US-1 Federal Highway

Village of North Palm Beach, Florida

Lane Repurposing Application:

Parker Bridge / Northlake Boulevard

Revised per FDOT Comments

August 2022 FINAL

Prepared by Treasure Coast Regional Planning Council

With Support from VHB, Inc. and CAPTEC, Inc.

On Behalf of the Village of North Palm Beach, Florida

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TERMS COMMONLY USED IN THIS DOCUMENT	
FDOT	Florida Department of Transportation
LOS	Level of Service
TPA	Palm Beach Transportation Planning Agency
TCRPC	Treasure Coast Regional Planning Council
Village	Village of North Palm Beach

EXECUTIVE SUMMARY

The Village of North Palm Beach is requesting FDOT approval of its lane repurposing application to improve multimodal function and Complete Streets characteristics on US-1 within the Village limits. Specifically, the Village is seeking to repurpose two vehicle lanes of traffic (one in each direction) on US-1 between Anchorage Drive North and Anchorage Drive South (referred to as the "Core Segment") and one southbound lane between Anchorage Drive North and the Parker Bridge (referred to as the "Northern Segment") to add bicycle lanes, shared-use paths, and areas for landscaping and decorative streetlights. The project's "Southern Segment," from Anchorage Drive South to Northlake Boulevard, will remain as designed by FDOT. The total project study area extends south to Northlake Boulevard and ties into a programmed FDOT improvement from Anchorage Drive South to Northlake Boulevard (FM # 442891-1-52-01) that will provide wide sidewalks/shared-use paths (typical sections are attached) and improved bike lanes. The Village's request to FDOT for review and approval of its request is embodied in Resolution # 2022-54, adopted July 14, 2022, and included in Attachment 17 of the Lane Repurposing Report.

The currently 6-lane subject segment of US-1 in the Village connects to four-lane segments both north and south, which continue north to the Palm Beach County limits and south to Boca Raton. The Village's section of US-1 is wider than necessary for vehicular traffic and lacks appropriate facilities for cyclists and pedestrians. Accordingly, the purpose of this request is to improve safety conditions for all users along the corridor, remedy deficient bicycle facilities, and improve the connectivity of the bicycle and pedestrian network through the installation of shared-use paths and supplemental bicycle lanes.

The Village has been working towards a lane repurposing for more than six years. The subject segment was identified as a lane repurposing candidate by Village residents in the Village of North Palm Beach Master Plan, which was adopted in 2016. Subsequently, the subject segment was identified as a "Tier One" priority lane repurposing candidate in the US-1 Multimodal Corridor Study, adopted by the Palm Beach Transportation Planning Agency (TPA) in May 2018. This study documented the deficiency of appropriate bicycle facilities on US-1 county-wide and prioritized opportunities to repurpose the corridor where appropriate and establish a more balanced multimodal design.

The addition of bicycle facilities, through the installation of shared-use paths and bicycle lanes in key locations, will help complete a significant piece of the regional bicycle network that utilizes the US-1 alignment to cross city and county borders and connects to complementary bicycle networks in communities throughout the state. The completion of this component of the regional bicycle network can help create a mode shift by improving the network of multimodal streets to allow residents, employees, and visitors the ability to choose to use a bicycle for transportation between residential and commercial districts and other municipalities. Further, a repurposing will allow the Village to install landscaping and decorative streetlights and reduce crosswalk widths, which will improve the pedestrian experience and enhance the appearance, economic potential, and quality of life for the community.

I. PROJECT DESCRIPTION

A. Purpose

The purpose of the US-1 lane repurposing project in the Village of North Palm Beach is to introduce improved multimodal facilities, including shared-use paths and bicycle lanes as well as shorter crosswalk lengths, to improve safety, connectivity, mobility, and access. US-1 is in the heart of the Village, functioning as the municipality's "main street." The Village's adopted Village Master Plan (October 2016) highlighted the imbalance between the current vehicular lane capacity and travel volumes along with the lack of multimodal amenities. This deficiency was further identified by the Palm Beach Transportation Planning Agency (TPA) in its US-1 Multimodal Corridor Study (adopted 2018). The recommended lane repurposing will remedy this deficiency and transform US-1 into a complete street with better connectivity and functionality for the traveling public.

Project Location

The 1.7-mile subject section is in the Village of North Palm Beach, and the project limits extend from Northlake Boulevard to the south to the Parker Bridge to the north. It should be noted the proposed lane repurposing would occur in the 1.5-mile section between the Parker Bridge and Anchorage Drive South, and FDOT has already programmed complementary improvements from Anchorage Drive South to Northlake Boulevard (FM # 442891-1-52-01). A map of the project location is included as **Figure 1**.

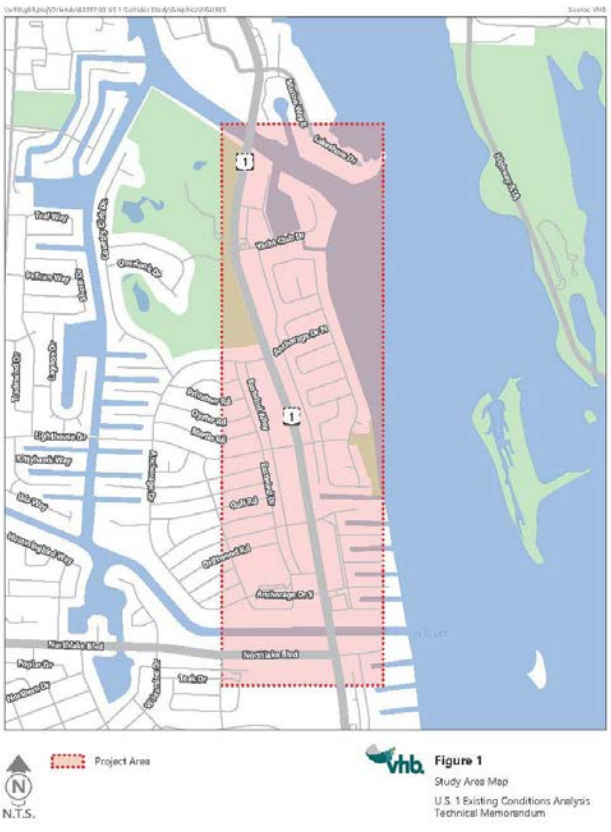

Figure 1 - Project Location Map

B. Area of Influence

US-1 is the major commercial corridor through eastern Palm Beach County, traversing roughly 45 miles through 15 municipalities, from the City of Boca Raton to the Village of Tequesta. Historically, US-1 has provided mobility for north-south trips through Palm Beach County. US-1 was designated in 1926 as "The Dixie Highway," which was one of several transcontinental roads envisioned in the early days of the automobile. With the construction of Interstate 95 in the 1970s, demands on the corridor changed over time. Long-

distance trips shifted to the higher-speed interstate while development density and intensity along US-1 advanced with more localized traffic. The role of US-1 began to change in the 1970's with the construction of Interstate 95, when it was the main road to get to and through Palm Beach County for long distance trips along the eastern seaboard and within Florida. Today, US-1 is a "Main Connector" serving downtown areas in the eastern core of Palm Beach County, hosting Palm-Tran's Route 1, which has the highest ridership. The high number of destinations that have grown along the corridor have also increased use by pedestrians, bicyclists, and transit riders.

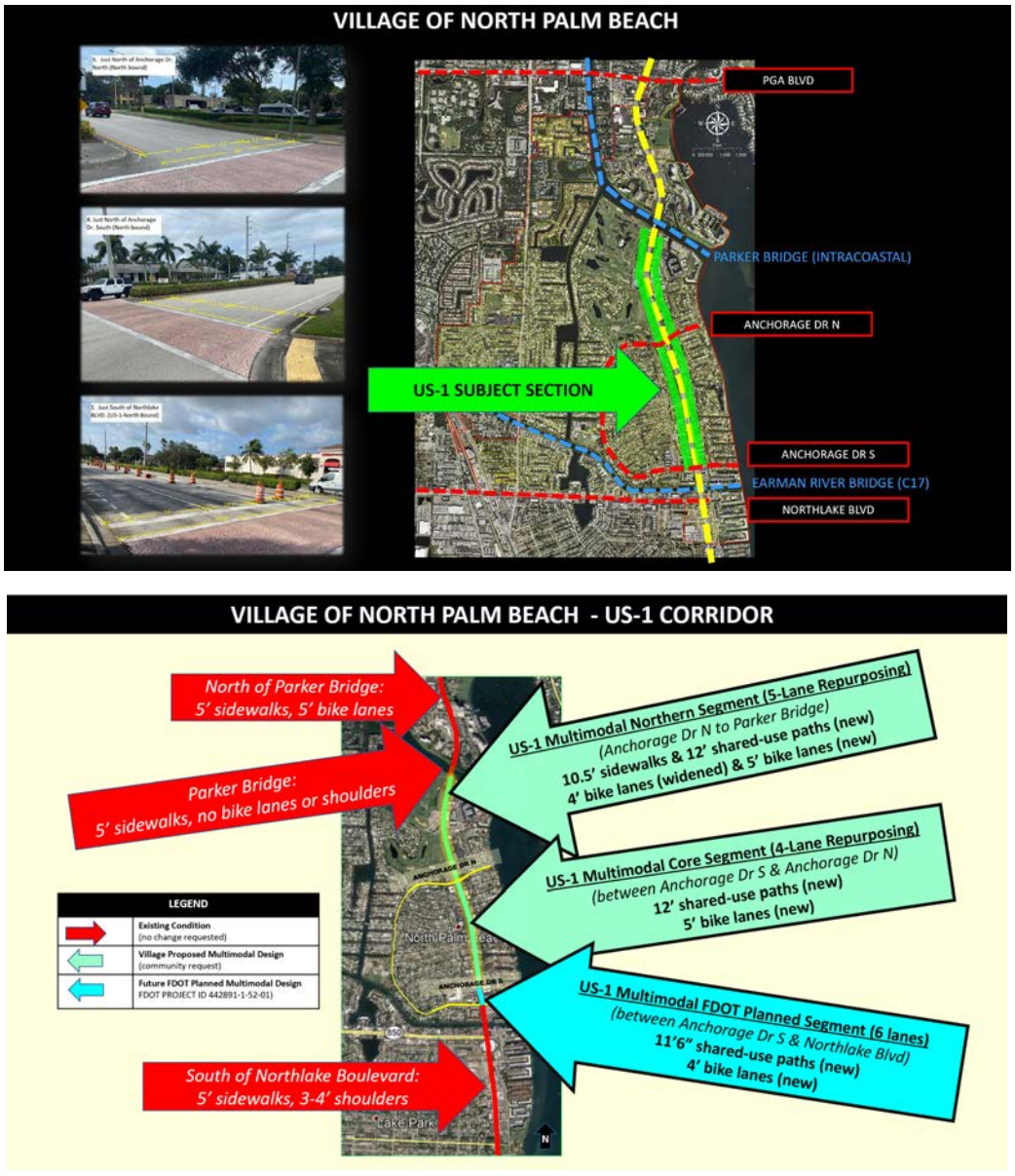

Figure 2 – General Project Details: The segment of US-1 north of the proposed lane repurposing has deficient facilities. The Village's proposal will tie into programmed FDOT improvements at the southern end (between Anchorage Drive South and Northlake Boulevard).

The subject corridor is contained entirely within the Village of North Palm Beach municipal limits. The Town of Lake Park lies adjacent to the corridor to the south. Roughly one mile north of the northern study limits is the City of Palm Beach Gardens.

The Palm Beach TPA has strongly emphasized its desire to improve the US-1 corridor countywide, given its continuity, connectivity it provides to coastal population centers and downtowns, and convenient geography for residents, commuters, and visitors. In May 2018, the TPA adopted the US-1 Multimodal Corridor Study, following nearly 18 months of analysis, public outreach, and interagency collaboration. The Study further evaluated the US-1 segment in North Palm Beach, identifying it as a near-term opportunity for a lane repurposing to "right-size" the corridor's vehicular capacity with demand and introduce improved bicycle and pedestrian facilities. The figures below illustrate the deficiency of current bicycle facilities and the corridor's contextual location.

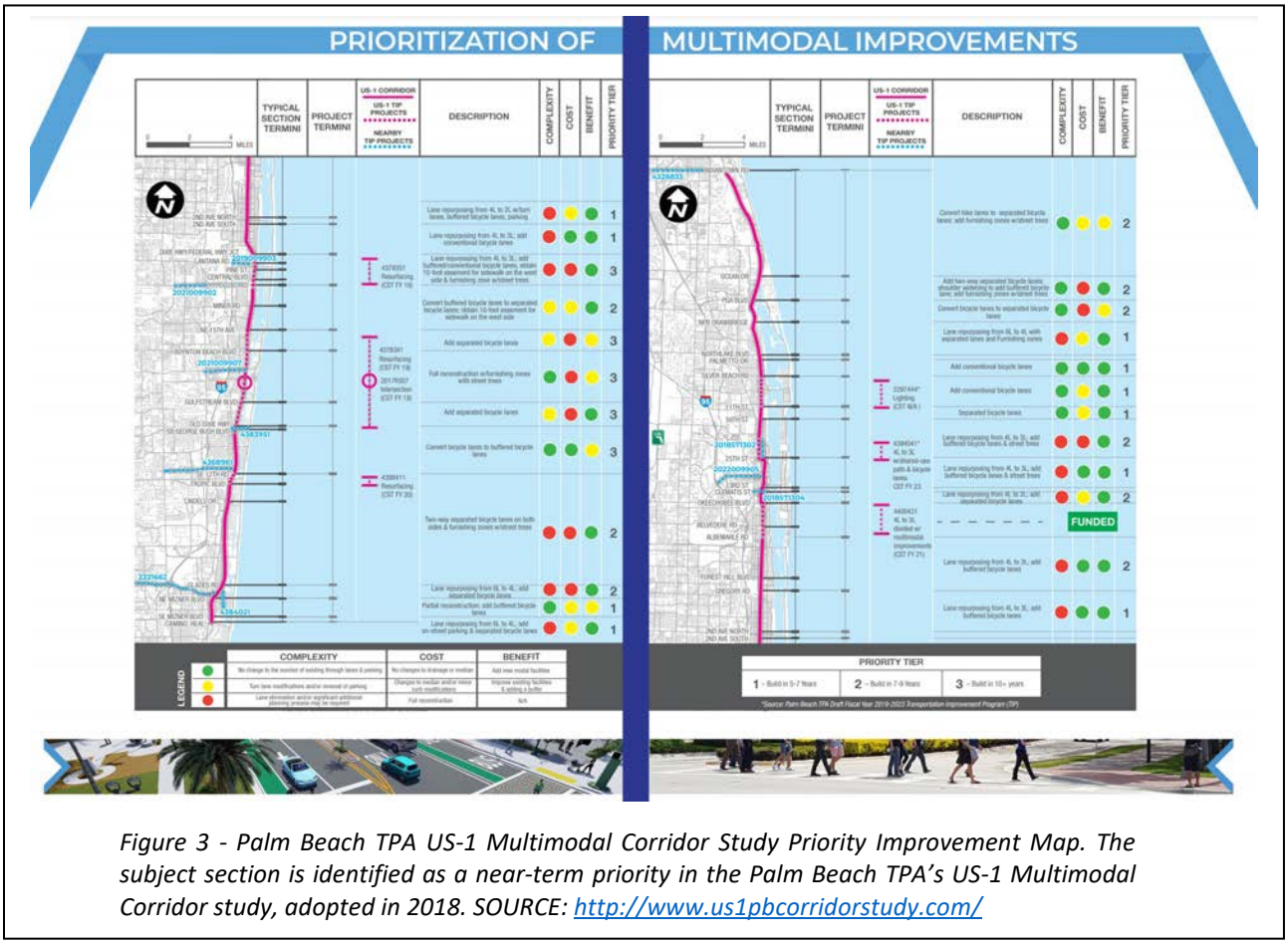

Figure 3 - Palm Beach TPA US-1 Multimodal Corridor Study Priority Improvement Map. The subject section is identified as a near-term priority in the Palm Beach TPA's US-1 Multimodal Corridor study, adopted in 2018. SOURCE: http://www.us1pbcorridorstudy.com/

C. Existing Conditions

1. Typical Section

U.S. 1 is a six (6) lane divided corridor with 11-foot travel lanes and a raised median ranging from 18 to 25 feet. As U.S. 1 approaches the Parker Bridge on the north side of the corridor, it narrows down to a four (4) lane divided corridor with 11-foot travel lanes. In 2017, U.S. 1 in the vicinity of the bridge over the Earman River was restriped from six (6) lanes to four (4) lanes to reduce loads on the bridge due to a partial collapse. As a result, U.S. 1 in the southbound direction carries two (2) through lanes from Village Hall to Northlake Boulevard, while the northbound direction carries two (2) through lanes from Northlake Boulevard to north of the bridge where it widens to three (3) lanes just south of the Anchorage Drive intersection. The posted speed limit throughout the corridor is 35 mph up to the Anchorage Drive North intersection, where it changes to 40 mph. South of Northlake Boulevard, the posted speed is 35 mph. There are large overhead utilities that run along the west side of the corridor, while lighting is provided along both sides of the road via standalone poles.

It should be noted that FDOT has a programmed project (FM # 442891-1-52-01) to replace the bridge over the Earman River with a scheduled construction letting date of December 7, 2022. This project would return the bridge to its previous six-lane cross section and add 11'6" shared-use paths and 4' bike lanes. Additional details regarding the typical section are included in **Attachment 1** (US-1 Corridor Study – Traffic Analysis Technical Memorandum).

2. Roadway Functional Class, Access Management, and Context Classification

Functional Classification: Urban Arterial Minor

Access Class: 05

Context Classification: C4 – Urban General

3. Evacuation Route

The subject section of US-1 is designated as an evacuation route, which is a consideration when evaluating potential geometric changes along the corridor. From an evacuation route perspective, the section of U.S 1 being considered connects to two other evacuation routes: Northlake Boulevard and PGA Boulevard. At the connections to these two facilities, US-1 shows a four-lane cross-section with the section of US-1 being studied (six-lane cross section) located in the middle of these two. No geometry changes to four-lane sections of US-1 are being proposed, resulting in no changes to where US-1 connects to these sections; therefore, no significant changes (if any at all) on evacuation times are expected resulting from the implementation of the lane repurposing project. Additional detail is contained in **Attachment 1**.

4. SIS Designation

The subject segment of US-1 is on the State Highway System (SHS), but it is not included on the District IV SIS designation map. A copy of the Palm Beach County component of the SIS is included as **Attachment 2**.

5. Posted Speed

The subject segment has a posted speed of 35 MPH.

6. Signalized Intersections

There are five signalized intersections along the subject corridor:

- US-1 at Northlake Boulevard Signalized
- US-1 at Anchorage Drive South Signalized
- US-1 at Lighthouse Drive Signalized
- US-1 at Anchorage Drive North Signalized
- US-1 at Yacht Club Drive Signalized

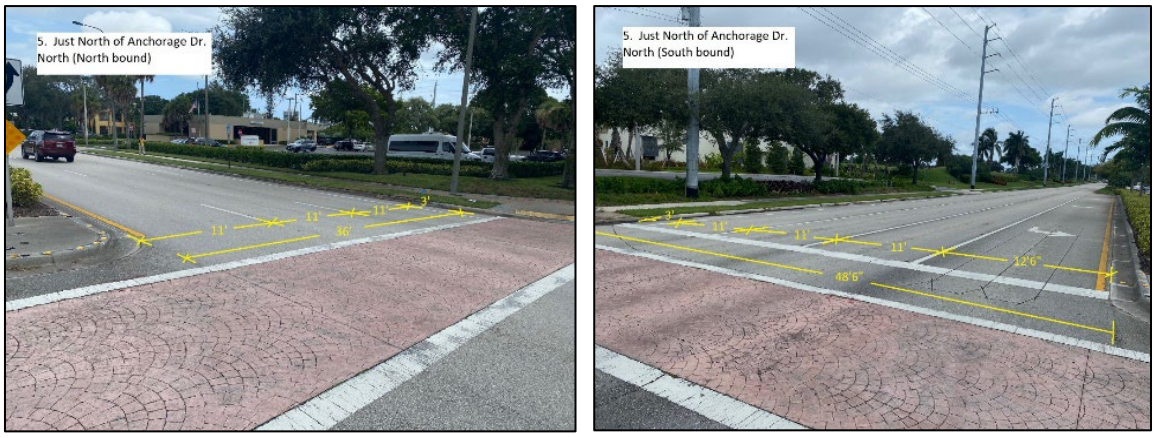

Figure 4 – Photos of Current Conditions - As illustrated in the pictures above, the current condition on US-1 includes 3' shoulders, which are deficient facilities for safe bicycling.

7. Bicycle/Pedestrian Facilities

The corridor currently has 5' sidewalks on both sides with 3' paved shoulders. While the Village's internal roadway network is appropriate for multimodal access, the US-1 corridor is deficient. Photos of existing conditions are provided in this section along with a map illustrating the Village's current multimodal network.

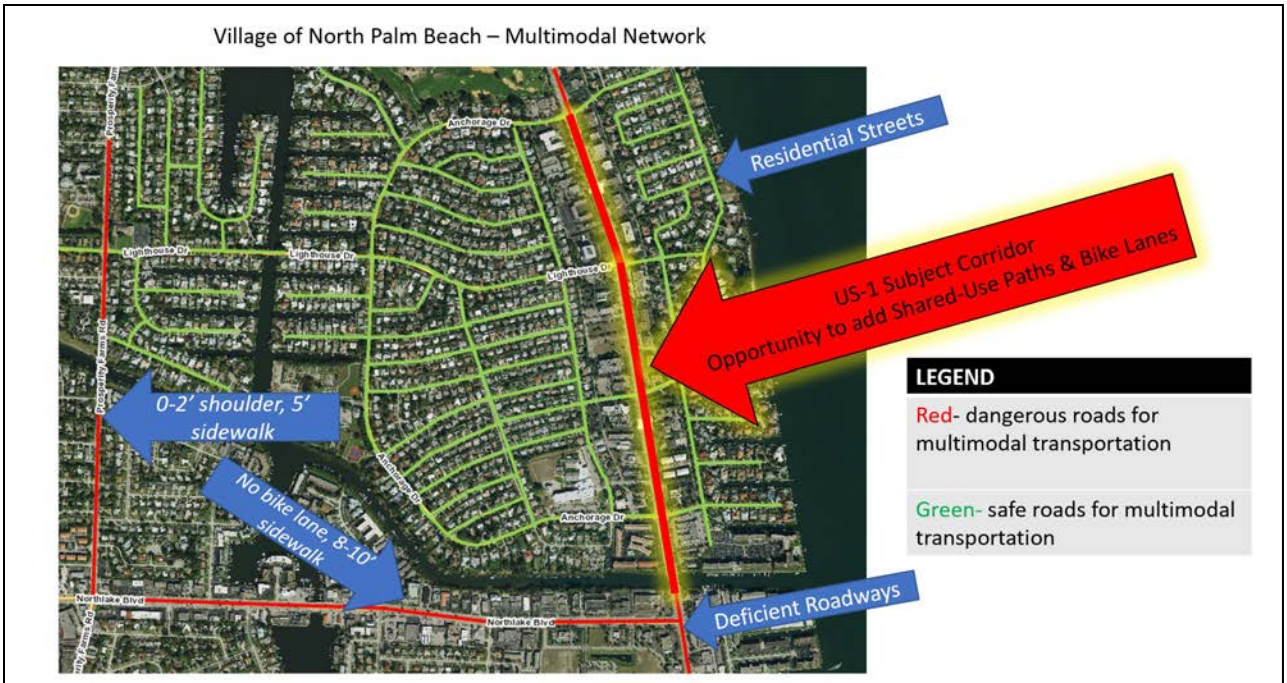

Figure 5 – Village Multimodal Network – US1 Deficiency – The introduction of proper bicycle facilities on the subject segment of US-1 will help complete the Village of North Palm Beach Multimodal Network.

8. Traffic Data Collection

Traffic Count Information

The latest available roadway daily traffic count information was obtained from Florida Traffic Online (FTO) 2019 data and the Palm Beach County Historic Peak Season Traffic Counts (2015-2020) report. The peak season daily traffic counts obtained from the Palm Beach County traffic count program were adjusted using seasonal adjustment factors to obtain Annual Average Daily Traffic (AADT) volumes. The daily counts in the County count program were collected in February 2020, before traffic volumes were affected by the COVID-19 pandemic and, therefore, are acceptable for use in the analysis. The AADTs for the individual roadway segments are provided in **Table 1**. Daily traffic volumes and relevant printouts from FTO are included in **Attachment 1**. NOTE: Select figures and tables have been included in the body of the report, and a complete inventory is included in **Attachment 1**.

Table 1: Existing Annual Average Daily Traffic

Roadway / Segment	Date of Count	Source(1)	Station	ADT	SF	AADT
U.S. 1						
Park Avenue to Northlake Boulevard	2019	FTO	930103	--	--	24,000
Northlake Boulevard to Lighthouse Drive	February 25, 2020	County	2832	31,217	0.88	27,500
Lighthouse Drive to PGA Boulevard	February 11, 2020	County	2838	26,152	0.88	23,000

(1) Only counts unaffected by COVID-19 are reported for 2020

Weekday turning movement counts were collected for the above mentioned five (5) intersections between the peak hours of 7:00-9:00 AM and 4:00-6:00 PM on the last week of January 2019 by CALTRAN Engineering Group, Inc. These existing traffic volumes, shown in Figure 4, were checked for reasonableness and used to determine the roadway arterial and intersection level of service. The intersection counts were not seasonally adjusted since the counts were collected during the average week of the peak season (i.e., Peak Season Conversion Factor: 1.00). The raw intersection turning movement counts are included in **Attachment 1**.

Existing Operational Analysis

The existing operational conditions for the study corridor (intersections and roadway segments) were evaluated using the existing turning movement counts, existing signal timings, and existing geometry data using the Synchro 10 software and the methodology established in the Highway Capacity Manual, 6th Edition (HCM 6). Existing signal timings were provided by Palm Beach County and are provided in **Attachment 1**. The study corridor was analyzed for the AM and PM peak hours.

Intersection LOS Analysis

The level of service (LOS) for all the intersections was determined using HCM 6th Edition methodology. A summary of the LOS analysis for the study intersections is included in **Table 2**. The existing Synchro outputs are included in **Attachment 1**. As can be observed in **Table 2**, all the intersection movements along the US-1 mainline were found to operate at LOS D or better, except the northbound and southbound left turn movements at the intersection of US-1 and Northlake Boulevard, which operate at LOS E during the PM condition. All the study area intersection movements operate at volume-to-capacity ratios lower than 1.0.

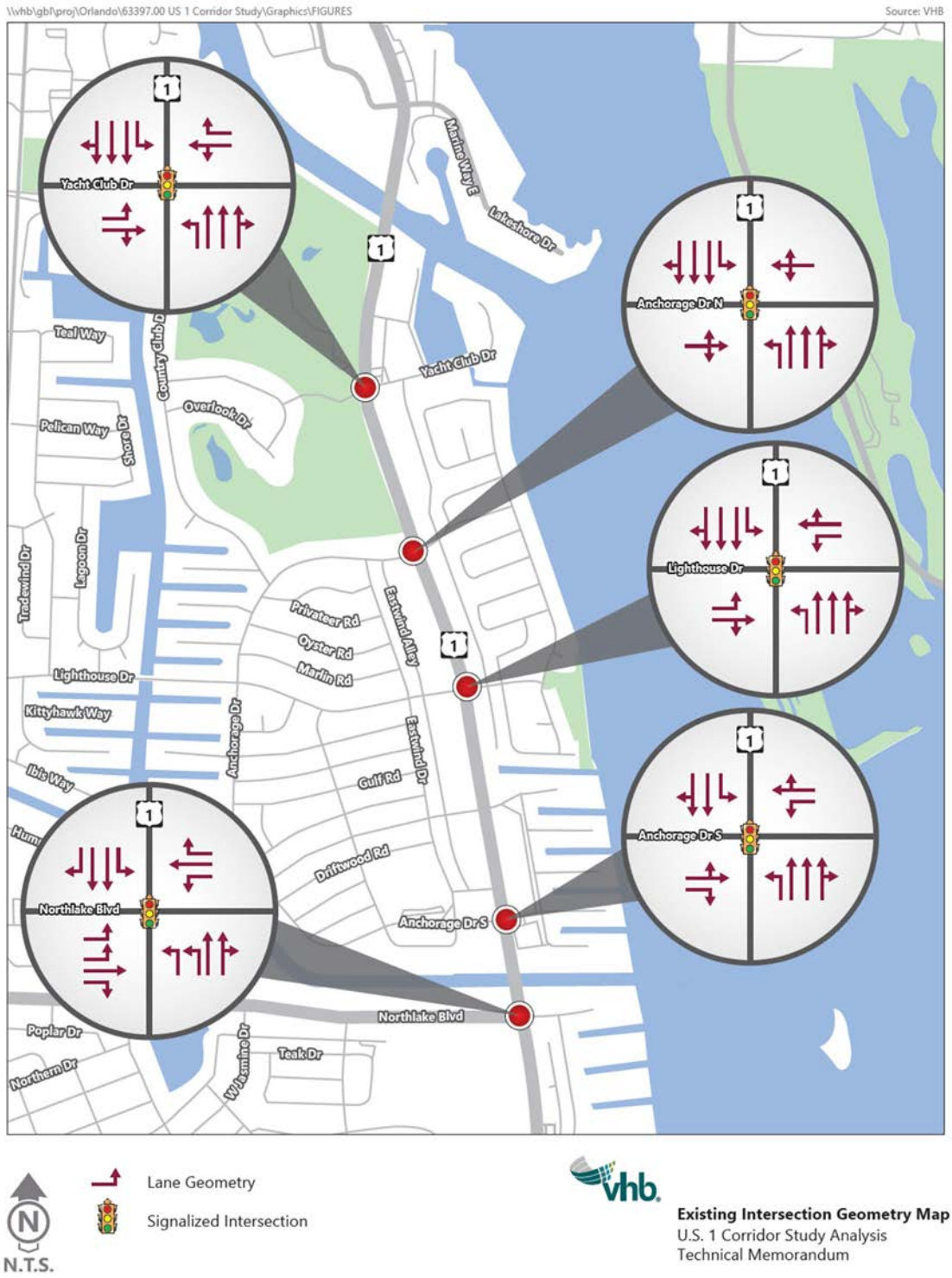

Figure 6 – Existing Intersection Geometry Map

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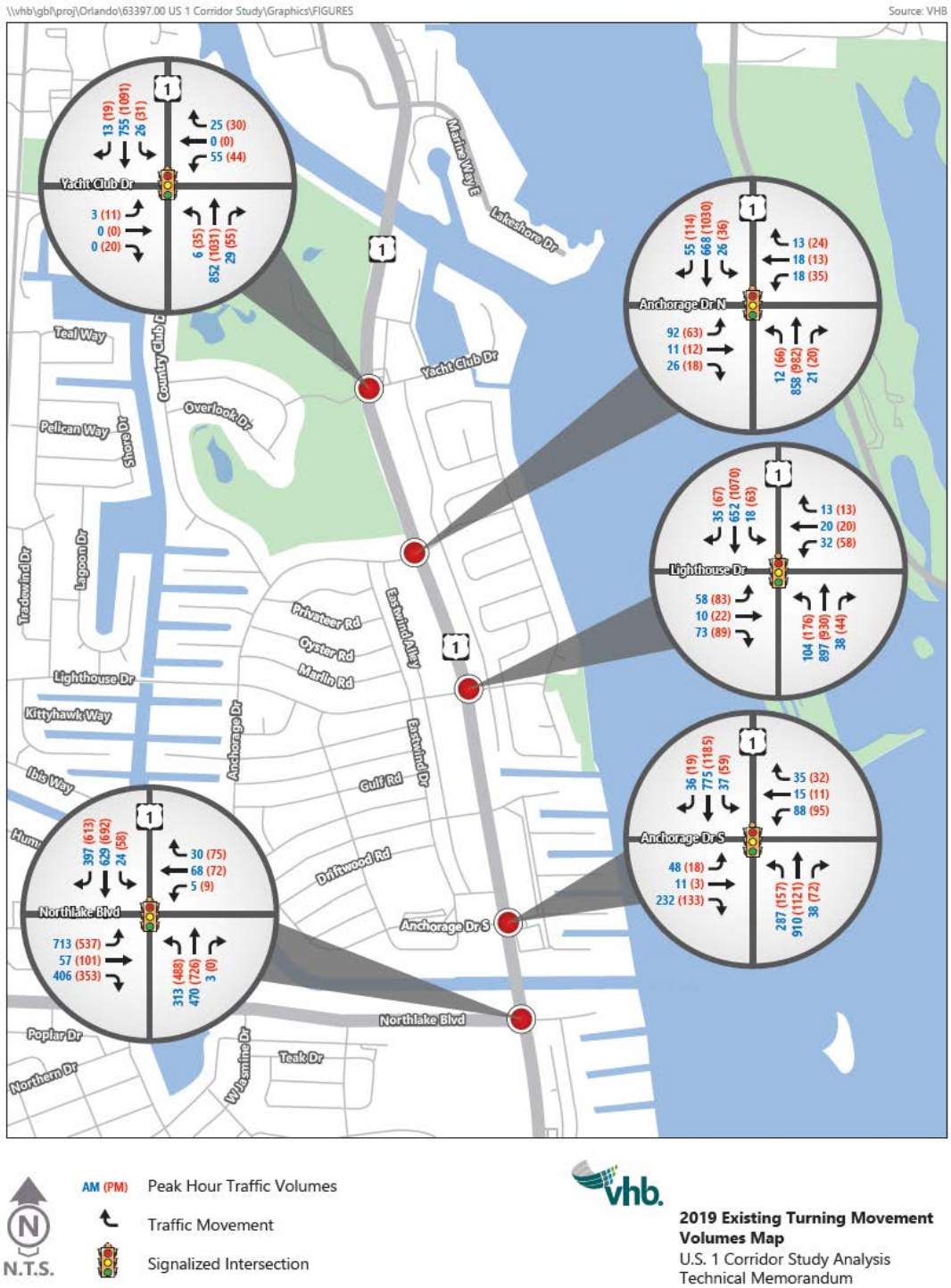


Figure 7 – Existing Turning Movement Volumes Map

Table 2: 2019 Existing Intersection Level of Service

Intersection	Control Type	Movement	Village Adopted LOS Standard	2019 AM Peak Hour			2019 PM Peak Hour		
				V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
U.S. 1 @ Northlake Blvd	Signalized	EBL	D	0.93	47.6	D	0.90	47.4	D
		EBT	D	0.12	30.6	C	0.25	33.5	C
		EBR	D	0.69	29.8	C	0.59	25.9	C
		WBL	D	0.22	57.4	E	0.23	52.0	D
		WBT	D	0.69	55.8	E	0.59	49.5	D
		WBR	D	0.36	52.8	D	0.73	58.8	E
		NBL	D	0.85	51.5	D	0.89	52.2	D
		NBT	D	0.30	20.5	C	0.47	21.1	C
		NBR	D	0.30	20.5	C	0.00	0.0	A
		SBL	D	0.30	53.0	D	0.43	47.3	D
		SBT	D	0.48	27.1	C	0.56	28.6	C
		SBR	D	0.43	12.1	B	0.75	24.3	C
		Overall	**D**		**32.9**	**C**		**33.5**	**C**
U.S. 1 @ Anchorage Dr South	Signalized	EBLT	D	0.25	47.9	D	0.11	55.9	E
		EBR	D	0.91	67.8	E	0.67	59.3	E
		WBL	D	0.55	56.6	E	0.59	63.5	E
		WBTR	D	0.19	44.7	D	0.22	54.5	D
		NBL	D	0.63	9.5	A	0.46	8.9	A
		NBT	D	0.33	10.8	B	0.34	8.2	A
		NBR	D	0.33	11.1	B	0.34	8.5	A
		SBL	D	0.11	9.5	A	0.17	6.4	A
		SBT	D	0.44	1.3	A	0.50	11.8	B
		SBTR	D	0.44	1.3	A	0.50	11.7	B
		Overall	**D**		**16.0**	**B**		**14.9**	**B**
U.S. 1 @ Lighthouse Dr	Signalized	EBL	D	0.38	58.7	E	0.42	59.4	E
		EBTR	D	0.58	57.7	E	0.55	57.9	E
		WBL	D	0.31	61.8	E	0.46	65.5	E
		WBTR	D	0.21	54.7	D	0.15	54.2	D
		NBL	D	0.17	4.0	A	0.41	5.7	A
		NBT	D	0.25	5.5	A	0.28	7.7	A
		NBR	D	0.25	5.7	A	0.28	8.0	A
		SBL	D	0.04	4.4	A	0.15	6.0	A
		SBT	D	0.19	0.2	A	0.33	0.4	A
		SBR	D	0.19	0.3	A	0.33	0.7	A
		Overall	**D**		**9.2**	**A**		**10.0**	**B**
U.S. 1 @ Anchorage Dr North	Signalized	EBLTR	D	0.66	59.7	E	0.60	66.3	E
		WBLTR	D	0.24	53.6	D	0.45	63.3	E
		NBL	D	0.02	4.5	A	0.21	6.8	A
		NBT	D	0.25	6.1	A	0.28	5.3	A
		NBR	D	0.25	6.3	A	0.28	5.5	A
		SBL	D	0.06	4.4	A	0.09	3.9	A
		SBT	D	0.21	0.2	A	0.32	23.5	C
		SBR	D	0.21	0.4	A	0.32	23.8	C
		Overall	**D**		**8.9**	**A**		**18.1**	**B**
U.S. 1 @ Yacht Club Dr	Signalized	EBL	D	0.04	63.3	E	0.15	67.7	E
		EBTR	D	0.00	0.0	A	0.20	61.7	E
		WBLT	D	0.43	61.3	E	0.37	65.1	E
		WBR	D	0.30	59.6	E	0.30	62.4	E
		NBL	D	0.01	2.4	A	0.09	2.8	A
		NBT	D	0.22	3.3	A	0.28	4.1	A
		NBR	D	0.22	3.4	A	0.28	4.3	A
		SBL	D	0.05	2.2	A	0.08	2.7	A
		SBT	D	0.19	2.8	A	0.29	4.1	A
		SBR	D	0.19	2.9	A	0.29	4.4	A
		Overall	**D**		**5.8**	**A**		**6.8**	**A**

Table 3 provides a comparison of the study intersection storage lengths against the 95th queues estimated using the HCM 6th methodology in Synchro 10. As can be seen in **Table 3**, the northbound left and southbound right turn movements at the Northlake Boulevard intersection, the eastbound right turn movement at the Anchorage Drive South intersection, and the eastbound left turn movement at the Lighthouse Drive intersection

experience 95th percentile queues that extend beyond the available storage and can occasionally have an adverse impact on the operations of the through movements and, in some instances, of the upstream intersections (e.g. southbound right movement at the Northlake Boulevard intersection).

Table 3: 2019 Intersection Queue Length

Intersection	Movement	Available Storage (ft)	95th Percentile Queue (ft)-HCM 6th	
			2019 AM Peak Hour	2019 PM Peak Hour
U.S. 1 at Northlake Blvd	EBL	-	403	298
	EBR	-	375	295
	WBL	125	8	10
	WBR	170	40	105
	NBL	225	208	290
	NBT	-	190	268
	SBL	200	33	70
	SBT	-	280	298
	SBR	300	233	468
U.S. 1 at Anchorage Dr South	EBTL	-	90	33
	EBR	250	380	213
	WBL	120	150	163
	NBL	290	158	60
	NBT	-	188	190
	SBL	150	20	23
	SBT	-	18	348
U.S. 1 at Lighthouse Dr	EBL	135	90	135
	WBL	150	50	100
	NBL	290	30	68
	NBT	-	113	158
	SBL	250	5	25
	SBT	-	3	5
U.S. 1 at Anchorage Dr North	EBLTR	-	210	170
	WBLTR	-	75	125
	NBL	200	3	18
	NBT	-	120	130
	SBL	200	8	10
	SBT	-	3	463
U.S. 1 at Yacht Club Dr	EBL	50	5	20
	WBR	200	38	53
	NBL	160	0	8
	NBT	-	70	113
	SBL	170	5	8
	SBT	-	53	118

The 95th percentile queues were estimated using the HCM 6th methodology in Synchro 10

The Parker Bridge is located at the northern limit of the study area. This is a draw bridge that generally opens twice an hour for approximately seven minutes each time. These bridge openings generate a queue of vehicles traveling in the northbound direction on US-1. The current geometry of the northbound approach includes three lanes (until approximately 600 feet south of the bridge that the approach starts transitioning to two lanes); therefore, the queue is distributed among them. In the event the lane repurposing project is implemented, the number of lanes to accommodate the queues will be reduced to two. Based on this, the interaction of the Parker Bridge openings and the potential lane repurposing project needs to be evaluated.

Table 4: 2019 Drawbridge Queue Length

Roadway Segment	Time Period	95th Percentile Queue (ft) – Synchro	Intersection through which queue extends
Northbound U.S. 1 south of Parker Bridge	Existing AM Peak Hour	1,424	N/A
	Existing PM Peak Hour	1,815	Yacht Club Drive

Arterial LOS Analysis

The Arterial LOS was estimated using the arterial average speed from the Arterial Level of Service Module in Synchro 10 software compared to the arterial average speed LOS thresholds contained in HCM 6th Manual Exhibit 16-3. The arterial LOS results are shown in **Table 5**. As illustrated in this table, the roadway segment operates at acceptable LOS and speeds during the AM and PM peak hours. Year 2019 AM and PM peak hour Synchro arterial analysis outputs, LOS thresholds from HCM 6th Manual, and additional details are included in **Attachment 1 (Appendix L)**.

Table 5: 2019 Arterial Segment Level of Service

Roadway Segment – U.S. 1	2019 AM Peak Hour		2019 PM Peak Hour	
	NB	SB	NB	SB
Travel Time (Sec)	186.4	217.1	178.7	220.2
Average Speed (MPH)	25.9	22.2	27.0	21.9
LOS	B	C	B	C

II. PROPOSED MODIFICATIONS

A. Conceptual Design

The proposed conceptual roadway design includes a lane repurposing from Anchorage Drive South to the Parker Bridge, with a four-lane configuration in the Core Segment (from Anchorage Drive South to Anchorage Drive North) and a five-lane configuration in the Northern Segment (from Anchorage Drive North to the Parker Bridge). For the Core segment, a 12' shared-use path and 5' bike lane is proposed, and for the Northern Segment, a 12' shared-use path and 5' bike lane is proposed on the west side, with a 10' sidewalk and 4' bike lane on the east side. After discussions with FDOT District IV staff, the proposed project would retain the existing curb on the east side, and therefore, with modest lane restriping and a design variance, the current 3' shoulder could be expanded to become a 4' bike lane. The

Village is proposing no additional changes to the Southern Segment that will be constructed by FDOT prior to the project. Landscaping would be installed by the Village via landscaping permits after roadway construction has been completed.

A summary of existing and proposed designs was presented to the FDOT District IV Design Review Committee in September 2020, and feedback from the committee has been incorporated into the project design. A summary of the September 2020 presentation is included as **Attachment 3**, and the proposed conceptual roadway design is included as **Attachment 4**.

1. Typical Section

Typical section illustrations for the two segments proposed for modifications by this project are provided in this section. Additionally, conceptual renderings are provided to help illustrate the context and design of the proposed design with street-level views of the relationship between the FDOT right-of-way (including vehicular travel lanes, bike lanes, landscape strips, and shared-use paths), existing Florida Power & Light utility poles, and private right-of-way (including 7' furnishing zone and building frontages).

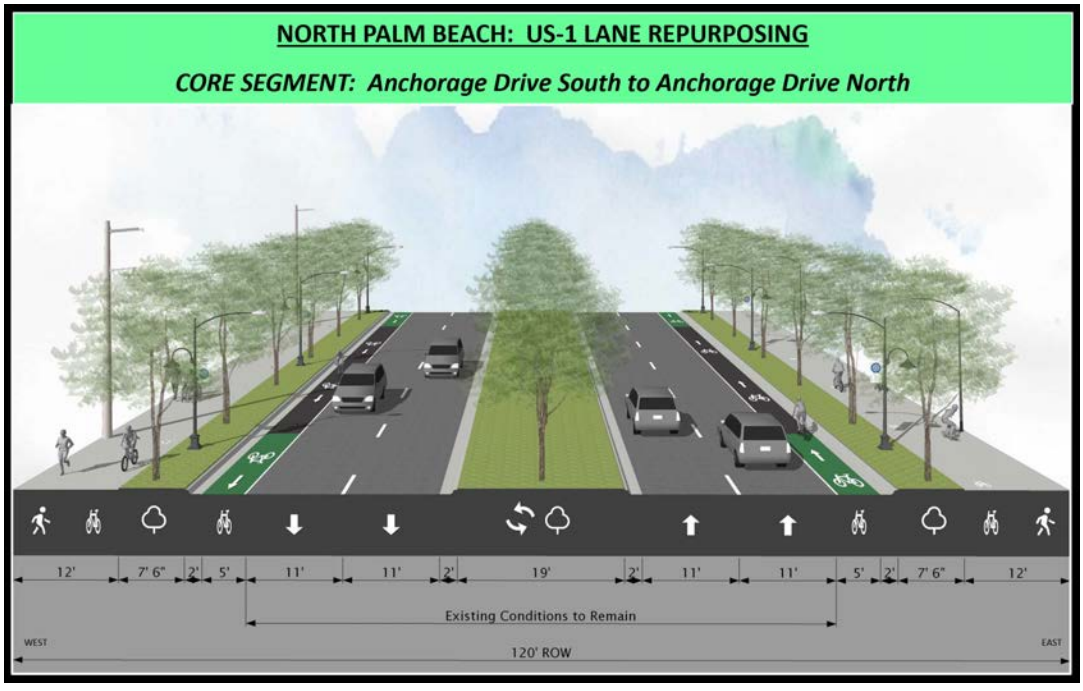


Figure 8 – Core Segment – Typical Section

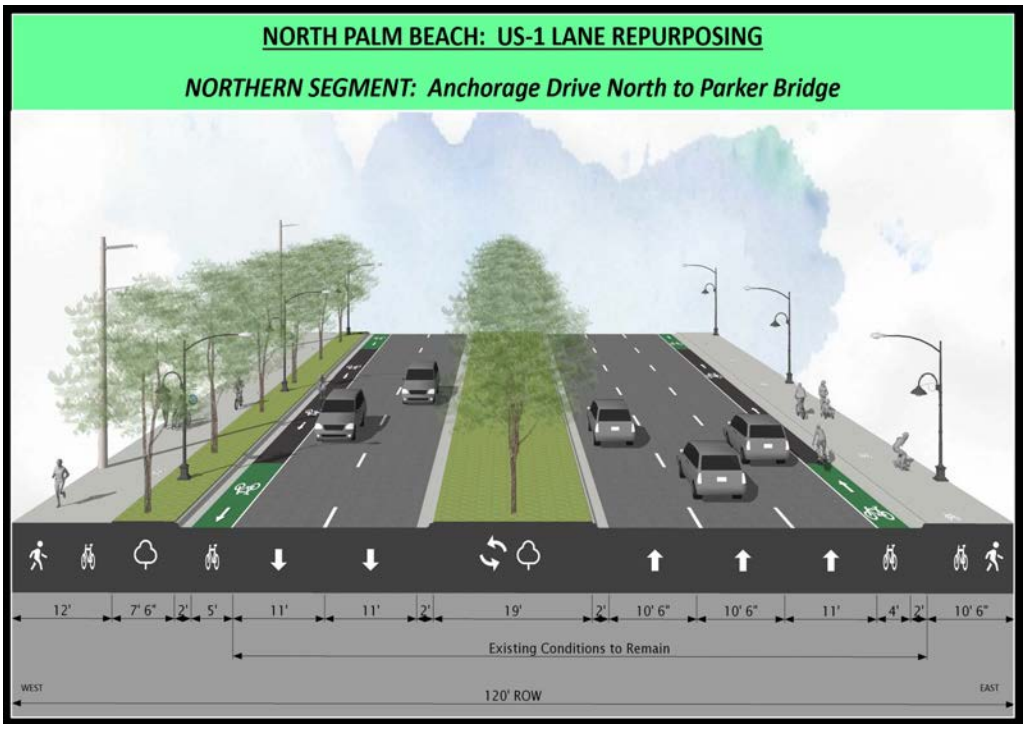


Figure 9 – Northern Segment – Typical Section

Figure 10 – Multimodal Condition – Illustrative Image

Figure 11 – Multimodal Condition – Illustrative Image

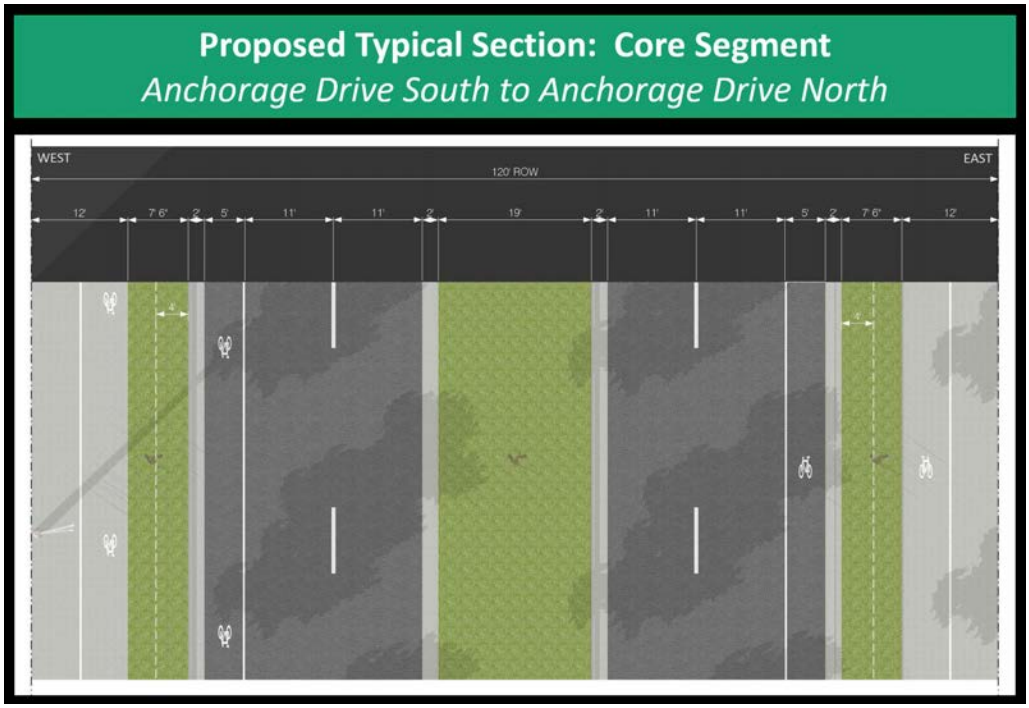


Figure 12 – Core Segment, Typical Section (Plan View)

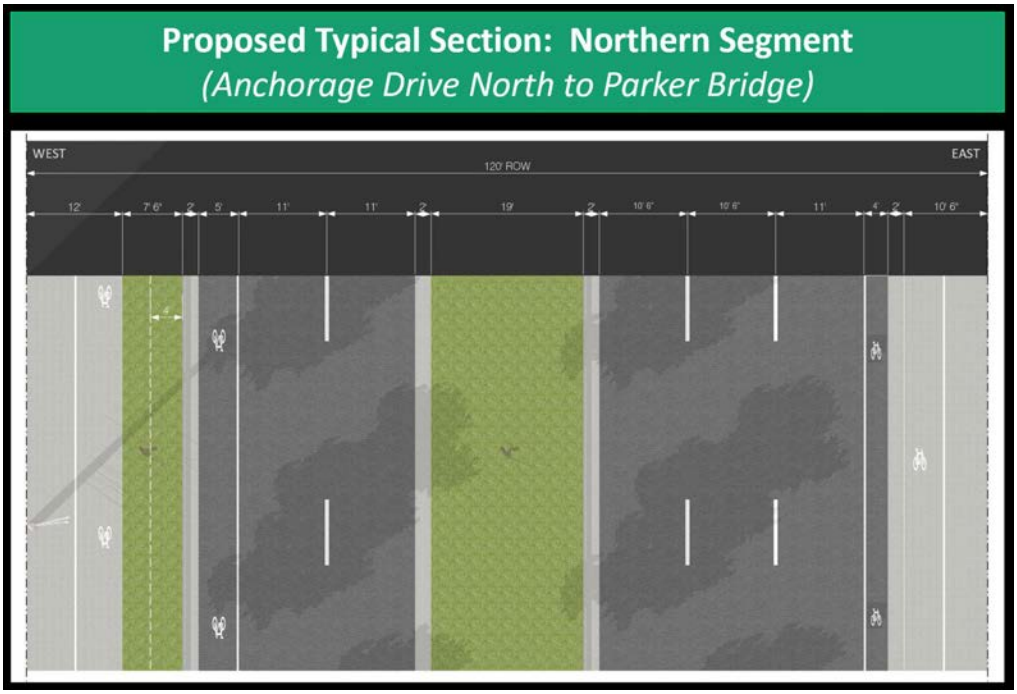


Figure 13 – Northern Segment – Typical Section (Plan View)

The conceptual design will perfectly complement the proposed conceptual design for the Earman River Bridge replacement, which is currently funded for FY 2021/22. A photo of the current condition is provided below.

Figure 14 – Earman River Bridge – current condition

2. Intersection Design

The lane repurposing project will reduce the number of through lanes from three to two. Existing medians will be maintained in their current locations. The proposed design includes appropriate modifications to pavement markings, crosswalks, and traffic signals as needed to accommodate the lane repurposing. Additional coordination with FDOT will be undertaken during the design process to ensure intersection modifications are appropriate for the modified corridor.

B. Changes in Design and Posted Speed

The proposed lane repurposing will change the roadway design from a 6-lane configuration to a combination of 4- and 5-lane configurations as illustrated in the typical section drawings. No changes are recommended to the posted speed, which will remain 35 MPH.

C. Site Access Impacts

There will be no adverse site access impacts. No new medians are proposed, and therefore, site access will remain as in the current condition. The design team will closely coordinate with impacted property and business owners during the development of the project. If any additional access issues arise, they should be addressed to the satisfaction of all partners.

The Village and FDOT design team will work with adjacent property owners to understand if delivery and loading zones are required. During project design, the corridor will be evaluated for specialty infrastructure if needed, such as signage and markings to designate these areas.

D. Emergency Access

Emergency access for fire and police vehicles along this corridor has been considered as part of the design concepts. A North Palm Beach fire station is located within the Study Area, with an emergency signal that will remain as it is currently located. Emergency vehicles will have access to bike lanes, bus bays (if any), vehicular lanes, and turn lanes to reach destinations as needed. Additional coordination with the North Palm Beach Fire Department and Palm Beach County Fire/Rescue should be provided during the design phase.

E. Impacts on Transit Service

Access to transit service along this corridor will be improved for pedestrians by reducing the crossing distance in the Core and Northern Segments from 6 lanes to 4 or 5 lanes

respectively and enhancing the pedestrian experience with the introduction of shared-use paths and wider sidewalks. Cyclist access will also be improved with the introduction of 5' bicycle lanes. All transit stops will remain but may be relocated to align with marked crosswalks to increase safety of users and to the far-side of intersections where possible. With a posted speed of 35 MPH, transit stops will occur in the outside travel lane. Project development has included coordination with both the Palm Beach TPA and Palm-Tran, which should continue through the design phase.

F. Consistency with Local Plans

The proposed lane repurposing will implement the recommendations of the North Palm Beach Citizen's Master Plan, which was adopted in 2016. This effort, which included extensive public engagement during a year-long process, identified the excessive capacity of the six-lane US-1 versus the traffic demand on the corridor. Coupled with a high vacancy rate (more than 40% of office space is vacant), the corridor was identified as a key component of the Village's redevelopment strategy. The Village has directed itself to implement the provisions and guiding principles of the Citizen's Master Plan, including amendments to its comprehensive plan and land development regulations in Policy 1.A.9 of its Future Land Use Element (FLUE). Objective 1.B (FLUE) emphasizes the Village's desire to enhance aging commercial corridors into walkable and bikeable centers of vibrant activity, supplemented with new residential and mixed-use development. Objective 6 (FLUE) notes the Village shall encourage infill development and redevelopment along the US-1 corridor.

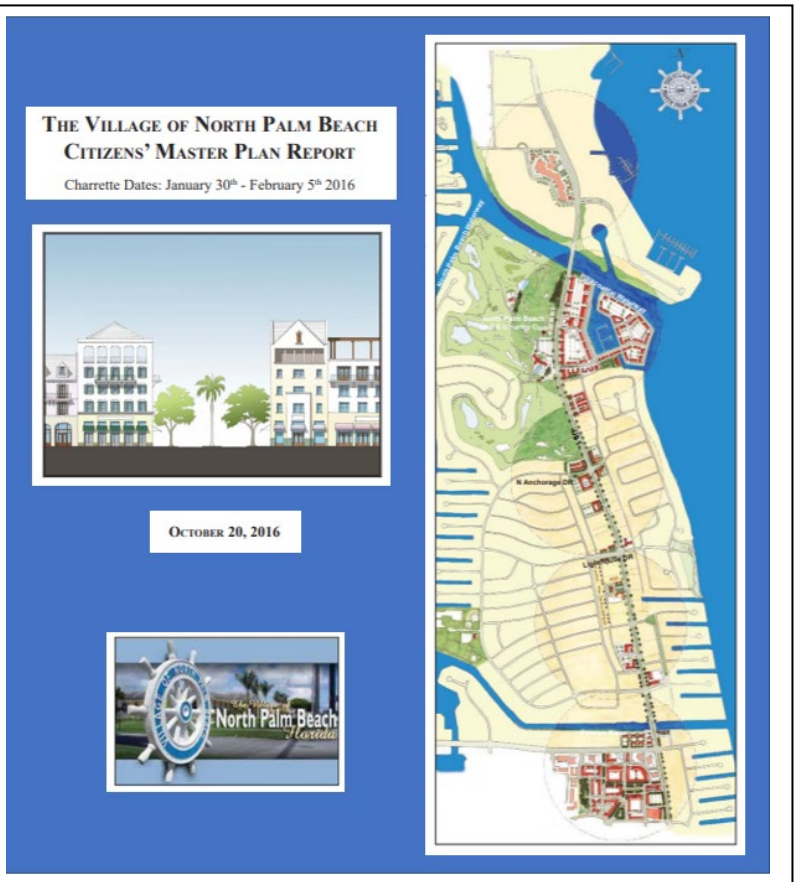


Figure 15 - The North Palm Beach Citizen's Master Plan, adopted in October 2016, focuses on the US-1 corridor for a potential lane repurposing.

US-1 serves as the Village's "main street," connecting the eastern and western neighborhoods. The Village's parallel roadway network is walk and bike friendly, with a series of mostly two-lane roads that function as sharrows with posted speeds of less than 25 MPH. US-1 in its current condition is a barrier, with minimal 5' sidewalks, 3' shoulders in place of proper bike facilities, and an oversized roadway for the corresponding traffic volume.

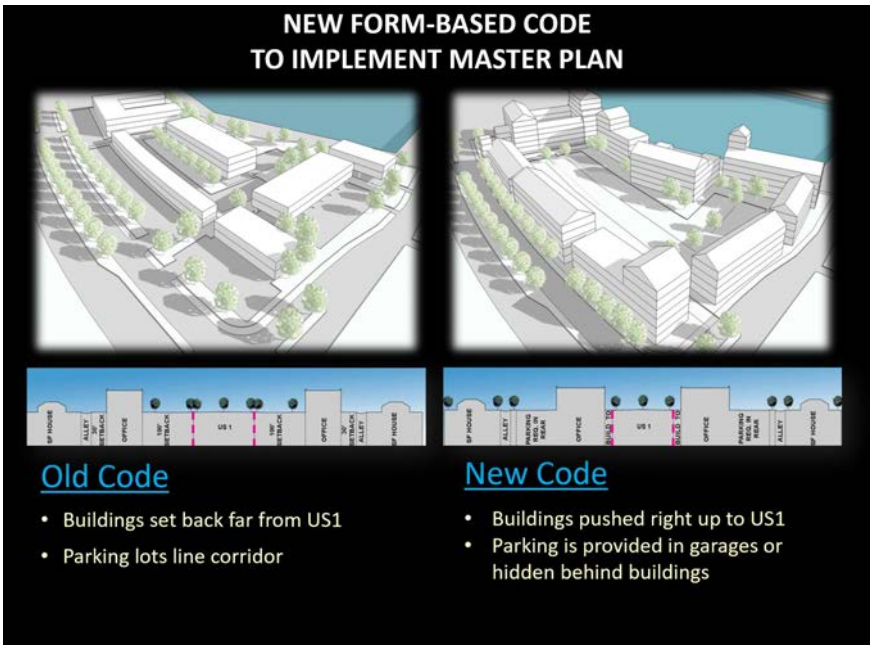


Figure 16 – Updated Code, Reference to Building Form

By repurposing the extra lanes, the Core Segment of the roadway can be properly designed with complete streets features including wide 12' shared-use paths and 5' bike lanes to accommodate the range of bicyclists on the roadway network (both the "confident and fearless" comfortable in on-road facilities as well as the "interested and cautious" who will only utilize grade-separated facilities. Additionally, the Northern Segment can be improved with 10'5" sidewalks and 4' bike lanes on the east side and 12' shared-use paths and 5' bike lanes on the west side. Complementing the improved bicycle/pedestrian facilities will be a 7.5-foot planting strip that can accommodate shade trees, wayfinding, and improved streetlights to illuminate the corridor for vehicular and non-vehicular traffic. The lane repurposing will also allow for narrowed crosswalks, improving safety, and shortening crossing distance for pedestrians.

The Village implemented the Master Plan recommendations in its Comprehensive Plan and Land Development Regulations, which include a newly adopted form-based code. This code promotes a land development pattern that will complement the reconfigured US-1 with on-street dining and outdoor seating fronting buildings set at a 7' "build-to" line. Rather than separating building frontages from the edge of US-1 by vast parking lots, the new code will bring new buildings close to the street, shifting parking to side and rear

property lines. New driveways will be shifted to side and rear access, with driveway consolidation for driveways interconnecting with US-1. This will improve the functionality and safety of the proposed shared-use path and the pedestrian itinerary.

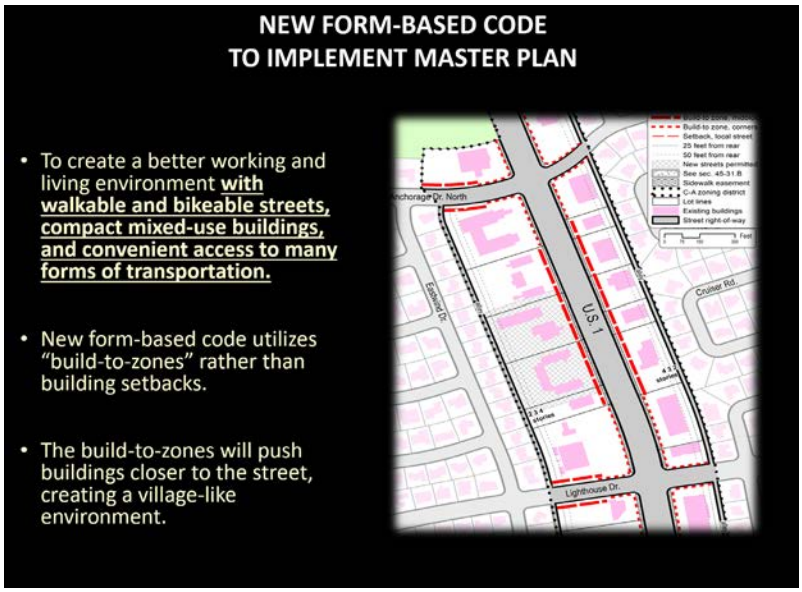


Figure 17 – Updated Code, Reference to Multimodal Transportation

Figure 18 – Updated Code, Reference to Parking Circulation and Interconnectivity

It should be noted the Village's new form-based code requires a 7' furnishing zone be provided at the street-facing property line for new development, which will provide the location for seating, bike racks, water fountains, landscaping, and decorative elements – adjacent to the 12' shared-use path and outside the FDOT right-of-way.

An additional feature that should be noted is the Village bicycle network, which extends throughout the community but for US-1 in its current condition. As illustrated previously in the bike network map, the improved facilities proposed for US-1, including the shared-use paths and bike lanes, are the lynchpin for completing the network.

To inform the traffic study, the Village has analyzed the proposed code changes and supplied development projections (see **Attachment 1, Appendix G**).

G. Public Engagement

The Village has provided substantial public engagement opportunities to receive public comment and ideas regarding the US-1 corridor, including the 2016 Citizen's Master Plan process, which included more than 40 stakeholder interviews and public workshops attracting nearly 200 participants. Subsequently, for the development of its form-based code, which implements the Master Plan and further advances the concept of the lane repurposing, the Village hosted nearly a dozen public workshops and hearings. Concurrently, the Village established a US-1 Repurposing Stakeholder Committee, comprised of residents, business and property owners, and Village staff, which met three

Figure 19 – Public Engagement, Representative Images. As noted in the images in this section, the Village has undertaken continued extensive and successful public engagement to solicit public input and inform the community about the project.

times in 2019 and 2020 to review the US-1 corridor concepts and recommendations. In mid-2020, the Village hosted two public open houses, with nearly 150 participants at both events, to engage the public, detail the various options for US-1, and receive public input. In late 2020, the Village Council hosted two public workshops and two public hearings regarding the proposed lane repurposing, which culminated in the adoption of Resolution 2020-77, authorizing the Village staff to submit the lane repurposing application for FDOT review. Following the address of FDOT and other agency comments, the Village Council adopted Resolution 2022-54, supporting the revised lane repurposing configuration, requesting FDOT District and Central Office review and approval, and directing staff to seek funding through the TPA and other agencies as appropriate. **Attachments 6, 7, 17, 18, and 19** provide the Village Council resolutions and Village correspondence referencing prior and continued public engagement as needed through the course of the project. Correspondence evidencing coordination with the adjacent municipalities ~ Town of Lake Park and City of Palm Beach Gardens ~ as well as Palm Beach County have been included as **Attachments 9 and 10**.

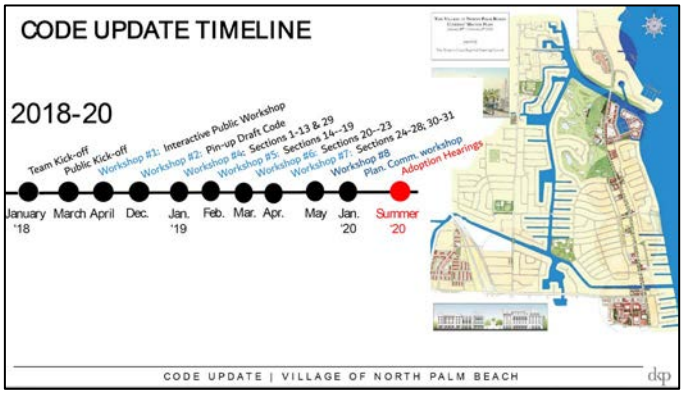


Figure 20 – Code Update Timeline

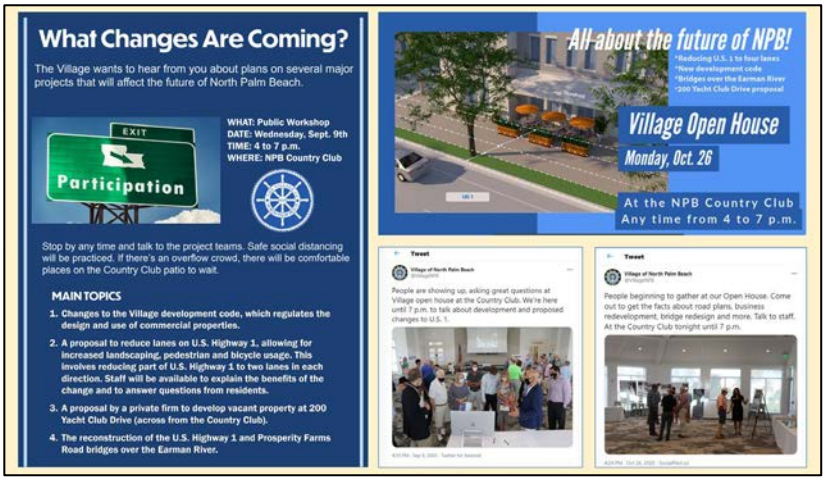


Figure 21 – Public Engagement Documentation

H. Funding Sources

The project will be funded from a variety of sources, which will be finalized as the project is further developed. Sources are anticipated to include funding appropriated by the Palm Beach TPA through direct priority project funding, Local Initiatives, or Transportation Alternatives Program funding and the Village of North Palm Beach. Additionally, the anticipated stormwater enhancement components of the project are anticipated to be funded through the Village of North Palm Beach, the Village's stormwater utility, and grant sources that may include the South Florida Water Management District, Florida Department of Environmental Protection, or legislative appropriation through the Lake Worth Lagoon Initiative. A generalized cost estimate for the project, which separates roadway costs from stormwater costs, is included as **Attachment 5**, and **Attachments 7** and 17 includes a funding commitment and additional detail from the Village.

I. Design Variations and Exceptions (If Applicable)

The proposed design includes: (1) a 12' shared-use path and 5' bike lane in the Core Segment to replace an existing condition of a 3' paved shoulder and 5' sidewalk, and (2) a 10'6" sidewalk and a 4' bike lane (without relocating the existing curb) on the east side and a 12' shared-use path and a 5' bike lane on the west side in the Northern Segment. Discussions with FDOT District IV staff have indicated design variances will likely be needed, which will be submitted as part of project design.

III. TRAFFIC ANALYSIS

A. Traffic Forecasting Methodology

As detailed in **Attachment 1**, the project's traffic forecasting approach utilizes commonly accepted traffic engineering practices, including the Southeast Regional Planning Model (SERPM Version 7), Level of Service analysis utilizing Synchro 10 software, and the methodology as recommended in the Highway Capacity Manual, 6th Edition. The Design Year 2040 was used to provide future traffic forecasts for the study corridor, and historical traffic trends analysis utilized traffic data from the Palm Beach County 2017 Historic Traffic Growth Table. Population estimates were utilized from The Bureau of Economic and Business Research (BEBR), Florida Population Studies, Bulletin 183.

The SERPM7 is the appropriate travel-forecasting tool for generating a single 24-hour daily demand volume set that reflects future travel demand during a typical weekday in the predefined project subarea based on FSUTMS-Cube Framework Phase II – Model Calibration Standards. The model output files for the years 2010 and 2040 were used in this study with a 1% rate of growth.

Population Projections

Historical population data from the BEBR was examined to gain a better understanding of the traffic growth that the area has experienced during the past few years. Population projections were also used to estimate the anticipated traffic growth in the area. As seen in **Table 6**, the population projections indicate the area is expected to experience an annual growth rate of 0.3 percent, 1.0 percent, and 1.8 percent for low, medium, and high population estimates, respectively.

Table 6: BEBR Growth Rates

Palm Beach County	Population Analysis		Growth Rate (2018-2045)
	2018	2045	
Low Population Estimate	1,433,417	1,518,000	0.2%
Medium Population Estimate	1,433,417	1,811,000	1.0%
High Population Estimate	1,433,417	2,119,700	1.8%

Source: Bureau of Economic and Business Research

The growth rates obtained from the trends analysis, the travel demand models, and the population estimates were compared to determine an appropriate growth rate for future traffic forecasts. After performing a comparison of the growth rates obtained from each methodology, it was concluded the annual growth rate obtained from the travel demand model is generally appropriate for estimating future traffic forecasts; however, since it does not reflect updates made to the Comprehensive Plan, minor adjustments to this annual growth rate are needed. Therefore, to provide for a conservative estimate of future traffic, an annual growth rate of 1.25 percent is recommended. This annual growth rate is based on the average of the annual growth rates obtained from the travel demand model and BEBR population projections (low, medium, and high). In addition, this additional 0.25 percent offsets the potential trips to be generated/attracted by travel demand SE data shortage in households and employment resulting from the Comprehensive Plan update. Additional detail is contained in **Attachment 1**.

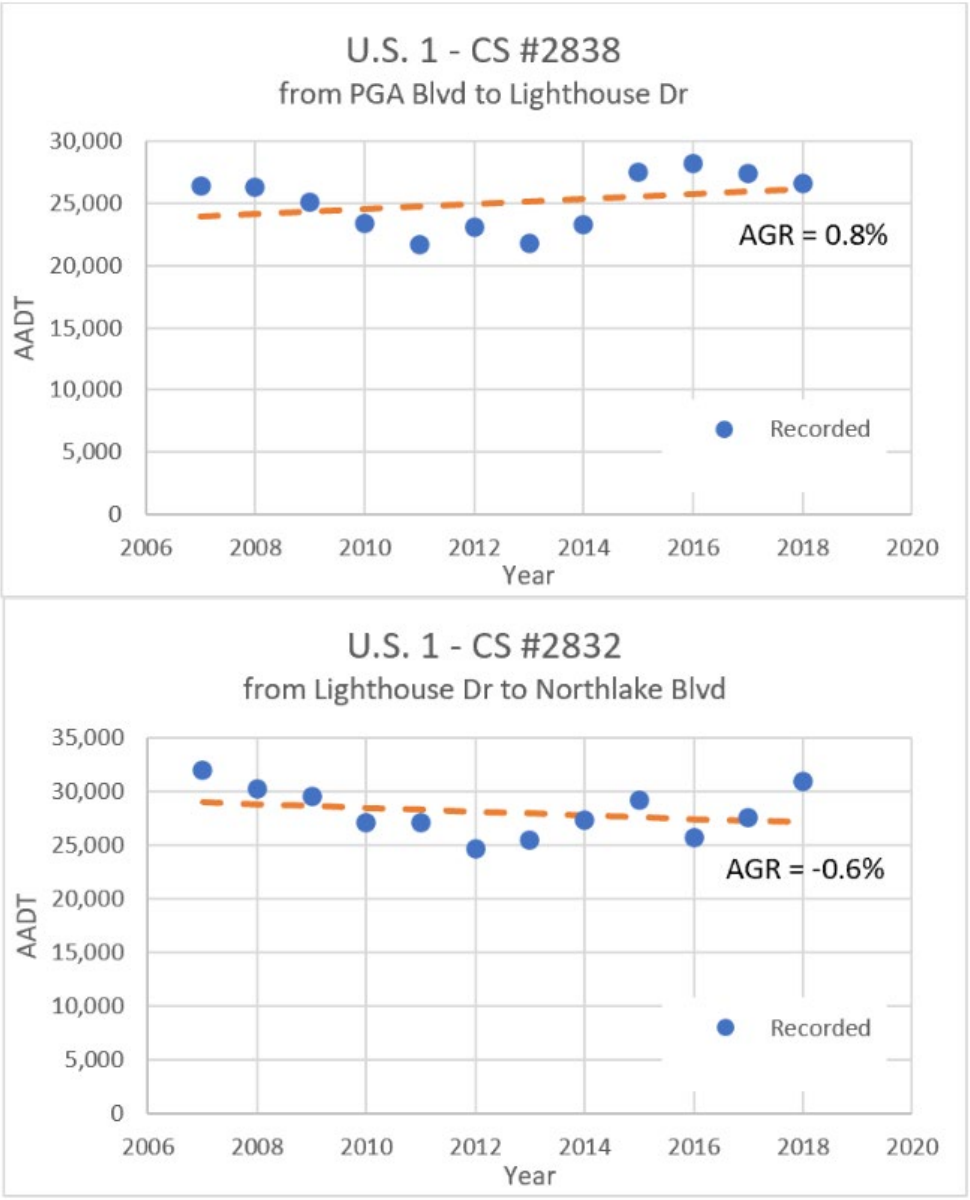
Table 7 provides the Design Year 2040 AADT volumes calculated from the recommended growth rate, and **Figure 22** provides the Palm Beach County Historical Traffic Trends.

Table 7: Year 2040 Annual Average Daily Traffic

Roadway / Segment		Count Year	Existing AADT	Growth Rate	Year 2040 AADT
U.S. 1	Park Avenue to Northlake Boulevard	2019	24,000	1.25%	30,500
U.S. 1	Northlake Boulevard to Lighthouse Drive	2020	27,500	1.25%	34,500
U.S. 1	Lighthouse Drive to PGA Boulevard	2020	23,000	1.25%	29,000

The year 2040 intersection turning movement volumes are shown in **Figure 23**. Detailed traffic volume development spreadsheets for the study area intersections can be found in **Attachment 1 (Appendix I)**.

Figure 22: Palm Beach County Historical Traffic Trends



Source: Palm Beach County Traffic Counts

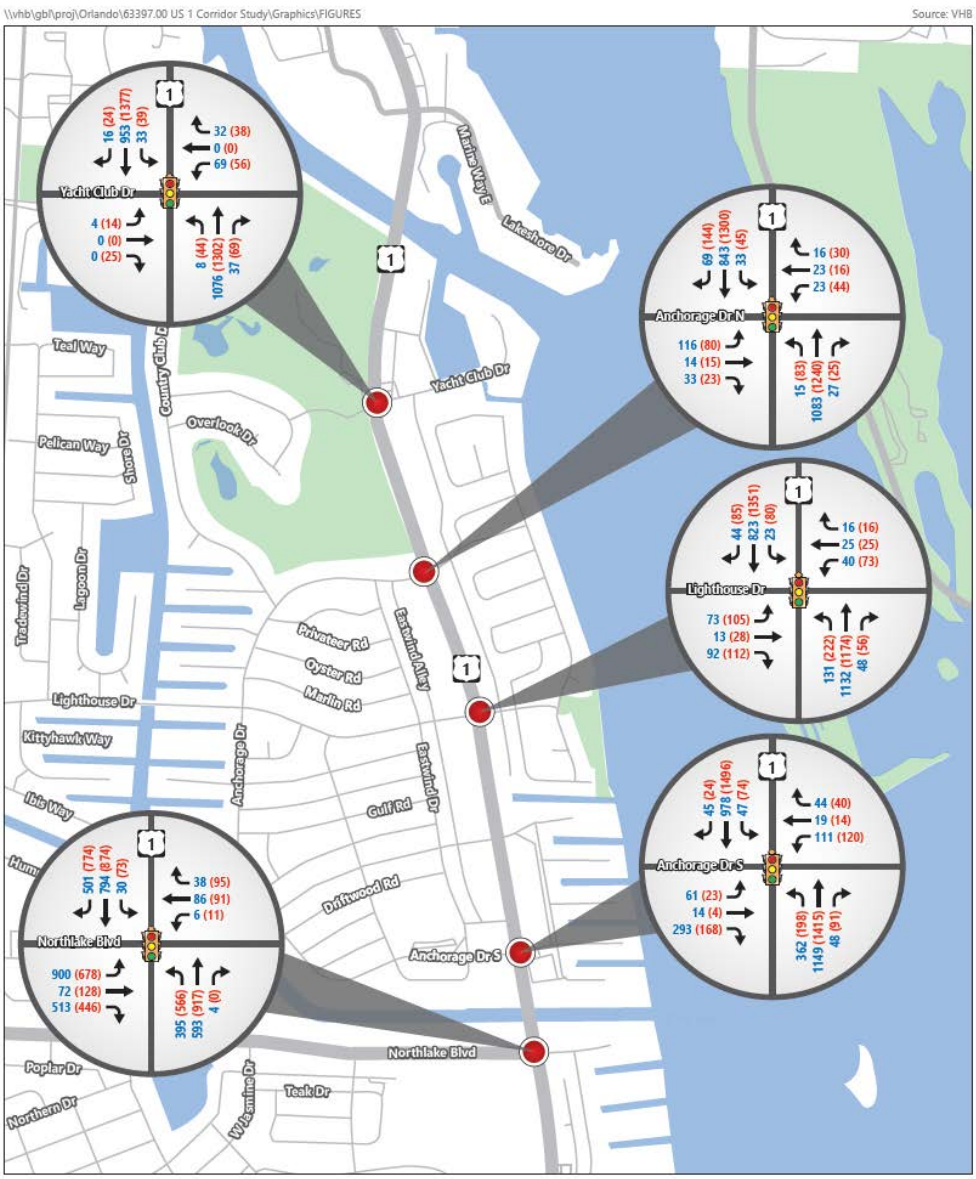


Figure 23

2040 Future Turning Movement Volumes Map

U.S. 1 Corridor Study Analysis Technical Memorandum

B. Level of Service Analysis of Build Alternative vs. No-Build Alternative

For the traffic analysis, both a No-Build Alternative and a Build Alternative were evaluated for the study corridor. The evaluated alternatives are summarized as follows:

- **No-Build Alternative:** This alternative assumes no changes to the existing six-lane roadway section of US-1 within the study area, with exception of the segment between Anchorage Drive South and Northlake Boulevard which will be improved as part of FDOT's bridge reconstruction project over Earman River. The bridge project is planned to reopen the outermost lanes of US-1, and as such, the bridge cross section

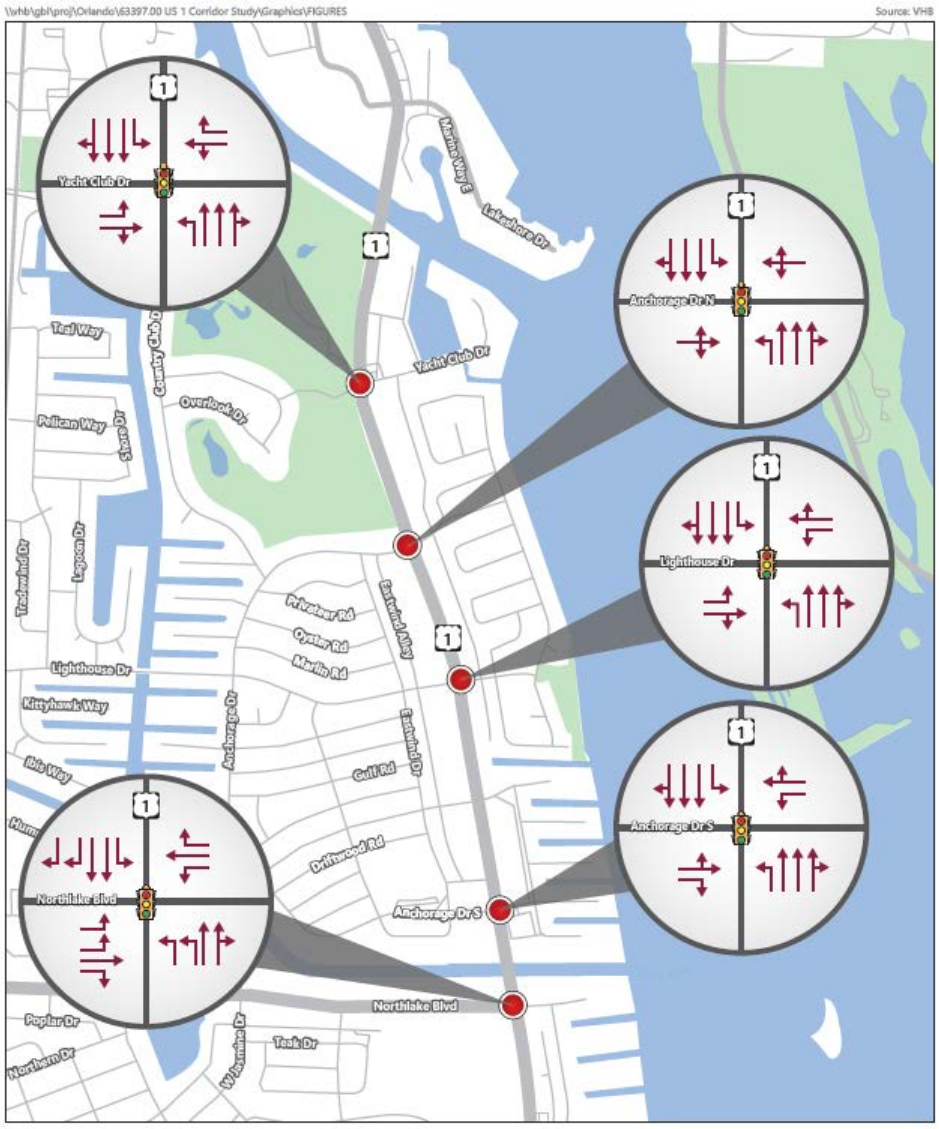


Figure 24
No Build Intersection Geometry Map
U.S. 1 Corridor Study Analysis
Technical Memorandum

will be considered 6 lanes in the no-build alternative. **Figure 24** shows the geometry of the No-Build Alternative. The conceptual plans of the improvement are included in **Attachment 1**.

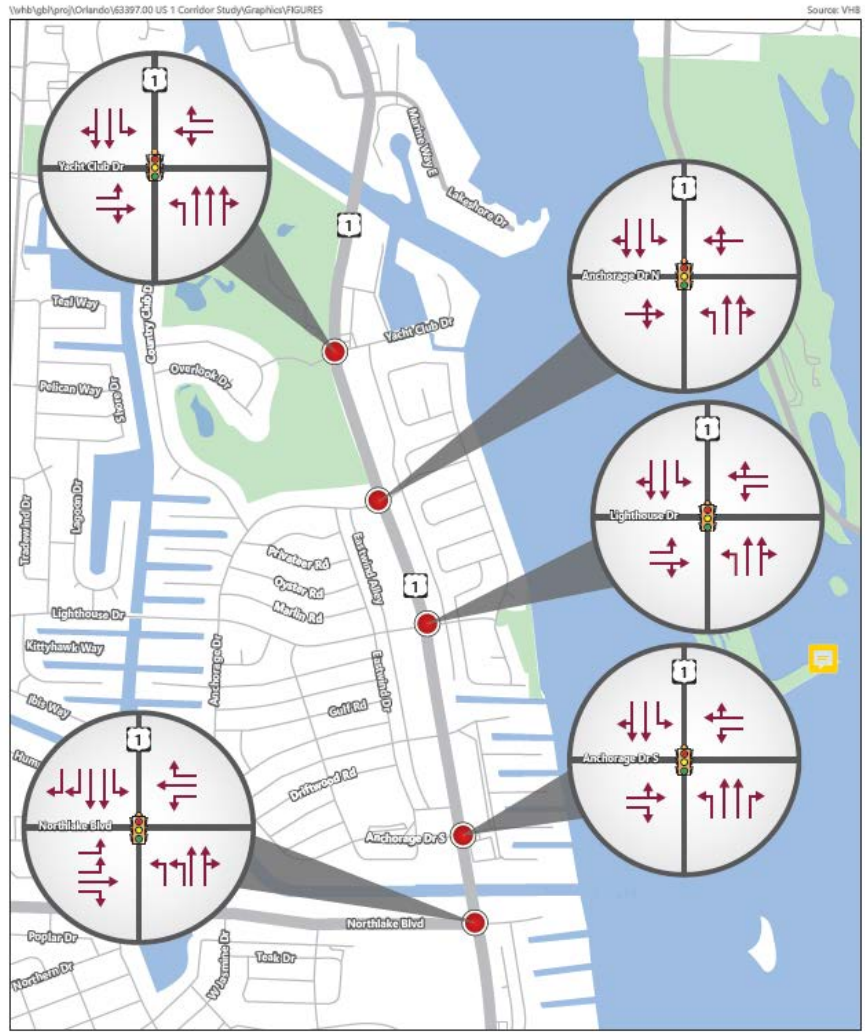


Figure 25
Build Intersection Geometry Map
U.S. 1 Corridor Study Analysis
Technical Memorandum

- **Build Alternative:** This alternative considers the feasibility of a lane repurposing converting the existing six-lane cross section along US-1 into a four-lane cross-section from Anchorage Drive South to Anchorage Drive North and a five-lane cross-section from Anchorage Drive North to Parker Bridge. **Figure 25** shows the geometry of the Build Alternative.

It should be noted that no diversion of traffic was assumed to occur in the event the lane repurposing project is implemented. Therefore, only one set of future volumes was developed resulting in both alternatives being evaluated using the same future volumes.

No-Build Alternative Operational Analysis

No-Build Geometry

The No-Build Alternative assumes no changes along U.S. 1 except for the improvements associated with the U.S. 1 bridge over the Earman River project and the optimization of signal timings along the existing six-lane roadway section of U.S. 1. Cycle lengths at the demand-responsive traffic signal at Northlake Boulevard intersection were assumed to match the adjacent coordinated intersections for the future conditions and optimized to account for the intersection improvement project. Error! Reference source not found.**26** illustrates the existing lane configurations for the study intersections which form the basis for the No-Build Alternative analysis.

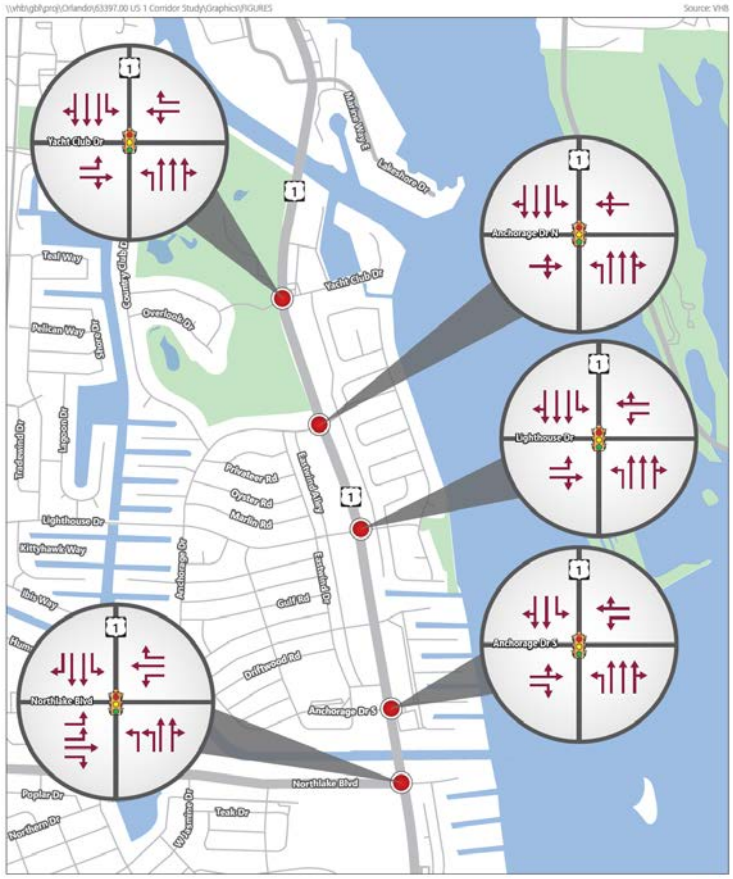


Figure 26
Existing Intersection Geometry Map
U.S. 1 Corridor Study Analysis
Technical Memorandum

Intersection Operational Analysis

For the 2040 no-build conditions, the LOS for all the subject intersections was determined using HCM 6th Edition methodology. A summary of the LOS analysis for the study intersections is included in **Table 8**. The Synchro outputs are included in **Attachment 1, Appendix K**. As can be observed in **Table 8**, all the subject intersections operate overall at LOS D or better for the No-Build Alternative future conditions. Except for the northbound left turn movement at the Northlake Boulevard intersection (AM and PM peak hours) that is anticipated to operate at LOS E, all movements along U.S. 1 are anticipated to operate at LOS D or better. In addition, all the movements are anticipated to operate at volume-to-capacity ratios lower than 1.0.

Table 8: 2040 No Build Alternative Intersection Level of Service

Intersection @ U.S. 1	Control Type	Movement	Village Adopted LOS Standard	2040 AM Peak Hour			2040 PM Peak Hour		
				V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
U.S. 1 @ Northlake Blvd	Signalized	EBL	D	0.95	52.2	D	0.94	67.3	E
		EBT	D	0.12	23.7	C	0.27	38.8	D
		EBR	D	0.71	23.8	C	0.63	28.1	C
		WBL	D	0.22	52.6	D	0.25	64.8	E
		WBT	D	0.71	50.7	D	0.69	71.6	E
		WBR	D	0.37	47.6	D	0.85	101.3	F
		NBL	D	0.87	55.8	E	0.93	68.8	E
		NBT	D	0.47	28.0	C	0.59	28.1	C
		NBR	D	0.47	27.9	C	0.00	0.0	A
		SBL	D	0.31	48.2	D	0.61	62.3	E
		SBT	D	0.82	42.7	D	0.78	45.4	D
		SBR	D	0.33	12.3	B	0.53	20.4	C
		Overall	**D**		**37.6**	**D**		**44.3**	**D**
U.S. 1 @ Anchorage Dr South	Signalized	EBLT	D	0.26	45.9	D	0.12	52.7	D
		EBR	D	0.92	71.6	E	0.68	56.3	E
		WBL	D	0.60	56.0	E	0.64	61.9	E
		WBTR	D	0.19	42.3	D	0.21	50.8	D
		NBL	D	0.79	16.7	B	0.73	21.3	C
		NBT	D	0.39	12.8	B	0.45	11.2	B
		NBR	D	0.39	13.1	B	0.45	11.6	B
		SBL	D	0.15	10.9	B	0.29	9.3	A
		SBT	D	0.36	0.5	A	0.47	23.3	C
		SBR	D	0.36	0.9	A	0.47	23.8	C
		Overall	**D**		**17.7**	**B**		**21.5**	**C**
U.S. 1 @ Lighthouse Dr	Signalized	EBL	D	0.43	57.4	E	0.46	57.0	E
		EBTR	D	0.60	55.9	E	0.56	55.0	E
		WBL	D	0.36	61.4	E	0.52	64.7	E
		WBTR	D	0.22	52.5	D	0.15	50.7	D
		NBL	D	0.25	4.9	A	0.61	7.5	A
		NBT	D	0.33	6.9	A	0.37	10.3	B
		NBR	D	0.33	7.2	A	0.37	10.6	B
		SBL	D	0.06	5.4	A	0.24	8.2	A
		SBT	D	0.25	0.2	A	0.45	0.6	A
		SBR	D	0.25	0.5	A	0.45	1.1	A
		Overall	**D**		**9.8**	**A**		**11.0**	**B**
U.S. 1 @ Anchorage Dr North	Signalized	EBLTR	D	0.70	58.4	E	0.65	65.2	E
		WBLTR	D	0.25	51.2	D	0.47	61.2	E
		NBL	D	0.03	5.3	A	0.32	10.0	B
		NBT	D	0.32	7.7	A	0.34	6.7	A
		NBR	D	0.32	8.0	A	0.34	7.0	A
		SBL	D	0.09	5.4	A	0.13	4.9	A
		SBT	D	0.26	0.3	A	0.40	27.5	C
		SBR	D	0.26	0.5	A	0.40	27.9	C
		Overall	**D**		**9.6**	**A**		**20.6**	**C**
U.S. 1 @ Yacht Club Dr	Signalized	EBL	D	0.05	63.1	E	0.18	67.5	E
		EBTR	D	0.00	0.0	A	0.20	60.1	E
		WBLT	D	0.48	60.4	E	0.41	64.2	E
		WBR	D	0.32	58.3	E	0.30	60.9	E
		NBL	D	0.02	2.8	A	0.14	3.5	A
		NBT	D	0.28	4.1	A	0.35	5.0	A
		NBR	D	0.28	4.3	A	0.35	5.3	A
		SBL	D	0.08	2.7	A	0.12	3.4	A
		SBT	D	0.24	3.4	A	0.36	5.1	A
		SBR	D	0.24	3.6	A	0.36	5.5	A
		Overall	**D**		**6.4**	**A**		**7.7**	**A**

Error! Reference source not found. provides a comparison of the study intersection storage lengths against the 95th percentile queues estimated using the HCM 6th methodology in Synchro 10. The comparison revealed that most of the estimated 95th percentile queues at the study intersections can be accommodated within the available storage lengths. Those that cannot be accommodated are the 95th percentile queues corresponding to the northbound left turn movement at the Northlake Boulevard intersection, and the westbound left turn and eastbound right turn movements at the Anchorage Drive intersection. This table also includes 95th percentile queues for through movements along the U.S. 1 mainline. The highest through movement queue observed in the no-build conditions is 555 feet on the southbound approach of Anchorage Drive North during the PM peak hour.

Table 9: 2040 No-Build Intersection Queue Length

Intersection	Movement	Available Storage (ft)	95th Percentile Queue (ft)-HCM 6th	
			2040 AM Peak Hour	2040 PM Peak Hour
U.S. 1 at Northlake Blvd	EBL	-	490	418
	EBR	-	398	370
	WBL	125	8	15
	WBR	170	45	133
	NBL	225	250	355
	NBT	-	255	403
	SBL	200	38	98
	SBT	-	405	473
	SBR	-	145	295
U.S. 1 at Anchorage Dr South	EBTL	-	103	40
	EBR	250	438	253
	WBL	120	173	200
	NBL	290	68	150
	NBT	-	223	270
	SBL	150	25	35
	SBT	-	5	468
U.S. 1 at Lighthouse Dr	EBL	135	113	170
	WBL	150	63	125
	NBL	290	43	103
	NBT	-	170	228
	SBL	250	8	38
	SBT	-	3	8
U.S. 1 at Anchorage Dr North	EBLTR	-	243	203
	WBLTR	-	88	150
	NBL	200	5	35
	NBT	-	173	185
	SBL	200	10	15
	SBT	-	5	555
U.S. 1 at Yacht Club Dr	EBL	50	5	25
	WBR	200	50	63
	NBL	160	3	10
	NBT	-	105	165
	SBL	170	5	10
	SBT	-	78	170

The 95th percentile queues were estimated using the HCM 6th methodology in Synchro 10

As reflected in **Table 9**, except for the northbound left turn movement at the Northlake Boulevard intersection (AM and PM peak hours), no turn movement queue along U.S. 1 is anticipated to exceed the available storage.

Error! Reference source not found.**0** shows the queue lengths on northbound U.S. 1 produced by the opening of the drawbridge on the Parker Bridge. The drawbridge is opened approximately twice an hour for approximately seven minutes each time. The distance between the Parker Bridge drawbridge and the U.S. 1 intersection with Yacht Club Drive (which is the adjacent upstream intersection on northbound U.S. 1) is approximately 1,650 ft. As such, the queue caused by the drawbridge opening is projected to extend through the intersection with Yacht Club Drive both in the AM and PM peak hours. As can be seen in the table below, the queue length would not reach the Anchorage Drive South intersection; therefore, not impacting the portion of the corridor where the lane repurposing is proposed for the northbound direction. The queue analysis is included in **Attachment 1 (Appendix K).**

Table 10: 2040 Drawbridge Queue Length

Roadway Segment	Time Period	95th Percentile Queue (ft) – Synchro	Intersection through which queue extends
Northbound U.S. 1 south of Parker Bridge	2040 AM Peak Hour	1,827	Yacht Club Drive
	2040 PM Peak Hour	2,399	Yacht Club Drive

Arterial LOS Analysis

The arterial LOS was estimated by comparing the arterial average speed from the Arterial Level of Service Module in Synchro 10 software to the arterial average speed level of service thresholds contained in HCM 6th Manual Exhibit 16-3. The arterial LOS results are shown in **Table 11**. The No Build arterial analysis reveals that US-1 is anticipated to operate at LOS C during the year 2040 conditions. No build future years AM and PM peak hour Synchro arterial analysis outputs and LOS thresholds from HCM 6th Manual are included in **Attachment 1 (Appendix L)**.

Table 11: No Build Arterial Segment Level of Service

Roadway Segment – U.S. 1	2040 AM Peak Hour		2040 PM Peak Hour	
	NB	SB	NB	SB
Travel Time (Sec)	189.8	237.2	182.9	265.8
Average Speed (MPH)	25.4	20.4	26.4	18.2
LOS	B	C	B	C

Build Alternative Operational Analysis

This alternative considers the feasibility of a lane repurposing converting the existing six-lane cross section along US-1 north of Anchorage Drive South into a four-lane cross-section to Anchorage Drive North and a five-lane cross-section to the Parker Bridge.

Intersection Operational Analysis

For the 2040 Build Alternative conditions the LOS for all the subject intersections was determined using HCM 6th Edition methodology in Synchro 10. A summary of the LOS analysis for the study intersections is included in **Table 12**. The Synchro outputs are included in **Attachment 1 (Appendix M)**. As can be observed in **Table 12**, all the intersections operate overall at LOS D or better for the Build Alternative future conditions. It should be noted that no geometric changes are proposed at the Northlake Boulevard Intersection, and the signal timings at the intersection were matched with the optimized no-build conditions. Similar to the No Build condition, with the exception of the northbound and southbound left turn movements at the Northlake Boulevard intersection (AM and PM peak hours) that are anticipated to operate at LOS E, all movements along U.S. 1 are anticipated to operate at LOD D or better and operate at volume-to-capacity ratios lower than 1.0.

Table 12: 2040 Build Alternative Intersection Level of Service

Intersection @ U.S. 1	Control Type	Movement	Village Adopted LOS Standard	2040 AM Peak Hour			2040 PM Peak Hour		
				V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
U.S. 1 @ Northlake Blvd	Signalized	EBL	D	0.95	53.0	D	0.94	67.1	E
		EBT	D	0.12	23.7	C	0.27	38.8	D
		EBR	D	0.71	24.0	C	0.63	28.2	C
		WBL	D	0.22	53.0	D	0.25	64.7	E
		WBT	D	0.71	51.1	D	0.70	72.5	E
		WBR	D	0.37	48.0	D	0.44	52.8	D
		NBL	D	0.87	56.5	E	0.93	68.6	E
		NBT	D	0.48	28.4	C	0.59	27.9	C
		NBR	D	0.48	28.2	C	0.00	0.0	A
		SBL	D	0.31	48.5	D	0.61	62.1	E
		SBT	D	0.84	44.0	D	0.78	45.1	D
		SBR	D	0.33	12.4	B	0.53	20.2	C
		Overall	**D**		**38.1**	**D**		**43.1**	**D**
U.S. 1 @ Anchorage Dr South	Signalized	EBLT	D	0.26	44.3	D	0.12	52.7	D
		EBR	D	0.93	74.6	E	0.68	56.3	E
		WBL	D	0.63	56.7	E	0.64	61.9	E
		WBTR	D	0.19	40.4	D	0.21	50.8	D
		NBL	D	0.82	13.1	B	0.78	23.5	C
		NBT	D	0.63	17.7	B	0.62	13.7	B
		NBR	D	0.06	11.0	B	0.09	8.1	A
		SBL	D	0.23	16.7	B	0.32	12.1	B
		SBT	D	0.65	2.3	A	0.69	17.1	B
		SBR	D	0.07	0.7	A	0.02	9.0	A
		Overall	**D**		**19.8**	**B**		**19.8**	**B**
U.S. 1 @ Lighthouse Dr	Signalized	EBL	D	0.43	57.4	E	0.46	57.0	E
		EBTR	D	0.60	55.9	E	0.56	55.0	E
		WBL	D	0.36	61.4	E	0.52	64.7	E
		WBTR	D	0.22	52.5	D	0.15	50.7	D
		NBL	D	0.25	4.9	A	0.61	7.4	A
		NBT	D	0.46	8.1	A	0.52	12.0	B
		NBR	D	0.04	5.3	A	0.06	7.8	A
		SBL	D	0.07	6.1	A	0.26	9.4	A
		SBT	D	0.35	0.4	A	0.62	1.0	A
		SBR	D	0.04	0.1	A	0.09	0.1	A
		Overall	**D**		**10.2**	**B**		**11.7**	**B**
U.S. 1 @ Anchorage Dr North	Signalized	EBLTR	D	0.70	58.1	E	0.66	64.9	E
		WBLTR	D	0.25	50.7	D	0.47	60.7	E
		NBL	D	0.03	5.5	A	0.37	12.3	B
		NBT	D	0.48	9.6	A	0.52	8.7	A
		NBR	D	0.03	6.1	A	0.02	5.1	A
		SBL	D	0.10	6.8	A	0.16	6.6	A
		SBT	D	0.37	0.4	A	0.55	20.4	C
		SBR	D	0.07	0.1	A	0.14	11.8	B
		Overall	**D**		**10.3**	**B**		**17.6**	**B**
U.S. 1 @ Yacht Club Dr	Signalized	EBL	D	0.05	63.1	E	0.18	67.5	E
		EBTR	D	0.00	0.0	A	0.20	59.9	E
		WBLT	D	0.48	60.4	E	0.41	64.1	E
		WBR	D	0.32	58.3	E	0.30	60.6	E
		NBL	D	0.02	3.0	A	0.16	5.1	A
		NBT	D	0.28	4.0	A	0.37	5.2	A
		NBR	D	0.28	4.2	A	0.37	5.4	A
		SBL	D	0.08	2.7	A	0.13	3.6	A
		SBT	D	0.35	3.9	A	0.54	6.8	A
		SBR	D	0.01	2.6	A	0.02	3.6	A
		Overall	**D**		**6.6**	**A**		**8.5**	**A**

C. Include Delays, Volumes, Queues Analysis

Table 13 provides a comparison of the study intersection storage lengths against the 95th percentile queues estimated using the Synchro methodology in Synchro 10. As can be seen in this comparison, the queues in the northbound left movement of US-1 and Northlake Boulevard intersection and the westbound left and eastbound right movements of the Anchorage Drive South intersection are anticipated to extend past the available storage length but are not expected to reach the upstream intersections.

Table 13: 2040 Build Alternative Intersection Queue Length

Intersection	Movement	Available Storage (ft)	95th Percentile Queue (ft)-HCM 6th	
			2040 AM Peak Hour	2040 PM Peak Hour
U.S. 1 at Northlake Blvd	EBL	-	498	480
	EBR	-	403	428
	WBL	125	8	18
	WBR	170	48	140
	NBL	225	255	448
	NBT	-	260	425
	SBL	190	38	118
	SBT	-	415	513
	SBR	-	148	323
U.S. 1 at Anchorage Dr South	EBTL	-	110	40
	EBR	150	488	253
	WBL	125	193	200
	NBL	330	215	188
	NBT	-	423	433
	SBL	-	35	35
	SBT	-	33	525
	SBR	120	3	13
U.S. 1 at Lighthouse Dr	EBL	125	113	170
	WBL	150	63	125
	NBL	285	43	103
	NBT	-	255	340
	NBR	180	18	28
	SBL	250	8	38
	SBT	-	5	15
	SBR	150	43	103
U.S. 1 at Anchorage Dr North	EBLTR	-	250	208
	WBLTR	-	93	155
	NBL	200	5	45
	NBT	-	283	315
	NBR	75	13	10
	SBL	200	13	15
	SBT	-	5	600
	SBR	75	3	125
U.S. 1 at Yacht Club Dr	EBL	50	5	25
	WBR	100	50	63
	NBL	180	3	10
	NBT	-	105	170
	SBL	160	5	10
	SBT	-	135	300
	SBR	65	3	8

The 95th percentile queues were estimated using the HCM 6th methodology in Synchro 10

Based on the queue analysis performed at the Northlake Boulevard intersection, it is recommended that the southbound right turn lane extends to the Anchorage Drive South intersection. The FDOT design for this section will provide two southbound right turn lanes, including the conversion of an existing outside through lane to a right turn lane. It is noted there is no lane repurposing activity proposed south of Anchorage Drive South.

Table 14 shows the through movement queue length comparisons on northbound US-1 produced by the opening of the drawbridge on Parker Bridge. The drawbridge is opened

approximately twice an hour for approximately seven minutes each time. The distance between the Parker Bridge drawbridge and the US-1 intersection with Yacht Club Drive (which is the adjacent upstream intersection on northbound US-1) is approximately 1,650 ft, the distance between Yacht Club Drive and Anchorage Drive North is approximately 1,850 feet (Anchorage Drive North is approximately 3,500 feet south of Parker Bridge). The queue analysis for the No-Build alternative is included in **Attachment 1 (Appendix K)**.

Table 14: 2040 U.S. 1 Through Movements Queue Length Comparison

Intersection	Movement	95th Percentile Queue (ft) – Synchro					
		AM Peak Hour			PM Peak Hour		
		No Build	Build	Intersection/ Median Opening Blockage	No Build	Build	Intersection/ Median Opening Blockage
U.S. 1 at Northlake Blvd	NBT	255	260	--	403	398	--
	SBT	405	415	--	473	468	--
U.S. 1 at Anchorage Dr South	NBT	233	423	--	270	428	Build: queue extends to near median opening to access Frigate's Waterfront Bar & Grill.
	SBT	5	55	--	468	523	Build: queue extends to near Fire Station median opening.
U.S. 1 at Lighthouse Dr	NBT	170	268	--	228	360	--
	SBT	3	13	--	8	28	--
U.S. 1 at Anchorage Dr North	NBT	173	290	--	185	318	--
	SBT	5	15	--	555	678	Build: queue extends to near access to median opening to access building at 824 U.S. 1.
U.S. 1 at Yacht Club Dr	NBT	105	105	--	165	170	--
	SBT	78	140	--	170	308	--

As can be seen in **Table 14** above, during the AM or PM peak hours, no median opening or intersection is anticipated to be blocked by the U.S. 1 through movement queues (No Build or Build scenarios). It should be noted that, during the PM peak hour and under the Build scenario, there are a few instances where the ends of the queues are anticipated to extend close to existing median openings:

- Median opening to access Frigate's Waterfront Bar & Grill.
- Fire Station median opening.
- Access to median opening to access building at 824 U.S. 1.

However, it should be noted that the analysis shows that, even though the end of the queues will extend close to these openings, it is not anticipated that they will block them.

Arterial LOS Analysis

The arterial LOS was estimated by comparing the arterial average speed from the Arterial Level of Service Module in Synchro 10 software to the arterial average speed level of service thresholds contained in HCM 6th Manual Exhibit 16-3. The arterial LOS results are shown in **Table 15**. The Build Alternative arterial analysis reveals that the U.S. 1 corridor is anticipated to operate at LOS C in the northbound direction while the southbound direction is anticipated to operate at LOS D during the AM peak hour. During the PM peak hour, the northbound direction is anticipated to work at LOS B and the southbound direction at LOS D.

Build Alternative future years AM and PM peak hour Synchro arterial analysis outputs are included in **Attachment 1 (Appendix N)**.

Table 15: Build Alternative Arterial Segment Level of Service

Roadway Segment – U.S. 1	2040 AM Peak Hour		2040 PM Peak Hour	
	NB	SB	NB	SB
Travel Time (Sec)	202.2	246.0	188.2	291.0
Average Speed (MPH)	23.9	19.6	25.6	16.6
LOS	C	C	B	D

When compared against the No Build Alternative, the proposed lane repurposing project would result in the following reductions in speed and corresponding additional travel times:

- AM peak hour:
  - NB Direction: 1.5 mph 12.4 sec
  - SB Direction: 0.8 mph 8.8 sec
- PM peak hour:
  - NB Direction: 0.8 mph 5.3 sec
  - SB Direction: 2.3 mph 35.8 sec

D. Impacts on the Corridor or Network

1. Environmental

The US-1 lane repurposing as proposed will improve pedestrian and bicycle facilities, encouraging more non-motorized trips. The Village's form-based code promotes a mixed-use, interconnected system of streets and blocks, with building frontages designed to

enhance the pedestrian experience. The code further requires furnishing zones be located at front property lines to augment the nonmotorized experience with seating, fountains, bicycle racks, shade structures, landscaping, and public art. The Village's code also promotes a park-once environment, with the mix of uses arranged around common, shared-use parking areas, which will further reduce vehicular trips. Transit in the improved corridor will have improved walk-access and last-mile connectivity, which will also help mode-shifting from single-occupant vehicle to alternative modes. These factors together will help reduce carbon emissions and fuel demands for transportation in the corridor.

The subject segment of US-1 is designed with stormwater outfalls that drain to the Lake Worth Lagoon. Utilizing as-built drawings provided by FDOT, the conceptual design process has included a review of stormwater outfall locations to identify opportunities to introduce enhanced stormwater infrastructure. The proposed design envisions the inclusion of baffle boxes with bioswales (to be provided by the Village) to improve stormwater treatment and quality to the functionality of the corridor. The Village has developed a stormwater utility to design, fund, and maintain stormwater improvements. In the design process, additional coordination will be undertaken with FDOT, South Florida Water Management District, and the Florida Department of Environmental Protection to further design these stormwater improvements and enhance access to agency grant funding for these purposes.

It should be further noted the Village is a waterfront community, with frontage along the Lake Worth Lagoon and Earman River. Each of these waterbodies is tidal, and updated designs for all infrastructure in the Village, including the subject US-1 corridor, will consider best practices during project design.

2. Pedestrian and Bicyclist Activity

The lane repurposing will improve the safety of pedestrian and bicycling facilities with wider, shared-use paths, on-street bicycle lanes, and shorter crossing distances for crosswalks. Shade trees and pedestrian-scale lighting will further improve safety, convenience, and desirability for nonmotorized users. The US-1 corridor will help complete the Village's internal bicycle network as well as the County's bicycle network, filling in an important gap in Palm Beach County's 45-miles US-1 segment. By creating and separating the different modes of travel in the corridor, safety will be improved for all modes by creating a sense of awareness of where and how people are moving.

3. Transit and Freight Routes

There are two transit routes that operate on the study corridor:

- Route 1, Palm Beach Gardens to Boca Raton

This route provides service along US-1, from Camino Real in Boca Raton to Northlake Boulevard in North Palm Beach. From Northlake Boulevard, the route goes northbound on Prosperity Farms Road to the Gardens Mall in Palm Beach Gardens. Buses run in both directions along US-1. There are multiple bus stops along the east and westbound directions of Northlake Boulevard, west of the US-1 intersection.

Route 1 operates on 20-minute headways from approximately 5:20 AM to 11:00 PM on weekdays, 30-minute headways from 6:15 AM to 10:15 PM on Saturdays, and 30-minute headways on Sundays from 8:15 AM to 7:30 PM.

- Route 21, Gardens Mall to Mangonia Park Tri-Rail via US-1/Barack Obama Highway

This route provides service along US-1/Barack Obama Highway, from 45th Street in Mangonia Park to the Gardens Mall in Palm Beach Gardens. Buses run in both directions along US-1. There are multiple bus stops along the north and southbound directions of US-1 within the study area. Route 21 operates hourly headways on weekdays from approximately 6:10 AM to 8:00 PM, hourly service on Saturdays from 8:10 AM to 6:00 PM, and does not operate on Sundays.

Transit stops are typically marked with signage only, with a few containing benches. Documentation regarding these Palm Tran routes can be found in Appendix A – Existing Conditions Analysis, and coordination with Palm-Tran is noted in **Attachment 13**. No changes are proposed to the transit stop locations or routes on the corridor. During project design, a design evaluation will be conducted with Palm Tran to review existing bus stops for potential changes and improvements to bus stop landing areas and connections from the sidewalk to bus stops. If needed, benches will be reinstalled. With improved multimodal facilities, transit access and first-mile/last-mile mobility will be improved.

Freight routes will not be modified with the project, and no impacts are anticipated. The corridor will maintain two vehicular travel lanes in each direction, and with the implementation of the Village's updated code, deliveries will be encouraged through rear-access points that will further be improved through redevelopment.

IV. SAFETY ANALYSIS

A. Crash Data Analysis

A multi-modal safety analysis was completed for the corridor to determine if the traffic demand combined with geometric conditions pose potential safety concerns. To identify crash patterns along the corridor, crash data were obtained from the Signal Four Analytics S4 database for the previous three (3) years (January 1, 2016 to December 31, 2018), including both the "long-form" and "short-form" crash data.

Total Crashes

Between January 1, 2016 and December 31, 2018, a total of 117 crashes were recorded, which resulted in 46 injuries and 0 fatalities. The crashes reported over the three-year period along U.S. 1 within the study area are summarized in **Table 16** and **Table 17** (and depicted graphically in **Figure 27** and **Figure 28**). The predominant crash types were rear end crashes (37.61%), other crashes (17.95%), and left turn crashes (13.68%).

Tables 16 and 17 provide data regarding crash data by year and harmful event. The crash rate in crashes per million vehicle-miles traveled (MVMT) for the US-1 corridor was calculated as 3.57. The corridor specific crash rate was compared to the statewide, districtwide, and countywide average crash rates for similar facilities for a three-year period. The statewide, districtwide, and countywide average crash rates were extracted from the FDOT Crash Analysis Reporting System (CARS) database. **Tables 18 and 19** provide data summarizing and comparing roadway crash rates. As indicated, US-1 experiences an average crash rate lower than the statewide and districtwide average crash rates but higher than the countywide average crash rate for similar facilities. Detailed crash information can be found in **Attachment 1**.

Table 16: Crash Data Summary by Year

Year	Total Number of Crashes	Number of Injury Crashes	Total Number of Injuries	Number of Fatal Crashes	Total Number of Fatalities	Number of Night Crashes	Number of Wet Weather Crashes
2016	40	9	18	0	0	5	5
2017	34	5	8	0	0	7	1
2018	43	14	20	0	0	6	6
2016-2018	**117**	**28**	**46**	**0**	**0**	**18**	**12**
Average	**39.00**	**9.33**	**15.33**	**0.00**	**0.00**	**6.00**	**4.00**
Percent	-	**23.93%**	-	**0.00%**	-	**15.38%**	**10.26%**

Source: Signal Four Analytics

Table 17: Crash Data Summary by Harmful Event

Crash Type	2016	2017	2018	2016-2018	Average per Year	Percent
Angle	8	1	2	**11**	**3.67**	**9.40%**
Animal	0	0	0	**0**	**0.00**	**0.00%**
Rear End	13	12	19	**44**	**14.67**	**37.61%**
Head On	7	2	0	**9**	**3.00**	**7.69%**
Left Turn	3	6	7	**16**	**5.33**	**13.68%**
Sideswipe	1	3	7	**11**	**3.67**	**9.40%**
Pedestrian	0	0	0	**0**	**0.00**	**0.00%**
Right Turn	0	0	0	**0**	**0.00**	**0.00%**
Rollover	0	1	0	**1**	**0.33**	**0.85%**
Bicycle	1	0	0	**1**	**0.33**	**0.85%**
Off Road	0	2	1	**3**	**1.00**	**2.56%**
All Other	7	7	7	**21**	**7.00**	**17.95%**
Total	40	34	43	**117**	-	**100.00%**

Source: Signal Four Analytics

Table 18: Summary of Roadway Crash Rates (number of crashes per million vehicle miles)

From/To	Length (miles)	Number of Crashes[1]	Per Year	AADT (2017)	ACR[2]	Crash Rate Category
Northlake Blvd to Yacht Club Dr	1.30	117	39	23,000	3.57	Urban 6+Lane 2 Way Divided Raised

Notes:
1) Number of crashes from January 1, 2016 to December 31, 2018.
2) Average Crash Rate = (N*1,000,000)/(365*Y*AADT*L), where N = number of crashes, Y = number of years, AADT = Annual Average Daily Traffic, and L = Length of the segment in miles.

Table 19: Comparison of Roadway Crash Rates (number of crashes per million vehicle miles)

From/To	ACR[1]	Crash Rate Category	Average[2]			High Crash Segment?
			State	District	County	
Northlake Blvd to Yacht Club Dr	3.57	Urban 6+Lane 2 Way Divided Raised	5.03	5.07	2.68	Yes

Source: FDOT CARS West Palm Beach County, 3-year Average Crash Rate

Notes:
1) Average Crash Rate = (N*1,000,000)/(365*Y*AADT*L), where N = number of crashes, Y = number of years, AADT = Annual Average Daily Traffic, and L = Length of the segment in miles.
2) AVG = Average Crash Rate for Corresponding Category.

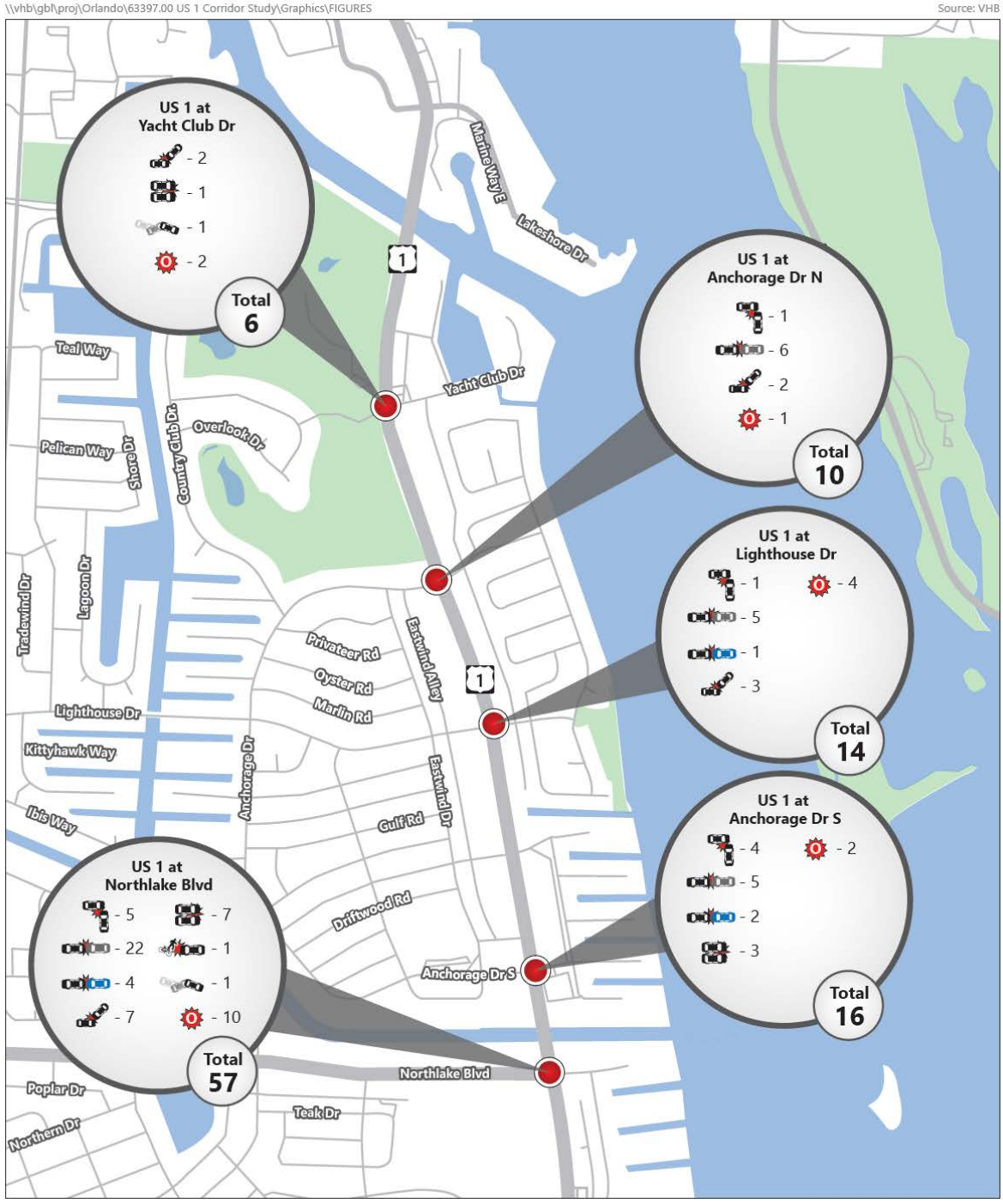
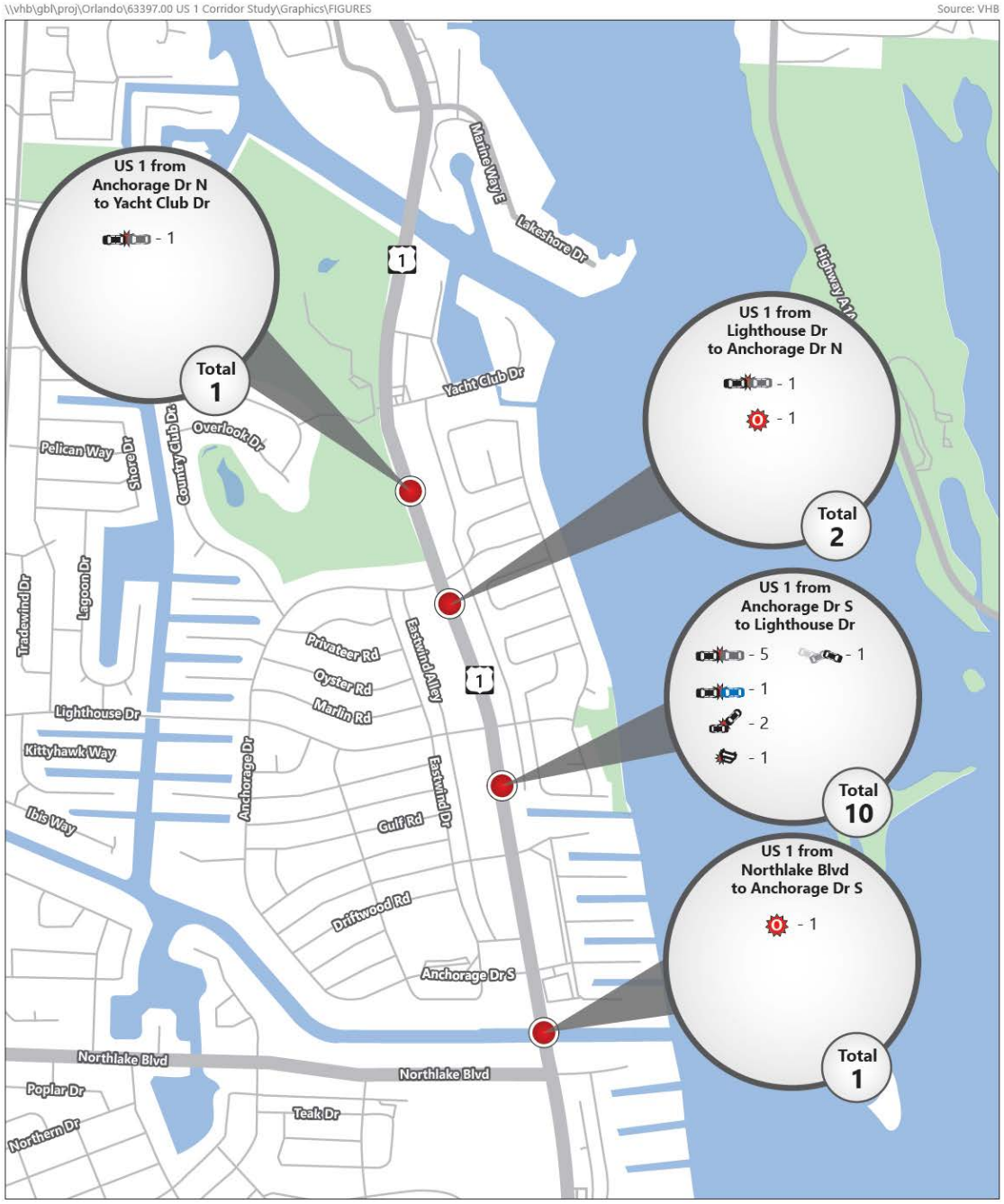


Figure 27

Crash Type by Intersection

U.S. 1 Corridor Study Analysis Technical Memorandum



Crash data collected from 1/1/2016 to 12/31/2018

Figure 28

Crash Type by Segment
U.S. 1 Corridor Study Analysis
Technical Memorandum

B. Project Safety Impacts

Lane repurposing (previously referred to as the lane reduction, lane elimination, or road diet) is one of FHWA's Proven Safety Countermeasures to increase safety for all road users. FHWA's studies show an overall crash reduction of 19 to 47 percent for lane repurposing projects. Therefore, if the average of these two values (33 percent) is applied to the existing number of crashes (117), these number could potentially be reduced to 79 crashes, resulting in a crash rate of 2.39 (down from the current 3.57). The proposed lane repurposing along US-1 is expected to target and reduce rear-end, left-turn, and angle crashes, which make up more than 60 percent of the crashes along the corridor. Other benefits of lane repurposing projects include fewer lanes for pedestrians/bicyclists to cross, traffic calming with context sensitive and consistent speeds, and a more community-focused "complete street" environment that better accommodates the needs of all road users. Additional detail is contained in **Attachment 1**.

V. CONCLUSION

The Village of North Palm Beach has indicated it is interested in pursuing a lane repurposing as described in this report and as requested in Resolution 2022-54 (adopted 7/14/2022 and included as Attachment 17). The requested configuration is the locally configuration of improvements recommended in the Palm Beach TPA's US-1 Multimodal Corridor Study. Currently, US-1/Federal Highway is a 6-lane divided roadway between the Parker Bridge and Northlake Boulevard, which represents a 1.7-mile segment. To implement enhanced multimodal facilities, the Village proposes to modify the corridor as follows: (1) shift from 6-lanes to a 5-lane transition in the "Northern Segment," from the southern touchdown of the Parker Bridge to Anchorage Drive North (3 lanes northbound; 2 lanes southbound); (2) shift from a 5-lane to a 4-lane section in the "Central Segment" from Anchorage Drive North (2 lanes northbound; 2 lanes southbound) to Anchorage Drive South; and (3) continue with a 4-lane section to Anchorage Drive South; (4) shift to a 6-lane transition at Anchorage Drive South as designed by FDOT (3 lanes southbound, 3 lanes northbound); and maintain the 4-lane existing section from Northlake Boulevard south to the southern Village limits.

Based on the evaluation of operating conditions for the existing year and future year 2040 conditions under the No-Build and Build Alternatives, it is concluded that the Build Alternative involving a lane repurposing on US-1 between north of Northlake Boulevard and Parker Bridge provides comparable operations to those of the No-Build Alternative.

<u>Existing Conditions</u>

During existing conditions (year 2019), the US-1 corridor operates at an acceptable level of service during the AM and PM peak hours. In addition, all the study intersections operate acceptably, within the Village's adopted LOS standard.