### Preliminary Critical Roundabout Design Parameters - 2-Lane Roundabout

**PIN 1085.42, Rt 146 over the Mohawk River**
Towns of Niskayuna and Clifton Park - Saratoga and Schenectady Counties

<table>
<thead>
<tr>
<th>Element</th>
<th>Parameter</th>
<th>North Leg</th>
<th>South Leg</th>
<th>West Leg</th>
<th>East Leg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Max. Entry Speed 1 Lane:</td>
<td>20 - 25 mph</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>22 mph (R= 150.1 ft)</td>
</tr>
<tr>
<td>2 Lane:</td>
<td>27 mph (R= 204.1 ft)</td>
<td>23 mph (R= 136.1 ft)</td>
<td>27 mph (R= 205.1 ft)</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2 Entry Lane Width</td>
<td>13' - 16' typical</td>
<td>2@11 ft</td>
<td>12 ft</td>
<td>12 ft</td>
<td>11 ft</td>
</tr>
<tr>
<td>3 Entry Width 1 Lane:</td>
<td>14' - 18' typical</td>
<td>38.0 ft</td>
<td>29.9 ft</td>
<td>32.0 ft</td>
<td>14.7 ft</td>
</tr>
<tr>
<td>2 Lane:</td>
<td>24' - 30' typical</td>
<td>100 ft</td>
<td>100 ft</td>
<td>100 ft</td>
<td>100 ft</td>
</tr>
<tr>
<td>4 Entry Radius</td>
<td>65' - 130' typical</td>
<td>50 deg.</td>
<td>42 deg.</td>
<td>102 deg.</td>
<td>125 deg.</td>
</tr>
<tr>
<td>5 Sweep Angle Criteria #1: 20° – 60° (30° - 40° desired)</td>
<td>53 deg.</td>
<td>38 deg.</td>
<td>46 deg.</td>
<td>44 deg.</td>
<td></td>
</tr>
<tr>
<td>Entry Angle Criteria #2: ≥ ⅔ obstructed view? (yes or no)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>6 Entry Angle of Visibility</td>
<td>≥ 75°, Per Section 6.7.4</td>
<td>67.7 ft</td>
<td>100.4 ft</td>
<td>63.1 ft</td>
<td>50.2 ft</td>
</tr>
<tr>
<td>7 Splitter Island length at high speed approaches:</td>
<td>≥ 50' (100' desirable)</td>
<td>N/A</td>
<td>N/A</td>
<td>83 ft</td>
<td>140 ft</td>
</tr>
<tr>
<td>8 Control of Access &amp; Parking</td>
<td>No parking or access within 20' of crosswalk or 80' m of yield line, which ever is more restrictive; if ≥ 200' of yield line indicate distance, otherwise indicate &quot;N/A&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Approach Stopping Sight Distance</td>
<td>Per Section 6.7.3 (SDD 197.8@30 mph, 152.7@25mph)</td>
<td>338 ft</td>
<td>185 ft</td>
<td>221 ft</td>
<td>192 ft</td>
</tr>
<tr>
<td>10 Circulating Roadway Sight Distance</td>
<td>Per Section 6.7.3 (SDD 197.8@30 mph, 152.7@25mph)</td>
<td>101 ft (Assumes Full Center Island Obstruction)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11a Intersection Sight Distance Req.</td>
<td>Per Section 6.7.3.4</td>
<td>d₁ = 176 ft</td>
<td>d₂ = 147 ft</td>
<td>d₃ = 161 ft</td>
<td>d₄ = 213 ft</td>
</tr>
<tr>
<td>11b Intersection Sight Distance Provided</td>
<td>Per Section 6.7.3.2</td>
<td>d₁ = 399 ft</td>
<td>d₂ = 182 ft</td>
<td>d₃ = 248 ft</td>
<td>d₄ = 311 ft</td>
</tr>
<tr>
<td>12 Sight Distance to Crosswalk (Exit SSD)</td>
<td>Per Section 6.7.3 (SDD 197.8@30 mph, 152.7@25mph)</td>
<td>230 ft</td>
<td>296 ft</td>
<td>278 ft</td>
<td>245 ft</td>
</tr>
<tr>
<td>13 Inscribed Circle Diameter</td>
<td>Per Section 6.3.1</td>
<td>190 ft - 240 ft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 Circulatory Road 1 Lane:</td>
<td>16' - 20'</td>
<td>16 ft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lane Width 2 Lane:</td>
<td>14' - 16'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 Min. Exit Radius 5</td>
<td>65' – w'</td>
<td>1400</td>
<td>396</td>
<td>Tangent</td>
<td>319</td>
</tr>
<tr>
<td>16 Pedestrian Accommodations</td>
<td>Compliance w/ADA, HDM Ch. 18 &amp; NCHRP 672</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 Design Vehicle</td>
<td>See HDM § 5.7.1</td>
<td>S-BUS-48 Checked w/ WB-67</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

1 Parameters per NCHRP Report 672, "Roundabouts: An Informational Guide (Second Edition)", Main Office Intersection Design Squad and/or Region 1, as applicable.

2 Section numbers listed in the table above refer to NCHRP Report 672, "Roundabouts: An Informational Guide (Second Edition)"

3 Criteria #1 for the entry angle shall be the angle (in degrees) that represents the degree of curvature of the approach entry radius. It is understood that this may be contrary to what is illustrated on Figure 1 in EI 00-021.

4 To determine Criteria #2 for the entry angle, the designer shall project the tangent portions of the right approach lane’s left and right lane lines into the circulating roadway. At the splitter island’s bull-nose in the vicinity of the projection (between the approach and circulating roadways), it is preferred that 2/3 or more of the width of the projection at the bull-nose, measured perpendicular to the projections, is taken up by the splitter island.

5 Exit radius is measured along the right curbline at exit.

6 Once the Design Parameters table is completed, the designer shall highlight any information that is not typical, desired &/or preferred as indicated below:

**Key:**

- not typical, desired, &/or preferred, but within general range of acceptance (highlight yellow)
- not typical, desired, &/or preferred and outside general range of acceptance (highlight orange)
NOTES:
1. VEHICLE TRACKING SHOWN IS BASED ON PRELIMINARY ROUNDABOUT LAYOUT.
2. WB-67 NOT USED FOR EAST LEG (WILLIAMS ST) RIGHT TURN. LARGE SCHOOL BUS
USED AND ACCOMMODATED.

NEW YORK STATE DEPARTMENT OF TRANSPORTATION
REGION 4
BRIDGES/CULVERTS

DESIGN VEHICLE TRACKING

AS-BUILT REVISIONS

DESCRIPTION OF ALTERATIONS

FILE NAME 108542_AN_RAB_20.dgn

DATE/TIME USED AND ACCOMMODATED.

WB-20-INTERSTATE SEMI-TRAILER WITH LWB TRAILER

WB-20-INTERSTATE SEMI-TRAILER WITH LWB TRAILER
NOTE:
PATHS AND RISE SHOWN ARE PRELIMINARY; FASTEST PATH SHALL BE ANALYZED BASED ON FINAL DESIGN LAYOUT.

DESCRIPTION OF ALTERATIONS:
AS-BUILT REVISIONS

PATHS AND RISE SHOWN ARE PRELIMINARY; FASTEST PATH SHALL BE ANALYZED BASED ON FINAL DESIGN LAYOUT.
NOTE:
PATHS AND RACES SHOWN ARE PRELIMINARY; FASTEST PATHS SHALL BE ANALYZED BASED ON FINAL DESIGN LAYOUT.

NOTE:
AS-BUILT REVISIONS
DESCRIPTION OF ALTERATIONS:

ANCHOR
DATE/TIME =
FILENAME =

108542_AN_RAB_20.dgn

ON FINAL DESIGN LAYOUT.
PATHS AND RADII SHOWN ARE PRELIMINARY. FASTEST PATHS SHALL BE ANALYZED BASED ON FINAL DESIGN LAYOUT.
### Fastest Path ("Racing Line") Calculations

**PIN 1085.42, NY Rte 146 at Aqueduct Rd**

**Town of Niskayuna and Clifton Park - Schenectady and Saratoga Counties - New York State**

<table>
<thead>
<tr>
<th>Single or Multi-lane?</th>
<th>Multi-lane</th>
<th>Fastest Path Radii (see figure below)</th>
<th>North Leg</th>
<th>South Leg</th>
<th>West Leg</th>
<th>East Leg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>R1</td>
<td>Radius (ft)</td>
<td>Associated Speed (mph)</td>
<td>Radius (ft)</td>
<td>Associated Speed (mph)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R1</td>
<td>204.1</td>
<td>27</td>
<td>136.1</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R2</td>
<td>141.9</td>
<td>21</td>
<td>62</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R3</td>
<td>1506.8</td>
<td>33</td>
<td>399.9</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R4</td>
<td>48.6</td>
<td>14</td>
<td>62</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R5</td>
<td>216.5</td>
<td>27</td>
<td>136.1</td>
<td>23</td>
</tr>
</tbody>
</table>

**Maximum Roundabout Entry Design Speed Check**

- **R1 Speed vs. Maximum Entry Speed**
  - single-lane: OK
  - multi-lane: OK

**Speed Consistency (between 10 - 15 mph)**

- a. Difference between R1 & R2 speeds: OK
- b. R2 < R3 speeds: OK
- c. Difference between R1 & conflicting R2 speed: OK
- d. Difference between R1 & conflicting R4 speed: OK

### Key to colors within the table:
- Requires designer input
- Obtained from Exhibit 6-52 (page 6-57) in NCHRP’s publication titled, "Roundabouts: An Informational Guide – 2nd Edition"
- Calculated (output)

### Notes:
1. Fastest paths shall be drawn as described in Section 6.7.1 of NCHRP’s publication titled, “Roundabouts: An Informational Guide – 2nd Edition”
2. For R1-R5 in table above, values should be filled in from the leg the move originates from. For instance, in the figure to the right, R4 originates from the east leg - R4 value for east leg. R5 originates from the north leg - R5 value for north leg. R1, R2 and R3 all originate from the west leg.
3. The five criteria in the table are based on Sections 6.2.1 and 6.7.1.3 of NCHRP’s publication titled, "Roundabouts: An Informational Guide – 2nd Edition”.
4. Per Section 6.2.1 of NCHRP’s publication titled, “Roundabouts: An Informational Guide – 2nd Edition”, the roundabout’s maximum entry design speed (along the fastest path) should be 20-25 mph for a single lane roundabout and 25-30 mph for a multilane roundabout.
5. The speed in the table above associated with R3 (obtained from Exhibit 6-52) does not take into account equation 6-4 in NCHRP’s publication titled, “Roundabouts: An Informational Guide – 2nd Edition” because the speed obtained from Exhibit 6-52 will typically be the minimum speed per Equation 6-4. Designers are encouraged to check the speed associated with R3 by using Equation 6-4.
RAD - Intersection Sight Distance Required
NCHRP Report 672

N. Legs
\[ V_{\text{major (entering)}} = \frac{V_1 + V_2}{2} = \frac{27 + 21}{2} = 24 \text{ mph} \]
\[ V_{\text{major (circulating)}} = R_4 = 14 \text{ mph} \]
\[ d_1 = 1.468 \times (V_{\text{major (entering)}} + c_5 \text{ sec}) = 1.468 (24)(5.0) = 176 \text{ ft} \]
\[ d_2 = 1.468 \times (V_{\text{major (circulating)}} + c_5 \text{ sec}) = 1.468 (14)(5.0) = 103 \text{ ft} \]

S. Legs
\[ V_{\text{major (entering)}} = \frac{23 + 17}{2} = 30 \text{ mph} \]
\[ V_{\text{major (circulating)}} = 17 \text{ mph} \]
\[ d_1 = 1.468 (20)(5.0) = 147 \text{ ft} \]
\[ d_2 = 1.468 (17)(5.0) = 125 \text{ ft} \]

West Legs
\[ V_{\text{major (entering)}} = \frac{27 + 17}{2} = 22 \text{ mph} \]
\[ V_{\text{major (circulating)}} = 17 \text{ mph} \]
\[ d_1 = 1.468 (22)(5.0) = 161 \text{ ft} \]
\[ d_2 = 1.468 (17)(5.0) = 125 \text{ ft} \]

East Legs
\[ V_{\text{major (entering)}} = \frac{22 + 29}{2} = 29 \text{ mph} \]
\[ V_{\text{major (circulating)}} = 14 \text{ mph} \]
\[ d_1 = 1.468 (22)(5.0) = 213 \text{ ft} \]
\[ d_2 = 1.468 (14)(5.0) = 103 \text{ ft} \]
STOPPING SIGHT DISTANCE

- EXIT SSD = 230 ft
- EXIT SSD = 278 ft
- APPROACH SSD = 296 ft
- EXIT SSD = 245 ft
- APPROACH SSD = 338 ft
- Approach SSD = 221 ft
- Approach SSD = 250 ft
- Approach SSD = 450 ft
- Approach SSD = 192 ft
- Exit SSD = 101 ft

PATHS AND SIGHT TRIANGLES SHOWN ARE PRELIMINARY. SSD'S SHALL BE ANALYZED BASED ON FINAL DESIGN LAYOUT.