ROUNDABOUTTOPICS-- FINDINGS AND TRENDS FROM VERMONT AND BEYOND

TONYREDINGTON

TransportationPolicy
Montpelier,Vermont

NationalRoundaboutConference

Vail, Colorado May 24, 2005


SPRING ST

TRENDS

- U.S. LOST HIGHWAY SAFETY LEAD TO U.K., U.S. NOW NINTH (7 AHEAD HEAVILY INVESTED IN ROUNDABOUTS)
- VEHICLE MILES OF TRAVEL GROWTH SLOWS--U.S. VMT, 2004, UP 1.1%
- VMT GROWTH STALLS IN NEW ENGLAND--90s HISTORIC LOW OF 16%, FLAT LINE AFTER 1999
- FUTURE: TOWARD “EUROPE,” INTEGRATED, CAR MODAL SHARE DOWN AND OTHERS UP

TRENDS

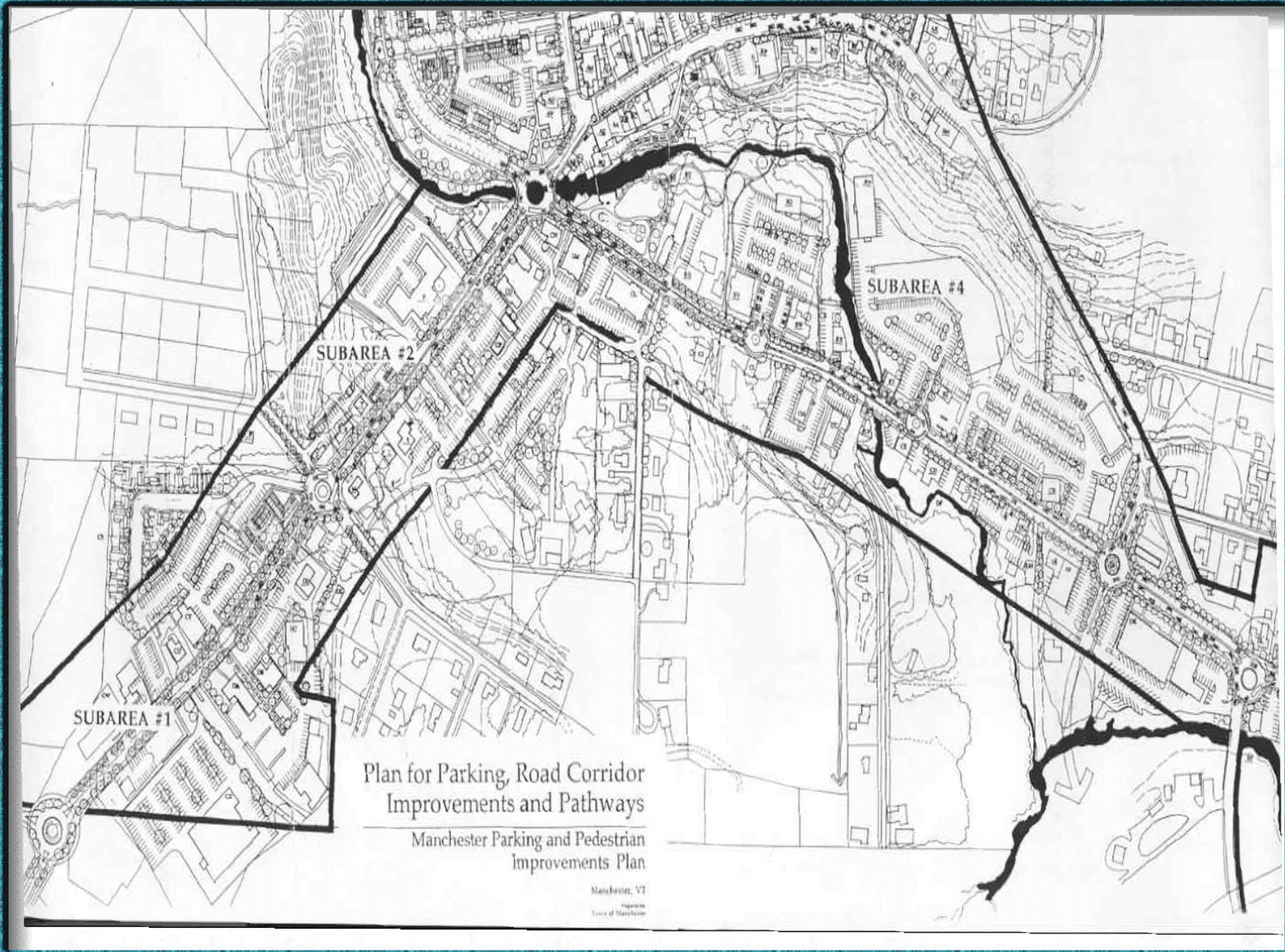
- LAWSUITS IN NH STATE COURT (2002) AND VT FEDERAL (2004) STOP MAJOR HIGHWAY EXPANSIONS IN GREAT PART BECAUSE ROUNDABOUT TECHNOLOGY DISCOUNTED IN ENVIRONMENTAL STUDIES
- INCREASING ENGINEERING COMMUNITY CONCERN OVER INJURY NEGLIGENCE SUITS FOR INSTALLING STOP LIGHTS WITH THEIR MULTIPLE RATES OF DISABLING INJURIES

FIRSTS IN NORTHEAST ROUNDABOUTS

- Roundabout: August 1995, Montpelier, VT, “Keck Circle”--19th in U.S.
- Town center roundabout plan: 1995, Manchester, VT
- 2-Lane and interstate interchange: 1999, Brattleboro, VT, “Keene-Turn”
- 1st federal Scenic Byway funded design, Smggler’s Notch Scenic Road/Stowe Mtn. Resort gateway, 1995

ROUNDABOUTS IN THE U.S., A PREDICTION:

The roudabout impact on the U.S urban built environment will be far greater than that of the interstate highway--and the impact will be totally positive


SUBAREA #1
SUBAREA #2
SUBAREA #4
Plan for Parking, Road Corridor Improvements and Pathways
Manchester Parking and Pedestrian Improvements Plan
Manchester, VT

FIRSTS IN NORTHEAST ROUNDABOUTS

- First Governor's dedication:
  - 1999, VT Gov. Howard Dean, Brattleboro (1st in U.S.?)
- First Micro-NECTA Core Area Full Feasibility Assessment: Keene, NH
  - Michael "Mr. Roundabout" Wallwork, Jacksonville, 1993;
  - U.K's Barry Crown and Lief Ourston of Santa Barbara for Concerned Cheshire Citizens 2000-2003;
  - Barry Crown for NHDOT, 2004, and for City, 2003-2004)

FIRSTS IN NORTHEAST ROUNDABOUTS

- First U.S. law, 2002, directs VT transportation agency to “pursue... construction of roundabouts at intersections determined to pose safety hazards for motorists.”
- “Roundabout Corridor”--2005, Malta, NY, five roundabouts, including Northway, I 87, interchange, NYDOT

VERMONTROUNDABOUTS SAFETYPERFORMANCE

- 24 “ROUNDABOUT YEARS”--NO DISABLING INJURIES
- FIVE MINOR INJURIES--4 CAR OCCUPANTS, ONE PEDESTRIAN
- INJURY RATE (PER MILLION ENTERING VEHICLES) (/MEV): 0.045
- 2-LANE MEV INJURY RATE: 0.023
- 1-LANE MEV INJURY RATE: 0.059

VERMONTROUNDABOUTS SAFETYPERFORMANCE

- Comparative injuries rates /MEV

VT Roundabouts:	0.045
US 7/VT 103 (TWSC):	0.270
VT 62 (West 3 Signals):	0.490

(Note: TWSC and signals are high speed intersections)

MONTPELIER'S KECK CIRCLE

- 1995, 3-Leg, 10,050 VPD, 106 ft. ICD
- 260 peds per day; Design: Wallwork
- Peak hour stop delay: 6.3 sec. before, 2.7 sec. after; block away signal delay drops 40 to 27 sec. from shift of traffic on rectangle grid
- MEV injuries rate:

Before:	0.17	
After:	0.058	-66%

MONTPELIER'S KECK CIRCLE

- 2 Injury crashes (9/95 through12/04): (1) 83-year-old pedestrian, bumps and bruises; (2) Two vehicle, one complaint of back soreness, headache
- 100% City funded
- 2 Property Damage Only (PDO) Crashes

MANCHESTER'S GRAND UNION

- 4-leg; opened, September,1997; 90 ft. ICD
- VT 7A; 10,800 VPD (estimated)
- Wallwork design, Grand Union Co.
- 1 crash late 1997, 2 minor injuries from air bag, MEV crash rate 10/97 through 12/04: 0.075

MANCHESTER'S GRAND UNION

- Commercial product "Bomanite," concrete veneer with custom color and pattern, used on all splitter islands and apron, stood up well since 1997


YIELD
TO TRAFFIC ON LEFT

BRATTLEBORO'S"KEENE TURN"

- 4 leg, 1999, I 91/US 5/VT 9, 172 ICD
- 28,000 VPD, sidewalked
- Replaced signal with left turn protection
- MEV injury rate:
  Before 1.076
  After 0.058 -95%
  (Before data 5 years, after 4.25 years)


Ford

BRATTLEBORO'S"KEENE TURN"

- Heavy truck volume (tractor trailers), 900 daily, 3.2% of VPD; medium trucks, 1,120 daily, 4.0% of VPD
- Identified significant design flaws remain in place--higher PDO rate results
- Design--VT Agency of Transportation
- Stop delay a.m. peak: Before, 44 sec.; after, 12 sec.

WILLISTON'S "MAPLE TREE PLACE"

- 4-leg, 2001, about 90 ft. ICD
- Private shopping complex street, 6,000 VPD (estimated); at future point, town highway
- No injury crashes, 11/2001 through12/2004)
- Design: local firm

VERMONTEXPERIENCE

- Several trainings starting with Wallwork, 1992 and subsequent; mini-workshop, U.K.’s Clive Sawers,1999; U.K.’s Barry Crown, 2001; Canada’s Mark Lenters, 2004; Howard McCulloch, 2005
- No state agency initiated roundabouts to date
- 3 of 4 roundabouts private or city funded

MOTOR FUEL USE REDUCTION

- Base research, Sweden, Andras Varhelyi, annual reduction of 18,000 gallons, 23,000 vpd; car following methodology, signal converted to roundabout (2001)
- VAOT evaluation of a.m. and p.m. peak, Keene Turn: 28,000 vpd from video tape; before and after hours of idle delay. By converting to fuel use and extrapolated to full daily average--30,845 gallons annually

MOTOR FUEL USE REDUCTION

- aaSIDRA software enables easy calculation of fuel use reduction in stop light conversions
- Assuming 20,000 gallons per intersection for 200 intersections in Vermont (300 signalized intersections), potential savings equal one percent of motor fuel consumption, over half percent total State petroleum consumption

MOTOR FUEL USE REDUCTION

- Motor fuel reduction per entering vehicle per year:

Swedish Study	0.75 gal.
Brattleboro Analysis	1.10 gal.

- Motor fuel reduction converts to pollutants, GHGs (aaSidra calculates)

U.S. ROUNDABOUT MARKET POTENTIAL

- Extrapolation of 2002 France 20,000 roundabout population to U.S.: 93,000
- Extrapolation of 2002 roundabout building rate to U.S.: 4,600
- Value ($1 million per roundabout)
  - 93,000 roundabouts: $93 billion
  - 4,600 roundabouts: 4.6 billion (about 15% of the federal highway program)

U.S. ROUNDABOUT MARKET POTENTIAL

- Vermont in-place French population equivalent, 200, and annual production, 10 yearly. Vermont has 300 stop lights. Numbers are realistic for Vermont.
- Apply "French ratios" to any state or area: Roundabouts in place--337 per million population; production--18 yearly per million population

TRANSPORTATION LAND USE EQUATION

- Conclusion: roundabouts reduce sprawl
- In the same functional manner a new highway at urban fringe changes land use by inducing sprawl, i.e., lower densities over time--the roundabout placement at existing intersections over time operates in the exactly opposite direction, i.e., higher densities of development over time

THE URBAN IMPACT OF THE ROUNDABOUT--CAR‘ATTRITION”

UrbanologistJaneJacobs

“Erosion of cities by automobiles entails...eventsthat..hardlyneed describing...Attritionofautomobiles by cities is today almost always by happenstance...Neverthelessitdoes occur”

***The Death and Life of Great American Cities,* 1961**

THE URBAN IMPACT OF THE ROUNDABOUT--CAR "ATTRITION"

The roundabout constitutes a powerful new technology to apply as a tool of car attrition in urban North America

ROUNDABOUTKEYS PEDESTRIANMODE

- 1000 Friends of Oregon study found 4 factors key good pedestrian environment and walking mode use: (1) intersection crossing ease; (2) sidewalks present; (3) sidewalk connectivity; and (4) topography
- By scoring each factor 0 to 3, a score of at least 9 of 12 needed to indicate a positive environment for pedestrians
- For any busy intersection, roundabout needed for strong “crossing ease” score

ROUNDABOUTKEYSPEDESTRIAN MODE--*A Pattern Language, Section 54, "Road Crossing," p.281*:

"No amount of painted white lines, crosswalks, traffic lights, button operated signals, ever quite manage to change the fact that a car weighs a ton or more, and will run over any pedestrian unless the driver brakes...The people who cross a road will only feel comfortable and safe if the road crossing is a physical obstruction, which physically guarantees that the cars must slow down and give way to pedestrians."

ROUNDABOUT KEYS PEDESTRIAN MODE

A roundbout by providing a "physical obstruction" we call deflection and a pedestrian refuge at mid-traffic stream moves a substantial distance toward meeting the criterion stated in "Pattern Language"

“THE ROUNDABOUT IS THE PERSONAL COMPUTER OF TRANSPORTATION BUILT WITH STONE AGE MATERIALS”

ROUNDABOUTS AND NATIONAL HIGHWAY SAFETY

- 2003 Highway deaths (FARS), 42,600; injuries, 2,889,000 (313,000 incapacitating)
- Intersection/intersection related crashes:
  - 8,700 fatality, 23% of all
  - 894,000 injury,
  - 1,664,000 property damage only
  - 2,700 signal (31%)--includes about 900 red-light-run fatalities; 3,200 stop sign (36%)

ROUNDABOUTS AND NATIONAL HIGHWAY SAFETY

- Signal percentage of all intersection/intersection related crashes:
  - 23%, 2700 fatalities
  - 51%, 451,000 injury
  - 47%, 789,000 property damage only

ROUNDABOUTS AND NATIONAL HIGHWAY SAFETY

Suggested objective of full roundaboutdeployment: Reduceintersection fatalities 25%, about 2,000; injuries 25%, about 200,000

TONY REDINGTON

TRANSPORTATION POLICY AND
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www.NEARoundabouts.org (built and operated by Bob White, founder of NEARC)

Excellent roundabouts "link" website at
Roundabouts.ca:
http://roundabouts.ca/links.htm

Webcam of first Ontario roundabout:
http://roundabouts.ca/livecam.htm