Oak Avenue Traffic Calming Concept Stage 2 – 400 and 500 Blocks

DRAFT: February 14, 2014

This paper seeks to provide a preliminary strategy for transitioning from temporary to permanent traffic calming measures on the 400 and 500 blocks of Oak Ave.

Various permanent measures have been recommended in documents such as the Oak-Poplar Neighborhood Traffic Study and the Safe Routes to School Action Plan, which was adopted by the Board of Aldermen and endorsed by the CHCCS Board of Education.

Based on a Board of Aldermen resolution on May 21, Town staff have implemented temporary traffic calming measures on these blocks since September 2013.

1 Pedestrian refuge island: Oak-Greensboro intersection

Permanent measure

- Contract for the design of:
  - A permanent refuge island
  - Improvements to the curb ramps at the intersection to accord with ADA PROWAG draft guidelines
  - If feasible, potential improvements to slow down southbound right turns onto Oak Ave.

Oak-Poplar Neighborhood Traffic Study

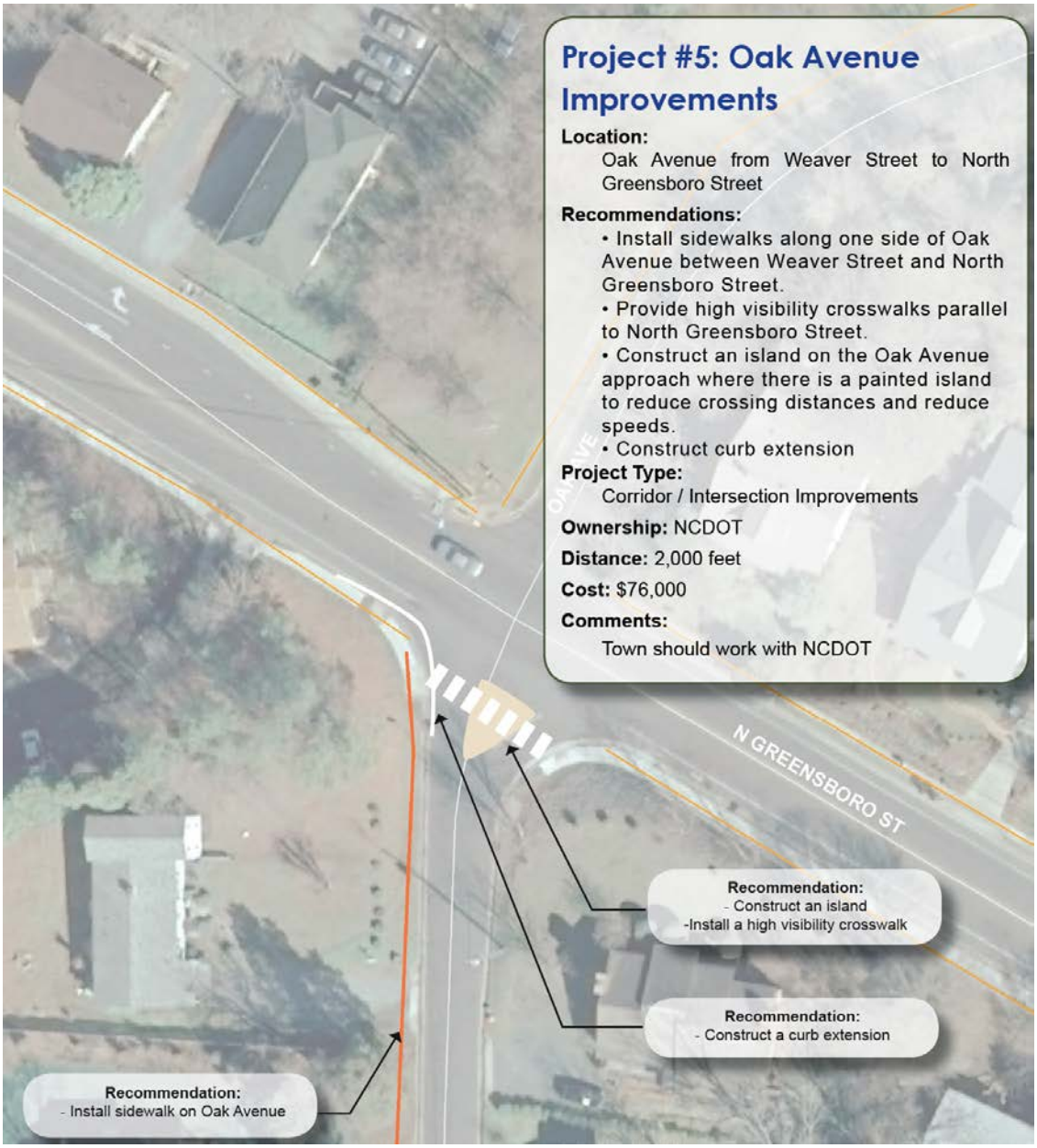
N. Greensboro St. and Oak Ave.

- "…there were concerns raised about the intersection of Oak Avenue and North Greensboro Street. There is no marked pedestrian crossing here, either for pedestrians trying to cross Oak Avenue while traveling along North Greensboro Street or for pedestrians seeking to cross North Greensboro Street." (p. 14)
- "Cars can turn from North Greensboro Street into Oak Avenue at a high speed and pedestrians walking along North Greensboro Street do not have a raised pedestrian refuge while crossing Oak Avenue." (p. 15)

Recommended in adopted Safe Routes to School Action Plan – Project #5 – Carrboro Elementary

“Oak Avenue currently has a very large turning radius onto N Greensboro Street, making the roadway an abnormally wide distance for pedestrian to cross.” (p. 3-37)

“Construct an island on the Oak Avenue approach where there is a painted island to reduce crossing distances and reduce speeds. Also, construct a curb extension to tighten curb radius.” (p. 3-37)



Stage 1 – Trial cone configuration – Aug. 2013

Trial cones placed – Aug. 2013

Cones replaced with flexible delineators – Nov. 2013

In November 2013, the cones were replaced with flexible delineators epoxied to the pavement in the same configuration.

2 Speed cushions: 500 block

Stage 2 measure: rubber speed cushions

- Install two speed cushions (also known as "speed lumps") side-by-side near the midpoint of the 500 block of Oak Ave.
    - Approx. 6 ft. in width
    - Leave space in center for bikes
    - Spacing to accommodate emergency vehicle movement
- Timeline for installation: *Town staff are in the process of purchasing the speed cushions at the time of writing*

Description

"Speed lumps are rounded or flat-topped raised areas placed across the road with wheel cutouts designed to allow large vehicles, such as fire trucks and buses, to pass with minimal slowing or rocking." (*U.S. Traffic Calming Manual, p. 44*)

Speed cushions:

- Reduce delay for larger vehicles, while ensuring passenger cars slow down because their wheelbases cannot straddle the lumps
- Speed cushions have been installed in Europe for over 20 years
- First installations in the U.S. were late 1990s
- Reduce 85th percentile speed by 25%, or 9 MPH, comparable to speed humps
- May not reduce volumes as much as speed humps
- Width typically 5.5 to 7 ft. (6 ft. lump is ideal, generally allows large vehicles to straddle)
- Shorter speed cushion length: ~12 ft. – should be shorter for lower-speed roads.
- Asphalt cushions require skilled construction crews. Rubber cushions can be installed by street maintenance crews.

Source: *U.S. Traffic Calming Manual, Appendix D*

Installation notes

- Installation of rubber cushions would allow for simple adjustment compared with asphalt ones, and would be substantially less expensive.
- Coordinate with PW Solid Waste on best location to install in order to accommodate solid waste pickup.
- Install in location not across from driveways to avoid inconvenience of access
- Aim to reduce 85th percentile speed on block to below 25 MPH

Speed cushion example – Badin, NC

Trial chicane configuration – Aug. 2013

*Note: Many chicanes feature three curb extensions to force an additional curve in the motor vehicle path. However, a full chicane would be challenging without installing at least one curb extension across from a driveway, which may impair vehicles backing out or turning in to the driveway. The measure is more akin to a simple lateral shift, but the term chicane is used here for practicality.

Trial chicane configuration – overview

Trial cones installed – Aug. 2013

Cones replaced with flexible delineators – Nov. 2013

In November 2013, the cones were replaced with flexible delineators epoxied to the pavement in the same configuration.

In December 2013/January 2014, several cones were damaged and dislocated from their adhesive pads and the asphalt. Typically these posts are bolted to the asphalt, but given the

trial nature of this installation, they were only epoxied at this time. Also, the asphalt has deteriorated enough such that it may not be ideal for adhesiveness.

Flexible delineator damage – January 2014

A measure such as speed cushions could be tested to compare its traffic calming effect, effect on emergency vehicles, aesthetics, and durability with the trial chicane. If the speed cushions are effective, they could be retained as a permanent measure. Otherwise, another permanent measure, or taking no action on a permanent measure, could be discussed further.

3 Permanent chicane: 400 block

- Install a permanent chicane on the 400 block of Oak Ave. with two curb extensions

Chicane design considerations

- Neighbor input
- Taper length
  - 8:1 shown in the typical design below. However, this is for a wider street (30 ft.) than Oak Ave., which is 21 ft.
  - The design speed of the chicane is a function of the sharpness of the curve of the motor vehicle path. Of course, sharper curves could have more of an impact on large vehicles traversing the measure.
- Length from curb
  - Should be at least 6 to 8 ft.
- Curb extension placement
  - Staggered on opposite sides of the street
- Curb extension curb design

    - A mountable curb could allow for a fire truck to more easily traverse it in the event two fire trucks need to pass.
- Separation from curb
    - In order to leave open drainage channel in gutter pan
- Landscaping in the bulbs, designed to be traversable by fire trucks
- In-pavement markers to increase visibility, associated signs

Excerpt from U.S. Traffic Calming Manual (Reid Ewing, Steven J. Brown) – Typical lateral shift (with center island) and chicane designs

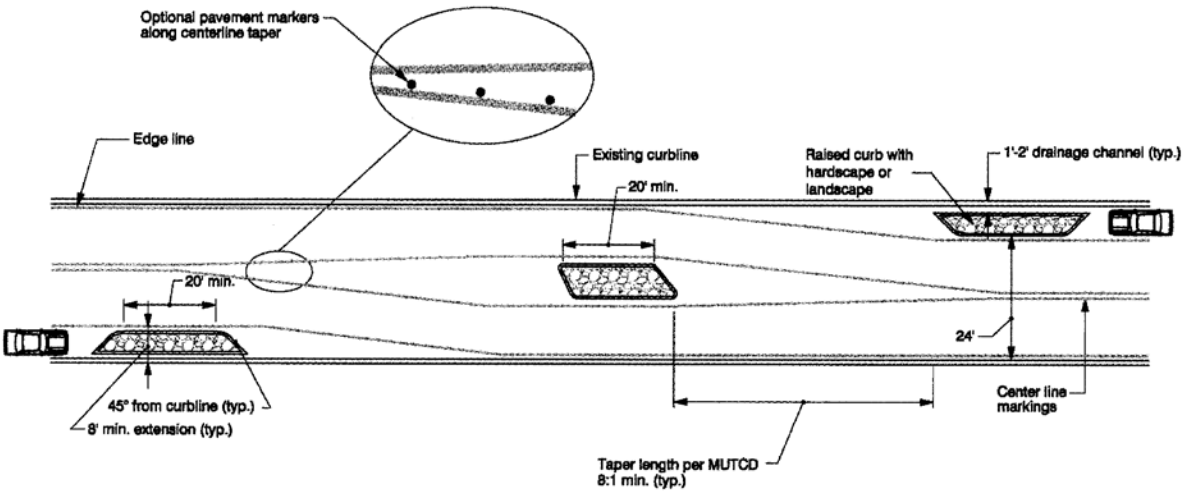


Figure 4-61. Typical Lateral Shift

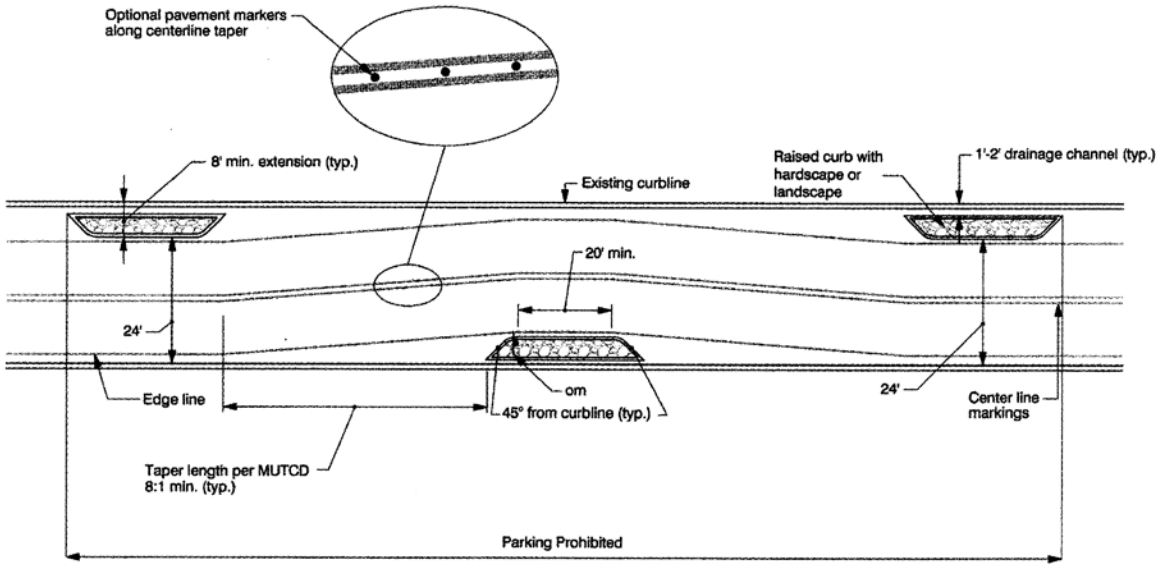


Figure 4-62. Typical Chicane

Appendix

West Main Street Road Diet and Pavement Marking Study and Oak-Poplar Neighborhood Traffic Circulation Study: Oak Avenue Recommendations

From the comments summary section:

- "The Oak Avenue and North Greensboro Street intersection was described by a couple of participants as difficult both for drivers and pedestrians." (25)

From the potential solutions matrix:

Potential Solution	Problem(s) Addressed	Expected Outcomes and Impacts	Affordability [1]	Feasibility [1]	Effectiveness [1]	Next Steps
[...]						
Raised Pedestrian Islands at the North Greensboro Street and Oak Avenue intersection and the West Main Street and Weaver Street intersection	▪ Pedestrian discomfort at crossings	▪ Slower traffic ▪ Safer pedestrian crossings	++	+++	++	Town and NCDOT approval

Oak Ave.

From the potential solutions matrix:

Potential Solution	Problem(s) Addressed	Expected Outcomes and Impacts	Affordability [1]	Feasibility [1]	Effectiveness [1]	Next Steps
[...]						
Traffic calming: traffic humps or speed tables on Oak Avenue	▪ Speeding ▪ Cut through traffic	▪ Slower traffic	++	++	++	Detailed engineering study on possible locations

From the comments summary section:

- "Several participants expressed a desire for speed humps on Oak Avenue…"(25)
- "Cut-through traffic was cited by a couple participants as a problem, particularly on Oak Avenue and Shelton Street." (25)

Oak-Poplar Neighborhood Survey Results

Additional traffic calming on Oak Ave. is seen as the most effective alternative (average rating = 3.97)

The Board of Aldermen has discussed potential strategies for improving safety for people traveling on Oak Avenue. Please rate the following general strategies by how effective you think they would be in improving traffic safety. (For this question, focus on traffic safety benefits, even if you believe there are other benefits or drawbacks associated with one or more of the strategies.)

Strategy	Ineffective	(mid pt.)	Somewhat effective	(mid pt.)	Very effective	Average Rating
Convert Oak Avenue to a one-way street	16.13%	9.68%	16.13%	12.90%	45.16%	3.61
Install additional traffic calming measures on each block of Oak Avenue	6.06%	3.03%	21.21%	27.27%	42.42%	3.97
Install a sidewalk on one side of Oak Avenue	25%	6.25%	21.88%	18.75%	28.13%	3.19
Increase enforcement of speeding	9.09%	12.12%	36.36%	18.18%	24.24%	3.36
Install bicycle "shared lane" pavement markings (like on E. Weaver St.) to increase awareness of bicyclists	9.09%	27.27%	18.18%	27.27%	18.18%	3.18
Educate drivers on the importance of slower speeds and driving alertly	43.75%	31.25%	12.50%	0%	12.50%	2.06

A number of commenters also supported the one-way idea on Oak Ave.; however, there was a much larger proportion of respondents who viewed that as an ineffective strategy for lowering speeds compared to those who believed it would be effective. Also, 60% agreed that a one-way conversion will increase traffic on neighboring streets.

Speed data – Sept. 2013 – Trial Chicane – 500 block

Block	Segment	Day	% 25+ MPH	85pct
500	Greensboro to Chicane	Tues 9/10	10%	22.44
500	Greensboro to Chicane	Wed 9/11	9%	
500	Chicane to Merritt	Tues 9/10	23%	26.78
500	Chicane to Merritt	Wed 9/11	15%	
400	400 block (no treatment)	Tues 9/10	42%	29.33
400	400 block (no treatment)	Wed 9/11	33%	
300	300 block	Tues 9/10	20%	26.89
300	300 block	Wed 9/11	17%	
200	204 Oak Ave	Tues 9/10	15%	24.12
200	204 Oak Ave	Wed 9/11	11%	
200	200 Oak Ave	Tues 9/10	14%	24.31
200	201 Oak Ave	Wed 9/11	12%	
100	100 Oak Ave	Tues 9/10	17%	27.57
100	100 Oak Ave	Wed 9/11	18%	

** Speed data are planned to be collected in February for the 400 block temporary chicane. Inclement weather has twice delayed data collection efforts.*