

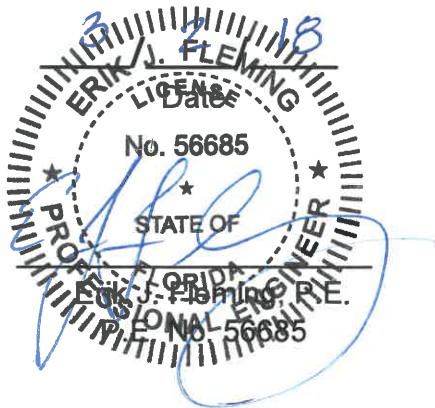


## PRELIMINARY ENGINEERING REPORT

### Littleton Road/Kismet Parkway at NE 24<sup>th</sup> Avenue Realignment Study Lee County, Florida

Contract Number: CN160459DLK

This preliminary engineering report contains detailed engineering information that fulfills the purpose and need for Littleton Road/Kismet Parkway at NE 24<sup>th</sup> Avenue Realignment Study in Lee County.



## ***PROFESSIONAL ENGINEER CERTIFICATE***

I hereby certify that I am a registered professional engineer in the State of Florida practicing with **AIM Engineering & Surveying, Inc.**, and that I have supervised the preparation of, and approved the analysis, findings, opinions, conclusions, and technical advice reported in:

REPORT: Preliminary Engineering Report  
PROJECT: Littleton Road/Kismet Parkway at NE 24<sup>th</sup> Avenue Realignment Study  
LOCATION: Lee County, Florida  
CONTRACT: CN160459DLK  
CLIENT: Lee County Department of Transportation  
City of Cape Coral

The following duly authorized engineering business performed the engineering work represented by this report:

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Florida Certificate of Authorization: 3114

This preliminary engineering report contains detailed engineering information that fulfills the purpose and need for the Littleton Road/Kismet Parkway at NE 24<sup>th</sup> Avenue Realignment Study in Lee County, Florida.

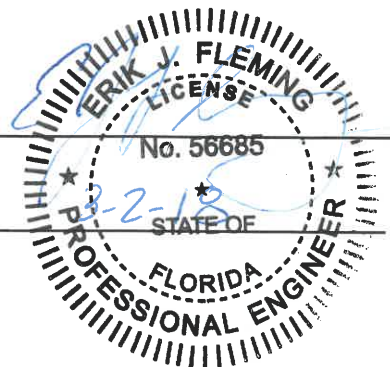
I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through design standards and criteria set forth by the federal, state, and local regulatory agencies as well as professional judgment and experience.

Name: Erik J. Fleming, P.E.

P.E. Number: 56685

Signature: \_\_\_\_\_

Date: \_\_\_\_\_



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Appendix B	Northern Alternative
Appendix C	Southern Alternative
Appendix D	Public Meeting Technical Memorandum
Appendix E	Recommended Alternative
Appendix F	Engineer's Estimate of Construction Cost



## **1.2 Purpose and Need**

The purpose of this project is to align Kismet Parkway and Littleton Road resulting in one intersection with NE 24<sup>th</sup> Avenue. The intersections of Kismet Parkway and Littleton Road with NE 24<sup>th</sup> Avenue are off-set T-intersections separated by a distance of approximately 200 feet. The proposed realignment of Kismet Parkway or Littleton Road is anticipated to improve traffic operations in the area and improve east-west access between the City of Cape Coral and Lee County. Littleton Road and NE 24<sup>th</sup> Avenue are in the Lee County Metropolitan Planning Organization's 2040 Cost Feasible Road and Highway Projects Long Range Transportation Plan to be widened to four lanes. Littleton Road or Kismet Parkway needs to be realigned to improve system continuity and better accommodate future year traffic volumes.

## **1.3 Public Involvement Program**

A public involvement program was implemented to inform and solicit local government and community interaction throughout the study. Newsletters were mailed to public officials, property owners, and interested persons to inform them of project information and opportunity for involvement. The public workshop provided project information, allowed interested persons to ask the project team questions, and the opportunity to submit comments.



## ***SECTION 2.0 EXISTING CONDITIONS***

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The existing conditions described in the following sections of this report were derived from a review of multiple data sources as well as additional data that was collected during several field reviews conducted in the early stages of this study.

### **2.1 Typical Section**

Kismet Parkway is a four-lane divided facility with 10-foot travel lanes (two in each direction) and a 32-foot grass median. There are no paved shoulders, bicycle lanes or sidewalks on Kismet Parkway within the study area. The posted speed limit for Kismet Parkway is 45 miles per hour (mph). **Figure 2-1** shows a view of Kismet Parkway to the east of NE 24<sup>th</sup> Avenue.



**Figure 2-1 Kismet Parkway – Looking East**

Littleton Road is a two-lane undivided facility with 10-foot travel lanes (one in each direction) and a posted speed limit of 30 mph. There are no paved shoulders, bicycle lanes or sidewalks on Littleton Road from NE 24<sup>th</sup> Avenue to Corbett Road. **Figure 2-2** shows a view of Littleton Road to the east of NE 24<sup>th</sup> Avenue.



**Figure 2-2 Littleton Road – Looking East**

NE 24<sup>th</sup> Avenue is a two-lane undivided facility with 10-foot travel lanes (one in each direction) and a posted speed limit of 40 mph south of Littleton Road. There are no paved shoulders, bicycle lanes or sidewalks on NE 24<sup>th</sup> Avenue within this area. **Figure 2-3** shows a view of NE 24<sup>th</sup> Avenue to the south of Kismet Parkway.



**Figure 2-3 NE 24<sup>th</sup> Avenue – Looking North**

## 2.2 Existing Roadway Right-of-Way

The existing right-of-way information was obtained from right-of-way maps and property appraiser maps from Lee County. **Table 2-1** summarizes the existing right-of-way for the project area.

**Table 2-1 Existing Right-of-Way**

Roadway	Existing Right-of-Way Width (ft)	Limits
Kismet Parkway	100	From NE 22 <sup>nd</sup> Avenue to NE 24 <sup>th</sup> Avenue
Littleton Road	50	From NE 24 <sup>th</sup> Avenue to west of Corbett Road
NE 24 <sup>th</sup> Avenue	55	South of Littleton Road
NE 24 <sup>th</sup> Avenue	65	North of Littleton Road
Corbett Road	45	South of Littleton Road

## 2.3 Roadway Classification

The functional classifications of the roadways within the project limits were obtained from the Lee County Administrative Code AC-11-1 and the Cape Coral Comprehensive Plan are summarized in **Table 2-2**. Kismet Parkway is classified as a Minor Arterial while Littleton Road is classified as a Major Collector.

**Table 2-2 Functional Classification**

Roadway	Functional Classification	Limits	Maintained By
Kismet Parkway	Minor Arterial	From NE 22 <sup>nd</sup> Avenue to NE 24 <sup>th</sup> Avenue	City of Cape Coral
Littleton Road	Major Collector	From NE 24 <sup>th</sup> Avenue to west of Corbett Road	Lee County
NE 24 <sup>th</sup> Avenue	Major Collector	South of Littleton Road	City of Cape Coral
NE 24 <sup>th</sup> Avenue	Local Road	North of Littleton Road	City of Cape Coral
Corbett Road	Major Collector	South of Littleton Road	Lee County

## 2.4 Pedestrian Facilities

There are no pedestrian facilities within the project limits.

## 2.5 Bicycle Facilities

There are no bicycle facilities within the project limits.

## 2.6 Transit Facilities

LeeTran currently provides transit (bus) service via Route 595 (Merchants Crossing/Pondella Road) which travels northbound on Corbett Road and eastbound on Littleton Road. Route 595 is shown in **Figure 2-4**. The service operates from 5:00 a.m. to 8:00 p.m. with one-hour headways

on Monday through Saturday. Sunday service operates only from 10:20 a.m. to 5:00 p.m. There are no bus stops within the project limits.

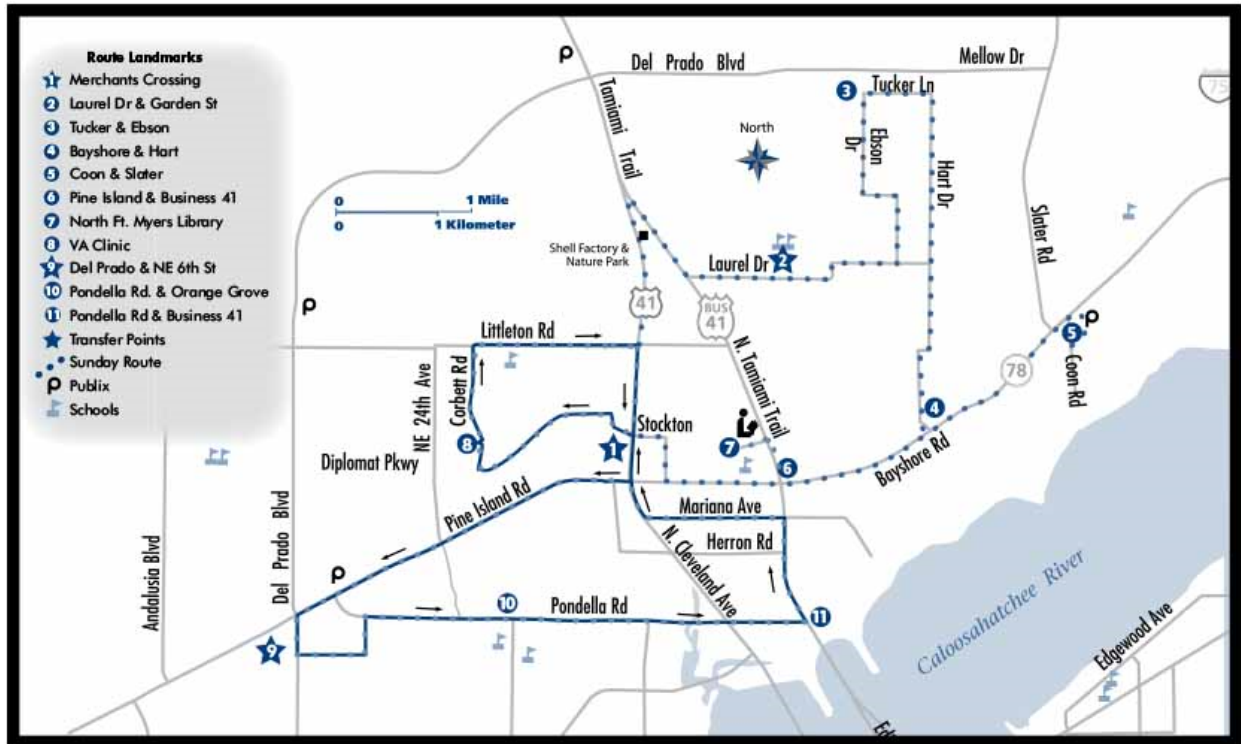


Figure 2-4 LeeTran Route 595

## 2.7 Lighting

There is no lighting within the project limits except one overhead light on the southwest corner of Kismet Parkway and NE 24<sup>th</sup> Avenue.

## 2.8 Posted Speeds

The posted speed limits range from 25 to 45 mph. **Table 2-3** lists the posted speed limits for all roadways within the project limits.

Table 2-3 Posted Speed Limits

Roadway	Posted Speed Limit (mph)	Limits
Kismet Parkway	45	From NE 22 <sup>nd</sup> Avenue to NE 24 <sup>th</sup> Avenue
Littleton Road	30	From NE 24 <sup>th</sup> Avenue to west of Corbett Road
NE 24 <sup>th</sup> Avenue	40	South of Littleton Road
NE 24 <sup>th</sup> Avenue	25	North of Littleton Road
Corbett Road	40	South of Littleton Road



## 2.9 Intersection Layout

There are three intersections within the project limits. All three intersections are stop sign controlled. **Figure 2-5** illustrates the lane geometry and intersection control for all three intersections.



Figure 2-5 Existing Intersection Lane Geometry

## 2.10 Signalized Intersections

There are no signalized intersections within the project limits.

## 2.11 Existing Traffic Conditions

This section provides a brief summary of the existing traffic conditions information contained in the *Existing (2017) and Design Year (2040) Traffic Volumes Memorandum (September 2017)*, prepared under separate cover. A more thorough discussion of the existing daily and peak hour traffic volumes that were obtained for this study is provided in the memorandum.

### 2.11.1 Existing Year Traffic Volumes

A traffic count program was conducted during the month of April 2017. Twenty-four hour bi-directional volume counts were conducted at three locations on Littleton Road and Kismet Parkway for two consecutive days on Tuesday April 18<sup>th</sup> and Wednesday April 19<sup>th</sup>, 2017. **Table 2-4** summarizes the traffic counts for each day, as well as the two-day average values at the three mainline locations.

**Table 2-4 2017 AADT Mainline Volumes**

Roadway	Location	Date	Volume	MF	DF	AF	AADT	AADT <sup>(1)</sup>
Kismet Pkwy	West of NE 24th Ave	4/18/2017	6,343	1.03	1.11	0.99	5,492	
		4/19/2017	6,530	1.03	1.11	0.99	5,654	
		<b>Two-day Avg.</b>	<b>6,437</b>				<b>5,573</b>	<b>5,600</b>
Littleton Rd	East of NE 24th Ave	4/18/2017	6,263	1.03	1.11	0.99	5,423	
		4/19/2017	6,518	1.03	1.11	0.99	5,644	
		<b>Two-day Avg.</b>	<b>6,391</b>				<b>5,534</b>	<b>5,500</b>
Littleton Rd	East of Corbett Rd	4/18/2017	7,320	1.03	1.11	0.99	6,338	
		4/19/2017	7,565	1.03	1.11	0.99	6,551	
		<b>Two-day Avg.</b>	<b>7,443</b>				<b>6,445</b>	<b>6,400</b>

MF = Monthly Adjustment Factor, DF = Day of Week Adjustment Factor, AF = Axle Adjustment Factor

(1) Rounded

Twenty-four hour bi-directional volume counts were also conducted north and/or south of Littleton Road on two cross streets during this same two-day period. **Table 2-5** summarizes the traffic counts for each day, as well as the two-day average values on the two cross streets.

**Table 2-5 2017 AADT Cross Street Volumes**

Roadway	Location	Date	Volume	MF	DF	AF	AADT	AADT <sup>(1)</sup>
NE 24th Ave	South of Kismet Pkwy	4/18/2017	3,023	1.03	1.11	0.99	2,618	
		4/19/2017	3,059	1.03	1.11	0.99	2,649	
		<b>Two-day Avg.</b>	<b>3,041</b>				<b>2,633</b>	<b>2,600</b>
NE 24th Ave	Between Kismet Pkwy and Littleton Rd	4/18/2017	7,215	1.03	1.11	0.99	6,248	
		4/19/2017	7,442	1.03	1.11	0.99	6,444	
		<b>Two-day Avg.</b>	<b>7,329</b>				<b>6,346</b>	<b>6,300</b>
NE 24th Ave	North of Littleton Rd	4/18/2017	1,801	1.03	1.11	0.99	1,560	
		4/19/2017	1,806	1.03	1.11	0.99	1,564	
		<b>Two-day Avg.</b>	<b>1,804</b>				<b>1,562</b>	<b>1,600</b>
Corbett Rd	South of Littleton Rd	4/18/2017	1,417	1.03	1.11	1.00	1,239	
		4/19/2017	1,449	1.03	1.11	1.00	1,267	
		<b>Two-day Avg.</b>	<b>1,433</b>				<b>1,253</b>	<b>1,250</b>

MF = Monthly Adjustment Factor, DF = Day of Week Adjustment Factor, AF = Axle Adjustment Factor

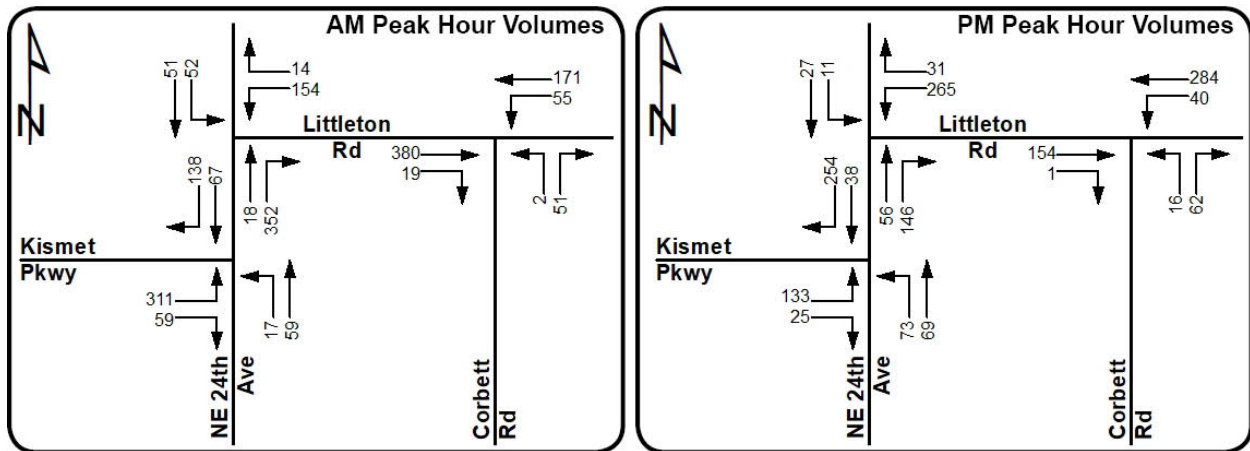
(1) Rounded

Eight-hour turning movement counts were conducted on Littleton Road and Kismet Parkway at the two cross streets listed above. These turning movement counts were conducted on April 19, 2017 during the following time periods:

- 7:00 a.m. to 9:00 a.m.
- 12:00 p.m. to 3:00 p.m.
- 3:30 p.m. to 6:30 p.m.

A review of the turning movement count data indicated that the highest a.m. and p.m. hourly volumes generally occurred from 7:00 a.m. to 8:00 a.m. and from 4:30 p.m. to 5:30 p.m., respectively. Consequently, these time periods were used to represent the existing peak hours of the study corridor. The raw turning movement count data was adjusted using the monthly and weekday adjustment factors and **Figure 2-6** illustrates the resulting 2017 a.m. and p.m. peak hour volumes.

**Figure 2-6 Existing Year (2017) Peak Hour Volumes**



### 2.11.2 Existing Year Levels of Service

**Table 2-6** summarizes the results of the peak hour traffic operations analyses conducted for the three stop controlled intersections. All three of these intersections are currently operating at LOS B or better overall during both the a.m. and p.m. peak hours. An arterial analysis was also conducted for Littleton Road and the results are summarized in **Table 2-7**. Littleton Road is currently operating at LOS B during both the a.m. and p.m. peak hours.

**Table 2-6 Existing Year (2017) Peak Hour Intersection Analysis Summary**

Intersection	Approach	Movement	AM Peak Hour			PM Peak Hour		
			V/C	Delay	LOS	V/C	Delay	LOS
Kismet Pkwy & NE 24th Ave	Northbound	LT	0.01	7.8	A	0.06	8.0	A
	Eastbound	LT	0.49	14.8	B	0.23	13.0	B
	Eastbound	RT	0.07	9.3	A	0.03	9.2	A
Littleton Rd & NE 24th Ave	Southbound	LT	0.05	8.3	A	0.01	7.8	A
	Westbound	LT/RT	0.34	14.5	B	0.37	11.8	B
Littleton Rd & Corbett Rd (All-Way Stop)	Northbound	LT/RT	0.09	8.5	A	0.11	8.3	A
	Eastbound	TH/RT	0.58	13.2	B	0.21	8.7	A
	Westbound	LT/TH	0.35	10.1	B	0.43	10.6	B

V/C = Volume-to-Capacity Ratio

Delay = Average Stopped Delay (in seconds per vehicle)

LOS = Level of Service

**Table 2-7 Existing Year (2017) Peak Hour Roadway Segment Analysis Summary**

Segment		AM Peak Hour						PM Peak Hour					
From	To	Two-Way Volume	Peak Dir. Volume	V/C	PTSF	PFFS	LOS	Two-Way Volume	Peak Dir. Volume	V/C	PTSF	PFFS	LOS
NE 24th Ave	Corbett Rd	573	402	0.53	64.1%	84.0%	B	458	302	0.53	56.3%	88.0%	B

V/C = Volume-to-Capacity Ratio

PTSF = Percent Time-Spent-Following

PFFS = Percent Free Flow Speed

LOS = Level of Service

## 2.12 Utilities

The utility companies listed in **Table 2-8** were contacted by e-mail on April 18, 2017, to identify the locations and types of utilities within the project limits. Plan sheets were mailed to the companies with a request to identify the location(s) of existing facilities and planned facilities. The existing utilities include overhead electric, overhead cable, buried communication lines, water, and sewer. **Table 2-8** also provides a summary of the responses received from providers.

The Lee County Electric Co-op (LCEC) has indicated that they have a utility easement adjacent to the roadway, within the project limits. The 40-foot easement on the north side of Littleton Road extends from their substation in the northeast quadrant of the Littleton Road/NE 24<sup>th</sup> Avenue intersection to east of Corbett Road.



**Table 2-8 Utility Companies**

Utility Company		Buried/ Overhead	Description
LCEC	Distribution	Overhead	Along the south side of KP to west side of NE. Along the east side of NE and crosses over LR. Along the west side of NE from LR north. Along the west side of CR and cross LR and continues north.
		Buried	NE crossing on the south side of KP. LR crossings east side of NE and three crossing at driveway to substation.
	Transmission	Overhead	Along the north side of KP. Along the east side of NE and crosses LR into substation. Along north side of LR.
Century Link		Buried	Along the north side of LR from CR to NE then turns up the east side of NE. Along the west side of NE and along the south side of KR. Northwest corner of KR and NE along north side of KR for 250 feet then cross KR to the south side. Along the west side of CR then turns to south side of LR for 140 feet then cross LR to the north side.
City of Cape Coral	Wastewater	Buried	Sewer main along the center of the eastbound KP travel lanes and turns south along the center of the northbound NE travel lanes for 50 feet and turns east. Along KP there are 17 service connections.
	Water	Buried	12" PVC along the north side of KP and turns south along the west side of NE. Along KP there are 11 service connections. Two fire hydrants along the north side of KP.
Comcast		Buried	Along the south side of KP and turns south along the west side of NE. Vault in the southwest quadrant of KP and NE.
		Overhead	Along the south side of KP to 130' east of NE.
Fibernet Direct		Buried	Along the south side of KP and then turns north along the west side of NE, and turns east along the south side of LR.

LR = Littleton Road, KP = Kismet Parkway, NE = NE 24<sup>th</sup> Avenue, CR = Corbett Road

## 2.13 Access Management

Kismet Parkway is the only four-lane divided roadway within the project limits. There are full median openings for NE 22<sup>nd</sup> Avenue and NE 23<sup>rd</sup> Place approximately 1,200 and 300 feet west of the NE 24<sup>th</sup> Avenue intersection.

**Table 2-9** summarizes the number of parcels and driveway connections. A review of this table indicates that all segments have at least six existing driveway connections but Kismet Parkway has the largest potential for future connections.

**Table 2-9 Existing Cross Street and Driveway Connections**

Segment	Side of Roadway	No. of Roads	No. of Parcels	No. of Driveways
Kismet Pkwy from NE 22 <sup>nd</sup> Ave to NE 24 <sup>th</sup> Ave	North Side	0	13	3
	South Side	1	13	4
	<b>Both Sides</b>	<b>1</b>	<b>26</b>	<b>7</b>
Littleton Rd from NE 24 <sup>th</sup> Ave to Corbett Road	North Side	0	7	6
	South Side	0	2	1
	<b>Both Sides</b>	<b>0</b>	<b>9</b>	<b>7</b>
Corbett Rd from Littleton Rd to 1,000 ft south	West Side	0	2	0
	East Side	0	5	6
	<b>Both Sides</b>	<b>0</b>	<b>7</b>	<b>6</b>

## **2.14 Structures**

There are no structures located within the project limits. Yellow Fever Creek is located approximately 150 feet east of Corbett Road.

## **2.15 Contamination**

Contamination evaluations were conducted for the study following standard environmental assessment practices of reviewing records of regulatory agencies, site reconnaissance, and historical information review within the limits of the project. An Environmental Data Report (EDR) was obtained in May 2017 to identify sites within one-half mile of the project corridor containing documented or suspected petroleum contamination or other hazardous materials.

Four sites were investigated for facilities or operations that may present the potential for finding petroleum contamination or hazardous materials, and therefore may impact the proposed improvements for this project. **Table 2-10** identifies the Risk Ranking for the identified sites.

**Table 2-10 Risk Ranking for Potential Contamination Sites**

Site	Name	Facility Address	Risk Ranking
1	Northeast Loop Utility Betterment	Kismet Pkwy and NE 24 <sup>th</sup> Ave	No
2	Corbett Substation Expansion	9980 Littleton Rd	No
3	Honc Contractor's Office	2501 NE 24 <sup>th</sup> Ave	No
4	Kismet Industrial Park	2313 NE 24 <sup>th</sup> Ave	No

SITE 1 – Ranking: No – NE LOOP – Utility Betterment Project is registered in the Permit Compliance System (PCS) and in the Facility Registry Services (FRS). The PCS provides information on companies which have been issued permits to discharge wastewater into rivers and the FRS is a centrally managed database that identifies facilities, sites or places subject to environmental regulations or of environmental interest. Facilities that register with either of these systems do not necessarily indicate involvement with hazardous materials. This site was a utility construction project, in which the construction contractor obtained a general stormwater permit. This site is incorporated within the current project limits. Based on all available information, there is no reason to believe there would be any involvement with contamination.

SITE 2 – Ranking: No – Corbett Substation Expansion is registered in the PCS and FRS. This site was a utility construction project, in which the construction contractor obtained a general stormwater permit. This site is located on adjacent property to the north of the project limits. Based on all available information, there is no reason to believe there would be any involvement with contamination.

SITE 3 – Ranking: No – Honc Contractor's Office is registered in the PCS and FRS. This site was a utility construction contractor who obtained a general stormwater permit. This site is located approximately 0.11 miles north of the project limits. Based on all available information, there is no reason to believe there would be any involvement with contamination.

SITE 4 – Ranking: No – Kismet Industrial Park is registered in the PCS and FRS. This site was a construction project, in which the construction contractor obtained a general stormwater permit.

## ***SECTION 2.0 EXISTING CONDITIONS***

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This site is located approximately 0.14 miles southeast of the project limits. Based on all available information, there is no reason to believe there would be any involvement with contamination.

For the sites ranked “No” for potential contamination, no further action is planned. These sites have been evaluated and determined not to have any potential environmental risk to the study area at this time.

## **SECTION 3.0 PROJECT DESIGN CRITERIA**

The design criteria for the proposed intersection realignment of Littleton Road/Kismet Parkway/NE 24<sup>th</sup> Avenue intersection adhere to the Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (2016 Edition), commonly known as the Florida Greenbook. **Table 3-1** lists the specific design criteria that were used to develop the typical sections, as well as the horizontal and vertical alignment for the proposed improvements. The design year for the proposed improvements is 2040. The functional classification for Kismet Parkway and Littleton Road are different, therefore, the urban arterial classification was utilized for selecting the design criteria for the realignment.

**Table 3-1 Project Design Criteria**

Design Element			Urban Arterial	Documentation / Florida Greenbook 2016 Edition
Typical Section	Design Speed (mph)		45	Table 3-1
	Lane Widths (ft)		11	Table 3-10
	Bicycle Lane Widths (ft)		4	Figure 9-1
	Min. Median Width (ft)		15.5	Table 3-14
	Min. Width of Clear Zone (ft)		4	Table 3-15
Horizontal	Min. Stopping Sight Distance (ft)		360	Table 3-3
	Max. Superelevation (%)		5	Table 3-5
	Max. Curvature (e=NC) (ft)		680	Table 3-5
	Max. Curvature (e max = 0.05) (ft)		680	Table 3-5
Vertical	Max. Grade (Flat Terrain) (%)		6	Table 3-7
	Max. Change in Grade without Vertical Curve (%)		0.70	Table 3-8
	Crest Curve	K Value	61	Table 3-9
		Min. Length (ft)	135	Table 3-9
	Sag Curve	K Value	79	Table 3-9
		Min. Length (ft)	135	Table 3-9

## ***SECTION 4.0 ALTERNATIVES ANALYSIS***

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The objective of the alternatives analysis process is to identify technically and environmentally sound alternatives that meet the needs of the project, are cost-effective, and are acceptable to the community. This section describes the alternatives considered and the results of the alternatives evaluation.

### **4.1 No-Build Alternative**

The No-Build Alternative assumes that Littleton Road/NE 24<sup>th</sup> Avenue and Kismet Parkway/NE 24<sup>th</sup> Avenue intersections will remain as they currently are through the design year 2040, with only routine maintenance being performed during this period. The 2040 traffic analysis conducted for the No-Build Alternative indicates that the Littleton Road/NE 24<sup>th</sup> Avenue intersection is projected to operate at LOS E in the a.m. peak hour and LOS F in the p.m. peak hour without the proposed realignment. The Kismet Parkway/NE 24<sup>th</sup> Avenue intersection is projected to operate at LOS F during both peak hours in 2040 without the proposed realignment.

The following are the advantages and limitations associated with the No-Build Alternative:

Advantages of the No-Build Alternative include:

- No additional right-of-way needed;
- No design, right-of-way, or construction costs;
- No delays to motorists or inconveniences to property owners during construction; and
- No construction impacts to the adjacent natural, physical, and social environment.

Limitations of the No-Build Alternative include:

- No pedestrian and bicycle facilities added;
- Increased potential for crashes to occur due to congested travel lanes and intersections;
- Increased traffic congestion and user costs associated with increased delays;
- Increased emergency vehicle response times; and
- Increased vehicle emission pollutants due to higher levels of traffic congestion.

The No-Build Alternative will remain a viable alternative throughout this study.

### **4.2 Alternative Evaluations**

#### ***4.2.1 Typical Section Evaluation***

The proposed typical section includes four 11-foot travel lanes, curb and gutter, and a 26.5-foot grassed median. Six-foot sidewalks and four-foot bicycle lanes will accommodate pedestrian and bicycle traffic. A total right-of-way width of 106.5 feet is needed to accommodate the proposed improvements. The proposed typical section is illustrated in **Figure 4-1**. The proposed typical section includes constructing four new travel lanes, without saving the existing pavement. The design speed for this urban typical section is 45 mph.

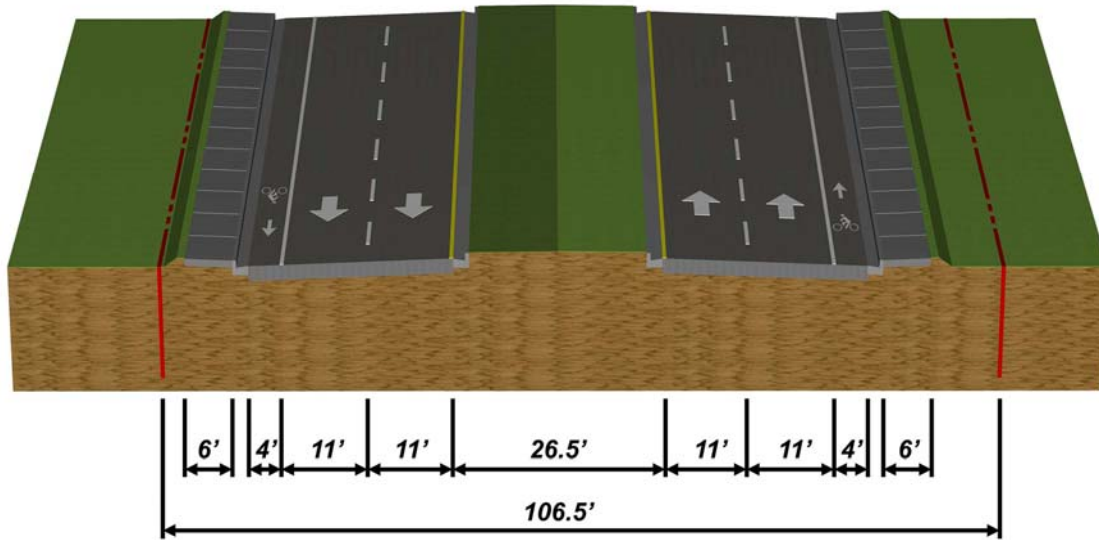


Figure 4-1 Proposed Typical Section

#### 4.2.2 Viable Alternatives

There is a separate project evaluating the widening of Littleton Road from Corbett Road to US 41 being studied by LCDOT. Based on this study, the Littleton Road widening improvements are a north, middle, and south alternative east of Corbett Road. The separate project for widening Littleton Road will be referred to as the adjacent project. The adjacent project will influence the tie-in point for this realignment project.

##### 4.2.2.1 Northern Alternatives

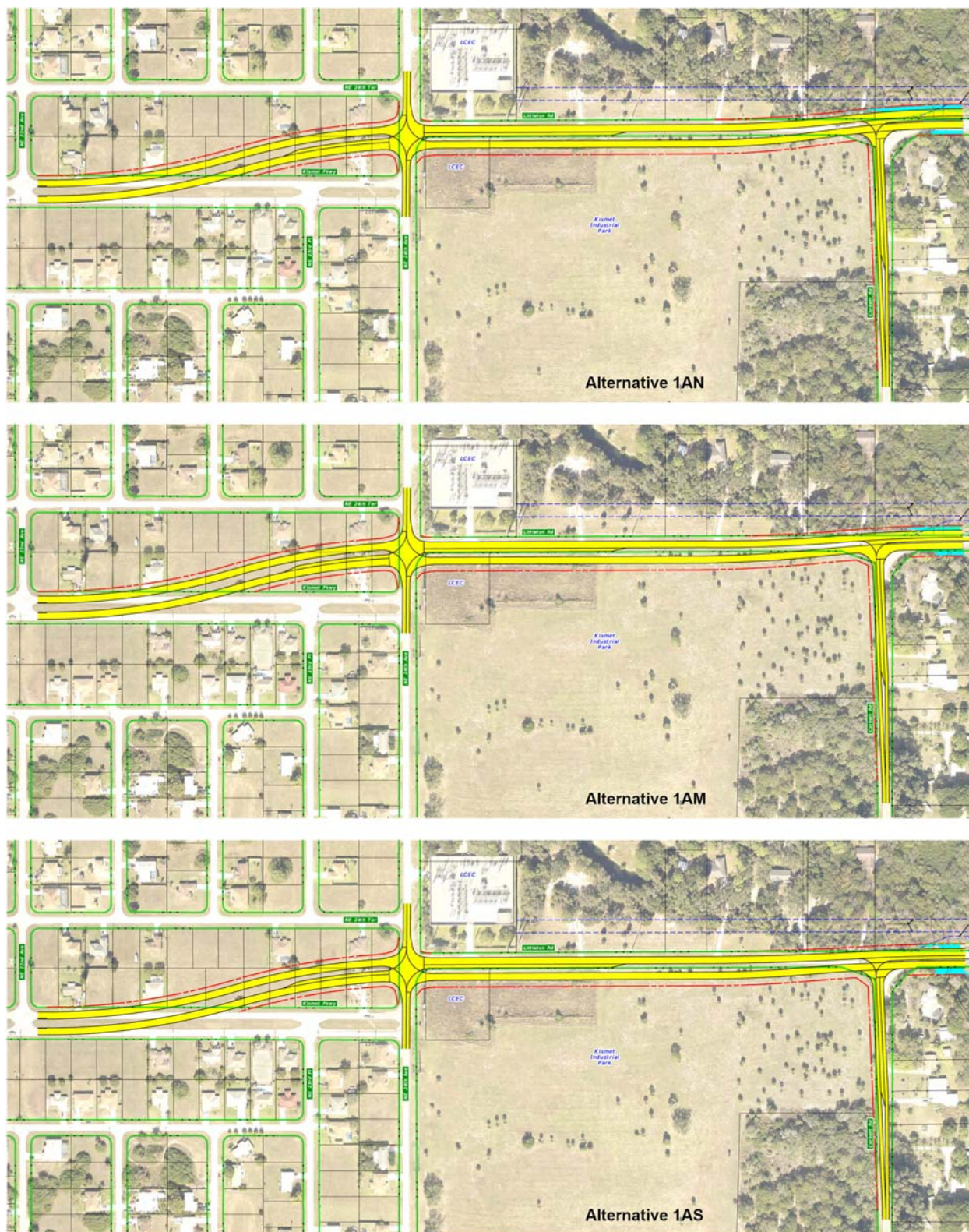
The northern alignment alternatives begin east of NE 22<sup>nd</sup> Avenue and realign existing Kismet Parkway north to the Littleton Road/NE 24<sup>th</sup> Avenue intersection. Two reverse horizontal curves are used with degree of curve of 2° 45' (or radius of 2,083.48 feet). This degree of curve does not require superelevation for a design speed of 45 mph. These alignment alternatives then hold the northern existing right-of-way line of Littleton Road and widen to the south from NE 24<sup>th</sup> Avenue to west of Corbett Road. All six northern alternatives are the same from NE 23<sup>rd</sup> Avenue to approximately 600 feet west of Corbett Road. **Table 4-1** identifies the six northern alternatives.

Table 4-1 Northern Alternatives

Alternative Name	Corbett Road Intersection Configuration	Adjacent Study
1AN	T-Intersection	Northern Alignment
1AM	T-Intersection	Middle Alignment
1AS	T-Intersection	South Alignment
1BN	Roundabout	Northern Alignment
1BM	Roundabout	Middle Alignment
1BS	Roundabout	South Alignment



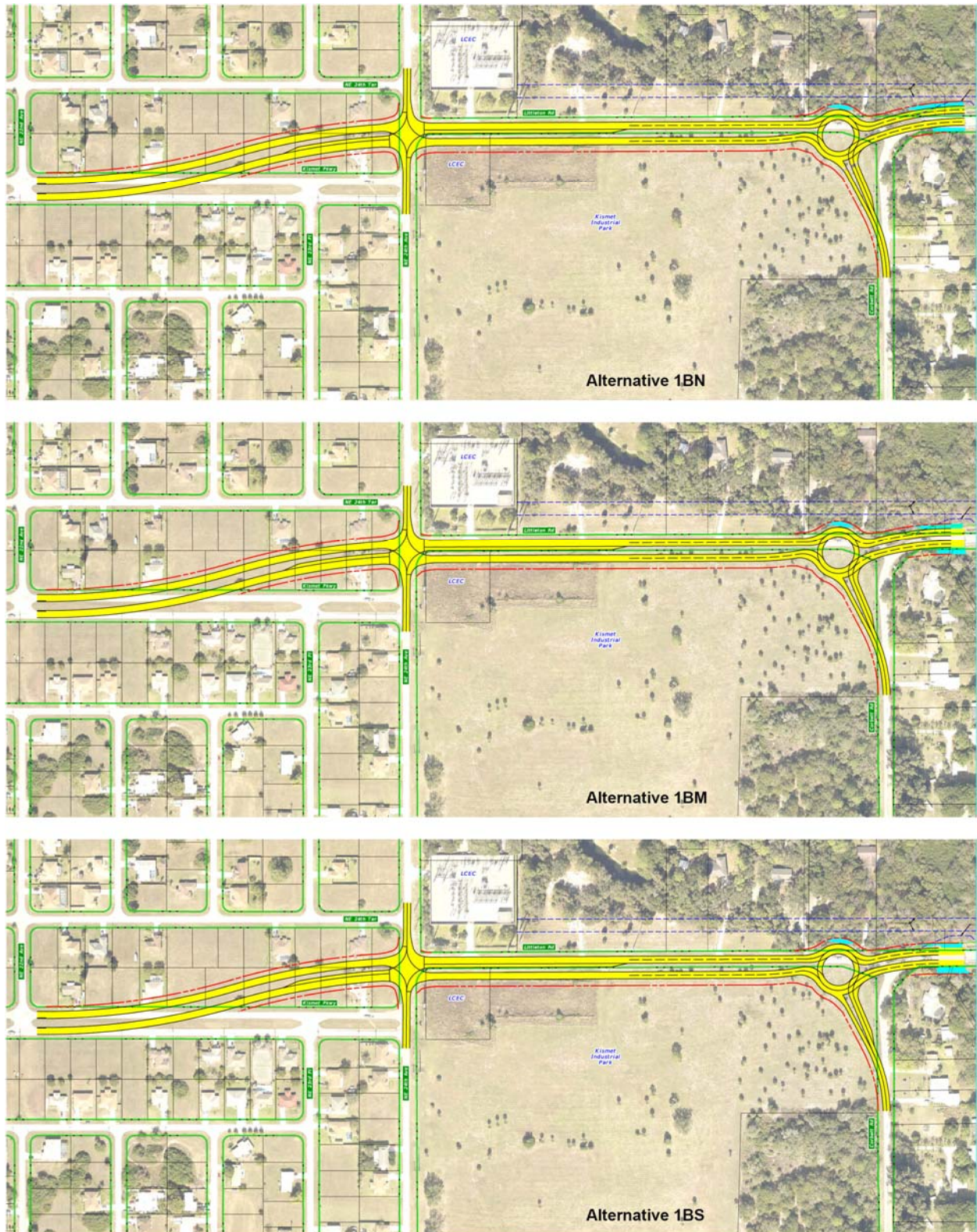
## SECTION 4.0 ALTERNATIVE ANALYSIS



**Figure 4-2 North Alternatives with T-intersection at Corbett Rd**



## SECTION 4.0 ALTERNATIVE ANALYSIS



**Figure 4-3 Northern Alternatives with Roundabout at Corbett Rd**



The first three alternatives that provide a T-intersection at Corbett Road are slightly different along Littleton Road because of their tie-in to the adjacent study alignment. The last three alternatives that provide a roundabout at Corbett Road are only slightly different from east of the roundabout to the tie-in with the adjacent study alignment.

#### **4.2.2.2 Southern Alternatives**

The southern alignment alternatives begin at the Kismet Parkway/NE 24<sup>th</sup> Avenue intersection and realign Littleton Road north to a location east of Corbett Road. Two reverse horizontal curves are used with degree of curve of 2° 45' (or radius of 2,083.48 feet). This degree of curve does not require superelevation for a design speed of 45 mph. The intersection at NE 24<sup>th</sup> Avenue and the first horizontal curve are the same for all six alternatives. **Table 4-2** identifies the six southern alternatives.

**Table 4-2 Southern Alternatives**

Alternative Name	Corbett Road Intersection Configuration	Adjacent Study
1CN	T-Intersection	Northern Alignment
1CM	T-Intersection	Middle Alignment
1CS	T-Intersection	South Alignment
1DN	Roundabout	Northern Alignment
1DM	Roundabout	Middle Alignment
1DS	Roundabout	South Alignment

The second horizontal curve associated with the first three alternatives that provide a T-intersection at Corbett Road changes location to tie-in to the adjacent study alignment. The last three alternatives that provide a roundabout at Corbett Road have the same second horizontal curve and only slightly change from east of the roundabout to the tie-in with the adjacent study alignment.

#### **4.2.3 Design Year Traffic Volumes**

The 2040 AADT volumes were obtained by multiplying the 2040 Peak Season Weekday Average Daily Traffic (PSWADT) volumes by a Model Output Conversion Factor (MOCF) obtained from the FDOT's Peak Season Factor Category Report. An MOCF value of 0.95 was used for Littleton Road, Kismet Parkway, NE 24<sup>th</sup> Avenue and Corbett Road. The 2040 PSWADT volumes were obtained from the Florida Department of Transportation District One Regional Planning Model. **Table 4-3** summarizes the 2040 AADT volumes.

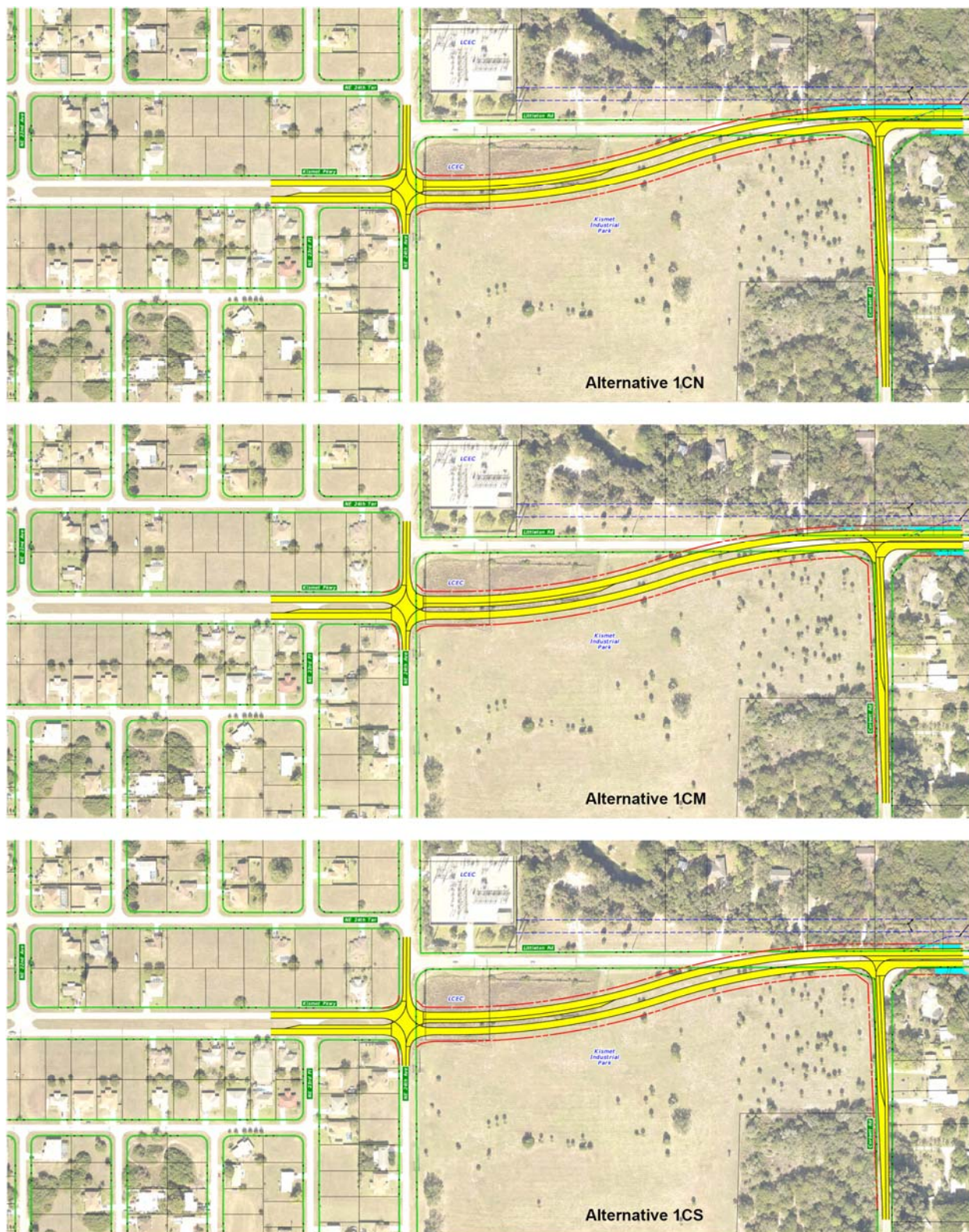
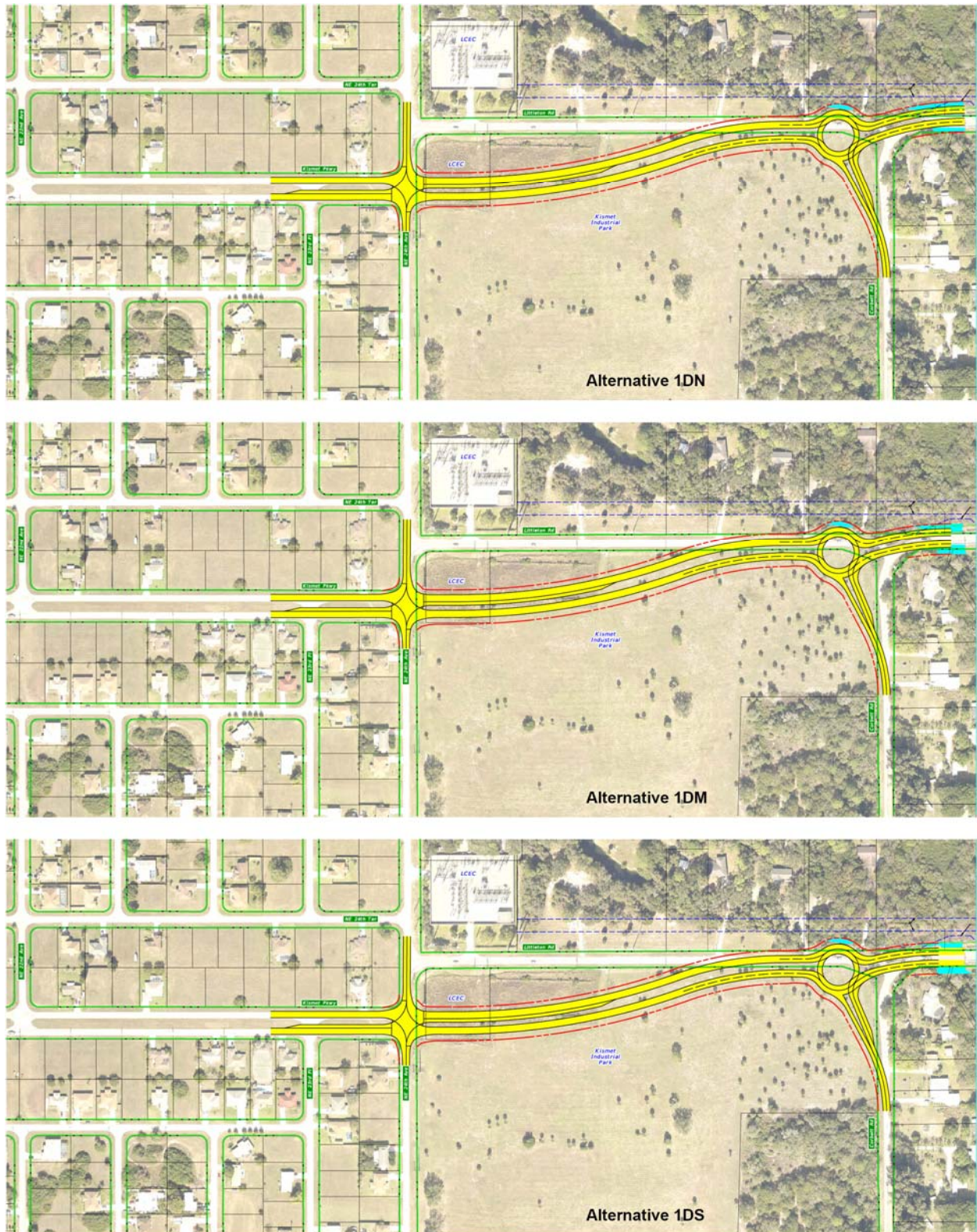


Figure 4-4 Southern Alternatives with T-intersection at Corbett Rd



## SECTION 4.0 ALTERNATIVE ANALYSIS



**Figure 4-5 Southern Alternatives with roundabout at Corbett Rd**

Table 4-3 Future Year AADT Volumes

Roadway	Location	2017 AADT	2040 Model PSWADT	2040 Model AADT <sup>(1)</sup>	2040 Model AADT <sup>(2)</sup>
Kismet Pkwy	West of NE 24th Ave	5,600	14,485	13,761	13,800
Littleton Rd	East of NE 24th Ave	5,500	21,723	20,637	20,600
Littleton Rd	East of Corbett Rd	6,400	20,362	19,344	19,300

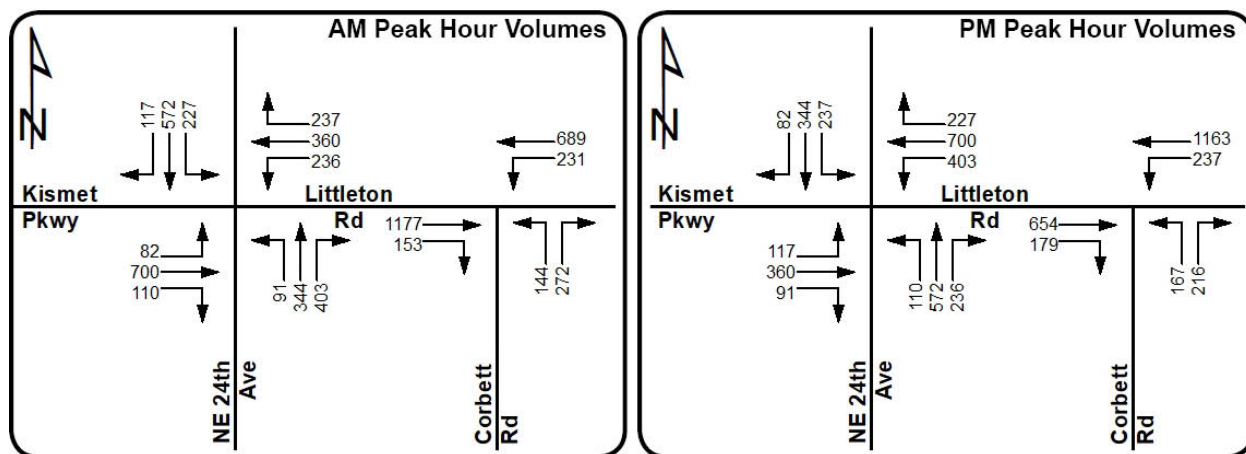
(1) 2040 AADT volume = 2040 PSWADT volume x MOCF (0.95).

(2) Rounded to the nearest 100 vehicles.

(3) 2020 AADT volumes were derived via interpolation using the 2017 and 2040 AADT volumes.

Figure 4-6 illustrates the design year (2040) a.m. and p.m. peak hour volumes. The methodology used to derive these peak hour volumes is documented in the Existing (2017) and Design Year (2040) Traffic Volumes Memorandum (September 2017) located in **Appendix A**.

Figure 4-6 Design Year (2040) Peak Hour Volumes



#### 4.2.3.1 Design Year Level of Service

#### 4.2.3.2 Intersection Analysis

Table 4-4 summarizes the results of the peak hour signalized intersection analyses conducted for these two intersections. Both of these intersections are projected to operate at LOS D or better overall during the a.m. and p.m. peak hours.

**Table 4-4 Design Year (2040) Peak Hour Signalized Intersection Analysis Summary**

Intersection	Approach	AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS
Littleton Rd/Kismet Pkwy & NE 24th Ave	EB	48.9	D	40.6	D
	WB	36.7	D	35.6	D
	NB	36.4	D	44.6	D
	SB	47.4	D	47.9	D
	Overall	42.6	D	41.1	D
Littleton Rd & Corbett Rd	EB	27.9	C	18.0	B
	WB	9.4	A	8.7	A
	NB	34.9	C	32.5	C
	Overall	22.6	C	15.2	B

Delay = Average Stopped Delay (in seconds per vehicle)

LOS = Level of Service

#### **4.2.3.3 Roundabout Evaluation**

Roundabouts were analyzed at both the Littleton Road/Kismet Parkway/NE 24<sup>th</sup> Avenue and Littleton Road/Corbett Road intersections. The results of the roundabout traffic operations analysis are shown in **Table 4-5** and **Table 4-6**. The Littleton Road/Corbett Road intersection is projected to operate at LOS B overall during both the a.m. and p.m. peak hours.

**Table 4-5 Design Year (2040) Peak Hour Roundabout Analysis Summary at Corbett Rd**

Intersection	Approach	AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS
Littleton Rd & Corbett Rd	EB	11.9	B	8.1	A
	WB	7.8	A	13.0	B
	NB	16.3	C	7.9	A
	Overall	11.9	B	10.7	B

Delay = Average Stopped Delay (in seconds per vehicle)

LOS = Level of Service

The Littleton Road/Kismet Parkway/NE 24<sup>th</sup> Avenue intersection is projected to operate at LOS F overall during both the a.m. and p.m. peak hours.

**Table 4-6 Design Year (2040) Peak Hour Roundabout Analysis Summary at NE 24<sup>th</sup> Ave**

Intersection	Approach	AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS
Littleton Rd/Kismet Pkwy & NE 24 <sup>th</sup> Ave	EB	56.1	F	14.7	B
	WB	11.4	B	114.3	F
	NB	50.5	F	82.7	F
	SB	183.1	F	192.8	F
	Overall	77.5	F	104.7	F

Delay = Average Stopped Delay (in seconds per vehicle)

LOS = Level of Service

#### **4.2.4 Preliminary Evaluation Matrix**

Each build alternative was evaluated based on environmental impacts, ROW needs, project costs and engineering factors. The evaluation matrices for the northern and southern alternatives are provided in **Table 4-7** and **Table 4-8**, respectively. These matrices quantify considerations including potential business and residential relocations, impacts to environmental resources, and the acres of ROW needed for roadway improvements and stormwater facilities. The potential for the proposed realignment to impact surface waters, wetlands, threatened and endangered species, and contamination sites were also qualified in the matrix.

The bottom portion of the matrices provides cost estimates for design, wetland mitigation, utility relocations, construction, and construction engineering and inspection. The estimates were based on 2017 unit costs. The mitigation cost estimates are based on \$115,000 per credit price for forested freshwater credits at the Little Pine Island Mitigation Bank. The costs for design and construction engineering and inspection are estimated as 10% of the total construction cost.

**Table 4-7 Evaluation Matrix – Northern Alternatives**

Evaluation Criteria	Corbett Road T- Intersection			Corbett Road Roundabout		
	1AN - North	1AM - North	1AS - North	1BN - North	1BM - North	1BS - North
Number of business relocations	0	0	0	0	0	0
Number of residential relocations	3	3	3	3	3	3
Surface Waters (acres)	0.097	0.097	0.097	0.059	0.058	0.058
Wetland (acres)	0.199	0.131	0.117	0.145	0.159	0.139
Potential threatened and endangered species involvement	Medium	Medium	Medium	Medium	Medium	Medium
Potential contamination sites	Low	Low	Low	Low	Low	Low
Transmission poles	3	3	3	2	2	2
Transmission pole support wires	4	4	4	2	2	2
Distribution poles	6	6	6	5	5	5
Parcels impacted	22	22	22	20	21	29
Right-of-way to be acquired for roadway improvements (acres)	2.85	2.79	2.81	3.36	3.35	3.35
Right-of-way to be acquired for stormwater facilities (acres)	2.74	2.74	2.74	2.74	2.74	2.74
<b>Design cost</b>	\$553,600	\$553,600	\$553,600	\$546,800	\$546,800	\$546,800
<b>Mitigation cost</b>	\$18,400	\$12,100	\$10,800	\$13,400	\$14,700	\$12,800
<b>Utility relocation costs</b>	\$1,481,000	\$1,481,000	\$1,481,000	\$1,019,000	\$1,019,000	\$1,019,000
<b>Construction cost for stormwater sites</b>	\$590,000	\$590,000	\$590,000	\$590,000	\$590,000	\$590,000
<b>Construction cost for roadway</b>	\$4,946,000	\$4,946,000	\$4,946,000	\$4,878,000	\$4,878,000	\$4,878,000
<b>Total construction cost</b>	\$5,536,000	\$5,536,000	\$5,536,000	\$5,468,000	\$5,468,000	\$5,468,000
<b>Construction engineering &amp; inspection cost</b>	\$553,600	\$553,600	\$553,600	\$546,800	\$546,800	\$546,800
<b>Preliminary Estimate of Total Project Cost (2017 Cost)</b>	<b>\$8,142,600</b>	<b>\$8,136,300</b>	<b>\$8,135,000</b>	<b>\$7,594,000</b>	<b>\$7,595,300</b>	<b>\$7,593,400</b>



**Table 4-8 Evaluation Matrix – Southern Alternatives**

Evaluation Criteria	Corbett Road T- Intersection			Corbett Road Roundabout		
	1CN - South	1CM - South	1CS- South	1DN - South	1DM - South	1DS - South
Number of business relocations	0	0	0	0	0	0
Number of residential relocations	0	0	0	0	0	0
Surface waters (acres)	0.097	0.097	0.097	0.059	0.058	0.058
Wetland (acres)	0.277	0.161	0.120	0.164	0.120	0.139
Potential threatened and endangered species involvement	Medium	Medium	Medium	Medium	Medium	Medium
Potential contamination sites	Low	Low	Low	Low	Low	Low
Transmission poles	1	1	1	0	0	0
Transmission poles support wires	2	3	3	1	1	1
Distribution poles	2	2	2	1	1	1
Parcels impacted	10	12	12	11	11	11
Right-of-way to be acquired for roadway improvements (acres)	3.38	3.32	3.30	3.84	3.82	3.81
Right-of-way to be acquired for stormwater facilities (acres)	1.46	1.46	1.46	1.46	1.46	1.46
<b>Design cost</b>	\$417,400	\$417,400	\$417,400	\$410,600	\$410,600	\$410,600
<b>Mitigation cost</b>	\$25,500	\$14,900	\$11,100	\$15,100	\$11,100	\$12,800
<b>Utility relocation costs</b>	\$531,000	\$588,000	\$588,000	\$125,000	\$125,000	\$125,000
<b>Construction cost for stormwater sites</b>	\$306,000	\$306,000	\$306,000	\$306,000	\$306,000	\$306,000
<b>Construction cost for roadway</b>	\$3,868,000	\$3,868,000	\$3,868,000	\$3,800,000	\$3,800,000	\$3,800,000
<b>Total construction cost</b>	\$4,174,000	\$4,174,000	\$4,174,000	\$4,106,000	\$4,106,000	\$4,106,000
<b>Construction engineering &amp; inspection cost</b>	\$417,400	\$417,400	\$417,400	\$410,600	\$410,600	\$410,600
<b>Preliminary Estimate of Total Project Cost (2017 Cost)</b>	<b>\$5,565,300</b>	<b>\$5,611,700</b>	<b>\$5,607,900</b>	<b>\$5,067,300</b>	<b>\$5,063,300</b>	<b>\$5,065,000</b>

As shown in the matrix for both the northern and southern alternatives, the right-of-way impacts for the T-intersection are less than the roundabout alternatives; however, the surface water and wetland impacts are greater for the T-intersection alternatives resulting in a higher mitigation cost. The roundabout alternatives are projected to operate at a lower overall delay in both the a.m. and p.m. peak hours, and enhance access management and safety.

Based on the reduced environmental impacts, enhanced safety, and overall lower preliminary estimate of total project cost, the roundabout alternatives were selected. In order to select one northern and southern alternative, the adjacent project (i.e., the widening of Littleton Road from Corbett Road to US 41) has to be considered. Since the roundabout alternatives are relatively similar and a northern alignment of the adjacent project would minimize impacts to the residential properties on the south side of Littleton Road, Alternatives 1BN and 1DN were selected for display at the Public Meeting. Alternative 1BN was identified as the Northern Alternative and Alternative 1DN was identified as the Southern Alternative.



### 4.2.5 Evaluation Matrix

The evaluation matrix shown in **Table 4-9** compares the Northern and Southern Alternatives. Based on coordination meetings with LCEC, additional information regarding preliminary utility relocations were provided and these costs were updated from the previous preliminary evaluation matrices. Lee County Department of County Lands estimated the right-of-way cost for both alternatives which is estimated land cost for budgetary and management purposes only.

**Table 4-9 Realignment Public Meeting Evaluation Matrix**

Evaluation Criteria	No-Build Alternative	Northern Alternative	Southern Alternative
<b>Business Impacts</b>			
Number of business relocations	0	0	0
<b>Residential Impacts</b>			
Number of residential relocations	0	3	0
<b>Environmental Effects</b>			
Surface Waters (acres)	0	0.059	0.059
Wetland (acres)	0	0.145	0.164
Potential threatened and endangered species involvement <sup>1</sup>	None	Medium	Medium
Potential contamination sites	None	Low	Low
<b>Right-of-Way Needs</b>			
Parcels Impacted	0	20	11
Right-of-way to be acquired for roadway improvements (acres)	0	3.36	3.84
Right-of-way to be acquired for stormwater facilities (acres)	0	2.74	1.46
<b>Estimated Total Project Costs (2017 Cost)</b>			
<b>Design<sup>2</sup></b>	<b>\$0</b>	\$546,800	\$410,600
<b>Mitigation Cost<sup>3</sup></b>	<b>\$0</b>	\$13,400	\$15,100
<b>Utility relocation costs</b>	<b>\$0</b>	\$560,000	\$140,000
<b>Total Right-of-Way Cost</b>	<b>\$0</b>	\$4,007,100	\$3,500,000
<b>Construction Cost for stormwater sites</b>	<b>\$0</b>	\$590,000	\$306,000
<b>Construction Cost for roadway</b>	<b>\$0</b>	\$4,878,000	\$3,800,000
<b>Total Construction Cost</b>	<b>\$0</b>	\$5,468,000	\$4,106,000
<b>Construction Engineering &amp; Inspection<sup>2</sup></b>	<b>\$0</b>	\$546,800	\$410,600
<b>Preliminary Estimate of Total Project Cost (2017 Cost)</b>	<b>\$0</b>	<b>\$11,142,100</b>	<b>\$8,582,300</b>

1. Build Alternatives require a protected species survey and consultation with the U.S. Fish and Wildlife Service and Florida Fish and Wildlife Conservation Commission during permitting. Preliminary site evaluations were conducted to determine the likelihood of protected species presence. Low = unlikely protected species are present, Medium = protected species habitat observed and species may be present, High = protected species habitat and species presence observed.

2. Design and Construction Engineering & Inspection is estimated as 10% of the Total Construction Cost.

3. Final Mitigation Cost will be determined through consultation with environmental agencies. Mitigation cost estimate is based on \$115,000 per credit price for forested freshwater credits at the Little Pine Island Mitigation Bank. A preliminary functional assessment score of 0.8 was applied to account for diminished habitat quality and location scores.

## ***SECTION 4.0 ALTERNATIVE ANALYSIS***

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The evaluation matrix was displayed at the Public Meeting held on January 9, 2018 to share the results of the alternatives evaluation process. It quantifies considerations such as potential business and residential relocations, impacts to environmental resources, the acres of ROW needed for roadway improvements and stormwater facilities and the estimated costs of the alternatives. The potential for the proposed realignment to impact surface waters, wetlands, threatened and endangered species, and contamination sites were also qualified in the matrix.

## ***SECTION 5.0 PUBLIC INVOLVEMENT***

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### **5.1 Realignment Public Meeting**

The Lee County Department of Transportation held a public meeting on January 9, 2018 at the Northside Baptist Church Worship Center at 8250 Littleton Road, North Fort Myers, Florida for the Littleton Road/Kismet Parkway at NE 24<sup>th</sup> Avenue Realignment Study. A total of 62 attendees signed in at the registration table. Members of the public were provided a meeting handout and comment form upon arrival. Displays of the improvement concepts were available for review and project representatives answered questions and discussed the project.

### **5.2 Public Comments**

Members of the public were provided comment forms at the meeting in order to have their opinion recorded as public record. The public was also able to submit their comments online or mail them in until January 23, 2018 to the email address and mailing address provided on the comment forms. There were a total of 25 written comment forms received from the meeting.

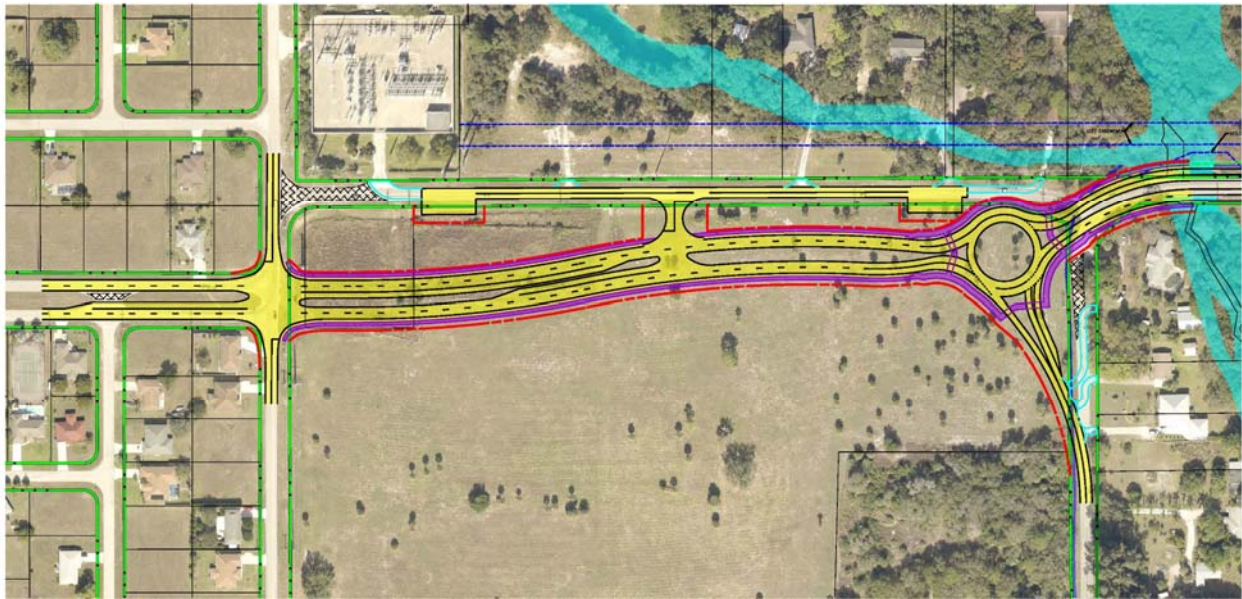
Below is a summary of the written comments received and the number of times the same comment was made. Multiple comments may have been made on one comment form.

- 1 In favor of the Southern Alternative: 16 comments
- 2 In favor of no improvements: 3 comments
- 3 In favor of a different alternative: 3 comments
- 4 Concern with driveway access: 3 comments
- 5 Concerns with adjacent project: 3 comments
- 6 In favor of moving the roundabout south: 2 comments
- 7 Concerns with funding: 1 comment

## SECTION 6.0 RECOMMENDED ALTERNATIVE

### 6.1 Selection of Recommended Alternative

Following the public workshop Lee County met with Randy Krise, owner of the Kismet Industrial Park property, to discuss modifying the Southern Alternative. If the alignment is shifted further south, the existing Littleton Road could remain as a frontage road. This frontage road would provide access to properties north of Littleton Road via an access connection to the realigned Littleton Road approximately centered between NE 24<sup>th</sup> Avenue and Corbett Road. Mr. Krise indicated that he was not opposed to this modification. **Figure 6-1** illustrates the Modified Southern Alternative.

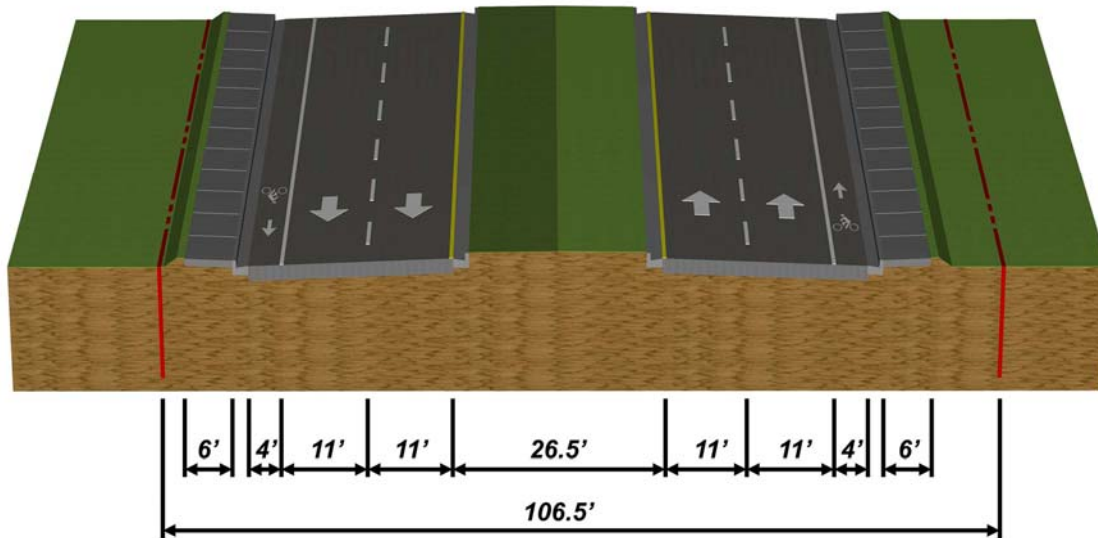


**Figure 6-1 Modified Southern Alternative**

Based on the alternatives evaluation described in **Section 4.0** and a follow-up meeting, the City of Cape Coral and Lee County agreed to recommend the Modified Southern Alternative as the Recommended Alternative. The Recommended Alternative is illustrated on the concept plan contained in **Appendix E**.

### 6.2 Typical Section

The recommended typical section consists of four 11-foot travel lanes, curb and gutter, and a 26.5-foot grass median. Six-foot sidewalks and four-foot bicycle lanes will accommodate pedestrian and bicycle traffic along the corridor. This typical section requires approximately 106.5 feet of proposed right-of-way as illustrated in **Figure 6-2**. The design speed for this project is 45 mph.



**Figure 6-2 Recommended Typical Section**

## 6.3 Design Year Traffic Volumes

### 6.3.1 Design Year Traffic Volumes

The 2040 AADT volumes were obtained by multiplying the 2040 Peak Season Weekday Average Daily Traffic (PSWADT) volumes by a Model Output Conversion Factor (MOCF) obtained from the FDOT's Peak Season Factor Category Report. An MOCF value of 0.95 was used for Littleton Road, Kismet Parkway, NE 24<sup>th</sup> Avenue and Corbett Road. The 2040 PSWADT volumes were obtained from the Florida Department of Transportation District One Regional Planning Model. **Table 6-1** summarizes the 2040 AADT volumes.

**Table 6-1 Future Year AADT Volumes**

Roadway	Location	2017 AADT	2040 Model PSWADT	2040 Model AADT <sup>(1)</sup>	2040 Model AADT <sup>(2)</sup>
Kismet Pkwy	West of NE 24th Ave	5,600	14,485	13,761	13,800
Littleton Rd	East of NE 24th Ave	5,500	21,723	20,637	20,600
Littleton Rd	East of Corbett Rd	6,400	20,362	19,344	19,300

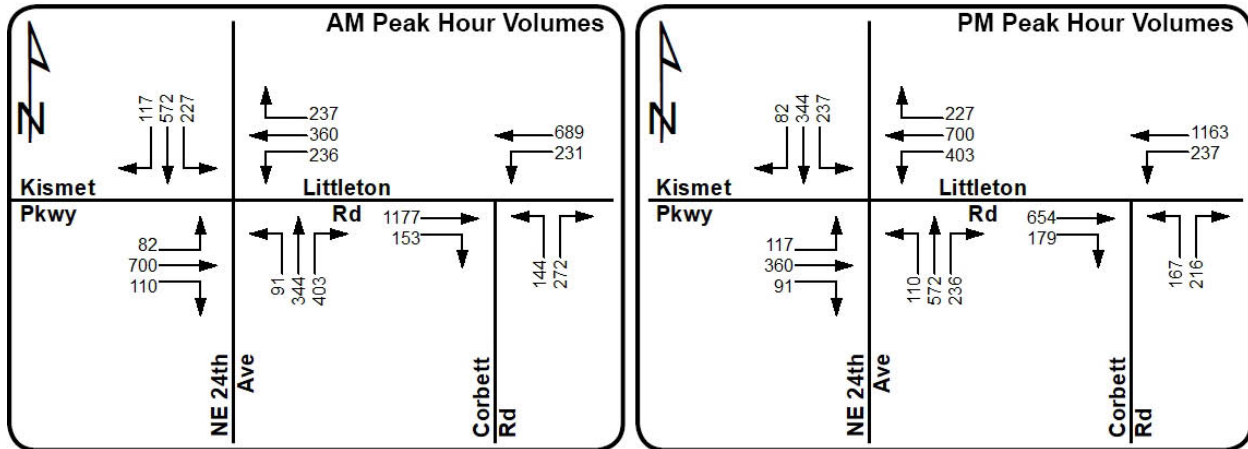
(4) 2040 AADT volume = 2040 PSWADT volume x MOCF (0.95).

(5) Rounded to the nearest 100 vehicles.

(6) 2020 AADT volumes were derived via interpolation using the 2017 and 2040 AADT volumes.

**Figure 6-3** illustrates the design year (2040) a.m. and p.m. peak hour volumes. The methodology used to derive these peak hour volumes is documented in the Existing (2017) and Design Year (2040) Traffic Volumes Memorandum (September 2017).

**Figure 6-3 Design Year (2040) Peak Hour Volumes**



### 6.3.1.1 Design Year Level of Service

### 6.3.1.2 Intersection Analysis

**Table 6-2** summarizes the results of the peak hour signalized intersection analyses conducted at Littleton Road/Kismet Parkway/NE 24<sup>th</sup> Avenue. This intersection is projected to operate at LOS D overall during the a.m. and p.m. peak hours.

**Table 6-2 Design Year (2040) Peak Hour Signalized Intersection Analysis Summary**

Intersection	Approach	AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS
Littleton Rd/Kismet Pkwy & NE 24th Ave	EB	48.9	D	40.6	D
	WB	36.7	D	35.6	D
	NB	36.4	D	44.6	D
	SB	47.4	D	47.9	D
	Overall	42.6	D	41.1	D

Delay = Average Stopped Delay (in seconds per vehicle)

LOS = Level of Service

### 6.3.1.3 Roundabout Evaluation

A roundabout was analyzed at Littleton Road/Corbett Road intersection and the results of the traffic operations analysis are shown in **Table 6-3**. The Littleton Road/Corbett Road intersection is projected to operate at LOS B overall during both the a.m. and p.m. peak hours.

**Table 6-3 Design Year (2040) Peak Hour Roundabout Analysis Summary at Corbett Rd**

Intersection	Approach	AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS
Littleton Rd & Corbett Rd	EB	11.9	B	8.1	A
	WB	7.8	A	13.0	B
	NB	16.3	C	7.9	A
	Overall	11.9	B	10.7	B

Delay = Average Stopped Delay (in seconds per vehicle)

LOS = Level of Service

## 6.4 Design Variations and Exceptions

No design variations or exceptions were identified or are anticipated as part of these improvements. The Lee County Land Development Code identifies a 150-foot right-of-way width for a Principal or Minor Arterial. It also identifies a five-foot on-road bicycle facility and a planting area or utility strip between the curb and gutter and sidewalk. To minimize the proposed right-of-way width, a four-foot bicycle lane and no utility strip was selected for this typical section. The design criteria for this project is located in **Section 3.0**. The criteria follows the Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (2016 Edition), commonly known as the Florida Greenbook.

## 6.5 Right-of-Way Needs and Relocations

The Recommended Alternative requires approximately 106.5 feet of right-of-way for the southern realignment of Littleton Road over to Kismet Parkway. The proposed roundabout is located in the southwest quadrant of the existing Littleton Road/Corbett Road intersection. The Recommended Alternative is estimated to require 6.58 acres of proposed right-of-way from eight parcels. The proposed improvements will not result in any business or residential relocations.

## 6.6 Structures

This study did not evaluate the existing bridge over Yellow Fever Creek.

## 6.7 Access Management

The proposed realignment includes two full median openings, a roundabout, and closes one existing full median opening on Kismet Parkway. **Table 6-4** lists the median opening types and locations for the proposed improvements within the study area.

**Table 6-4 Proposed Access Management**

Intersection with Kismet Pkwy/Realigned Littleton Rd	Type of Median Opening	Distance (feet)
Kismet Pkwy/NE 22 <sup>nd</sup> Ave	Existing Full Median Opening	
Kismet Pkwy/NE 23 <sup>rd</sup> Pl	Close Existing Full Median Opening	1,200
Kismet Pkwy/Realigned Littleton Rd/NE 24 <sup>th</sup> Ave	Full Median Opening	
		600
Realigned Littleton Rd/Connection to Frontage Rd (Existing Littleton Rd)	Full Median Opening	
		600
Realigned Littleton Rd/Corbett Rd	Roundabout	

The proposed median openings (and existing median opening closure) are shown in **Figure 6-1**. Comments received at the public workshop identified concerns with large trailers accessing existing driveways with the roundabout located further north as shown in the Southern Alternative. The Recommended Alternative does not require any modifications to the existing driveways along the existing Littleton Road from NE 24<sup>th</sup> Avenue to Corbett Road. These existing driveways will access the realigned Littleton Road through a connection in the middle of the realignment.

## 6.8 Utility Impacts

The utility companies listed in **Table 6-5** were contacted by e-mail on April 18, 2017, to identify the locations and types of utilities within the project limits. Plan sheets were mailed to the companies with a request to identify the location(s) of existing facilities and planned facilities. The existing utilities include overhead electric, overhead cable, buried communication lines, water, and sewer. **Table 6-5** also provides a summary of the responses received from providers.

The Lee County Electric Co-op (LCEC) has indicated that they have a utility easement adjacent to the roadway, within the project limits. The 40-foot easement on the north side of Littleton Road extends from their substation in the northeast quadrant of the Littleton Road/NE 24<sup>th</sup> Avenue intersection to east of Corbett Road.



**Table 6-5 Utility Companies**

Utility Company		Buried/ Overhead	Description
LCEC	Distribution	Overhead	Along the south side of KP to west side of NE. Along the east side of NE and crosses over LR. Along the west side of NE from LR north. Along the west side of CR and cross LR and continues north.
		Buried	NE crossing on the south side of KP. LR crossings east side of NE and three crossing at driveway to substation.
	Transmission	Overhead	Along the north side of KP. Along the east side of NE and crosses LR into substation. Along north side of LR.
Century Link		Buried	Along the north side of LR from CR to NE then turns up the east side of NE. Along the west side of NE and along the south side of KR. Northwest corner of KR and NE along north side of KR for 250 feet then cross KR to the south side. Along the west side of CR then turns to south side of LR for 140 feet then cross LR to the north side.
City of Cape Coral	Wastewater	Buried	Sewer main along the center of the eastbound KP travel lanes and turns south along the center of the northbound NE travel lanes for 50 feet and turns east. Along KP there are 17 service connections.
	Water	Buried	12" PVC along the north side of KP and turns south along the west side of NE. Along KP there are 11 service connections. Two fire hydrants along the north side of KP.
Comcast		Buried	Along the south side of KP and turns south along the west side of NE. Vault in the southwest quadrant of KP and NE.
		Overhead	Along the south side of KP to 130' east of NE.
Fibernet Direct		Buried	Along the south side of KP and then turns north along the west side of NE, and turns east along the south side of LR.

LR = Littleton Road, KP = Kismet Parkway, NE = NE 24<sup>th</sup> Avenue, CR = Corbett Road

## 6.9 Bicycle and Pedestrian Accommodations

The proposed typical section provides six-foot sidewalks and four-foot bicycle lanes on both sides of the roadway. The proposed sidewalks and bicycle lanes will be designed and constructed to comply with the Americans with Disabilities Act (ADA) of 1990, as amended. The sidewalks will meet ADA requirements for access, width, and grade.

## 6.10 Preliminary Drainage Analysis

### 6.10.1 Stormwater Management

Stormwater runoff from the realignment improvements will be collected and conveyed to stormwater management facilities by curb and gutter. These stormwater management facilities will provide water quality (treatment) and water quantity (attenuation). The method of stormwater treatment for this project includes wet detention due to the high Seasonal High Water Table.

The pond sizes were estimated using SFWMD water quality treatment and attenuation requirements. **Table 6-6** lists the one stormwater management facility.

**Table 6-6 Stormwater Management Facilities**

Basin	SMF Alternative	SMF Area (Acres)
2	Pond B	1.46

The proposed stormwater facility design will include, at a minimum, the quantity requirements for water quality impacts as required by the SFWMD. The facility will be designed to meet Lee County

water quality and quantity requirements, and best management practices will be utilized during construction. Therefore, the Recommended Alternative is expected to have no significant impact on water quality and quantity.

## 6.11 Horizontal Geometry

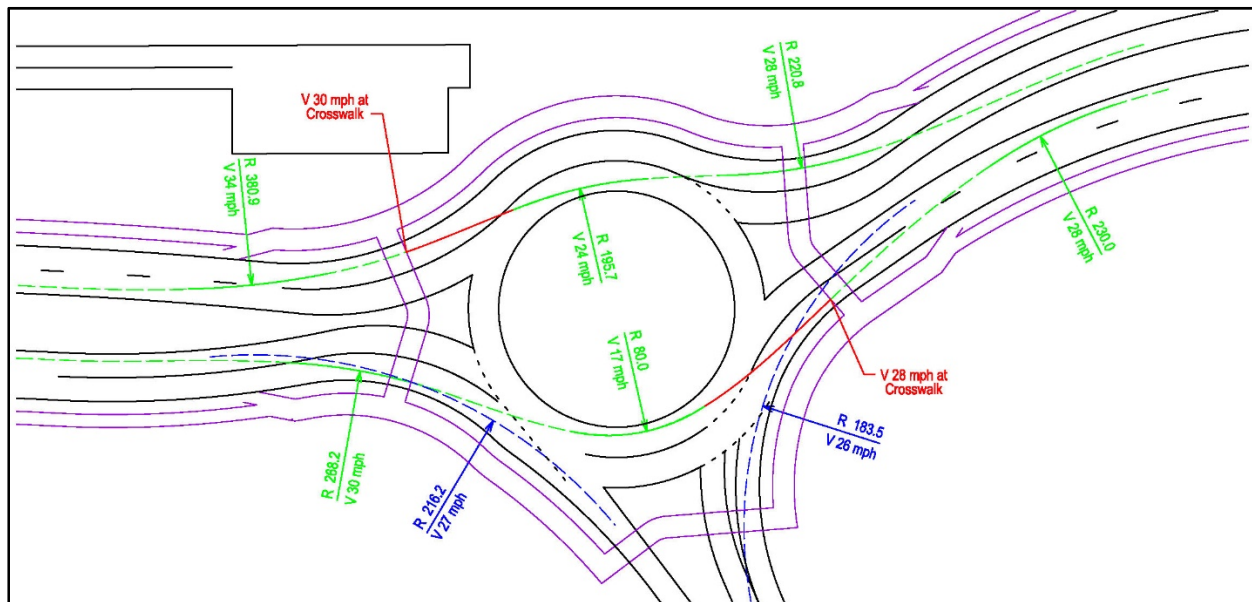
The Recommended Alternative begins at the Kismet Parkway/NE 24<sup>th</sup> Avenue intersection and realigns Littleton Road north to a location east of Corbett Road. Two reverse horizontal curves are used with degree of curve of 2° 45' (or radius of 2,083.48 feet). This degree of curve does not require superelevation for a design speed of 45 mph. The radii associated with the horizontal curves approaching the roundabout at Littleton Road/Corbett Road are approximately 546 feet (the south approach) and 350 feet (the east approach).

### 6.11.1 Roundabout Performance Checks

The following geometric performance checks were conducted for the Recommended Alternative roundabout at the Littleton Road/Corbett Road intersection:

- Fastest path speeds
- Design vehicle swept path (i.e., AutoTURN analysis)

The fastest path allowed by the roundabout geometry determines the speed for that particular movement into, through and out of the roundabout. It is the smoothest, flattest travel path possible for a single vehicle, in the absence of any other vehicles and ignoring all lane markings. **Figure 6-4** illustrates the fastest path performance check.



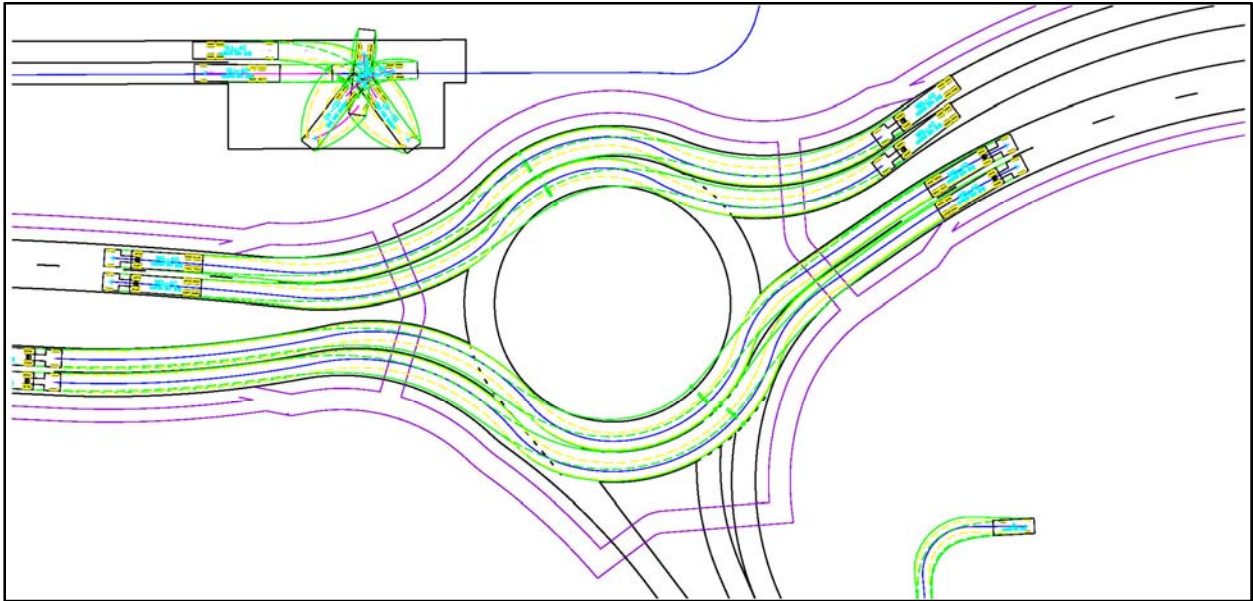
**Figure 6-4 Fastest Path**

The fastest path speeds range from 17 mph to 34 mph. National Cooperative Highway Research Program (NCHRP) Report 672 states that two-lane roundabouts should be designed for operating speeds between 25 and 30 mph. It should be noted that the fastest path speed greater than 30

## SECTION 6.0 DESIGN DETAILS OF RECOMMENDED ALTERNATIVE

mph is associated with westbound vehicles exiting the roundabout. The speed of the westbound vehicles exiting the roundabout at the crosswalk is 30 mph.

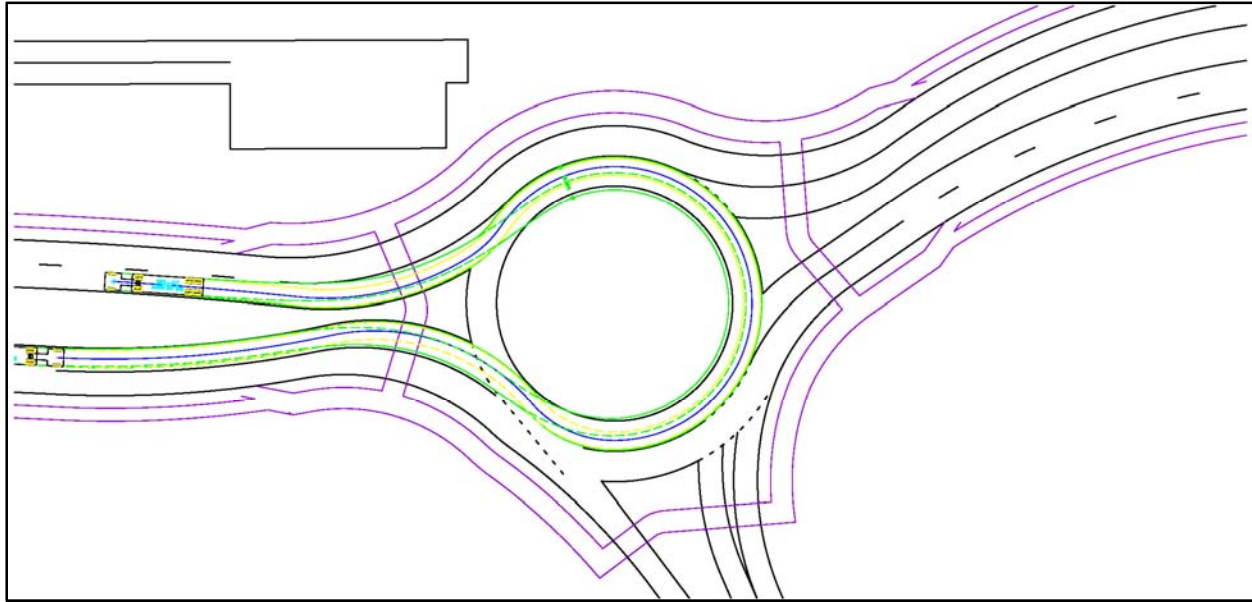
The AutoTURN analysis output is illustrated in **Figure 6-5**, **Figure 6-6**, and **Figure 6-7**. With respect to the through movements, the roundabout concept geometry was developed to accommodate a passenger vehicle traveling in the inside lane side-by-side with a WB-40 design vehicle traveling in the outside lane. **Figure 6-5** illustrates WB-40 design vehicles traveling in both lanes.



**Figure 6-5 Design Vehicle Swept Path 1**



**Figure 6-6 Design Vehicle Swept Path 2**



**Figure 6-7 Design Vehicle Swept Path 3**

## 6.12 Cost Estimates

The project costs estimated for the Recommended Alternative are summarized in **Table 6-7**. Construction costs were estimated using an Engineering Estimate and this is provided in **Appendix F**. The cost for final design and construction engineering and inspection was estimated at 10% of the total construction cost.

**Table 6-7 Project Cost Estimate**

Project Phases	Optimized Alternative
Design <sup>1</sup>	\$408,000
Mitigation Cost <sup>2</sup>	\$12,000
Utility Relocation Cost	\$153,000
Total right-of-way cost	\$2,600,000
Total construction cost	\$4,077,000
Construction Engineering & Inspection <sup>1</sup>	\$408,000
Preliminary Estimate of Total Project Cost	\$7,658,000

1 Design and Construction Engineering & Inspection is estimated at 10% of the Total Construction Cost.

2 Final Mitigation Cost will be determined through consultation with environmental agencies. Mitigation cost estimate is based on \$115,000 per credit price for forested freshwater credits at the Little Pine Island Mitigation Bank. A preliminary functional assessment score of 0.8 was applied to account for diminished habitat quality and location scores.

## **6.13 Environmental Impacts**

### **6.13.1 Natural Resources**

#### **6.13.1.1 Wetlands**

South Florida Water Management District (SFWMD) and U.S. Army Corps of Engineers (Corps) Jurisdictional wetlands and Other Surface Waters (OSW) within the recommended alignment are limited to approximately 5,132 square feet (0.13 acres) of forested wetland on the westerly adjacent edge of Yellow Fever Creek and approximately 2,298 square feet (0.06 acres) of roadside ditches located on the north side of the Littleton Road/Corbett Road intersection and the west side of Corbett Rd. **Table 6-8** identifies the wetland and surface water impacts of the Recommended Alternative. The forested wetland is primarily comprised of oaks (*Quercus* spp.), slash pines (*Pinus elliotii*) and cabbage palms (*Sabal palmetto*) with a scattered leather fern (*Acrostichum danaeifolium*) understory. The roadside ditches have maintained herbaceous side slopes that are sparsely vegetated with bahiagrass (*Paspalum notatum*), torpedograss (*Panicum repens*), and frogfruit (*Phyla nodiflora*).

The potential wetland impacts are located within the Tidal Caloosahatchee Drainage Basin. Because no known permitted off-site mitigation credits are available within the basin, and due to the extremely small area of impact, mitigation would be most appropriately provided through the purchase of an estimated 0.10 (0.13 acreage of impact X 0.8 functional assessment score) forested freshwater credits at the Little Pine Island Mitigation Bank (LPIMB). Off-site mitigation would be most appropriately provided at the LPIMB because the proposed impacts are located within the Bank's Service Area and are associated with a linear project.

Mitigation proposed outside of the drainage basin may require a Cumulative Impact Assessment that demonstrates the loss of wetlands will not result in an unacceptable cumulative loss of wetland function within the Tidal Caloosahatchee Basin. Due to the minor wetland impact proposed, it is anticipated the SFWMD will concur that an unacceptable cumulative impact will not occur. However, should the SFWMD require a portion of the mitigation within the same basin, onsite mitigation could potentially be provided through native planting enhancements within the creek.

**Table 6-8 Surface Water and Wetland Effects**

<b>Environmental Effects</b>	<b>Square Footage</b>	<b>Acres</b>
Surface Water	2,298	0.06
Wetlands	5,132	0.13

#### **6.13.1.2 Protected Species and Habitat**

Most of the project area is comprised of uplands including existing paved roadway with maintained right-of-way along Kismet Parkway and NE 24<sup>th</sup> Avenue. The remaining uplands are comprised of undeveloped and previously disturbed / cleared lands located at the southeast corner of NE 24<sup>th</sup> Avenue and Littleton Road. The previously disturbed area is primarily comprised of herbaceous vegetation with scattered cabbage palms and Brazilian pepper (*Schinus*



terebinthifolius). Herbaceous vegetation is predominately comprised of bahiagrass, grapevine (*Vitis rotundifolia*), ragweed (*Ambrosia artemisiifolia*), and caesarweed (*Urena lobate*).

Preliminary site investigations of the study area were conducted during the morning hours of September 5, 2017. The purpose of the survey was to identify and document the presence of listed species and their habitat that are regulated by the U.S. Fish and Wildlife Service (FWS) and Florida Fish and Wildlife Conservation Commission (FWC). No nests, dens, burrows, tracks or signs indicative of protected species use of the property were identified during the preliminary investigations. However, the project area is located within the consultation areas and contains suitable habitat for the federally threatened eastern indigo snake (*Drymarchon corais couperi*), wood stork (*Mycteria Americana*) and endangered Florida bonneted bat (*Eumops floridanus*). The project area additionally contains habitat suitable for the state listed gopher tortoise (*Gopherus Polyphemus*), burrowing owl (*Athene cunicularia floridana*), and various wading birds. Comprehensive protected species surveys for these species and consultation with the FWS and FWC will be required at the time of permitting.

Based on the preliminary site investigations, it is anticipated the project area does not include roosting habitat or significant foraging habitat for the bonneted bat. Upon completion and review of the detailed species survey findings, it is anticipated the FWS will determine that the project may affect but is not likely to adversely affect the Florida bonneted bat. It is also anticipated the FWS will make the same determinations for the eastern indigo snake with the applicant's commitment to adhere to the Service's Standard Protection Measures for the Eastern Indigo Snake, and for the wood stork given the minor wetland impacts proposed.

Should gopher tortoise and/or burrowing owl burrows be observed during the comprehensive protected species surveys, further permitting with the FWC will be required. Relocation permits would need to be obtained to excavate gopher tortoises and relocate them to an approved on-site or off-site location prior to construction. Migratory Bird Nest Removal / Incidental Take permits would need to be obtained to excavate burrowing owl burrows outside of the nesting season (generally February 15 – July 10). Impacts to burrowing owls also requires conservation measures that typically include replacement starter burrows within the project limits post construction and mitigation donations to a non-profit agency specializing in conservation for burrowing owls.

## **6.13.2 Physical Resources**

### **6.13.2.1 Contamination**

Contamination evaluations were conducted for the study following standard environmental assessment practices of reviewing records of regulatory agencies, site reconnaissance, and historical information review within the limits of the project. An Environmental Data Report (EDR) was obtained in May 2017 to identify sites within one-half mile of the project corridor containing documented or suspected petroleum contamination or other hazardous materials.

Four sites were investigated for facilities or operations that may present the potential for finding petroleum contamination or hazardous materials, and therefore may impact the proposed improvements for this project. **Table 6-9** identifies the Risk Ranking for the identified sites.

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**SECTION 6.0 DESIGN DETAILS OF RECOMMENDED ALTERNATIVE**

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**Table 6-9 Risk Ranking for Potential Contamination Sites**

Site	Name	Facility Address	Risk Ranking
1	Northeast Loop Utility Betterment	Kismet Pkwy and NE 24 <sup>th</sup> Ave	No
2	Corbett Substation Expansion	9980 Littleton Rd	No
3	Honc Contractor's Office	2501 NE 24 <sup>th</sup> Ave	No
4	Kismet Industrial Park	2313 NE 24 <sup>th</sup> Ave	No

## ***SECTION 7.0 CONCLUSION AND RECOMMENDATION***

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### ***7.1.1 Conclusion***

The purpose of this study is to evaluate engineering and environmental data and document information that will aid the City of Cape Coral and Lee County in determining the type, preliminary design and location of the proposed improvements. The purpose of this project is to align Kismet Parkway and Littleton Road resulting in one intersection with NE 24<sup>th</sup> Avenue. The intersections of Kismet Parkway and Littleton Road with NE 24<sup>th</sup> Avenue are off-set T-intersections separated by a distance of approximately 200 feet. The proposed realignment of Littleton Road is anticipated to improve traffic operations in the area and improve east-west access between the City of Cape Coral and Lee County. Littleton Road and NE 24<sup>th</sup> Avenue are in the Lee County Metropolitan Planning Organization's 2040 Cost Feasible Road and Highway Projects Long Range Transportation Plan to be widened to four lanes. The proposed realignment of Littleton Road is needed to improve system continuity and better accommodate future year traffic volumes.

### ***7.1.2 Recommendation***

Based on comments received from the public and evaluations of engineering and environmental factors, the Modified Southern Alternative will meet the needs of the City of Cape Coral and Lee County. The recommended typical section consists of four 11-foot travel lanes, curb and gutter, and a 26.5-foot grass median. Six-foot sidewalks and four-foot bicycle lanes will accommodate pedestrian and bicycle traffic along the corridor. This typical section requires approximately 106.5 feet of proposed right-of-way.

# APPENDIX A

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Traffic Documentation

## **APPENDIX B**

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Northern Alternative



## **APPENDIX C**

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Southern Alternative

## **APPENDIX D**

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### Public Meeting Technical Memorandum

## APPENDIX E

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Recommended Alternative

## **APPENDIX F**

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Engineer's Estimate of Construction Cost