safety mitigation measures to potentially mitigate similar collisions in the future. Countermeasures have been proposed in compliance with the California Manual on Uniform Traffic Control Devices. It is important to utilize Collision Modification Factor (CMF) when identifying potential systemic safety improvements. The CMF method is found in Part D of the American Association of State Highway and Transportation Officials (AASHTO) Highway Safety Manual (HSM). CMFs are defined as the ratio of effectiveness of expected Collisions with treatment in comparison to expected Collisions without treatment. Furthermore, A CMF is a multiplicative factor used to determine the expected number of Collisions after implementing the proposed countermeasures to ensure efficiency of utilizing and implementing the proposed countermeasures. Countermeasures with CMFs less than one are expected to reduce Collisions. On the other hand, countermeasures with CMFs greater than one are expected to increase Collisions. CMFs are calculated as follows:

$$CMF = \frac{\text{Expected Crashes WITH Treatment}}{\text{Expected Crashes WITHOUT Treatment}}$$

CMF < 1.0	Expected to reduce crashes
CMF = 1.0	Expected to have no impact on safety
CMF > 1.0	Expected to increase crashes

A Collision Reduction Factor (CRF) is similar and related to a CMF but stated in different terms. A CRF is defined as a percentage of Collision reduction that might be expected after the implementation of a given countermeasure at a specific site. CRFs are calculated as follows:

$$CRF = (1 - CMF) \times 100$$

Appropriate CMFs shall be used with caution. CMFs should be selected from the HSM Part D, the LRSM, or from the FHWA CMF Clearinghouse website (http://www.cmfclearinghouse.org).

Table 7-1 City of Seal Beach Engineering Countermeasures (CM) Toolbox

LRSM No. [1]	Countermeasure (CM) Name	Collision Type			CMF [2]	CRF [3]	HSIP Funding Eligibility
		All	Night	Ped and Bike			
NS01INT	Add intersection lighting (NS.I.)		X		0.60	40%	90%
NS08	Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs	X			0.85	15%	90%
NS09	Upgrade intersection pavement markings (NS.I.)	X			0.75	25%	90%
NS23PB	Install/upgrade pedestrian crossing at uncontrolled locations (with enhanced safety features)			X	0.65	35%	90%
NS24PB	Install Rectangular Rapid Flashing Beacon (RRFB)			X	0.65	35%	90%
R02	Remove or relocate fixed objects outside of Recovery Zone	X			0.65	35%	90%
R08	Install Raised Median	X			0.75	25%	90%
R22	Install/upgrade signs with new fluorescent sheeting (regulatory or warning)	X			0.85	15%	90%
R25	Install curve advance warning signs (flashing beacon)	X			0.7	30%	90%
R26	Install dynamic/variable speed warning signs	X			0.7	30%	90%
R27	Install delineators, reflectors and/or object markers	X			0.85	15%	90%
R36PB	Install/upgrade pedestrian crossing (with enhanced safety features)			X	0.65	35%	90%

R38PB	Install Rectangular Rapid Flashing Beacon (RRFB)			X	0.65	35%	90%
SI02	Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number	X			0.85	15%	90%
SI03	Improve signal timing (coordination, phases, red, yellow, or operation)	X			0.85	15%	50%
SI04EV*	Install emergency vehicle pre-emption systems				0.30	70%	90%
SI07	Convert signal to mast arm (from pedestal-mounted)	X			0.70	30%	90&
SI08	Install raised pavement markers and striping (Through Intersection)	X			0.90	10%	90%
SI11	Install Raised Median on Approach+	X			0.75	25%	90%
SI22PB	Modify signal phasing to implement a Leading Pedestrian Interval (LPI)			X	0.40	60%	90%

[1] Local Roadway Safety Manual Countermeasure Identification Number

- NS: Non-Signalized Intersection
- R: Roadway Segment
- SI: Signalized Intersection

[2] Crash Modification Factor
[3] Crash Reduction Factor
*SI04EV falls under the emergency vehicle collision type

7.6 Focus Intersections

High collision intersections are critical locations that require the most analytical focus since it is anticipated that many more collisions will occur based on its history of high crash concentration. Table 7-2 displays the fifteen (15) most prominent intersections in the City of Seal Beach.

Table 7-2: List of Focus High Collision Intersections and Rankings*

Ranking[1]	Location	Control	Within Underserved Community[2]	Total Entering Vehicles	Crash Rate[3]	Collisions[4]			Crash Cost[5]
						Total	Fatal	Fatal & Serious Injury	
1	Seal Beach Blvd & Westminster Ave	Signalized	No	71,530	0.69	90	1	16	$ 41,668,000
2	Seal Beach Blvd & N Gate Rd/Caltrans I-405 SB On- & Off-Ramps	Signalized	Yes	43,320	0.39	31	0	1	$ 4,865,000
3	Seal Beach Blvd & Old Ranch Pkwy/Caltrans I-405 NB On- & Off-Ramps	Signalized	No	46,950	0.36	31	0	2	$ 7,193,000
4	Seal Beach Blvd & Towne Center Dr	Signalized	No	32,320	0.41	24	0	0	$ 2,660,000
5	Seal Beach Blvd & Lampson Ave	Signalized	No	48,150	0.24	21	0	0	$ 1,722,000
6	Seal Beach Blvd & St Cloud Dr	Signalized	No	52,340	0.19	18	0	0	$ 1,816,000
7	Seal Beach Blvd & Golden Rain Rd	Signalized	No	39,000	0.21	15	0	1	$ 2,948,000
8	Seal Beach Blvd & Adolfo Lopez	Signalized	No	21,900	0.13	5	0	0	$ 633,000
9	Marina Dr & 5th St	All-Way Stop	No	21,500	0.10	4	0	1	$ 3,853,000
10	Central Ave & 8th St	Two-Way Stop	No	4,900	0.45	4	0	0	$ 523,000
11	Seal Beach Blvd & St Andrews Dr	Signalized	Yes	3,720	2.65	18	0	1	$ 4,245,000
12	Main St & Ocean Ave	Signalized	No	8,800	0.68	11	0	0	$ 925,000
13	Westminster Ave & Kitts Hwy	Signalized	No	20,450	0.27	10	0	3	$ 6,879,000
14	Marina Dr & 1st St	All-Way Stop	No	7,880	0.63	9	0	2	$ 7,641,000
15	Golden Rain Rd & St Andrews Dr	Signalized	Yes	4,500	1.10	9	0	0	$ 963,000

[1] Intersection Ranking is based on the number of contiguous collisions within each intersection.
[2] Based on the U.S. DOT Transportation Insecurity Tool.
[3] Crash rate per million vehicle miles traveled.
[4] Total Number of Collisions during the 5-year period between January 1, 2019 and December 31, 2023 from SWITRS/TIMS & SBPD data.
[5] Based on the Caltrans Local Roadway Safety Manual 2024.

Legend: Leisure World | Naval Weapons Base | Caltrans

*Total Number of Collisions correspond to the total number of fatal, fatal & serious injury, minor injury, and PDOs as seen in Table 7-3.

Table 7-3: Intersection Number of Collisions and Ranking in the City of Seal Beach

Intersection Ranking Number*	Intersection	Number of Collisions**	Collision Severity				
			Killed	Severe Injury	Visible Injury	Complaint of Pain	No Injury
1	Seal Beach Blvd & Westminster Ave	90	1	15	16	32	26
2	Seal Beach Blvd & N Gate Rd	31	0	1	5	14	11
3	Seal Beach Blvd & Old Ranch Pkwy	31	0	2	5	16	8
4	Seal Beach Blvd & Towne Center Dr	24	0	0	8	9	7
5	Seal Beach Blvd & Lampson Ave	21	0	0	4	7	10
6	Seal Beach Blvd & Saint Cloud Dr	18	0	0	8	1	9
7	Seal Beach Blvd & Golden Rain Rd	15	0	1	2	2	10
8	Seal Beach Blvd & Adolfo Lopez Dr	5	0	0	1	4	0
9	Marina Dr & 5th Street	4	0	1	1	2	0
10	Central Ave & 8th Street	4	0	0	1	3	0
11	Seal Beach Blvd & Saint Andrews Dr	18	0	1	7	6	4
12	Main Street & Ocean Ave	11	0	0	1	6	4
13	Westminster Ave & Kitts Hwy	10	0	3	1	1	5
14	Marina Dr & 1st Street	9	0	2	1	5	1
15	Golden Rain Rd & Saint Andrews Dr	9	0	0	3	3	3

* Intersection Ranking Number is based on the number of contiguous collisions within each intersection.
** Total Number of Collisions during the 5-year period between January 1, 2019 and December 31, 2023.

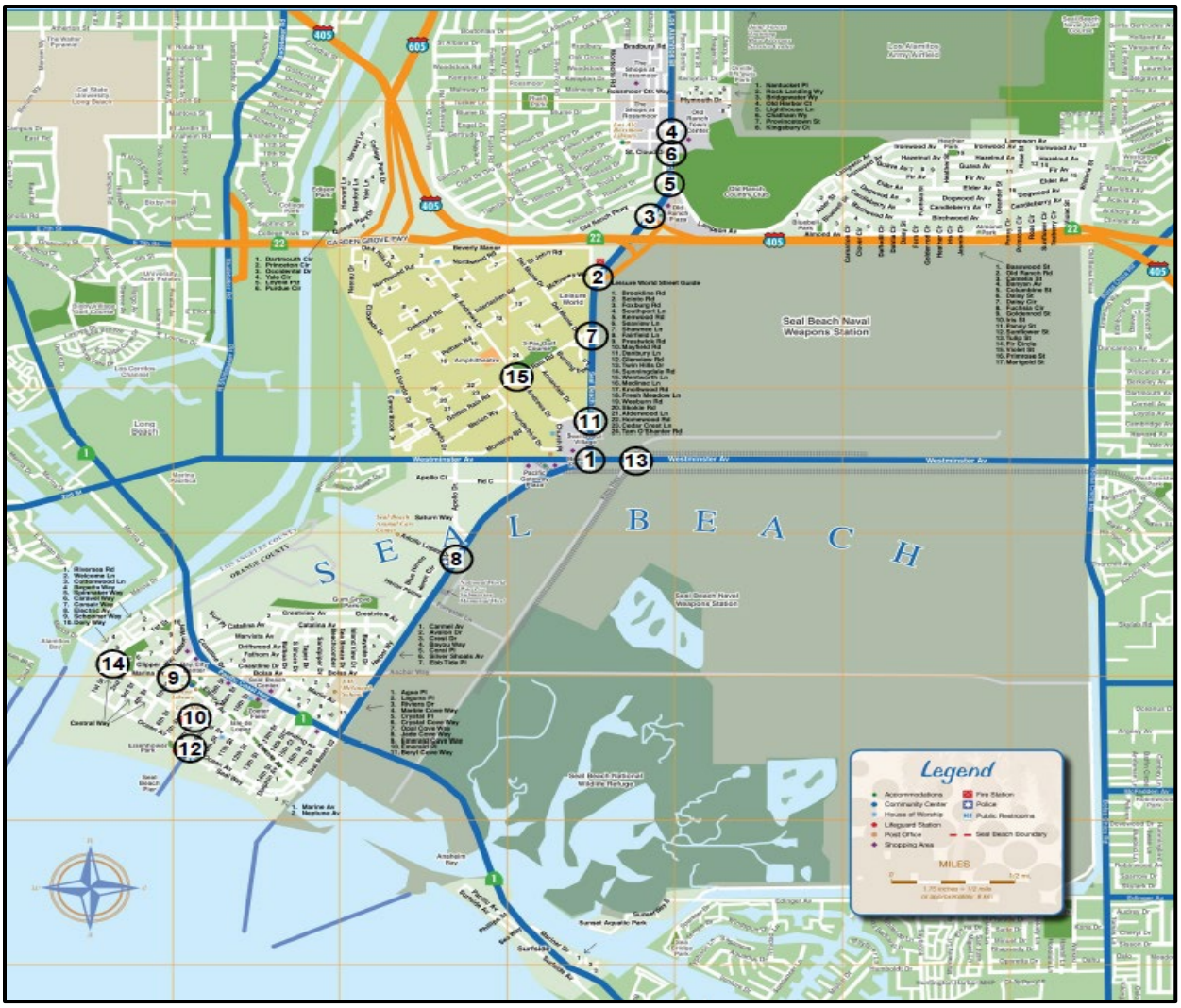


Figure 7-1: City of Seal Beach Top 15 Intersections Location Map

7.6.1 Intersection 1: Seal Beach Blvd & Westminster Ave

Table 7-4: Intersection 1 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
27	Unsafe Speeds
20	Unsafe Turning
10	DUI
10	Red Light
8	Failure to Yield
5	Other Improper Driving
5	N/A
3	Hit and Run
2	Failure to Stop
Total 90	

Pattern: Motorists are not maintaining safe speeds and are turning improperly from the long road segment in all directions.

High Collision Recommendations:

1. Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.
2. Upgrade To APS Pedestrian Pushbutton, Install R10-3 Updated Crosswalk Sign.
3. Improve Signal Timing (Coordination, Phases, Red, Yellow, Or Operation).
4. Restriping Intersection Traffic Striping with Thermoplastic Polyurethane.
5. Install R73-5 Sign.
6. Install R73-2 Sign.
7. Install Leading Pedestrian Interval (LPI) System.
8. Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.
9. Restriping Intersection Traffic Striping with Paint.
10. Install Advance Warning Beacon with W3-3 Sign At 365 Feet South of Stop Bar on Northbound Seal Beach Blvd's East Shoulder.
11. Install Bicycle Video Detection System (VDS) on Mast Arm.
12. Reconstruct Existing Raised Median (500 LF) South of Westminster Ave on Seal Beach Blvd Between Northbound and Southbound Lanes Per APWA Std.
13. Reconstruct Existing Raised Median (210 LF) South of Westminster Ave on Seal Beach Blvd Between Northbound Left Turn Lane and Through Lanes Per APWA Std.
14. Replace Existing W1-8 Chevron Signs with Flashing LED Chevron Solar Traffic Signs.
15. Install Advanced Dilemma Zone Detection System.
16. Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with Cyclegrip MMAX Green Paint.
17. Install emergency vehicle pre-emption (EVP).
18. Relocate existing OCTA bus stop at NEC on NB Seal Beach Blvd to 220' north of ECR.
19. Install signs W11-2 and W16-7P with rectangular rapid flashing beacon (RRFB) and APS

pedestrian pushbutton.

20. Install sign R10-15.
21. Upgrade signal head lenses to programmable visibility (PV) LED lenses.

7.6.2 Intersection 2: Seal Beach Blvd & N Gate Rd

Table 7-5: Intersection 2 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
14	Unsafe Speeds
8	Unsafe Turning
3	Red Light
2	DUI
2	Maintain Lane
1	Other
1	N/A
Total 31	

Pattern: Motorists are not maintaining safe speeds and are turning improperly into oncoming traffic.

High Collision Recommendations:

1. Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.
2. Upgrade to APS Pedestrian Pushbutton, Install R10-3 Updated Crosswalk Sign.
3. Improve signal Timing (Coordination, Phases, Red, Yellow, with Dynamic Dilemma Zone Protection).
4. Restriping Intersection Traffic Striping with Thermoplastic Polyurethane.
5. Upgrade The Existing Traffic Signal Heads to 12" LED Lenses.
6. Reinstall R9-3 Sign.
7. Uninstall Existing Sign D and Replace with R9-3A.
8. Install R73-2 Sign.
9. Install Internally Illuminated Street Name Sign (IISNS).
10. Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.
11. Install R61-1 (CA) Sign.
12. Install Bicycle Video Detection System (VDS) on Mast Arm.
13. Install Leading Pedestrian Interval (LPI) System.
14. Restriping Intersection Traffic Striping with Paint.
15. Install Signs R81 (CA) and R81A (CA).
16. Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with CycleGrip MMAX Green Paint.
17. Install Emergency Vehicle Pre-Emption (EVP).

18. Install Advanced Dilemma Zone Detection System

7.6.3 Intersection 3: Seal Beach Blvd & Old Ranch Pkwy

Table 7-6: Intersection 3 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
12	Unsafe Speeds
6	Red Light
4	Unsafe Turning
3	Other
3	N/A
2	Unsafe Lane Change
1	DUI
Total 31	

High Collision Recommendations:

1. Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.
2. Upgrade to APS Pedestrian Pushbutton, Install R10-3 Updated Crosswalk Sign.
3. Improve Signal Timing (Coordination, Phases, Red, Yellow, With Dynamic Dilemma Zone Protection).
4. Restriping Intersection Traffic Striping with Thermoplastic Polyurethane.
5. Install Bicycle Video Detection System (VDS) on Mast Arm.
6. Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.
7. Install Leading Pedestrian Interval (LPI) System.
8. Restriping Intersection Traffic Striping with Paint.
9. Trim Bushes for Sight Distance.
10. Reinstall Signs R4-7 And N-1 (CA).
11. Install Sign A.
12. Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with CycleGrip MMaX Green Paint.
13. Install Emergency Vehicle Pre-Emption (EVP).
14. Install Advanced Dilemma Zone Detection System.

7.6.4 Intersection 4: Seal Beach Blvd & Towne Center Dr

Table 7-7: Intersection 4 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
10	Unsafe Speed
10	Red Light
2	Unsafe Turning
1	Unsafe Backing
1	Cell Phone Use
Total 24	

Pattern: Motorists are travelling at unsafe speeds and drivers entering oncoming traffic are running red lights.

High Collision Recommendations:

1. Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.
2. Upgrade To APS Pedestrian Pushbutton, Install R10-3 Updated Crosswalk Sign.
3. Improve Signal Timing (Coordination, Phases, Red, Yellow, or Operation).
4. Restriping Intersection Traffic Striping with Thermoplastic Polyurethane.
5. Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.
6. Install Leading Pedestrian Interval (LPI) System.
7. Install R3-5 Sign.
8. Restriping Intersection Traffic Striping With Paint.
9. Install R3-4 Sign.
10. Install Emergency Vehicle Pre-Emption (EVP).
11. Install Advanced Dilemma Zone Detection System.
12. Install R44 (CA) Sign.

7.6.5 Intersection 5: Seal Beach Blvd & Lampson Ave

Table 7-8: Intersection 5 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
9	Unsafe Speed
8	Red Light
2	Unsafe Turning
1	Unsafe Backing
1	Cell Phone Use
Total 21	

Pattern: Motorists are travelling at unsafe speeds and drivers entering oncoming traffic are running red lights.

High Collision Recommendations:

1. Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.
2. Upgrade To APS Pedestrian Pushbutton, Install R10-3 Updated Crosswalk Sign.
3. Improve Signal Timing (Coordination, Phases, Red, Yellow, With Dynamic Dilemma Zone Protection).
4. Restriping Intersection Traffic Striping with Thermoplastic Polyurethane.
5. Install R3-7 Sign.
6. Install Bicycle Video Detection System (VDS) on Mast Arm.
7. Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.
8. Restriping Intersection Traffic Striping with Paint.
9. Install Leading Pedestrian Interval (LPI) System.
10. Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with Cyclegrip MMAX Green Paint.
11. Install Emergency Vehicle Pre-Emption (EVP).
12. Install Advanced Dilemma Zone Detection System.
13. Upgrade Signal Head Lenses to Programmable Visibility (PV) Lenses.
14. Remove Existing Signs A and W11-1. Replace with R44 (CA).

7.6.6 Intersection 6: Seal Beach Blvd & Saint Cloud Dr

Table 7-9: Intersection 6 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
4	Red Light
4	Unsafe Speed
3	Unsafe Turning
3	N/A
1	Maintain Lane
1	Unsafe Backing
1	Other
1	Failure to Yield
Total 18	

Pattern: Motorists are not maintaining safe speeds and tend to run red lights.

High Collision Recommendations:

1. Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.
2. Upgrade to APS Pedestrian Pushbutton, Install R10-3 Updated

Crosswalk Sign.

3. Improve Signal Timing (Coordination, Phases, Red, Yellow, or Operation).
4. Restriping Intersection Traffic Striping with Thermoplastic Polyurethane.
5. Install Leading Pedestrian Interval (LPI) System.
6. Install R73-2 Sign.
7. Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.
8. Modify Existing Access Ramp Per APWA Std 111-5 with Truncated Domes.
9. Restriping Traffic Striping with Paint.
10. Install Advanced Dilemma Zone Detection System.
11. Install Emergency Vehicle Pre-Emption (EVP).
12. Install R10-15 Sign.
13. Remove Signs A and W11-1. Replace with R44 (CA) Sign.

7.6.7 Intersection 7: Seal Beach Blvd & Golden Rain Rd

Table 7-10: Intersection 7 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions		Primary Collision Factor
6		Unsafe Speeds
5		Unsafe Turning
2		DUI
1		Emergency Vehicle
1		Disobeying Signage
Total	15	

Pattern: Motorists are travelling at unsafe speeds at the intersection and performing unsafe turning maneuvers.

High Collision Recommendations:

1. Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.
2. Upgrade to APS Pedestrian Pushbutton, Install R10-3 Updated Crosswalk Sign.
3. Improve Signal Timing (Coordination, Phases, Red, Yellow, with Dynamic Dilemma Zone Protection).
4. Restriping Intersection Traffic Striping with Thermoplastic Polyurethane.
5. Install Vehicle Speed Feedback Sign.
6. Install R5-1 Sign.
7. Install Bicycle Video Detection System (VDS) On Mast Arm.

8. Reinstall Thermoplastic Polyurethane Pedestrian Zebra Crosswalk.
9. Install Leading Pedestrian Interval (LPI) System.
10. Upgrade to Programmable Traffic Signal Head Indication for Northbound Direction.
11. Upgrade Signal Head Lenses to LED.
12. Upgrade Signal Head Lenses to Programmable Visibility (PV) LED Lenses.
13. Install R3-7 Sign.
14. Restriping Traffic Striping with Paint.
15. Install Advanced Dilemma Zone Detection System.
16. Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with Cyclegrip MMAX Green Paint.12.
17. Install Emergency Vehicle Pre-Emption (EVP).

7.6.8 Intersection 8: Seal Beach Blvd & Adolfo Lopez Dr

Table 7-11: Intersection 8 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
1	DUI
1	Failure to Stop
1	Unsafe Speed
1	Slow Speed
1	Red Light
Total 5	

High Collision Recommendations:

1. Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.
2. Upgrade to APS Pedestrian Pushbutton, Install R10-3 Updated Crosswalk Sign.
3. Improve Signal Timing (Coordination, Phases, Red, Yellow, or Operation).
4. Restriping Intersection Traffic Striping with Thermoplastic Polyurethane
5. Install Bicycle Video Detection System (VDS) on Mast Arm.
6. Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.
7. Install Leading Pedestrian Interval (LPI) System.
8. Install R61-19 (CA) Sign.
9. Install Cat Tracks with Paint.
10. Install Advanced Dilemma Zone Detection System.
11. Modify Existing Access Ramp Per APWA Std 111-5 with Truncated Domes.

12. Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with Cyclegrip MMAX Green Paint.
13. Install Emergency Vehicle Pre-Emption (EVP).

7.6.9 Intersection 9: Marina Dr & 5th Street

Table 7-12: Intersection 9 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
1	Hit and Run
1	Stop Sign
1	Unsafe Turning
1	Wrong Side of the Road
Total 4	

High Collision Recommendations:

1. Upgrade Existing Flashing Beacon Head Backplates to Yellow Retroreflective Backplates.
2. Restriping Intersection Traffic Striping with Thermoplastic Polyurethane.
3. Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.
4. Restriping Intersection Traffic Striping with Paint.
5. Install Sign R1-3P.
6. Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with Cyclegrip MMAX Green Paint.

7.6.10 Intersection 10: Central Ave & 8th Street

Table 7-13: Intersection 10 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
2	Failure to Yield
1	Stop Sign
1	Unsafe Speed
Total 4	

Pattern: Motorists are not yielding to cross traffic properly and driving at unsafe speeds.

High Collision Recommendations:

1. Install LED Flashing Stop Sign.
2. Install W4-4P Sign.
3. Trim Trees for Sign Visibility.
4. Restriping Intersection Legends with Thermoplastic Polyurethane.
5. Restriping Intersection Traffic Striping with Paint.

6. Reinstall Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.
7. Install Rectangular Rapid Flashing Beacon (RRFB) With APS Pedestrian Pushbutton on Existing W11-2, W16-7P Signpost.

7.6.11 Intersection 11: Seal Beach Blvd & Saint Andrews Dr

Table 7-14: Intersection 11 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
4	Unsafe Speed
4	Red Light
4	Other Improper Driving
3	Unsafe Turning
2	DUI
1	N/A
Total 18	

Pattern: Motorists are not driving at unsafe speeds and running red lights.

High Collision Recommendations:

1. Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.
2. Upgrade to APS Pedestrian Pushbutton, Install R10-3 Updated Crosswalk Sign.
3. Improve Signal Timing (Coordination, Phases, Red, Yellow, or Operation).
4. Restriping Intersection Traffic Striping with Thermoplastic Polyurethane.
5. Reinstall R3-4 Sign.
6. Install R61-19 Sign.
7. Upgrade Signal Head Lenses to LED.
8. Add Truncated Domes to Existing Access Ramp.
9. Install Bicycle Video Detection System (VDS) on Mast Arm.
10. Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.
11. Install Cat Tracks with Paint.
12. Install R3-18 Sign.
13. Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with Cyclegrip MMAX Green Paint.
14. Install Emergency Vehicle Pre-Emption (EVP).
15. Install Advanced Dilemma Zone Detection System.
16. Upgrade Signal Heads to Programmable Visibility (PV) LED Lenses.

7.6.12 Intersection 12: Main Street & Ocean Ave

Table 7-15: Intersection 12 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
3	Unsafe Speed
3	Unsafe Turning
2	Unsafe Backing
2	N/A
1	DUI
Total 11	

Pattern: Motorists are not yielding to cross traffic properly and driving at unsafe speeds.

High Collision Recommendations:

1. Upgrade the Existing Traffic Signal Heads to 12” Lenses.
2. Install R10-3 Sign.
3. Upgrade to APS Pedestrian Pushbutton.
4. Replace Existing Signal Pole with Type 15TS (Traffic Signal & Lighting).
5. Replace Existing Traffic Signal Controller and Cabinet with a new 170E Controller inside a new 332 Cabinet with Foundation.
6. Install Thermoplastic Polyurethane Striping Edges on the existing crosswalk.
7. Install Curb Ramps Per APWA Section 111-5 with Truncated Domes.
8. Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.
9. Restriping Intersection Traffic Striping with Thermoplastic Polyurethane.
10. Restriping Intersection Traffic Striping with Paint.
11. Install Leading Pedestrian Interval (LPI) System.
12. Install New Signal Timing (Phases, Red, Yellow, Or Operation).
13. Install Emergency Vehicle Pre-Emption (EVP).
14. Install Automatic Retractable Hydraulic Bollard Stainless Steel Roadway Traffic Bollard on All Four Legs of the Intersection For Special Events.

7.6.13 Intersection 13: Westminster Ave & Kitts Highway

Table 7-16: Intersection 13 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
3	DUI
2	Unsafe Speed
2	N/A
1	Unsafe Turning
1	Hit and Run
1	Failure to Stop
Total 10	

High Collision Recommendations:

1. Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.
2. Restriping Intersection Traffic Striping with Thermoplastic Polyurethane.
3. Install R9-3 And R9-3bP Signs.
4. Install Bicycle Video Detection System (VDS) on Mast Arm.
5. Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.
6. Restriping Intersection Traffic Striping with Paint.
7. Improve Signal Timing (Phases, Red, Yellow, Or Operation) Traffic Signal Pre-Emption Per Consultation with The U.S. Naval Weapons Base Operations Unit.
8. Install Leading Pedestrian Interval (LPI) System.
9. Upgrade To APS Pedestrian Pushbutton, Install R10-3 Updated Crosswalk Sign.
10. Install Emergency Vehicle Pre-Emption (EVP).
11. Install R3-8B Sign.
12. Install R61-5 (CA) Sign.
13. Restriping "U.S. Government Property" Legend with Thermoplastic Polyurethane.
14. Install Advanced Dilemma Zone Detection System.
15. Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with Cyclegrip MMAX Green Paint.
16. Replace Existing Advance Warning Flashing Beacons at ~2000’ East of Kitts HWY on WB Westminster Ave’s North Shoulder.

7.6.14 Intersection 14: Marina Dr & 1st Street

Table 7-17: Intersection 14 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions		Primary Collision Factor
3		Stop Sign
2		Unsafe Speed
1		Unsafe Backing
1		Failure to Stop
1		Unsafe Turning
1		N/A
Total	9	

Pattern: Motorists are not properly stopping and driving at unsafe speeds.

High Collision Recommendations:

1. Install LED Flashing Stop Sign.
2. Install R3-1 Sign.
3. Install R1-3P Sign.

4. Modify Existing Access Ramp Per APWA Std 111-5 with Truncated Domes.
5. Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.
6. Restriping Intersection Traffic Striping with Thermoplastic Polyurethane.
7. Restriping Intersection Traffic Striping with Paint.
8. Install Bike Legend as shown on plans.
9. Install “Greenback Bike Lane” enhanced CL2 Bikeway Pavement Legend Background with CycleGrip MMAX Green Paint.
10. Install Signs W16-1P and W11-1.

7.6.15 Intersection 15: Golden Rain Rd & St Andrews Dr

Table 7-18: Intersection 15 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
3	Unsafe Speed
2	Failure to Yield
2	Red Light
2	Unsafe Turning
Total 9	

High Collision Recommendations:

1. Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.
2. Improve Signal Timing (Phases, Red, Yellow, Or Operation).
3. Restriping Intersection Traffic Striping with Thermoplastic Polyurethane.
4. Install Thermoplastic Polyurethane Pedestrian Zebra Crosswalk.
5. Modify Existing Access Ramp Per APWA Std 111-5 with Truncated Domes.
6. Install Leading Pedestrian Interval (LPI) System.
7. Install Thermoplastic Polyurethane Turn Arrow Legends.
8. Install Emergency Vehicle Pre-Emption (EVP).

7.7 Focus Street Segments/Corridors

High collision street segments/corridors are critical segments that require analytical focus since it is anticipated that collisions will occur within a high collision street segment based on its crash history. Table 7-19 displays the ten (10) most prominent street segments in the City of Seal Beach.

Table 7-19: List of Focus High Collision Street Segments and Rankings*

Ranking[1]	Location	Classification	Within Underserved Community[2]	Length (Miles)	Average Daily Traffic	Crash Rate[3]	Crashes[4]			Crash Cost[5]
							Total	Fatal	Fatal & Serious Injury	
1	Seal Beach Blvd between St Andrews Dr and Westminster Ave	Major Arterial	No	0.18	34,500	308.83	35	1	4	$ 13,247,800
2	Seal Beach Blvd between Westminster Ave and Apollo Dr	Major Arterial	No	0.65	29,100	49.25	17	0	1	$ 4,343,000
3	Seal Beach Blvd between Old Ranch Pkwy and North Gate Rd/ Caltrans I-405 SB On- & Off-Ramps	Major Arterial	No	0.35	45,900	61.39	18	0	0	$ 1,410,000
4	Seal Beach Blvd between North Gate Rd/Caltrans I-405 SB On- & Off-Ramps and Golden Rain Rd	Major Arterial	Yes	0.3	4,230	561.33	13	0	0	$ 1,053,000
5	Seal Beach Blvd between Golden Rain Rd and St Andrews Dr	Urban Arterial	Yes	0.37	36,100	49.23	12	0	1	$ 4,244,000
6	Seal Beach Blvd between St Cloud Dr and Old Ranch Pkwy	Major Arterial	No	0.32	49,500	38.05	11	0	1	$ 4,042,000
7	Marina Dr between 1st St and 5th St	Major Collector	No	0.26	5,900	321.48	9	0	0	$ 788,000
8	Main St between 1 Pacific Coast Highway and Electric Ave	Major Collector	No	0.14	6,100	577.46	9	0	0	$ 521,000
9	Seal Beach Blvd between Bradbury Rd and Rossmoor Center Way	Major Arterial	No	0.17	36,000	71.63	8	0	0	$ 871,000
10	Seal Beach Blvd between Rossmoor Center Way and St Cloud Dr	Major Arterial	No	0.11	36,000	83.02	6	0	0	$ 384,000

[1] Segment Ranking is based on the number of contiguous collisions within each intersection.
[2] Based on the U.S. DOT Transportation Insecurity Tool.
[3] Crash rate per 100 million vehicle miles traveled.
[4] Total Number of Collisions during the 5-year period between January 1, 2019 and December 31, 2023 from SWITRS/TIMS & SBPD data.
[5] Based on the Caltrans Local Roadway Safety Manual 2024.

Legend: Leisure World | 1 Pacific Coast Highway | Caltrans

*Total Number of Collisions correspond to the total number of fatal, fatal & serious injury, minor injury, and PDOs as seen in Table 7-20.

Table 7-20: Segment Number of Collisions and Ranking in the City of Seal Beach

Intersection Ranking Number*	Intersection	Number of Collisions**	Collision Severity				
			Killed	Severe Injury	Visible Injury	Complaint of Pain	No Injury
1	Seal Beach Blvd btw St Andrews Dr & Westminster Ave	35	1	3	12	13	6
2	Seal Beach Blvd btw Westminster Ave and Apollo Dr	17	0	1	3	6	7
3	Seal Beach Blvd btw Old Ranch Pkwy & North Gate Rd	18	0	0	2	8	8
4	Seal Beach Blvd btw N Gate Rd & Golden Rain Rd	13	0	0	1	7	5
5	Seal Beach Blvd btw Golden Rain Rd & St Andrews Dr	12	0	1	4	4	3
6	Seal Beach Blvd btw Saint Cloud Dr & Old Ranch Pkwy	11	0	1	4	2	4
7	Marina Dr btw 1st St & 5th St	9	0	0	2	3	4
8	Main St btw PCH & Electric Ave	9	0	0	1	2	6
9	Seal Beach Blvd btw Bradbury Rd & Rossmoor Center Way	8	0	0	1	6	1
10	Seal Beach Blvd btw Rossmoor Center Way and Saint Cloud Dr	6	0	0	0	3	3

* Street Segment Ranking Number is based on the number of collisions that occurred on a street segment.
** Total Number of Collisions during the 5-year period between January 1, 2019 and December 31, 2023.

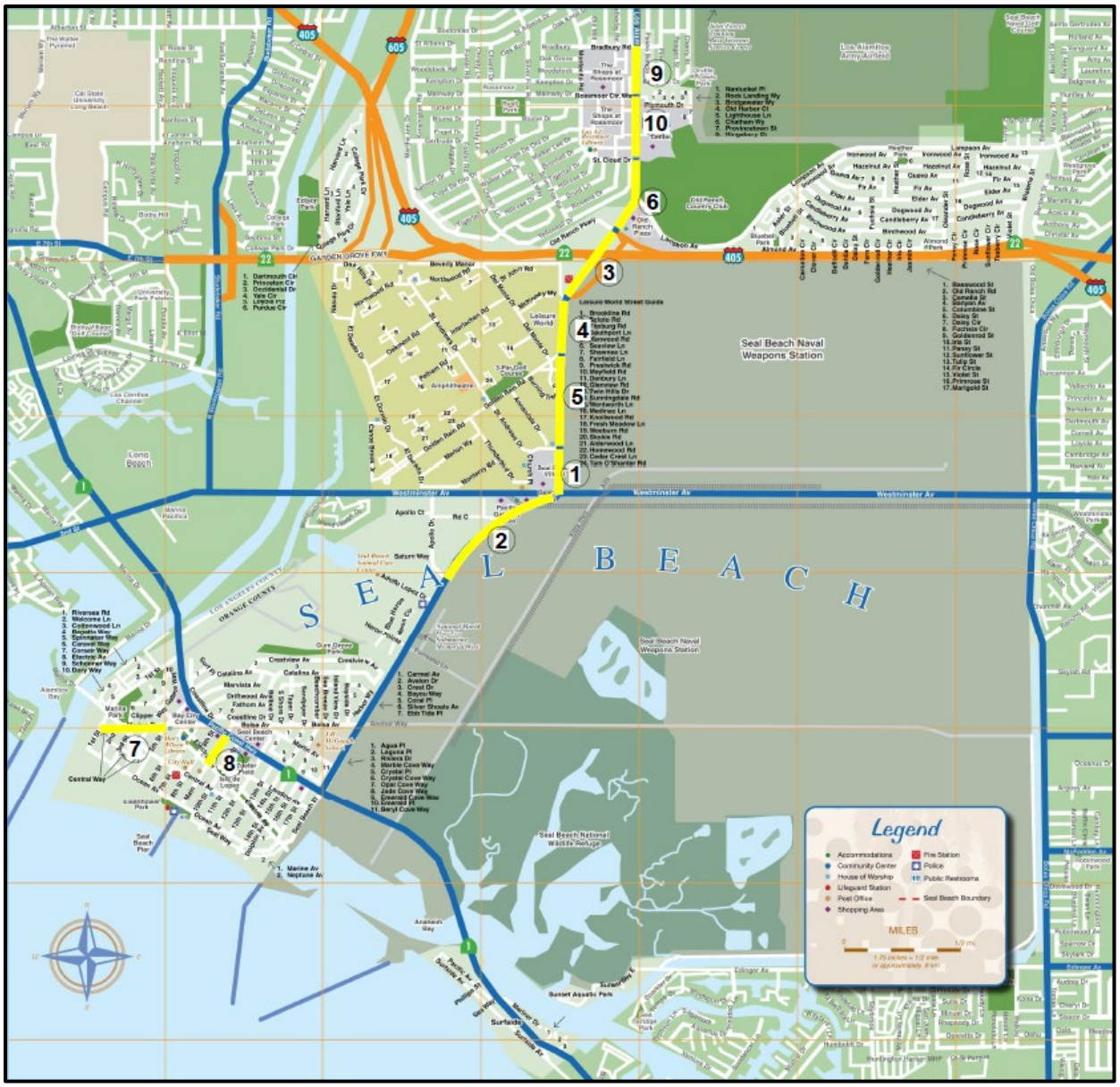


Figure 7-2: City of Seal Beach Top 10 Street Segments Location Map

7.7.1 Street Segment 1: Seal Beach Blvd between St Andrews Dr and Westminster Ave

Table 7-21: Segment 1 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
15	Unsafe Turning
11	Unsafe Speed
4	Hit and Run
3	N/A
2	Crossing Double Yellow
Total 35	

Pattern: Motorists are not maintaining safe speeds and are turning improperly from the long road segment in all directions.

High Collision Recommendations:

1. Restriping Traffic Striping with Thermoplastic Polyurethane.
2. Restriping Traffic Striping with Paint.
3. Install Dynamic Speed Warning Sign with Existing R2-1 (50) Sign.
4. Install R81 (CA) Sign.
5. Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with Cyclegrip MMAX Green Paint.
6. Relocate Existing OCTA Bus Stop at NB NEC of Seal Beach Blvd and Westminster Ave to 220' North of ECR.

7.7.2 Street Segment 2: Seal Beach Blvd between Westminster Ave and Apollo Dr

Table 7-22: Segment 2 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
5	Unsafe Speed
4	Red Light
3	Unsafe Turning
2	N/A
2	Hit and Run
1	Unsafe Lane Change
1	Failure to Stop
Total 18	

Pattern: Motorists are not maintaining safe speeds and are running red lights.

High Collision Recommendations:

1. Restriping Traffic Striping with Thermoplastic Polyurethane.
2. Restriping Traffic Striping with Paint.
3. Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.

4. Upgrade to APS Pedestrian Pushbutton, Install R10-3 Updated Crosswalk Sign.
5. Improve Signal Timing (Coordination, Phases, Red, Yellow, Or Operation).
6. Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.
7. Install Bicycle Video Detection System (VDS) on Mast Arm.
8. Install Advanced Dilemma Zone Detection System.
9. Install Dynamic Speed Warning Sign with Existing R2-1 (50) Sign.
10. Install Dynamic Speed Warning Sign with New R2-1 (50) Sign.
11. Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with Cyclegrip MMAX Green Paint.
12. Reinstall R81 (CA) Sign.
13. Replace Existing D11-1 Sign with R81 (CA) Sign.
14. Install Emergency Vehicle Pre-Emption (EVP).

7.7.3 Street Segment 3: Seal Beach Blvd between Old Ranch Pkwy and North Gate Rd

Table 7-23: Segment 3 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
6	Unsafe Speed
3	Failure to Yield
3	Red Light
2	Unsafe Turning
1	Unsafe Backing
1	Illegal U-Turn
1	DUI
1	N/A
Total 18	

Pattern: Motorists are not maintaining safe speeds at this intersection.

High Collision Recommendations:

1. Restriping Traffic Striping with Thermoplastic Polyurethane.
2. Restriping Traffic Striping with Paint.
3. Install Dynamic Speed Warning Sign with New R2-1 (40) Sign.
4. Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with Cyclegrip MMAX Green Paint.

7.7.4 Street Segment 4: Seal Beach Blvd between North Gate Rd and Golden Rain Rd

Table 7-24: Segment 4 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
5	Unsafe Speed
4	Unsafe Turning Movement
2	Illegal U-Turn
1	Unsafe Lane Change
1	N/A
Total 13	

Pattern: Motorists are travelling at unsafe speeds and drivers are performing unsafe turning movements.

High Collision Recommendations:

1. Restriping Traffic Striping with Thermoplastic Polyurethane.
2. Restriping Traffic Striping with Paint.
3. Install Dynamic Speed Warning Sign with New R2-1 (50) Sign.
4. Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with Cyclegrip MMAX Green Paint.

7.7.5 Street Segment 5: Seal Beach Blvd between Golden Rain Rd and St Andrews

Table 7-25: Segment 5 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
5	Unsafe Speed
4	Unsafe Lane Change
3	Unsafe Turning
Total 12	

Pattern: Motorists are not maintaining safe speeds as they enter the intersection.

High Collision Recommendations:

1. Restriping Traffic Striping with Thermoplastic Polyurethane.
2. Restriping Traffic Striping with Paint.
3. Install Dynamic Speed Warning Sign with Existing R2-1 (50) Sign.
4. Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with Cyclegrip MMAX Green Paint.

7.7.6 Street Segment 6: Seal Beach Blvd between St Cloud Dr and Old Ranch Pkwy

Table 7-26: Segment 6 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor

5	Unsafe Speed
2	Unsafe Turning
2	Red Light
1	Hit and Run
1	N/A
Total	11

Pattern: Motorists are not maintaining safe speeds.

High Collision Recommendations:

1. Install R4-7 Sign.
2. Install OM2-1H (CA) Sign.
3. Restriping Traffic Striping with Thermoplastic Polyurethane.
4. Restriping Traffic Striping with Paint.
5. Reconstruct Existing Raised Median (470 LF) South of Lampson Ave on Seal Beach Blvd Per APWA Std.
6. Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with Cyclegrip MMAX Green Paint.
7. Remove Signs W11-1 and D. Replace with R44 (CA) Sign.
8. Install Bike Symbol Legend.

7.7.7 Street Segment 7: Marina Dr between 1st St and 5th St

Table 7-27: Segment 7 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
4	Stop Sign
3	Unsafe Turning
2	Unsafe Speed
Total	9

Pattern: Motorists are failing to obey the stop sign and performing unsafe turning movements.

High Collision Recommendations:

1. Restriping Traffic Striping with Thermoplastic Polyurethane.
2. Restriping Traffic Striping with Paint.
3. Reinstall Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.
4. Install a Street Luminaire with LED Per Caltrans Std.
5. Construct Access Ramp Per APWA Std 111-5 with Truncated Domes.
6. Upgrade to APS Pedestrian Pushbutton, Install R10-3 Updated Crosswalk Sign.
7. Install Dynamic Speed Warning Sign with R2-1 (30) Sign.

8. Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with Cyclegrip MMAX Green Paint.

9. Install R81 (CA) Sign.

7.7.8 Street Segment 8: Main St between Pacific Coast Highway and Electric Ave

Table 7-28: Segment 8 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions		Primary Collision Factor
5		Unsafe Backing
2		Unsafe Turning
2		Failure to Yield
Total	9	

Pattern: Motorists are performing unsafe backing maneuvers.

High Collision Recommendations:

1. Install Rectangular Rapid Flashing Beacon (RRFB) with W11-2 Sign, W16-7P Sign, R10- Sign, and APS Pedestrian Pushbutton.

2. Install In-Street Pedestrian Crossing Sign R1-6.

3. Restriping Traffic Striping with Thermoplastic Polyurethane.

4. Reinstall Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.

5. Restriping Traffic Striping with Paint.

6. Reinstall R31 (CA) Sign.

7. Reinstall R26 (CA) Sign.

7.7.9 Street Segment 9: Seal Beach Blvd between Bradbury Rd and Rossmoor Center Way

Table 7-29: Segment 9 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions		Primary Collision Factor
3		Unsafe Speed
2		Unsafe Turning
2		Failure to Yield
1		N/A
Total	8	

High Collision Recommendations:

1. Install Raised Hardscape Median with Turnouts (~500 LF).

2. Install R3-5R Sign.

3. Install Dynamic Speed Warning Sign with R2-1 (40) Sign.

4. Install Signs R4-7 And OM1-3.

5. Restriping Traffic Striping with Thermoplastic Polyurethane.
6. Restriping Traffic Striping with Paint.
7. Install "40 MPH" Legend.
8. Upgrade Corners with Proper Radii Per APWA Std Plans Due to Tight Turns.
9. Remove Conflict Striping by Wet Sandblasting.
10. Extend Lane Line Divider By 7 Ft and Install New Stop Bar and Legend with Thermoplastic Polyurethane.
11. Install R6-1 Sign.
12. Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with Cyclegrip MMAX Green Paint.

7.7.10 Street Segment 10: Seal Beach Blvd between Rossmoor Center Way & St. Cloud Dr

Table 7-30: Segment 10 Number of Collisions and Corresponding Primary Collision Factor

Number of Collisions	Primary Collision Factor
3	Unsafe Speed
2	Red Light
1	Failure to Yield
Total 6	

Pattern: Motorists are driving at unsafe speeds.

High Collision Recommendations:

1. Install R6-1 Sign.
2. Restriping Traffic Striping with Thermoplastic Polyurethane.
3. Restriping Traffic Striping with Paint.
4. Install OM2-1H (CA) Sign.
5. Install Dynamic Speed Warning Sign with Existing R2-1 (40) Sign.
6. Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with Cyclegrip MMAX Green Paint.

Table 7-31: Action Plan Timeframe Summary

Intersection/Segment	Location (Where)	Timeframe (When)	Potential Funding Source (How)
Intersection 1	Seal Beach Blvd & Westminster Ave	2025-2027 (Funding/Design) 2028-2030 (Construction)	SS4A Implementation/ HSIP/ ATP/ Others
Intersection 2	Seal Beach Blvd & N Gate Rd/I-405 On- & Off-Ramps		
Intersection 3	Seal Beach Blvd & Old Ranch Pkwy/I-405NB On- & Off-Ramps		
Intersection 4	Seal Beach Blvd & Towne Center Dr		
Intersection 5	Seal Beach Blvd & Lampson Ave	2027-2029 (Funding/Design) 2030+ (Construction)	
Intersection 6	Seal Beach Blvd & Saint Cloud Dr	2025-2027 (Funding/Design) 2028-2030 (Construction)	
Intersection 7	Seal Beach Blvd & Golden Rain Rd		
Intersection 8	Seal Beach Blvd & Adolfo Lopez Dr		
Intersection 9	Marina Dr & 5th St		
Intersection 10	Central Ave & 8th St		
Intersection 11	Seal Beach Blvd & Saint Andrews Dr		
Intersection 12	Main St & Ocean Ave	2027-2029 (Funding/Design) 2030+ (Construction)	
Intersection 13	Westminster Ave & Kitts Hwy		
Intersection 14	Marina Dr & 1st St	2025-2027 (Funding/Design) 2028-2030 (Construction)	
Intersection 15	Golden Rain Rd & Saint Andrews Dr		
Roadway Segment 1	Seal Beach Blvd between St Andrews Dr & Westminster Ave	2025-2027 (Funding/Design) 2028-2030 (Construction)	
Roadway Segment 2	Seal Beach Blvd between Westminster Ave & Apollo Dr		
Roadway Segment 3	Seal Beach Blvd between Old Ranch Pkwy & N Gate Rd/I-405 SB On- & Off- Ramps		
Roadway Segment 4	Seal Beach Blvd between N Gate Rd/I-405 SB On- & Off- Ramps & Golden Rain Rd		
Roadway Segment 5	Seal Beach Blvd between Golden Rain Rd & St Andrews Dr		
Roadway Segment 6	Seal Beach Blvd between St Cloud Dr & Old Ranch Pkwy	2027-2029 (Funding/Design) 2030+ (Construction)	
Roadway Segment 7	Marina Dr between 1st St & 5th St	2025-2027 (Funding/Design) 2028-2030 (Construction)	
Roadway Segment 8	Main St between Pacific Coast Highway & Electric Ave		
Roadway Segment 9	Seal Beach Blvd between Bradbury Rd & Rossmoor Center Way	2027-2029 (Funding/Design) 2030+ (Construction)	
Roadway Segment 10	Seal Beach Blvd between Rossmoor Center Way & St Cloud Dr	2025-2027 (Funding/Design) 2028-2030 (Construction)	

8. Progress and Transparency

The City of Seal Beach as a municipal corporation and the recipient of this Federal grant funding for the Safety Action Plan is committed, at a minimum, annual public and accessible reporting on progress toward reducing roadway fatalities and serious injuries, and public posting of the Action Plan online.

9. Action Plan

At each of the aforementioned focus high collision intersections and street segments/corridors, the collision patterns have been evaluated and countermeasures to those patterns have been developed through a preliminary conceptual plan and the preliminary cost of those measures has been estimated. This section of this report summarizes those results.

This Local Safety Plan is funded through a Highway Safety Improvement Program (HSIP) grant from the California Department of Transportation (Caltrans). HSIP grant funding is prioritized and awarded based on the grant funding's economic effectiveness, which is established by a benefit to cost ratio. For the HSIP Cycle 12 call for projects, the minimum Benefit to Cost Ratio is 3.5. A summary of the benefit to cost ratios is provided in this section. Project cost estimates, as of December 16, 2024, are calculated on a line-item basis using the Caltrans Contract Cost Database. In some cases, recent construction bids and benefit values are calculated based on Caltrans established countermeasure values. A summation of the total construction cost as of December 16, 2024, of all intersections and road segments are displayed at the end of the report.

Depending on the City’s priorities, it is highly recommended that multiple projects as provided below are grouped into one HSIP application to maximize potential funding allocations. It is also highly recommended that since each funding source has a different cycle length and/or application deadline, multiple sources to be explored to maximize the outcome in order to be able to secure funding and implement and construct the safety projects.

9.1 Focus (High Collision) Intersections

9.1.1 Intersection 1: Seal Beach Blvd & Westminster Ave

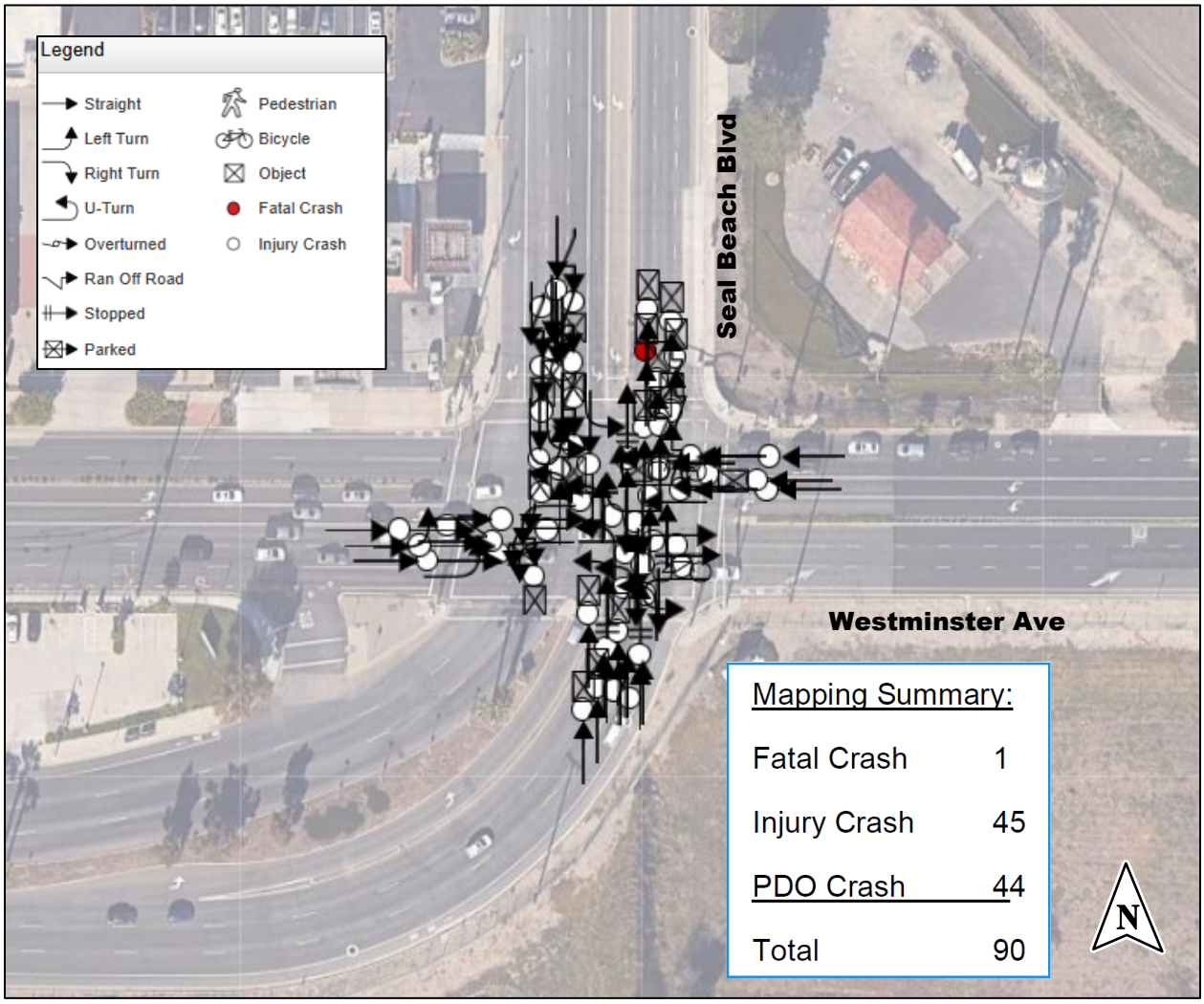
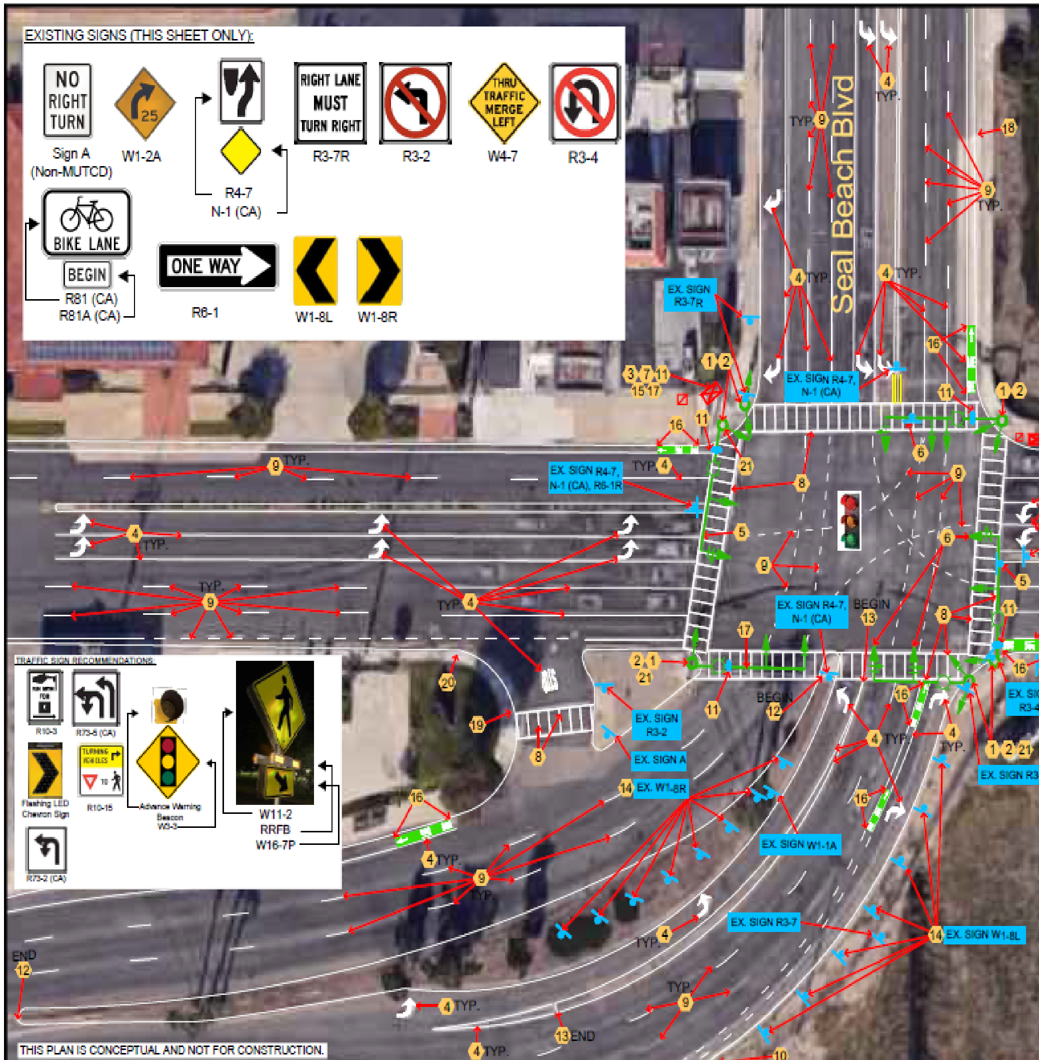


Figure 9-1: Intersection 1 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable



RECOMMENDATIONS:

1. UPGRADE SIGNAL HEAD BACKPLATES TO YELLOW RETROREFLECTIVE BACKPLATES.
2. UPGRADE TO APS PEDESTRIAN PUSHBUTTON. INSTALL R10-3 UPDATED CROSSWALK SIGN.
3. IMPROVE SIGNAL TIMING (COORDINATION, PHASES, RED, YELLOW, OR OPERATION).
4. RESTRIPE INTERSECTION TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
5. INSTALL R73-5 SIGN.
6. INSTALL R73-2 SIGN.
7. INSTALL LEADING PEDESTRIAN INTERVAL (LPI) SYSTEM.
8. INSTALL THERMOPLASTIC POLYURETHANE PEDESTRIAN LADDER CROSSWALK.
9. RESTRIPE INTERSECTION TRAFFIC STRIPING WITH PAINT.
10. INSTALL ADVANCE WARNING BEACON WITH W3-3 SIGN AT 365 FEET SOUTH OF STOP BAR ON NORTHBOUND SEAL BEACH BLVD'S EAST SHOULDER.
11. INSTALL BICYCLE VIDEO DETECTION SYSTEM (VDS) ON MAST ARM.
12. RECONSTRUCT EXISTING RAISED MEDIAN (500 LF) SOUTH OF WESTMINSTER AVE ON SEAL BEACH BLVD BETWEEN NORTHBOUND AND SOUTHBOUND LANES PER APWA STD.
13. RECONSTRUCT EXISTING RAISED MEDIAN (210 LF) SOUTH OF WESTMINSTER AVE ON SEAL BEACH BLVD BETWEEN NORTHBOUND LEFT TURN LANE AND THROUGH LANES PER APWA STD.
14. REPLACE EXISTING W1-8 CHEVRON SIGNS WITH FLASHING LED CHEVRON SOLAR TRAFFIC SIGNS.
15. INSTALL ADVANCED DILEMMA ZONE DETECTION SYSTEM.
16. INSTALL "GREENBACK BIKE LANE" ENHANCED CL2 BIKEWAY PAVEMENT LEGEND BACKGROUND WITH *CYCLEGRIP MMAX* GREEN PAINT.

RECOMMENDATIONS (CONT.):

17. INSTALL EMERGENCY VEHICLE PRE-EMPTION (EVP).
18. RELOCATE EXISTING OCTA BUS STOP AT NEC ON NB SEAL BEACH BLVD TO 220' NORTH OF ECR.
19. INSTALL SIGNS W11-2 AND W16-7P WITH RECTANGULAR RAPID FLASHING BEACON (RRFB) AND APS PEDESTRIAN PUSHBUTTON.
20. INSTALL SIGN R10-15.
21. UPGRADE SIGNAL HEAD LENSES TO PROGRAMMABLE VISIBILITY (PV) LED LENSES.

Intersection #1
Seal Beach Blvd & Westminster Ave
Recommended Improvements

MINAGAR & ASSOCIATES, INC.
TRAFFIC/CIVIL/ELECTRICAL ENGINEERING - ITS - TRANSPORTATION PLANNING
23282 MILL CREEK DRIVE, EAST TOWER, SUITE 120
LAGUNA HILLS, CA 92653
Tel (949) 707-1199
www.minagarinc.com
11/27/2024
FRED MINAGAR – RCE 53466 DATE

City of Seal Beach
Safety Action Plan
High Collision Locations

9.1.1.1 Intersection 1 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-1: Intersection 1 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	Upgrade Signal Head Backplates To Yellow Retroreflective Backplates.	EA	20	$ 878.00	$ 17,560.00
2A	Upgrade To APS Pedestrian Pushbutton.	EA	8	$ 2,000.00	$ 16,000.00
2B	Install R10-3 Updated Crosswalk Sign.	EA	8	$ 598.00	$ 4,784.00
3	Improve Signal Timing (Coordination, Phases, Red, Yellow, Or Operation).	LS	1	$ 10,000.00	$ 10,000.00
4A	Restriping Intersection Traffic Striping With Thermoplastic Polyurethane.	LF	3,000	$ 2.60	$ 7,800.00
4B	Thermoplastic Legends	SF	630	$ 5.46	$ 3,439.80
5	Install R73-5 Sign.	EA	2	$ 598.00	$ 1,196.00
6	Install R73-2 Sign.	EA	1	$ 598.00	$ 598.00
7	Install Leading Pedestrian Interval (LPI) System.	EA	1	$ 7,000.00	$ 7,000.00
8	Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.	LF	450	$ 5.46	$ 2,457.00
9	Restriping Intersection Traffic Striping With Paint.	LF	900	$ 3.65	$ 3,285.00
10	Install Advance Warning Beacon With W3-3 Sign At 365 Feet South Of Stop Bar On Northbound Seal Beach Blvd's East Shoulder.	EA	1	$ 17,500.00	$ 17,500.00
11	Install Bicycle Video Detection System (VDS) On Mast Arm.	EA	4	$ 20,000.00	$ 80,000.00
12	Reconstruct Existing Raised Median (500 LF) South Of Westminster Ave On Seal Beach Blvd Between Northbound And Southbound Lanes Per APWA Std.	SF	6,000	$ 36.00	$ 216,000.00
13	Reconstruct Existing Raised Median (210 LF) South Of Westminster Ave On Seal Beach Blvd Between Northbound Left Turn Lane And Through Lanes Per APWA Std.	SF	630	$ 35.00	$ 22,050.00
14	Replace Existing W1-8 Chevron Signs With Flashing LED Chevron Solar Traffic Signs.	EA	16	$ 4,500.00	$ 72,000.00
15	Install Advanced Dilemma Zone Detection System.	LS	1	$ 25,000.00	$ 25,000.00
16	Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background With Cycle MMX Green Paint.	SF	180	$ 14.00	$ 2,520.00
17	Install Emergency Vehicle Pre-Emption (EVP).	EA	1	$ 15,000.00	$ 15,000.00
18	Relocate Existing OCTA Bus Stop At NEC On NB Seal Beach Blvd To 220' North of ECR.	EA	1	$ 17,600.00	$ 17,600.00
19A	Install Signs W11-2 and W16-7P.	EA	1	$ 1,196.00	$ 1,196.00
19B	Install Rectangular Rapid Flashing Beacon (RRFB).	EA	1	$ 15,000.00	$ 15,000.00
19C	Install APS Pedestrian Pushbutton.	EA	1	$ 2,000.00	$ 2,000.00
20	Install Sign R10-15.	EA	1	$ 598.00	$ 598.00
21	Upgrade Signal Head Lenses To Programmable Visibility (PV) LED Lenses.	EA	38	$ 2,153.00	$ 81,814.00
				Total	$ 642,397.80
			Total Construction Cost:	$	642,397.80
			Contingencies percentage of the aforementioned Total Construction Cost:	20%	$ 128,479.56
			Total Construction Cost (Including Contingencies):	$	770,877.36

Total Cost and Benefit:

The project's total cost is estimated at $770,877.36 which does not include the design and engineering costs. The estimated benefit of these improvements is $32,269,848 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 41.86.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 441.86, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$32,221,966
Travel Time	$43,510
Vehicle Operating Cost	$3,938
Emissions	$435
Total Benefits	$32,269,848

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$770,877
Present Value Benefits ($ Dollars)	$32,269,848
Net Present Value ($ Dollars)	$31,498,971
Benefit / Cost Ratio	**41.86**

9.1.2 Intersection 2: Seal Beach Blvd & North Gate Rd/Caltrans I-405 SB On-Off Ramps

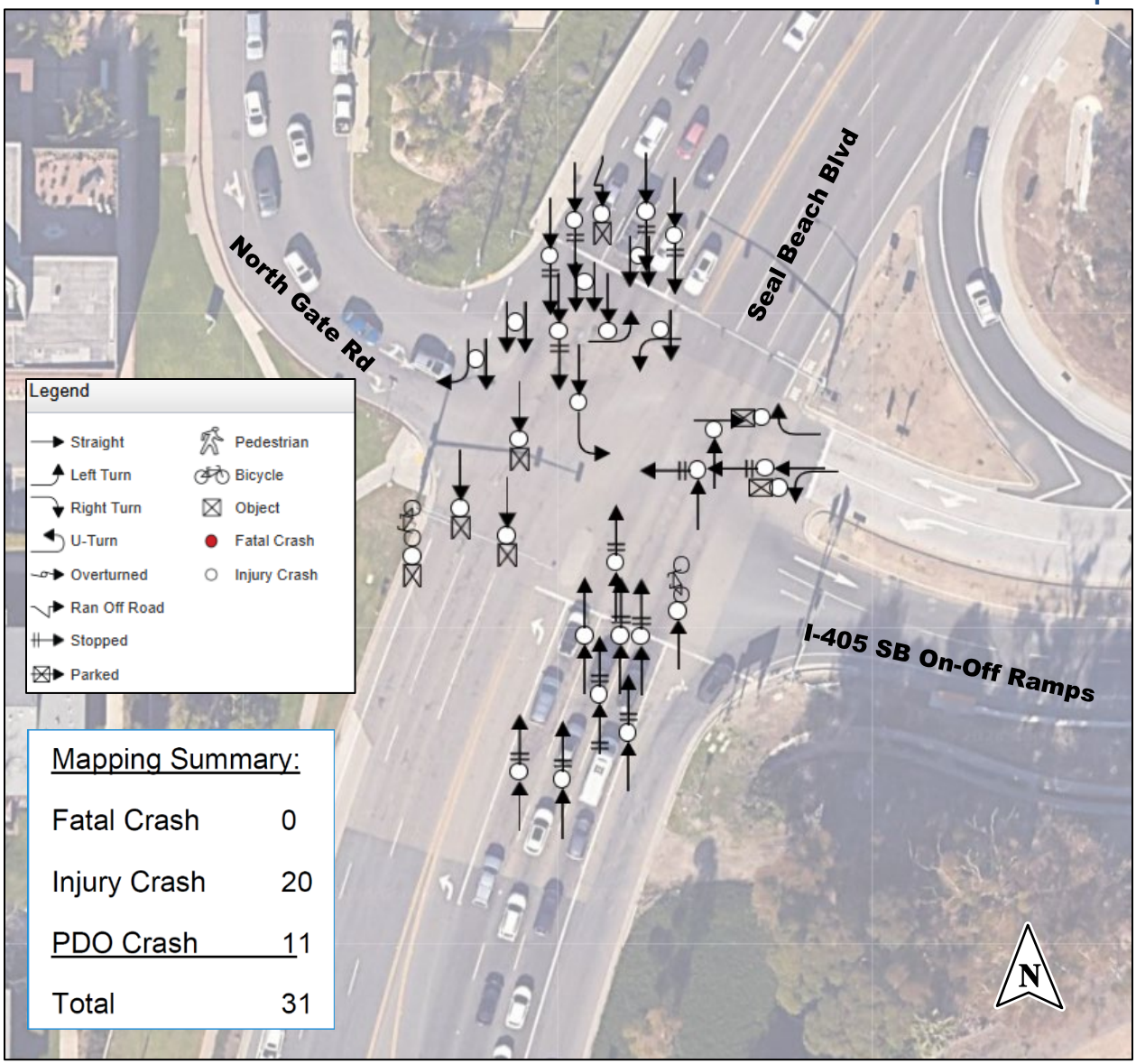
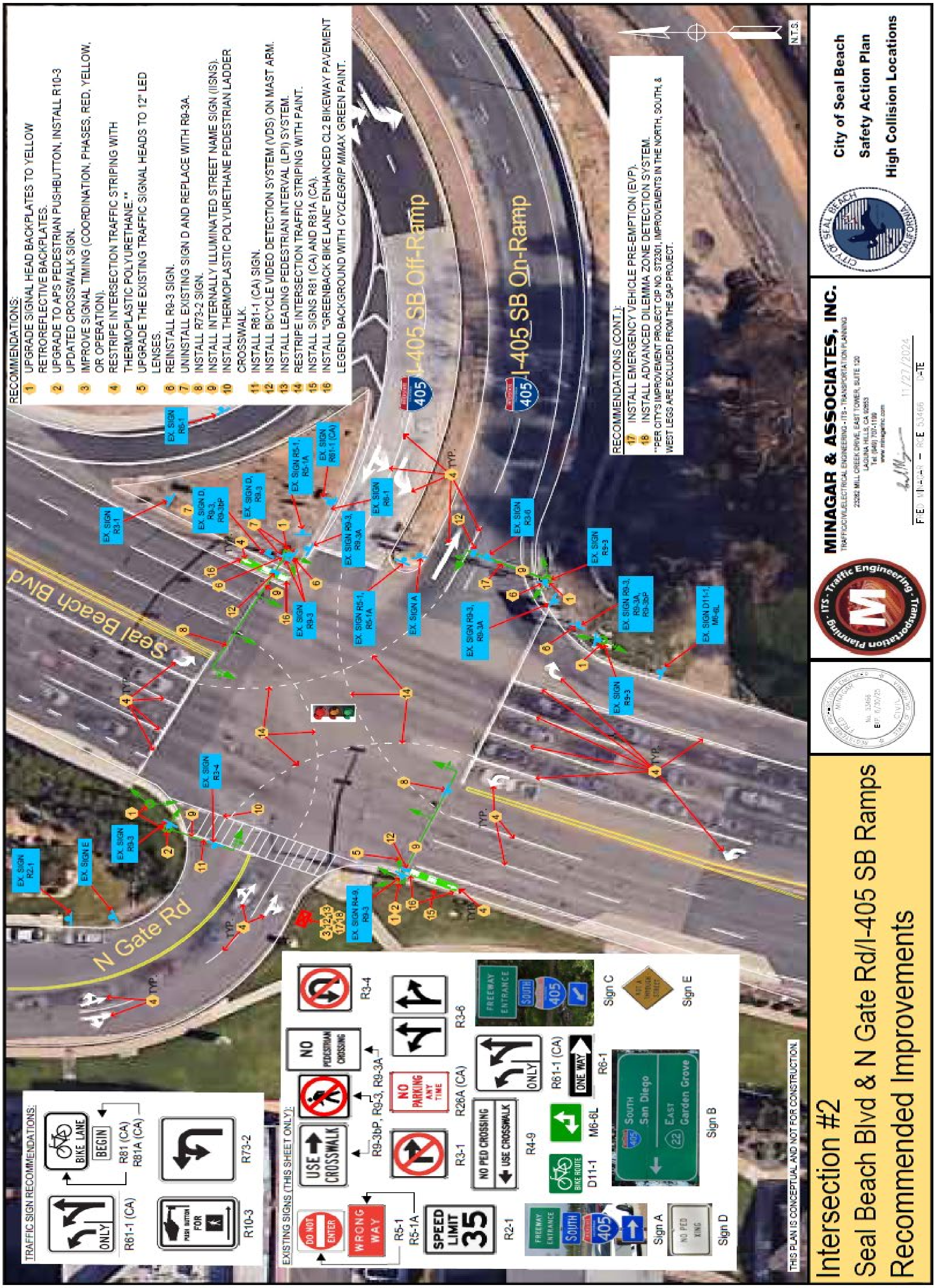


Figure 9-2: Intersection 2 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


RECOMMENDATIONS:
1 UPGRADE SIGNAL HEAD BACKPLATES TO YELLOW RETROREFLECTIVE BACKPLATES.
2 UPGRADE TO APS PEDESTRIAN PUSHBUTTON, INSTALL R10-3 UPDATED CROSSWALK SIGN.
3 IMPROVE SIGNAL TIMING (COORDINATION, PHASES, RED, YELLOW, OR OPERATION).
4 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.**
5 UPGRADE THE EXISTING TRAFFIC SIGNAL HEADS TO 12" LED LENSES.
6 REINSTALL R9-3 SIGN.
7 UNINSTALL EXISTING SIGN D AND REPLACE WITH R9-3A.
8 INSTALL R73-2 SIGN.
9 INSTALL INTERNALLY ILLUMINATED STREET NAME SIGN (IISNS).
10 INSTALL THERMOPLASTIC POLYURETHANE PEDESTRIAN LADDER CROSSWALK.
11 INSTALL R61-1 (CA) SIGN.
12 INSTALL BICYCLE VIDEO DETECTION SYSTEM (VDS) ON MAST ARM.
13 INSTALL LEADING PEDESTRIAN INTERVAL (LPI) SYSTEM.
14 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH PAINT.
15 INSTALL SIGNS R81 (CA) AND R81A (CA).
16 INSTALL "GREENBACK BIKE LANE" ENHANCED CL2 BIKEWAY PAVEMENT LEGEND BACKGROUND WITH CYCLEGRIP MMAX GREEN PAINT.
RECOMMENDATIONS (CONT.):
17 INSTALL EMERGENCY VEHICLE PRE-EMPTION (EVP).
18 INSTALL ADVANCED DILEMMA ZONE DETECTION SYSTEM.
**PER CITY'S IMPROVEMENT PROJECT CIP NO. ST2301, IMPROVEMENTS IN THE NORTH, SOUTH, & WEST LEGS ARE EXCLUDED FROM THE SAP PROJECT.
I-405 SB Off-Ramp
I-405 SB On-Ramp
Seal Beach Blvd
N Gate Rd
N.T.S.
TRAFFIC SIGN RECOMMENDATIONS:
R61-1 (CA)
R81 (CA)
R81A (CA)
R10-3
R73-2
EXISTING SIGNS (THIS SHEET ONLY):
R5-1
R5-1A
R9-3bP, R9-3, R9-3A
R3-1
R26A (CA)
R3-4
R3-6
R2-1
R4-9
R61-1 (CA)
D11-1
M6-6L
R6-1
Sign A
Sign B
Sign C
Sign D
Sign E
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
City of Seal Beach
Safety Action Plan
High Collision Locations
MINAGAR & ASSOCIATES, INC.
TRAFFIC/CIVIL/ELECTRICAL ENGINEERING - ITS - TRANSPORTATION PLANNING
23282 MILL CREEK DRIVE, EAST TOWER, SUITE 120
LAGUNA HILLS, CA 92653
Tel: (949) 707-1199
www.minagarinc.com
11/27/2024
Intersection #2
Seal Beach Blvd & N Gate Rd/I-405 SB Ramps
Recommended Improvements

9.1.2.1 Intersection 2 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-2: Intersection 2 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.	EA	17	$ 878.00	$ 14,926.00
2A	Upgrade To APS Pedestrian Pushbutton.	EA	2	$ 2,000.00	$ 4,000.00
2B	Install R10-3 Updated Crosswalk Sign.	EA	2	$ 598.00	$ 1,196.00
3	Improve Signal Timing (Coordination, Phases, Red, Yellow).	LS	1	$ 10,000.00	$ 10,000.00
4A	Restripe Intersection Traffic Striping with Thermoplastic Polyurethane.	LF	1,750	$ 2.60	$ 4,550.00
4B	Thermoplastic Legends	SF	320	$ 5.46	$ 1,747.20
5	Upgrade The Existing Traffic Signal Heads To 12" LED Lenses.	EA	3	$ 717.00	$ 2,151.00
6	Reinstall R9-3 Sign.	EA	3	$ 598.00	$ 1,794.00
7	Uninstall Existing Sign D And Replace with R9-3A.	EA	2	$ 650.00	$ 1,300.00
8	Install R73-2 Sign.	EA	2	$ 598.00	$ 1,196.00
9	Install Internally Illuminated Street Name Sign (IISNS).	EA	4	$ 1,580.00	$ 6,320.00
10	Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.	LF	70	$ 5.46	$ 382.20
11	Install R61-1 (CA) Sign.	EA	1	$ 598.00	$ 598.00
12	Install Bicycle Video Detection System (VDS) On Mast Arm.	EA	3	$ 2,000.00	$ 6,000.00
13	Install Leading Pedestrian Interval (LPI) System.	EA	1	$ 7,000.00	$ 7,000.00
14	Restriping Intersection Traffic Striping With Paint.	LF	1,900	$ 3.65	$ 6,935.00
15	Install Signs R81 (CA) And R81A (CA).	EA	2	$ 598.00	$ 1,196.00
16	Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with *CycleGrip MMAX* Green Paint.	SF	90	$ 14.00	$ 1,260.00
17	Install Emergency Vehicle Pre-Emption (EVP).	EA	1	$ 15,000.00	$ 15,000.00
18	Install Dynamic Dilemma Zone Protection.	LS	1	$ 25,000.00	$ 25,000.00
				Total	$ 87,551.40
				Total Construction Cost:	$ 87,551.40
				Contingencies percentage of the aforementioned Total Construction Cost:	20% $ 17,510.28
				Total Construction Cost (Including Contingencies):	$ 105,061.68

Total Cost and Benefit:

The project's total cost is estimated at $105,062 which does not include the design and engineering costs. The estimated benefit of these improvements is $4,731,107 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 45.03.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 45.03, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$4,714,870
Travel Time	$14,536
Vehicle Operating Cost	$1460
Emissions	$241
Total Benefits	$4,731,107

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$105,062
Present Value Benefits ($ Dollars)	$4,731,107
Net Present Value ($ Dollars)	$4,626,045
Benefit / Cost Ratio	**45.03**

9.1.3 Intersection 3: Seal Beach Blvd & Old Ranch Pkwy

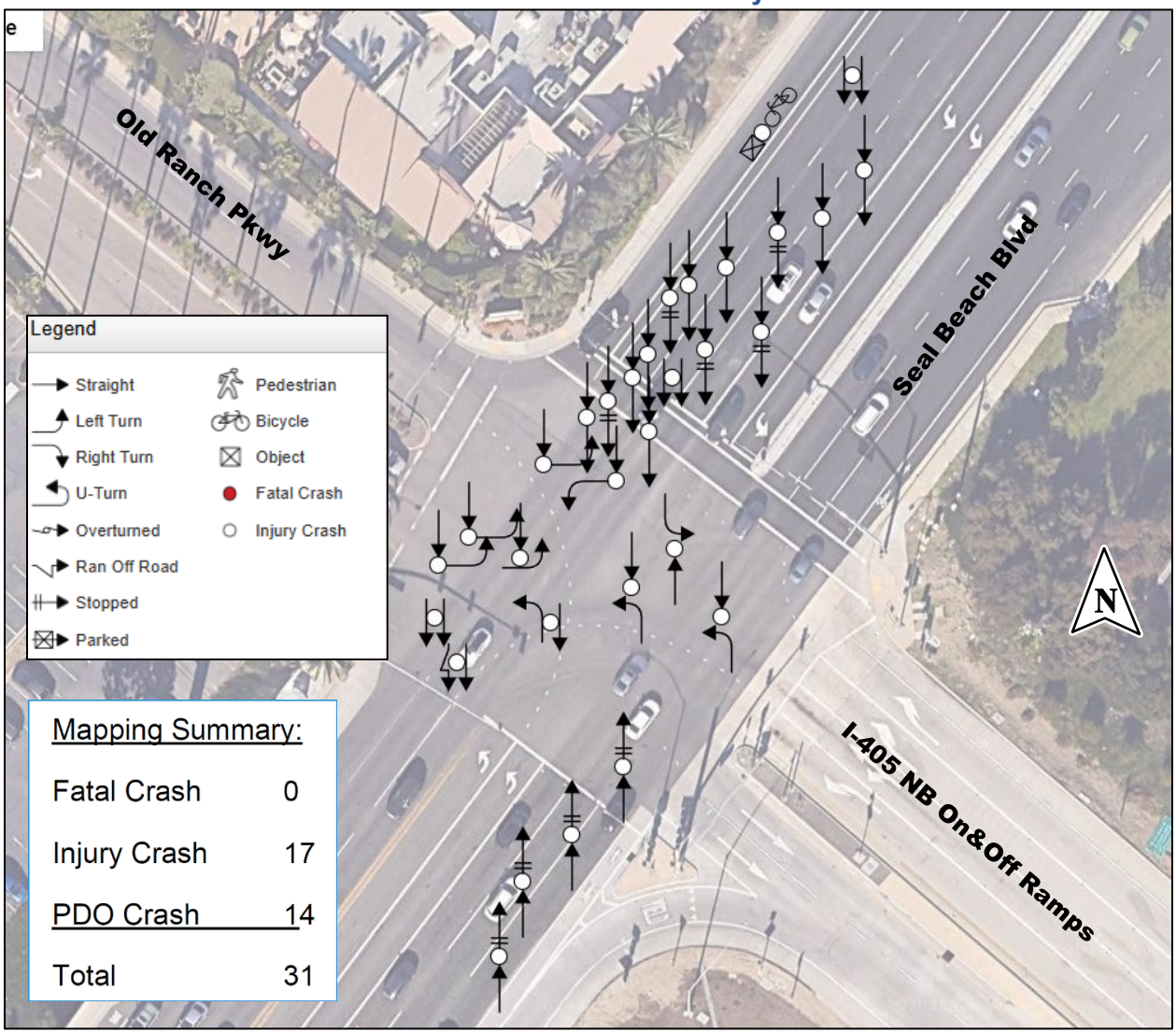
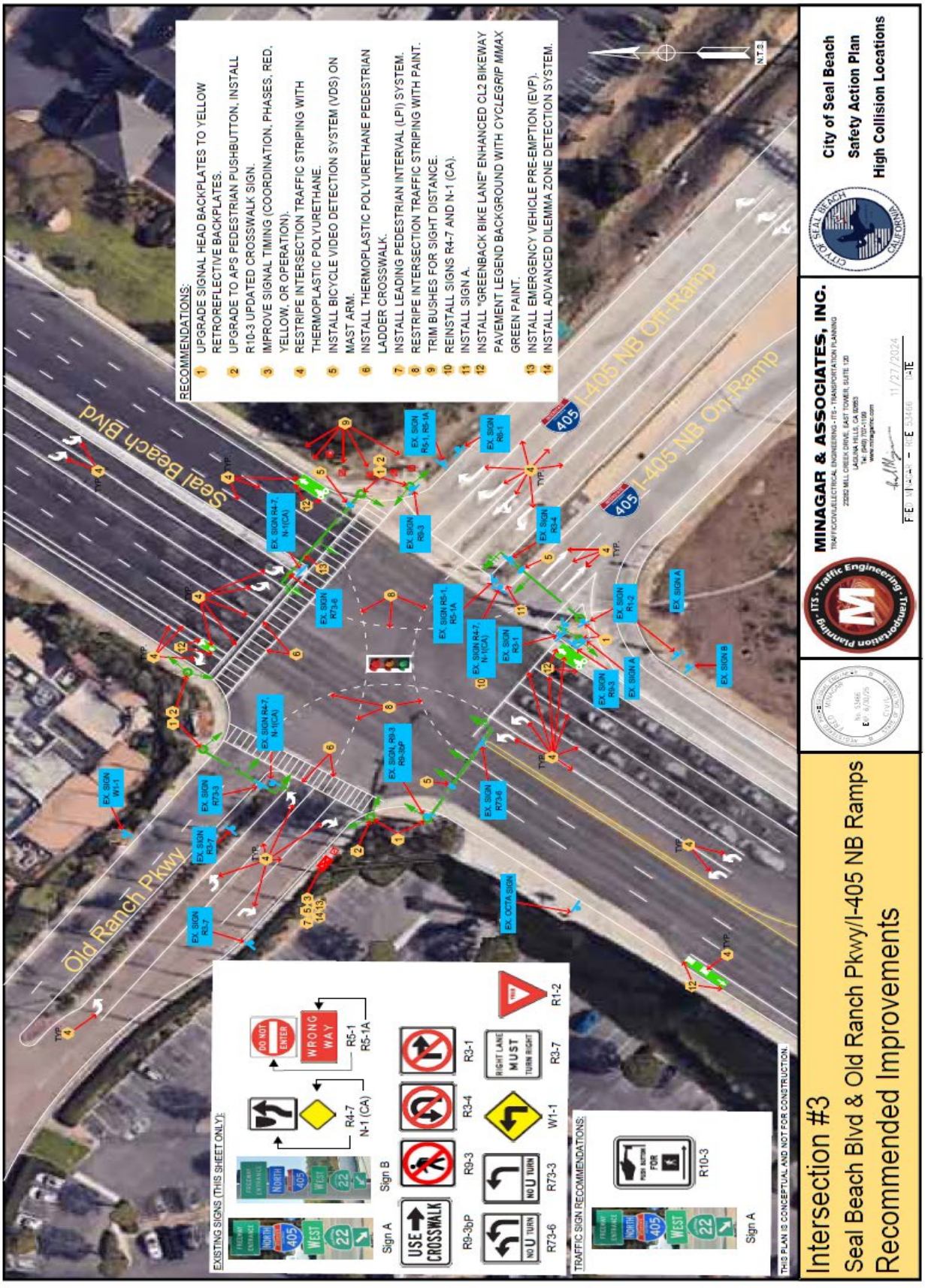


Figure 9-3: Intersection 3 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


RECOMMENDATIONS:
1 UPGRADE SIGNAL HEAD BACKPLATES TO YELLOW RETROREFLECTIVE BACKPLATES.
2 UPGRADE TO APS PEDESTRIAN PUSHBUTTON. INSTALL R10-3 UPDATED CROSSWALK SIGN.
3 IMPROVE SIGNAL TIMING (COORDINATION, PHASES, RED, YELLOW, OR OPERATION).
4 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
5 INSTALL BICYCLE VIDEO DETECTION SYSTEM (VDS) ON MAST ARM.
6 INSTALL THERMOPLASTIC POLYURETHANE PEDESTRIAN LADDER CROSSWALK.
7 INSTALL LEADING PEDESTRIAN INTERVAL (LPI) SYSTEM.
8 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH PAINT.
9 TRIM BUSHES FOR SIGHT DISTANCE.
10 REINSTALL SIGNS R4-7 AND N-1 (CA).
11 INSTALL SIGN A.
12 INSTALL "GREENBACK BIKE LANE" ENHANCED CL2 BIKEWAY PAVEMENT LEGEND BACKGROUND WITH *CYCLEGRIP MMAX* GREEN PAINT.
13 INSTALL EMERGENCY VEHICLE PRE-EMPTION (EVP).
14 INSTALL ADVANCED DILEMMA ZONE DETECTION SYSTEM.
Seal Beach Blvd
Old Ranch Pkwy
I-405 NB Off-Ramp
I-405 NB On-Ramp
EXISTING SIGNS (THIS SHEET ONLY):
TRAFFIC SIGN RECOMMENDATIONS:
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
Intersection #3
Seal Beach Blvd & Old Ranch Pkwy/I-405 NB Ramps
Recommended Improvements
MINAGAR & ASSOCIATES, INC.
City of Seal Beach
Safety Action Plan
High Collision Locations

9.1.3.1 Intersection 3 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-3: Intersection 3 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.	EA	21	$ 878.00	$ 18,438.00
2A	Upgrade To APS Pedestrian Pushbutton	EA	4	$ 2,000.00	$ 8,000.00
2B	Install R10-3 Updated Crosswalk Sign.	EA	4	$ 598.00	$ 2,392.00
3	Improve Signal Timing (Coordination, Phases, Red, Yellow).	LS	1	$ 10,000.00	$ 10,000.00
4A	Restripe Intersection Traffic Striping with Thermoplastic Polyurethane.	LF	2,900	$ 2.60	$ 7,540.00
4B	Thermoplastic Legends	SF	520	$ 5.46	$ 2,839.20
5	Install Bicycle Video Detection System (VDS) On Mast Arm.	EA	2	$ 20,000.00	$ 40,000.00
6	Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.	LF	250	$ 5.46	$ 1,365.00
7	Install Leading Pedestrian Interval (LPI) System.	EA	1	$ 7,000.00	$ 7,000.00
8	Restripe Intersection Traffic Striping with Paint.	LF	3,400	$ 3.65	$ 12,410.00
9	Trim Bushes for Sight Distance.	LS	1	$ 750.00	$ 750.00
10	Reinstall Signs R4-7 And N-1 (CA).	EA	2	$ 598.00	$ 1,196.00
11	Install Sign A.	EA	6	$ 598.00	$ 3,588.00
12	Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with *CycleGrip MMAX* Green Paint.	SF	180	$ 14.00	$ 2,520.00
13	Install Emergency Vehicle Pre-Emption (EVP).	EA	1	$ 15,000.00	$ 15,000.00
14	Install Dynamic Dilemma Zone Protection.	LS	1	$ 25,000.00	$ 25,000.00
				Total	$ 133,038.20
				Total Construction Cost:	$ 133,038.20
				Contingencies percentage of the aforementioned Total Construction Cost:	20% $ 26,607.64
				Total Construction Cost (Including Contingencies):	$ 159,645.84

Total Cost and Benefit:

The project's total cost is estimated at $159,646 which does not include the design and engineering costs. The estimated benefit of these improvements is $4,654,092 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 29.15.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 29.15, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$4,638,120
Travel Time	$14,299
Vehicle Operating Cost	$1,436
Emissions	$234
Total Benefits	$4,654,092

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$159,646
Present Value Benefits ($ Dollars)	$4,654,092
Net Present Value ($ Dollars)	$4,494,446
Benefit / Cost Ratio	**29.15**

9.1.4 Intersection 4: Seal Beach Blvd & Towne Center Dr

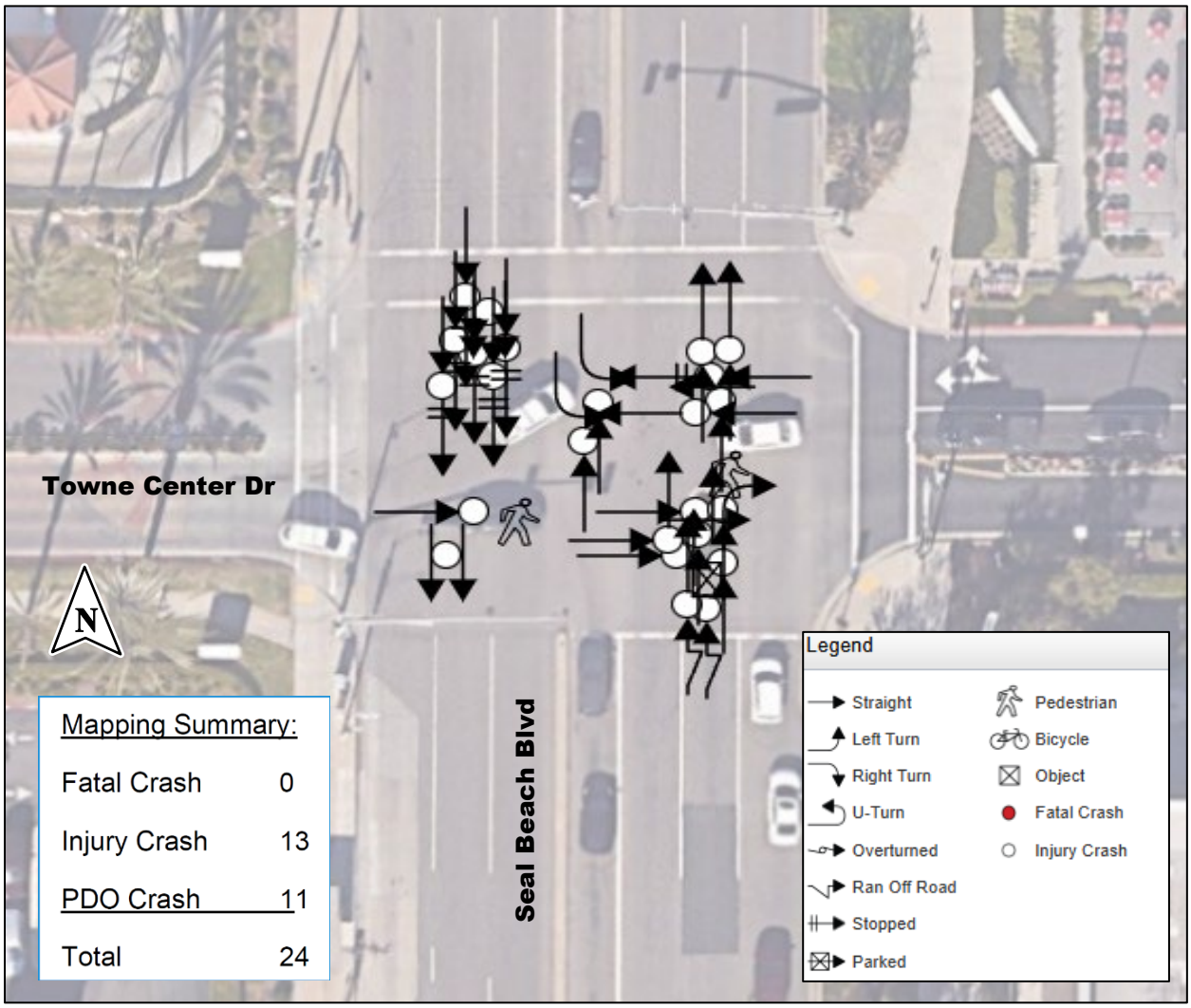
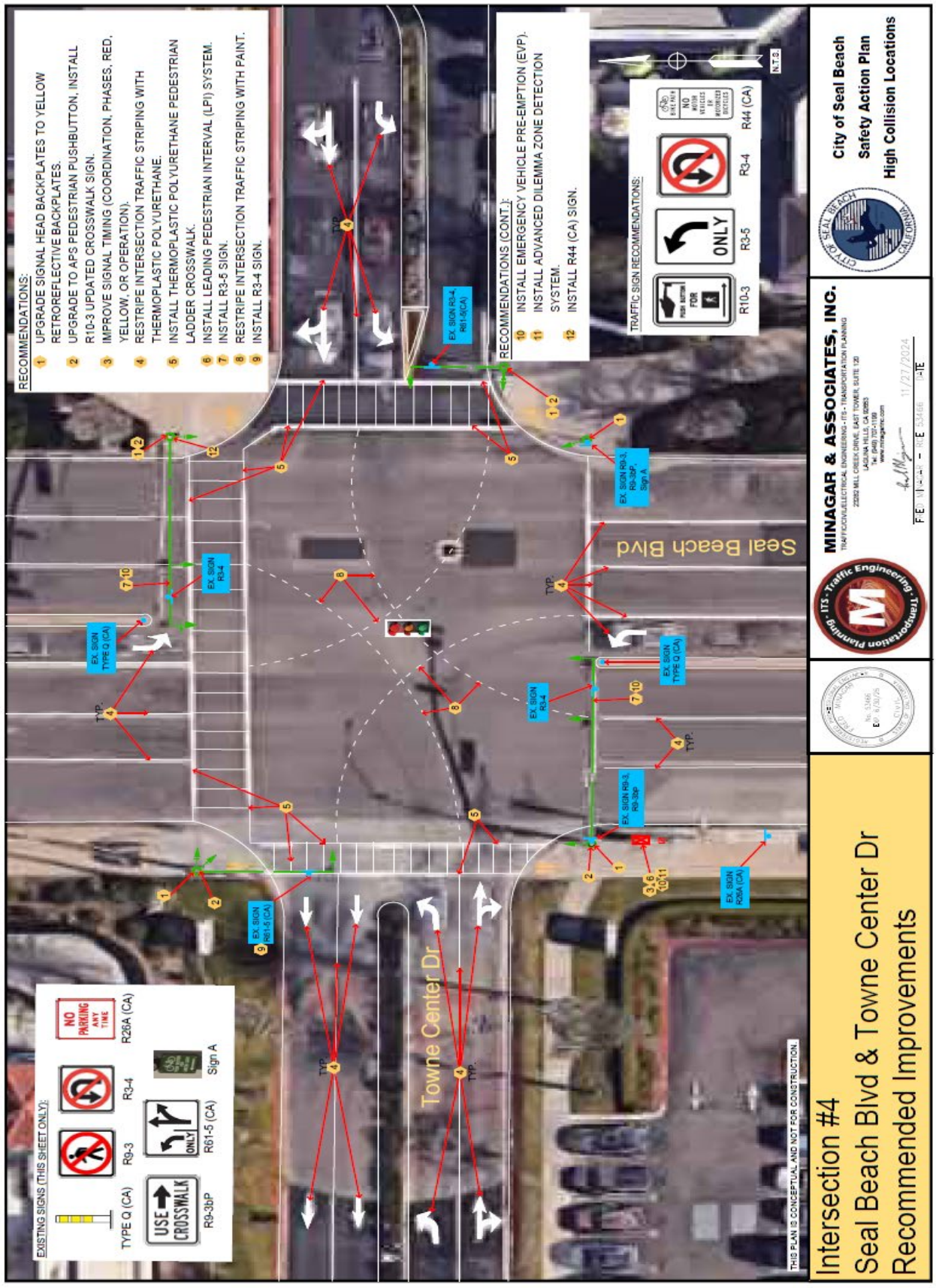


Figure 9-4: Intersection 4 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


RECOMMENDATIONS:
1 UPGRADE SIGNAL HEAD BACKPLATES TO YELLOW RETROREFLECTIVE BACKPLATES.
2 UPGRADE TO APS PEDESTRIAN PUSHBUTTON, INSTALL R10-3 UPDATED CROSSWALK SIGN.
3 IMPROVE SIGNAL TIMING (COORDINATION, PHASES, RED, YELLOW, OR OPERATION).
4 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
5 INSTALL THERMOPLASTIC POLYURETHANE PEDESTRIAN LADDER CROSSWALK.
6 INSTALL LEADING PEDESTRIAN INTERVAL (LPI) SYSTEM.
7 INSTALL R3-5 SIGN.
8 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH PAINT.
9 INSTALL R3-4 SIGN.
RECOMMENDATIONS (CONT.):
10 INSTALL EMERGENCY VEHICLE PRE-EMPTION (EVP).
11 INSTALL ADVANCED DILEMMA ZONE DETECTION SYSTEM.
12 INSTALL R44 (CA) SIGN.
TRAFFIC SIGN RECOMMENDATIONS:
R10-3
R3-5
R3-4
R44 (CA)
N.T.S.
EXISTING SIGNS (THIS SHEET ONLY):
TYPE Q (CA)
R9-3bP
R61-5 (CA)
R3-4
R9-3
R26A (CA)
Sign A
Towne Center Dr
Seal Beach Blvd
EX. SIGN TYPE Q (CA)
EX. SIGN R3-4
EX. SIGN R61-5 (CA)
EX. SIGN R9-3, R9-3bP, Sign A
EX. SIGN R9-3, R9-3bP
EX. SIGN R26A (CA)
EX. SIGN R61-4(CA)
TYP.
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
Intersection #4
Seal Beach Blvd & Towne Center Dr
Recommended Improvements
City of Seal Beach
Safety Action Plan
High Collision Locations
MINAGAR & ASSOCIATES, INC.
TRAFFIC/CIVIL/ELECTRICAL ENGINEERING - ITS - TRANSPORTATION PLANNING
22992 MILL CREEK DRIVE, EAST TOWER, SUITE 120
LAGUNA HILLS, CA 92653
Tel: (949) 753-7169
www.minagar.com
FILED MINAGAR - RCE 53466 11/27/2024
No. 53466 Exp. 6/30/25
Traffic Engineering · Transportation Planning · ITS

9.1.4.1 Intersection 4 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-4: Intersection 4 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.	EA	12	$ 878.00	$ 10,536.00
2A	Upgrade To APS Pedestrian Pushbutton	EA	6	$ 2,000.00	$ 12,000.00
2B	Install R10-3 Updated Crosswalk Sign.	EA	6	$ 598.00	$ 3,588.00
3	Improve Signal Timing (Coordination, Phases, Red, Yellow).	LS	1	$ 10,000.00	$ 10,000.00
4A	Restripe Intersection Traffic Striping with Thermoplastic Polyurethane.	LF	1,050	$ 2.60	$ 2,730.00
4B	Thermoplastic Legends	SF	290	$ 5.46	$ 1,583.40
5	Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.	LF	200	$ 5.46	$ 1,092.00
6	Install Leading Pedestrian Interval (LPI) System.	EA	1	$ 7,000.00	$ 7,000.00
7	Install R3-5 Sign.	EA	2	$ 598.00	$ 1,196.00
8	Restripe Intersection Traffic Striping With Paint.	LF	2,800	$ 3.65	$ 10,220.00
9	Install R3-4 Sign.	EA	1	$ 598.00	$ 598.00
10	Install Emergency Vehicle Pre-Emption (EVP).	EA	2	$ 15,000.00	$ 30,000.00
11	Install Dynamic Dilemma Zone Protection.	LS	1	$ 25,000.00	$ 25,000.00
				Total	$ 115,543.40
				Total Construction Cost:	$ 115,543.40
				Contingencies percentage of the aforementioned Total Construction Cost:	20% $ 23,108.68
				Total Construction Cost (Including Contingencies):	$ 138,652.08

Total Cost and Benefit:

The project's total cost is estimated at $138,652 which does not include the design and engineering costs. The estimated benefit of these improvements is $6,950,284 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 50.13.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 50.13, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$6,930,257
Travel Time	$17,877
Vehicle Operating Cost	$1,815
Emissions	$336
Total Benefits	$6,950,284

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$138,652
Present Value Benefits ($ Dollars)	$6,950,284
Net Present Value ($ Dollars)	$6,811,632
Benefit / Cost Ratio	**50.13**

9.1.5 Intersection 5: Seal Beach Blvd & Lampson Ave

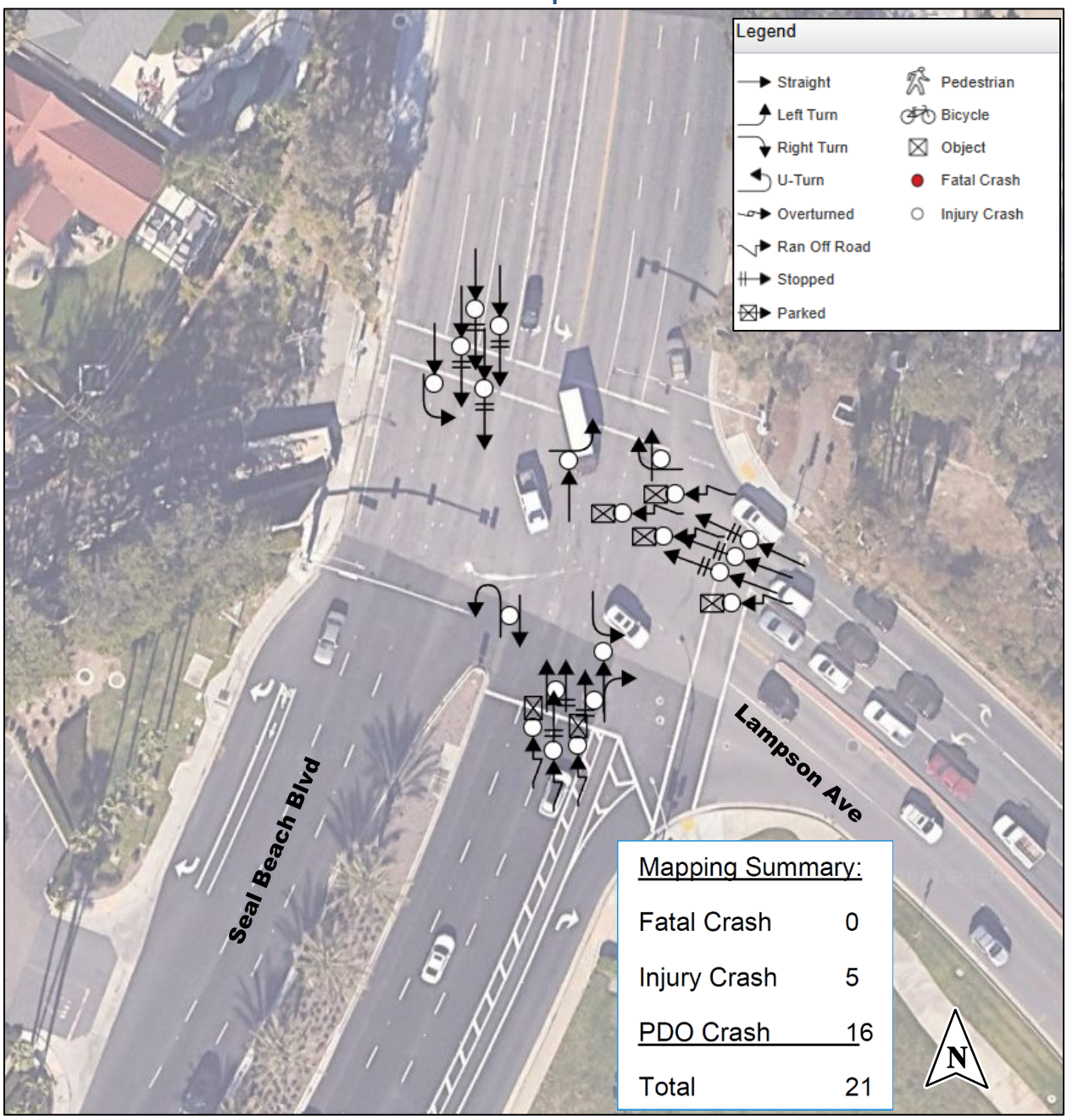
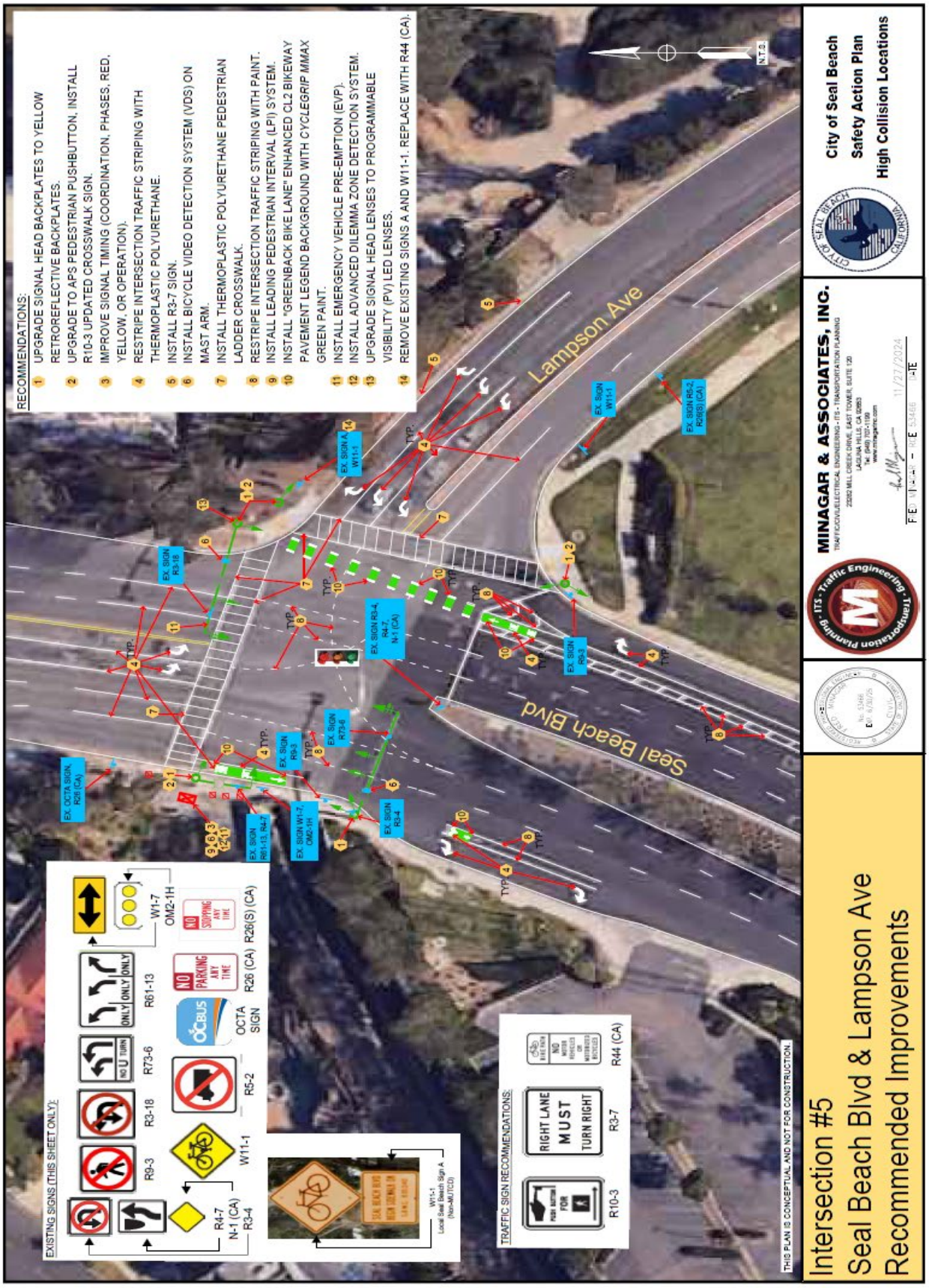


Figure 9-5: Intersection 5 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


RECOMMENDATIONS:
1 UPGRADE SIGNAL HEAD BACKPLATES TO YELLOW RETROREFLECTIVE BACKPLATES.
2 UPGRADE TO APS PEDESTRIAN PUSHBUTTON, INSTALL R10-3 UPDATED CROSSWALK SIGN.
3 IMPROVE SIGNAL TIMING (COORDINATION, PHASES, RED, YELLOW, OR OPERATION).
4 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
5 INSTALL R3-7 SIGN.
6 INSTALL BICYCLE VIDEO DETECTION SYSTEM (VDS) ON MAST ARM.
7 INSTALL THERMOPLASTIC POLYURETHANE PEDESTRIAN LADDER CROSSWALK.
8 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH PAINT.
9 INSTALL LEADING PEDESTRIAN INTERVAL (LPI) SYSTEM.
10 INSTALL "GREENBACK BIKE LANE" ENHANCED CL2 BIKEWAY PAVEMENT LEGEND BACKGROUND WITH CYCLEGRIP MMAX GREEN PAINT.
11 INSTALL EMERGENCY VEHICLE PRE-EMPTION (EVP).
12 INSTALL ADVANCED DILEMMA ZONE DETECTION SYSTEM.
13 UPGRADE SIGNAL HEAD LENSES TO PROGRAMMABLE VISIBILITY (PV) LED LENSES.
14 REMOVE EXISTING SIGNS A AND W11-1. REPLACE WITH R44 (CA).
Lampson Ave
Seal Beach Blvd
EXISTING SIGNS (THIS SHEET ONLY):
R4-7 N-1 (CA)
R3-4
W11-1
R9-3
R3-18
R73-6
R5-2
R61-13
R26 (CA)
R26(S) (CA)
W1-7 OM2-1H
OCTA SIGN
TRAFFIC SIGN RECOMMENDATIONS:
R10-3
R3-7
R44 (CA)
RIGHT LANE MUST TURN RIGHT
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
Intersection #5
Seal Beach Blvd & Lampson Ave
Recommended Improvements
MINAGAR & ASSOCIATES, INC.
City of Seal Beach
Safety Action Plan
High Collision Locations

9.1.5.1 Intersection 5 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-5: Intersection 5 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.	EA	13	$ 878.00	$ 11,414.00
2A	Upgrade To APS Pedestrian Pushbutton.	EA	4	$ 2,000.00	$ 8,000.00
2B	Install R10-3 Updated Crosswalk Sign.	EA	4	$ 598.00	$ 2,392.00
3	Improve Signal Timing (Coordination, Phases, Red, Yellow).	LS	1	$ 10,000.00	$ 10,000.00
4A	Restripe Intersection Traffic Striping with Thermoplastic Polyurethane.	LF	1,310	$ 2.60	$ 3,406.00
4B	Thermoplastic Legends	SF	260	$ 5.46	$ 1,419.60
5	Install R3-7 Sign.	EA	2	$ 598.00	$ 1,196.00
6	Install Bicycle Video Detection System (VDS) On Mast Arm.	EA	2	$ 20,000.00	$ 40,000.00
7	Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.	EA	250	$ 5.46	$ 1,365.00
8	Restripe Intersection Traffic Striping with Paint.	LF	3,500	$ 3.65	$ 12,775.00
9	Install Leading Pedestrian Interval (LPI) System.	LS	1	$ 7,000.00	$ 7,000.00
10	Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with *CycleGrip MMAX* Green Paint.	SF	135	$ 14.00	$ 1,890.00
11	Install Emergency Vehicle Pre-Emption (EVP).	EA	1	$ 15,000.00	$ 15,000.00
12	Install Dynamic Dilemma Zone Protection.	LS	1	$ 25,000.00	$ 25,000.00
13	Upgrade Signal Head Lenses To Programmable Visibility (PV) LED Lenses.	EA	11	$ 2,153.00	$ 23,683.00
				Total	$ 164,540.60
			Total Construction Cost:	$	164,540.60
			Contingencies percentage of the aforementioned Total Construction Cost:	20%	$ 32,908.12
			Total Construction Cost (Including Contingencies):	$	197,448.72

Total Cost and Benefit:

The project's total cost is estimated at $197,449 which does not include the design and engineering costs. The estimated benefit of these improvements is $3,686,744 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 18.67.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 18.67, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$3,674,115
Travel Time	$11,332
Vehicle Operating Cost	$1,145
Emissions	$153
Total Benefits	$3,686,744

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$197,449
Present Value Benefits ($ Dollars)	$3,686,744
Net Present Value ($ Dollars)	$3,489,296
Benefit / Cost Ratio	**18.67**

9.1.6 Intersection 6: Seal Beach Blvd & Saint Cloud Dr

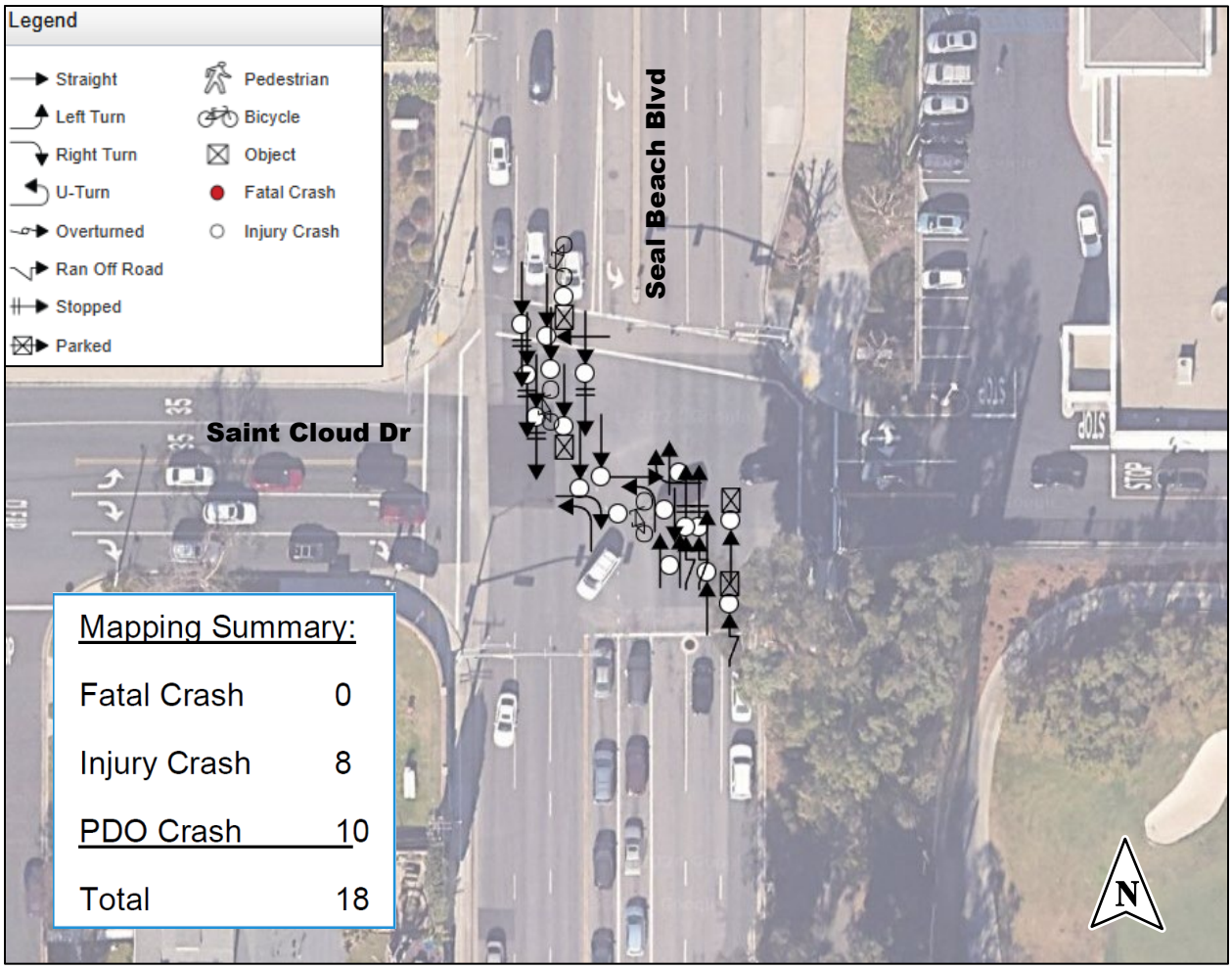
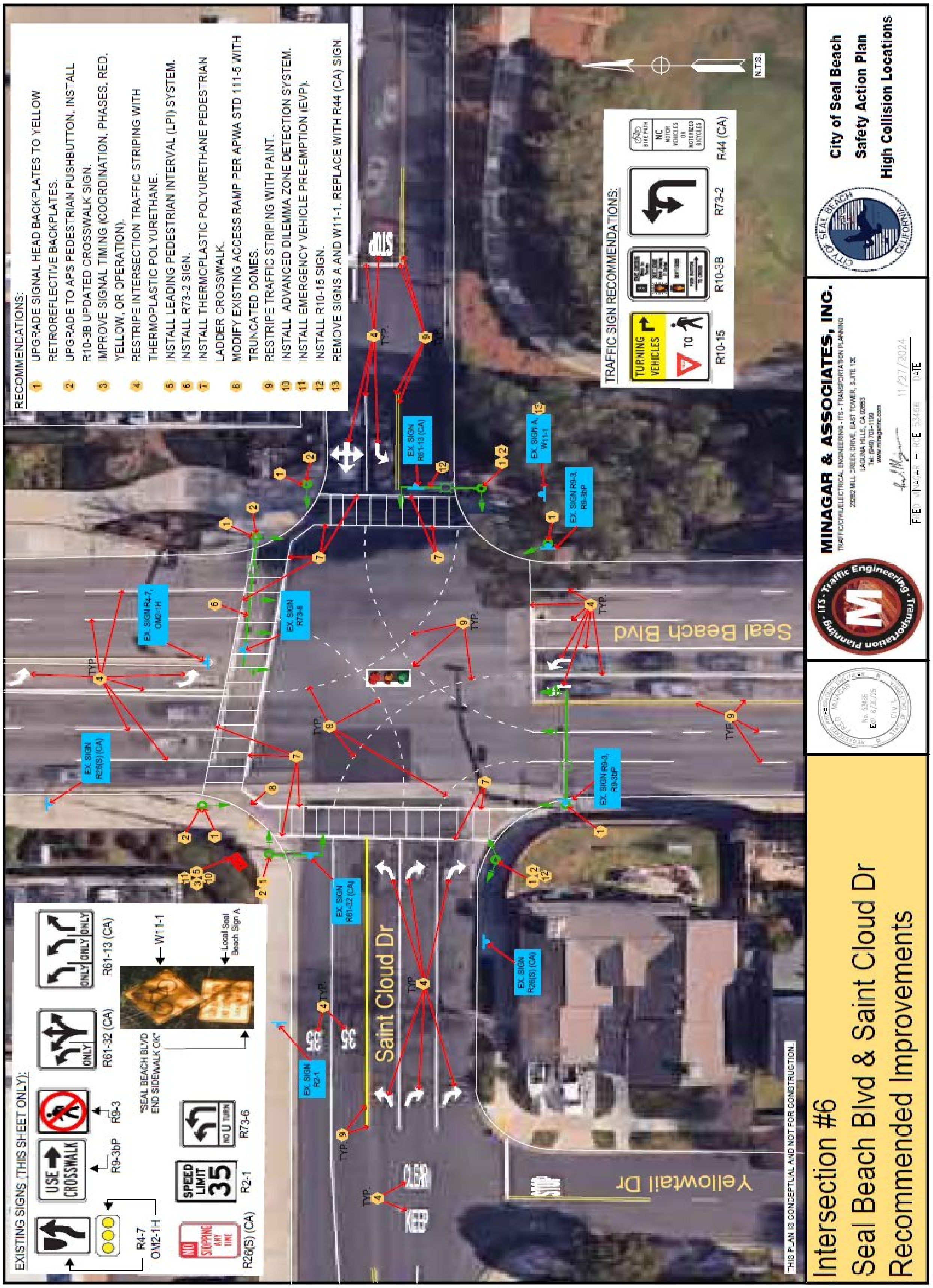


Figure 9-6: Intersection 6 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


EXISTING SIGNS (THIS SHEET ONLY):
R4-7
OM2-1H
USE CROSSWALK
R9-3bP
R9-3
R61-32 (CA)
R61-13 (CA)
"SEAL BEACH BLVD END SIDEWALK OK"
W11-1
Local Seal Beach Sign A
NO STOPPING ANY TIME
R26(S) (CA)
SPEED LIMIT 35
R2-1
NO U TURN
R73-6
RECOMMENDATIONS:
1 UPGRADE SIGNAL HEAD BACKPLATES TO YELLOW RETROREFLECTIVE BACKPLATES.
2 UPGRADE TO APS PEDESTRIAN PUSHBUTTON, INSTALL R10-3B UPDATED CROSSWALK SIGN.
3 IMPROVE SIGNAL TIMING (COORDINATION, PHASES, RED, YELLOW, OR OPERATION).
4 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
5 INSTALL LEADING PEDESTRIAN INTERVAL (LPI) SYSTEM.
6 INSTALL R73-2 SIGN.
7 INSTALL THERMOPLASTIC POLYURETHANE PEDESTRIAN LADDER CROSSWALK.
8 MODIFY EXISTING ACCESS RAMP PER APWA STD 111-5 WITH TRUNCATED DOMES.
9 RESTRIPE TRAFFIC STRIPING WITH PAINT.
10 INSTALL ADVANCED DILEMMA ZONE DETECTION SYSTEM.
11 INSTALL EMERGENCY VEHICLE PRE-EMPTION (EVP).
12 INSTALL R10-15 SIGN.
13 REMOVE SIGNS A AND W11-1. REPLACE WITH R44 (CA) SIGN.
EX. SIGN R26(S) (CA)
EX. SIGN R4-7, OM2-1H
EX. SIGN R73-6
EX. SIGN R2-1
EX. SIGN R61-32 (CA)
EX. SIGN R61-13 (CA)
EX. SIGN A, W11-1
EX. SIGN R9-3, R9-3bP
TYP.
Saint Cloud Dr
Seal Beach Blvd
Yellowtail Dr
KEEP CLEAR
STOP
TRAFFIC SIGN RECOMMENDATIONS:
TURNING VEHICLES YIELD TO
R10-15
R10-3B
R73-2
NO MOTOR VEHICLES OR MOTORIZED BICYCLES
R44 (CA)
N.T.S.
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
Intersection #6
Seal Beach Blvd & Saint Cloud Dr
Recommended Improvements
MINAGAR & ASSOCIATES, INC.
TRAFFIC/CIVIL/ELECTRICAL ENGINEERING - ITS - TRANSPORTATION PLANNING
23282 MILL CREEK DRIVE, EAST TOWER, SUITE 120
LAGUNA HILLS, CA 92653
Tel: (949) 707-1199
www.minagarinc.com
11/27/2024
FRED MINAGAR - RCE 53466 DATE
City of Seal Beach
Safety Action Plan
High Collision Locations

9.1.6.1 Intersection 6 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-6: Intersection 6 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.	EA	16	$ 878.00	$ 14,048.00
2A	Upgrade To APS Pedestrian Pushbutton.	EA	6	$ 2,000.00	$ 12,000.00
2B	Install R10-3 Updated Crosswalk Sign.	EA	6	$ 598.00	$ 3,588.00
3	Improve Signal Timing (Coordination, Phases, Red, Yellow).	LS	1	$ 10,000.00	$ 10,000.00
4A	Restripe Intersection Traffic Striping with Thermoplastic Polyurethane.	LF	830	$ 2.60	$ 2,158.00
4B	Thermoplastic Legends	SF	380	$ 5.46	$ 2,074.80
5	Install Leading Pedestrian Interval (LPI) System.	EA	1	$ 7,000.00	$ 7,000.00
6	Install R73-2 Sign.	EA	1	$ 598.00	$ 598.00
7	Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.	EA	250	$ 5.46	$ 1,365.00
8	Modify Existing Access Ramp Per APWA Std 111-5 With Truncated Domes.	LS	1	$ 7,000.00	$ 7,000.00
9	Restripe Traffic Striping with Paint.	LF	1,900	$ 3.65	$ 6,935.00
10	Install Advanced Dilemma Zone Detection System.	EA	1	$ 25,000.00	$ 25,000.00
11	Install Emergency Vehicle Pre-Emption (EVP).	EA	2	$ 15,000.00	$ 30,000.00
12	Install Sign R10-15.	EA	2	$ 598.00	$ 1,196.00
				Total	$ 122,962.80
				Total Construction Cost:	$ 122,962.80
				Contingencies percentage of the aforementioned Total Construction Cost:	20% $ 24,592.56
				Total Construction Cost (Including Contingencies):	$ 147,555.36

Total Cost and Benefit:

The project's total cost is estimated at $147,555 which does not include the design and engineering costs. The estimated benefit of these improvements is $2,398,405 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 16.25.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 16.25, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$2,387,954
Travel Time	$9,400
Vehicle Operating Cost	$931
Emissions	$121
Total Benefits	$2,398,405

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$147,555
Present Value Benefits ($ Dollars)	$2,398,405
Net Present Value ($ Dollars)	$2,250,850
Benefit / Cost Ratio	**16.25**

9.1.7 Intersection 7: Seal Beach Blvd & Golden Rain Rd

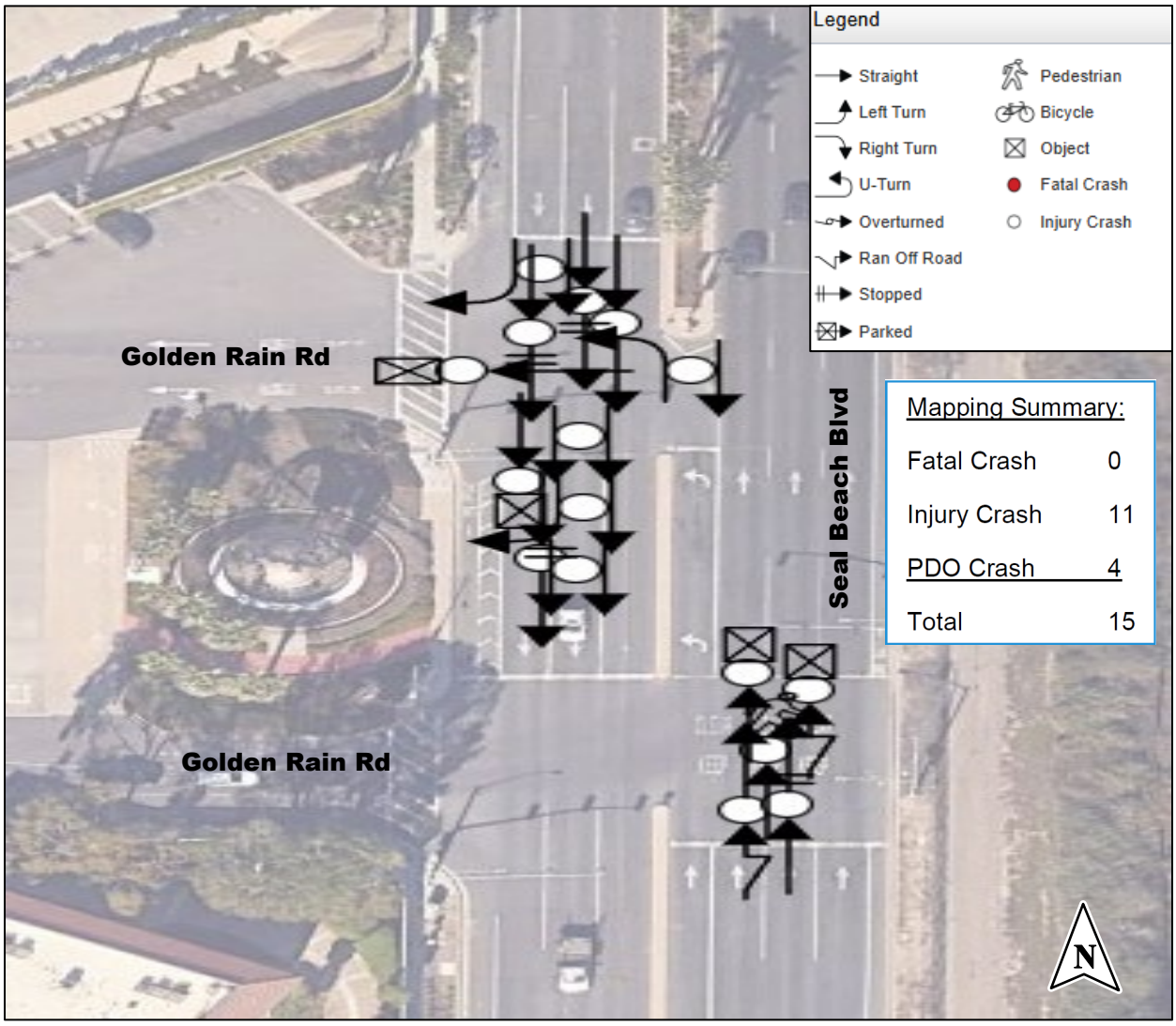


Figure 9-7: Intersection 7 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


RECOMMENDATIONS:
1 UPGRADE SIGNAL HEAD BACKPLATES TO YELLOW RETROREFLECTIVE BACKPLATES.
2 UPGRADE TO APS PEDESTRIAN PUSHBUTTON, INSTALL R10-3 UPDATED CROSSWALK SIGN.
3 IMPROVE SIGNAL TIMING (COORDINATION, PHASES, RED, YELLOW, OR OPERATION).
4 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
5 INSTALL VEHICLE SPEED FEEDBACK SIGN.
6 INSTALL R5-1 SIGN.
7 INSTALL BICYCLE VIDEO DETECTION SYSTEM (VDS) ON MAST ARM.
8 REINSTALL THERMOPLASTIC POLYURETHANE PEDESTRIAN ZEBRA CROSSWALK.
9 INSTALL LEADING PEDESTRIAN INTERVAL (LPI) SYSTEM.
10 UPGRADE TO PROGRAMMABLE TRAFFIC SIGNAL HEAD INDICATION FOR NORTHBOUND DIRECTION.
11 UPGRADE SIGNAL HEAD LENSES TO LED.
12 UPGRADE SIGNAL HEAD LENSES TO PROGRAMMABLE VISIBILITY (PV) LED LENSES.
13 INSTALL R3-7 SIGN.
14 RESTRIPE TRAFFIC STRIPING WITH PAINT.
15 INSTALL ADVANCED DILEMMA ZONE DETECTION SYSTEM.
16 INSTALL "GREENBACK BIKE LANE" ENHANCED CL2 BIKEWAY PAVEMENT LEGEND BACKGROUND WITH CYCLEGRIP MMAX GREEN PAINT.
17 INSTALL EMERGENCY VEHICLE PRE-EMPTION (EVP).
EXISTING SIGNS (THIS SHEET ONLY):
R73-3 OM2-1H
W1-7 N-1 (CA)
D11-1
R9-3
R3-4
R2-1
R3-1
TYPE Q (CA)
R3-18
N.T.S.
TRAFFIC SIGN RECOMMENDATIONS:
R10-3
R2-1 VEHICLE SPEED FEEDBACK SIGN
R5-1
R3-7R
Golden Rain Rd (Leisure World Entrance)
Golden Rain Rd (Leisure World Exit)
Seal Beach Blvd
EX. SIGN POST
EX. SIGN R73-3, OM2-1H
EX. SIGN R3-4
EX. SIGN R2-1
EX. SIGN TYPE Q (CA)
EX. SIGN D11-1
EX. SIGN R9-3
EX. SIGN R3-1
EX. SIGN W1-7, N-1 (CA)
EX. SIGN R3-18, OM2-1H
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
Intersection #7
Seal Beach Blvd & Golden Rain Rd
Recommended Improvements
MINAGAR & ASSOCIATES, INC.
TRAFFIC/CIVIL/ELECTRICAL ENGINEERING - ITS - TRANSPORTATION PLANNING
23282 MILL CREEK DRIVE, EAST TOWER, SUITE 120
LAGUNA HILLS, CA 92653
Tel: (949) 707-1199
www.minagarinc.com
FRED MINAGAR – RCE 53466
11/27/2024
DATE
City of Seal Beach
Safety Action Plan
High Collision Locations

9.1.7.1 Intersection 7 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-7: Intersection 7 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.	EA	26	$ 878.00	$ 22,828.00
2A	Upgrade To APS Pedestrian Pushbutton.	EA	4	$ 2,000.00	$ 8,000.00
2B	Install R10-3 Updated Crosswalk Sign.	EA	4	$ 598.00	$ 2,392.00
3	Improve Signal Timing (Coordination, Phases, Red, Yellow).	LS	1	$ 10,000.00	$ 10,000.00
4A	Restripe Intersection Traffic Striping with Thermoplastic Polyurethane.	LF	900	$ 2.60	$ 2,340.00
4B	Thermoplastic Legends	SF	940	$ 5.46	$ 5,132.40
5	Install Vehicle Speed Feedback Sign.	EA	1	$ 15,000.00	$ 15,000.00
6	Install R5-1 Sign.	EA	1	$ 598.00	$ 598.00
7	Install Bicycle Video Detection System (VDS) On Mast Arm.	EA	4	$ 20,000.00	$ 80,000.00
8	Reinstall Thermoplastic Polyurethane Pedestrian Zebra Crosswalk.	LF	160	$ 5.46	$ 873.60
9	Install Leading Pedestrian Interval (LPI) System.	LS	1	$ 7,000.00	$ 7,000.00
10	Upgrade To Programmable Traffic Signal Head Indication For Northbound Direction.	EA	3	$ 2,153.00	$ 6,459.00
11	Upgrade Signal Head Lenses To LED.	EA	36	$ 717.00	$ 25,812.00
12	Upgrade Signal Head Lenses To Programmable Visibility (PV) LED Lenses.	EA	18	$ 2,153.00	$ 38,754.00
13	Install R3-7 Sign.	EA	1	$ 598.00	$ 598.00
14	Restripe Traffic Striping With Paint.	LF	2,400	$ 3.65	$ 8,760.00
15	Install Advanced Dilemma Zone Detection System.	LS	1	$ 25,000.00	$ 25,000.00
16	Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background With *CycleGrip MMAX* Green Paint.	SF	135	$ 14.00	$ 1,890.00
17	Install Emergency Vehicle Pre-Emption (EVP).	EA	3	$ 15,000.00	$ 45,000.00
				Total	$ 306,437.00
			Total Construction Cost:	$	306,437.00
			Contingencies percentage of the aforementioned Total Construction Cost:	20%	$ 61,287.40
			Total Construction Cost (Including Contingencies):	$	367,724.40

Total Cost and Benefit:

The project's total cost is estimated at $367,724 which does not include the design and engineering costs. The estimated benefit of these improvements is $9,515,960 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 25.88.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 25.88, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$9,481,718
Travel Time	$31,070
Vehicle Operating Cost	$3,000
Emissions	$172
Total Benefits	$9,515,960

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$367,724
Present Value Benefits ($ Dollars)	$9,515,960
Net Present Value ($ Dollars)	$9,148,236
Benefit / Cost Ratio	**25.88**

9.1.8 Intersection 8: Seal Beach Blvd & Adolfo Lopez Dr

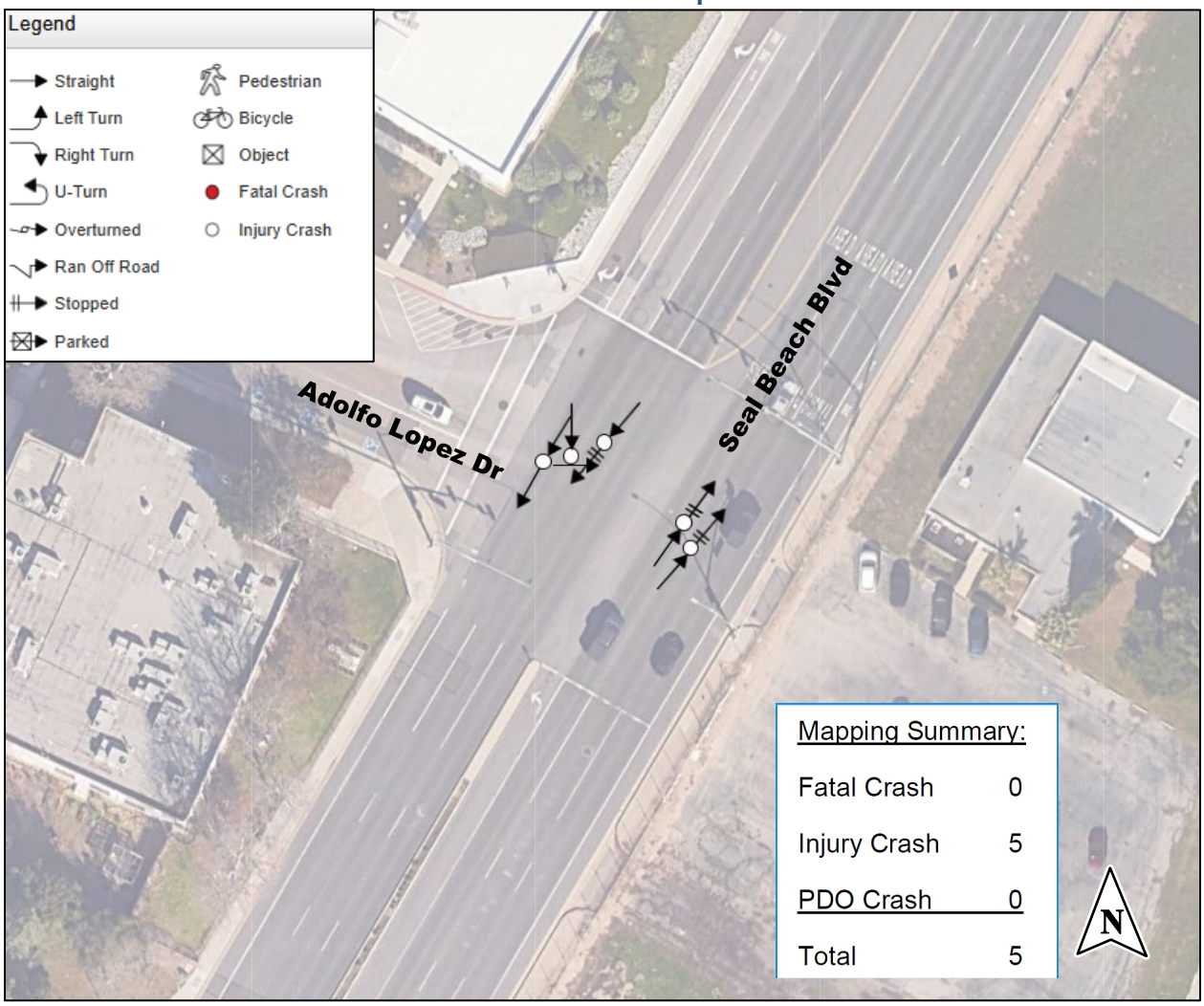
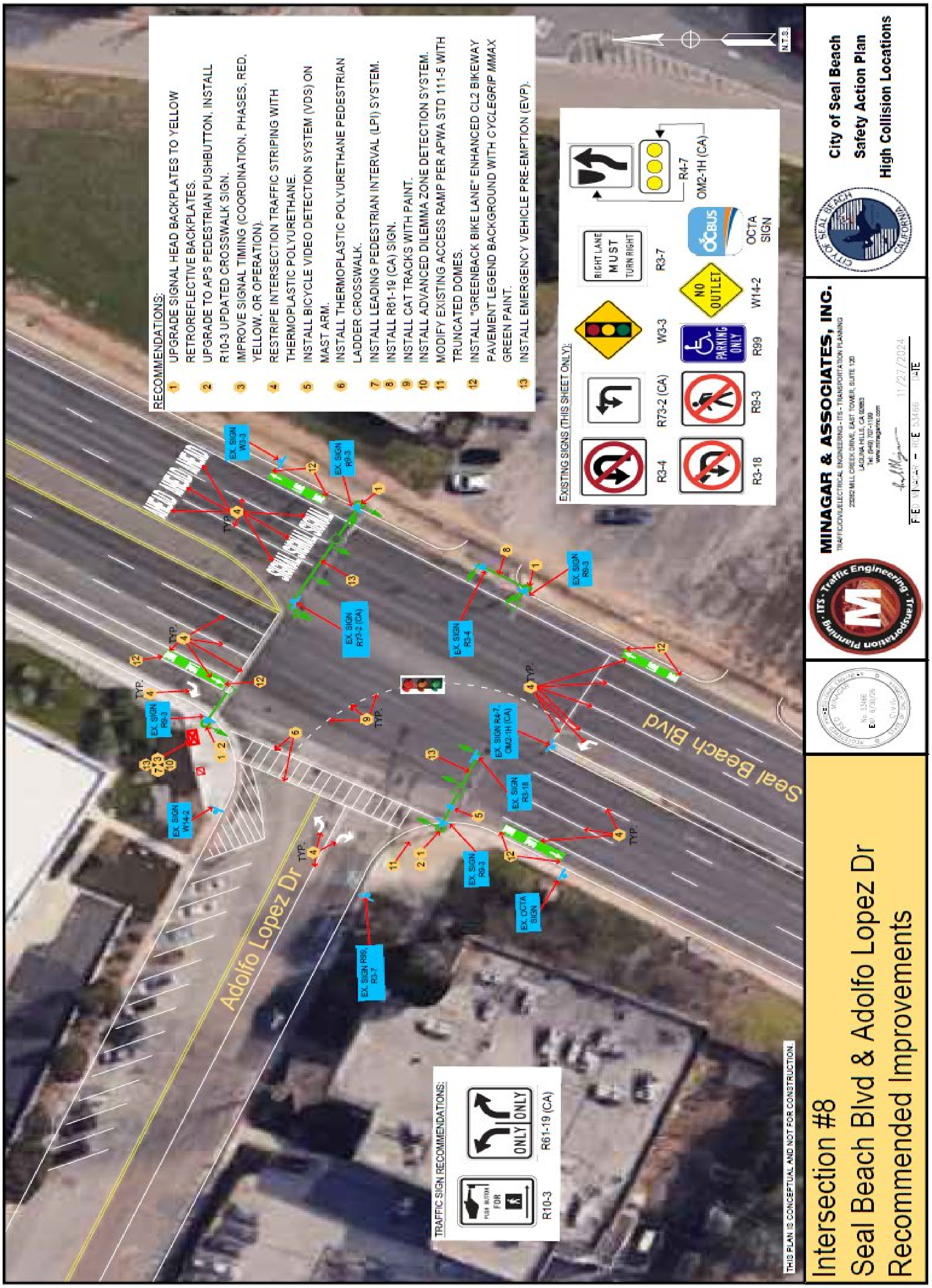


Figure 9-8: Intersection 8 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


RECOMMENDATIONS:
1 UPGRADE SIGNAL HEAD BACKPLATES TO YELLOW RETROREFLECTIVE BACKPLATES.
2 UPGRADE TO APS PEDESTRIAN PUSHBUTTON. INSTALL R10-3 UPDATED CROSSWALK SIGN.
3 IMPROVE SIGNAL TIMING (COORDINATION, PHASES, RED, YELLOW, OR OPERATION).
4 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
5 INSTALL BICYCLE VIDEO DETECTION SYSTEM (VDS) ON MAST ARM.
6 INSTALL THERMOPLASTIC POLYURETHANE PEDESTRIAN LADDER CROSSWALK.
7 INSTALL LEADING PEDESTRIAN INTERVAL (LPI) SYSTEM.
8 INSTALL R61-19 (CA) SIGN.
9 INSTALL CAT TRACKS WITH PAINT.
10 INSTALL ADVANCED DILEMMA ZONE DETECTION SYSTEM.
11 MODIFY EXISTING ACCESS RAMP PER APWA STD 111-5 WITH TRUNCATED DOMES.
12 INSTALL "GREENBACK BIKE LANE" ENHANCED CL2 BIKEWAY PAVEMENT LEGEND BACKGROUND WITH CYCLEGRIP MMAX GREEN PAINT.
13 INSTALL EMERGENCY VEHICLE PRE-EMPTION (EVP).
EXISTING SIGNS (THIS SHEET ONLY):
R3-4
R73-2 (CA)
W3-3
R3-7
R4-7
OM2-1H (CA)
R3-18
R9-3
R99
W14-2
OCTA SIGN
RIGHT LANE MUST TURN RIGHT
NO OUTLET
PARKING ONLY
N.T.S.
TRAFFIC SIGN RECOMMENDATIONS:
R10-3
R61-19 (CA)
ONLY
Seal Beach Blvd
Adolfo Lopez Dr
EX. SIGN W3-3
EX. SIGN R9-3
EX. SIGN R73-2 (CA)
EX. SIGN R3-4
EX. SIGN R4-7, OM2-1H (CA)
EX. SIGN R3-18
EX. SIGN W14-2
EX. OCTA SIGN
EX. SIGN R99, R3-7
TYP.
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
MINAGAR & ASSOCIATES, INC.
TRAFFIC/CIVIL/ELECTRICAL ENGINEERING - ITS - TRANSPORTATION PLANNING
23282 MILL CREEK DRIVE, EAST TOWER, SUITE 120
LAGUNA HILLS, CA 92653
Tel: (949) 707-1199
www.minagarinc.com
F.E. MINAGAR - R.C.E. 53466
11/27/2024
DATE
City of Seal Beach
Safety Action Plan
High Collision Locations
Intersection #8
Seal Beach Blvd & Adolfo Lopez Dr
Recommended Improvements

9.1.8.1 Intersection 8 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-8: Intersection 8 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.	EA	10	$ 878.00	$ 8,780.00
2A	Upgrade To APS Pedestrian Pushbutton.	EA	2	$ 2,000.00	$ 4,000.00
2B	Install R10-3 Updated Crosswalk Sign.	EA	2	$ 598.00	$ 1,196.00
3	Improve Signal Timing (Coordination, Phases, Red, Yellow).	LS	1	$ 10,000.00	$ 10,000.00
4A	Restripe Intersection Traffic Striping with Thermoplastic Polyurethane	LF	700	$ 2.60	$ 1,820.00
4B	Thermoplastic Legends	SF	440	$ 5.46	$ 2,402.40
5	Install Bicycle Video Detection System (VDS) On Mast Arm.	EA	1	$ 20,000.00	$ 20,000.00
6	Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.	EA	100	$ 5.46	$ 546.00
7	Install Leading Pedestrian Interval (LPI) System.	LS	1	$ 7,000.00	$ 7,000.00
8	Install R61-19 (CA) Sign.	EA	1	$ 598.00	$ 598.00
9	Install Cat Tracks with Paint.	LF	125	$ 3.65	$ 456.25
10	Install Advanced Dilemma Zone Detection System.	LS	1	$ 25,000.00	$ 25,000.00
11	Modify Existing Access Ramp Per APWA Std 111-5 With Truncated Domes.	LS	1	$ 7,000.00	$ 7,000.00
12	Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background With *CycleGrip MMAX* Green Paint.	SF	180	$ 14.00	$ 2,520.00
13	Install Emergency Vehicle Pre-Emption (EVP).	EA	2	$ 15,000.00	$ 30,000.00
				Total	$ 121,318.65
				Total Construction Cost:	$ 121,318.65
				Contingencies percentage of the aforementioned Total Construction Cost:	20% $ 24,263.73
				Total Construction Cost (Including Contingencies):	$ 145,582.38

Total Cost and Benefit:

The project's total cost is estimated at $145,582 which does not include the design and engineering costs. The estimated benefit of these improvements is $9,685,810 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 66.53.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 66.53, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$9,671,155
Travel Time	$13,276
Vehicle Operating Cost	$1,378
Emissions	$0
Total Benefits	$9,685,810

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$145,582
Present Value Benefits ($ Dollars)	$9,685,810
Net Present Value ($ Dollars)	$9,540,227
Benefit / Cost Ratio	**66.53**

9.1.9 Intersection 9: Marina Dr & 5th Street

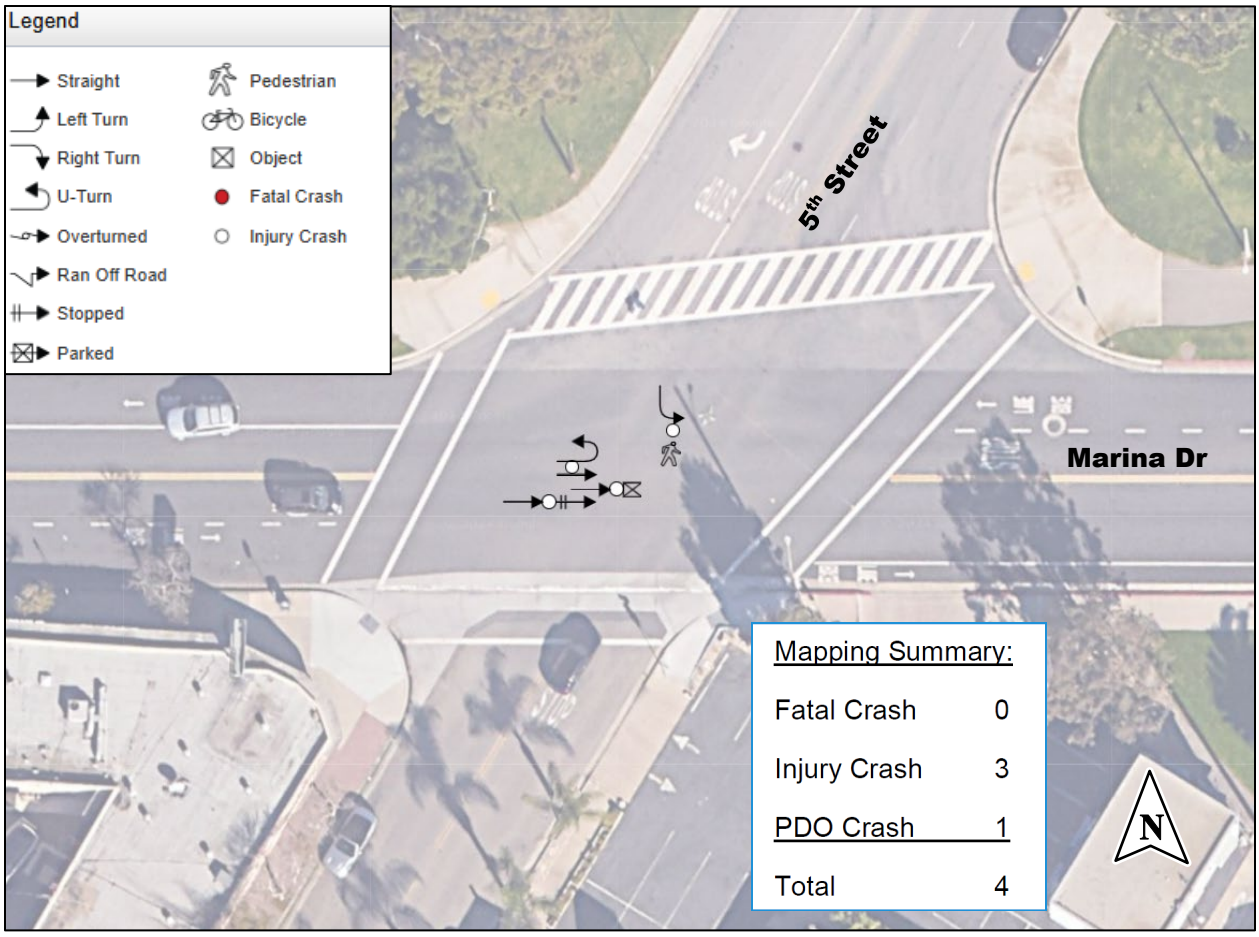
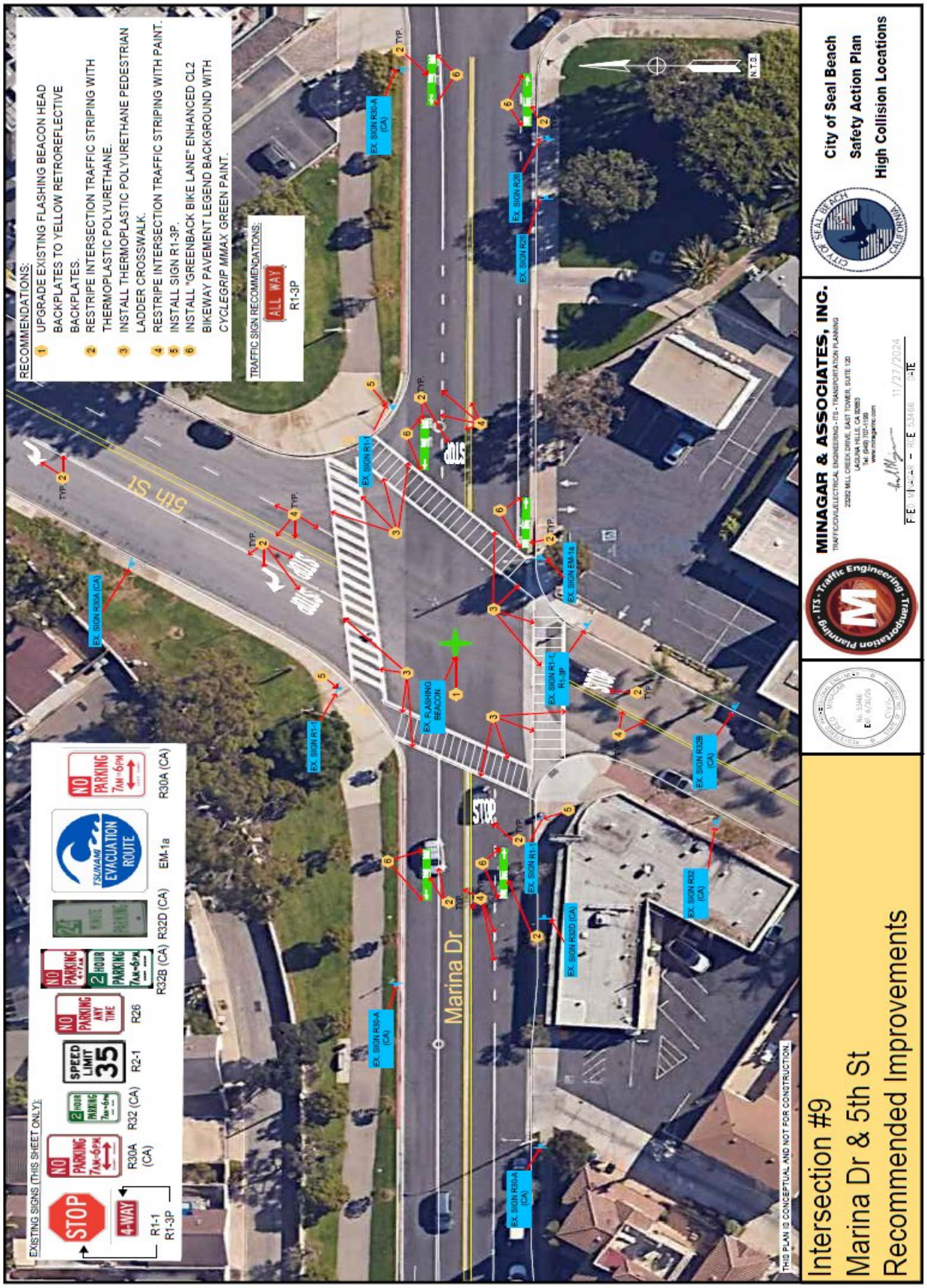


Figure 9-9: Intersection 9 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


RECOMMENDATIONS:
1 UPGRADE EXISTING FLASHING BEACON HEAD BACKPLATES TO YELLOW RETROREFLECTIVE BACKPLATES.
2 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
3 INSTALL THERMOPLASTIC POLYURETHANE PEDESTRIAN LADDER CROSSWALK.
4 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH PAINT.
5 INSTALL SIGN R1-3P.
6 INSTALL "GREENBACK BIKE LANE" ENHANCED CL2 BIKEWAY PAVEMENT LEGEND BACKGROUND WITH CYCLEGRIP MMAX GREEN PAINT.
TRAFFIC SIGN RECOMMENDATIONS:
ALL WAY
R1-3P
EXISTING SIGNS (THIS SHEET ONLY):
STOP
4-WAY
R1-1
R1-3P
NO PARKING 7AM-6PM
R30A (CA)
2 HOUR PARKING 7AM-6PM
R32 (CA)
SPEED LIMIT 35
R2-1
NO PARKING ANY TIME
R26
NO PARKING 2 HOUR PARKING 7AM-6PM
R32B (CA)
R32D (CA)
TSUNAMI EVACUATION ROUTE
EM-1a
NO PARKING 7AM-6PM
R30A (CA)
5th St
Marina Dr
STOP
EX. SIGN R30A (CA)
EX. SIGN R1-1
EX. FLASHING BEACON
EX. SIGN R1-1, R1-3P
EX. SIGN EM-1a
EX. SIGN R32B (CA)
EX. SIGN R32 (CA)
EX. SIGN R32D (CA)
EX. SIGN R1-1
EX. SIGN R30-A (CA)
EX. SIGN R25
EX. SIGN R26
2 TYP.
4 TYP.
6 TYP.
N.T.S.
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
Intersection #9
Marina Dr & 5th St
Recommended Improvements
City of Seal Beach
Safety Action Plan
High Collision Locations
MINAGAR & ASSOCIATES, INC.
TRAFFIC/CIVIL/ELECTRICAL ENGINEERING - ITS - TRANSPORTATION PLANNING
22082 MILL CREEK DRIVE, EAST TOWER, SUITE 120
LAGUNA HILLS, CA 92653
Tel: (949) 707-1199
www.minagartic.com
11/27/2024
Traffic Engineering, ITS, Transportation Planning

9.1.9.1 Intersection 9 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-9: Intersection 9 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	Upgrade Existing Flashing Beacon Head Backplates to Yellow Retroreflective Backplates.	EA	4	$ 878.00	$ 3,512.00
2A	Restripe Intersection Traffic Striping with Thermoplastic Polyurethane.	LF	200	$ 2.60	$ 520.00
2B	Thermoplastic Legends	SF	260	$ 5.46	$ 1,419.60
3	Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.	LF	240	$ 5.46	$ 1,310.40
4	Restripe Intersection Traffic Striping with Paint.	LF	1,000	$ 3.65	$ 3,650.00
5	Install Sign R1-3P.	EA	3	$ 598.00	$ 1,794.00
6	Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with *CycleGrip MMAX* Green Paint.	SF	270	$ 14.00	$ 3,780.00
				Total	$ 15,986.00
				Total Construction Cost:	$ 15,986.00
				Contingencies percentage of the aforementioned Total Construction Cost:	20% $ 3,197.20
				Total Construction Cost (Including Contingencies):	$ 19,183.20

Total Cost and Benefit:

The project's total cost is estimated at $19,183 which does not include the design and engineering costs. The estimated benefit of these improvements is $983,983 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 51.29.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 51.29, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

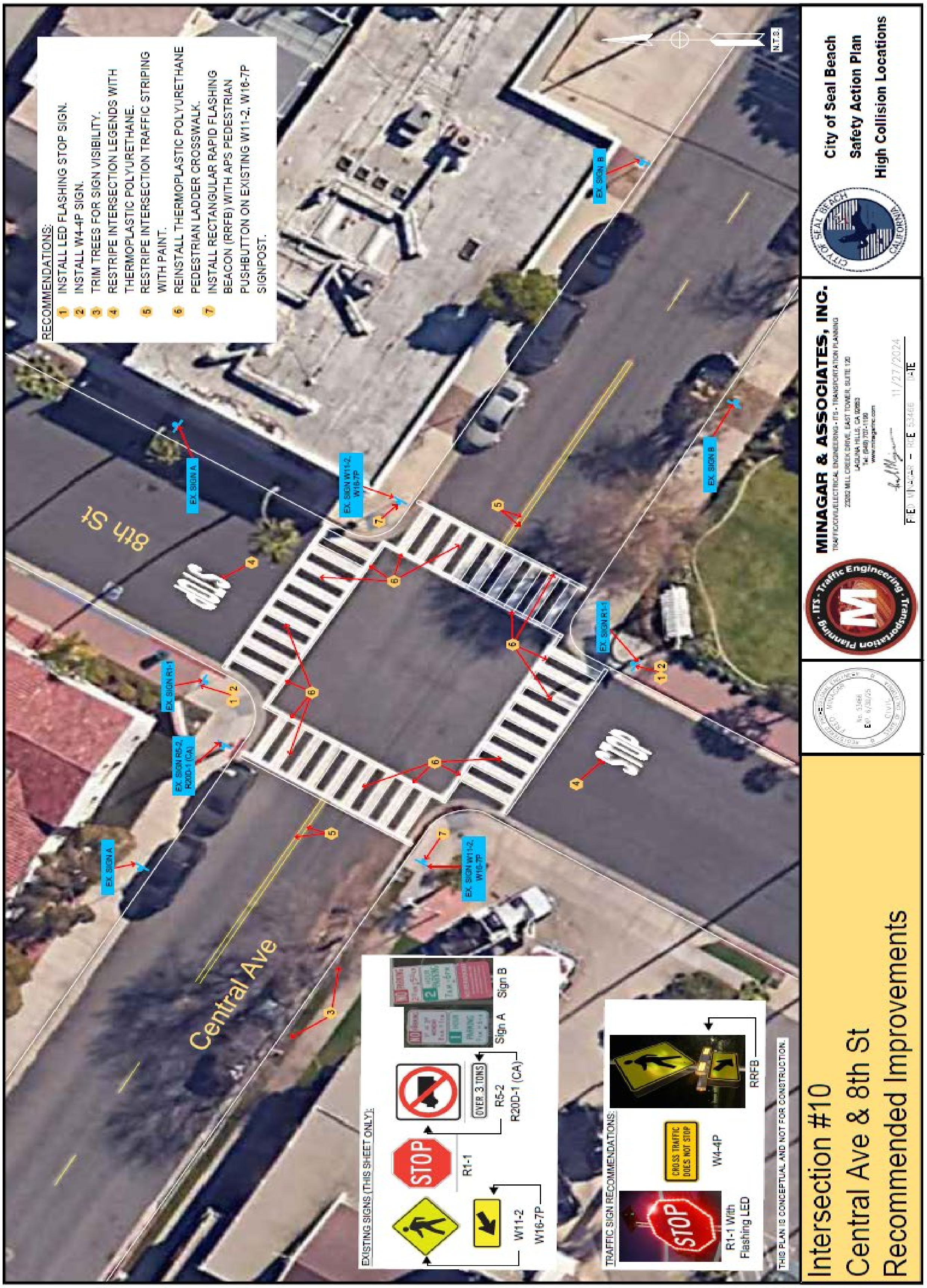
Itemized Benefits	
Safety	$982,398
Travel Time	$1,415
Vehicle Operating Cost	$147
Emissions	$23
Total Benefits	$983,983

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$19,183
Present Value Benefits ($ Dollars)	$983,983
Net Present Value ($ Dollars)	$964,800
Benefit / Cost Ratio	**51.29**

9.1.10 Intersection 10: Central Ave & 8th Street

Figure 9-10: Intersection 10 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


RECOMMENDATIONS:
1 INSTALL LED FLASHING STOP SIGN.
2 INSTALL W4-4P SIGN.
3 TRIM TREES FOR SIGN VISIBILITY.
4 RESTRIPE INTERSECTION LEGENDS WITH THERMOPLASTIC POLYURETHANE.
5 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH PAINT.
6 REINSTALL THERMOPLASTIC POLYURETHANE PEDESTRIAN LADDER CROSSWALK.
7 INSTALL RECTANGULAR RAPID FLASHING BEACON (RRFB) WITH APS PEDESTRIAN PUSHBUTTON ON EXISTING W11-2, W16-7P SIGNPOST.
8th St
Central Ave
STOP
EX. SIGN A
EX. SIGN B
EX. SIGN W11-2, W16-7P
EX. SIGN R1-1
EX. SIGN R5-2, R20D-1 (CA)
N.T.S.
EXISTING SIGNS (THIS SHEET ONLY):
W11-2
W16-7P
R1-1
R5-2
R20D-1 (CA)
OVER 3 TONS
Sign A
Sign B
TRAFFIC SIGN RECOMMENDATIONS:
R1-1 With Flashing LED
W4-4P
CROSS TRAFFIC DOES NOT STOP
RRFB
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
City of Seal Beach
Safety Action Plan
High Collision Locations
MINAGAR & ASSOCIATES, INC.
FIED MINAGAR – RCE 53466
11/27/2024
DATE
Intersection #10
Central Ave & 8th St
Recommended Improvements

9.1.10.1 Intersection 10 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-10: Intersection 10 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	Install LED Flashing Stop Sign.	EA	2	$ 4,500.00	$ 9,000.00
2	Install W4-4P Sign.	EA	2	$ 598.00	$ 1,196.00
3	Trim Trees For Sign Visibility.	LS	1	$ 750.00	$ 750.00
4	Restripe Intersection Legends With Thermoplastic Polyurethane.	SF	45	$ 2.60	$ 117.00
5	Restripe Intersection Traffic Striping With Paint.	LF	200	$ 3.65	$ 730.00
6	Reinstall Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.	LF	120	$ 5.46	$ 655.20
7A	Install Rectangular Rapid Flashing Beacon (RRFB) on Existing W11-2, W16-7P Signpost.	EA	2	$ 15,000.00	$ 30,000.00
7B	Install APS Pedestrian Pushbutton on Existing W11-2, W16-7P Signpost.	EA	2	$ 2,000.00	$ 4,000.00
				Total	$ 46,448.20
				Total Construction Cost:	$ 46,448.20
				Contingencies percentage of the aforementioned Total Construction Cost:	20% $ 9,289.64
				Total Construction Cost (Including Contingencies):	$ 55,737.84

Total Cost and Benefit:

The project's total cost is estimated at $55,738 which does not include the design and engineering costs. The estimated benefit of these improvements is $645,750 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 11.59.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 11.59, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$643,739
Travel Time	$1,783
Vehicle Operating Cost	$185
Emissions	$43
Total Benefits	$645,750

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$55,738
Present Value Benefits ($ Dollars)	$645,750
Net Present Value ($ Dollars)	$590,012
Benefit / Cost Ratio	**11.59**

9.1.11 Intersection 11: Seal Beach Blvd & Saint Andrews Dr

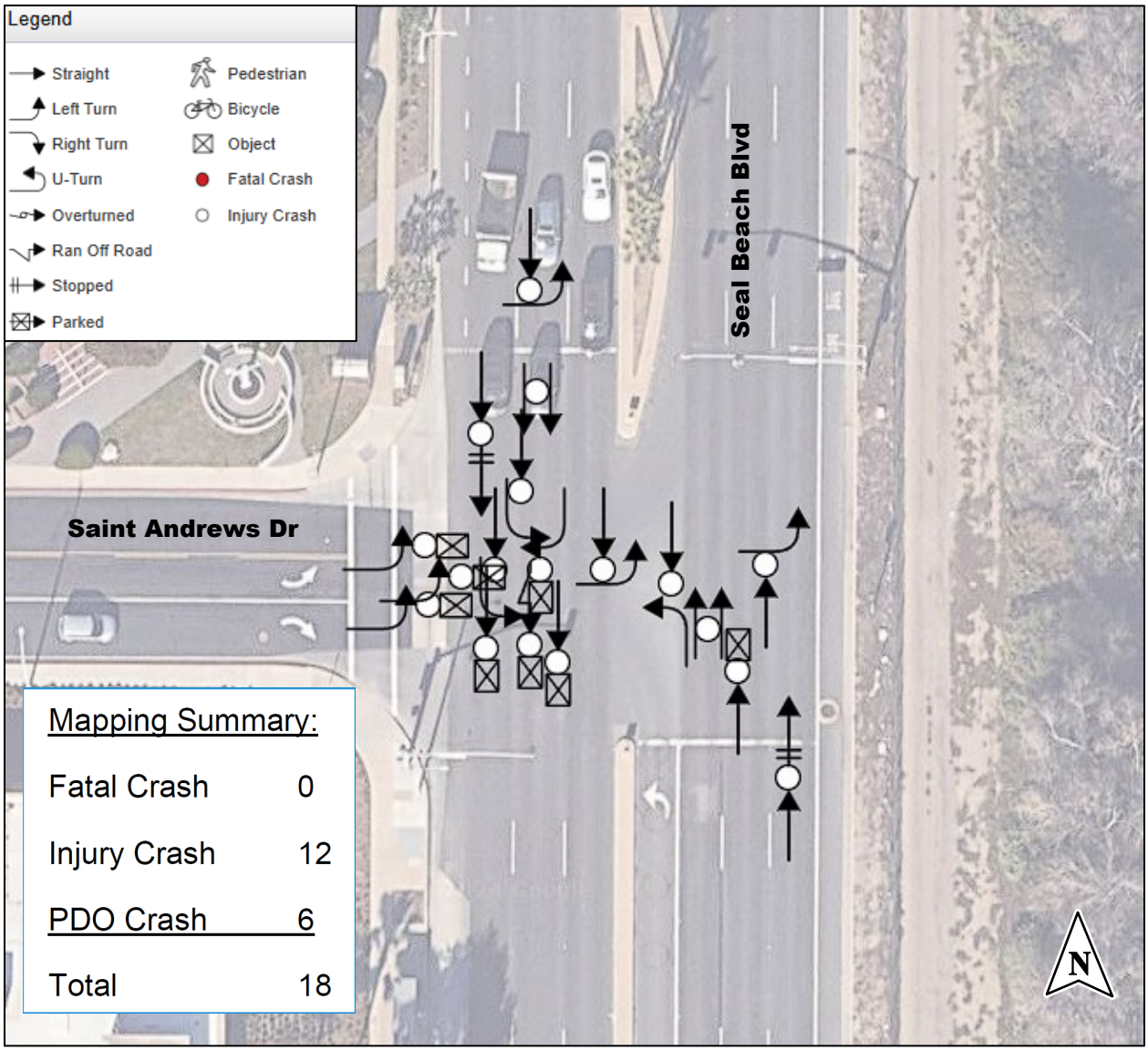
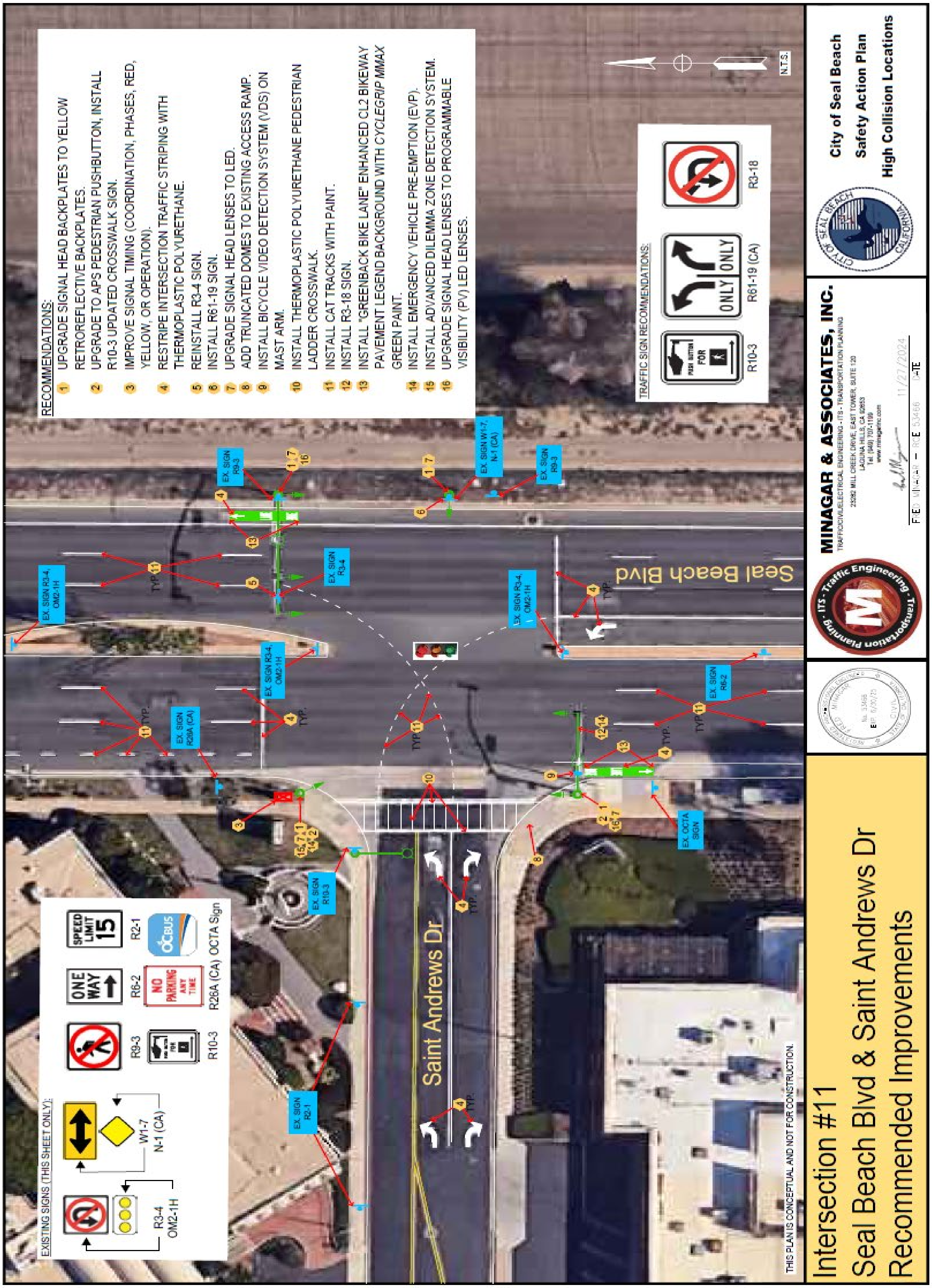


Figure 9-11: Intersection 11 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


RECOMMENDATIONS:
1 UPGRADE SIGNAL HEAD BACKPLATES TO YELLOW RETROREFLECTIVE BACKPLATES.
2 UPGRADE TO APS PEDESTRIAN PUSHBUTTON, INSTALL R10-3 UPDATED CROSSWALK SIGN.
3 IMPROVE SIGNAL TIMING (COORDINATION, PHASES, RED, YELLOW, OR OPERATION).
4 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
5 REINSTALL R3-4 SIGN.
6 INSTALL R61-19 SIGN.
7 UPGRADE SIGNAL HEAD LENSES TO LED.
8 ADD TRUNCATED DOMES TO EXISTING ACCESS RAMP.
9 INSTALL BICYCLE VIDEO DETECTION SYSTEM (VDS) ON MAST ARM.
10 INSTALL THERMOPLASTIC POLYURETHANE PEDESTRIAN LADDER CROSSWALK.
11 INSTALL CAT TRACKS WITH PAINT.
12 INSTALL R3-18 SIGN.
13 INSTALL "GREENBACK BIKE LANE" ENHANCED CL2 BIKEWAY PAVEMENT LEGEND BACKGROUND WITH CYCLEGRIP MMAX GREEN PAINT.
14 INSTALL EMERGENCY VEHICLE PRE-EMPTION (EVP).
15 INSTALL ADVANCED DILEMMA ZONE DETECTION SYSTEM.
16 UPGRADE SIGNAL HEAD LENSES TO PROGRAMMABLE VISIBILITY (PV) LED LENSES.
TRAFFIC SIGN RECOMMENDATIONS:
R10-3
R61-19 (CA)
R3-18
N.T.S.
EXISTING SIGNS (THIS SHEET ONLY):
R3-4
OM2-1H
W1-7
N-1 (CA)
R9-3
R10-3
R6-2
R26A (CA)
R2-1
OCTA Sign
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
Seal Beach Blvd
Saint Andrews Dr
EX. SIGN R9-3
EX. SIGN R3-4
EX. SIGN R3-4, OM2-1H
EX. SIGN W1-7, N-1 (CA)
EX. SIGN R26A (CA)
EX. SIGN R6-2
EX. OCTA SIGN
EX. SIGN R10-3
EX. SIGN R2-1
TYP.
MINAGAR & ASSOCIATES, INC.
City of Seal Beach
Safety Action Plan
High Collision Locations
Intersection #11
Seal Beach Blvd & Saint Andrews Dr
Recommended Improvements

9.1.11.1 Intersection 11 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-11: Intersection 11 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	Upgrade Signal Head Backplates To Yellow Retroreflective Backplates.	EA	7	$ 878.00	$ 6,146.00
2A	Upgrade To APS Pedestrian Pushbutton	EA	2	$ 2,000.00	$ 4,000.00
2B	Install R10-3 Updated Crosswalk Sign.	EA	2	$ 598.00	$ 1,196.00
3	Improve Signal Timing (Coordination, Phases, Red, Yellow).	LS	1	$ 10,000.00	$ 10,000.00
4A	Restripe Intersection Traffic Striping With Thermoplastic Polyurethane.	LF	400	$ 2.60	$ 1,040.00
4B	Thermoplastic Legends	SF	120	$ 5.46	$ 655.20
5	Reinstall R3-4 Sign.	EA	1	$ 598.00	$ 598.00
6	Install R61-19 Sign.	EA	1	$ 598.00	$ 598.00
7	Upgrade Signal Head Lenses To LED.	EA	21	$ 717.00	$ 15,057.00
8	Add Truncated Domes To Existing Access Ramp.	LS	1	$ 605.00	$ 605.00
9	Install Bicycle Video Detection System (VDS) On Mast Arm.	EA	1	$ 20,000.00	$ 20,000.00
10	Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.	LF	80	$ 5.46	$ 436.80
11	Install Cat Tracks With Paint.	LF	1,300	$ 3.65	$ 4,745.00
12	Install R3-18 Sign.	EA	1	$ 598.00	$ 598.00
13	Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background With *CycleGrip MMAX* Green Paint.	SF	90	$ 14.00	$ 1,260.00
14	Install Emergency Vehicle Pre-Emption (EVP).	EA	1	$ 15,000.00	$ 15,000.00
15	Install Dynamic Dilemma Zone Protection.	LS	1	$ 25,000.00	$ 25,000.00
16	Upgrade Signal Head Lenses To Programmable Visibility (PV) LED Lenses.	EA	5	$ 2,153.00	$ 10,765.00
				Total	$ 117,700.00
			Total Construction Cost:	$	117,700.00
			Contingencies percentage of the aforementioned Total Construction Cost:	20%	$ 23,540.00
			Total Construction Cost (Including Contingencies):	$	141,240.00

Total Cost and Benefit:

The project's total cost is estimated at $141,240.00 which does not include the design and engineering costs. The estimated benefit of these improvements is $3,805,599 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 26.94.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 26.94, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

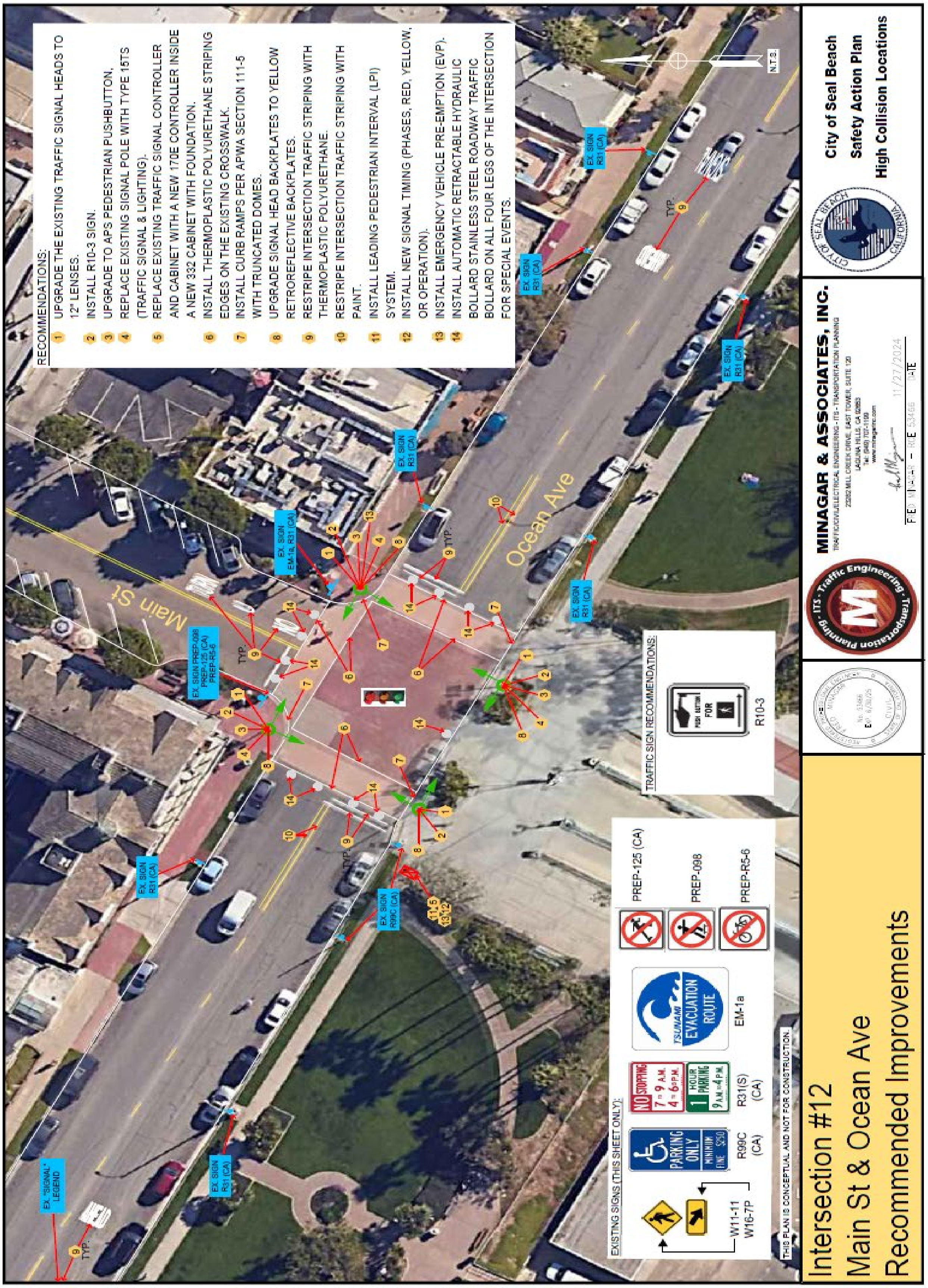
Itemized Benefits	
Safety	$3,795,736
Travel Time	$8,858
Vehicle Operating Cost	$902
Emissions	$103
Total Benefits	$3,805,599

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$141,240
Present Value Benefits ($ Dollars)	$3,805,599
Net Present Value ($ Dollars)	$3,664,359
Benefit / Cost Ratio	**26.94**

9.1.12 Intersection 12: Main Street & Ocean Ave

Figure 9-12: Intersection 12 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


RECOMMENDATIONS:
1 UPGRADE THE EXISTING TRAFFIC SIGNAL HEADS TO 12" LENSES.
2 INSTALL R10-3 SIGN.
3 UPGRADE TO APS PEDESTRIAN PUSHBUTTON.
4 REPLACE EXISTING SIGNAL POLE WITH TYPE 15TS (TRAFFIC SIGNAL & LIGHTING).
5 REPLACE EXISTING TRAFFIC SIGNAL CONTROLLER AND CABINET WITH A NEW 170E CONTROLLER INSIDE A NEW 332 CABINET WITH FOUNDATION.
6 INSTALL THERMOPLASTIC POLYURETHANE STRIPING EDGES ON THE EXISTING CROSSWALK.
7 INSTALL CURB RAMPS PER APWA SECTION 111-5 WITH TRUNCATED DOMES.
8 UPGRADE SIGNAL HEAD BACKPLATES TO YELLOW RETROREFLECTIVE BACKPLATES.
9 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
10 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH PAINT.
11 INSTALL LEADING PEDESTRIAN INTERVAL (LPI) SYSTEM.
12 INSTALL NEW SIGNAL TIMING (PHASES, RED, YELLOW, OR OPERATION).
13 INSTALL EMERGENCY VEHICLE PRE-EMPTION (EVP).
14 INSTALL AUTOMATIC RETRACTABLE HYDRAULIC BOLLARD STAINLESS STEEL ROADWAY TRAFFIC BOLLARD ON ALL FOUR LEGS OF THE INTERSECTION FOR SPECIAL EVENTS.
Main St
Ocean Ave
N.T.S.
EX. SIGN R31 (CA)
EX. SIGN EM-1a, R31 (CA)
EX. SIGN PREP-098 PREP-125 (CA) PREP-R5-6
EX. SIGN R99C (CA)
EX. "SIGNAL" LEGEND
TYP.
TRAFFIC SIGN RECOMMENDATIONS:
R10-3
EXISTING SIGNS (THIS SHEET ONLY):
W11-11
W16-7P
R99C (CA)
R31(S) (CA)
EM-1a
PREP-125 (CA)
PREP-098
PREP-R5-6
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
City of Seal Beach
Safety Action Plan
High Collision Locations
MINAGAR & ASSOCIATES, INC.
11/27/2024
DATE
Intersection #12
Main St & Ocean Ave
Recommended Improvements

9.1.12.1 Intersection 12 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-12: Intersection 12 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	Upgrade The Existing Traffic Signal Heads To 12" Lenses.	EA	24	$ 717.00	$ 17,208.00
2	Install R10-3 Sign.	EA	4	$ 598.00	$ 2,392.00
3	Upgrade To APS Pedestrian Pushbutton.	EA	4	$ 2,000.00	$ 8,000.00
4	Replace Existing Signal Pole with Type 15TS (Traffic Signal & Lighting).	LS	3	$ 12,500.00	$ 37,500.00
5	Replace Existing Traffic Signal Controller and Cabinet With A New 170E Controller Inside A New 332 Cabinet With Foundation.	LS	1	$21,300.00	$ 21,300.00
6	Install Thermoplastic Polyurethane Striping Edges on The Existing Crosswalk.	LF	170	$ 2.60	$ 442.00
7	Install Curb Ramps Per APWA Section 111-5 With Truncated Domes.	LS	4	$ 7,000.00	$ 28,000.00
8	Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.	EA	8	$ 878.00	$ 7,024.00
9A	Restripe Intersection Traffic Striping with Thermoplastic Polyurethane.	LF	150	$ 2.60	$ 390.00
9B	Thermoplastic Legends	SF	185	$ 5.46	$ 1,010.10
10	Restripe Intersection Traffic Striping with Paint.	LF	300	$ 3.65	$ 1,095.00
11	Install Leading Pedestrian Interval (LPI) System.	LS	1	$ 7,000.00	$ 7,000.00
12	Install New Signal Timing (Phases, Red, Yellow, Or Operation).	LS	1	$ 10,000.00	$ 10,000.00
13	Install Emergency Vehicle Pre-Emption (EVP).	EA	1	$ 15,000.00	$ 15,000.00
14	Install Automatic Retractable Hydrolic Bollard Stainless Steel Roadway Traffic Bollard on All Four Legs of the Intersection For Special Events.	EA	13	$ 13,700.00	$ 178,100.00
				Total	$ 334,461.10
				Total Construction Cost:	$ 334,461.10
				Contingencies percentage of the aforementioned Total Construction Cost:	20% $ 66,892.22
				Total Construction Cost (Including Contingencies):	$ 401,353.32

Total Cost and Benefit:

The project's total cost is estimated at $401,353 which does not include the design and engineering costs. The estimated benefit of these improvements is $1,402,901 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 3.50.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 3.50, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$1,396,860
Travel Time	$5,392
Vehicle Operating Cost	$541
Emissions	$108
Total Benefits	$1,402,901

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$401,353
Present Value Benefits ($ Dollars)	$1,402,901
Net Present Value ($ Dollars)	$1,001,548
Benefit / Cost Ratio	**3.50**

9.1.13 Intersection 13: Westminster Ave & Kitts Highway

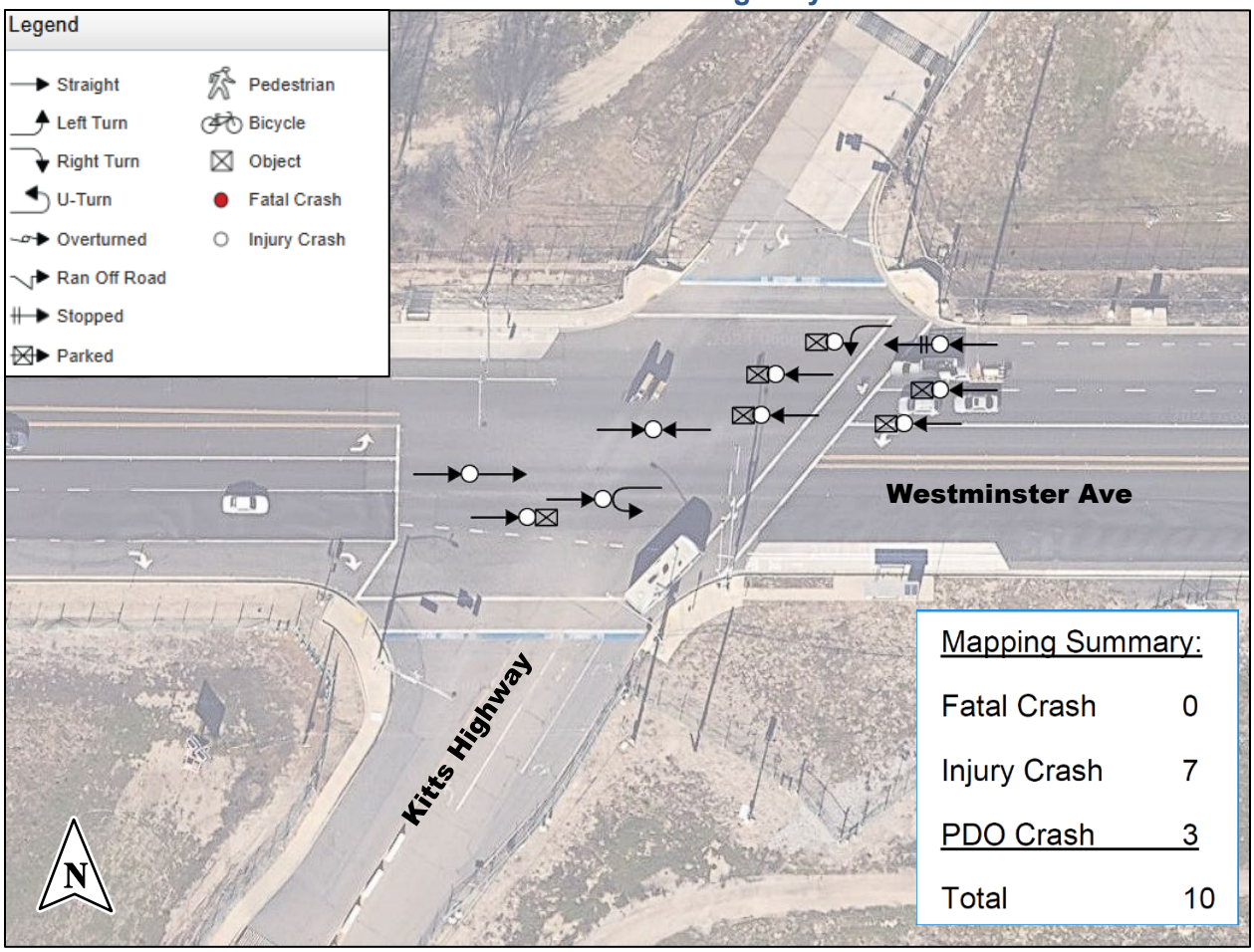
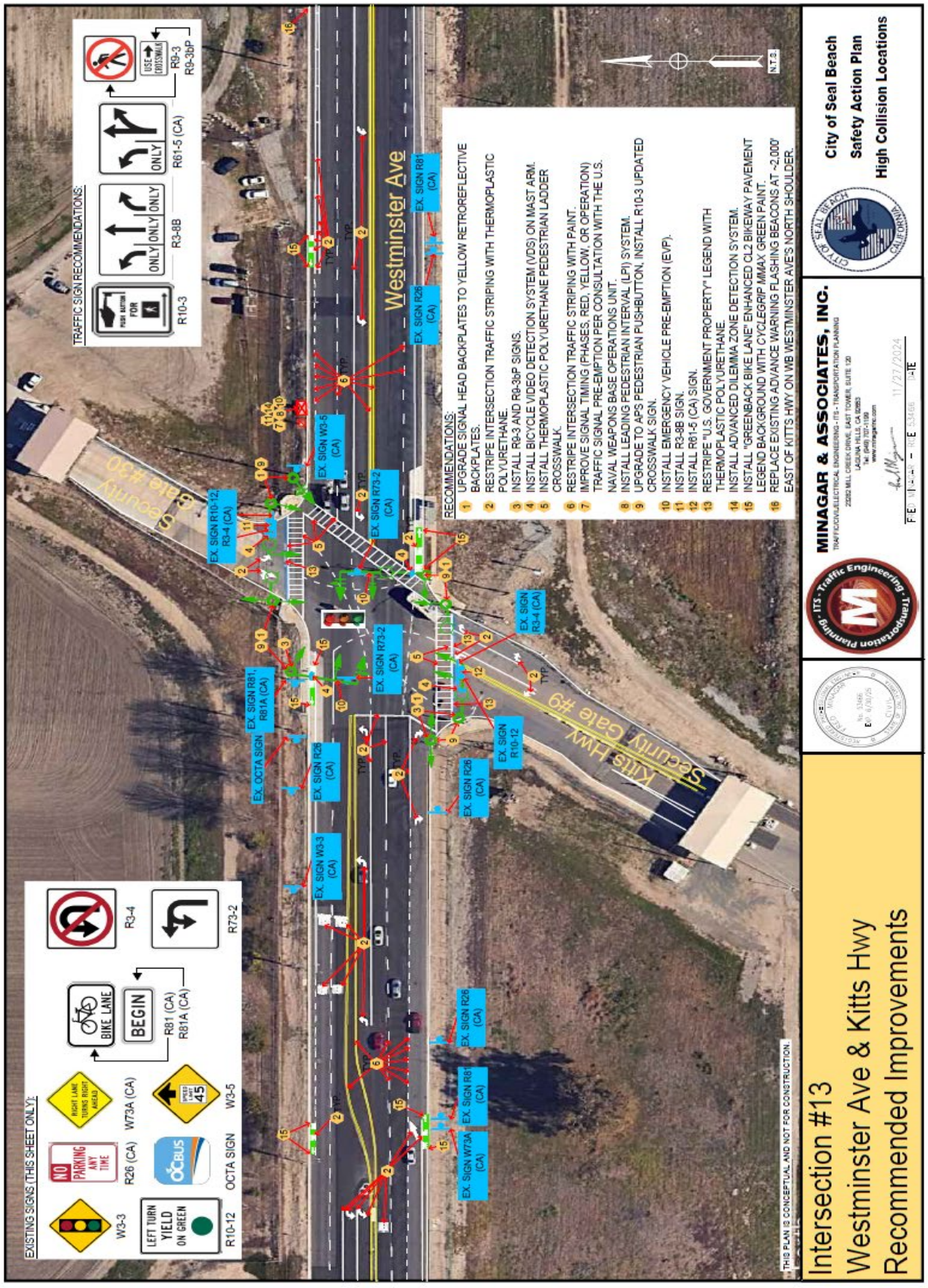


Figure 9-13: Intersection 13 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


Intersection #13
Westminster Ave & Kitts Hwy
Recommended Improvements
City of Seal Beach
Safety Action Plan
High Collision Locations
MINAGAR & ASSOCIATES, INC.
RECOMMENDATIONS:
1 UPGRADE SIGNAL HEAD BACKPLATES TO YELLOW RETROREFLECTIVE BACKPLATES.
2 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
3 INSTALL R9-3 AND R9-3bP SIGNS.
4 INSTALL BICYCLE VIDEO DETECTION SYSTEM (VDS) ON MAST ARM.
5 INSTALL THERMOPLASTIC POLYURETHANE PEDESTRIAN LADDER CROSSWALK.
6 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH PAINT.
7 IMPROVE SIGNAL TIMING (PHASES, RED, YELLOW, OR OPERATION) TRAFFIC SIGNAL PRE-EMPTION PER CONSULTATION WITH THE U.S. NAVAL WEAPONS BASE OPERATIONS UNIT.
8 INSTALL LEADING PEDESTRIAN INTERVAL (LPI) SYSTEM.
9 UPGRADE TO APS PEDESTRIAN PUSHBUTTON, INSTALL R10-3 UPDATED CROSSWALK SIGN.
10 INSTALL EMERGENCY VEHICLE PRE-EMPTION (EVP).
11 INSTALL R3-9B SIGN.
12 INSTALL R81-5 (CA) SIGN.
13 RESTRIPE "U.S. GOVERNMENT PROPERTY" LEGEND WITH THERMOPLASTIC POLYURETHANE.
14 INSTALL ADVANCED DILEMMA ZONE DETECTION SYSTEM.
15 INSTALL "GREENBACK BIKE LANE" ENHANCED CL2 BIKEWAY PAVEMENT LEGEND BACKGROUND WITH CYCLEGRIP MMAX GREEN PAINT.
16 REPLACE EXISTING ADVANCE WARNING FLASHING BEACONS AT ~2,000' EAST OF KITTS HWY ON WB WESTMINSTER AVE'S NORTH SHOULDER.
TRAFFIC SIGN RECOMMENDATIONS:
R10-3
R3-8B
R61-5 (CA)
R9-3
R9-3bP
EXISTING SIGNS (THIS SHEET ONLY):
W3-3
R10-12
R26 (CA)
OCTA SIGN
W73A (CA)
W3-5
R81 (CA)
R81A (CA)
R3-4
R73-2
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
Westminster Ave
Kitts Hwy
Security Gate #30
Security Gate #9
EX. SIGN R10-12 R3-4 (CA)
EX. SIGN W3-5 (CA)
EX. SIGN R81 (CA)
EX. SIGN R26 (CA)
EX. SIGN R73-2 (CA)
EX. OCTA SIGN
EX. SIGN R81, R81A (CA)
EX. SIGN W3-3 (CA)
EX. SIGN W73A (CA)
EX. SIGN R3-4 (CA)
EX. SIGN R10-12
N.T.S.

9.1.13.1 Intersection 13 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-13: Intersection 13 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	Upgrade Signal Head Backplates to Yellow Retroreflective Backplates.	EA	17	$ 878.00	$ 14,926.00
2A	Restripe Intersection Traffic Striping with Thermoplastic Polyurethane.	LF	1100	$ 2.60	$ 2,860.00
2B	Thermoplastic Legends	SF	610	$ 5.46	$ 3,330.60
3	Install R9-3 And R9-3bP Signs.	EA	6	$ 598.00	$ 3,588.00
4	Install Bicycle Video Detection System (VDS) On Mast Arm.	EA	2	$ 20,000.00	$ 40,000.00
5	Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.	LF	300	$ 5.46	$ 1,638.00
6	Restripe Intersection Traffic Striping with Paint.	LF	4,000	$ 3.65	$ 14,600.00
7	Improve Signal Timing (Phases, Red, Yellow, Or Operation) Traffic Signal Pre-Emption Per Consultation with The U.S. Naval Weapons Base Operations Unit.	LS	1	$ 15,000.00	$ 15,000.00
8	Install Leading Pedestrian Interval (LPI) System.	LS	1	$ 7,000.00	$ 7,000.00
9A	Upgrade To APS Pedestrian Pushbutton.	EA	6	$ 2,000.00	$ 12,000.00
9B	Install R10-3 Updated Crosswalk Sign.	EA	6	$ 598.00	$ 3,588.00
10	Install Emergency Vehicle Pre-Emption (EVP).	EA	2	$ 15,000.00	$ 30,000.00
11	Install R3-8B Sign.	EA	1	$ 598.00	$ 598.00
12	Install R61-5 (CA) Sign.	EA	1	$ 598.00	$ 598.00
13	Restripe "U.S. Government Property" Legend with Thermoplastic Polyurethane.	SF	90	$ 3.60	$ 324.00
14	Install Advanced Dilemma Zone Detection System.	LS	1	$ 25,000.00	$ 25,000.00
15	Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background With *CycleGrip MMAX* Green Paint.	SF	225	$ 14.00	$ 3,150.00
16	Replace Existing Advance Warning Flashing Beacons at ~2,000' East Of Kitts Hwy On Westbound Westminster Ave's North Shoulder.	EA	2	$ 17,000.00	$ 34,000.00
				Total	$ 212,200.60
			Total Construction Cost:	$	212,200.60
			Contingencies percentage of the aforementioned Total Construction Cost:	20%	$ 42,440.12
			Total Construction Cost (Including Contingencies):	$	254,640.72

Total Cost and Benefit:

The project's total cost is estimated at $254,641 which does not include the design and engineering costs. The estimated benefit of these improvements is $3,293,570 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 12.93.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 12.93, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$3,288,442
Travel Time	$4,651
Vehicle Operating Cost	$459
Emissions	$18
Total Benefits	$3,293,570

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$254,641
Present Value Benefits ($ Dollars)	$3,293,570
Net Present Value ($ Dollars)	$3,038,9329
Benefit / Cost Ratio	**12.93**

9.1.14 Intersection 14: Marina Dr & 1st Street

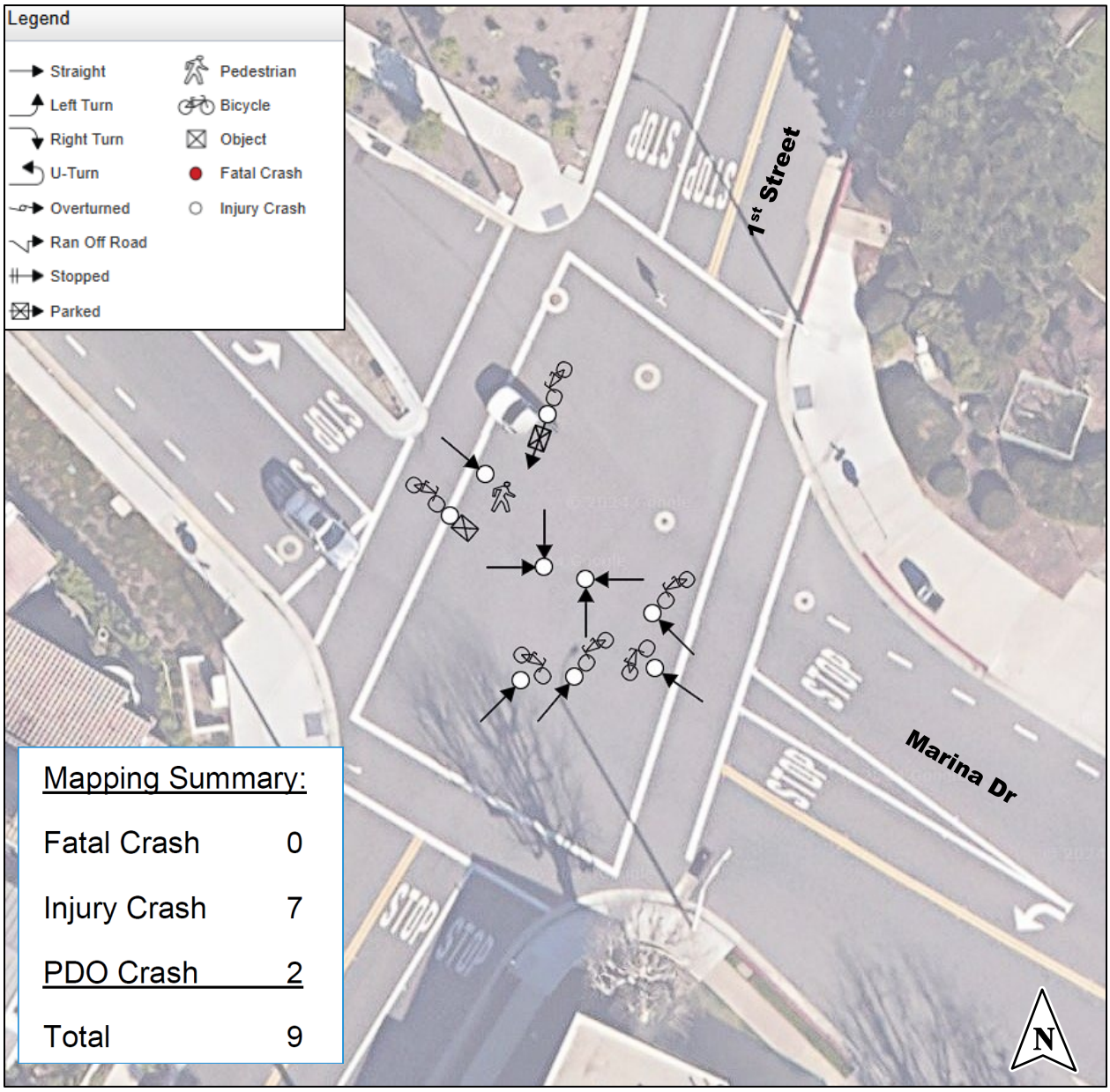
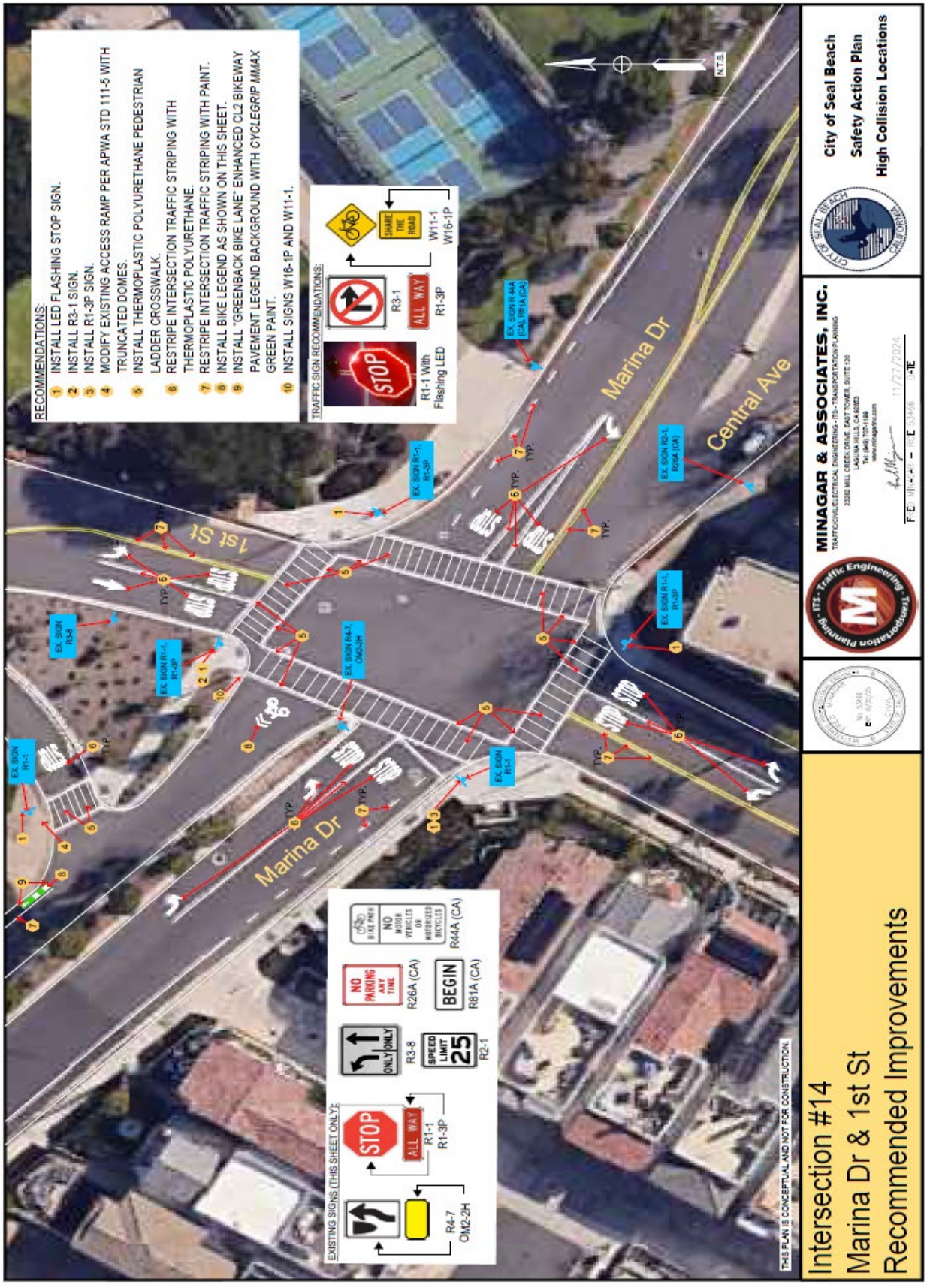


Figure 9-14: Intersection 14 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


RECOMMENDATIONS:
1 INSTALL LED FLASHING STOP SIGN.
2 INSTALL R3-1 SIGN.
3 INSTALL R1-3P SIGN.
4 MODIFY EXISTING ACCESS RAMP PER APWA STD 111-5 WITH TRUNCATED DOMES.
5 INSTALL THERMOPLASTIC POLYURETHANE PEDESTRIAN LADDER CROSSWALK.
6 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
7 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH PAINT.
8 INSTALL BIKE LEGEND AS SHOWN ON THIS SHEET.
9 INSTALL "GREENBACK BIKE LANE" ENHANCED CL2 BIKEWAY PAVEMENT LEGEND BACKGROUND WITH CYCLEGRIP MMAX GREEN PAINT.
10 INSTALL SIGNS W16-1P AND W11-1.
TRAFFIC SIGN RECOMMENDATIONS:
R1-1 With Flashing LED
R3-1
R1-3P
W11-1
W16-1P
EXISTING SIGNS (THIS SHEET ONLY):
R1-1
R1-3P
R4-7
OM2-2H
R3-8
R2-1
R26A (CA)
R81A (CA)
R44A (CA)
Marina Dr
1st St
Central Ave
N.T.S.
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
Intersection #14
Marina Dr & 1st St
Recommended Improvements
MINAGAR & ASSOCIATES, INC.
City of Seal Beach
Safety Action Plan
High Collision Locations

9.1.14.1 Intersection 14 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-14: Intersection 14 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	Install LED Flashing Stop Sign.	EA	5	$ 4,680.00	$ 23,400.00
2	Install R3-1 Sign.	EA	1	$ 598.00	$ 598.00
3	Install R1-3P Sign.	EA	1	$ 598.00	$ 598.00
4	Modify Existing Access Ramp Per APWA Std 111-5 With Truncated Domes.	LS	1	$ 7,000.00	$ 7,000.00
5	Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.	LF	240	$ 5.46	$ 1,310.40
6A	Restripe Intersection Traffic Striping with Thermoplastic Polyurethane.	LF	500	$ 2.60	$ 1,300.00
6B	Thermoplastic Legends	SF	310	$ 5.46	$ 1,692.60
7	Restripe Intersection Traffic Striping with Paint.	LF	800	$ 3.65	$ 2,920.00
				Total	$ 38,819.00
			Total Construction Cost:	$	38,819.00
			Contingencies percentage of the aforementioned Total Construction Cost:	20%	$ 7,763.80
			Total Construction Cost (Including Contingencies):	$	46,582.80

Total Cost and Benefit:

The project's total cost is estimated at $46,583 which does not include the design and engineering costs. The estimated benefit of these improvements is $1,415,028 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 30.38.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 30.38, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$1,412,484
Travel Time	$2,268
Vehicle Operating Cost	$233
Emissions	$42
Total Benefits	$1,415,028

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$46,583
Present Value Benefits ($ Dollars)	$1,415,028
Net Present Value ($ Dollars)	$1,368,445
Benefit / Cost Ratio	**30.38**

9.1.15 Intersection 15: Golden Rain Rd & St Andrews Dr

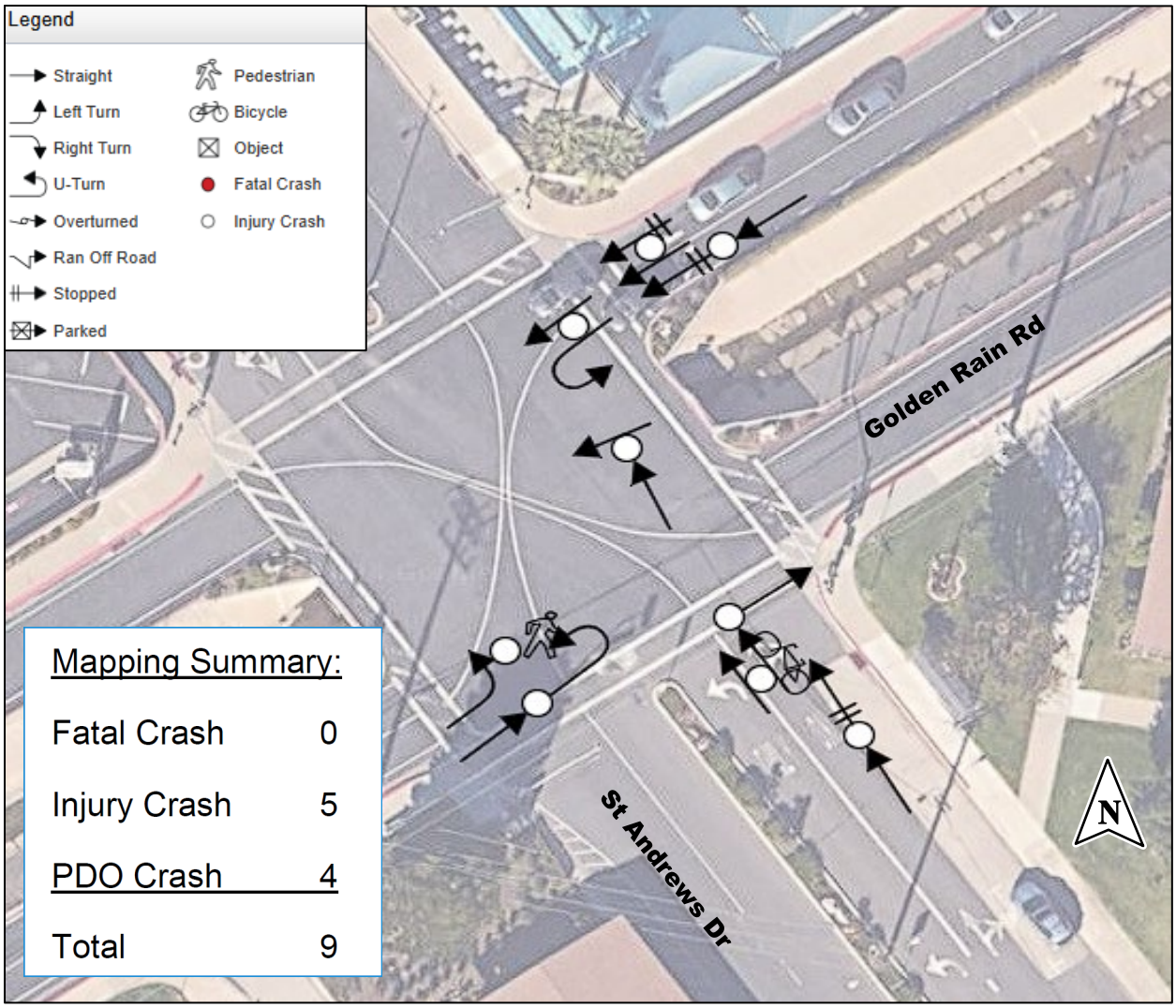
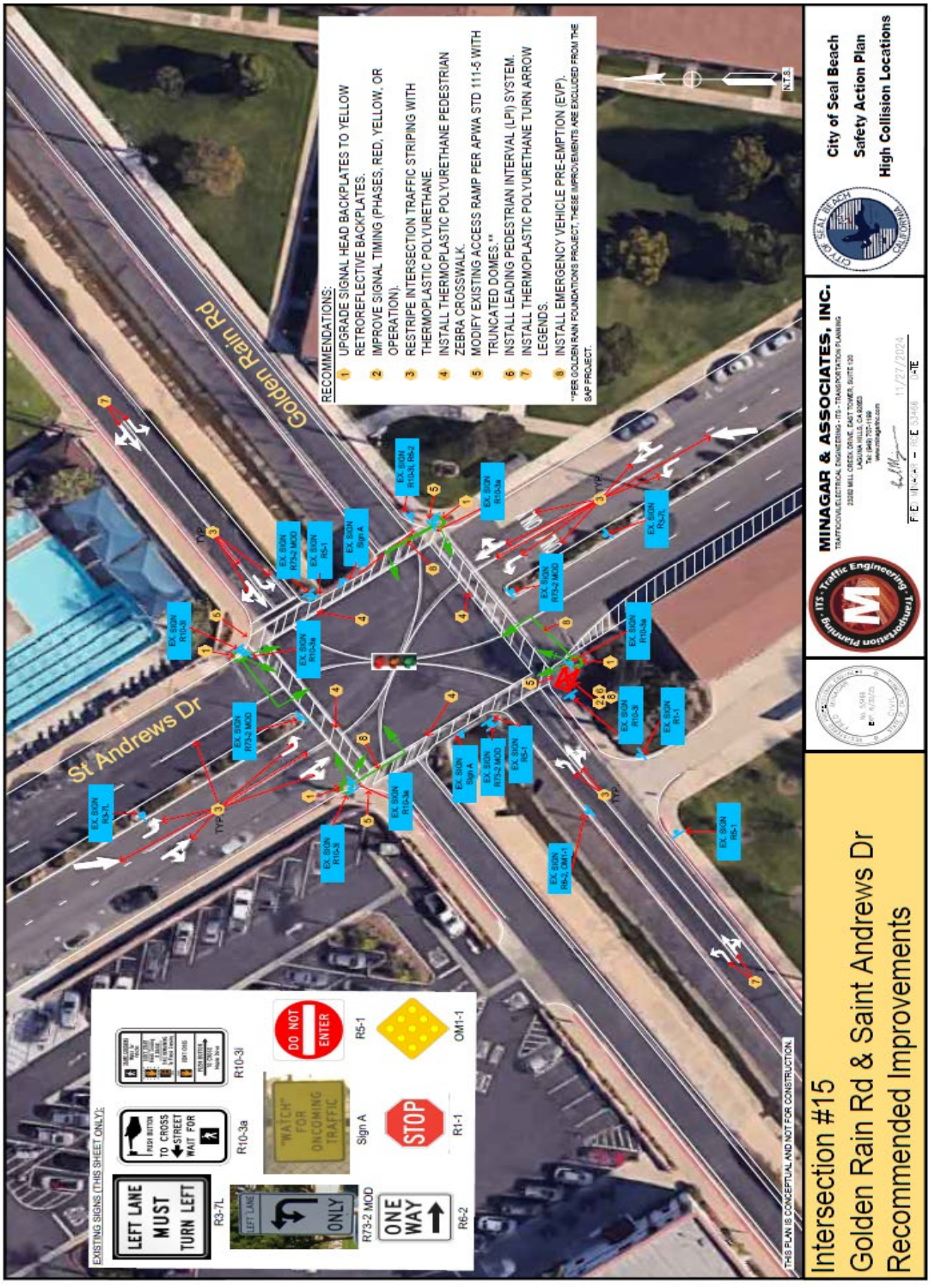


Figure 9-15: Intersection 15 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


Golden Rain Rd
St Andrews Dr
RECOMMENDATIONS:
1 UPGRADE SIGNAL HEAD BACKPLATES TO YELLOW RETROREFLECTIVE BACKPLATES.
2 IMPROVE SIGNAL TIMING (PHASES, RED, YELLOW, OR OPERATION).
3 RESTRIPE INTERSECTION TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
4 INSTALL THERMOPLASTIC POLYURETHANE PEDESTRIAN ZEBRA CROSSWALK.
5 MODIFY EXISTING ACCESS RAMP PER APWA STD 111-5 WITH TRUNCATED DOMES.**
6 INSTALL LEADING PEDESTRIAN INTERVAL (LPI) SYSTEM.
7 INSTALL THERMOPLASTIC POLYURETHANE TURN ARROW LEGENDS.
8 INSTALL EMERGENCY VEHICLE PRE-EMPTION (EVP).
**PER GOLDEN RAIN FOUNDATION'S PROJECT, THESE IMPROVEMENTS ARE EXCLUDED FROM THE SAP PROJECT.
N.T.S.
EXISTING SIGNS (THIS SHEET ONLY):
LEFT LANE MUST TURN LEFT R3-7L
PUSH BUTTON TO CROSS STREET WAIT FOR R10-3a
R10-3i
"WATCH" FOR ONCOMING TRAFFIC Sign A
LEFT LANE ONLY R73-2 MOD
STOP R1-1
DO NOT ENTER R5-1
ONE WAY R6-2
OM1-1
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
Intersection #15
Golden Rain Rd & Saint Andrews Dr
Recommended Improvements
MINAGAR & ASSOCIATES, INC.
TRAFFIC/CIVIL/ELECTRICAL ENGINEERING - ITS - TRANSPORTATION PLANNING
23332 MILL CREEK DRIVE, EAST TOWER, SUITE 120
LAGUNA HILLS, CA 92653
Tel: (949) 707-1199
www.minagarinc.com
11/27/2024
City of Seal Beach
Safety Action Plan
High Collision Locations

9.1.15.1 Intersection 15 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-15: Intersection 15 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	Upgrade Signal Head Backplates To Yellow Retroreflective Backplates.	EA	11	$ 878.00	$ 9,658.00
2	Improve Signal Timing (Phases, Red, Yellow, Or Operation).	LS	1	$ 10,000.00	$ 10,000.00
3A	Restripe Intersection Traffic Striping With Thermoplastic Polyurethane.	LF	700	$ 2.60	$ 1,820.00
3B	Reinstall Thermoplastic Legends	SF	465	$ 5.46	$ 2,538.90
3C	Restripe Traffic Striping With Paint	LF	2000	$ 3.65	$ 7,300.00
4	Install Thermoplastic Polyurethane Pedestrian Zebra Crosswalk.	LF	320	$ 5.46	$ 1,747.20
5	Modify Existing Access Ramp Per APWA Std 111-5 With Truncated Domes.*	LS	4	$ 7,000.00	$ 28,000.00
6	Install Leading Pedestrian Interval (LPI) System.	LS	1	$ 7,000.00	$ 7,000.00
7	Install Thermoplastic Polyurethane Turn Arrow Legends.	SF	84	$ 5.46	$ 458.64
8	Install Emergency Vehicle Pre-Emption (EVP).	EA	3	$ 15,000.00	$ 45,000.00
				Total	$ 113,522.74
			Total Construction Cost:	$	113,522.74
			Contingencies percentage of the aforementioned Total Construction Cost:	20%	$ 22,704.55
			Total Construction Cost (Including Contingencies):	$	136,227.29

Total Cost and Benefit:

The project's total cost is estimated at $136,227 which does not include the design and engineering costs. The estimated benefit of these improvements is $1,348,458 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 9.90.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 9.90, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$1,343,724
Travel Time	$4,254
Vehicle Operating Cost	$428
Emissions	$52
Total Benefits	$1,348,458

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$136,227
Present Value Benefits ($ Dollars)	$1,348,458
Net Present Value ($ Dollars)	$1,212,231
Benefit / Cost Ratio	**9.90**

9.2 High Collision Street Segments

9.2.1 Street Segment 1: Seal Beach Blvd between St Andrews Dr and Westminster Ave

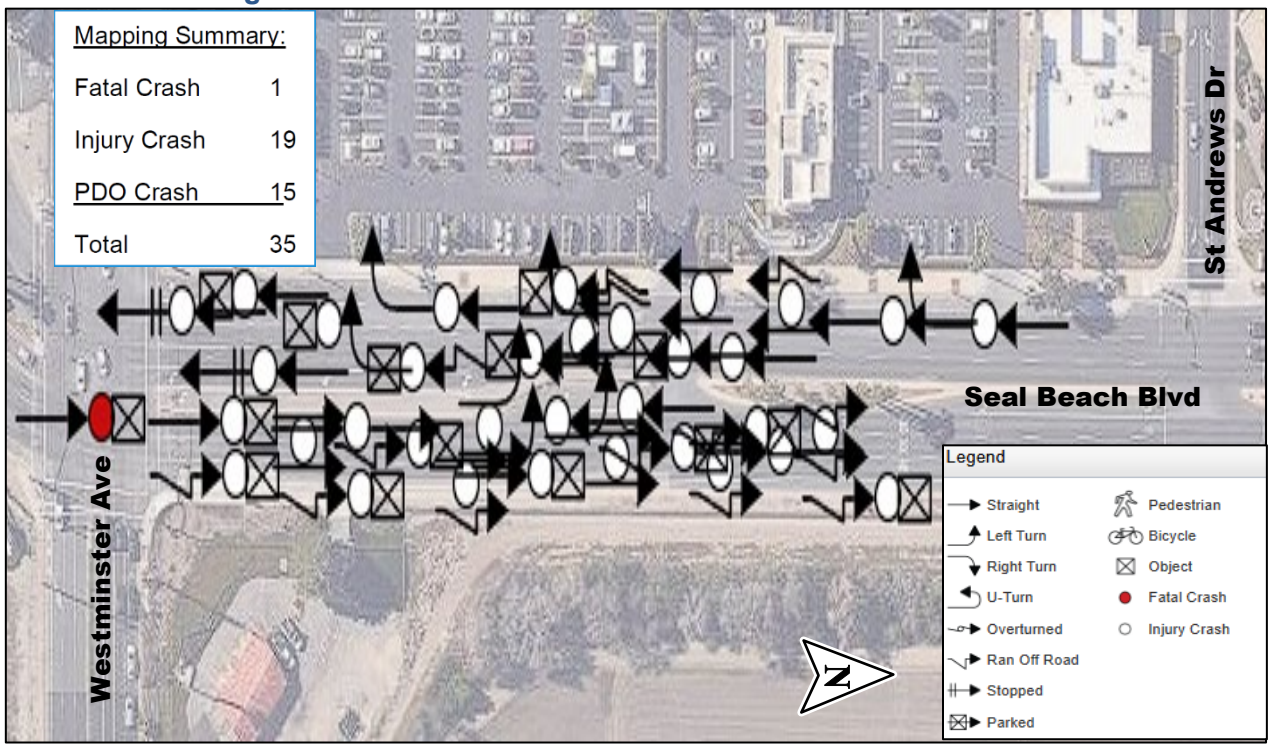


Figure 9-16: Street Segment 1 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


RECOMMENDATIONS:
1 SEE INTERSECTION #1.
2 SEE INTERSECTION #11.
3 RESTRIPE TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.**
4 RESTRIPE TRAFFIC STRIPING WITH PAINT.**
5 INSTALL DYNAMIC SPEED WARNING SIGN WITH EXISTING R2-1 (50) SIGN.
6 INSTALL R81 (CA) SIGN.
7 INSTALL "GREENBACK BIKE LANE" ENHANCED CL2 BIKEWAY PAVEMENT LEGEND BACKGROUND WITH CYCLEGRIP MMAX GREEN PAINT.
8 RELOCATE EXISTING OCTA BUS STOP AT NB NEC OF SEAL BEACH BLVD AND WESTMINSTER AVE TO 220' NORTH OF ECR.
**PER CITY'S IMPROVEMENT PROJECT CIP O-0T-3, THESE IMPROVEMENTS ARE EXCLUDED FROM THE SAP PROJECT.
EXISTING SIGNS (THIS SHEET ONLY):
R26 (CA) R81 (CA) R3-7 (CA) R2-1 (CA) W3-3 R4-7
R6-1 Sign A R6-2 OM2-1H (CA) TYPE Q (CA)
TRAFFIC SIGN RECOMMENDATIONS:
R81 (CA)
Lynamic Speed Warning Sign
St Andrews Dr
Seal Beach Blvd
Westminster Ave
N.T.S.
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
Street Segment #1 Seal Beach Blvd
Between St Andrews Dr & Westminster Ave
Recommended Improvements
MINAGAR & ASSOCIATES, INC.
City of Seal Beach
Safety Action Plan
High Collision Locations

9.2.1.1 Street Segment 1 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-16: Street Segment 1 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	See Intersection #1.	-		$ -	$ -
2	See Intersection #11.	-		$ -	$ -
3A	Restripe Traffic Striping With Thermoplastic Polyurethane.	LF	0		$ -
3B	Thermoplastic Legends	SF	420	$ 5.46	$ 2,293.20
4	Restripe Traffic Striping With Paint.	LF	0		$ -
5	Install Dynamic Speed Warning Sign With Existing R2-1 (50) Sign.	EA	1	$ 15,000.00	$ 15,000.00
6	Install R81 (CA) Sign.	EA	1	$ 598.00	$ 598.00
7	Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background With *CycleGrip MMAX* Green Paint.	SF	90	$ 14.00	$ 1,260.00
				Total	$ 19,151.20
			Total Construction Cost:	$	19,151.20
			Contingencies percentage of the aforementioned Total Construction Cost:	20%	$ 3,830.24
			Total Construction Cost (Including Contingencies):	$	22,981.44

Total Cost and Benefit:

The project's total cost is estimated at $22,981 which does not include the design and engineering costs. The estimated benefit of these improvements is $1,361,189 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 59.23.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 59.23, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$1,355,443
Travel Time	$5,148
Vehicle Operating Cost	$512
Emissions	$87
Total Benefits	$1,361,189

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$22,981
Present Value Benefits ($ Dollars)	$1,361,189
Net Present Value ($ Dollars)	$1,338,208
Benefit / Cost Ratio	**59.23**

9.2.2 Street Segment 2: Seal Beach Blvd between Westminster Ave and Apollo Dr

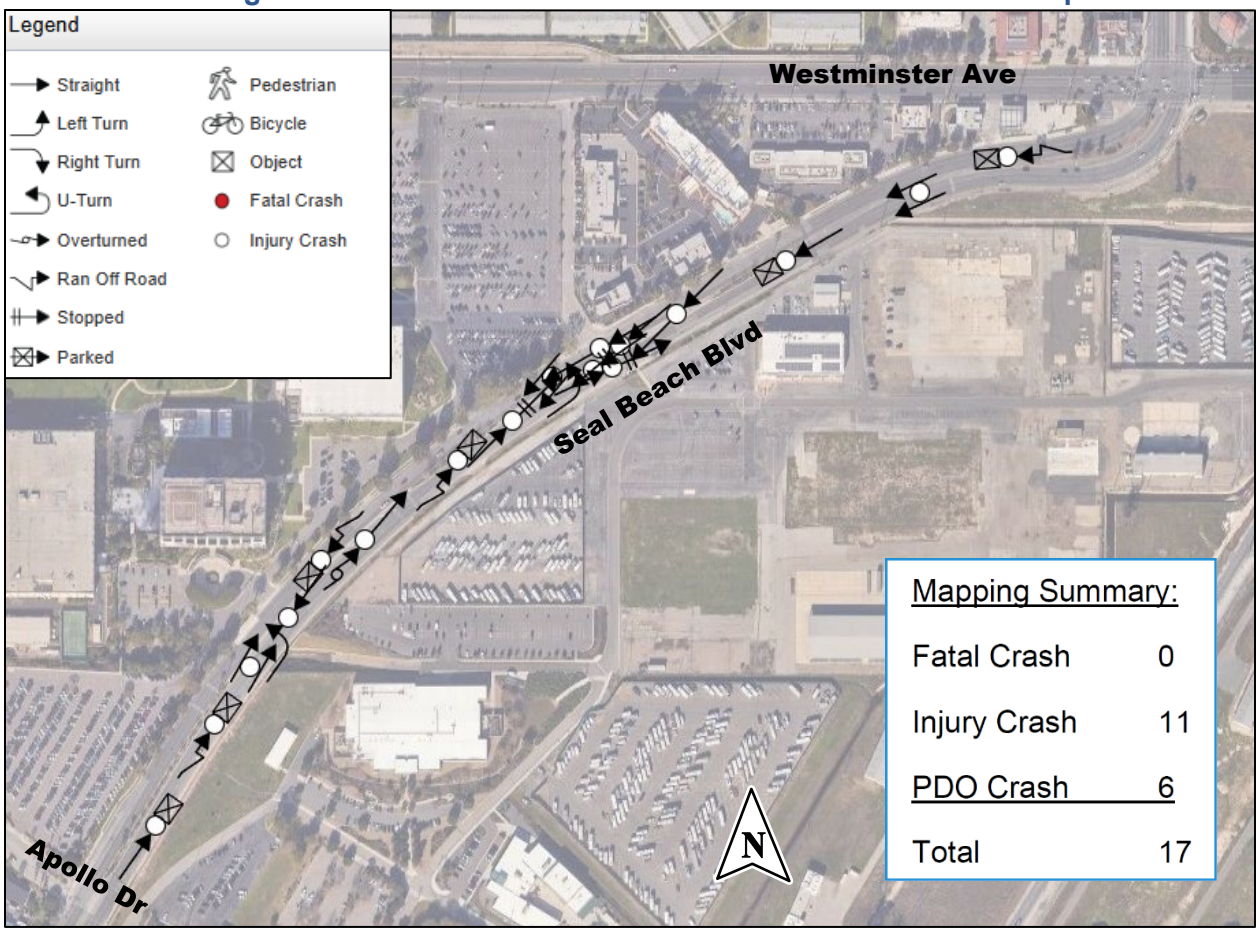
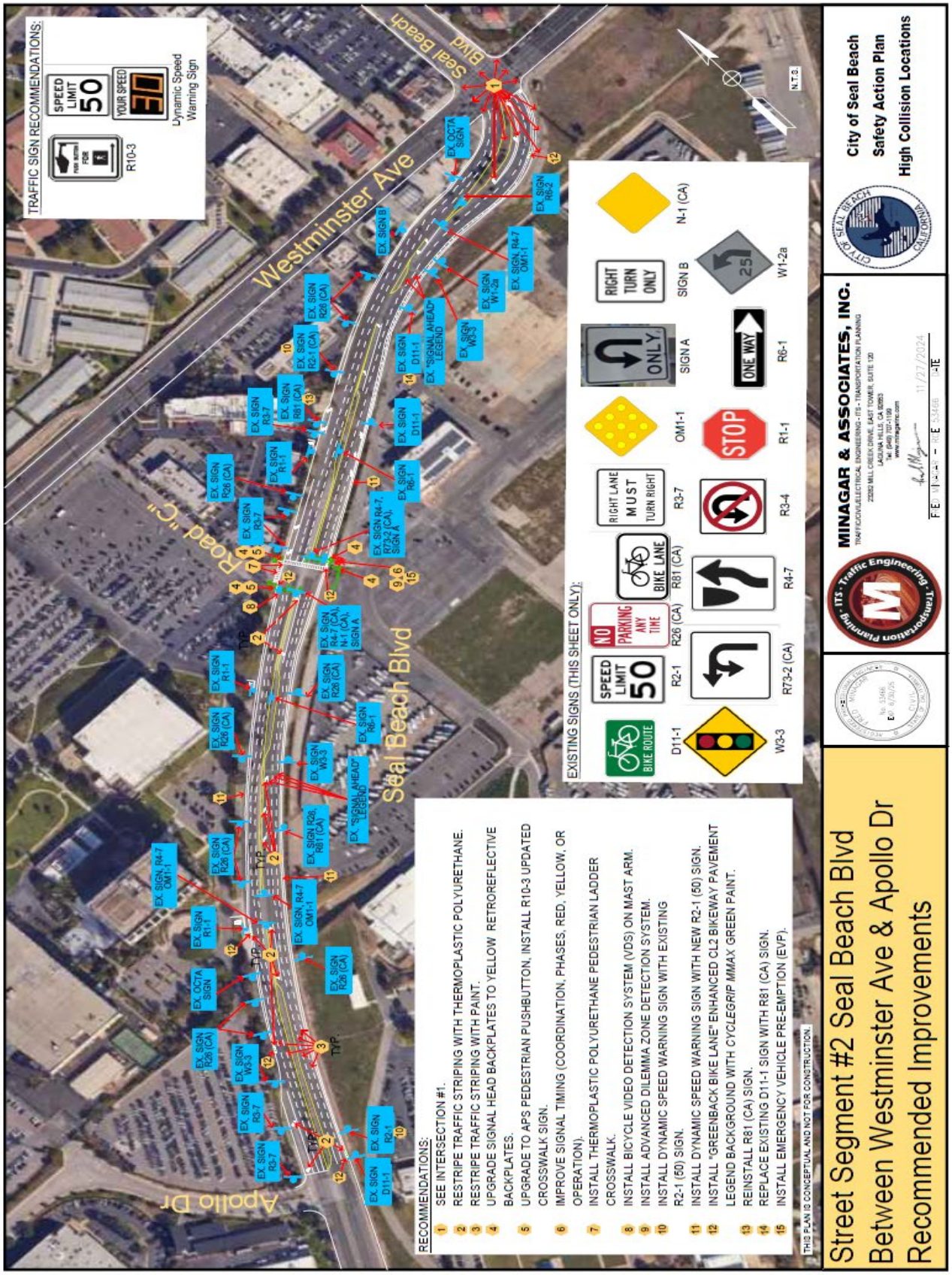


Figure 9-17: Street Segment 2 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


TRAFFIC SIGN RECOMMENDATIONS:
SPEED LIMIT 50
YOUR SPEED 50
Dynamic Speed Warning Sign
R10-3
Westminster Ave
Seal Beach Blvd
Road "C"
Apollo Dr
N.T.S.
EXISTING SIGNS (THIS SHEET ONLY):
SPEED LIMIT 50
R2-1
NO PARKING ANY TIME
R26 (CA)
BIKE LANE
R81 (CA)
RIGHT LANE MUST TURN RIGHT
R3-7
OM1-1
ONLY
SIGN A
RIGHT TURN ONLY
SIGN B
N-1 (CA)
BIKE ROUTE
D11-1
W3-3
R73-2 (CA)
R4-7
R3-4
STOP
R1-1
ONE WAY
R6-1
25
W1-2a
RECOMMENDATIONS:
1 SEE INTERSECTION #1.
2 RESTRIPE TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
3 RESTRIPE TRAFFIC STRIPING WITH PAINT.
4 UPGRADE SIGNAL HEAD BACKPLATES TO YELLOW RETROREFLECTIVE BACKPLATES.
5 UPGRADE TO APS PEDESTRIAN PUSHBUTTON, INSTALL R10-3 UPDATED CROSSWALK SIGN.
6 IMPROVE SIGNAL TIMING (COORDINATION, PHASES, RED, YELLOW, OR OPERATION).
7 INSTALL THERMOPLASTIC POLYURETHANE PEDESTRIAN LADDER CROSSWALK.
8 INSTALL BICYCLE VIDEO DETECTION SYSTEM (VDS) ON MAST ARM.
9 INSTALL ADVANCED DILEMMA ZONE DETECTION SYSTEM.
10 INSTALL DYNAMIC SPEED WARNING SIGN WITH EXISTING R2-1 (50) SIGN.
11 INSTALL DYNAMIC SPEED WARNING SIGN WITH NEW R2-1 (50) SIGN.
12 INSTALL "GREENBACK BIKE LANE" ENHANCED CL2 BIKEWAY PAVEMENT LEGEND BACKGROUND WITH *CYCLEGRIP MMAX* GREEN PAINT.
13 REINSTALL R81 (CA) SIGN.
14 REPLACE EXISTING D11-1 SIGN WITH R81 (CA) SIGN.
15 INSTALL EMERGENCY VEHICLE PRE-EMPTION (EVP).
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
Street Segment #2 Seal Beach Blvd
Between Westminster Ave & Apollo Dr
Recommended Improvements
MINAGAR & ASSOCIATES, INC.
TRAFFIC/CIVIL/ELECTRICAL ENGINEERING - ITS - TRANSPORTATION PLANNING
LAGUNA HILLS, CA 92653
11/27/2024
City of Seal Beach
Safety Action Plan
High Collision Locations

9.2.2.1 Street Segment 2 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-17: Street Segment 2 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	See Intersection #1.	-			$ -
2	Restripe Traffic Striping With Thermoplastic Polyurethane.	EA	600	$ 2.60	$ 1,560.00
3A	Restripe Traffic Striping With Paint.	LF	19,300	$ 3.65	$ 70,445.00
3B	Thermoplastic Legends	SF	620	$ 5.46	$ 3,385.20
4	Upgrade Signal Head Backplates To Yellow Retroreflective Backplates.	EA	13	$ 878.00	$ 11,414.00
5A	Upgrade To APS Pedestrian Pushbutton.	EA	2	$ 2,000.00	$ 4,000.00
5B	Install R10-3 Updated Crosswalk Sign.	EA	4	$ 598.00	$ 2,392.00
6	Improve Signal Timing (Coordination, Phases, Red, Yellow, Or Operation).	LS	1	$ 10,000.00	$ 10,000.00
7	Install Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.	LF	170	$ 5.46	$ 928.20
8	Install Bicycle Video Detection System (VDS) On Mast Arm.	EA	1	$ 20,000.00	$ 20,000.00
9	Install Advanced Dilemma Zone Detection System.	LS	1	$ 25,000.00	$ 25,000.00
10	Install Dynamic Speed Warning Sign With Existing R2-1 (50) Sign.	EA	2	$ 15,000.00	$ 30,000.00
11	Install Dynamic Speed Warning Sign With New R2-1 (50) Sign.	EA	3	$ 15,878.00	$ 47,634.00
12	Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background With *CycleGrip MMAX* Green Paint.	SF	270	$ 14.00	$ 3,780.00
13	Reinstall R81 (CA) Sign.	EA	1	$ 598.00	$ 598.00
14	Replace Existing D11-1 Sign With R81 (CA) Sign.	EA	1	$ 598.00	$ 598.00
15	Install Emergency Vehicle Pre-Emption (EVP).	EA	1	$ 15,000.00	$ 15,000.00
				Total	$ 246,734.40
				Total Construction Cost:	$ 246,734.40
				Contingencies percentage of the aforementioned Total Construction Cost:	20% $ 49,346.88
				Total Construction Cost (Including Contingencies):	$ 296,081.28

Total Cost and Benefit:

The project's total cost is estimated at $296,081 which does not include the design and engineering costs. The estimated benefit of these improvements is $1,761,931 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 5.95.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 5.95, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$1,756,452
Travel Time	$4,923
Vehicle Operating Cost	$491
Emissions	$65
Total Benefits	$1,761,931

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$296,081
Present Value Benefits ($ Dollars)	$1,761,931
Net Present Value ($ Dollars)	$1,465,850
Benefit / Cost Ratio	**5.95**

9.2.3 Street Segment 3: Seal Beach Blvd between Old Ranch Pkwy and North Gate Rd

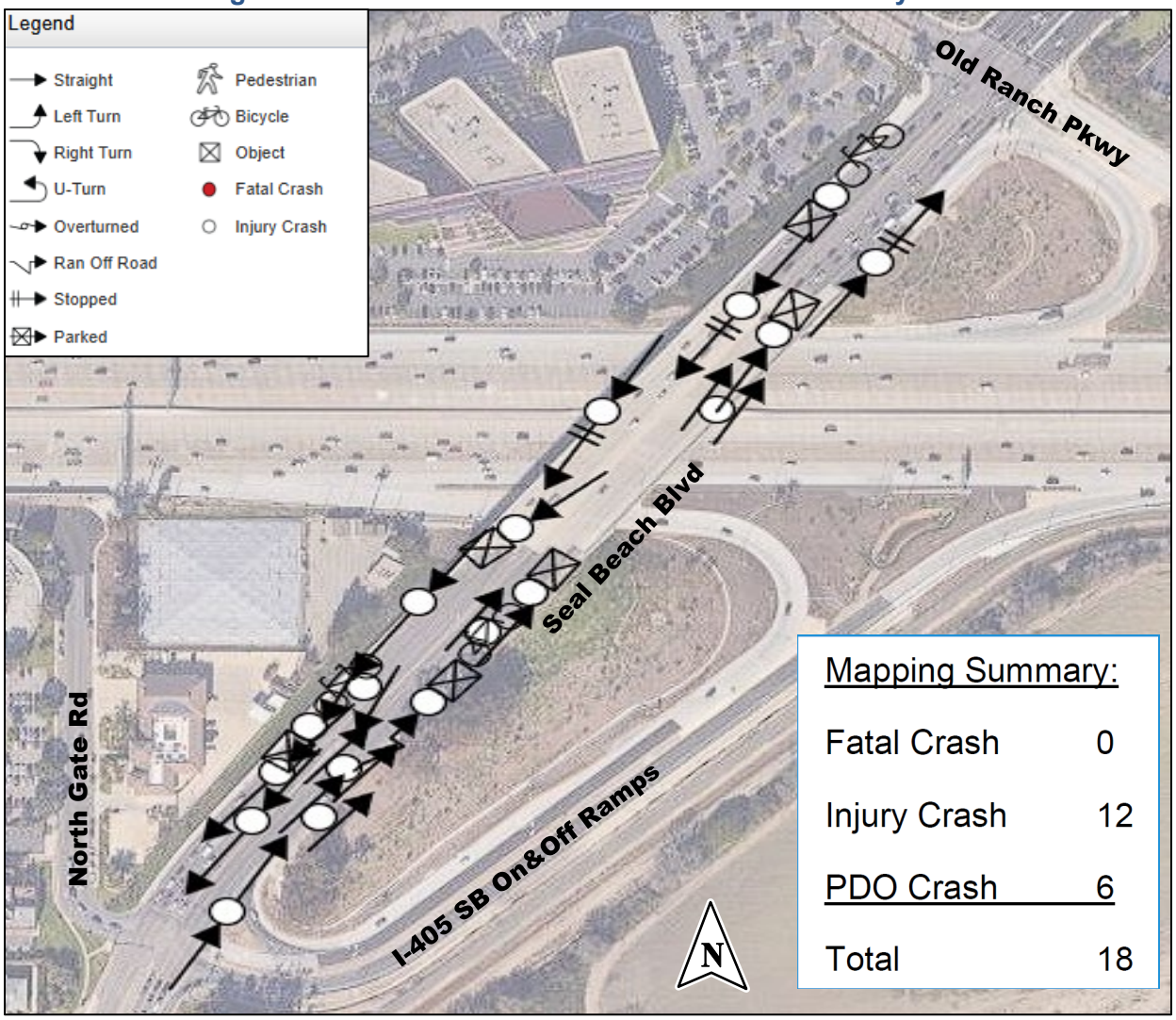


Figure 9-18: Street Segment 3 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


Seal Beach Blvd
Old Ranch Pkwy
I-405 NB On- & Off-Ramps
I-405 SB On- & Off-Ramps
N Gate Rd
EX. SIGN R3-1
EX. SIGN R1-2 SIGN A
EX. OCTA SIGN
EX. SIGN A
EX. SIGN C
EX. SIGN B
EX. SIGN D11-1
EX. SIGN D4-2
TYP.
N.T.S.
RECOMMENDATIONS:
1 SEE INTERSECTION #2.
2 SEE INTERSECTION #3.
3 RESTRIPE TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
4 RESTRIPE TRAFFIC STRIPING WITH PAINT.
5 INSTALL DYNAMIC SPEED WARNING SIGN WITH NEW R2-1 (40) SIGN.
6 INSTALL "GREENBACK BIKE LANE" ENHANCED CL2 BIKEWAY PAVEMENT LEGEND BACKGROUND WITH CYCLEGRIP MMAX GREEN PAINT.
TRAFFIC SIGN RECOMMENDATIONS:
SPEED LIMIT 40
YOUR SPEED
Dynamic Speed Warning Sign
EXISTING SIGNS (THIS SHEET ONLY):
R3-1
R2-1
D4-2
G77-7 (CA)
D11-1
G28-2 (CA)
R26 (S) (CA)
G27-2 (CA)
D13-3
R1-2
Sign A
Sign B
Sign C
PARK - RIDE
BIKE ROUTE
FREEWAY ENTRANCE
YIELD
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
City of Seal Beach
Safety Action Plan
High Collision Locations
MINAGAR & ASSOCIATES, INC.
11/27/2024
Street Segment #3 Seal Beach Blvd
Between Old Ranch Pkwy & N Gate Rd/I-405 SB Ramps
Recommended Improvements

9.2.3.1 Street Segment 3 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-18: Street Segment 3 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	See Intersection #2.	-			$ -
2	See Intersection #3.	-			$ -
3A	Restripe Traffic Striping With Thermoplastic Polyurethane.	LF	0		$ -
3B	Thermoplastic Legends	SF	220	$ 5.46	$ 1,201.20
4	Restripe Traffic Striping With Paint.	LF	11,400	$ 3.65	$ 41,610.00
5	Install Dynamic Speed Warning Sign With New R2-1 (40) Sign.	EA	2	$ 15,598.00	$ 31,196.00
6	Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background With *CycleGrip MMAX* Green Paint.	SF	45	$ 14.00	$ 630.00
				Total	$ 74,637.20
			Total Construction Cost:	$	74,637.20
			Contingencies percentage of the aforementioned Total Construction Cost:	20%	$ 14,927.44
			Total Construction Cost (Including Contingencies):	$	89,564.64

Total Cost and Benefit:

The project's total cost is estimated at $89,565 which does not include the design and engineering costs. The estimated benefit of these improvements is $1,264,142 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 14.11.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 14.11, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$1,258,396
Travel Time	$5,148
Vehicle Operating Cost	$512
Emissions	$87
Total Benefits	$1,264,142

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$89,565
Present Value Benefits ($ Dollars)	$1,264,142
Net Present Value ($ Dollars)	$1,174,577
Benefit / Cost Ratio	**14.11**

9.2.4 Street Segment 4: Seal Beach Blvd between North Gate Rd and Golden Rain Rd

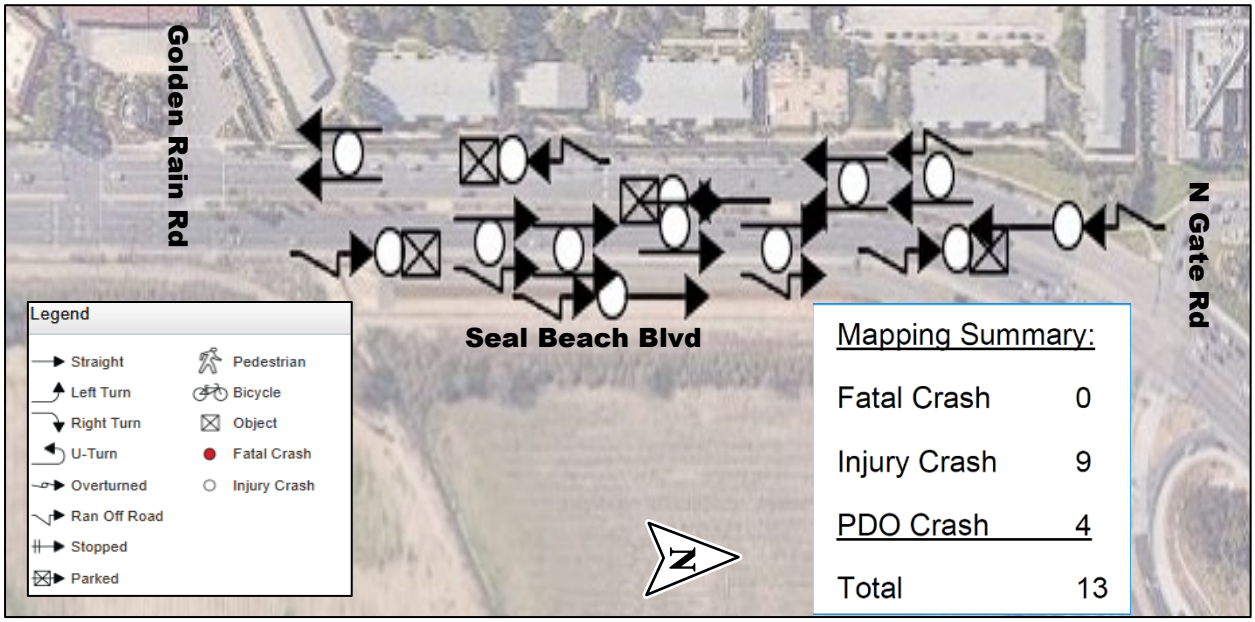


Figure 9-19: Street Segment 4 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


RECOMMENDATIONS:
1 SEE INTERSECTION #2.
2 SEE INTERSECTION #7.
3 RESTRIPE TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.**
4 RESTRIPE TRAFFIC STRIPING WITH PAINT.**
5 INSTALL DYNAMIC SPEED WARNING SIGN WITH NEW R2-1 (50) SIGN.
6 INSTALL "GREENBACK BIKE LANE" ENHANCED CL2 BIKEWAY PAVEMENT LEGEND BACKGROUND WITH CYCLEGRIP MMAX GREEN PAINT.
**PER CITY'S IMPROVEMENT PROJECT CIP O-ST-3, THESE IMPROVEMENTS ARE EXCLUDED FROM THE SAP PROJECT.
N Gate Rd
I-405 SB On- & Off-Ramps
Seal Beach Blvd
Golden Rain Rd
N.T.S.
TRAFFIC SIGN RECOMMENDATIONS:
SPEED LIMIT 50
YOUR SPEED 30
Dynamic Speed Warning Sign
EXISTING SIGNS (THIS SHEET ONLY):
D11-1 BIKE ROUTE
R2-1 SPEED LIMIT 50
R26 (CA) NO PARKING ANY TIME
G86-3 (CA) NORTH SOUTH EAST
W11-8
W3-3
R4-7
R3-4
R3-7 RIGHT LANE MUST TURN RIGHT
Sign A
Sign B
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
Street Segment #4 Seal Beach Blvd
Between N Gate Rd/I-405 SB Ramps & Golden Rain Rd
Recommended Improvements
MINAGAR & ASSOCIATES, INC.
City of Seal Beach
Safety Action Plan
High Collision Locations

9.2.4.1 Street Segment 4 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-19: Street Segment 4 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	See Intersection #2.	-			$ -
2	See Intersection #7.	-			$ -
3A	Restripe Traffic Striping With Thermoplastic Polyurethane.	LF	0		$ -
3B	Thermoplastic Legends	SF	210	$ 5.46	$ 1,146.60
4	Restripe Traffic Striping With Paint.	LF	0		$ -
5	Install Dynamic Speed Warning Sign With New R2-1 (50) Sign.	EA	2	$ 15,598.00	$ 31,196.00
6	Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background With *CycleGrip MMAX* Green Paint.	SF	45	$ 14.00	$ 630.00
				Total	$ 32,972.60
			Total Construction Cost:	$	32,972.60
			Contingencies percentage of the aforementioned Total Construction Cost:	20%	$ 6,594.52
			Total Construction Cost (Including Contingencies):	$	39,567.12

Total Cost and Benefit:

The project's total cost is estimated at $39,567 which does not include the design and engineering costs. The estimated benefit of these improvements is $960,191 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 24.27.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 24.27, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$955,931
Travel Time	$3,804
Vehicle Operating Cost	$381
Emissions	$76
Total Benefits	$960,191

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$39,567
Present Value Benefits ($ Dollars)	$960,191
Net Present Value ($ Dollars)	$920,624
Benefit / Cost Ratio	**24.27**

9.2.5 Street Segment 5: Seal Beach Blvd between Golden Rain Rd and St Andrews Dr

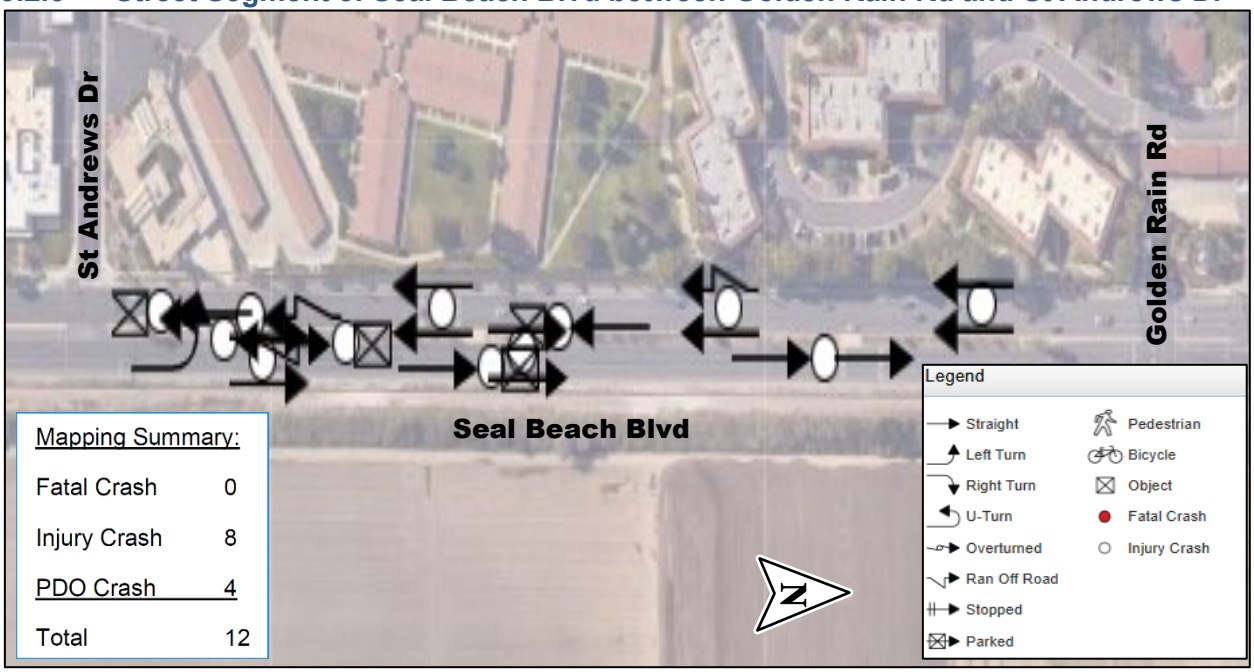


Figure 9-20: Street Segment 5 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable

9.2.5.1 Street Segment 5 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-20: Street Segment 5 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	See Intersection #11.	-			$ -
2	See Intersection #7.	-			$ -
3A	Restripe Traffic Striping With Thermoplastic Polyurethane.	LF	0		$ -
3B	Thermoplastic Legends	SF	405	$ 5.46	$ 2,211.30
4	Restripe Traffic Striping With Paint.	LF	0		$ -
5	Install Dynamic Speed Warning Sign With Existing R2-1 (50) Sign.	EA	2	$ 15,598.00	$ 31,196.00
6	Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background With *CycleGrip MMAX* Green Paint.	SF	15	$ 14.00	$ 210.00
				Total	$ 33,617.30
			Total Construction Cost:	$	33,617.30
			Contingencies percentage of the aforementioned Total Construction Cost:	20%	$ 6,723.46
			Total Construction Cost (Including Contingencies):	$	40,340.76

Total Cost and Benefit:

The project's total cost is estimated at $40,341 which does not include the design and engineering costs. The estimated benefit of these improvements is $1,782,806 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 44.19.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 44.19, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$1,778,318
Travel Time	$4,025
Vehicle Operating Cost	$409
Emissions	$54
Total Benefits	$1,782,806

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$40,341
Present Value Benefits ($ Dollars)	$1,782,806
Net Present Value ($ Dollars)	$1,742,465
Benefit / Cost Ratio	**44.19**

9.2.6 Street Segment 6: Seal Beach Blvd between St Cloud Dr and Old Ranch Pkwy

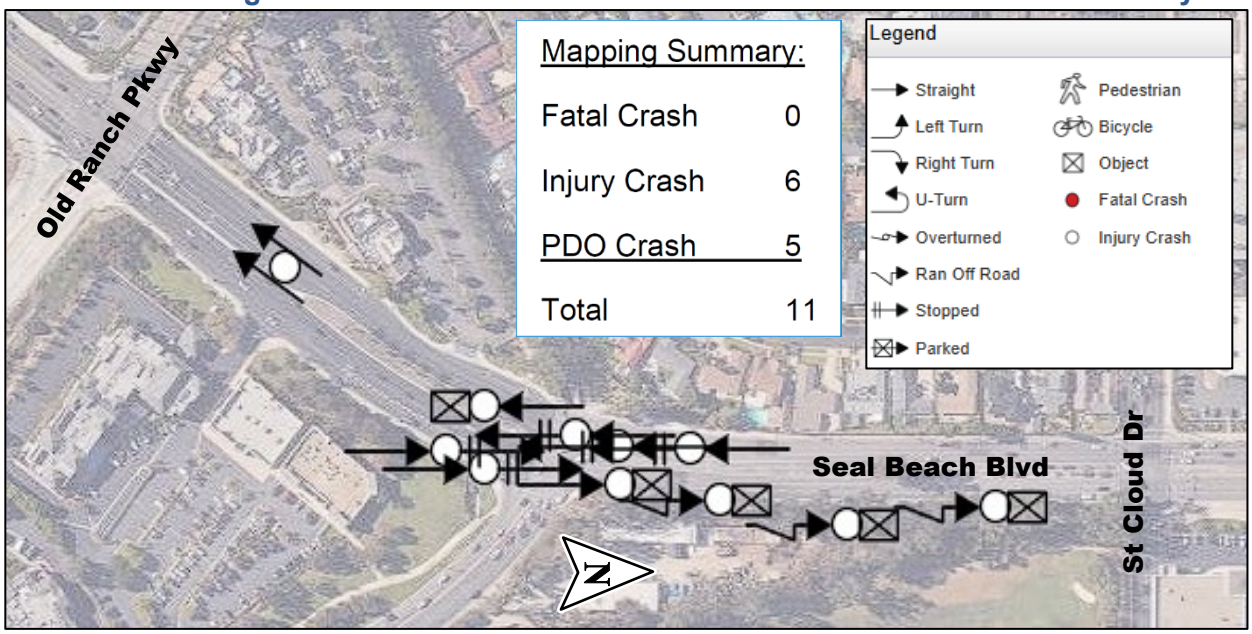
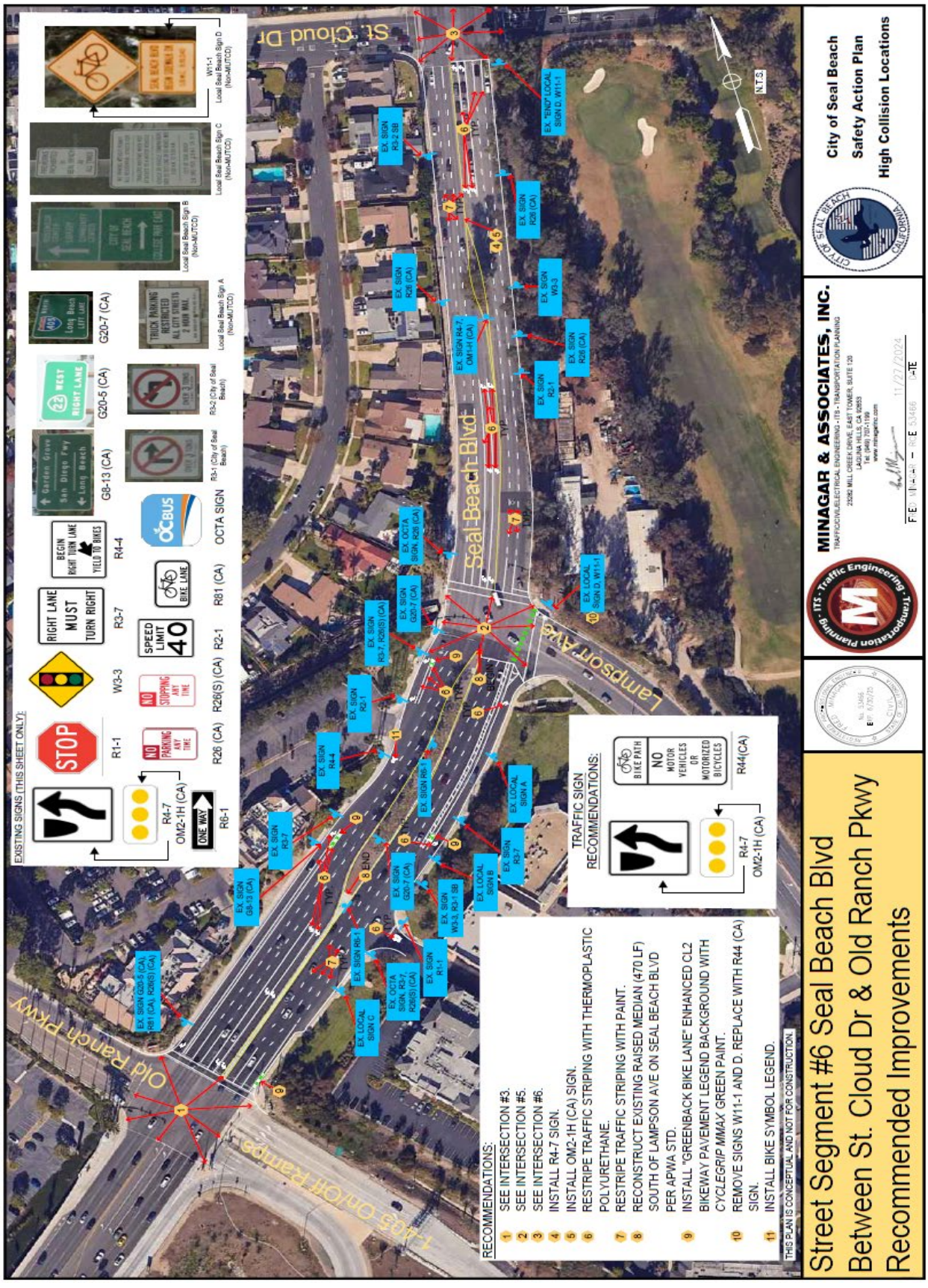


Figure 9-21: Street Segment 6 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


Street Segment #6 Seal Beach Blvd
Between St. Cloud Dr & Old Ranch Pkwy
Recommended Improvements
City of Seal Beach
Safety Action Plan
High Collision Locations
MINAGAR & ASSOCIATES, INC.
TRAFFIC/CIVIL/ELECTRICAL ENGINEERING - ITS - TRANSPORTATION PLANNING
RECOMMENDATIONS:
1 SEE INTERSECTION #3.
2 SEE INTERSECTION #5.
3 SEE INTERSECTION #6.
4 INSTALL R4-7 SIGN.
5 INSTALL OM2-1H (CA) SIGN.
6 RESTRIPE TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
7 RESTRIPE TRAFFIC STRIPING WITH PAINT.
8 RECONSTRUCT EXISTING RAISED MEDIAN (470 LF) SOUTH OF LAMPSON AVE ON SEAL BEACH BLVD PER APWA STD.
9 INSTALL "GREENBACK BIKE LANE" ENHANCED CL2 BIKEWAY PAVEMENT LEGEND BACKGROUND WITH *CYCLEGRIP MMAX* GREEN PAINT.
10 REMOVE SIGNS W11-1 AND D. REPLACE WITH R44 (CA) SIGN.
11 INSTALL BIKE SYMBOL LEGEND.
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION
EXISTING SIGNS (THIS SHEET ONLY):
TRAFFIC SIGN RECOMMENDATIONS:
Seal Beach Blvd
Lampson Ave
Old Ranch Pkwy
St. Cloud Dr
I-405 On/Off Ramps
N.T.S.

9.2.6.1 Street Segment 6 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-21: Street Segment 6 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	See Intersection #3.	-			$ -
2	See Intersection #5.	-			$ -
3	See Intersection #6.	-			$ -
4	Install R4-7 Sign.	EA	1	$ 598.00	$ 598.00
5	Install OM2-1H (CA) Sign.	EA	1	$ 598.00	$ 598.00
6A	Restripe Traffic Striping With Thermoplastic Polyurethane.	LF	50	$ 2.60	$ 130.00
6B	Thermoplastic Legends	SF	70	$ 5.46	$ 382.20
7	Restripe Traffic Striping With Paint.	LF	6,500	$ 3.65	$ 23,725.00
8	Reconstruct Existing Raised Median (470 LF) South Of Lampson Ave On Seal Beach Blvd Per APWA Std.	SF	11,750	$ 36.00	$ 423,000.00
				Total	$ 448,433.20
				Total Construction Cost:	$ 448,433.20
				Contingencies percentage of the aforementioned Total Construction Cost:	20% $ 89,686.64
				Total Construction Cost (Including Contingencies):	$ 538,119.84

Total Cost and Benefit:

The project's total cost is estimated at $538,120 which does not include the design and engineering costs. The estimated benefit of these improvements is $6,835,962 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 12.70.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 12.70, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$6,819,318
Travel Time	$15,035
Vehicle Operating Cost	$1,508
Emissions	$101
Total Benefits	$6,835,962

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$538,120
Present Value Benefits ($ Dollars)	$6,835,962
Net Present Value ($ Dollars)	$6,297,842
Benefit / Cost Ratio	**12.70**

9.2.7 Street Segment 7: Marina Dr between 1st St and 5th St

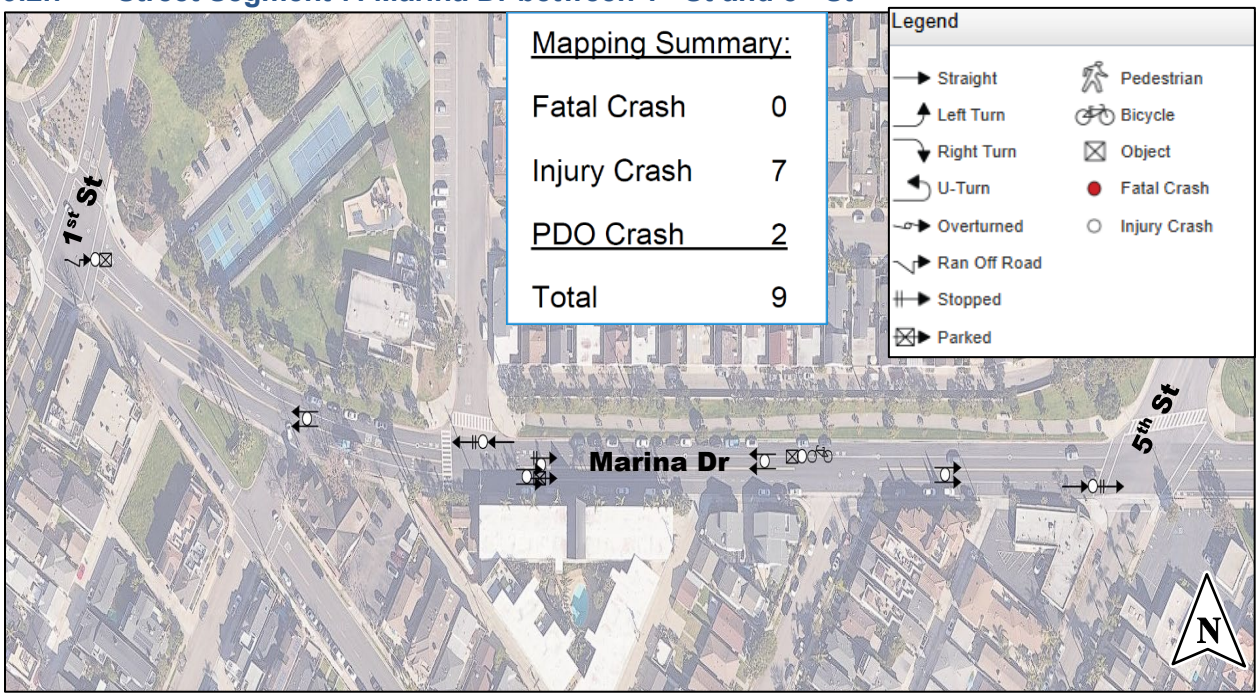
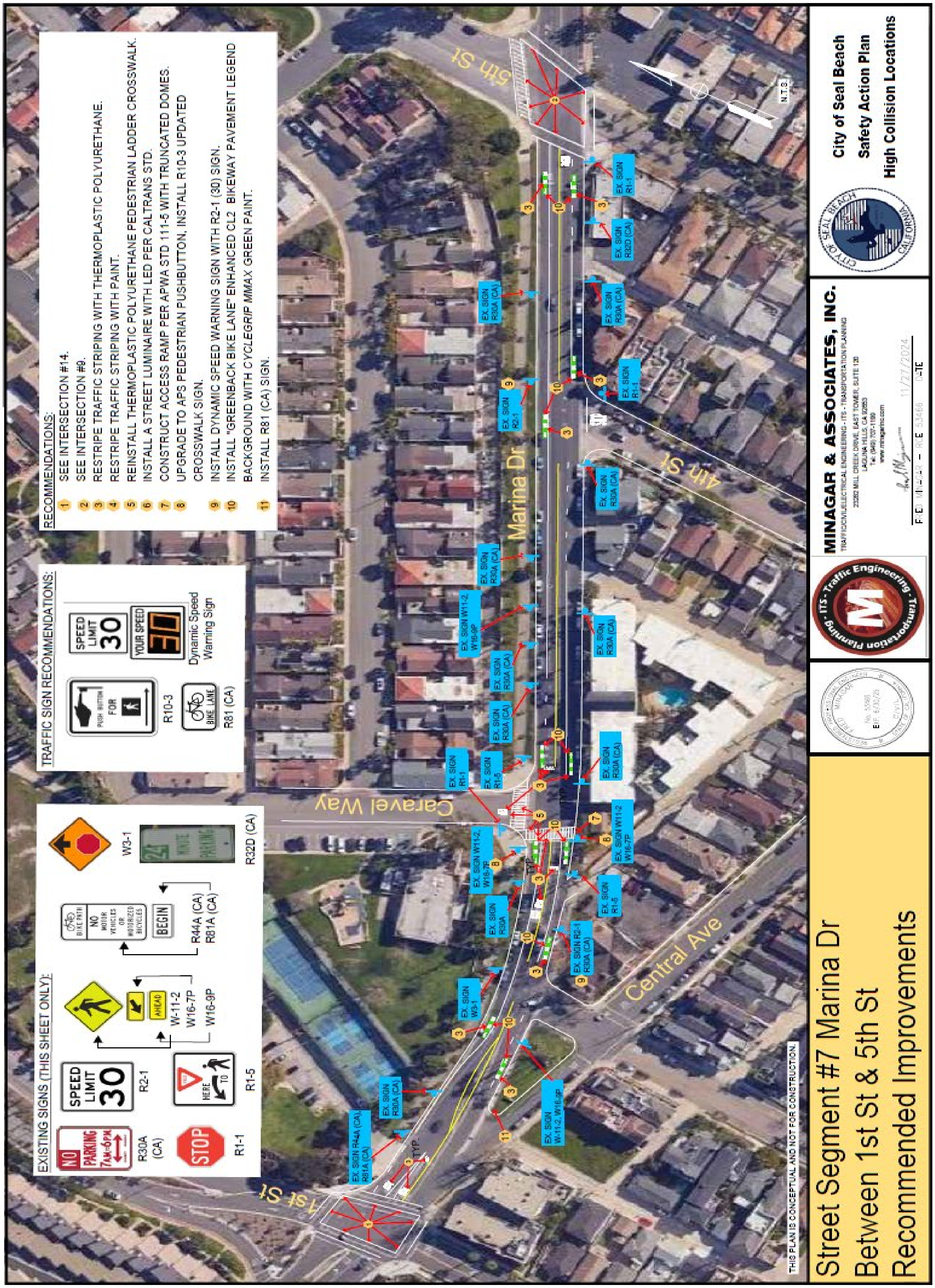


Figure 9-22: Street Segment 7 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


RECOMMENDATIONS:
1 SEE INTERSECTION #14.
2 SEE INTERSECTION #9.
3 RESTRIPE TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
4 RESTRIPE TRAFFIC STRIPING WITH PAINT.
5 REINSTALL THERMOPLASTIC POLYURETHANE PEDESTRIAN LADDER CROSSWALK.
6 INSTALL A STREET LUMINAIRE WITH LED PER CALTRANS STD.
7 CONSTRUCT ACCESS RAMP PER APWA STD 111-5 WITH TRUNCATED DOMES.
8 UPGRADE TO APS PEDESTRIAN PUSHBUTTON, INSTALL R10-3 UPDATED CROSSWALK SIGN.
9 INSTALL DYNAMIC SPEED WARNING SIGN WITH R2-1 (30) SIGN.
10 INSTALL "GREENBACK BIKE LANE" ENHANCED CL2 BIKEWAY PAVEMENT LEGEND BACKGROUND WITH CYCLEGRIP MMAX GREEN PAINT.
11 INSTALL R81 (CA) SIGN.
TRAFFIC SIGN RECOMMENDATIONS:
R10-3
R81 (CA)
Dynamic Speed Warning Sign
EXISTING SIGNS (THIS SHEET ONLY):
R30A (CA)
R2-1
W-11-2
W16-7P
W16-9P
R44A (CA)
R81A (CA)
W3-1
R32D (CA)
R1-1
R1-5
Marina Dr
Central Ave
Caravel Way
1st St
4th St
5th St
N.T.S.
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
City of Seal Beach
Safety Action Plan
High Collision Locations
MINAGAR & ASSOCIATES, INC.
Street Segment #7 Marina Dr
Between 1st St & 5th St
Recommended Improvements

9.2.7.1 Street Segment 7 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-22: Street Segment 7 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	See Intersection #14.	-		$ -	$ -
2	See Intersection #9.	-		$ -	$ -
3	Restripe Traffic Striping With Thermoplastic Polyurethane.	SF	275	$ 2.60	$ 715.00
4	Restripe Traffic Striping With Paint.	LF	2,400	$ 3.65	$ 8,760.00
5	Reinstall Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.	LF	100	$ 5.46	$ 546.00
6	Install A Street Luminaire With LED Per Caltrans Std.	EA	1	$ 2,500.00	$ 2,500.00
7	Construct Access Ramp Per APWA Std 111-5 With Truncated Domes.	LS	1	$ 7,000.00	$ 7,000.00
8A	Upgrade To APS Pedestrian Pushbutton.	EA	1	$ 2,000.00	$ 2,000.00
8B	Install R10-3 Updated Crosswalk Sign.	EA	1	$ 598.00	$ 598.00
9	Install Dynamic Speed Warning Sign With R2-1 (30) Sign.	EA	2	$ 15,598.00	$ 31,196.00
10	Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background With *CycleGrip MMAX* Green Paint.	SF	405	$ 14.00	$ 5,670.00
11	Install R81 (CA) Sign.	EA	1	$ 598.00	$ 598.00
				Total	$ 59,583.00
				Total Construction Cost:	$ 59,583.00
				Contingencies percentage of the aforementioned Total Construction Cost:	20% $ 11,916.60
				Total Construction Cost (Including Contingencies):	$ 71,499.60

Total Cost and Benefit:

The project's total cost is estimated at $71,500 which does not include the design and engineering costs. The estimated benefit of these improvements is $860,567 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 12.04.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 12.04, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$857,015
Travel Time	$3,194
Vehicle Operating Cost	$317
Emissions	$40
Total Benefits	$860,567

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$71,500
Present Value Benefits ($ Dollars)	$860,567
Net Present Value ($ Dollars)	$789,067
Benefit / Cost Ratio	**12.04**

9.2.8 Street Segment 8: Main St between Pacific Coast Highway and Electric Ave

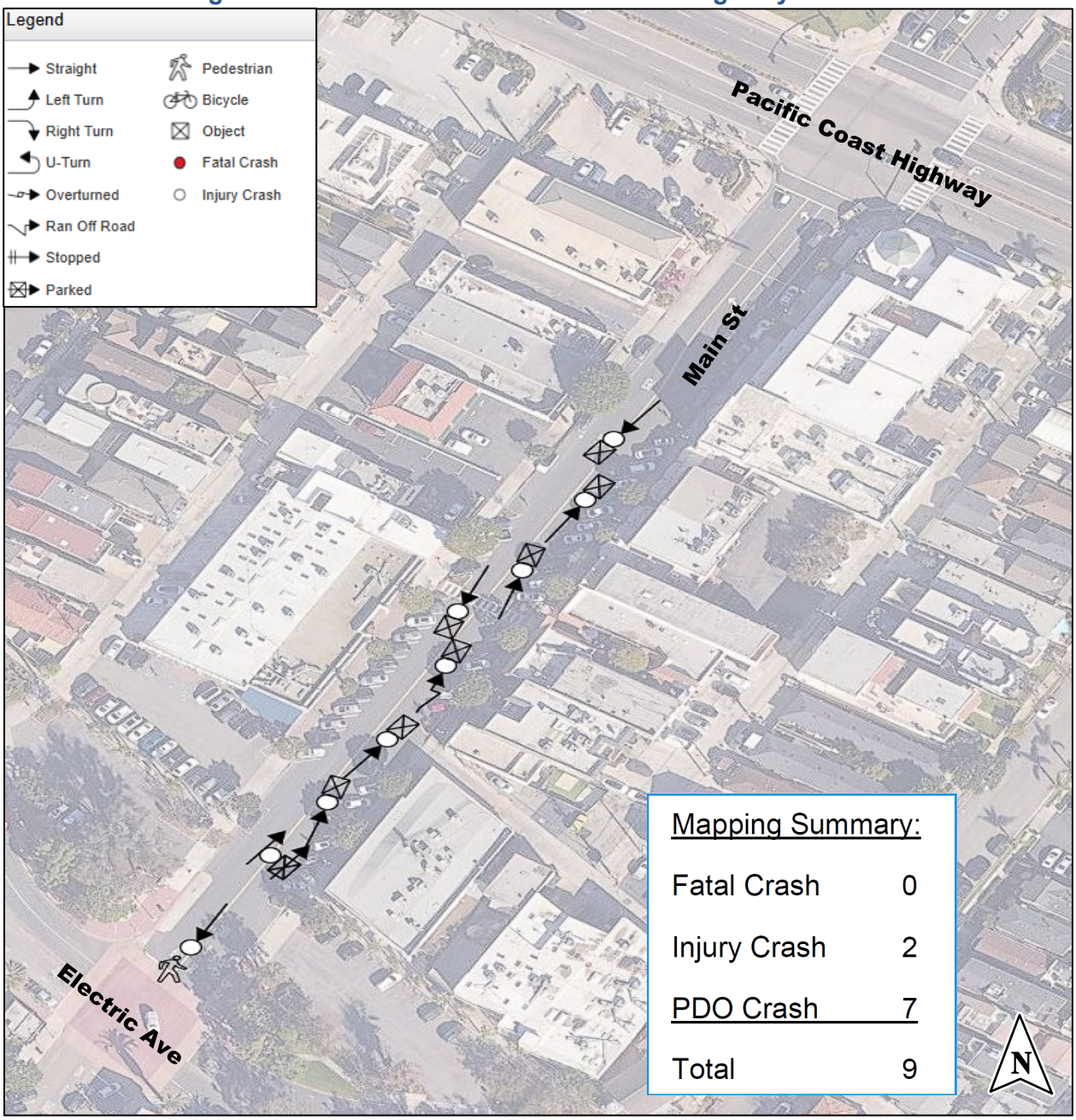


Figure 9-23: Street Segment 8 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


RECOMMENDATIONS:
1 INSTALL RECTANGULAR RAPID FLASHING BEACON (RRFB) WITH W11-2 SIGN, W16-7P SIGN, R10-3 SIGN, AND APS PEDESTRIAN PUSHBUTTON.
2 3 INSTALL IN-STREET PEDESTRIAN CROSSING SIGN R1-6.
RESTRIPE TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
4 REINSTALL THERMOPLASTIC POLYURETHANE PEDESTRIAN LADDER CROSSWALK.
5 RESTRIPE TRAFFIC STRIPING WITH PAINT.
6 REINSTALL R31 (CA) SIGN.
7 REINSTALL R26 (CA) SIGN.
Pacific Coast Highway
Main St
Electric Ave
N.T.S.
EXISTING SIGNS (THIS SHEET ONLY):
NO PARKING ANY TIME R26 (CA)
30 MINUTE PARKING 2AM-6AM R32D (CA)
TURNING VEHICLES TO R10-15
R3-8b
NO PARKING 4 AM - 5 AM 2 HOUR PARKING 9 AM - 6 PM R31 (CA)
STOP R1-1
OCTA Sign
NO REPARKING
AREA UNDER POLICE VIDEO SURVEILLANCE
PREP-125 (CA)
PREP-098
PREP-R5-6
TRAFFIC SIGN RECOMMENDATIONS:
NO PARKING 4 AM - 5 AM 2 HOUR PARKING 9 AM - 6 PM R31 (CA)
NO PARKING ANY TIME R26 (CA)
R1-6
R10-3
W11-2
RRFB
W16-7P
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
MINAGAR & ASSOCIATES, INC.
TRAFFIC/CIVIL/ELECTRICAL ENGINEERING - ITS - TRANSPORTATION PLANNING
22292 MILL CREEK DRIVE, EAST TOWER, SUITE 120
LAGUNA HILLS, CA 92653
Tel. (949) 707-1199
www.minagarinc.com
11/27/2024
DATE
City of Seal Beach
Safety Action Plan
High Collision Locations
Street Segment #8 Main St
Between Pacific Coast Highway & Electric Ave
Recommended Improvements

9.2.8.1 Street Segment 8 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-23: Street Segment 8 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1A	Install Rectangular Rapid Flashing Beacon (RRFB)	EA	2	$ 15,000.00	$ 30,000.00
1B	Upgrade To APS Pedestrian Pushbutton.	EA	2	$ 2,000.00	$ 4,000.00
1C	Install R10-3 Updated Crosswalk Sign.	EA	2	$ 598.00	$ 1,196.00
2	Install In-Street Pedestrian Crossing Sign R1-6.	EA	2	$ 650.00	$ 1,300.00
3A	Restripe Traffic Striping with Thermoplastic Polyurethane.	LF	250	$ 2.60	$ 650.00
3B	Thermoplastic Legends	SF	250	$ 5.46	$ 1,365.00
4	Reinstall Thermoplastic Polyurethane Pedestrian Ladder Crosswalk.	LF	50	$ 5.46	$ 273.00
5	Restripe Traffic Striping with Paint.	LF	1,300	$ 3.65	$ 4,745.00
6	Reinstall R31 (CA) Sign.	EA	1	$ 598.00	$ 598.00
7	Reinstall R26 (CA) Sign.	EA	1	$ 598.00	$ 598.00
				Total	$ 44,725.00
			Total Construction Cost:	$	44,725.00
			Contingencies percentage of the aforementioned Total Construction Cost:	20%	$ 8,945.00
			Total Construction Cost (Including Contingencies):	$	53,670.00

Total Cost and Benefit:

The project's total cost is estimated at $53,670 which does not include the design and engineering costs. The estimated benefit of these improvements is $571,063 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 10.64.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 10.64, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$567,690
Travel Time	$3,051
Vehicle Operating Cost	$295
Emissions	$28
Total Benefits	$571,063

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$53,670
Present Value Benefits ($ Dollars)	$571,063
Net Present Value ($ Dollars)	$517,393
Benefit / Cost Ratio	**10.64**

9.2.9 Street Segment 9: Seal Beach Blvd between Bradbury Rd & Rossmoor Center Way

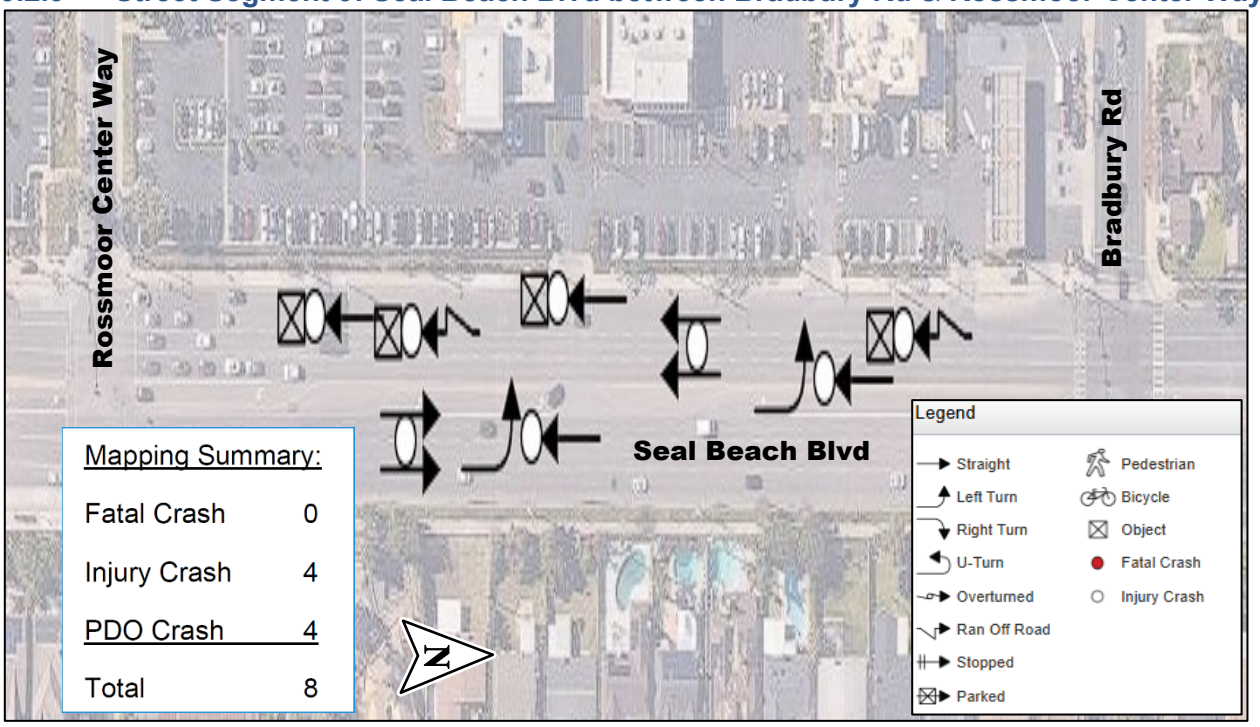


Figure 9-24: Street Segment 9 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes includes non-injury crashes if applicable


Bradbury Rd
Seal Beach Blvd
Rossmoor Center Way
RECOMMENDATIONS:
1 INSTALL RAISED HARDSCAPE MEDIAN WITH TURNOUTS (~500 LF).
2 INSTALL R3-5R SIGN.
3 INSTALL DYNAMIC SPEED WARNING SIGN WITH R2-1 (40) SIGN.
4 INSTALL SIGNS R4-7 AND OM1-3.
5 RESTRIPE TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
6 RESTRIPE TRAFFIC STRIPING WITH PAINT.
7 INSTALL "40 MPH" LEGEND.
8 UPGRADE CORNERS WITH PROPER RADII PER APWA STD PLANS DUE TO TIGHT TURNS.
9 REMOVE CONFLICT STRIPING BY WET SANDBLASTING.
10 EXTEND LANE LINE DIVIDER BY 7 FT AND INSTALL NEW STOP BAR AND LEGEND WITH THERMOPLASTIC POLYURETHANE.
11 INSTALL R6-1 SIGN.
12 INSTALL "GREENBACK BIKE LANE" ENHANCED CL2 BIKEWAY PAVEMENT LEGEND BACKGROUND WITH CYCLEGRIP MMAX GREEN PAINT.
EXISTING SIGNS (THIS SHEET ONLY):
SPEED LIMIT 40
R2-1
STOP
R1-1
W3-3
SPEED CHECKED BY RADAR
TRUCK PARKING RESTRICTED ALL CITY STREETS 2 HOUR MAX
Sign A (Non-MUTCD)
OCTA SIGN
TRAFFIC SIGN RECOMMENDATIONS:
SPEED LIMIT 40
YOUR SPEED 30
R4-7
OM1-3 Dynamic Speed Warning Sign
ONLY
R3-5R
ONE WAY
R6-1
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
City of Seal Beach
Safety Action Plan
High Collision Locations
MINAGAR & ASSOCIATES, INC.
Traffic Engineering · ITS · Transportation Planning
Segment #9 Seal Beach Blvd
Between Bradbury Rd & Rossmoor Center Way
Recommended Improvements

9.2.9.1 Street Segment 9 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-24: Street Segment 9 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	Install Raised Hardscape Median with Turnouts (~500 LF).	SF	4,500	$ 36.00	$ 162,000.00
2	Install R3-5R Sign.	EA	1	$ 598.00	$ 598.00
3	Install Dynamic Speed Warning Sign with R2-1 (40) Sign.	EA	2	$ 15,598.00	$ 31,196.00
4	Install Signs R4-7 And OM1-3.	EA	2	$ 760.00	$ 1,520.00
5A	Restripe Traffic Striping with Thermoplastic Polyurethane.	LF	1,000	$ 2.60	$ 2,600.00
5B	Thermoplastic Legends	SF	440	$ 5.46	$ 2,402.40
6	Restripe Traffic Striping with Paint.	LF	5,000	$ 3.65	$ 18,250.00
7	Install "40 MPH" Legend.	SF	240	$ 5.46	$ 1,310.40
8	Upgrade Corners with Proper Radii Per APWA Std Plans Due to Tight Turns.	LS	1	$ 12,500.00	$ 12,500.00
9	Remove Conflict Striping by Wet Sandblasting.	LF	50	$ 3.78	$ 189.00
10	Extend Lane Line Divider By 7 Ft and Install New Stop Bar and Legend With Thermoplastic Polyurethane.	SF	45	$ 3.78	$ 170.10
11	Install R6-1 Sign.	EA	1	$ 598.00	$ 598.00
12	Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with *CycleGrip MMAX* Green Paint.	SF	45	$ 14.00	$ 630.00
				Total	$ 233,963.90
			Total Construction Cost:	$	233,963.90
			Contingencies percentage of the aforementioned Total Construction Cost:	20%	$ 46,792.78
			Total Construction Cost (Including Contingencies):	$	280,756.68

Total Cost and Benefit:

The project's total cost is estimated at $280,757 which does not include the design and engineering costs. The estimated benefit of these improvements is $1,030,263 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 3.67.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 3.67, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$1,026,588
Travel Time	$3,255
Vehicle Operating Cost	$335
Emissions	$85
Total Benefits	$1,030,263

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$280,757
Present Value Benefits ($ Dollars)	$1,030,263
Net Present Value ($ Dollars)	$749,506
Benefit / Cost Ratio	**3.67**

9.2.10 Street Segment 10: Seal Beach Blvd between Rossmoor Center Way & St Cloud Dr

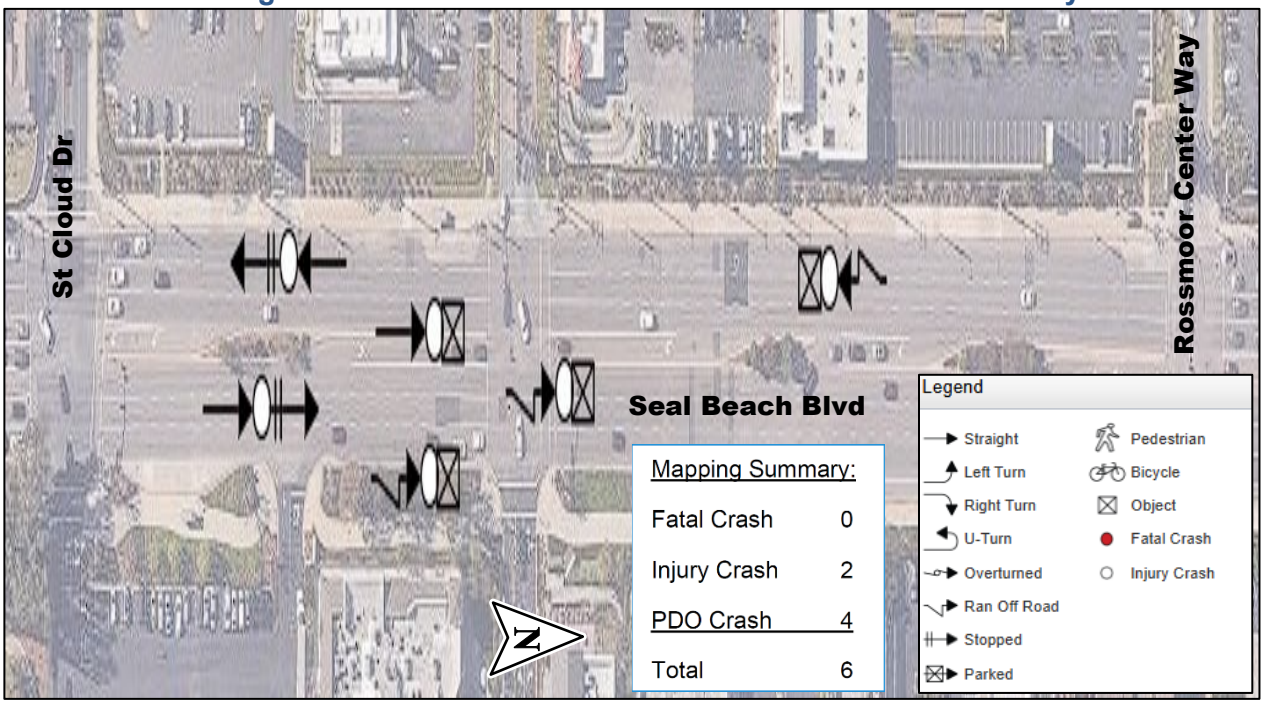


Figure 9-25: Street Segment 10 Crash Diagram
(January 1, 2019 - December 31, 2023)

Source: University of California, Berkeley Transportation Injury Mapping System (TIMS)
*Collision Locations are approximate due to the size and overlapping of collisions
**PDO crashes include non-injury crashes if applicable


Street Segment #10 Seal Beach Blvd
Between Rossmoor Center Way & St. Cloud Dr
Recommended Improvements
City of Seal Beach
Safety Action Plan
High Collision Locations
MINAGAR & ASSOCIATES, INC.
RECOMMENDATIONS:
1 SEE INTERSECTION #8.
2 SEE INTERSECTION #4.
3 SEE SEGMENT #9.
4 INSTALL R6-1 SIGN.
5 RESTRIPE TRAFFIC STRIPING WITH THERMOPLASTIC POLYURETHANE.
6 RESTRIPE TRAFFIC STRIPING WITH PAINT.
7 INSTALL OM2-1H (CA) SIGN.
8 INSTALL DYNAMIC SPEED WARNING SIGN WITH EXISTING R2-1 (40) SIGN.
9 INSTALL "GREENBACK BIKE LANE" ENHANCED CL2 BIKEWAY PAVEMENT LEGEND BACKGROUND WITH CYCLEGRIP MMAX GREEN PAINT.
TRAFFIC SIGN RECOMMENDATIONS:
ONE WAY R6-1
OM2-1H (CA)
SPEED LIMIT 40
YOUR SPEED 30
Dynamic Speed Warning Sign
EXISTING SIGNS (THIS SHEET ONLY):
STOP R1-1
SPEED LIMIT 40 R2-1
ONE WAY R6-1
BIKE ROUTE D11-1
NO PARKING ANY TIME R26 (CA)
NO STOPPING ANY TIME R26(S)
NO LEFT TURN
OCBUS
OCTA SIGN
Seal Beach Blvd
Towne Center Dr
St. Cloud Dr
Rossmoor Center Way
Plymouth Dr
THIS PLAN IS CONCEPTUAL AND NOT FOR CONSTRUCTION

9.2.10.1 Street Segment 10 Cost Estimate and Benefit Cost Analysis

Construction Cost Estimate:

The following table represents the preliminary line-item cost for the proposed countermeasures.

Table 9-25: Street Segment 10 Cost Estimate

No.	Item Description	Unit	Quantity	Unit Cost	Total
1	See Intersection #6.	-		$ -	$ -
2	See Intersection #4.	-		$ -	$ -
3	See Segment #9.	-		$ -	$ -
4	Install R6-1 Sign.	EA	1	$ 598.00	$ 598.00
5A	Restripe Traffic Striping with Thermoplastic Polyurethane.	LF	700	$ 2.60	$ 1,820.00
5B	Thermoplastic Legends	SF	180	$ 5.46	$ 982.80
6	Restripe Traffic Striping with Paint.	LF	4,500	$ 3.65	$ 16,425.00
7	Install OM2-1H (CA) Sign.	EA	2	$ 598.00	$ 1,196.00
8	Install Dynamic Speed Warning Sign with Existing R2-1 (40) Sign.	EA	1	$ 15,000.00	$ 15,000.00
9	Install "Greenback Bike Lane" Enhanced CL2 Bikeway Pavement Legend Background with *CycleGrip MMAX* Green Paint.	SF	45	$ 14.00	$ 630.00
				Total	$ 36,651.80
				Total Construction Cost:	$ 36,651.80
				Contingencies percentage of the aforementioned Total Construction Cost:	20% $ 7,330.36
				Total Construction Cost (Including Contingencies):	$ 43,982.16

Total Cost and Benefit:

The project's total cost is estimated at $43,982 which does not include the design and engineering costs. The estimated benefit of these improvements is $348,435 based on the FHWA's Highway Safety Benefit-Cost Analysis Model (Version 2.0). The resulting Benefit-Cost ratio is 7.92.

The current HSIP Cycle 12 program has a required minimum B/C ratio (BCR) of 3.5 for a BCR Application. With a B/C ratio of 7.92, the proposed intersection improvement project is eligible for HSIP funding and is considered a competitive HSIP project.

Itemized Benefits	
Safety	$346,557
Travel Time	$1,679
Vehicle Operating Cost	$166
Emissions	$33
Total Benefits	$348,435

Summary of Total Cost & Benefit	
Present Value Costs ($ Dollars)	$43,982
Present Value Benefits ($ Dollars)	$348,435
Net Present Value ($ Dollars)	$304,453
Benefit / Cost Ratio	**7.92**

Table 9-26: Total Construction Cost of Intersections and Roadway Segments

Intersection/Segment	Location	Total Construction Cost (Including Contingencies)
Intersection 1	Seal Beach Blvd & Westminster Ave	$770,877.36
Intersection 2	Seal Beach Blvd & N Gate Rd/I-405 On- & Off-Ramps	$105,061.68
Intersection 3	Seal Beach Blvd & Old Ranch Pkwy/I-405NB On- & Off-Ramps	$159,645.84
Intersection 4	Seal Beach Blvd & Towne Center Dr	$138,652.08
Intersection 5	Seal Beach Blvd & Lampson Ave	$197,448.72
Intersection 6	Seal Beach Blvd & Saint Cloud Dr	$147,555.36
Intersection 7	Seal Beach Blvd & Golden Rain Rd	$367,724.40
Intersection 8	Seal Beach Blvd & Adolfo Lopez Dr	$145,582.38
Intersection 9	Marina Dr & 5th St	$19,183.20
Intersection 10	Central Ave & 8th St	$55,737.84
Intersection 11	Seal Beach Blvd & Saint Andrews Dr	$141,240.00
Intersection 12	Main St & Ocean Ave	$401,353.32
Intersection 13	Westminster Ave & Kitts Hwy	$254,640.72
Intersection 14	Marina Dr & 1st St	$46,582.80
Intersection 15	Golden Rain Rd & Saint Andrews Dr	$136,227.29
Roadway Segment 1	Seal Beach Blvd between St Andrews Dr & Westminster Ave	$22,981.44
Roadway Segment 2	Seal Beach Blvd between Westminster Ave & Apollo Dr	$296,081.28
Roadway Segment 3	Seal Beach Blvd between Old Ranch Pkwy & N Gate Rd/I-405 SB On- & Off- Ramps	$89,564.64
Roadway Segment 4	Seal Beach Blvd between N Gate Rd/I-405 SB On- & Off- Ramps & Golden Rain Rd	$39,567.12
Roadway Segment 5	Seal Beach Blvd between Golden Rain Rd & St Andrews Dr	$40,340.76
Roadway Segment 6	Seal Beach Blvd between St Cloud Dr & Old Ranch Pkwy	$538,119.84
Roadway Segment 7	Marina Dr between 1st St & 5th St	$71,499.60
Roadway Segment 8	Main St between Pacific Coast Highway & Electric Ave	$53,670.00
Roadway Segment 9	Seal Beach Blvd between Bradbury Rd & Rossmoor Center Way	$280,756.68
Roadway Segment 10	Seal Beach Blvd between Rossmoor Center Way & St Cloud Dr	$43,982.16
Total Construction Cost (inclusive of 20% contingencies)		**$4,564,076.51**
Assuming 9.6% of Total Construction Estimate for the PS&E Phase:		**$438,151.34**
Assuming 3.4% of Total Construction Estimate for the CM&I (Construction Management & Inspection):		**$155,178.60**
Assuming 5.0% of Total Construction Estimate for the PM&S (Project Management & Support):		**$228,203.83**
	Grand Total:	**$5,385,610.28**

9.3 HSIP Funding Eligibility for Intersections

Table 9-27: Intersection 1 HSIP Funding Eligibility

	HSIP Funding Eligibility												
	LRSM CM No. (SI02)*	LRSM CM No. (SI03)*	LRSM CM No. (SI04EV)*	LRSM CM No. (SI08)*	LRSM CM No. (SI11)*	LRSM CM No. (SI22PB)*	LRSM CM No. (R08)*	LRSM CM No. (R22)*	LRSM CM No. (R23)*	LRSM CM No. (R25)*	LRSM CM No. (R36PB)*	LRSM CM No. (R38PB)*	OS**
	90%												
											90%		
								90%					
		50%											
				90%									
								90%					
						90%							
											90%		
				90%									
										90%			
													0%
					90%								
							90%						
									90%				
													0%
				90%									
			90%										
								90%					
												90%	
											90%		
								90%					
	90%												
Weighted Average (%)	15%	1.6%	2.3%	2.7%	33.6%	1.1%	3.4%	4.0%	11.2%	2.7%	3.2%	2.3%	16.3%
*Signalized Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)													
**Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)													
***OS: Other Safety-Related Improvements													
CMF:	0.85	0.85	0.3	0.9	0.75	0.4	0.75	0.85	0.6	0.7	0.65	0.65	

Table 9-28: Intersection 2 HSIP Funding Eligibility

	HSIP Funding Eligibility							
	LRSM CM No. (SI02)*	LRSM CM No. (SI03)*	LRSM CM No. (SI04EV)*	LRSM CM No. (SI08)*	LRSM CM No. (SI22PB)*	LRSM CM No. (R22)**	LRSM CM No. (R36PB)**	OS***
	90%							
							90%	
						90%		
		50%						
				90%				
	90%							
						90%		
								0%
							90%	
						90%		
								0%
					90%			
				90%				
						90%		
				90%				
			90%					
								0%
Weighted Average (%)	19.5%	11.4%	17.1%	16.5%	8.0%	8.3%	5.0%	42.6%
* Signalized Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)								
**Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)								
***OS: Other Safety-Related Improvements								
CMF:	0.85	0.85	0.3	0.9	0.4	0.85	0.65	

Table 9-29: Intersection 3 HSIP Funding Eligibility

		HSIP Funding Eligibility							
	LRSM CM No. (SI02)*	LRSM CM No. (SI03)*	LRSM CM No. (SI04EV)*	LRSM CM No. (SI08)*	LRSM CM No. (SI22PB)*	LRSM CM No. (R02)**	LRSM CM No. (R22)**	LRSM CM No. (R36PB)**	OS***
	90%								
								90%	
							90%		
		50%							
				90%					
									0%
								90%	
					90%				
				90%					
						90%			
							90%		
				90%					
			90%						
									0%
Weighted Average (%)	13.9%	7.5%	11.3%	19.0%	5.3%	0.6%	9.6%	7.0%	48.9%
*Signalized Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)									
**Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)									
***OS: Other Safety-Related Improvements									
CMF:	0.85	0.85	0.3	0.9	0.4	0.65	0.85	0.65	

Table 9-30: Intersection 4 HSIP Funding Eligibility

	HSIP Funding Eligibility							
	LRSM CM No. (SI02)*	LRSM CM No. (SI03)*	LRSM CM No. (SI04EV)*	LRSM CM No. (SI08)*	LRSM CM No. (SI22PB)*	LRSM CM No. (R22)**	LRSM CM No. (R36PB)**	OS***
	90%							
							90%	
						90%		
		50%						
				90%				
					90%			
							90%	
					90%			
						90%		
					90%			
						90%		
			90%					
								0%
Weighted Average (%)	9.1%	8.7%	26.0%	2.4%	18.0%	10.7%	11.3%	21.6%
*Signalized Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)								
**Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)								
***OS: Other Safety-Related Improvements								
CMF:	0.85	0.85	0.3	0.9	0.4	0.85	0.65	

Table 9-31: Intersection 5 HSIP Funding Eligibility

		HSIP Funding Eligibility						
	LRSM CM No. (SI02)*	LRSM CM No. (SI03)*	LRSM CM No. (SI04EV)*	LRSM CM No. (SI08)*	LRSM CM No. (SI22PB)*	LRSM CM No. (R22)*	LRSM CM No. (R36PB)*	OS**
	90%							
							90%	
						90%		
		50%						
				90%				
						90%		
								0%
							90%	
				90%				
					90%			
				90%				
			90%					
								0%
	90%							
Weighted Average (%)	6.9%	6.1%	9.1%	11.8%	4.3%	2.2%	5.7%	39.5%
*Signalized Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)								
**Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)								
***OS: Other Safety-Related Improvements								
CMF:	0.85	0.85	0.3	0.9	0.4	0.85	0.65	

Table 9-32: Intersection 6 HSIP Funding Eligibility

		HSIP Funding Eligibility						
	LRSM CM No. (SI02)*	LRSM CM No. (SI03)*	LRSM CM No. (SI04EV)*	LRSM CM No. (SI08)*	LRSM CM No. (SI22PB)*	LRSM CM No. (R22)**	LRSM CM No. (R36PB)**	OS***
	90%							
							90%	
						90%		
		50%						
				90%				
					90%			
						90%		
							90%	
								0%
				90%				
								0%
			90%					
Weighted Average (%)	11%	8.1%	24.4%	9.1%	5.7%	3.4%	10.9%	26.0%
*Signalized Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)								
**Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)								
***OS: Other Safety-Related Improvements								
CMF:	0.85	0.85	0.3	0.9	0.4	0.85	0.65	

Table 9-33: Intersection 7 HSIP Funding Eligibility

		HSIP Funding Eligibility								
	LRSM CM No. (SI02)*	LRSM CM No. (SI03)*	LRSM CM No. (SI04EV)*	LRSM CM No. (SI08)*	LRSM CM No. (SI22PB)*	LRSM CM No. (R22)**	LRSM CM No. (R26)**	LRSM CM No. (R36PB)**	OS***
	90%								
								90%	
						90%			
		50%							
				90%					
							90%		
						90%			
									0%
				90%					
					90%				
	90%								
						90%			
				90%					
									0%
				90%					
			90%						
Weighted Average (%)	31%	3.3%	14.7%	6.2%	2.3%	1.2%	4.9%	2.6%	34.3%
*Signalized Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)									
**Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)									
***OS: Other Safety-Related Improvements									
CMF:	0.85	0.85	0.3	0.9	0.4	0.85	0.7	0.65	

Table 9-34: Intersection 8 HSIP Funding Eligibility

	HSIP Funding Eligibility							
	LRSM CM No. (SI02)*	LRSM CM No. (SI03)*	LRSM CM No. (SI04EV)*	LRSM CM No. (SI08)*	LRSM CM No. (SI22PB)*	LRSM CM No. (R22)**	LRSM CM No. (R36PB)**	OS***
	90%							
							90%	
						90%		
		50%						
				90%				
								0%
							90%	
					90%			
						90%		
				90%				
								0%
				90%				
			90%					
Weighted Average (%)	7%	8.2%	24.7%	5.9%	5.8%	1.5%	3.7%	42.9%
*Signalized Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)								
**Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)								
***OS: Other Safety-Related Improvements								
CMF:	0.85	0.85	0.3	0.9	0.4	0.85	0.65	

Table 9-35: Intersection 9 HSIP Funding Eligibility

	HSIP Funding Eligibility			
	LRSM CM No. (NS08)*	LRSM CM No. (NS09)*	LRSM CM No. (NS23PB)*	LRSM CM No. (R22)**
	90%			
		90%		
			90%	
		90%		
				90%
		90%		
Weighted Average (%)	22.0%	58.6%	8.2%	11.2%
* Non-signalized Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)				
**Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)				
CMF:	0.85	0.75	0.65	0.85

Table 9-36: Intersection 10 HSIP Funding Eligibility

	HSIP Funding Eligibility						
	LRSM CM No. (NS08)*	LRSM CM No. (NS09)*	LRSM CM No. (NS23PB)*	LRSM CM No. (NS24PB)*	LRSM CM No. (R02)**	LRSM CM No. (R22)**	OS***
	90%						
						90%	
					90%		
		90%					
			90%				
				90%			
			90%				
Weighted Average (%)	19.4%	1.8%	1.4%	64.6%	1.6%	67.2%	0.0%
*Non-signalized Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)							
**Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)							
***OS: Other Safety-Related Improvements							
CMF:	0.85	0.75	0.65	0.62	0.65	0.85	

Table 9-37: Intersection 11 HSIP Funding Eligibility

	HSIP Funding Eligibility						
	LRSM CM No. (SI02)*	LRSM CM No. (SI03)*	LRSM CM No. (SI04EV)*	LRSM CM No. (SI08)*	LRSM CM No. (R22)**	LRSM CM No. (R36PB)**	OS***
	90%						
						90%	
					90%		
		50%					
				90%			
					90%		
	90%						
							0%
				90%			
					90%		
				90%			
			90%				
							0%
	90%						
Weighted Average (%)	18%	8.5%	12.7%	6.5%	2.5%	3.4%	38.7%
*Signalized Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)							
**Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)							
**OS: Other Safety-Related Improvements							
CMF:	0.85	0.85	0.3	0.9	0.85	0.65	

Table 9-38: Intersection 12 HSIP Funding Eligibility

		HSIP Funding Eligibility							
	LRSM CM No. (SI02)*	LRSM CM No. (SI03)*	LRSM CM No. (SI04EV)*	LRSM CM No. (SI07)*	LRSM CM No. (SI08)*	LRSM CM No. (SI22PB)*	LRSM CM No. (R22)**	LRSM CM No. (R36PB)**	OS***
	90%								
							90%		
								90%	
				90%					
									0%
					90%				
									0%
	90%								
					90%				
						90%			
		50%							
			90%						
									0%
Weighted Average (%)	7.2%	3.0%	4.5%	11.2%	0.9%	2.1%	0.7%	2.4%	68.0%
*Signalized Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)									
**Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)									
***OS: Other Safety-Related Improvements									
CMF:	0.85	0.85	0.3	0.7	0.9	0.4	0.85	0.65	

Table 9-39: Intersection 13 HSIP Funding Eligibility

	HSIP Funding Eligibility								
	LRSM CM No. (SI02)*	LRSM CM No. (SI03)*	LRSM CM No. (SI04EV)*	LRSM CM No. (SI08)*	LRSM CM No. (SI09)*	LRSM CM No. (SI22PB)*	LRSM CM No. (R22)**	LRSM CM No. (R36PB)**	OS***
	90%								
				90%					
							90%		
									0%
								90%	
				90%					
		50%							
						90%			
								90%	
							90%		
			90%						
							90%		
				90%					
									0%
				90%					
					90%				
Weighted Average (%)	7%	7.1%	14.1%	11.4%	16.0%	3.3%	3.9%	6.4%	30.6%
*Signalized Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)									
**Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)									
***OS: Other Safety-Related Improvements									
CMF:	0.85	0.85	0.3	0.9	0.7	0.4	0.85	0.65	

Table 9-40: Intersection 14 HSIP Funding Eligibility

	HSIP Funding Eligibility		
	LRSM CM No. (NS08)*	LRSM CM No. (NS23PB)*	OS**
	90%		
			0%
		90%	
	90%		
Weighted Average (%)	78.6%	3.4%	18.0%
* Non-signalized Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)			
**OS: Other Safety-Related Improvements			
CMF:	0.85	0.65	

Table 9-41: Intersection 15 HSIP Funding Eligibility

	HSIP Funding Eligibility						
	LRSM CM No. (SI02)*	LRSM CM No. (SI03)*	LRSM CM No. (SI04EV)*	LRSM CM No. (SI08)*	LRSM CM No. (SI22PB)*	LRSM CM No. (R36PB)**	OS***
	90%						
		50%					
				90%			
						90%	
							0%
					90%		
				90%			
			90%				
Weighted Average (%)	9%	8.8%	39.6%	10.7%	6.2%	1.5%	24.7%
* Signalized Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)							
**Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)							
***OS: Other Safety-Related Improvements							
CMF:	0.85	0.85	0.3	0.9	0.4	0.65	

9.4 HSIP Funding Eligibility for Street Segments

Table 9-42: Segment 1 HSIP Funding Eligibility

		HSIP Funding Eligibility	
	LRSM CM No. (R22)*	LRSM CM No. (R26)*	LRSM CM No. (R27)*
			90%
		90%	
	90%		
			90%
Weighted Average (%)	3.1%	78.3%	18.6%
*Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)			
CMF:	0.85	0.7	0.85

Table 9-43: Segment 2 HSIP Funding Eligibility

		HSIP Funding Eligibility					
	LRSM CM No. (R22)*	LRSM CM No. (R26)*	LRSM CM No. (R27)*	LRSM CM No. (R36PB)*	LRSM CM No. (SI02)**	LRSM CM No. (SI03)**	LRSM CM No. (SI04EV)**
			90%				
					90%		
				90%			
	90%						
						50%	
				90%			
		90%					
			90%				
	90%						
							90%
Weighted Average (%)	1.5%	31.5%	32.1%	2.0%	4.6%	4.1%	6.1%
*Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)							
**Signalized Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)							
CMF:	0.85	0.7	0.85	0.65	0.85	0.85	

Table 9-44: Segment 3 HSIP Funding Eligibility

	HSIP Funding Eligibility	
	LRSM CM No. (R26)*	LRSM CM No. (R27)*
		90%
	90%	
		90%
Weighted Average (%)	41.8%	58.2%
*Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)		
**OS: Other Safety-Related Improvements		
CMF:	0.7	0.85

Table 9-45: Segment 4 HSIP Funding Eligibility

	HSIP Funding Eligibility	
	LRSM CM No. (R26)*	LRSM CM No. (R27)*
		90%
	90%	
		90%
Weighted Average (%)	94.6%	5.4%
*Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)		
**OS: Other Safety-Related Improvements		
CMF:	0.7	0.85

Table 9-46: Segment 5 HSIP Funding Eligibility

	HSIP Funding Eligibility	
	LRSM CM No. (R26)*	LRSM CM No. (R27)*
		90%
	90%	
		90%
Weighted Average (%)	92.8%	7.2%
*Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)		
**OS: Other Safety-Related Improvements		
CMF:	0.7	0.85

Table 9-47: Segment 6 HSIP Funding Eligibility

		HSIP Funding Eligibility	
	LRSM CM No. (R08)*	LRSM CM No. (R22)*	LRSM CM No. (R27)*
		90%	
			90%
	90%		
Weighted Average (%)	94.3%	0.3%	5.4%
*Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)			
**OS: Other Safety-Related Improvements			
CMF:	0.75	0.85	0.85

Table 9-48: Segment 7 HSIP Funding Eligibility

	HSIP Funding Eligibility					
	LRSM CM No. (NS01INT)*	LRSM CM No. (R22)**	LRSM CM No. (R26)**	LRSM CM No. (R27)**	LRSM CM No. (R36PB)**	OS***
					90%	
	90%					
						0%
					90%	
		90%				
			90%			
				90%		
Weighted Average (%)	4%	1.0%	52.4%	9.5%	20.2%	11.7%
*Non-Signalized Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)						
**Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)						
***OS: Other Safety-Related Improvements						
CMF:	0.6	0.85	0.7	0.85	0.65	

Table 9-49: Segment 8 HSIP Funding Eligibility

	HSIP Funding Eligibility		
	LRSM CM No. (R22)*	LRSM CM No. (R36PB)*	LRSM CM No. (R38PB)*
			90%
	90%		
		90%	
	90%		
Weighted Average (%)	17.2%	15.7%	67.1%
*Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)			
**OS: Other Safety-Related Improvements			
CMF:	0.85	0.65	0.65

Table 9-50: Segment 9 HSIP Funding Eligibility

	HSIP Funding Eligibility				
	LRSM CM No. (R08)*	LRSM CM No. (R22)*	LRSM CM No. (R26)*	LRSM CM No. (R27)*	OS**
	90%				
		90%			
			90%		
		90%			
				90%	
					0%
				90%	
		90%			
				90%	
Weighted Average (%)	69.2%	1.2%	13.3%	10.8%	5.4%
*Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)					
**OS: Other Safety-Related Improvements					
CMF:	0.75	0.85	0.7	0.85	

Table 9-51: Segment 10 HSIP Funding Eligibility

		HSIP Funding Eligibility		
	LRSM CM No. (R22)*	LRSM CM No. (R26)*	LRSM CM No. (R27)*	OS**
	90%			
			90%	
	90%			
		90%		
			90%	
Weighted Average (%)	4.9%	40.9%	54.2%	
*Roadway Countermeasure Identification of Local Roadway Safety Manual (Version 1.7, April 2024)				
**OS: Other Safety-Related Improvements				
CMF:	0.85	0.7	0.85	

9.5 Other Potential Sources of Funding

The City should continue to seek available funding and grant opportunities from local, state, and federal resources to expedite the process in implementing safety improvements. Below are the main funding programs and grants for which the City of Seal Beach can apply.

1) Highway Safety Improvement Program (HSIP)

The Highway Safety Improvement Program (HSIP) is a Federal program operating under the Fixing America's Surface Transportation (FAST) Act. This program apportions funding as a lump sum for each state, which is then divided among apportioned programs. These funds can be used for projects to preserve or improve safety conditions and performance on any Federal-aid highway, bridge projects on any public road, facilities for non-motorized transportation, and other project types. Safety improvement projects eligible for this funding include new or upgraded traffic signals, upgraded guard rails, pedestrian warning flashing beacons, and marked crosswalks. California's local HSIP focuses on infrastructure projects with national recognized crash reduction factors. Additional information about this program at the Federal level can be found on https://highways.dot.gov/safety/hsip . California specific HSIP information can be found on https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/highway-safety-improvement-program.

2) Caltrans Active Transportation Program (ATP)

Caltrans Active Transportation Program (ATP) is a statewide funding program created in 2013, consolidating several federal and state programs. The ATP funds projects that encourage increased mode share for walking and bicycling, improve mobility and safety for non0motorized users, enhance public health, and decrease greenhouse gas emissions. Projects that are eligible for this funding include bicycle and pedestrian infrastructure projects, bicycle and pedestrian planning projects (safe routes to schools), and non-infrastructure programs (education and enforcement). Additional information about this program can be found on https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/active-transportation-program.

3) State Transportation Improvement Program (STIP)

The State Transportation Improvement Program (STIP) provides state and federal gas tax money for improvements both on and off the state highway system. STIP programming occurs every two years. The programming cycle begins with the release of a proposed fund estimate, followed by California Transportation Commission (CTC) adoption of the fund estimate. The fund estimate serves to identify the amount of new funds available for the programming of transportation projects. Caltrans prepares the Interregional Transportation Improvement Program (ITIP) using Interregional Improvement Program (IIP) funds, and regional agencies prepare Regional Transportation Improvement Programs (RTIPs)using Regional Improvement Program (RIP) funds. The STIP is then adopted by the CTC. Additional information about this program can be found on https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/state-transportation-improvement-program.

4) California Senate Bill 1 (SB 1)

SB 1 is a landmark transportation investment to rebuild California by fixing neighborhood streets, freeways, and bridges in communities across California and targeting funds toward transit and congested trade and commute corridor improvements. The legislative package invests $54 billion over the next decade and puts more dollars towards transit and safety. SB 1 provides the first significant, stable, and ongoing increase in state transportation funding in over two decades. It allows local agencies and Caltrans to fix California's roads and bridges, reduce traffic delays, improve goods movement, and increase options for transit, intercity rail, and active transportation. SB 1 increases funding for California's transportation system by an average of $5.4 billion annually, split between state and local investments. SB 1 invests more than $5 billion annually directly for maintenance, repair, and safety improvements on state highways, local streets and roads, bridges, tunnels and overpasses; $1.5 billion of which will be allocated towards local streets and roads. Additional information about this program can be found on http://rebuildingca.ca.gov/.

5) California Office of Traffic Safety (OTS) Grants

This program has funding for projects related to traffic safety, including transportation safety education and encouragement activities. Grants applications must be supported by local crash data and must relate to the following priority program areas such as alcohol impaired driving, distracted driving, drug-impaired emergency medical services, motorcycle safety, occupant

protection, pedestrian and bicycle safety, police traffic services, public relations, advertising, and marketing program, and roadway safety and traffic records. Additional information about this program can be found on https://www.ots.ca.gov/grants/.

Appendices

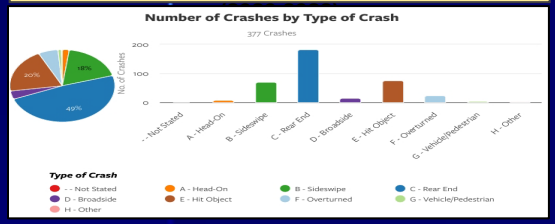
Appendix A: Sample Public Outreach Meeting Presentation

Development & Preparation of the Seal Beach's Safety Action Plan (SAP) Community Outreach #1

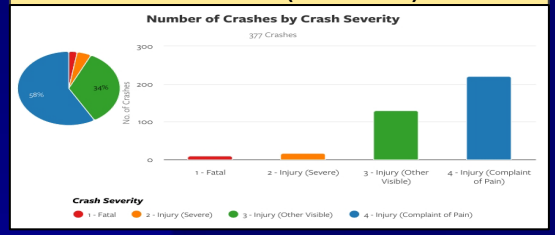
July 24, 2024

U.S. Department of Transportation Federal Highway Administration

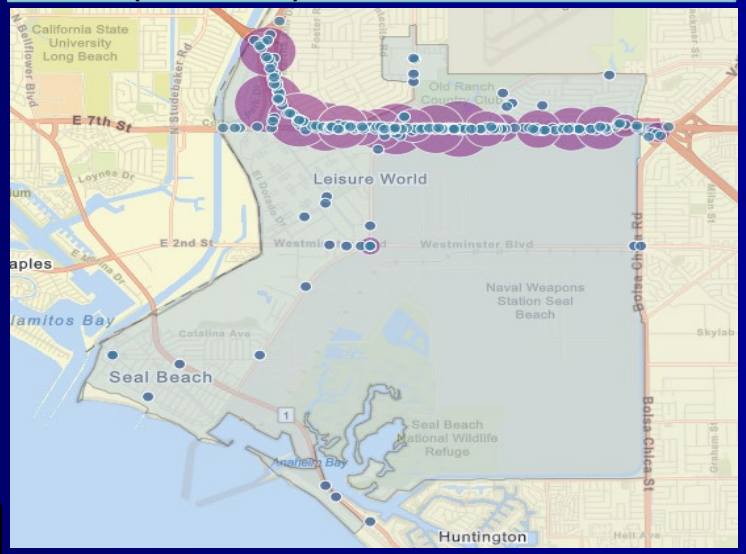
Number of Crashes by Type of Crash in the City of Seal Beach



Number of Crashes by Crash Severity in the City of Seal Beach (2019 - 2023)



City of Seal Beach's Concentration of Collisions (2019 - 2023) *Source: SWITRS, TIMS & SPD*



City of Seal Beach's California Office of Traffic Safety (OTS) Crash Ranking (2020)

Agency	Year	County	Group	Population (Avg)	DVMT
Seal Beach	2020	ORANGE COUNTY	D	25002	222989

TYPE OF CRASH	VICTIMS KILLED & INJURED	OTS RANKING
Total Fatal and Injury	41	71/91
Alcohol Involved	9	29/91
Had Been Drinking Driver < 21	0	33/91
Had Been Drinking Driver 21 – 34	5	13/91
Motorcycles	4	32/91
Pedestrians	2	71/91
Pedestrians < 15	0	40/91
Pedestrians 65+	0	58/91
Bicyclists	3	56/91
Bicyclists < 15	1	15/91
Composite	38	21/91

Presented to:

CITY OF SEAL BEACH

Presented by:

MINAGAR & ASSOCIATES, INC.

Project Objective

Develop & Prepare a Comprehensive Safety Action Plan (SAP) to Identify Potential Traffic Safety Projects and to be Used to Apply for Future Infrastructure Project Grants.

Work Plan

Task Overview

- **Major Tasks Summary**
  - Traffic Safety Data Collection form Seal Beach PD, UC TIMS & CHP's SWITRS
  - Analysis & Identification of High Priority Risk Areas
  - Engagement & Collaboration with Stakeholders/Community
  - Review of Policy and Process Changes
  - Strategy and Project Selections + Draft SAPs
  - Development of Final SAP
  - City Council Ratification

Federal SS4A
(Safe Streets & Roads for All)
Required Action Plan Components

1. Leadership Commitment and Goal Setting
2. Planning Strategies
3. Safety Analysis
4. Engagement and Collaboration
5. Equity Considerations
6. Policy and Process Changes
7. Strategy and Project Selections
8. Progress and Transparency

Next Major Steps

- **SAP (Safety Action Plan) Community Outreach Meeting #1:**
  - **WHAT:** Project Overview & Federal Components for the Public Review & Inputs
  - **WHEN:** Wed., July 24, 2024, 6:00 – 8:00 PM
  - **WHERE:** Fire Station 48 (3131 North Gate Road, Seal Beach)
- **SAP (Safety Action Plan) Community Outreach Meeting #2 (tentative):**
  - **WHAT:** Project Overview & Federal Components for the Public Review & Inputs
  - **WHEN:** Monday, August 5, 2024, 6:00 – 8:00 PM
  - **WHERE:** Marina Community Center (151 Marina Drive, Seal Beach)

Federal SS4A
(Safe Streets & Roads for All)
SBPD Data (2019-2023) With PCH

- 2019: 219 Collisions
- 2020: 164 Collisions
- 2021: 223 Collisions
- 2022: 258 Collisions
- 2023: 221 Collisions

TOTAL: 1,085

Federal SS4A
(Safe Streets & Roads for All)
SBPD Data (2019-2023) Without PCH

- 2019: 170 Collisions
- 2020: 119 Collisions
- 2021: 162 Collisions
- 2022: 180 Collisions
- 2023: 154 Collisions

TOTAL: 785

Federal SS4A

(Safe Streets & Roads for All)

Intersection Ranking Based on # of Collisions (W/O PCH)

Federal SS4A

(Safe Streets & Roads for All)

Street Segment Ranking Based on # of Collisions (w/o PCH)

Q/A

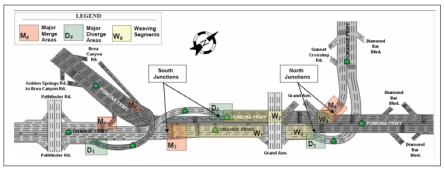
MINAGAR & ASSOCIATES, INC.

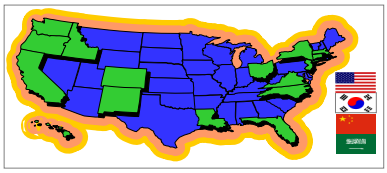
ITS - Traffic/Civil/Electrical Engineering - Transportation Planning - Homeland Security - CEM

2019	Winner of the Orange County Engineering Council's Outstanding Service Award
2016	Winner of the ASCE's Outstanding Civil Engineer in the Private Sector Award in the State of California
2016	Winner of the ASCE Los Angeles Section's Outstanding Civil Engineer in the Private Sector Award
2016	Winner of the ASCE Orange County Chapter's Outstanding Civil Engineer in the Private Sector Award
2016	Certificate of Recognition for Dedication to Support the ELTP Program by Los Angeles County MTA/Metro
2016	Winner of the Orange County Engineering Council's Outstanding Engineering Service Award
2015	Orange County Business Journal's 2015 Excellence in Entrepreneurship Award Nominee
2014	Orange County Business Journal's 2014 Excellence in Entrepreneurship Award Nominee
2012	Winner of Cal-EPA/California Air Resources Board's Cool California Climate Leader
2011	Award of Excellence in Service by Los Angeles County MTA/Metro in the County of Los Angeles
2011	Award of Excellence in Service by Los Angeles County MTA/Metro in the County of Los Angeles
2010	Award of Excellence in Service by Los Angeles County MTA/Metro in the County of Los Angeles
2009	Winner of the ASCE's Outstanding Private Sector Civil Engineering Project in Metropolitan Los Angeles
2009	Winner of the Caltrans' 2009 Excellence in Transportation Award in the State of California
2007	Winner of the ASCE's Outstanding Public/Private Sector Civil Engineering Project in Metropolitan Los Angeles
2005	Winner of the APWA's Best Traffic Congestion Mitigation Project of the Year in Southern California
2004	Top Nominee of Transportation Foundation's Highway Management Program in the State of California
2003	Winner of the PTI's Best Transportation Technology Solutions Award in the United States
2002	Winner of the ITS-CA's Best Return on Investment Project Award in the State of California
2000	Award of Excellence in Service by Los Angeles County MTA/Metro in the County of Los Angeles

Celebrating 30 Years of Planning & Engineering Excellence

- **Traffic Engineering**
- **Transportation Planning**
- **ITS (Intelligent Transportation Systems)**
- **Civil/Electrical Engineering**
- **Homeland Security**
- **Construction Engineering Management**





MINAGAR & ASSOCIATES, INC.

23282 Mill Creek Drive, East Tower, Suite 120
Laguna Hills, CA 92653

Tel: (949)707-1199
Web: **www.minagarinc.com**

30 Years of Engineering & Planning Excellence