Roundabout Capacity Check

A roundabout design was examined for the intersection of MO Route 9/River Park Drive & East Street & 1st Street.

Existing Traffic: Taken from the June 2010 Parkville, MO Downtown Traffic Engineering Assistance Program (TEAP)

Projected Traffic: The TEAP report recommended a traffic volume growth of 50% in 20 years. This is a 2% growth rate per year. To calculate 2035 traffic from 2010 traffic counts, a growth factor of 1.64, (1 + 0.02 growth rate)^25 years, was applied.

Capacity of Roundabout:

Volume Range (sum of entering and conflicting volumes)	Number of Lanes Required
0 to 1,000 veh/h	▪ Single-lane entry likely to be sufficient
1,000 to 1,300 veh/h	▪ Two-lane entry may be needed ▪ Single-lane may be sufficient based upon more detailed analysis.
1,300 to 1,800 veh/h	▪ Two-lane entry likely to be sufficient
Above 1,800 veh/h	▪ More than two entering lanes may be required ▪ A more detailed capacity evaluation should be conducted to verify lane numbers and arrangements.

Source: New York State Department of Transportation

- By sketching the turning-movement volumes, the number of lanes needed for a roundabout can be estimated.
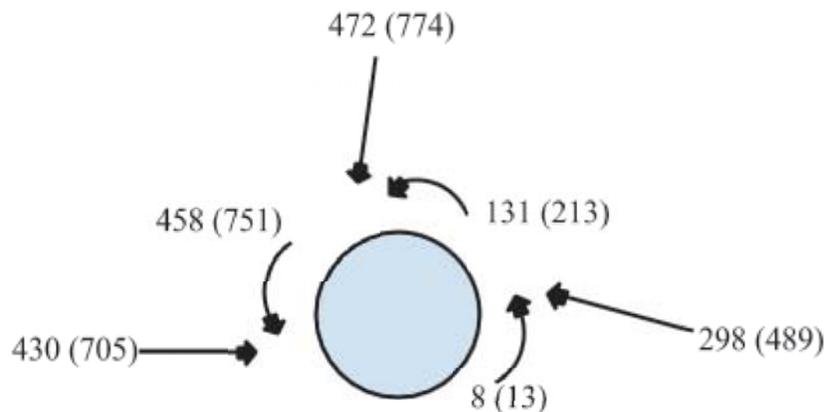
- Entering volume + Circulating volume = X   If X < 1000, Then Single Lane OK

AM 2010
- 472 + 131 = 603   < 1000, Single Lane OK
- 430 + 458 = 888   < 1000, Single Lane OK
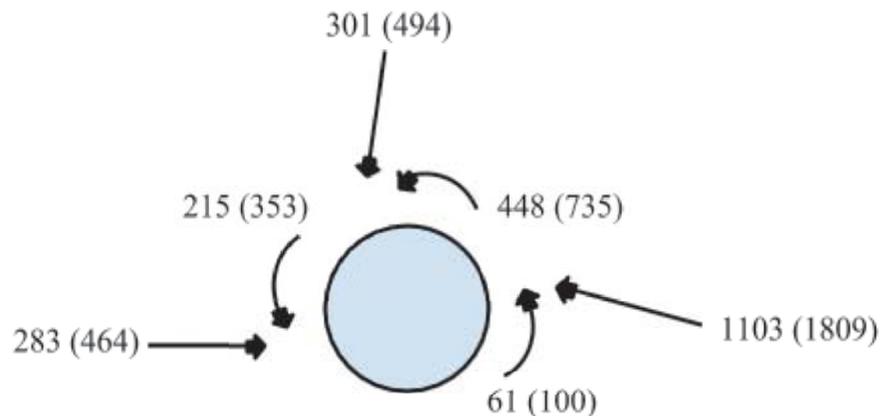- 298 + 8 = 306   < 1000, Single Lane OK

(AM 2035)
- 774 + 215 = 989   < 1000, Single Lane OK
- 705 + 751 = 1456   > 1000, Single Lane NOT OK
- 489 + 13 = 502   < 1000, Single Lane OK

301 (494)

215 (353)   448 (735)

283 (464)   1103 (1809)

61 (100)

PM 2010
- 301 + 448 = 749   < 1000, Single Lane OK
- 283 + 215 = 498   < 1000, Single Lane OK
- 1103 + 61 = 1164   > 1000, Single Lane NOT OK

(PM 2035)
- 494 + 735 = 1229   > 1000, Single Lane NOT OK
- 464 + 353 = 817   < 1000, Single Lane OK
- 1809 + 100 = 1909   > 1000, Single Lane NOT OK

Location of Roundabout:
- Option 1:
  - Extend Mill Street to connect directly with roundabout
  - Advantage: Less vehicle congestion for 450 vehicles routed through 1st Street in PM peak which have to make a left turn on Main Street
  - Disadvantage: Cost of removing businesses
- Option 2:
  - If Mill Street cannot be directly connected to roundabout
  - Advantage: Less cost
  - Disadvantage: Congestion could back up into roundabout.

Diameter of Roundabout:
- A common diameter of a Single Lane Roundabout is 90 to 180 ft.
- A common diameter of a 2-Lane Roundabout is 150 to 300 ft.
- Heavy use by trucks will necessitate a larger lane. A suggestion is 16 ft lane widths.

Roundabout Configuration	Typical Design Vehicle	Common Inscribed Circle Diameter Range*	
Mini-Roundabout	SU-30 (SU-9)	45 to 90 ft	(14 to 27 m)
Single-Lane Roundabout	B-40 (B-12)	90 to 150 ft	(27 to 46 m)
	WB-50 (WB-15)	105 to 150 ft	(32 to 46 m)
	WB-67 (WB-20)	130 to 180 ft	(40 to 55 m)
Multilane Roundabout (2 lanes)	WB-50 (WB-15)	150 to 220 ft	(46 to 67 m)
	WB-67 (WB-20)	165 to 220 ft	(50 to 67 m)
Multilane Roundabout (3 lanes)	WB-50 (WB-15)	200 to 250 ft	(61 to 76 m)
	WB-67 (WB-20)	220 to 300 ft	(67 to 91 m)

* Assumes 90° angles between entries and no more than four legs. List of possible design vehicles is not all-inclusive.

Recommendations: Do not install a roundabout at MO Route 9/River Park Drive & East Street & 1st Street since a single lane roundabout would be over capacity and a double lane roundabout would not fit in the limited space in the downtown area.