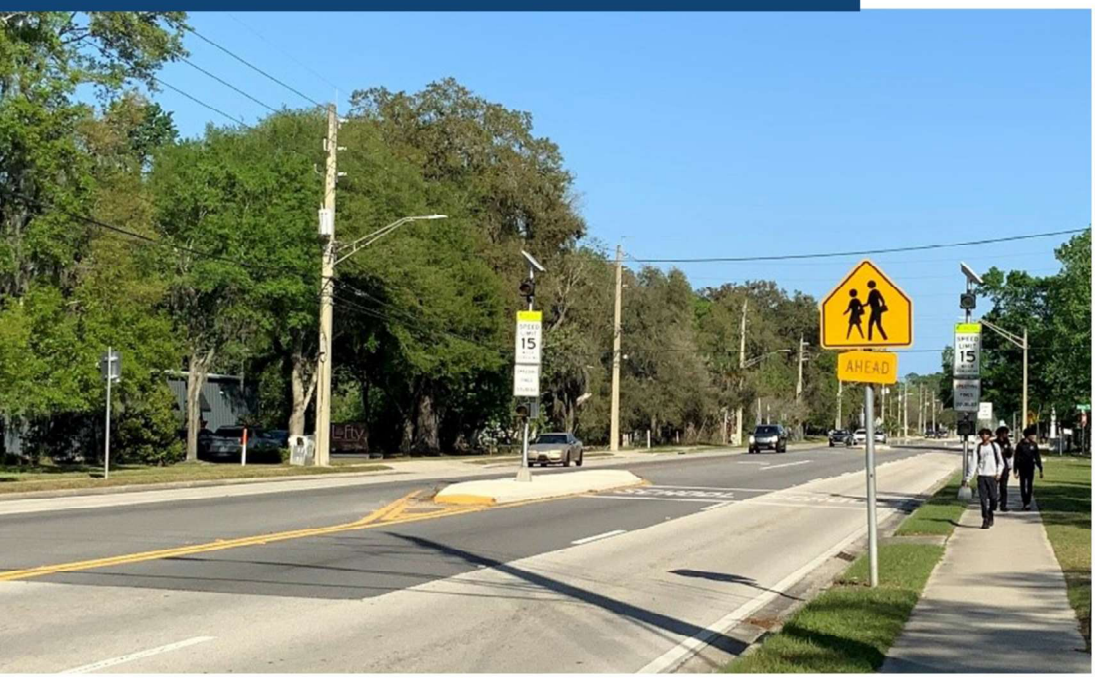
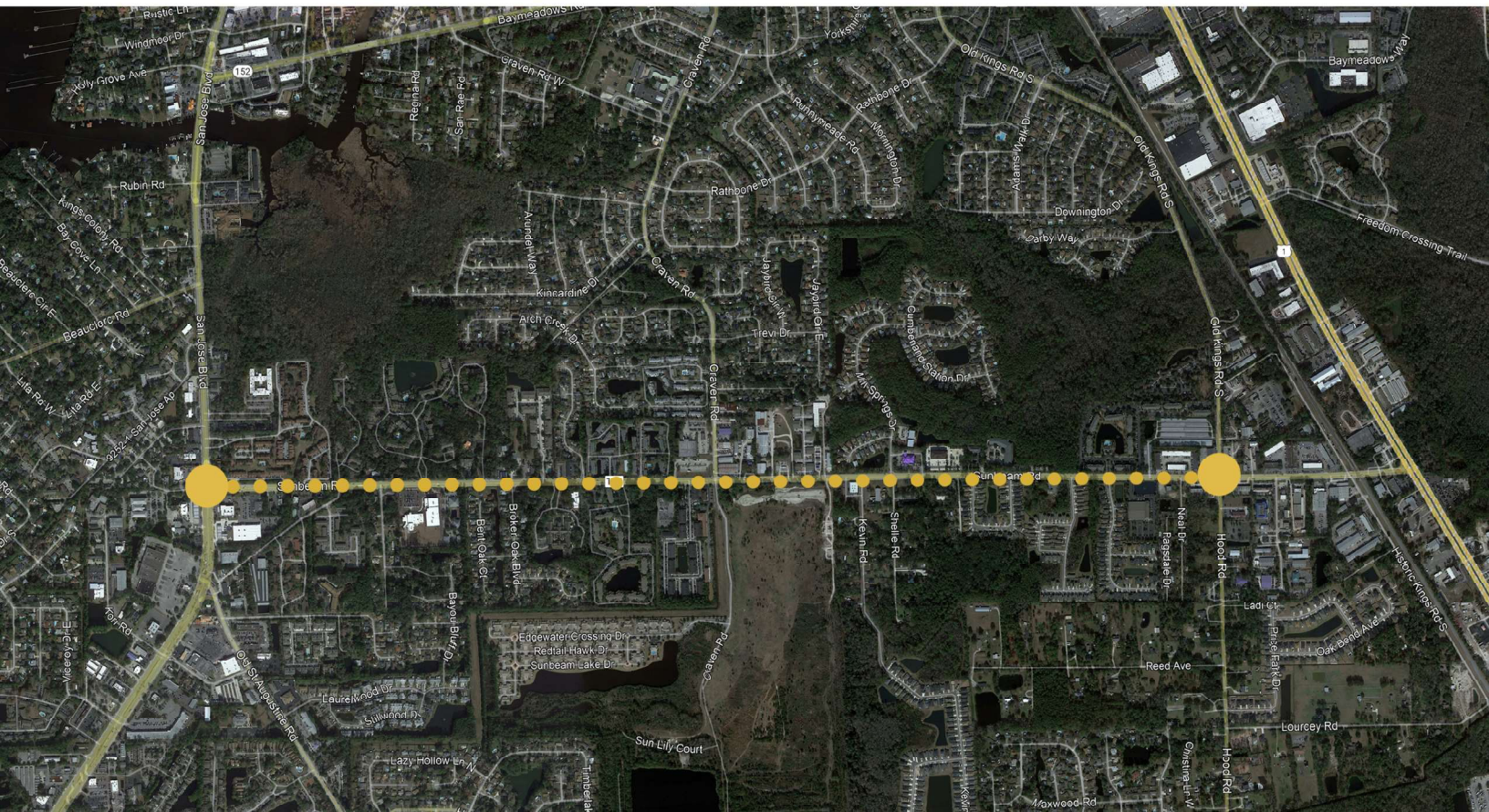
Sunbeam Road Corridor Study

NORTH FLORIDA TPO





SUNBEAM ROAD CORRIDOR STUDY

JACKSONVILLE, FLORIDA

Prepared for:

980 North Jefferson Street
Jacksonville, Florida 32209

Prepared by:

ETM
ENGLAND-THIMS & MILLER

14775 Old St. Augustine Road
Jacksonville, Florida 32258

ETM Project No. 20330-05

March 2024

TABLE OF CONTENTS

APPENDICES

EXECUTIVE SUMMARY

This corridor study identified potential safety/operational improvements for Sunbeam Road. The study area starts at SR 13/San Jose Boulevard (west end) and extends to US 1/Philips Highway (east end). Within the study area, Sunbeam Road's total distance is approximately 2.4 miles. The study improvements include access-management and intersection-configuration modifications. Specific focus areas included crash histories, the needs of pedestrians/cyclists, existing vehicle queues, and corridor congestion. Existing conditions and historical data were also used to identify roadway segments and intersections where travel times, delays and congestion are current problems (and locations where future conditions are expected to deteriorate).

Potential traffic-flow improvements were identified and analyzed. Planned local-roadway projects and any proposed enhancements within the study limits were considered and recommendations were developed. A proactive plan is suggested and numerous options to improve traffic flow within the study area were considered and/or identified. The following short-term improvements are recommended:

- Install flexible retroreflective backplates on all signal heads. Backplates added to traffic signal heads improve the visibility of the illuminated face of the signal by introducing a controlled-contrast background. As a FHWA Proven Safety Countermeasure, a 15% reduction in total crashes is expected.
- Special Emphasis Crosswalk striping should be added to all crosswalks at the signalized intersections where it is missing (Old Sunbeam Road, Craven Road, Old Kings Road/Hood Road, and Philips Highway (US 1). Crosswalk visibility enhancements are a FHWA Proven Safety Countermeasure and high-visibility crosswalks can reduce pedestrian injury crashes by up to 40%.
- Replace the existing pedestrian crossing warning signs at the existing midblock crossing for the San Jose Prep Charter School. The new signs should be neon-yellow-green (school zone) pedestrian crossing signs. The associated pavement markings should also be updated to meet current standards.

The estimated cost for these short-term improvements is **$132,522**.

Long-term improvements are also recommended and include the following:

- The lane repurposing typical section (see Option 1 Typical Section, Figure ES.1, next page) should be considered along the Sunbeam Road corridor. Selective use of the proposed raised median would allow for traffic calming and would reduce conflict points while also providing a buffered bike lane and additional separation between the sidewalk and motorists. Separated bike lanes with vertical delineation in the buffer zone would further support traffic calming[1]. Some segments of Sunbeam Road may need to maintain the existing two-way-left-turn lane.
- The signals on Sunbeam Road at the Old Sunbeam Road, Craven Road, and Hood Road/Old Kings Road South intersections are all approaching/exceeding 20 years old. When/If replaced, four-section flashing yellow arrow signals are recommended (to replace the existing 5-section signal heads). This change has been shown to reduce left-turn crashes by 14.3%. This improvement will also require an additional signal head for the through traffic movements (which will improve signal visibility).
- A leading pedestrian interval (LPI) is recommended at the signals on Sunbeam Road to reduce potential conflicts between pedestrians and turning vehicles. This signal modification allows pedestrians to enter the crosswalk before vehicles have priority to turn right or left. LPIs have been shown to reduce pedestrian-vehicle crashes at intersections by 13%.

[1] The Traffic Calming Effect of Delineated Bicycle Lanes, by Younes, et al., 2024. Journal of Urban Mobility, Volume 5 (2024) 100071. Published by Elsevier Ltd.

- At the San Jose Prep Charter School, replacing the pedestal beacons with overhead flashing beacons is recommended to provide additional emphasis for the existing school zone.
- Additionally, when the Sunbeam Road intersections at Philips Highway (US 1) and San Jose Boulevard (SR 13) are modified, incorporating Protected Intersection designs should be considered. This configuration includes corner refuge islands, forward stop lines for bicyclists, a setback bike and pedestrian crossing, and bicycle-friendly signal phasing.

The estimated cost for the Option 1 long-term improvements is **$22,706,545** and for reconstructing three (3) traffic signals is **$2,650,026**.

Recommended Option 1 typical section has 6'-wide sidewalks, 7'-wide buffered bike lanes, 11'-wide travel lanes and a 13'-wide two-way left-turn lane (see Figure ES.1 below). A 4'-wide traffic separator within a 5.5'-wide buffer is proposed to provide separation between the bicycle lanes and travel lanes.

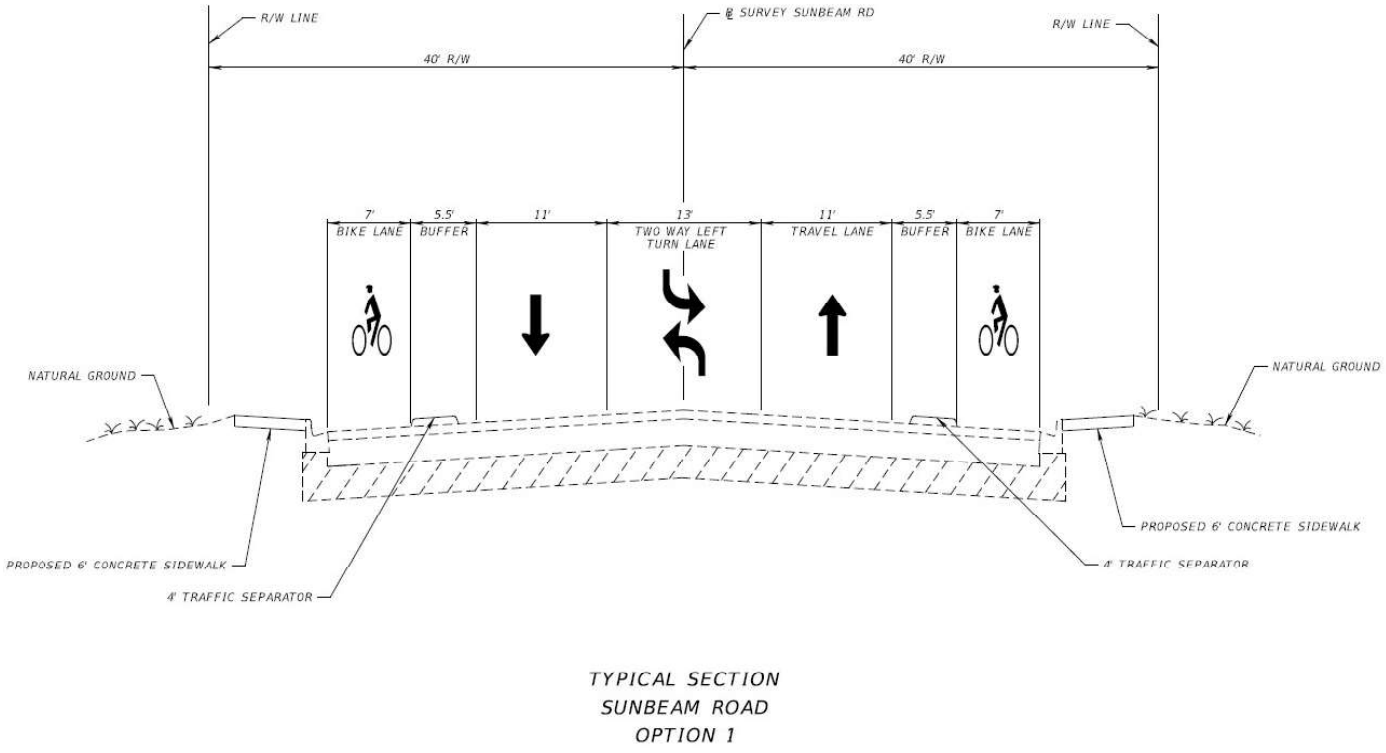


Figure ES.1 – Recommended Option 1 Typical Section (not to scale)

I. INTRODUCTION

As communities redesign and re-envision streets, much more focus is given to prioritizing safe, comfortable and connected bicycle and pedestrian networks, designed to serve users of all ages and abilities. Achieving these community goals is often determined by using a context-sensitive approach to planning and designing streets. The Sunbeam Road Corridor Study is a comprehensive study that proposes context-based and viable safety enhancements suitable for all roadway users, with a focus on bicyclists and pedestrians.

A. Study Description and Location

The North Florida Transportation Planning Organization (TPO) conducted a study along the Sunbeam Road corridor on behalf of the City of Jacksonville to develop safe mobility alternatives for the corridor. Sunbeam Road is an east-west roadway located in the City of Jacksonville, Florida. As shown in Figure 1, this roadway is approximately 2.4 miles long. The study limits start at San Jose Boulevard (SR 13) on the west end and extend to Philips Highway (US 1) on the east end. This report summarizes study efforts and recommendations to improve the corridor.

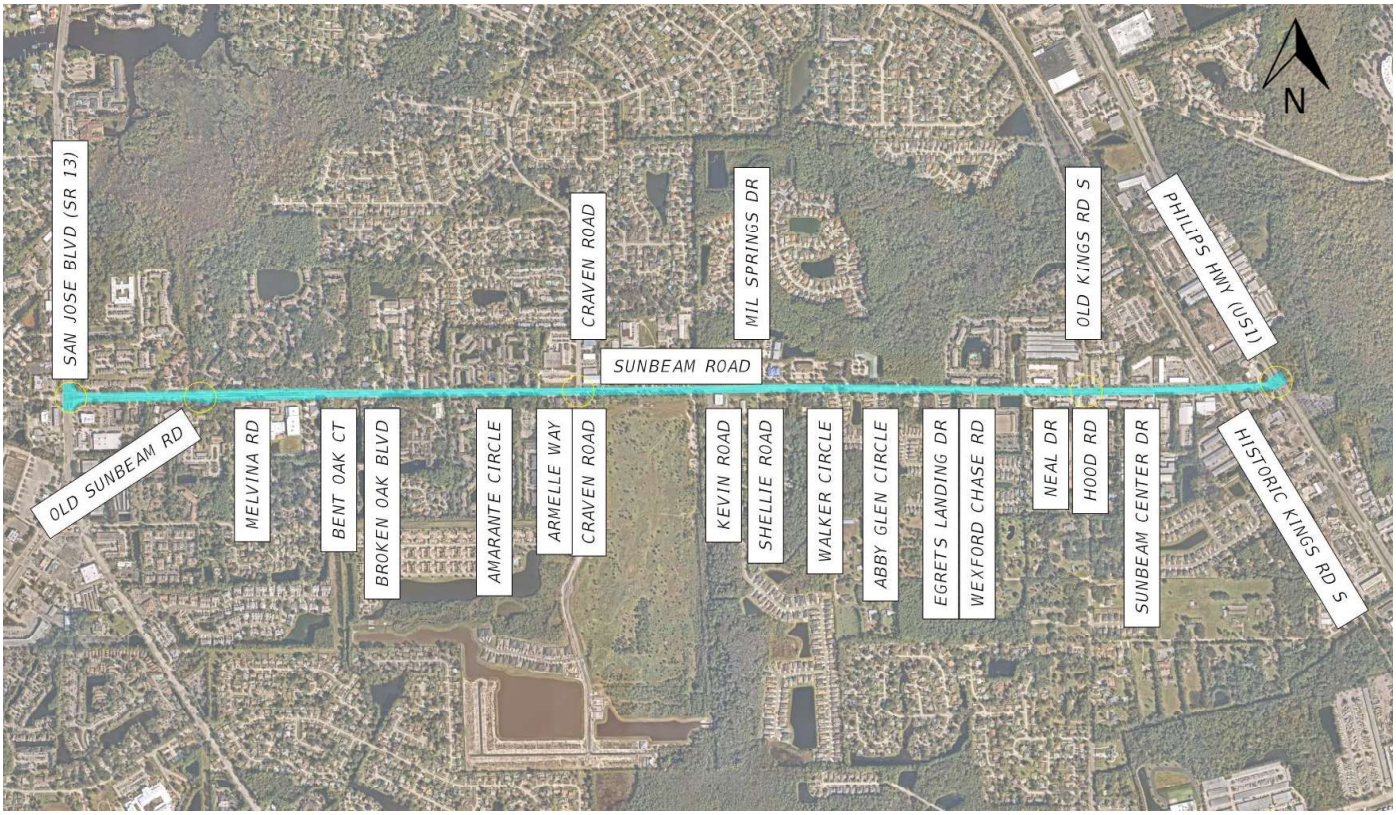


Figure 1 – Project Limits (not to scale)

B. Methodology

The study team identified corridor improvements that enhance safety and optimize traffic flow. Several features and characteristics of Sunbeam Road and the surrounding area were evaluated including traffic capacity and operations, crash history, land use, low-income households, public bus routes and stops, and pedestrian and bicycle facilities. Relevant studies, plans and projects were considered. Traffic analyses evaluated morning (AM), midday (MD), and evening (PM) peak operations at the signalized intersections. The existing roadway network (with 2022 traffic volumes) was analyzed and the LOS results for the various intersections were determined. An electronic survey was utilized to collect public input. By evaluating corridor conditions and public input results, the study team developed a plan to enhance safety, operations, and multimodal transportation along the Sunbeam Road corridor.

II. STUDY AREA DESCRIPTION

The following is a description of existing conditions along the Sunbeam Road corridor.

A. General Roadway Characteristics

Sunbeam Road from San Jose Boulevard (SR 13) east to Philips Highway (US 1) is primarily a five-lane Urban Major Collector. As a collector, Sunbeam Road provides both transportation mobility and property access, enabling the movement of people and goods. The roadway is located within the Jacksonville Urbanized Area and has a posted speed limit of 45 mph.

Signalized intersections along the corridor, from west to east are at San Jose Boulevard (SR 13), Old Sunbeam Road, Craven Road, Old Kings Road/Hood Road and Philips Highway (US 1). There is one school zone within the corridor, located east of Melvina Road between the signalized intersections of Old Sunbeam Road and Craven Road. The marked crosswalks at intersections are not special emphasis. Street lighting exists on both sides of Sunbeam Road (on the utility poles) for the entire corridor. The roadway is currently experiencing road-integrity failures at some curb inlets from suspected leaks between the drainage pipe connections and the inlet structures. Existing Conditions are shown in Appendix B. Aerial Photography was used to document various data needed to complete study analyses, roadway alternatives, and the preliminary conceptual design plans.

B. Adjacent Land Development Conditions

The City of Jacksonville Future Land Map, which guides future development and re-development, generally indicates a mix of residential, professional, institutional and commercial uses along Sunbeam Road. Medium density residential (i.e., apartments and condominiums) is mostly located on the western half of the corridor between San Jose Boulevard (SR 13) and Craven Road. Light industrial and business park uses are located mostly on the eastern portion of the corridor. Notable places along the corridor include San Jose Primary School and San Jose Prep Charter School (between Old Sunbeam Road and Craven Roads), a United States post office (at Craven Road) and an approximately 100-acre site that is being developed into a mountain bike park with running and walking trails (near Craven Road). A Future Land Use Map in Appendix K shows the land coverage in the vicinity of the Sunbeam Road corridor.

C. Bicycle and Pedestrian Facilities

Existing Conditions

Sidewalks are present along both sides of the Sunbeam Road study corridor. The existing sidewalks are generally 5’ wide. Bicycle lanes do not exist along Sunbeam Road; however they currently exist on Philips Highway (US 1) at the connection to Sunbeam Road. The missing bike lanes result in an incomplete pedestrian/cyclist network.

Planned Bicycle Facilities

State, regional and/or local projects are expected to improve Sunbeam Road's cyclist network (see Figure 2, below). The full GIS Map is included in Appendix K.

Figure 2 – Adjacent/Nearby Bike Lanes (not to scale)

The City of Jacksonville has also established context-sensitive-street standards and recently revised their Standard Specifications, Standard Details and Land Development Procedures Manual. Earlier this year, the City approved new Bicycle Facility Typical Standards (see Figure 3, next page). However, the nonmotorized roadway recommendations within the preferred Option 1 (summarized in the Executive Summary) are more optimal than the City standards and are expected to substantially reduce levels of traffic stress for both pedestrians and bicyclists.

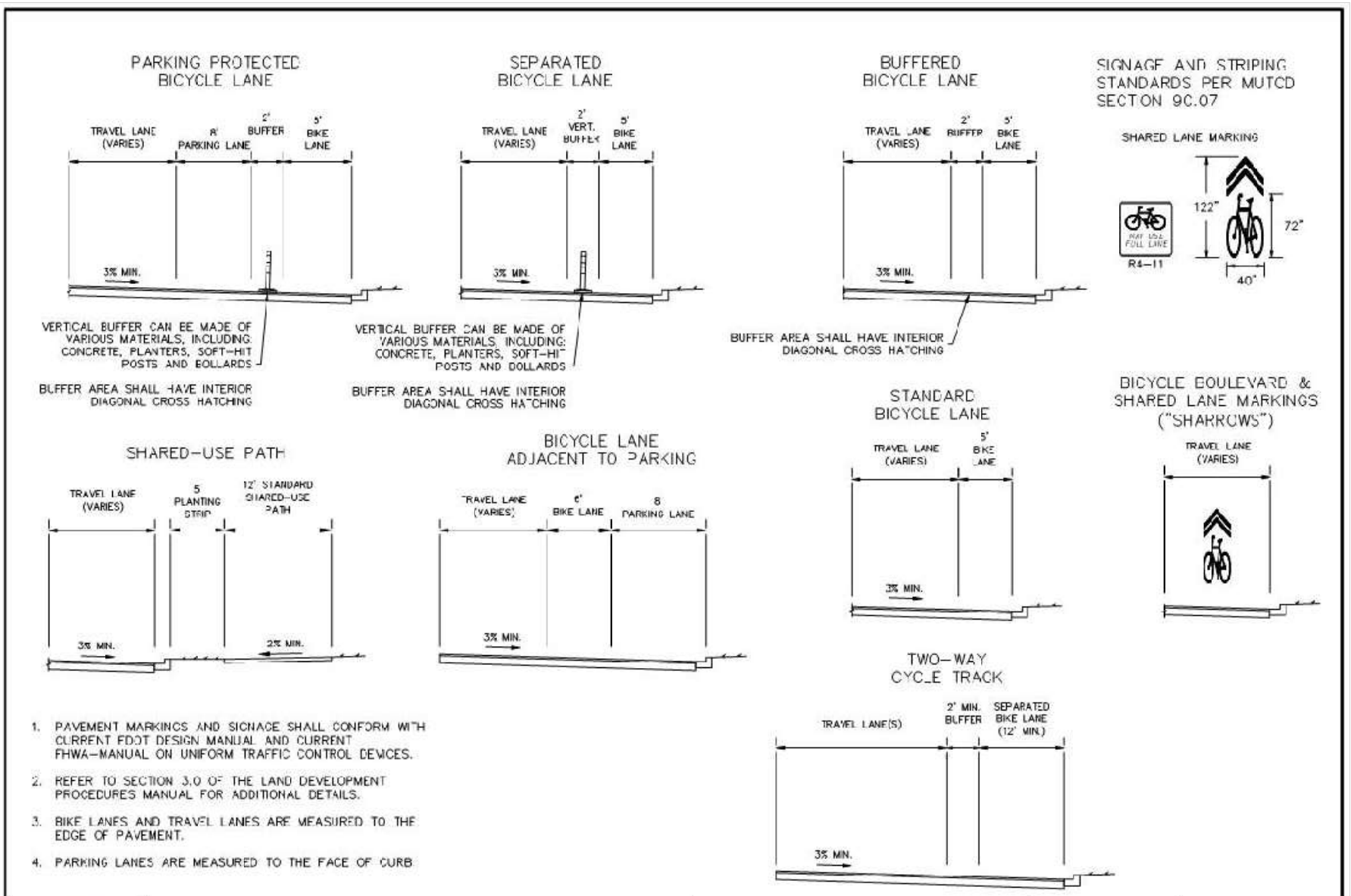


Figure 3 – City of Jacksonville's Bicycle Facility Typical Standards

D. Public Transit Network

Figure 4 (below) illustrates the location of JTA's bus routes and stops. JTA Route 28 travels along Sunbeam Rd between San Jose Boulevard (SR 13) and Craven Road, with a one-hour frequency between 5:30 a.m. and 8:30 p.m. (Monday through Friday), and between 8 a.m. and 5 p.m. (on Saturdays). Additionally, Sunbeam Rd is within the JTA's Mandarin ReadiRide Zone, which provides on-call, curb-to-curb transportation. The complete GIS Map is located in Appendix K.

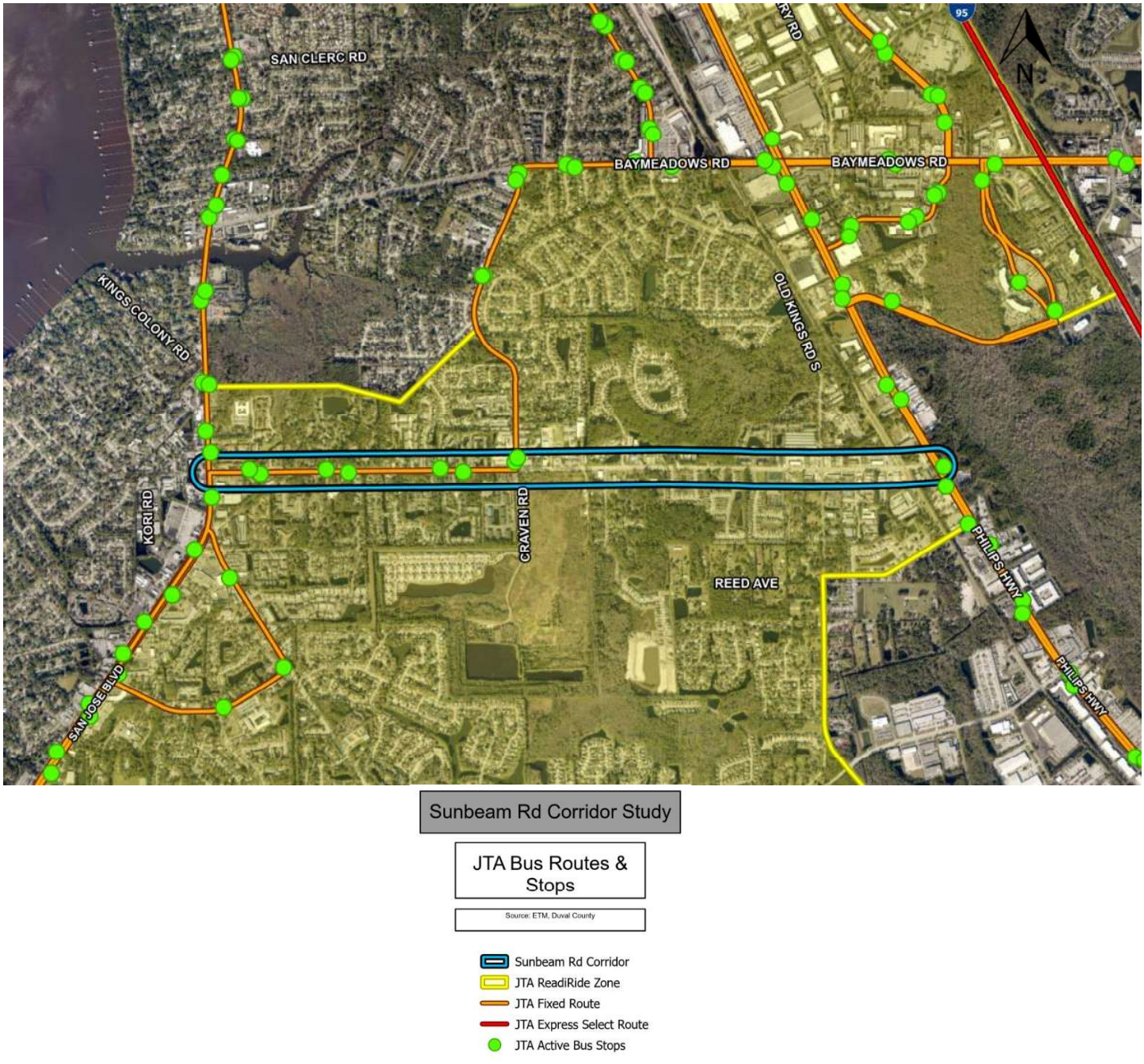


Figure 4 – JTA Bus Routes and Stops on Sunbeam Road (not to scale)

E. Sunbeam Road Corridor Typical Section

The existing typical section has 12'-wide travel lanes and a 12'-wide two-way left-turn lane (see Figure 5 below). The Florida Department of Transportation (FDOT) functional classification of Sunbeam Road is Urban Major Collector.

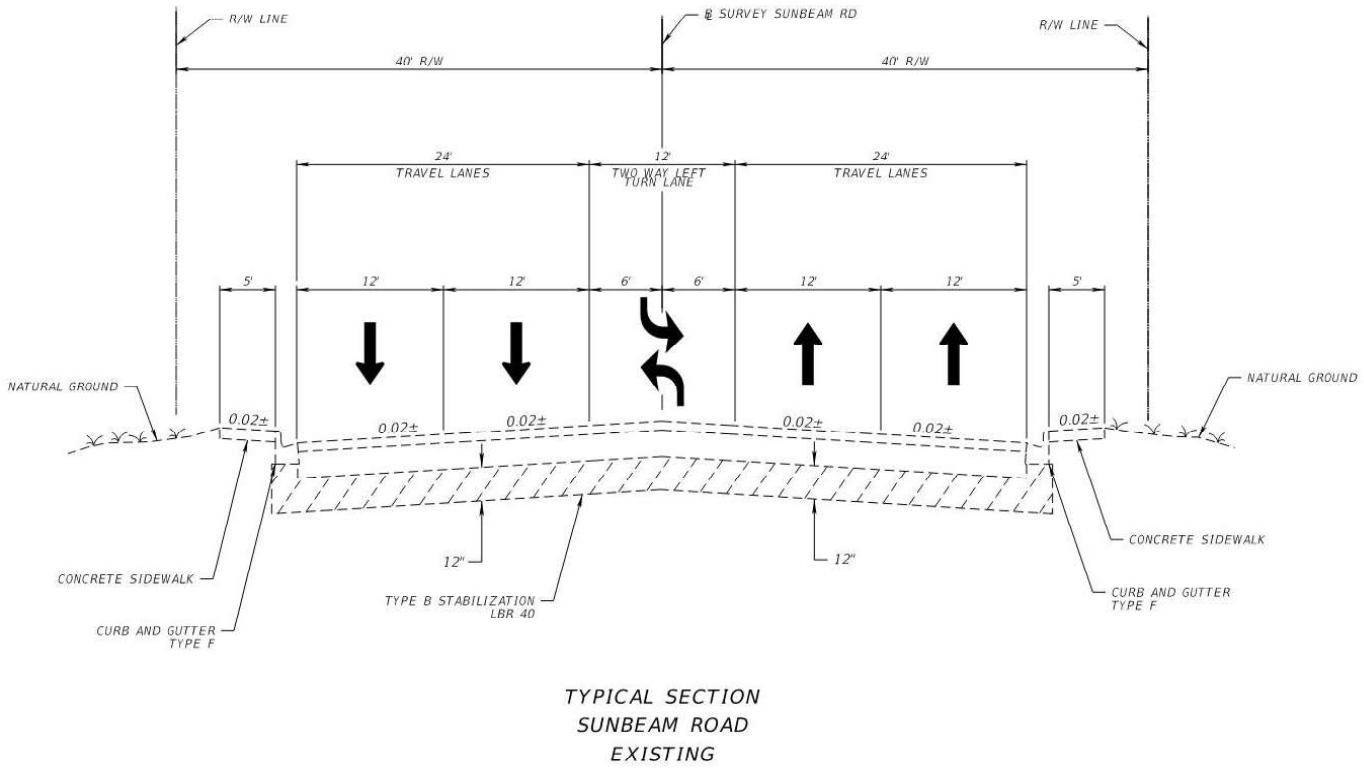


Figure 5 – Existing Typical Section (not to scale)

F. Capacity Analysis

Roadway-segment level of service (LOS) is based on existing traffic volumes which are compared to the maximum service volume capacities (Volume-to-Capacity or V/C). The Sunbeam Road segments currently operate below capacity and therefore do not reflect any segment-level capacity deficiencies. The corridor's traffic volumes have decreased over the past decade. Most of these decreases occurred between 2008 and 2010 (during the Great Recession) and have remained somewhat consistent since 2016. This information is detailed in Table 1 and Figure 6 (next page).

The Directional Distribution ("D" Factor) is the percentage of the total, two-way traffic traveling in the peak direction. The "T" Factor measures the percentage of trucks on a daily basis.

Table 1 – Historical Average Daily Traffic Volumes and V/C Ratios

YEAR	AADT	Source	D FACTOR	T FACTOR	V/C
2021	20,303	COJ Local Traffic Counts	54.5	12.6	0.54
2020	20,000	FL Traffic Online	55.4	2.1	0.53
2019	20,344	COJ Local Traffic Counts	55.9	1.2	0.54
2018	19,367	COJ Local Traffic Counts	55.8	1.4	0.51
2017	19,367	COJ Local Traffic Counts	56.1	1.3	0.51
2016	20,000	FL Traffic Online	56.2	1.5	0.53
2015	19,500	FL Traffic Online	56.3	1.1	0.52
2014	19,000	FL Traffic Online	56.4	1	0.51
2013	19,000	FL Traffic Online	57.1	1	0.51
2012	19,000	FL Traffic Online	57.8	2.1	0.51
2011	19,000	FL Traffic Online	56.6	1.4	0.51
2009	21,500	FL Traffic Online	57.48	1.4	0.57
2008	23,000	FL Traffic Online	57.27	1.7	0.61
2007	23,000	FL Traffic Online	57.87	1.6	0.61

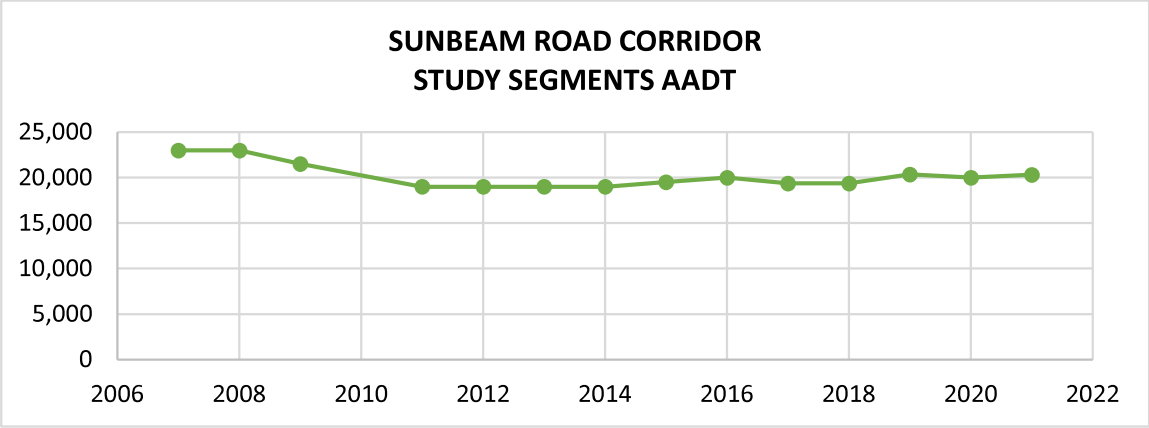


Figure 6 – Sunbeam Road Corridor Study– Historic AADT (2007-2021)[2]

G. Intersection Operational Analysis

An operational analysis of existing conditions was conducted using Synchro/SimTraffic software. This program considers the effects of signal spacing and signal coordination, and incorporates traffic volumes, signal timing and vehicle detection. The model output includes intersection approach delays, volume-to-capacity ratios, estimated queue lengths and level of service (LOS) results.

Sunbeam Road at San Jose Boulevard (SR 13) currently experiences the study corridor's most congestion, with LOS D and 37.5 seconds of delay during the AM peak hour and LOS D with 36.3 seconds of delay during the PM peak hour. This intersection also has the corridor's highest entering volumes (4,645 vehicles during the AM peak hour and 4,780 vehicles during the PM peak hour).

Additionally, four of the five signalized intersections along the corridor did not have back plates on the signal heads. The only Sunbeam Road location with signal head back plates occurs at the Philips Highway (US 1) intersection.

Existing turning-movement counts and Synchro Analysis reports are located in Appendix H and Appendix I, respectively. Appendix I also includes a summary table of 2022 LOS and Delay results.

[2] Source: City of Jacksonville Local Traffic Counts and FDOT Traffic Online

H. Roadway Safety

All Crashes

Crash data was collected from *Signal Four Analytics* within the study area for a five-year period from January 1, 2017 to December 31, 2021. A total of 541 crashes were reported within the study area. The crash reports for each collision pulled in this area were reviewed, crashes occurring out of the study area were removed from the collision summary.

- **Crash Severity**: Eleven crashes (2%) resulted in fatal or serious injuries, and the fatal crash resulted in two deaths. Several crashes (168 or 31%) resulted in 239 injuries. The total property damage amount for all 541 crashes was estimated to be $2,930,399. The property damage amount was obtained from the crash reports.
- **Crash Types**: Rear end (44%), left turn (19.6%) and sideswipe (11.8%) crashes were the top three crash types. These crashes made up 75% of total crashes during the analysis period.
- **Contributing Cause**: The most frequent causes of the crashes are illustrated in Figure 7. These five conditions (careless driving, failure to yield, followed too closely, hit and run, and improper lane change) made up 76% of total crashes over the five-year analysis period.

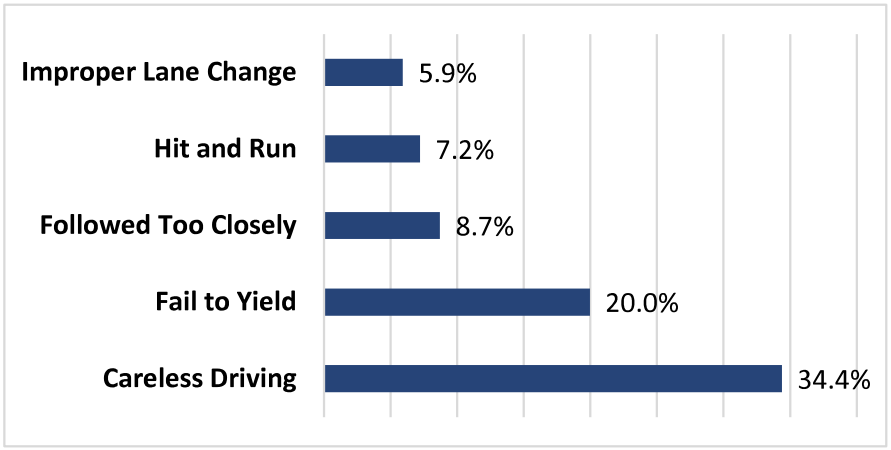


Figure 7 – Top 5 Contributing Conditions for All Crashes (%)

- **Lighting and Roadway Condition**: There were 76 (14%) wet-pavement crashes and 94 (17%) nighttime crashes (including dawn and dusk).
- **School Zone**: Two collisions within the study period were reported to have struck the school zone beacon in the median.
- **Signalized Intersections**: 35% of the collisions (189) occurred at a signalized intersection. Crash types distributed by intersection are included in Appendix C.

Fatal and Serious Injury Crashes

Of the fatal and serious injury crashes within the study area, the most frequent crash type and contributing cause were left turn and failure to yield, respectively, both at 64%. Over half (54%) occurred on wet pavement and were intersection related (54%). The fatal crash details are included below:

Thursday, April 6, 2017, at 8:51 PM: A motorist was traveling eastbound on Sunbeam Road and made a left turn in front of a westbound motorist. No impairment (alcohol/drugs) was identified in the crash report. Two motorists in the eastbound vehicle received fatal injuries from the collision. The collision occurred on dry pavement under dark-lighted conditions (Crash Report No. 86645596).

Bicycle/Pedestrian Crashes

In Florida, bicycle and pedestrian crashes disproportionately contribute to fatalities and serious injuries, making up 28% of Florida traffic deaths and serious injuries. Along the Sunbeam Road corridor, contributing causes for bicycle and pedestrian crashes included failure to yield and careless driving. One crash involved a pedestrian in the roadway, crossing midblock at night. Four bicycle crashes involved a bicyclist traveling in or near a crosswalk. None of the bicycle/pedestrian crashes specified whether the injured party was a student and none occurred at the school crossing.

Detailed crash summaries and collision diagrams are in Appendix C and Appendix D, respectively.

Safety Countermeasures

The predominant crash types were rear end (44%), left turn (19.6%) and sideswipes (11.8%). To reduce these collisions, the following recommendations should be considered:

- Install flexible retroreflective backplates on all signal heads. Backplates added to traffic signal heads improve the visibility of the illuminated face of the signal by introducing a controlled-contrast background. As a FHWA Proven Safety Countermeasure, a 15% reduction in total crashes is expected. A significant portion of the 15% reduction is anticipated to be rear-end collisions.
- The signals on Sunbeam Road at the Old Sunbeam Road, Craven Road, and Hood Road/Old Kings Road South intersections are all approaching/exceeding 20 years old. When/If replaced, four-section flashing yellow arrow signals are recommended (to replace the existing 5-section signal heads). This change has been shown to reduce left-turn crashes by 14.3%. This improvement will also require an additional signal head for the through-traffic movements (which will improve signal visibility).
- Sideswipes will be reduced/eliminated by converting Sunbeam Road's five-lane typical section to a three-lane typical section.
- Special Emphasis Crosswalk striping should be added to all crosswalks at the signalized intersections where missing (Old Sunbeam Road, Craven Road, Old Kings Road/Hood Road, and Philips Highway (US 1). Crosswalk visibility enhancements are a FHWA Proven Safety Countermeasure and high-visibility crosswalks can reduce pedestrian injury crashes by up to 40%.
- Leading pedestrian intervals (LPI) are recommended at signals on Sunbeam Road to reduce potential conflicts between pedestrians and turning vehicles. This safety countermeasure allows pedestrians to enter the crosswalk before vehicles have priority to turn right or left. LPIs have been shown to reduce pedestrian-vehicle crashes at intersections by 13%.
- In the long-term, consider the use of Protected Intersection designs at the Sunbeam Road intersections of Philips Highway (US 1) and San Jose Boulevard (SR 13) to reduce potential conflicts at the intersection between motor vehicles and bicyclists/pedestrians. Protected Intersections are described in more detail on page 16.

III. PUBLIC AND STAKEHOLDER INPUT

To connect with the local community and collect public input along Sunbeam Road, the study team attended stakeholder meetings and developed a public survey. An electronic survey was available for approximately one month and was promoted via regional and local outlets including e-newsletters, print and social media, websites and postcards to residents and businesses along the corridor. Over 500 people responded to the survey.

Many survey respondents indicated there is a need for Bicycle/Pedestrian enhancements along Sunbeam Road. Respondents selected wider sidewalks and multi-use/shared paths as the most beneficial Bicycle/Pedestrian enhancement. Survey results also revealed support for pedestrian refuge islands, high visibility crosswalks and other intersection enhancements, such as bicycle lanes. Respondents also suggested that "high traffic speeds and/or bad driver behaviors" create a substantial barrier to walking and bicycling along Sunbeam Road.

A. Survey Results

A brief selection of responses from the survey are provided below:

- Over half of the survey respondents (54%) stated that it is difficult to walk or bicycle along Sunbeam Road and most (almost 60%) would likely walk/bicycle more often if Bicycle/Pedestrian conditions along Sunbeam Road were improved.
- Survey respondents indicated their biggest barriers to walking along Sunbeam Road are:
  - High traffic speeds and/or bad driver behaviors (53%)
  - Too much traffic (46%)
  - Sunbeam Road intersections not comfortable for pedestrians (41%)
  - Sidewalks in poor condition (39%)
- The survey asked, "Which walking enhancements would be the most beneficial? (select up to three)?" The following responses received the most votes:
  - Wider sidewalks (42%)
  - An off-street multi-use/shared path (37%)
  - Raised medians to help protect pedestrians crossing Sunbeam Road (36%)
  - More visible, better marked crosswalks at intersections (34%)
- Survey respondents indicated their biggest barriers to bicycling along Sunbeam Road:
  - High traffic speeds and/or bad driver behaviors (49%)
  - No bicycle lanes (43%)
  - Too much traffic (39%)
  - Sunbeam Road intersections not comfortable for bicyclists (35%)
  - Sidewalks in poor condition (33%)
- "Which bicycling enhancement would be the most beneficial?"
  - An off-street trail or multi-use path (32%)
  - Wider sidewalks (22%)
  - An on-street bicycle lane with a barrier such as a curb or bollard/flexposts (17%)
  - None of the above (16%)
  - An on-street, clearly marked bicycle lane (12%)
- When asked, "If you do not cross at an intersection/crosswalk, while walking or bicycling, select all reasons that apply", the following options were selected most often:
  - I cross only at the intersection/crosswalk (47%)
  - Drivers don't stop/yield at the marked crosswalk (41%)
  - Drivers don't stop/yield at the traffic signal (32%)

B. School Safety Concerns

Survey participants and study stakeholders indicated that there are traffic concerns at/near San Jose Primary School (grades K-5) and San Jose Prep Charter School (grades 6-12) located on the south side of Sunbeam Road, east of Old Sunbeam Road. One concern is that some of the students do not cross with the crossing guard at the designated crosswalk. Another concern is that there have been instances of vehicles running into the crosswalk signs causing maintenance issues.

C. City of Jacksonville Bicycle and Pedestrian Advisory Committee (BPAC)

Discussions at the April 6, 2023, BPAC meeting described possible increases in bicycle use along the Sunbeam Road study corridor. The Southern Off-Road Bicycle Association Jacksonville (SORBA Jax), a chapter of SORBA, is working to build an off-road trail on private land on the south side of Sunbeam Road and east of Craven Road. The project is expected to include mountain-bike trails, a running trail and walking paths.

Also, in 2019, the BPAC established priorities for Sunbeam Road as part of the committee's Mobility Plan recommendations. The priorities included: 1) building a shared-use path on the south side of Sunbeam Road from San Jose Boulevard (SR 13) to Philips Highway (US 1); 2) reducing lane widths to create space in the right-of-way for the shared-use path; and 3) reducing the speed limit on Sunbeam Road (from 45 mph to 35 mph).

Public Input Materials and Survey Results are included in Appendix A and Appendix L, respectively.

(this space intentionally left blank)

IV. CORRIDOR ALTERNATIVES

A. Lane Repurposing Option

A proven countermeasure to reduce crash frequencies throughout the Sunbeam Road corridor is reducing the five-lane roadway to three lanes (one through lane in each direction and center lane devoted to providing left-turn movements). The benefits of lane repurposing include reduced right-angle crashes as side-street motorists cross fewer travel lanes, fewer lanes for pedestrians to cross, traffic calming, and more consistent/reasonable travel speeds. Additionally, many communities desire more livable spaces, more pedestrian and bicycle facilities, and increased transit options. These facilities are not easily accommodated within the existing five-lane undivided roadway. For these reasons, lane repurposing may benefit all travel modes (motorists, pedestrians, cyclists, etc.).

B. Traffic Volumes and Intersection Level of Service (LOS) – Future Conditions

No deficiencies (LOS E or LOS F results) will be generated if lane repurposing is pursued. Sunbeam Road's historic traffic volumes have been very stable for the past 15 years. The area is substantially developed and significant increases in traffic volumes are not anticipated. A summary table of Lane Repurposing LOS and Delay results, and Synchro Analysis reports are located in Appendix J.

C. Typical Sections and Conceptual Plans

Four different roadway configurations were identified as potential options for lane repurposing. The alternatives are shown as typical sections (Appendix E), and as a 1,000' conceptual plan exhibit (Appendix F). Using these concepts, an engineer's opinion of probable costs was developed for each option (Appendix G).

D. Protected Intersections

The use of Protected Intersection designs should be considered at the Sunbeam Road intersections of Philips Highway (US 1) and San Jose Boulevard (SR 13). This configuration includes corner refuge islands, forward stop lines for bicyclists, a setback bike and pedestrian crossing, and bicycle-friendly signal phasing. See Figure 8 (next page) from NACTO's ***Don't Give Up at the Intersection***.

- The corner refuge island physically separates bicyclists as they make right turns and provides a refuge from motorists.
- The forward stop location makes bicyclists visible to drivers. The physical distance ahead of cars gives bicyclists an effective head start when the light turns green. And the distance of the road that bicyclists need to cross is greatly reduced.
- The bike lane bends away from the intersection creating in a setback bicycle and pedestrian crossing.

Since both Philips Highway (US 1) and San Jose Boulevard (SR 13) are owned/maintained by the FDOT, implementation of the Protection Intersection design at these locations would require collaboration between state and local planning and engineering departments. Of note, the landscaped median along the Sunbeam Road section of Philips Highway (US 1) and one (or more) of the seven (7) vehicle lanes on San Jose Boulevard (SR 13) at Sunbeam Road may need to be reconfigured to implement the protected Sunbeam Road intersections (assuming no additional right-of-way is acquired).

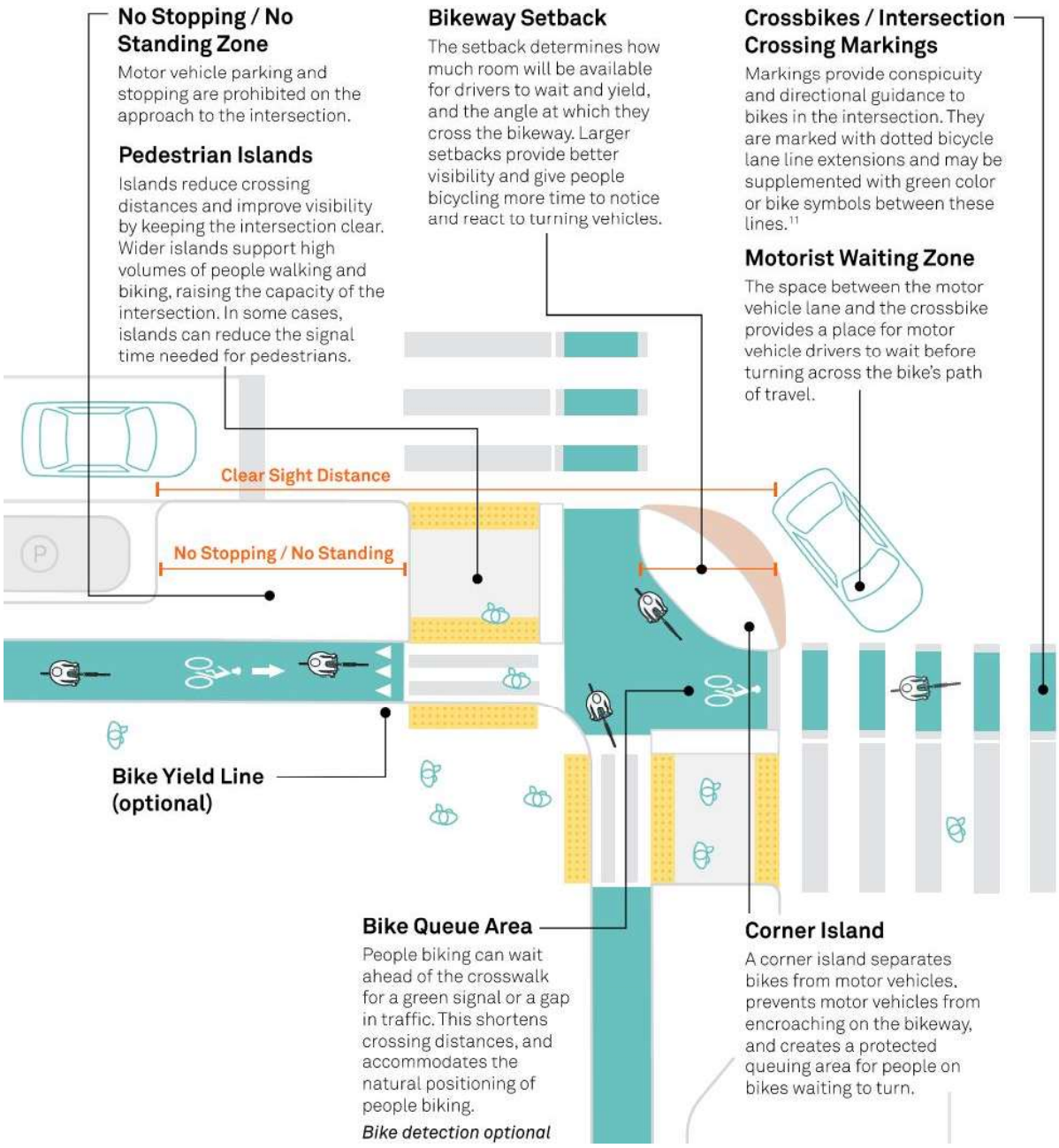


Figure 8 – Protected Intersection Design

E. Additional Recommendations

- The school zone at San Jose Prep Charter School was mentioned numerous times during the public survey and outreach phase. According to the City, the flashing beacons for the school zone warning within the raised median have been hit several times. Replacing the pedestal beacons with overhead flashing beacons is recommended (as a long-term improvement) to provide additional emphasis of the school zone.

- Replacing the existing pedestrian crossing warning signs at the existing midblock crossing at San Jose Prep Charter School with school-zone neon yellow-green pedestrian crossing signs and updating the pavement markings to satisfy FDOT's Standard Crosswalk with Stop Signing requirements is also recommended (as a short-term improvement). Because Sunbeam Road's posted speed limit is 45 mph, a Rectangular Rapid Flashing Beacon (RRFB) is not recommended at this time, unless the speed limit is reduced and traffic calming measures are constructed as long-term improvements.
- During the public outreach phase, it was noted that numerous students do not use the marked crosswalk that has assigned crossing guards. A short-term recommendation is to involve FDOT's Community Traffic Safety Team and the Sheriff's Office to develop and distribute educational materials for the San Jose Prep Charter School's students/parents. This information should explain using pedestrian features, crossing Sunbeam Road at the proper locations, and the importance of obeying pedestrian and bicycle laws.
- All long-term improvements and opinions of probable costs include addressing the existing road-failure issues occurring at the existing curb inlets.
- Consideration should be given to installing a zig-zag pedestrian rail system at the railroad crossing, This gate system is intended to slow bicyclists/pedestrians and guide cyclists across tracks at as close to a 90-degree angle as possible. This would include installing two metal railings guiding non-motorists in a "Z" formation for each approach of the railroad.

(this space intentionally left blank)

V. RECOMMENDED IMPROVEMENTS

Potential traffic-flow improvements were identified and analyzed. A proactive plan is suggested and potential options to improve safety within the study area were considered and/or identified. The following short-term improvements are recommended:

- Install flexible retroreflective backplates on all signal heads. Backplates added to signal heads improve the visibility of the illuminated face by introducing a controlled-contrast background. As a FHWA Proven Safety Countermeasure, a 15% reduction in total crashes is expected.
- Special Emphasis Crosswalk striping should be added to all crosswalks at the signalized intersections (Old Sunbeam Road, Craven Road, Old Kings Road/Hood Road, and Philips Highway/US 1). Crosswalk visibility enhancements are a FHWA Proven Safety Countermeasure and high-visibility crosswalks can reduce pedestrian injury crashes up to 40%.
- Replace the existing pedestrian crossing warning signs at the existing midblock crossing Sunbeam Road at the San Jose Prep Charter School with school-zone neon yellow-green pedestrian crossing signs and update the pavement markings to satisfy FDOT's Standard Crosswalk with Stop Signing.

The estimated cost for these short-term improvements is **$132,522**.

Long-term improvements are also recommended and include the following:

- The lane repurposing typical section Option 1 (preferred) should be considered for the Sunbeam Road corridor, especially for the segments west of the FEC Railway. Selective use of a raised median would provide traffic calming, reduce the number of conflict points, and provide room for a buffered bike lane and additional separation between the sidewalk and motorist travel lanes. Some segments of Sunbeam Road (especially those with numerous driveway connections) are expected to continue to use the existing two-way-left-turn lane to access private property. Separated bike lanes with vertical delineation in the buffer zone would further support traffic calming[3].
- The traffic signals on Sunbeam Road at Old Sunbeam Road, Craven Road, and Hood Road/Old Kings Road South are all approaching/exceeding 20 years old. When/If these signals are replaced, four-section flashing-yellow-arrow signal heads should replace the existing five-section signal heads. This change has been shown to reduce left-turn crashes by 14.3%. Additionally, this modification will require additional signal heads for adjacent through traffic which will improve signal visibility.
- A leading pedestrian interval (LPI) is recommended at the signals on Sunbeam Road to reduce potential conflicts between pedestrians and turning vehicles. This signal modification allows pedestrians to enter the crosswalk before vehicles have priority to turn right or left. LPIs have been shown to reduce pedestrian-vehicle crashes at intersections by 13%.
- The school zone at San Jose Prep Charter School was mentioned numerous times during the public survey and outreach phase. The flashing beacons for the school zone warning within the raised median have been hit several times. Replacing the pedestal beacons with overhead flashing beacons is recommended to provide additional emphasis for the existing school zone.
- Finally, when the Sunbeam Road intersections at Philips Highway (US 1) and San Jose Boulevard (SR 13) are modified, the use of a Protected Intersection design should be considered. This configuration includes corner refuge islands, forward stop lines for bicyclists, a setback bike and pedestrian crossing, and bicycle-friendly signal phasing.

The estimated cost for the Option 1 long-term improvements is **$22,706,545** and for reconstructing three (3) traffic signals is **$2,650,026**. The Concept Plans and Opinion of Probable Costs are located in Appendix D and Appendix E, respectively.

[3] The Traffic Calming Effect of Delineated Bicycle Lanes, by Younes, et al., 2024. Journal of Urban Mobility (2024) 100071.