

Roundabout Analysis

A comparison of Vissim, Arcady, and HCS 7

NCITE SimCAP Meeting

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Vissim

- Enter the following information:
 - Draw correct approach configuration
 - 15 minute volumes
 - Percent heavy vehicles by approach
 - Use Highway Capacity Manual capacity equations to calibrate the model based on geometry
 - Adjust desired speed decisions, reduced speed areas, conflict area front/rear gaps to get to correct capacity for each approach
- Output:
 - Average and maximum queues ***per movement***
 - Vehicle delay ***per movement & intersection overall***



HCS 7

- Enter the following information:
 - Peak hour factor (for overall intersection)
 - Roundabout approach configuration
 - Vehicles/hour
 - Percent heavy vehicles by movement
- Output:
 - 95% queues *per lane*
 - Vehicle delay *per lane, per approach & intersection overall*



Arcady

- Enter the following information:
 - Enter approach configuration
 - 15 minute volumes
 - Percent heavy vehicles by movement
 - Enter detailed geometrics:
 - Entry width, effective flare length, half width, entry radius, entry angle, inscribed diameter
- Output:
 - Average and 95% queues ***per movement***
 - Vehicle delay ***per movement & intersection overall***



Comparison Table

	<i>Modeling Features</i>	Vissim	HCS7	Arcady
INPUTS	<i>Volumes</i>	15 min volumes	60 min volumes	15 min volumes
	<i>Heavy Commercial</i>	By approach	By movement	By movement
	<i>Geometric Considerations</i>	Number of lanes	Number of lanes	Number of lanes, entry width, effective flare length, half width, entry radius, entry angle, inscribed diameter
	<i>Simulation</i>	Yes	No	Yes
	<i>Other factors</i>	Speed & Acceptable Gaps	-	-
OUTPUTS	<i>Delay</i>	Per movement	Per lane	Per movement
	<i>Queuing</i>	Average/Maximum queue per movement	95% queue per lane	Average/95% queue per movement



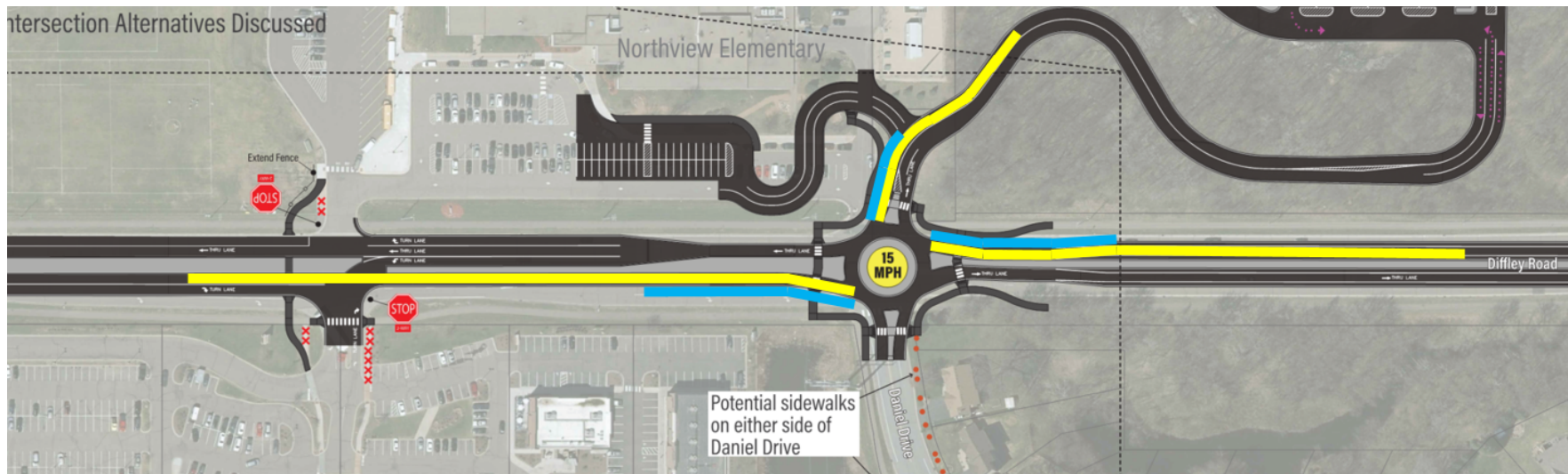
Example Operations

Program	Peak Hour	Intersection Delay*/LOS		Approach Delay*/LOS							
				EB		WB		NB		SB	
Vissim	AM	12	B	9	A	17	C	12	B	8	A
	PM	5	A	5	A	4	A	4	A	8	A
Arcady	AM	11	B	11	B	13	B	6	A	9	A
	PM	7	A	7	A	7	A	4	A	7	A
HCS 7	AM	15	C	11	B	22	C	9	A	15	C
	PM	10	A	9	A	11	B	6	A	11	B

Program	Peak Hour	Queue Length (ft)							
		EB		WB		NB		SB	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max
Vissim	AM	50	800	75	650	25	125	25	300
	PM	25	400	25	325	25	50	25	250
Arcady	AM	75	225	75	200	25	25	25	100
	PM	50	125	50	100	0	25	25	100
HCS 7	AM	-	150	-	200	-	25	-	100
	PM	-	100	-	100	-	25	-	50



Example Operations



- Vissim Maximum Queuing
- Arcady/HCS 7 Maximum Queuing



Conclusions

- Overall intersection delay and average queue lengths are very similar between all three programs
- Maximum queue lengths are shown to be worse in Vissim than Arcady or HCS7, but we can analyze queues per minute in Vissim to understand how long excessive queuing is anticipated to last
- We should consider operations in other programs such as RODEL and Synchro

