

Shelburne St. Rotary Burlington, VT



Intersection Safety Improvement Study



**Public Meeting
November, 2008**

Agenda

- Project History
- Safety
- Alternatives Studied
- Preferred Alternative
- Comments & Questions
- Next Steps

History

- Shelburne Road Rotary Redesign Project (2002)
 - Reconstruction not Safety Project
 - Studied 9 Alternatives
 - Preferred Alternatives
 - 5 way Roundabout
 - 5 way Traffic Signal
 - No Detailed Analysis on Impacts

Safety Project

- Top 50 High Crash Location in Vermont (2006) – *53 crashes in 5 years*
- Eligible for 100% Federal Funding under VTrans' Safety Program
- Safety Program's Criteria:
 - Preferred alternative shall provide safety benefits that outweigh the costs of the improvement
 - B/C Ratio Consideration:
$$\frac{\text{expected benefit (\$)}}{\text{construction cost (\$)}} \quad \text{must be } > \mathbf{1.0}$$

Alternatives Analyzed

- Do Nothing
- Signalization (4-way)
- Single Lane Roundabout within ROW (4-way)
- Hybrid Roundabout
 - Retain 2 Lanes for Shelburne St. Northbound Approach
- Single Lane Roundabout (4-way) on Hybrid's Footprint
 - Possible ROW Issues
 - Increased Costs

Highlights of Results

- Do Nothing
 - Safety not addressed

- Signalization
 - Traffic Flow Issues
 - High Delays & Queues
 - 23% Crash Reduction
 - $B/C=0.18$
 - Annual Benefit: \$19,000 / Costs: \$102,300

Highlights of Results (Continued)

- Single Lane Roundabout
 - Continuous Traffic Flow at Low Speeds
 - Safest Alternative for Pedestrian Crossing
 - Pedestrian exposure to traffic lower than other alternatives (refuge islands)
 - Vehicles *[are forced to]* approach and travel through slowly
 - Pedestrian crossing does not interfere with driver decision to enter the roundabout
 - Northbound lanes must merge before entering
 - Moving queues form only during peak times
 - 72% Crash Reduction
 - B/C=1.37
 - Annual Benefit: \$70,400 / Costs: \$51,400

Highlights of Results (Continued)

- Hybrid Roundabout
 - Continuous traffic flow at higher speeds than single lane roundabout
 - No Shelburne St. merge required but delays on St. Paul approach increase
 - 55% Crash Reduction
 - B/C=0.91
 - Annual Benefit: \$54,000/ Costs: \$59,000

- Single Lane Roundabout on Hybrid's Footprint
 - Option for 2nd lane northbound lane on Shelburne St.
 - Right of Way impacts are greater on school property
 - Cost is close to hybrid
 - 72% Crash Reduction (but may go up if 2nd lane is installed!)
 - B/C= 1.19
 - Annual Benefit: 70,400 / Costs: 59,000

CITY OF BURLINGTON - SHELBURNE STREET ROTARY

ROUNDABOUT ALTERNATIVE

Single Lane



**RIGHT TURN
OUT ONLY**

**"DON'T BLOCK THE
BOX" STRIPING**

**MERGE
NORTHBOUND
TRAFFIC TO
ONE LANE**

APPROXIMATE END
OF MAX QUEUE
(am & pm peak)

APPROXIMATE END
OF MAX QUEUE
(pm peak)

S. WILLARD STREET

ST. PAUL STREET

LEDGE ROAD

SHELBURNE STREET

**REMOVE
EXISTING
CROSSWALK
ON ALL
CROSSWALK
APPROACHES**

**NEW
CROSSWALK
ON ALL
CROSSWALK
APPROACHES**

**LEFT TURN
POCKET**

LOCUST STREET

GOVE COURT



CITY OF BURLINGTON - SHELBURNE STREET ROTARY ROUNDAABOUT ALTERNATIVE

Single Lane with 2nd lane
added Northbound (Hybrid)



RIGHT TURN
OUT ONLY

"DON'T BLOCK THE
BOX" STRIPING

S. WILLARD STREET
parking lane

ST. PAUL STREET
parking lane
parking lane

LEDGE STREET

SHELBURNE STREET

REMOVE
EXISTING
CROSSWALK

NEW
CROSSWALK
ON ALL
APPROACHES

LEFT TURN
POCKET
RIGHT OF WAY
AND PROPERTY
LINES

GROVE COURT

LOCUST STREET
parking lane

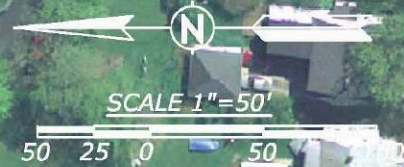


Compare Performance

Approach	Single Lane		Hybrid	
	Average Delay (s)	Max Queue (ft)	Average Delay (s)	Max Queue (ft)
S. Willard	14.4	58	13.5	53
St. Paul St	12.4	513	14.5	606
Locust St.	16.9	80	20.2	98
Shelburne St.	4.7	403	3.8	159
OVERALL	9.0		9.5	

CITY OF BURLINGTON - SHELBURNE STREET ROTARY ROUNDAABOUT ALTERNATIVE

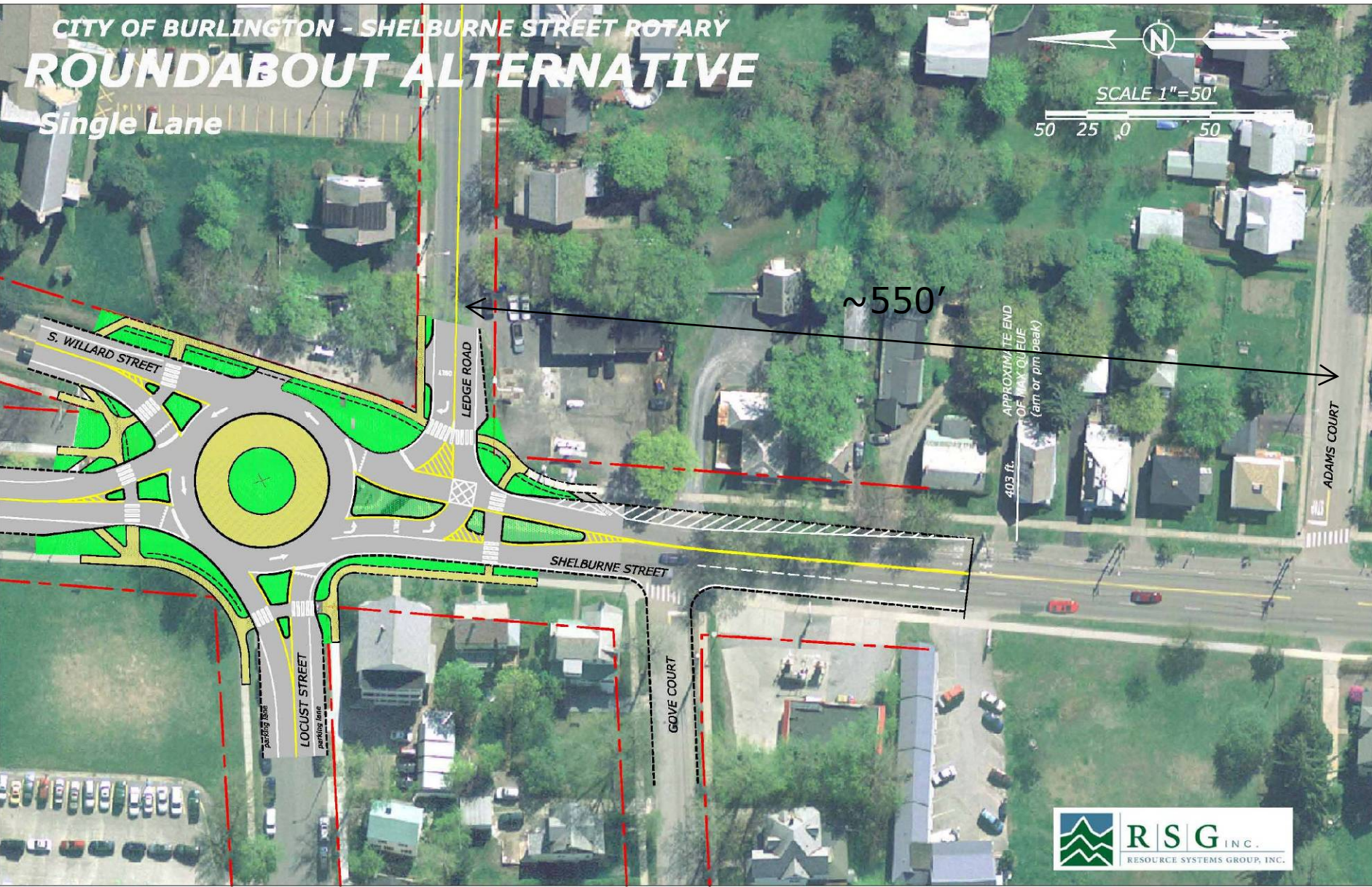
Single Lane



~550'

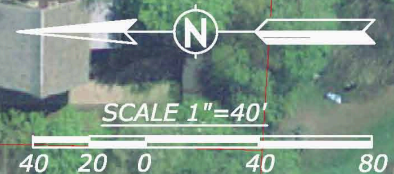
APPROXIMATE END
OF MAX QUEUE
(am or pm peak)

403 ft.



CITY OF BURLINGTON - SHELBURNE STREET ROTARY ROUNDAABOUT ALTERNATIVE

Single Lane with option for
future lane added Northbound



RIGHT TURN
OUT ONLY

"DON'T BLOCK THE
BOX" STRIPING

APPROXIMATE END
OF MAX OUFUJE

S. WILLARD STREET
parking lane

ST. PAUL STREET
parking lane
parking lane

LEDGE STREET

SHELBURNE STREET

REMOVE
EXISTING
CROSSWALK

NEW
CROSSWALK
ON ALL
APPROACHES

LEFT TURN
POCKET

RIGHT OF WAY
AND PROPERTY
LINES

GROVE COURT

LOCUST STREET
parking lane



Pros & Cons-Single Lane Roundabout

Estimated Construction Cost: \$895,000

PROS:

- Safer than 2 lane alternatives:
 - Opportunities for sideswipe where 2 lanes
 - Narrower pedestrian crossing is safer and quicker
 - Better vehicle speed control with narrower single lane entry
- Less dependent on striping to control traffic
- Better queuing performance for worst movement (southbound on St. Paul St.)
- Costs less / less pavement / smaller intersection / less maintenance / Minimum ROW impact

CONS:

- Northbound lanes must merge before entering causing longer moving queues during peak times

Pros & Cons - Hybrid Roundabout

Estimated Construction Cost \$1,034,000

PROS:

- 2 northbound lanes continue through intersection
- Less delay and shorter queues for NB approach

CONS:

- Likely to be more accidents (sideswipes where 2 lanes)
- Less speed control on two lane entry
- Longer pedestrian crossing on south approach
- Maintenance of striping is important for lane use control
- Northbound approach will tend to dominate traffic
- More delays and longer queues for St. Paul approach
- Bigger intersection / more pavement / costs more / more maintenance / More ROW impacted

Preferred Alternative

BDPW Commission

Single Lane Roundabout (4-Way)

- ❑ Not a traffic circle, or a rotary
- ❑ Strong history of improved safety
 - Vehicle, Pedestrian, Bicycle
- ❑ Accommodates all movements
- ❑ Continuous traffic flow at low speeds
- ❑ Fits within the current footprint
 - Little if any ROW Issues
 - Pavement area reduced
- ❑ $B/C=1.37$

Questions or Comments

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