National Committee on
Uniform Traffic Control Devices

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Item No.: 15B-RW-02

NCUTCD Proposal for Changes to the Manual on Uniform Traffic Control Devices

TECHNICAL COMMITTEE:	Regulatory & Warning Signs
ITEM NUMBER:	15B-RW-02
TOPIC:	Selecting Type of Traffic Control for Unsignalized Intersections
ORIGIN OF REQUEST:	RW Task Force: Tom Heydel (chair), Bob Seyfried, Robert Weber, Jim Pline, Fred Ranck, Lee Roadifer, Paul Carlson Results from NCHRP Web-Only Document 213, Potential MUTCD Criteria for Selecting the Type of Control at Unsignalized Intersections
AFFECTED SECTIONS OF MUTCD:	Sections 2B.04, 2B.06, 2B.07, 2B.09

DEVELOPMENT HISTORY:

- Approved by Technical Committee: 06/17/2015
- Approved by NCUTCD Council: 00/00/0000

This is a proposal for recommended changes to the MUTCD that has been developed by a technical committee of the NCUTCD. The NCUTCD is distributing it to its sponsoring organizations for review and comment. Sponsor comments will be considered in revising the proposal prior to NCUTCD Council consideration. This proposal does not represent a revision of the MUTCD and does not constitute official MUTCD standards, guidance, or options. If approved by the NCUTCD Council, the recommended changes will be submitted to FHWA for consideration for inclusion in a future MUTCD revision. The MUTCD can be revised only through the federal rulemaking process.

SUMMARY:

The MUTCD related to selection of traffic control in Part 2B has seen only minor changes since 1971. The volume and crash numbers contained within Section 2B.04, 2B.06, 2B.07 and 2B.09 have not been evaluated based on research since that time. Research was needed to look at the warrants (criteria) for determining whether an intersection should have no control, yield control or stop control. Signal control warrants are already provided for in Part 4. Accordingly, an NCHRP research project was awarded. This research project results was used to develop this language. Research: NCHRP Project 03-109, Criteria for selecting type of control for unsignalized intersections

DISCUSSION

Updating or developing new warrants (criteria) is the focus of the NCHRP 03-109 report. The report has been finalized and is dated March 2015. Prior to this there was much discussion regarding whether or not to go directly to Council under the exception in June or go out to sponsors. RWSTC voted to go to sponsors in the fall 2014 to then take action at the January 2015 meeting in Arlington, Virginia. The following is the recommended language as presented by the report and includes changes made as a result of sponsor comments in the fall of 2014 and as approved by RWSTC January 7, 2015. **Council tabled the proposal on January 9, 2015.** This proposal makes significant changes to 2B.04, 2B.06, 2B.07 and 2B.09. Therefore, rather than showing changes with crossouts and new text to the impacted sections, it was decided to show only the new text and existing retained 2009 MUTCD text in the proposal. We did this in hopes that it would provide less confusion by starting with a clean slate for these 4 sections of the existing MUTCD given the almost complete rewrite.

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At the end of the proposal, we have included the present language from sections 2B.04, 2B.06, 2B.07 and 2B.09 to show what portions we retained and what is not retained by ~~red strikethrough.~~

RECOMMENDED MUTCD CHANGES

The following present the proposed changes to the current MUTCD within the context of the current MUTCD language. Proposed additions to the MUTCD are shown in blue underline and proposed deletions from the MUTCD are shown in ~~red strikethrough~~. Changes previously approved by NCUTCD Council (but not yet adopted by FHWA) are shown in green double underline for additions and ~~green double strikethrough~~ for deletions. In some cases, background comments may be provided with the MUTCD text. These comments are indicated by [highlighted light blue in brackets].

Note: Existing MUTCD text is shown in black text. 2009 MUTCD deleted text is not shown for sections 2B.04, 2B.06, 2B.07 and 2B.09 within the new clean sections (2B.X1 to 2B.X14) proposal but rather for clarity is shown at the end of the proposal. We are deleting these sections and replacing them with the following:

PART 2. SIGNS

CHAPTER 2B. REGULATORY SIGNS, BARRICADES, AND GATES

The section numbers shown are for the structure of the 2009 Chapter 2B. If FHWA splits the current regulatory sign chapter into multiple chapters, this proposal would be a stand-alone chapter.

Sections 2B.04, 2B.06, 2B.07 and 2B.09 are deleted and replaced with the following:

NOTE: Sections 2B.05 (STOP sign and ALL WAY plaque) and 2B.08 (YIELD sign) and 2B.10 (STOP sign and YIELD sign placement) in the existing 2009 manual do not change. They would be inserted either before, after or somewhere between these proposed sections as deemed appropriate by FHWA.

Section 2B.04 General Considerations

Support:

01 Unsignalized intersections represent the most common form of intersection right-of-way control. Selection of unsignalized control type might be affected by specific requirements of state law or local ordinances.

02 Roundabouts, and traffic circles other circular intersections are intersection designs and are not traffic control devices. The YIELD sign at the roundabout is the traffic control device. The decision to convert an intersection from a traditional intersection to a roundabout is an engineering design decision and not a traffic control device traffic decision. As such, criteria for conversion from a traditional intersection to a roundabout are not included in the MUTCD.

Guidance:

03 *The type of traffic control used at an unsignalized intersection should be the least restrictive that provides appropriate levels of safety and efficiency.*

Support:

04 The types of right-of-way control that can exist at an unsignalized intersection are listed below in order from the least restrictive to the most restrictive.

A. No intersection control: There are no right-of-way traffic control devices on any of the approaches to the intersection.
B. Yield control: YIELD signs are placed on all approaches (for a roundabout), on opposing approaches (for a 4-leg intersection), on a single approach (for a 3-leg intersection), or in the median of a divided highway. The YIELD signs are typically placed on the minor road. (See Section 2B.X3 for guidance on selecting the minor road.)
C. Minor road stop control: STOP signs are typically placed on opposing approaches (for a 4-leg intersection) or on a single approach (for a 3-leg intersection). The STOP signs are typically placed on the minor road. (See Section 2B.X3 for guidance on selecting the minor road.)
D. All-way stop control: STOP signs are placed on all approaches to the intersection.

Guidance:

05 *When selecting a form of intersection control, the following factors should be considered:*

A. *Vehicular, bicycle, and pedestrian traffic volumes on all approaches. (From 2009 MUTCD Section 2B.04 Paragraph 02) Where the term units/day or units/hour is indicated, it should be the total of vehicular, bicycle, and pedestrian volume*

B. *Driver yielding behavior with regard to all modes of conflicting traffic including bicyclists and pedestrians.*

C. *Number and angle of approaches.*

D. *Approach speeds.*

E. *Sight distance available on each approach.*

F. *Reported crash experience.*[From 2009 MUTCD Section 2B.04 Paragraph 02]

G. *Evaluate and consider the presence of a rail crossing near the intersection of a local street with a collector street*

06 *Yield or Stop signs should not be used for speed control.* [From 2009 MUTCD Section 2B.04 Paragraph 05]

Standard:

07 **Because the potential for conflicting commands could create driver confusion, Yield or Stop signs shall not be used in conjunction with any traffic control signal operation, except in the following cases:**

A. If the signal indication for an approach is a flashing red at all times;

B. If a minor street or driveway is located within or adjacent to the area controlled by the traffic control signal, but does not require separate traffic signal control because an extremely low potential for conflict exists; or

C. If a channelized turn lane is separated from the adjacent travel lanes by an island and the channelized turn lane is not controlled by a traffic control signal. [From 2009 MUTCD Section 2B.04, paragraph 10]

08 **Except as provided in Section 2B.X6, Stop signs and Yield signs shall not be installed on different approaches to the same unsignalized intersection if those approaches conflict with or oppose each other.** [From 2009 MUTCD Section 2B.04, paragraph 11]

09 **Portable or part-time Stop or Yield signs shall not be used except for emergency and temporary traffic control zone purposes.** [From 2009 MUTCD Section 2B.04, paragraph 12]

10 **A portable or part-time (folding) Stop sign that is manually placed into view and manually removed from view shall not be used during a power outage to control a signalized approach unless the maintaining agency establishes that the signal indication that will first be displayed to that approach upon restoration of power is a flashing red signal indication and that the portable Stop sign will be manually removed from view prior to stop-and-go operation of the traffic control signal.** [From 2009 MUTCD Section 2B.04, paragraph 13]

Option:

11 A portable or part-time (folding) Stop sign that is electrically or mechanically operated such that it only displays the Stop message during a power outage and ceases to display the Stop message upon restoration of power may be used during a power outage to control a signalized approach. [From 2009 MUTCD Section 2B.04, paragraph 14]

Section 2B.04a Determining the Minor Road for Unsignalized Intersections

Guidance:

01 The selection of the minor road to be controlled by Yield or Stop signs should be based on one or more of the following criteria:

A. *A roadway intersecting a designated through or numbered highway.*
B. *A roadway with the lower functional classification.*
C. *A roadway with the lower traffic volume.*
D. *A roadway with the lower speed limit.*

02 *When two roadways that have relatively equal volumes, speeds, and/or other characteristics intersect, the following factors should be considered in selecting the minor road for installation of YIELD or STOP signs:*

(similar thought to 2009 MUTCD Section 2B.04, paragraph 09)

A. *Controlling the direction that conflicts the most with established pedestrian crossing activity or school walking routes;*
B. *Controlling the direction that has obscured vision, dips, or bumps that already require drivers to use lower operating speeds; and*
C. *Controlling the direction that has the best sight distance from a controlled position to observe conflicting traffic.* [From 2009 MUTCD Section 2B.04 Paragraph 09]

Add definition to Section 1A.13 for "Through Highway or Through Street". Refer to Edit Committee for action.

Section 2B.04b Alternatives to Changing Intersection Right-of-Way Control

Guidance:

01 *Before converting to a more restrictive form of right-of-way control at an unsignalized intersection, consideration should be given to alternative treatments that address safety, operational, or other concerns.*

Option:

02 Alternatives that may be considered include, but are not limited to, the following:

A. Where Yield or Stop controlled, installing STOP AHEAD or YIELD AHEAD signs on the appropriate approaches to the intersection.
B. Removing parking on one or more approaches.
C. Removing sight distance restrictions.
D. Installing warning signs along the major street to warn road users approaching the intersection;
E. Relocating the stop line(s) and making other changes to improve the sight distance at the intersection;
F. Installing measures designed to reduce speeds on the approaches.
G. Installing a flashing beacon at the intersection to supplement Stop sign control;
H. Installing yellow flashing beacons on warning signs in advance of a Stop sign controlled intersection on major- and/or minor-street approaches;
I. Adding one or more lanes on a minor-street approach to reduce the number of vehicles per lane on the approach;
J. Revising the geometrics at the intersection to channelize vehicular movements and reduce the time required for a vehicle to complete a movement, which could also assist pedestrians;
K. Revising the geometrics at the intersection to add pedestrian median refuge islands and/or curb extensions;
L. Installing roadway lighting if a disproportionate number of crashes occur at night;
M. Restricting one or more turning movements, perhaps on a time-of-day basis, if alternate routes are available;

N. Installing a pedestrian hybrid beacon (see Chapter 4F) or In-Roadway Warning Lights (see Chapter 4N) if pedestrian safety is the major concern;
O. Converting to a roundabout; and
P. Employing other alternatives, depending on conditions at the intersection.

NOTE: Items D-P noted above were taken from Part 4B.04

Section 2B.04c No Intersection Control

Guidance:

01 The decision to use no intersection control should be based on engineering judgment.

Option:

02 The following factors may be considered:

A. Intersection sight distance is adequate on all approaches.
B. All approaches to the intersection are a single lane and there are no separate turn lanes.
C. The combined vehicular, bicycle, and pedestrian volume (existing or projected) entering the intersection from all approaches averages less than 1,000 units per day or 80 units in the peak hour.

[Note: Value selected because (a) 1983 study in rural Michigan found no statistical difference for stop-controlled and no-control intersections with major street volumes less than 1000 vpd and (b) less than the value selected for Yield control.]

D. There are no pedestrian or bicycle traffic control devices on any approach.
E. None of the approaches to the intersection are for a through highway, or higher functional classification roadway.
F. The angle of intersection is between 90 and 75 degrees.

[Note: the *Handbook for Designing Roadways for the Aging Population* includes the recommendation that the angle not be less than 75 degrees; therefore, we added it to this list of when a Stop should not be replaced with no intersection control.]

G. The functional classification of the intersecting streets is either the intersection of two local streets or the intersection of a local street with a collector street.

Section 2B.04d Yield Control

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. [From 2009 MUTCD Section 2B.06, Paragraph 01]

02 Yield control should be considered when engineering judgment indicates that all of the following conditions apply:

A. Intersection sight distance is adequate on the approaches to be controlled by YIELD signs.
B. The approach to be controlled is a single lane.
C. One of the following crash-related criteria applies:
a. For changing from no intersection control to yield control, there have been two or more reported crashes that are susceptible to correction by installation of a YIELD sign in the previous 12 months.
b. For changing from minor road stop control to yield control, there have been two or fewer reported crashes in the previous 12 months.

D. Entering intersection volume of less than 1800 units per day or 140 units in the peak hour.

[Note: the 1800 units/day value was based on NCHRP 320 recommendation.]

E. The angle of intersection is between 90 and 75 degrees.

[Note: the *Handbook for Designing Roadways for the Aging Population* includes the recommendation that the angle not be less than 75 degrees; therefore, we added it to this list of when a Stop should not be replaced with a Yield.].

F. The functional classification of the intersecting streets is either the intersection of two local streets or the intersection of a local street with a collector street.

Option:

03 Yield signs may be installed at an intersection when any of the following conditions apply:

A. At the second crossroad of a divided highway, where the median width at the intersection is 30 feet or greater. (see Figure 2B-15) In this case, a YIELD sign may be installed at the entrance to the second roadway. [From 2009 MUTCD Section 2B.09, Paragraph 1, item B]

B. 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. [From 2009 MUTCD Section 2B.09, Paragraph 1, item C]

C. 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. [From 2009 MUTCD Section 2B.09, Paragraph 1, item D]

D. Facing the entering and exiting roadway for a merge-type movement if engineering judgment indicates that control is needed because acceleration or deceleration geometry and/or sight distance is not adequate for merging traffic operation. [From 2009 MUTCD Section 2B.09, Paragraph 01, item E]

Guidance:

04 The Yield signs should be installed on opposing minor- road approaches (for a 4-leg intersection) or on the minor-road approach (for a 3-leg intersection). (See Section 2B-X3) for information to identify the minor road. When two roadways have relatively equal volumes, speeds and other characteristics intersect, yield control should be established on the approach that conflicts most with established pedestrian crossing activity or school walking routes.

Standard:

05 A Yield 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. [From 2009 MUTCD Section 2B.09, Paragraph 02]

06 ~~Other than for all of the approaches to a roundabout~~, Yield signs shall not be placed on all of the approaches to an intersection, except at roundabouts. [From 2009 MUTCD Section 2B.09, Paragraph 03]

Section 2B.04e Minor Road Stop Control

Guidance:

01 Stop control on the minor road approach or approaches to an intersection should be considered when engineering judgment indicates that one or more of the following conditions exist:

A. *A restricted view exists that requires road users to stop in order to adequately observe conflicting traffic on the through street or highway. [From 2009 MUTCD Section 2B.06 Paragraph 2B]*

B. *Crash records indicate:*

1. *For a four-leg intersection, there are three or more reported crashes in a 12-month period or six or more reported crashes in a 36-month period. The crashes are of a type susceptible to correction by installation of minor- road stop control.*
2. *For a three-leg intersection, there are three or more reported crashes in a 12-month period or five or more reported crashes in a 36-month period. The crashes are of a type susceptible to correction by installation of minor- road stop control.*

C. *The intersection of a lower functional classification road with a higher functional classification road. [similar thought as in 2009 MUTCD Section 2B.04 Paragraph 03.A]*

D. *Conditions that previously supported installation of an all-way stop control under all-way stop control warrants no longer exist.*

Section 2B.04f All-Way Stop Control

[Note: We recommend the use of the term all-way rather than multi-way because all-way is the term used in the supplemental all-way plaque.]

Guidance:

01 *The decision to install all-way stop control at an unsignalized intersection should be based on an engineering study. [From 2009 MUTCD Section 2B.07 Paragraph 03] accounting for the advantages and disadvantages of the control treatment.*

02 *The evaluation of the need for all-way stop control should include an analysis of factors related to the existing operation and safety at the study intersection and the potential to improve these conditions and the applicable factors contained in the following all-way stop control criteria:*

A. *All-Way Stop Control Criteria A: Crash Experience (Section 2B.X9)*
B. *All-Way Stop Control Criteria B: Sight Distance (Section 2B.X10)*
C. *All-Way Stop Control Criteria C: Transition to Signal Control (Section 2B.X11)*
D. *All-Way Stop Control Criteria D: Peak Hour Delay (Section 2B.X12)*
E. *All-Way Stop Control Criteria E: 8-Hour Volume (Vehicle, Pedestrians, Bicycles) Section 2B.X13*
F. *All-Way Stop Control Criteria F: Other Factors (Section 2B.X14)*

Standard:

03 **The satisfaction of an all-way stop control criteria shall not in itself require the installation of all-way stop control at an unsignalized intersection.**

The following table from NCHRP Web-Only Document 213, "Potential MUTCD Criteria for Selecting the Type of Control at Unsignalized Intersections," is shown for information only and is not part of the MUTCD proposal. It is shown to recap what is in the MUTCD proposed text.

Table 51. Recommended criteria for unsignalized intersection control.

Criteria	No Control	Yield Control	Minor-Road Stop	All-Way Stop
Number of Crashes susceptible to correction by intersection control	No crash criteria	Two or fewer reported crashes in a year [1]	4-leg: 3 or more within 12 months, 6 or more within 36 months [2] 3-leg: 3 or more within 12 months, 5 or more within 36 months [2]	4-leg: 5 or more within 12 months, 6 or more within 36 months [2] 3-leg: 4 or more within 12 months, 5 or more within 36 months [2]
Peak Hour Entering Volume	Maximum 80 units/hr [3]	Maximum 140 units/hr [3]	No volume criteria	No volume criteria
Entering Volume per day	Maximum 1000 units / day [4]	Maximum 1800 units / day [5]	No volume criteria	No volume criteria
8-hrs	No volume criteria	No volume criteria	No volume criteria	1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 units 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; 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. [6]
Delay	No delay criteria	No delay criteria	No delay criteria	35 sec/veh [7]
Other	Adequate sight distance One-lane approaches Angle of intersection [8]	Adequate sight distance One-lane approaches Angle of intersection [8]	Sight distance	Sight distance Engineering study

[1] Maryland MUTCD Table 2B-1a (*10*) provides guidelines for conversion from stop to yield control.
[2] Selected with consideration of the proposed crash warrant criteria for signals, NCHRP Project 07-18 (*48*).
[3] Rounded calculation from the 1000 and 1800 units/day value using 7.8 percent which is the peak hour factor used in the economic analysis.
[4] Value selected because (a) 1983 study in rural Michigan (*40*) found no statistical difference for stop-controlled and no-control intersections with major street volumes less than 1000 vpd and (b) the 1000 value is less than the value selected for YIELD sign control (1800).
[5] From NCHRP Report 320 (*35*).
[6] Values currently in 2009 MUTCD with changes of vehicular volume to units.
[7] Selected based on *Highway Capacity Manual* (*22*) Exhibit 19-1, lowest control delay (sec/veh) for Level of Service E (when v/c <=1.0).
[8] As recommended in the *Handbook for Designing Roadways for the Aging Population* (*72*).

Section 2B.04g All-Way Stop Control Criteria A: Crash Experience

Option:

01 All-way stop control may be established-at an intersection where an engineering study indicates that:

A. For a four-leg intersection, there are five or more reported crashes in a 12-month period or six or more reported crashes in a 36-month period. The crashes should be susceptible to correction by installation of all-way stop control.

B. For a three-leg intersection, there are four or more reported crashes in a 12-month period or five or more reported crashes in a 36-month period. The crashes should be susceptible to correction by installation of all-way stop control

[Note: crash numbers are a reflection of the proposed signal crash experience warrant – NCHRP Project 07-18 (49)]

Section 2B.04h All-Way Stop Control Criteria B: Sight Distance

Option:

01 All-way stop control may be established at an intersection where an engineering study indicates that sight distance on the minor road approaches controlled by a STOP sign is not adequate for a vehicle to turn onto or cross the major (uncontrolled) road. At such a location, 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. [From 2009 MUTCD Section 2B.07 Paragraph 05C]

Section 2B.04i All-Way Stop Control Criteria C: Transition to Signal Control

Option:

01 All-way stop control may be established at locations where all-way stop control is an interim measure that can be installed to control traffic while arrangements are being made for the installation of the traffic control signals at the intersection. [similar to 2009 MUTCD Section 2B.07 Paragraph 04A]

Section 2B.04j All-Way Stop Control Criteria D: Peak Hour Delay

Option:

01 All-way stop control may be established at an intersection where an engineering study indicates that the peak- hour delay (vehicle, bicycle, and pedestrian) on an average day on the minor road(s) is greater than 35 sec/road users

Section 2B.04k All-Way Stop Control Criteria E: 8 Hour Volume-(Vehicle, Pedestrians, Bicycles)

Option:

01 All-way stop control may be established at an intersection where an engineering study indicates:

A. The volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 units per hour for any 8 hours of an average day: and

B. The 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; but

C. 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 A and B.

(Note: similar to 2009 MUTCD Section 2B.07 , Paragraph 04C)

Section 2B.04l All-Way Stop Control Criteria F: Other Factors

Option:

01 If no other warrant criteria is met, an all-way stop control may be established at an intersection where an engineering study indicates that all-way stop control is needed due to other factors not addressed in the other all-way stop control warrants. Such other factors may include, but are not limited to, the following:

A. The need to control left-turn conflicts. [From 2009 MUTCD Section 2B.07 Paragraph 05A]

B. An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where all-way stop control would improve traffic operational characteristics of the intersection. [From 2009 MUTCD Section 2B.07 Paragraph 05D]

C. Where pedestrian and/or bicycle movements justify the installation of all-way stop control, if other warrant criteria is met.

(similar to 2009 MUTCD section 2B.07 Paragraph 05B)

NOTE: Sections 2B.05 (STOP sign and ALL WAY plaque) and 2B.08 (YIELD sign) and 2B.10 (STOP sign and YIELD sign placement) in the existing 2009 manual do not change. They would be inserted either before , after or somewhere between these sections as deemed appropriate by FHWA.

~~**Section 2B.06 STOP Sign Applications**~~

This section is deleted

~~**Section 2B.07 Multi-Way Stop Applications**~~

This section is deleted

~~**Section 2B.09 YIELD Sign Applications**~~

This section is deleted

The following is present 2009 MUTCD language in the sections impacted, which are 2B.04, 2B.06, 2B.07 and 2B.09:

~~**Strikethrough Red**~~ **is MUTCD text being deleted.**
The location or section of the 2009 MUTCD provided in square brackets [ ] shows where text is being moved to.

2009 MUTCD:

~~**Section 2B.04 Right-of-Way at Intersections**~~

~~Support:~~

~~01 State or local laws written in accordance with the "Uniform Vehicle Code" (see Section 1A.11) establish the right-of-way rule at intersections having no regulatory traffic control signs~~

~~such that the driver of a vehicle approaching an intersection must yield the right-of-way to any vehicle or pedestrian already in the intersection. When two vehicles approach an intersection from different streets or highways at approximately the same time, the right-of-way rule requires the driver of the vehicle on the left to yield the right-of-way to the vehicle on the right. The right-of-way can be modified at through streets or highways by placing YIELD (R1-2) signs (see Sections 2B.08 and 2B.09) or STOP (R1-1) signs (see Sections 2B.05 through 2B.07) on one or more approaches.~~

Guidance: (Moved to Section 2B.X1)

02 *Engineering judgment should be used to establish intersection control. The following factors should be considered:*

A. Vehicular, bicycle, and pedestrian traffic volumes on all approaches;

B. Number and angle of approaches;

C. Approach speeds;

D. Sight distance available on each approach; and

E. *Reported crash experience.* [Moved to Section 2B.X1]

~~03 YIELD or STOP signs should be used at an intersection if one or more of the following conditions exist:~~

~~A. An intersection of a less important road with a main road where application of the normal right-of-way rule would not be expected to provide reasonable compliance with the law;~~ [similar thought was included in 2B.X7]

~~B. A street entering a designated through highway or street; and/or~~ (similar thought in 2B.X7)

~~C. An unsignalized intersection in a signalized area.~~

~~04 In addition, the use of YIELD or STOP signs should be considered at the intersection of two minor streets or local roads where the intersection has more than three approaches and where one or more of the following conditions exist:~~

~~A. The combined vehicular, bicycle, and pedestrian volume entering the intersection from all approaches averages more than 2,000 units per day;~~

~~B. The ability to see conflicting traffic on an approach is not sufficient to allow a road user to stop or yield in compliance with the normal right-of-way rule if such stopping or yielding is necessary; and/or~~

~~C. Crash records indicate that five or more crashes that involve the failure to yield the right-of-way at the intersection under the normal right-of-way rule have been reported within a 3-year period, or that three or more such crashes have been reported within a 2-year period.~~

05 *YIELD or STOP signs should not be used for speed control.* (Moved to section 2B.X1)

~~Support:~~

~~06 Section 2B.07 contains provisions regarding the application of multi-way STOP control at an intersection.~~

~~Guidance:~~

~~07 Once the decision has been made to control an intersection, the decision regarding the appropriate roadway to control should be based on engineering judgment. In most cases, the roadway carrying the lowest volume of traffic should be controlled.~~

~~08 A YIELD or STOP sign should not be installed on the higher volume roadway unless justified by an engineering study.~~

Support:

09 The following are considerations that might influence the decision regarding the appropriate roadway upon which to install a YIELD or STOP sign where two roadways with relatively equal volumes and/or characteristics intersect:

A. Controlling the direction that conflicts the most with established pedestrian crossing activity or school walking routes; (moved to section 2B.X3)
B. Controlling the direction that has obscured vision, dips, or bumps that already require drivers to use lower operating speeds; and (moved to section 2B.X3)
C. Controlling the direction that has the best sight distance from a controlled position to observe conflicting traffic. [moved to section 2B.X3]

Standard:

10 **Because the potential for conflicting commands could create driver confusion, YIELD or STOP signs shall not be used in conjunction with any traffic control signal operation, except in the following cases:** (Moved to section 2B.X1)

A. **If the signal indication for an approach is a flashing red at all times;** (moved to section 2B.X1)
B. **If a minor street or driveway is located within or adjacent to the area controlled by the traffic control signal, but does not require separate traffic signal control because an extremely low potential for conflict exists; or** (moved to section 2B.X1)
C. **If a channelized turn lane is separated from the adjacent travel lanes by an island and the channelized turn lane is not controlled by a traffic control signal.** [moved to section 2B.X1]

11 **Except as provided in Section 2B.09, STOP signs and YIELD signs shall not be installed on different approaches to the same unsignalized intersection if those approaches conflict with or oppose each other.** [moved to Section 2B.X1]

12 **Portable or part-time STOP or YIELD signs shall not be used except for emergency and temporary traffic control zone purposes**. [moved to Section 2B.X1]

13 **A portable or part-time (folding) STOP sign that is manually placed into view and manually removed from view shall not be used during a power outage to control a signalized approach unless the maintaining agency establishes that the signal indication that will first be displayed to that approach upon restoration of power is a flashing red signal indication and that the portable STOP sign will be manually removed from view prior to stop-and-go operation of the traffic control signal.** [Moved to Section 2B.X1]

Option:

14 A portable or part-time (folding) STOP sign that is electrically or mechanically operated such that it only displays the STOP message during a power outage and ceases to display the STOP message upon restoration of power may be used during a power outage to control a signalized approach. [moved to Section 2B.X1]

~~Support:~~

~~15 Section 9B.03 contains provisions regarding the assignment of priority at a shared-use path/roadway intersection.~~

~~**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 (moved to section 2B.X6)

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. *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* [moved to Section 2B.X7]

~~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.~~

~~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 Section2B.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.* [Moved to Section 2B.X8]

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.* (Moved to Section 2B.X11)

~~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*: (Moved to Section 2B.X13 with some changes)

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; [Section 2B.X14]

B. ~~The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;~~ (similar to section 2B.X14)

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 [moved to section 2B.X10]

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. [Moved to Section 2B.X14]

~~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. [Moved to Section 2B.X6]

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. [Moved to Section 2B.X6]

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. [Moved to Section 2B.X6]

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. [Moved to Section 2B.X6]

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. [**Moved to Section 2B.X6]

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.** [Moved to Section 2B.X6]

END OF PROPOSAL

The text below from 2009 MUTCD is shown for information only for reviewers:

Section 4C.01 Studies and Factors for Justifying Traffic Control Signals

Standard:

01 An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location.

02 The investigation of the need for a traffic control signal shall include an analysis of factors related to the existing operation and safety at the study location and the potential to improve these conditions, and the applicable factors contained in the following traffic signal warrants:

Warrant 1, Eight-Hour Vehicular Volume
Warrant 2, Four-Hour Vehicular Volume
Warrant 3, Peak Hour
Warrant 4, Pedestrian Volume
Warrant 5, School Crossing
Warrant 6, Coordinated Signal System
Warrant 7, Crash Experience
Warrant 8, Roadway Network
Warrant 9, Intersection Near a Grade Crossing

03 The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.