Transportation Engineering Tools for City Engineers

Marc Culver, PE
marc.culver@ci.roseville.mn.us

Mike Spack, PE, PTOE
mspack@spackconsulting.com
Traffic signals are not the best answer to every traffic question. Traffic signals increase certain types of crashes and increase delay on main line, and sometimes sidestreet. Other alternatives are roundabouts, access control, internal roadways that lead to a centralized signal that promotes proper access control and signal spacing. All way stops.
Roundabouts vs. all way stops or borderline warranted signal lights. Myth busters video on mndot website.
School Safety Phone Call......
School Safety

- CDC: $\frac{1}{2}$ of kids who die are killed in a crash
- http://spackconsulting.com/resources.php
- http://safety.fhwa.dot.gov/saferoutes/
- http://www.dot.state.mn.us/saferoutes/
Stop Sign Phone Call......
Stop signs are effective at assigning right-of-way, not controlling speed. May be necessary where sight distance is deficient for other types of control.

All Way Stops

**MUTCD Volume and Accident warrants**

**Restricted Sight Distance**

**Underlying issue SPEED**

Perception Only?

“Traffic Calming” Techniques
Speed profile of a street with a series of stop signs. Notice speeds in between the stop signs. It only takes a couple hundred feet to get back up to the prevailing speed, in some cases higher than before the stop signs.
MUTCD really wants us to use uncontrolled intersections at low volume, residential intersections. Richfield has a very well defined policy dictating this as it’s standard. However, many drivers these days don’t expect uncontrolled intersections. And inconsistencies from one community to the next, even within the Twin Cities Metro Area, doesn’t help this situation.
If you have the opportunity, in neighborhoods start using yield signs instead of stop signs to assign right-of-way. Must have appropriate sight distance at intersections for this to work.
Mini-roundabouts, diverters, chicanes, bump outs, medians all are physical devices to help control traffic in spots, but can help mark a transition to a residential area.
Field Checks Phone Call......
Field Checks
Field Checks Top 10.5

1. Trees Blocking Signs
2. Bad Signs
3. Sight Corners
4. Signal Indications or Street Lights Out
5. Long Queues at stop/signal
6. Bad Pavement
7. Cracks/Heaves in Walks/Trails
8. Running Stop Signs or Signals
9. Speeding
10. Bad Construction Zones/Detours
10.5 Trees Hanging Over Sidewalks
Crosswalk Phone Call......
MARKED vs. UNMARKED crosswalks
NCITE Pedestrian Crosswalk Guidelines
Minnesota State Statutes (169.21)
http://www.dot.state.mn.us/peds/
Fundamentally, pedestrian safety comes down to educating the driver to yield to pedestrians at EVERY corner, every intersection. This is beyond the scope of any one City or agency, but we can do what we can. Use the material on mndot’s website sharetheroadmn.org
NCITE guideline. Produced by the Ped and Traffic Safety Committee to offer some GUIDANCE beyond the MUTCD. Available on the NCITE website
One big theme from the NCITE document and in many other research documents is that marked crosswalks are not always safer than unmarked crosswalks. Great table from the FHA report and recommended guidelines on when to go beyond just marked crosswalks and use additional treatments such as flashers, Rapid Rectangular Flashing Beacons, medians, etc.

Functions of speed, volume and road cross-section are used to assist in consideration of installation.

C = still recommend engineering study, min 20 ped in peak hour suggersed or 15 kids/elderly
P = monitor locations and enhance and consider enhancing before marking crosswalk
N = Consider using other treatment to improve crossing safety for peds

Todays focus is on the “Enhancement” options
Mn/DOT and the Local Road Research Board provide some guidance for both pedestrians and bike safety best practices. Very helpful guide when looking at treatments. Available on Mn/DOT state aid website.
Safety Audit Phone Call......
Neighborhood Safety Audits
Speed Limit Phone Call......
Speed limits. Part of the problem is that most people don’t understand how speed limits are determined and set. The local agency really has very little control over what the speed limit on a particular roadway is.
State Law dictates statutory speed limits on certain types of roadways, such as 55 on most highways, 70 on interstate highways outside of urbanized area, 30 miles per hour in an urban district. The key is the definitions of residential roadway, rural residential district, urban district, etc.
Another problem is general erosion of the 30 mph statutory speed limit. There are several little clauses that allow 25 mph or lower (park roadway being one key) that really confuses and frustrates people that want 25 mph on their own local street. This latest one, indicating 25 mph on a street with a bicycle lane, is another example. There have been many efforts to get the statutory speed limit lowered to 25 mph for residential streets, but the committees formed to study this have always recommended against it.

MN Statute 160.263

- 160.263 Subd. 4. Speed on street with bicycle lane.
  Notwithstanding section 169.14, subdivision 5, the governing body of any political subdivision, by resolution or ordinance and without an engineering or traffic investigation, may designate a safe speed for any street or highway under its authority upon which it has established a bicycle lane; provided that such safe speed shall not be lower than 25 miles per hour. The ordinance or resolution designating a safe speed is effective when appropriate signs designating the speed are erected along the street or highway, as provided by the governing body.
Remember, a roadway with no posted speed limit is most either 30 mph or 55 mph, unless interstate or expressway. Local agencies do not have to post 30 mph on all residential streets. Many do post this where traffic is turning onto local roadway from a minor arterial with a higher speed limit.
Controlling speed at speed transition areas can be difficult. Speed display signs and speed trailers can be very helpful in this regard. These signs tend to lose effectiveness over time, except in a transition area with a high speed differential. Signs can be about $4000-$10,000 depending on size of sign and solar options, trailers tend to be $8,000 to almost $20,000, again depending on size and options.
Travel Demand Phone Call....
Travel Demand Management

-15% Parking

-30% Traffic

Site Review Access Management Phone Call
Traffic Signal Phone Call......
Traffic Signal maintenance. So you have a traffic signal. Lucky you. So do you have staff that can retime the signal? Get it out of flash? Replace a cabinet if it gets hit? Don’t wait until something goes wrong. Make sure you have an arrangement/agreement with either your County or Mn/DOT or another City that does have signal maintenance staff, or an electrical contractor. Make sure you have spare parts you might need on short notice and consider having a spare cabinet on hand for your own use, again, just in case. Cabinets can take several weeks to get if you need one. Consider preventive maintenance including cabinet cleaning, inspection, indication replacement.
Access Management Phone Call......
Site plan review and overall access management are certainly related. Work with your Planning/Community Development staff to get involved in the overall process early on. Help manage expectations early so that you aren’t fighting poor circulation or a bad driveway location late in the overall process. This image shows two driveways very close to each other. Low volume road, but still will lead to occasional issues between the two sites.
Develop a checklist of items to review. Remember even private property must conform to MUTCD. How many times have you seen yellow paint used for arrows and all lanes lines? Or white paint for a center line stripe? Can be confusing. Pima County Site Plan checklist (listed on Resource Links ha. Several communities in Minnesota certainly have some good examples as well. Don’t be afraid to call and ask a peer for what they use.
Good access management early on can save someone a lot of trouble later on. Even on local, low volume roadways line up accesses, consolidate when possible. Maintain minimum spacing of AT LEAST 100 feet. Is a quarter of a mile really better than 1000 feet? Yes, but these are generally guidelines. Wetland impacts, existing accesses on other side, property lines, will dictate actual spacing.

<table>
<thead>
<tr>
<th>Road Type (A)</th>
<th>Posted or Design Speed</th>
<th>Projected 2030 Average Daily Traffic</th>
<th>Full Movement Intersection</th>
<th>Partial Movement Intersection (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal arterial</td>
<td>All</td>
<td>≥ 35,000</td>
<td>½ mile</td>
<td>½ mile (C)</td>
</tr>
<tr>
<td>Divided Highway</td>
<td>All</td>
<td>≥ 35,000</td>
<td>½ mile</td>
<td>N/A</td>
</tr>
<tr>
<td>Undivided Highway</td>
<td>(≤ 40 mph)</td>
<td>All</td>
<td>½ mile</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>(≥ 45 mph)</td>
<td>&gt; 1,500</td>
<td>½ mile</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>(≥ 50 mph)</td>
<td>&gt; 1,500</td>
<td>Allowed per (Dn)</td>
<td>N/A</td>
</tr>
</tbody>
</table>

- Access to County accesses is typically provided through public street connections. Private access will be considered only if the County roadway is planned for engineering assessment of the function and use of the property.
- Specific corridor access plans or project designs developed through a public process and adopted by the County shall have superior influence.
- Where there are opportunities for access on more than one public roadway, access shall be provided from the higher function roadway, unless deemed impractical by the County. To support the objectives of urban efficiency and connectivity, access to the higher function County roadway may be allowed in addition to the new construction, provided there is adequate distance to accommodate access based on specific guidelines.
Data Collection Phone Call......
Data Collection

- Smart Phone
- Ubipix App
- AirSage
- CountingCars.com
  - $400 Tube Counters (Speed + Classification)
  - Portable Video Camera Systems
Available on mndot website (state aid website). Currently in the process of being updated. New version should be released sometime in 2014.
Available on state aid website
- www.ite.org
  - Technical Website Links
    - Past Journal Articles, Archives of Discussion Groups
    - Bookstore
- www.nc-ite.org
  - Traffic/Transportation Related Technical Committees
  - Newsletter
  - Affiliate memberships available
Thank You!

Marc Culver, PE
marc.culver@ci.roseville.mn.us

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Spack Consulting