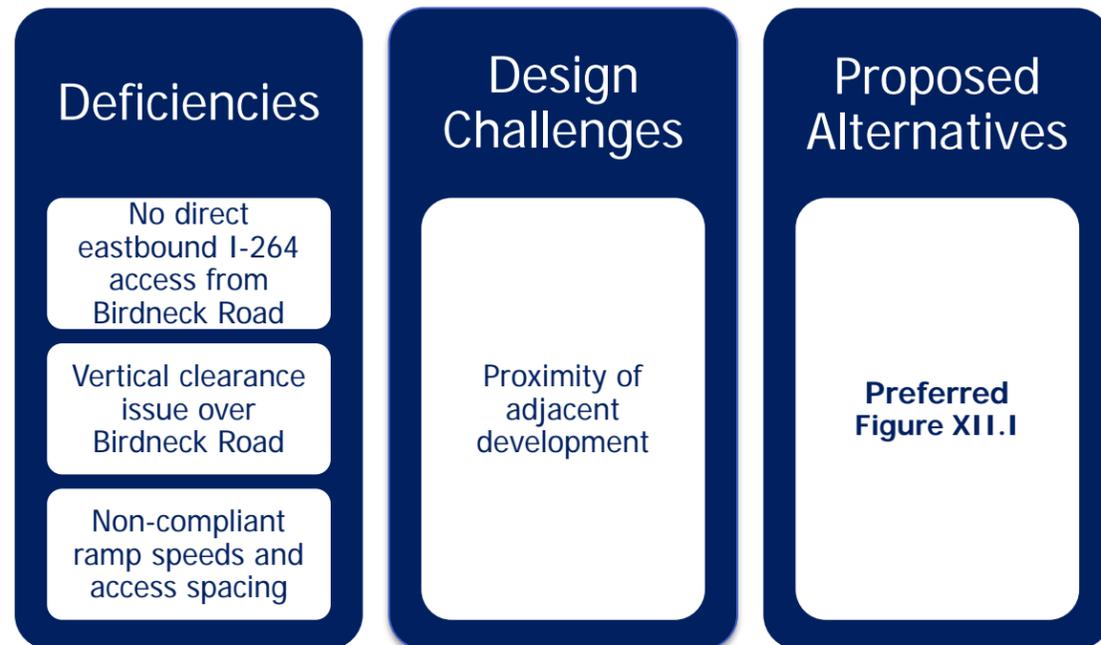


## XII. Birdneck Road Interchange



### XII.1 Existing Conditions

Existing conditions present at the Birdneck Road interchange are described in this chapter focusing on roadway geometry, volumes, capacity analysis, and crash history.

#### XII.1.1 Geometry, Speeds, Lanes, Traffic Control

Figure XII.1 displays a summary of the existing roadway geometry. The Birdneck Road interchange is laid out as a modified diamond interchange. Several geometric deficiencies exist at the Birdneck Road interchange; some of the notable deficiencies include:

- No direct I-264 eastbound access
- Less than 14.5' vertical clearance over Birdneck Road
- Ramp speeds are non-compliant at 1 location
- Access spacing is non-compliant at 1 location

Additional details on the existing conditions geometry at the Birdneck Road interchange can be found in the Technical Appendix.

### XII.1.2 Volumes & Operations

Figure XII.2: Existing Volumes displays the existing weekday peak hour volumes for the Birdneck Road interchange for the year 2014. Traffic counts were conducted during early December 2014, with counts conducted on Tuesdays, Wednesdays and/or Thursdays. The peak hour counts document the typical commuter pattern on I-264, with heavier volumes in the westbound direction during the AM peak period and in the eastbound direction during the PM peak period. On Birdneck Road, peak direction of flow is southbound in the AM peak period and it is northbound in the PM peak period.

Table 12.1 displays a summary of the results of the capacity analysis of existing conditions at the interchange of I-264 with Birdneck Road using the Highway Capacity Manual software (HCS) package. No major deficiencies are present, and all movements operate with no worse than LOS B conditions.

Movement (Type)	AM Peak Hour		PM Peak Hour	
	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
EB I-264 between First Colonial Rd and Birdneck Rd (Freeway)	9.9	A	13.4	B
EB I-264 to Birdneck Rd (Diverge)	15.1	B	19.6	B
EB I-264 between Birdneck Rd and Parks Ave (Freeway)	4.6	A	5.6	A
WB I-264 between Birdneck Rd and Parks Ave (Freeway)	5.4	A	5.3	A
NB Birdneck Rd to WB I-264 (Merge)	9.8	A	8.5	A
SB Birdneck Rd to WB I-264 (Merge)	17.9	B	13.9	B
WB I-264 between First Colonial Rd and Birdneck Rd (Freeway)	15.4	B	12.6	B

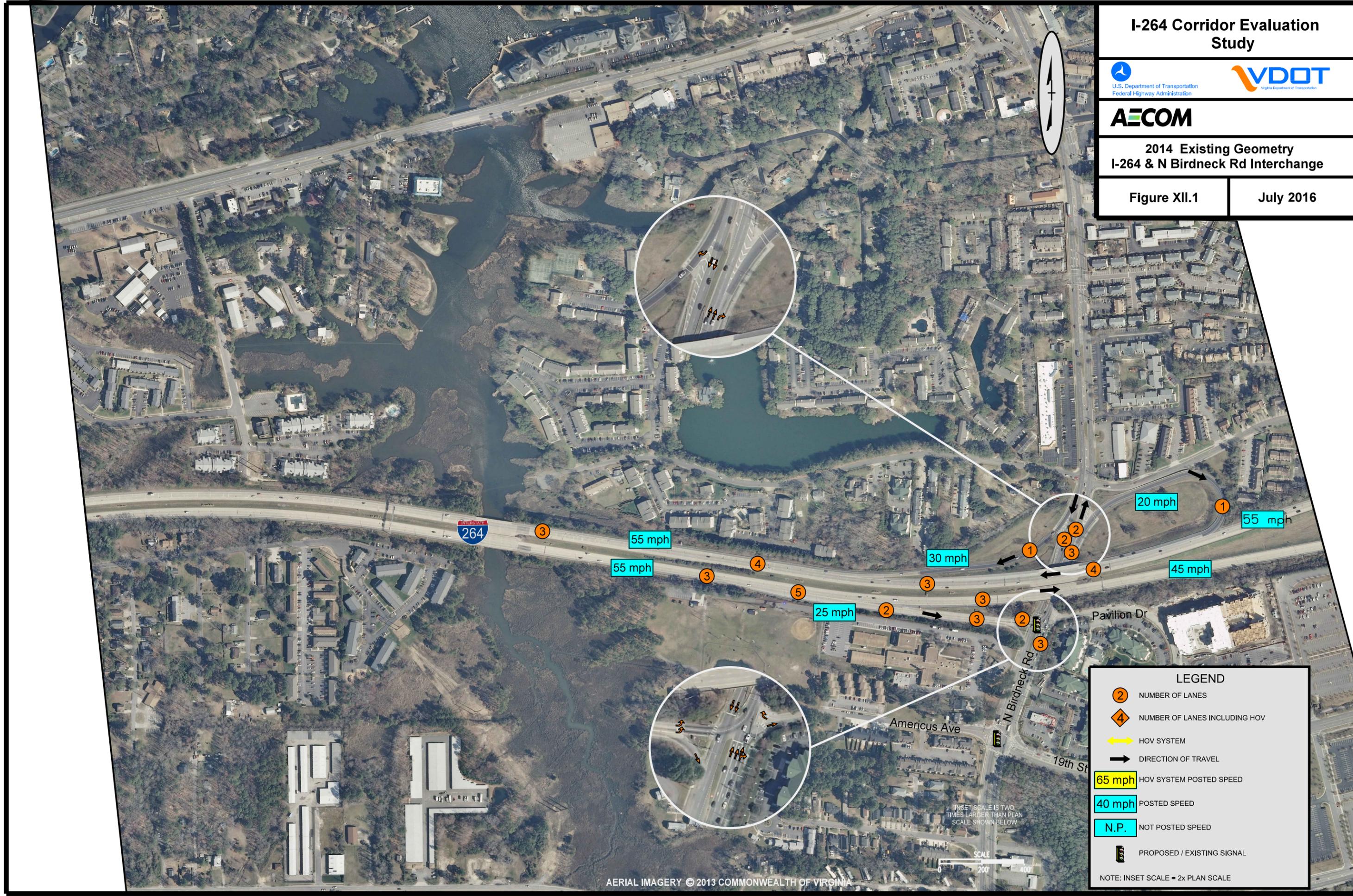
# I-264 Corridor Evaluation Study



## 2014 Existing Geometry I-264 & N Birdneck Rd Interchange

Figure XII.1

July 2016



# I-264 Corridor Evaluation Study

U.S. Department of Transportation  
Federal Highway Administration



**AECOM**

2014 Peak Hour Volumes  
I-264 & N Birdneck Rd Interchange

Figure XII.2

July 2016



**N. Birdneck Rd**

(25)(1,130) (92)	↖ 35 (91)
43 721 79	↖ 6 (4)
↘ 54 (54)	
<b>Americus Ave</b>	<b>19th St</b>
25 (59)	↖ 30 1,063 15
2 (1)	(14)(1,104) (27)
14 (31)	

**N. Birdneck Rd**

(571)	↖ 83 (58)
358	
<b>Off-Ramp</b>	<b>Pavilion Dr</b>
347 (614)	↖ 1,110 12
15 (50)	(1,212) (43)
485 (677)	

**LEGEND**

XXX AM PEAK HOUR VOLUME

(XXX) PM PEAK HOUR VOLUME



Table 12.2 displays a summary of the results of the capacity analysis for the existing conditions CORSIM analysis for the interchange at I-264 and Birdneck Road. The CORSIM analysis shows similar results to the HCS analysis with all movements operating at LOS B or better conditions.

Table 12.2 Summary of 2014 Existing Conditions CORSIM Capacity Analysis I-264 at Birdneck Road Interchange				
Movement (Type)	AM Peak Hour		PM Peak Hour	
	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
EB I-264 between First Colonial Rd and Birdneck Rd (Freeway)	8.5	A	12.6	B
EB I-264 to Birdneck Rd (Diverge)	7.7	A	11.8	B
EB I-264 between Birdneck Rd and Parks Ave (Freeway)	3.8	A	5.1	A
WB I-264 between Birdneck Rd and Parks Ave (Freeway)	4.9	A	4.4	A
NB Birdneck Rd to WB I-264 (Merge)	8.2	A	6.6	A
SB Birdneck Rd to WB I-264 (Merge)	12.8	B	9.5	A
WB I-264 between First Colonial Rd and Birdneck Rd (Freeway)	14.2	B	10.6	A

**Capacity Analysis indicates that all movements at the Birdneck Road interchange are currently operating with adequate capacity.**

Table 12.3 summarizes the existing conditions SimTraffic capacity analysis of the Birdneck Road corridor. The analysis shows no major deficiencies are present, and both intersections operate with overall LOS B or better conditions.

Table 12.3 Summary of 2014 Existing Conditions SimTraffic Capacity Analysis Birdneck Road Corridor				
Intersection	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
I-264 Off-Ramp/Pavilion Drive & Birdneck Road	10.8	B	15.5	B
Americus Avenue/19 <sup>th</sup> Street & Birdneck Road	7.9	A	8.9	A

Table 12.4 presents a summary of the existing conditions SimTraffic queueing analysis, and the results show that vehicle queues extending from the traffic signals are currently accommodated by the storage available on the respective off-ramps.

Table 12.4 Summary of 2014 Existing Conditions SimTraffic Queue Analysis I-264 at Birdneck Road Interchange					
Intersection	Ramp Length (feet)	AM Peak Hour		PM Peak Hour	
		Average (feet)	95th % (feet)	Average (feet)	95th % (feet)
EB I-264 Off-Ramp to NB/SB Birdneck Rd	891	129	197	195	271

**XII.1.3 Crashes**

**Figure XII.3** displays the 4-year crash history at Birdneck Road and I-264 for the years 2009-2012. It illustrates a small amount of crashes throughout the interchange, heavier crash density is found west of the interchange. Crashes in both directions of travel appear to be evenly distributed. The ramps in both directions of travel show a small density of crashes. The westbound I-264 on-ramp shows a number of rear end and fixed object off-road crashes at the merge point of I-264. The eastbound I-264 off-ramp to southbound Birdneck Road shows a number of rear end crashes nearest Birdneck Road.

**Table 12.5** summarizes the crash history by direction and type of freeway facility (ramp or mainline) at the Birdneck Road interchange for the period 2009-2012. A total of 48 crashes occurred in the interchange vicinity and a majority of the crashes (18) involved fixed object off-road crashes that occurred mostly (34) on the mainline of I-264. There were 27 injury crashes and 2 fatal crashes. Rear End and Fixed Object Off-Road crashes, the two most frequent types of crashes, made up 67% of the total number of crashes at the interchange.

Location	Type of Crash								Severity		
	Rear End	Angle	Head On	Sideswipe - Same Dir.	Fixed Object in Road	Non-Collision	Fixed Object Off Road	Total	Property Damage Only	Injury	Fatal
EB ML	5	3	0	0	1	1	7	<b>17</b>	6	10	1
WB ML	5	3	1	1	0	0	7	<b>17</b>	5	12	0
EB Ramp	4	0	0	0	0	0	1	<b>5</b>	3	1	1
WB Ramp	0	2	0	1	1	2	3	<b>9</b>	5	4	0
<b>Total</b>	<b>14</b>	<b>8</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>18</b>	<b>48</b>	19	27	2

**XII.2 Forecasted Conditions**

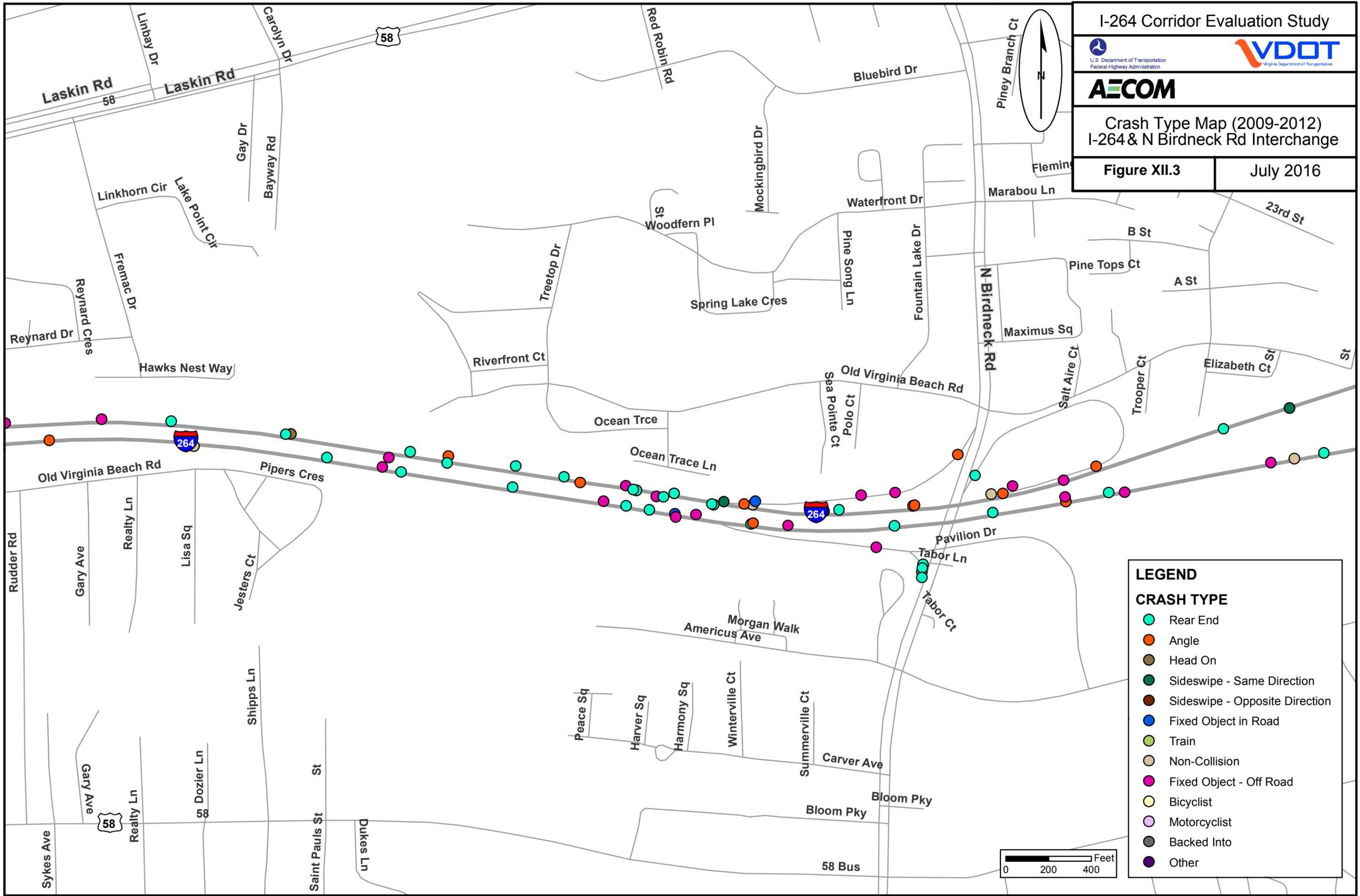
The analysis of forecasted conditions includes the development and evaluation of future volumes and operations for the year 2040. The forecasted conditions include the No Build Alternative and one improvement alternative. Impacts for the improvement alternative are listed at the end of this section.

**XII.2.1 Forecasted Volumes & Operations**

**Table 12.6** displays the forecasted conditions volumes for the No Build (regular font) and Build (**bold font**) Alternative at the Birdneck Road interchange for the year 2040. Existing volumes are also listed (*in italics*) in order to provide for comparison. In general, the volumes show moderate change in growth entering and exiting the interchange area. The roadway geometry for the No Build Alternative for this interchange is the same as the geometry found in the existing conditions. No improvements are currently funded in the *Six-Year Improvement Program* for the interchange or Birdneck Road extending from the interchange.

**Table 12.11**, on page XII-10, displays a summary of the results of the HCS capacity analysis of the No Build Alternative. Since moderate traffic volume growth is forecasted, service levels have remained the same or increased slightly from what is currently experienced in the existing condition. Almost all movements experience LOS B or better conditions, except for the diverge from eastbound I-264 to Birdneck Road which exhibits LOS C in the PM peak hour. **Table 12.11** also displays a summary of the results of the CORSIM analysis of the No Build Alternative, which show adequate service levels of B or better for all movements in both peak hours. The results are similar to the HCS capacity analysis.

**Capacity Analysis indicates that all movements at the Birdneck Road interchange will continue to operate with adequate capacity through 2040.**



**LEGEND**

**CRASH TYPE**

- Rear End
- Angle
- Head On
- Sideswipe - Same Direction
- Sideswipe - Opposite Direction
- Fixed Object in Road
- Train
- Non-Collision
- Fixed Object - Off Road
- Bicyclist
- Motorcyclist
- Backed Into
- Other

Interstate & Direction	Movement		2014 Existing Volumes		2040 No Build Alternative		2040 Build Alternative	
			AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
	From	To						
I-264 EB	Mainline before Birdneck		1,553	2,296	1,732	2,560	<b>1,731</b>	<b>2,571</b>
	EB I-264	Birdneck Rd	846	1,342	948	1,502	<b>947</b>	<b>1,513</b>
	Mainline after Birdneck		707	954	784	1,058	<b>784</b>	<b>1,058</b>
I-264 WB	Mainline before Birdneck		897	806	996	896	<b>998</b>	<b>891</b>
	NB Birdneck Rd	WB I-264	798	576	822	580	<b>803</b>	<b>576</b>
	SB Birdneck Rd	WB I-264	876	555	1,044	681	<b>1,058</b>	<b>690</b>
	Mainline after Birdneck		2,570	1,937	2,862	2,157	<b>2,859</b>	<b>2,157</b>

Table 12.7 summarizes the No Build SimTraffic capacity analysis of the Birdneck Road corridor. The analysis shows adequate service levels for the two intersections with LOS B or better conditions.

Intersection	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
I-264 Off-Ramp/Pavilion Drive & Birdneck Road	9.2	A	12.5	B
Americus Avenue/19 <sup>th</sup> Street & Birdneck Road	8.4	A	9.6	A

Table 12.8 presents a summary of the No Build SimTraffic queueing analysis, and the results show that vehicle queues extending from the traffic signal will be accommodated by the available storage length on the off-ramp at this interchange.

Intersection	Ramp Length (feet)	AM Peak Hour		PM Peak Hour	
		Average (feet)	95th % (feet)	Average (feet)	95th % (feet)
EB I-264 Off-Ramp to NB/SB Birdneck Rd	891	88	137	140	195

**XII.2.2 Improvement Alternatives**

Capacity analysis of the Birdneck Road interchange indicates no major deficiencies are forecasted to occur specifically on I-264. However, the interchange still exhibits geometric deficiencies. Consequently, any major maintenance activities (such as bridge replacement) should be designed to incorporate consideration of a plan for future improvements. To that end, one improvement alternative has been developed and analyzed, shown in **Figure XII.4**.

The improvement alternative in **Figure XII.4** - consists of adding a second right turn lane that is in association with the Arena development only located in the City of Virginia Beach.

The improvement alternative has been analyzed using the same procedures – HCS and CORSIM - used in the analysis of existing conditions and No Build Alternative. The results of the capacity analysis for the forecasted year 2040 alternative (including the No Build Alternative) are shown in **Table 12.11**. The results show that all of the movements associated with the Birdneck Road interchange exhibit adequate service levels of C or better.

In addition, SimTraffic simulation software capacity and queue analysis was conducted for the improvement alternative at signalized intersections and the results for the year 2040 improvement alternative are shown in **Table 12.9** and **Table 12.10**. The results show that the two signalized intersections along the Birdneck Road study area exhibit LOS B or better conditions in both peak hours. **Table 12.10** presents a summary of the SimTraffic queueing analysis, and the results show that vehicle queues extending from the traffic signals will be easily accommodated by the storage available on the eastbound I-264 off-ramp. The results of the improvement alternative are similar to the No Build Alternative since only one major improvement is being added at the interchange.

Table 12.9 Summary of 2040 Build SimTraffic Capacity Analysis I-264 at Birdneck Road Improvement Alternative				
Intersection	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
<i>Birdneck Road Alternative Improvement (Figure XII.4)</i>				
I-264 Off-Ramp/Pavilion Drive & Birdneck Road	9.3	A	13.1	B
Americus Avenue/19th Street & Birdneck Road	8.3	A	9.0	A

Table 12.10 Summary of 2040 Build SimTraffic Queue Analysis I-264 at Birdneck Road Improvement Alternative					
Intersection	Ramp Length (feet)	AM Peak Hour		PM Peak Hour	
		Average (feet)	95th % (feet)	Average (feet)	95th % (feet)
<i>Birdneck Road Alternative Improvement (Figure XII.4)</i>					
EB I-264 Off-Ramp to NB/SB Birdneck Rd	891	100	152	161	217

# I-264 Corridor Evaluation Study



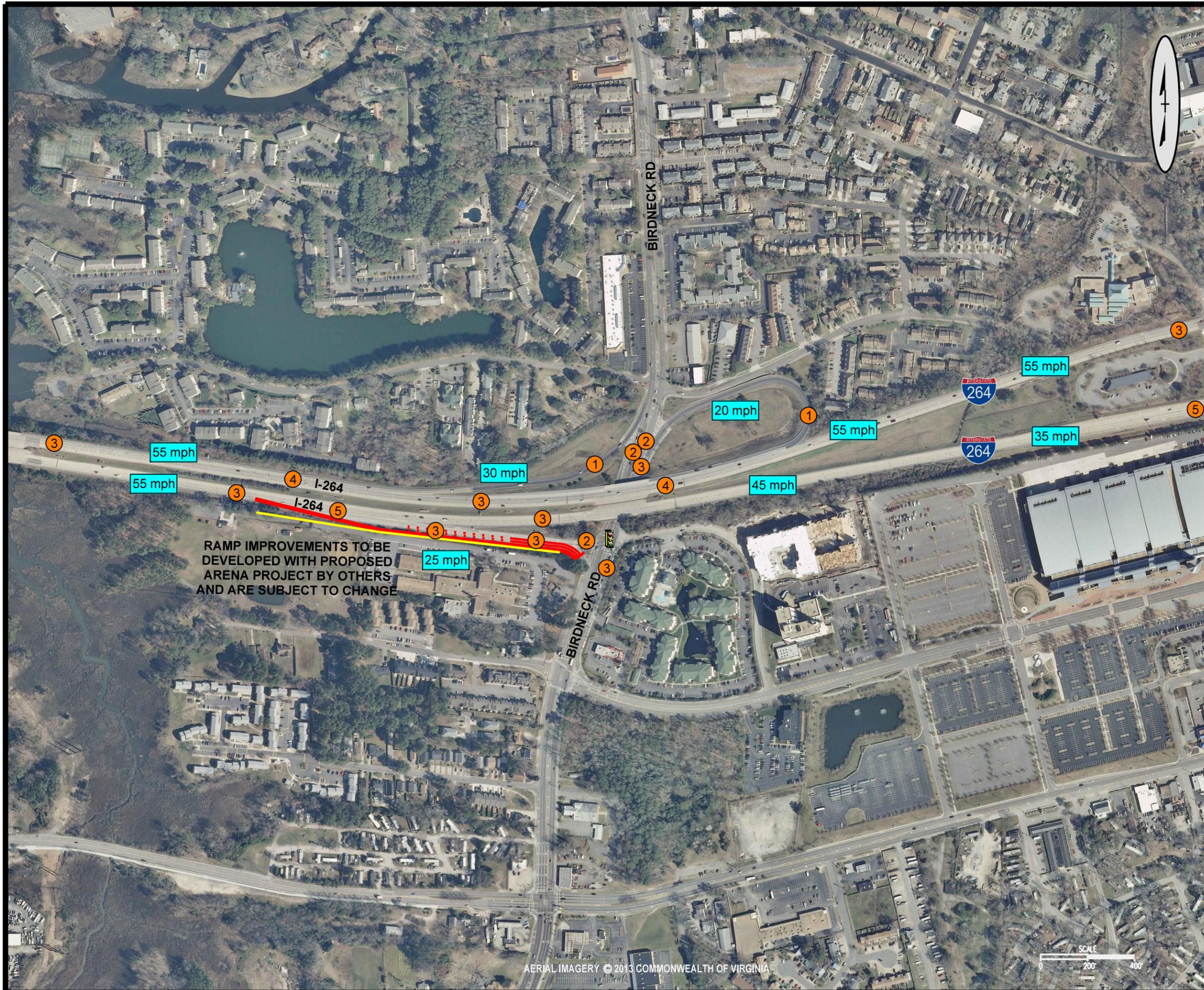
**AECOM**

2040 Build Preferred Alternative  
I-264 & Birdneck Interchange

Figure XII.4

July 2016

**Add second EB Right Turn Lane  
(in association with Arena Development only)**



**LEGEND**

- NUMBER OF LANES
- NUMBER OF LANES INCLUDING HOV
- HOV SYSTEM
- DIRECTION OF TRAVEL
- HOV SYSTEM POSTED SPEED
- POSTED SPEED
- NOT POSTED SPEED
- PROPOSED / EXISTING SIGNAL

NOTE: INSET SCALE = 2x PLAN SCALE

Table 12.11 Summary of Capacity Analysis Results Year 2040 Alternatives: Birdneck Road & I-264									
Year 2040 Alternative		No Build Alternative				Alternative Improvement			
Time of Day		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Dir	Movement (Type)	Density	LOS	Density	LOS	Density	LOS	Density	LOS
<b>HCS Analysis Results</b>									
East-bound I-264	EB I-264 between First Colonial Rd and Birdneck Rd (Freeway)	10.6	A	14.9	B	10.6	A	14.9	B
	EB I-264 to Birdneck Rd (Diverge)	16.0	B	21.4	C	16.0	B	21.5	C
	EB I-264 between Birdneck Rd and Parks Ave (Freeway)	4.8	A	6.2	A	4.8	A	6.2	A
West-bound I-264	WB I-264 between Birdneck Rd and Parks Ave (Freeway)	6.0	A	5.5	A	6.0	A	5.5	A
	NB Birdneck Rd to WB I-264 (Merge)	10.5	B	8.5	A	10.4	B	8.5	A
	SB Birdneck Rd to WB I-264 (Merge)	18.5	B	14.3	B	18.5	B	14.4	B
	WB I-264 between First Colonial Rd and Birdneck Rd (Freeway)	17.2	B	13.1	B	17.2	B	13.1	B
<b>CORSIM Analysis Results</b>									
East-bound I-264	EB I-264 between First Colonial Rd and Birdneck Rd (Freeway)	9.5	A	14.1	B	9.5	A	14.1	B
	EB I-264 to Birdneck Rd (Diverge)	8.7	A	13.2	B	8.7	A	13.3	B
	EB I-264 between Birdneck Rd and Parks Ave (Freeway)	4.2	A	5.7	A	4.3	A	5.8	A
West-bound I-264	WB I-264 between Birdneck Rd and Parks Ave (Freeway)	5.4	A	4.9	A	5.5	A	4.9	A
	NB Birdneck Rd to WB I-264 (Merge)	8.7	A	7.0	A	8.7	A	7.0	A
	SB Birdneck Rd to WB I-264 (Merge)	14.4	B	10.7	B	14.4	B	10.7	B
	WB I-264 between First Colonial Rd and Birdneck Rd (Freeway)	15.8	B	11.8	B	15.8	B	11.8	B

**XII.2.3 Alternative: Cost**

No planning level cost estimates were developed for the improvement alternative for the Birdneck Road Interchange. The improvements to the Birdneck Road interchange will be developed by others in association with the City of Virginia Beach and their development of the proposed Arena project.

**XII.2.4 Stakeholder Coordination**

A series of coordination meetings were held with staff from the City of Virginia Beach. In general, representatives from the City were supportive of the evaluation process and the selection of the preferred alternative.

**XII.2.5 Impacts**

Identification of potential impacts on key resources from construction of the improvement alternative was evaluated using desktop GIS mapping analysis. Detailed exhibits are in the Technical Appendix. Summarized in **Table 12.12**, the results show that the alternative would impact water resources (wetlands, for example) but would not potentially impact Section 4(f) properties (public parks, for example). This improvement alternative would impact one adjacent building. Additional impacts of the proposed Arena project were not developed in this study. these have been analyzed in a separate study by others in association with the City of Virginia Beach.

<b>Table 12.12</b> <b>Birdneck Road Interchange Improvement Alternative Impacts</b>				
<b>Improvement Alternative</b>	<b>WATER</b>	<b>BUILDINGS</b>	<b>RESIDENTIAL</b>	<b>POTENTIAL SECTION 4F</b>
Birdneck Road Improvement Alternative	Y	1	0	N

**XII.3 Recommendation**

The Birdneck Road interchange with I-264 currently operates with adequate service levels and it is forecast to continue operating with adequate service through the year 2040. The only reason an improvement alternative was developed was because of the strong City support for the Arena project near the Birdneck Road interchange. Preliminary traffic analysis of the Arena project suggested that an additional right turn lane was needed on the eastbound I-264 off-ramp to southbound Birdneck Road. This improvement is only needed to support heavy event traffic flows during off-peak periods.