CRITERIA FOR STOP/YIELD SIGNS, SPEED TABLES, CROSSWALK LOCATIONS AND MARKINGS

I. Stop/ Multi-Way Stop/ Yield Signs

The Manual on Uniform Traffic Control Devices (MUTCD) is the national standard for installing and maintaining traffic control on roadways, bikeways, etc. throughout the United States and is utilized by the City of Lebanon. The 2009 MUTCD Chapter 2B provides the standards and guidance for installation of stop signs. I would recommend that the City adopt the MUTCD as the standard. Below are the sections of the MUTCD (2B.05 – 2B.10) pertaining to stop sign consideration and installation.

Section 2B.05 STOP Sign (R1-1) and ALL WAY Plaque (R1-3P)

Standard:
01 When it is determined that a full stop is always required on an approach to an intersection, a STOP (R1-1) sign (see Figure 2B-1) shall be used.

Figure 2B-1 STOP and YIELD Signs and Plaques

02 The STOP sign shall be an octagon with a white legend and border on a red background.

03 Secondary legends shall not be used on STOP sign faces.

04 At intersections where all approaches are controlled by STOP signs (see Section 2B.07), an ALL WAY supplemental plaque (R1-3P) shall be mounted below each STOP sign. The ALL WAY plaque (see Figure 2B-1) shall have a white legend and border on a red background.

05 The ALL WAY plaque shall only be used if all intersection approaches are controlled by STOP signs.

06 Supplemental plaques with legends such as 2-WAY, 3-WAY, 4-WAY, or other numbers of ways shall not be used with STOP signs.

Support:
07 The use of the CROSS TRAFFIC DOES NOT STOP (W4-4P) plaque (and other plaques with variations of this word message) is described in Section 2C.59.

Guidance:
08 Plaques with the appropriate alternative messages of TRAFFIC FROM LEFT (RIGHT) DOES NOT STOP (W4-4aP) or ONCOMING TRAFFIC DOES NOT STOP (W4-4bP) should be used at intersections where STOP signs control all but one approach to the intersection, unless the only non-stopped approach is from a one-way street.

Option:
09 An EXCEPT RIGHT TURN (R1-10P) plaque (see Figure 2B-1) may be mounted below the STOP sign if an engineering study determines that a special combination of geometry and traffic volumes is present that makes it possible for right-turning traffic on the approach to be permitted to enter the intersection without stopping.

Support:
10 The design and application of Stop Beacons are described in Section 4L.05.

Section 2B.06 STOP Sign Applications

Guidance:
01 At intersections where a full stop is not necessary at all times, consideration should first be given to using less restrictive measures such as YIELD signs (see Sections 2B.08 and 2B.09).

02 The use of STOP signs on the minor-street approaches should be considered if engineering judgment indicates that a stop is always required because of one or more of the following conditions:

A. The vehicular traffic volumes on the through street or highway exceed 6,000 vehicles per day;
B. A restricted view exists that requires road users to stop in order to adequately observe conflicting traffic on the through street or highway; and/or
C. Crash records indicate that three or more crashes that are susceptible to correction by the installation of a STOP sign have been reported within a 12-month period, or that five or more such crashes have been reported within a 2-year period. Such crashes include right-angle collisions involving road users on the minor-street approach failing to yield the right-of-way to traffic on the through street or highway.

Support:
03 The use of STOP signs at grade crossings is described in Sections 8B.04 and 8B.05.

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Section 2B.07 Multi-Way Stop Applications

Support:
01 Multi-way stop control can be useful as a safety measure at intersections if certain traffic conditions exist. Safety concerns associated with multi-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Multi-way stop control is used where the volume of traffic on the intersecting roads is approximately equal.

02 The restrictions on the use of STOP signs described in Section 2B.04 also apply to multi-way stop applications.

Guidance:
03 The decision to install multi-way stop control should be based on an engineering study.

04 The following criteria should be considered in the engineering study for a multi-way STOP sign installation:

A. Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.
B. Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.
C. Minimum volumes:
    1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and
    2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but
    3. If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.
D. Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.

Option:
05 Other criteria that may be considered in an engineering study include:

A. The need to control left-turn conflicts;

Adopted by City Council on 8/4/2010

B. The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;
C. Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop; and
D. An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection.

Section 2B.08 YIELD Sign (R1-2)

Standard:
01 The YIELD (R1-2) sign (see Figure 2B-1) shall be a downward-pointing equilateral triangle with a wide red border and the legend YIELD in red on a white background.

Support:
02 The YIELD sign assigns right-of-way to traffic on certain approaches to an intersection. Vehicles controlled by a YIELD sign need to slow down to a speed that is reasonable for the existing conditions or stop when necessary to avoid interfering with conflicting traffic.

Section 2B.09 YIELD Sign Applications

Option:
01 YIELD signs may be installed:

A. On the approaches to a through street or highway where conditions are such that a full stop is not always required.
B. At the second crossroad of a divided highway, where the median width at the intersection is 30 feet or greater. In this case, a STOP or YIELD sign may be installed at the entrance to the first roadway of a divided highway, and a YIELD sign may be installed at the entrance to the second roadway.
C. For a channelized turn lane that is separated from the adjacent travel lanes by an island, even if the adjacent lanes at the intersection are controlled by a highway traffic control signal or by a STOP sign.
D. At an intersection where a special problem exists and where engineering judgment indicates the problem to be susceptible to correction by the use of the YIELD sign.
E. Facing the entering roadway for a merge-type movement if engineering judgment indicates that control is needed because acceleration geometry and/or sight distance is not adequate for merging traffic operation.

Standard:
02 A YIELD (R1-2) sign shall be used to assign right-of-way at the entrance to a roundabout. YIELD signs at roundabouts shall be used to control the approach roadways and shall not be used to control the circulatory roadway.

03 Other than for all of the approaches to a roundabout, YIELD signs shall not be placed on all of the approaches to an intersection.

Section 2B.10 STOP Sign or YIELD Sign Placement

Standard:
01 The STOP or YIELD sign shall be installed on the near side of the intersection on the right-hand side of the approach to which it applies. When the STOP or YIELD sign is installed at this required location and the sign visibility is restricted, a Stop Ahead sign (see Section 2C.36) shall be installed in advance of the STOP sign or a Yield Ahead sign (see Section 2C.36) shall be installed in advance of the YIELD sign.

02 The STOP or YIELD sign shall be located as close as practical to the intersection it regulates, while optimizing its visibility to the road user it is intended to regulate.

03 STOP signs and YIELD signs shall not be mounted on the same post.

04 No items other than inventory stickers, sign installation dates, and bar codes shall be affixed to the fronts of STOP or YIELD signs, and the placement of these items shall be in the border of the sign.

05 No items other than official traffic control signs, inventory stickers, sign installation dates, anti-vandalism stickers, and bar codes shall be mounted on the backs of STOP or YIELD signs.

06 No items other than retroreflective strips (see Section 2A.21) or official traffic control signs shall be mounted on the fronts or backs of STOP or YIELD signs supports.

Guidance:
07 STOP or YIELD signs should not be placed farther than 50 feet from the edge of the pavement of the intersected roadway (see Drawing F in Figure 2A-3).

08 A sign that is mounted back-to-back with a STOP or YIELD sign should stay within the edges of the STOP or YIELD sign. If necessary, the size of the STOP or YIELD sign should be increased so that any other sign installed back-to-back with a STOP or YIELD sign remains within the edges of the STOP or YIELD sign.

Option:
09 Where drivers proceeding straight ahead must yield to traffic approaching from the opposite direction, such as at a one-lane bridge, a TO ONCOMING TRAFFIC (R1-2aP) plaque may be mounted below the YIELD sign.

Support:
10 Figure 2A-3 shows examples of some typical placements of STOP signs and YIELD signs.

11 Section 2A.16 contains additional information about separate and combined mounting of other signs with STOP or YIELD signs.

Guidance:
12 Stop lines that are used to supplement a STOP sign should be located as described in Section 3B.16. Yield lines that are used to supplement a YIELD sign should be located as described in Section 3B.16.

13 Where there is a marked crosswalk at the intersection, the STOP sign should be installed in advance of the crosswalk line nearest to the approaching traffic.

14 Except at roundabouts, where there is a marked crosswalk at the intersection, the YIELD sign should be installed in advance of the crosswalk line nearest to the approaching traffic.

15 Where two roads intersect at an acute angle, the STOP or YIELD sign should be positioned at an angle, or shielded, so that the legend is out of view of traffic to which it does not apply.

16 If a raised splitter island is available on the left-hand side of a multi-lane roundabout approach, an additional YIELD sign should be placed on the left-hand side of the approach.

Option:
17 If a raised splitter island is available on the left-hand side of a single lane roundabout approach, an additional YIELD sign may be placed on the left-hand side of the approach.

18 At wide-throat intersections or where two or more approach lanes of traffic exist on the signed approach, observance of the right-of-way control may be improved by the installation of an additional STOP or YIELD sign on the left-hand side of the road and/or the use of a stop or yield line. At channelized intersections or at divided roadways separated by a median, the additional STOP or YIELD sign may be placed on a channelizing island or in the median. An additional STOP or YIELD sign may also be placed overhead facing the approach at the intersection to improve observance of the right-of-way control.

Standard:
19 More than one STOP sign or more than one YIELD sign shall not be placed on the same support facing in the same direction.

Option:
20 For a yield-controlled channelized right-turn movement onto a roadway without an acceleration lane and for an entrance ramp onto a freeway or expressway without an acceleration lane, a NO MERGE AREA (W4-5P) supplemental plaque (see Section 2C.40) may be mounted below a Yield Ahead (W3-2) sign and/or below a YIELD (R1-2) sign when engineering judgment indicates that road users would expect an acceleration lane to be present.

II. Speed Tables

The City of Lebanon recognizes that the installation of speed tables on streets within the City can be an effective means of traffic calming when installed in appropriate locations. The installation of speed tables should be viewed as a final effort in a comprehensive program for reducing vehicle speeds and cut-through traffic in a residential area. Prior to the installation of speed tables, other efforts such as police enforcement, signage, pavement markings, etc., shall be utilized.

The following procedure shall be used for the consideration of speed tables:

1. A request to the Public Safety Committee (PSC) for the installation of a speed table can be made by a resident or a City Department representative. The initial request shall be reviewed by City staff to determine appropriateness. If the request does not meet guideline requirements and appropriateness, the proposer and PSC shall be informed and no action will be taken.
2. If the proposer wishes to appeal staff's decision, a written request shall be made to the PSC. The request must be accompanied by a petition memorializing that a minimum of 2/3rd's of the property owners on the street affected support the installation of the speed table(s).
3. Upon acceptance of the appeal, the PSC shall instruct City staff to conduct the appropriate investigation to report back to the PSC to allow for further consideration.
4. The following criteria shall be utilized to determine the appropriateness of speed tables at specific locations:
    a. The street must be a local residential street.
    b. The average daily traffic volume for both directions on the street must be greater than 500 and no more than 3000 per day on average weekdays.
    c. The posted speed limit shall be a maximum of 25MPH and the 85th percentile speed is at or greater than 35MPH.
    d. The grade of the street is a maximum of 5%.
    e. The street should not be a truck or transit route.
    f. The street shall not be more than one lane in each direction.
    g. Possible speed table locations shall be a minimum of 200' from intersections.
    h. Possible speed table locations shall only be installed on through streets with a minimum length of 1000'.
    i. Speed tables should not be installed where stop/yield signs or traffic signals are less than 500' apart.
    j. Speed tables should not be installed over manholes, water valves, or catch basins and should be located a minimum of 10' from driveway entrances.
5. If the installation of speed tables is approved, the location shall be placed on a priority list and installation will take place as funding is available.
6. A request for removal of a speed table shall follow the same procedure.
7. This does not preclude the review of any requests by other appropriate boards and committees in the City of Lebanon.

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III. Crosswalk Locations and Markings

The purpose of this guideline is to ensure that pedestrian crossings are treated consistently in the City of Lebanon by providing guidance on the location of marked and unmarked crossings, and the associated pavement markings and signs.

This guideline is intended to supplement the Manual on Uniform Traffic Control Devices (MUTCD). Any conflicts between the two documents should defer to the latest edition of the MUTCD.

It must be recognized that not all situations can be adequately addressed in this guideline; therefore engineering judgment must be used at all times.

The following procedure shall be used for the consideration of crosswalks:

1. A request to the Public Safety Committee (PSC) for the installation of a marked crosswalk can be made by a resident or a City Department representative. The initial request shall be reviewed by City staff to determine appropriateness. If the request does not meet requirements and appropriateness, the proposer and PSC will be informed and no action will be taken.
2. If the proposer wishes to appeal staff's decision, a written request shall be made to the PSC. If the PSC accepts the request on appeal, the PSC instructs staff to conduct the appropriate investigation to report back to the PSC to allow for further consideration.

3. The following excerpts from the MUTCD and the NHDOT Guidelines provide the framework for this guideline.

MUTCD Support and Guidance:

MUTCD Section 3B.17 states in part:

- "Crosswalk markings provide guidance for pedestrians who are crossing roadways by defining and delineating paths on approaches to and within signalized intersections, and on approaches to other intersections where traffic stops
- Crosswalk markings also serve to alert road users of a pedestrian crossing point across roadways not controlled by traffic signals or STOP signs.
- At non-intersection locations, crosswalk markings legally establish the crosswalk.
- Crosswalks should be marked at all intersections where there is substantial conflict between vehicular and pedestrian movements.
- Marked crosswalks also should be provided at other appropriate points of pedestrian concentration, such as … mid-block pedestrian crossings, or where pedestrians could not otherwise recognize the proper place to cross.
- Crosswalk lines should not be used indiscriminately. An engineering study should be performed before they are installed at locations away from traffic signals or STOP signs.

- Because non-intersection pedestrian crossings are generally unexpected by the road user, warning signs … should be installed and adequate visibility should be provided by parking prohibitions."

NHDOT Guidelines:

Crosswalks shall be in compliance with the standards established in the current edition of the MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), and the current requirements for the AMERICANS WITH DISABILITIES ACT (ADA).

Crosswalks shall connect pedestrian facilities that are ADA compliant and be located in areas where the motorist will expect pedestrian traffic, typically at intersections.

Crosswalks shall only be allowed in areas where the posted speed limit is 35 MPH/ 55 KPH or less.

Mid-block Crosswalks shall have the following minimum stopping distance determined from the driver's eye at a height of 3 feet 6 inches to any part of proposed crosswalk and based on AASHTO "Green Book".

Table 1

Posted Speed (MPH)	Required Sight Distance (ft)*
25	155
30	200
35	250

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Criteria for installation:
All of the following criteria should be met prior to installing a crosswalk.

a. The speed limit is 35 mph or less, and;
b. There are 20 or more pedestrians using the crossing per hour during the vehicular A.M. and P.M. peak periods (lesser volumes may be considered if the pedestrian population consists of young, elderly, or disabled pedestrians), and;
c. The AADT (annual average daily traffic) for the roadway (both directions combined) exceeds 1500 vehicles per day, and;
d. A sidewalk or adequate shoulder for use by pedestrians (as determined by traffic volumes, adjacent land uses and other site specific considerations) or other pedestrian destination, such as a recreation field, where there is low potential for vehicle/pedestrian conflicts exists on both sides of the roadway, and;
e. There is not another crosswalk across the same roadway within 60 m (200 ft), and;
f. A determination has been made that the pedestrian shall have the right of way over the vehicular traffic, and;
g. Adequate sight distance (Table 1) is available in both directions. At a minimum, a driver must be able to see either the crosswalk or the pedestrian warning sign. Sight distance shall be measured from the driver's perspective to the outer edges of the traveled lanes, to ensure that an approaching driver can see a pedestrian at any point on the crosswalk within the traveled way.
h. Parking shall be prohibited within 20 feet of a crosswalk

When a proposed crosswalk is associated with a new development, change in land use, or new pedestrian facilities, an engineering study may be used to predict whether these criteria will be met once the development or facility has been constructed.

Crosswalks should not be marked on 3 or 4 lane roadways with AADT greater than 9,000 vehicles per day unless other safety features, such as raised median refuges, traffic calming measures, or overhead lighting are included, and an engineering study concludes that pedestrian safety will be enhanced.

IV. Resources and References

Manual on Uniform Traffic Control Devices (MUTCD) Federal Highway Administration, 2003
http://mutcd.fhwa.dot.gov/pdfs/2003/pdf-index.htm

Americans with Disabilities Act Accessibility Guidelines (ADAAG) US Department of Justice
http://www.access-board.gov/

A Policy on Geometric Design of Highways and Streets (aka "AASHTO Green Book" American Association of State Highway and Transportation Officials, 2001 http://www.transportation.org

New Hampshire Department of Transportation Work Instructions for Marked Crosswalks

Vermont Agency of Transportation Guideline for the Installation of Crosswalk Markings and Pedestrian Signing at Marked and Unmarked Crossings (Revised July 2004)
http://www.aot.state.vt.us/Progdev/Documents/TrafficOperations/Crosswalk%20Guidelines%202004.pdf

Town of Davie, FL - Speed Table Policy and Procedures for Residential Areas

City of Arcata Speed Table Policy.pdf

City of Duarte 2010-speed-tables.pdf