



APPENDIX N
TURN LANE WARRANT ANALYSIS

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Philadelphia County: Philadelphia County PennDOT Engineering District: 6	Analysis Date: 1/24/2014 Conducted By: TLM Checked By: AJC Agency/Company Name: PENNONI
Intersection & Approach Description: 8th Street (SB) and Casino Entrance - Evaluation for Right Turn Lane at Site Ent on 8th Street	
Analysis Period: 2021 Build Design Hour: FRI Street Peak Intersection Control: Unsignalized Posted Speed Limit (MPH): 25 Type of Terrain: Level	Number of Approach Lanes: 2 Undivided or Divided Highway: Undivided Type of Analysis: Right Turn Lane Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes			N/A
	Through	-			N/A
	Right	Yes			N/A
Opposing	Left	Yes			N/A
	Through	-			N/A
	Right	Yes			N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	714	0.0%	714
	Right	-	338	0.0%	338

Advancing Volume:	1052
Right Turn Volume:	338

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A	Applicable Warrant Figure: Figure 11
Warrant Met?: N/A	Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 338 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known):	Average # of Vehicles/Cycle: 6.0
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Type of Traffic Control	PennDOT Publication 46, Exhibit 11-6					
	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	250	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	250	Feet

Additional Findings:	N/A
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Additional Comments / Justifications:

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Municipality: Philadelphia County: Philadelphia County PennDOT Engineering District: 6	Analysis Date: 1/24/2014 Conducted By: TLM Checked By: AJC Agency/Company Name: PENNONI
Intersection & Approach Description: 8th Street (SB) and Casino Entrance - Evaluation for Right Turn Lane at Site Ent on 8th Street	
Analysis Period: 2021 Build Design Hour: FRI Casino Peak Intersection Control: Unsignalized Posted Speed Limit (MPH): 25 Type of Terrain: Level	Number of Approach Lanes: 2 Undivided or Divided Highway: Undivided Type of Analysis: Right Turn Lane Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes			N/A
	Through	-			N/A
	Right	Yes			N/A
Opposing	Left	Yes			N/A
	Through	-			N/A
	Right	Yes			N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	868	0.0%	868
	Right	-	435	0.0%	435

Advancing Volume:	1303
Right Turn Volume:	435

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A	Applicable Warrant Figure: Figure 11
Warrant Met?: N/A	Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 435 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known):	Average # of Vehicles/Cycle: 7.0
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Type of Traffic Control	PennDOT Publication 46, Exhibit 11-6					
	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	275	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	275	Feet

Additional Findings:	N/A
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Additional Comments / Justifications:

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STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Philadelphia County: Philadelphia County PennDOT Engineering District: 6	Analysis Date: 1/24/2014 Conducted By: TLM Checked By: AJC Agency/Company Name: PENNONI
Intersection & Approach Description: 8th Street (SB) and Casino Entrance - Evaluation for Right Turn Lane at Site Ent on 8th Street	
Analysis Period: 2021 Build Design Hour: SAT Casino Peak Intersection Control: Unsignalized Posted Speed Limit (MPH): 25 Type of Terrain: Level	Number of Approach Lanes: 2 Undivided or Divided Highway: Undivided Type of Analysis: Right Turn Lane Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes			N/A
	Through	-			N/A
	Right	Yes			N/A
Opposing	Left	Yes			N/A
	Through	-			N/A
	Right	Yes			N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	0	0.0%	N/A
	Through	-	857	0.0%	857
	Right	-	613	0.0%	613

Advancing Volume:	1470
Right Turn Volume:	613

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A	Applicable Warrant Figure: Figure 11
Warrant Met?: N/A	Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 613 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known):	Average # of Vehicles/Cycle: 10.0
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Type of Traffic Control	PennDOT Publication 46, Exhibit 11-6					
	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	375	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	375	Feet

Additional Findings:	N/A
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Additional Comments / Justifications:

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STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Philadelphia County: Philadelphia County PennDOT Engineering District: 6	Analysis Date: 1/24/2014 Conducted By: TLM Checked By: AJC Agency/Company Name: PENNONI
Intersection & Approach Description: 9th Street and Market Street - Evaluation for NB right turn lane on 9th Street	
Analysis Period: 2021 Build Design Hour: FRI Street Intersection Control: Unsignalized Posted Speed Limit (MPH): 25 Type of Terrain: Level	Number of Approach Lanes: 2 Undivided or Divided Highway: Undivided Type of Analysis: Right Turn Lane Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes			N/A
	Through	-			N/A
	Right	Yes			N/A
Opposing	Left	Yes			N/A
	Through	-			N/A
	Right	Yes			N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	107	0.0%	107
	Through	-	662	0.0%	662
	Right	-	269	0.0%	269

Advancing Volume:	1038
Right Turn Volume:	269

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A	Applicable Warrant Figure: Figure 11
Warrant Met?: N/A	Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 269 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known):	Average # of Vehicles/Cycle: 4.0
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Type of Traffic Control	PennDOT Publication 46, Exhibit 11-6					
	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	175	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	175	Feet

Additional Findings:	N/A
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Additional Comments / Justifications:

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STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Philadelphia County: Philadelphia County PennDOT Engineering District: 6	Analysis Date: 1/24/2014 Conducted By: TLM Checked By: AJC Agency/Company Name: PENNONI
Intersection & Approach Description: 9th Street and Market Street - Evaluation for NB right turn lane on 9th Street	
Analysis Period: 2021 Build Design Hour: FRI Casino Intersection Control: Unsignalized Posted Speed Limit (MPH): 25 Type of Terrain: Level	Number of Approach Lanes: 2 Undivided or Divided Highway: Undivided Type of Analysis: Right Turn Lane Left or Right-Turn Lane Analysis?: Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV		
Advancing	Left	Yes			N/A	Advancing Volume: N/A Opposing Volume: N/A Left Turn Volume: N/A
	Through	-			N/A	
	Right	Yes			N/A	
Opposing	Left	Yes			N/A	% Left Turns in Advancing Volume: N/A
	Through	-			N/A	
	Right	Yes			N/A	
Right Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV		
Advancing	Left	Yes	79	0.0%	79	Advancing Volume: 890 Right Turn Volume: 243
	Through	-	568	0.0%	568	
	Right	-	243	0.0%	243	

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: N/A	Applicable Warrant Figure: Figure 11
Warrant Met?: N/A	Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 243 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known):	Average # of Vehicles/Cycle: 4.0																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #FFDAB9;"> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr style="background-color: #FFDAB9;"> <th colspan="2">25-35</th> <th colspan="2">40-45</th> <th colspan="2">50-60</th> </tr> <tr style="background-color: #FFDAB9;"> <th colspan="6">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> </thead> <tbody> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </tbody> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
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	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
Right Turn Lane Storage Length, Condition A: 175 Feet Condition B: N/A Feet Condition C: N/A Feet Required Right Turn Lane Storage Length: 175 Feet																																									
Additional Findings: N/A																																									
Additional Comments / Justifications:																																									
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Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION										
Municipality:	Philadelphia	Analysis Date:	1/24/2014		Conducted By:	TLM		Checked By:	AJC	
County:	Philadelphia County	Agency/Company Name:	PENNONI		Agency/Company Name:	PENNONI		Agency/Company Name:	PENNONI	
PennDOT Engineering District:	6	Intersection & Approach Description:	9th Street and Market Street - Evaluation for NB right turn lane on 9th Street							
Analysis Period:	2021 Build	Number of Approach Lanes:	2		Undivided or Divided Highway:	Undivided		Type of Analysis	Right Turn Lane	
Design Hour:	SAT Casino	Left or Right-Turn Lane Analysis?:	Right Turn Lane							
Intersection Control:	Unsignalized									
Posted Speed Limit (MPH):	25									
Type of Terrain:	Level									

VOLUME CALCULATIONS											
Left Turn Lane Volume Calculations											
Movement	Include?	Volume	% Trucks	PCEV							
Advancing	Left	Yes								Advancing Volume:	N/A
	Through	-								Opposing Volume:	N/A
	Right	Yes								Left Turn Volume:	N/A
Opposing	Left	Yes									
	Through	-									
	Right	Yes								% Left Turns in Advancing Volume:	N/A
Right Turn Lane Volume Calculations											
Movement	Include?	Volume	% Trucks	PCEV							
Advancing	Left	Yes	93	0.0%	93					Advancing Volume:	1136
	Through	-	703	0.0%	703					Right Turn Volume:	340
	Right	-	340	0.0%	340						

TURN LANE WARRANT FINDINGS									
Left Turn Lane Warrant Findings					Right Turn Lane Warrant Findings				
Applicable Warrant Figure:					Applicable Warrant Figure:				
N/A					Figure 11				
Warrant Met?:					Warrant Met?:				
N/A					Yes				

TURN LANE LENGTH CALCULATIONS											
Intersection Control:	Unsignalized		Average # of Vehicles/Cycle:	6.0							
Design Hour Volume of Turning Lane:	340										
Cycles Per Hour (Assumed):	60										
Cycles Per Hour (If Known):											
PennDOT Publication 46, Exhibit 11-6											
Type of Traffic Control	Speed (MPH)										
	25-35		40-45		50-60						
	Turn Demand Volume										
	High	Low	High	Low	High	Low					
Signalized	A	A	B or C	B or C	B or C	B or C					
Unsignalized	A	A	C	B	B or C	B					
Right Turn Lane Storage Length, Condition A:										250	Feet
Condition B:										N/A	Feet
Condition C:										N/A	Feet
Required Right Turn Lane Storage Length:										250	Feet
Additional Findings:										N/A	
Additional Comments / Justifications:											