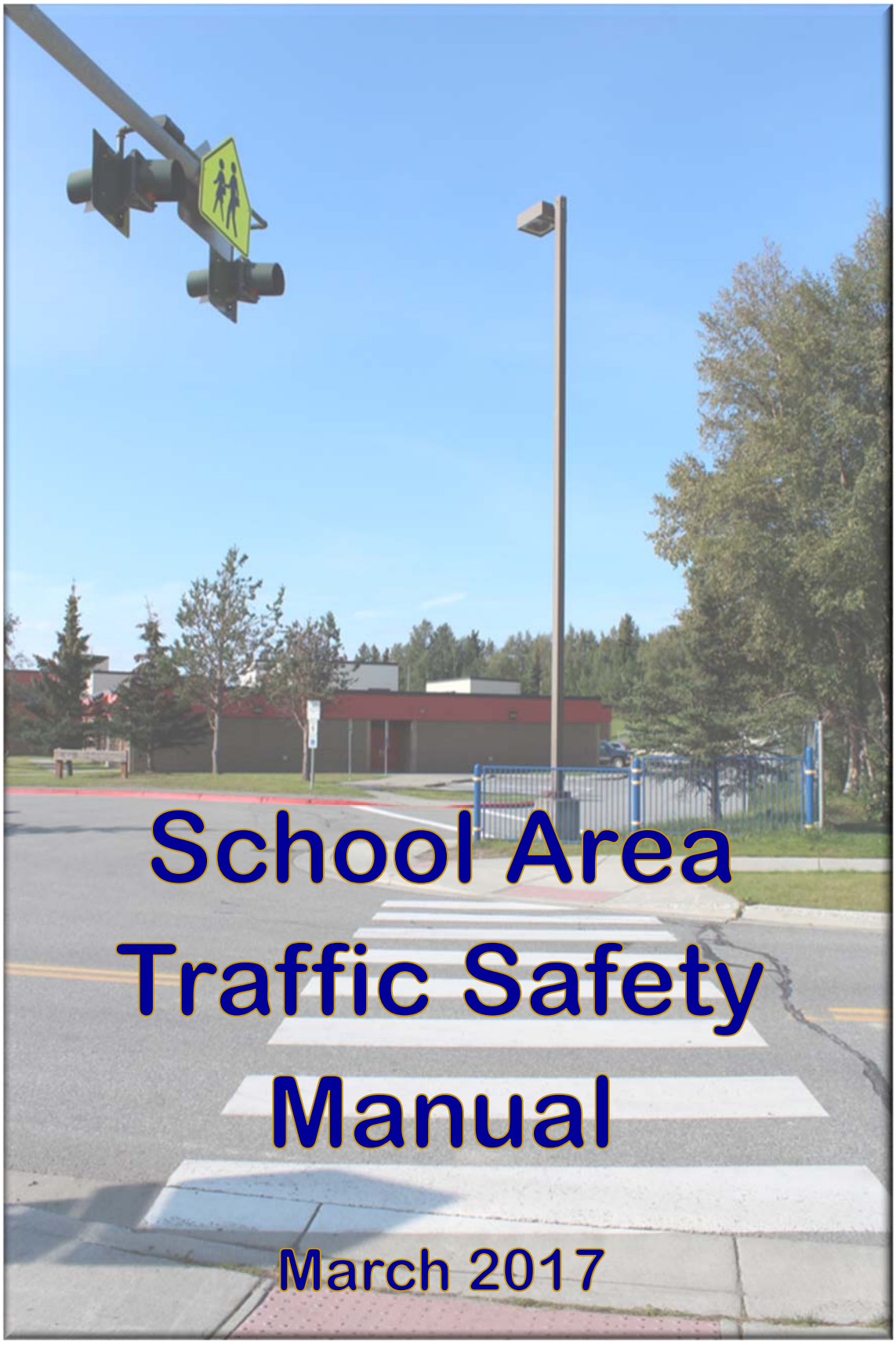
TRAFFIC DEPARTMENT



# School Area Traffic Safety Manual

March 2017

HDL ENGINEERING CONSULTANTS

# SCHOOL AREA TRAFFIC SAFETY MANUAL

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# INTRODUCTION
# SCHOOL AREA TRAFFIC SAFETY MANUAL

Support:

01 The 2017 School Area Traffic Safety Manual (SATSM) is intended to enhance road safety and operation in designated school areas within the Municipality of Anchorage (MOA) by specifying uniform, understandable, and effective traffic control devices for MOA roads.

**Standard:**

02 **Traffic control devices installed on state roads shall conform to the Alaska Traffic Manual (ATM). Traffic control devices on roads under municipal jurisdiction shall conform, "as far as practicable", to the ATM, as specified in Alaska Statutes (AS) 28.01.010(d).**

Support:

03 The SATSM is comprised of the "*2016 ATM Supplement*"; the 2009 edition of the "*Manual on Uniform Traffic Control Devices (MUTCD) including Revision 1 and Revision 2 dated May 2012*", published by the Federal Highway Administration; any adopted revisions or interim addenda to either document issued subsequently; and corrections to known errors to either document.

**Standard:**

04 **Devices installed or replaced after the publication date of the SATSM shall conform to the SATSM upon installation. Unless noted otherwise, existing devices that do not conform to the current SATSM shall be replaced at the end of their useful life.**

05 **The SATSM, ATM and MUTCD shall be consulted when researching traffic control device issues.**

Support:

06 How to use the SATSM:

07 The SATSM parts, chapters and sections correlate to the ATM and MUTCD parts, chapters and sections in sequence, heading and numbering.

08 The three documents interact as follows:

ATM and MUTCD sections, figures or tables not mentioned in the SATSM are adopted for MOA without any changes or additions.

MUTCD text modified by the ATM is indicated by ~~blue strikethrough~~ text for deletions and blue underline text for additions. In some cases, portions of unmodified MUTCD text are shown as black text along with deletions and additions to provide context. MOA modifications are written directly after each section under the "MOA Traffic Policies" heading. This manual includes sections that have been modified by the MOA for school areas.

MUTCD figures and tables modified by the ATM are changed either as directed by the instructions in blue brackets ([ ]) or as shown in the ATM to replace the MUTCD version.

Where no equivalent section, figure, or table exists in the MUTCD, the section, figure, or table in the ATM is the standard. Alaska-unique sections begin with a .100 suffix (as in Section 2C.100). Similarly, Alaska-unique figures and tables begin with -100 suffixes (as in Figure 2C-100 or Table 2C-100).

09 Obtaining the MUTCD:

10 The MUTCD and revisions may be obtained from the following publishing agencies:

American Traffic Safety Services Association (ATSSA): http://www.atssa.com/OnlineStore.aspx

Institute of Transportation Engineers (ITE): http://www.ite.org/bookstore

American Association of State Highway and Transportation Officials (AASHTO): http://bookstore.transportation.org/item_details.aspx?ID=1550

11 It may also be downloaded on the Web at http://mutcd.fhwa.dot.gov/kno_2009rlr2.htm.

12 The following Department of Transportation and Public Facilities (DOT&PF) documents can be useful references when working on traffic control device design on DOT&PF owned facilities:

Design details for signs and markers are not included in the ATM. They are found in the "*Alaska Sign Design Specifications (ASDS)*".

The DOT&PF "*Alaska Preconstruction Manual*" contains additional information on highway construction, street lighting, and supports for signs, streetlights, and traffic. It pertains only to DOT&PF construction projects.

The DOT&PF "*Standard Specifications for Highway Construction*" contains descriptions, material requirements, and construction methods for traffic control devices and other items. It pertains only to DOT&PF construction projects.

13 You can download the ATM and the above referenced documents for free at the DOT&PF Design and Construction Standards website at: http://www.dot.state.ak.us/stwddes/dcspubs/manuals.shtml.

14 The website also provides access to any updates adopted since publication of the 2016 ATM.

15 The following MOA documents can be useful references when working on traffic control device design on MOA owned facilities:

The MOA "*PM&E Design Criteria Manual (DCM)*" contains additional information on street, drainage, landscaping, trail, street lighting, traffic control, and public transportation design. It pertains only to MOA construction projects.

The MOA "*Municipality of Anchorage Standard Specifications (MASS)*" contains descriptions, material requirements, and construction methods for traffic control devices and other items. It pertains only to MOA construction projects.

16 You can download the above referenced documents for free at the MOA Project Management and Engineering Online Publications website at: http://www.muni.org/Departments/project_management/Pages/Publications.aspx

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# Table of Acronyms

**AASHTO:** American Association of State Highway and Transportation Officials

**ADT:** Average Daily Traffic

**ANSI:** American National Standards Institute

**AS:** Alaska Statute

**ASD:** Anchorage School District

**ASDS:** Alaska Sign Design Specifications

**ATM:** Alaska Traffic Manual

**ATSSA:** American Traffic Safety Services Association

**DCM:** Design Criteria Manual

**DOT&PF:** Alaska Department of Transportation and Public Facilities

**EP:** Evaluation Period: From forty-five (45) minutes before school starts in the morning until fifteen (15) minutes after school starts or from fifteen (15) minutes before school ends until forty-five (45) minutes after school ends.

**G:** Total Usable Gap: The summation of Usable Gaps during the Evaluation Period, measured in seconds.

**HTC:** Hazardous Transportation Committee

**HTV:** High Traffic Volume

**ITE:** Institute of Transportation Engineers

**LED:** Light Emitting Diode

**MASS:** Municipality of Anchorage Standard Specifications

**MUGT:** Minimum Usable Gap Time: The minimum gap in traffic required for a single or group of school pedestrians to safely cross a given street width.

**MNUG:** Maximum Number of Usable Gaps: Ratio of Total Usable Gap Time to Minimum Usable Gap Time during the Evaluation Period.

**MOA:** Municipality of Anchorage

**MPH:** Miles Per Hour

**MUTCD:** Manual on Uniform Traffic Control Devices, 2009 Edition including Revision 1 and Revision 2 dated May 2012

**RSSZ:** Reduced School Speed Zone

**SATSM:** School Area Traffic Safety Manual

**SSD:** Stopping Sight Distance

**PM&E:** Project Management and Engineering

Part 4

# PART 4
# HIGHWAY TRAFFIC SIGNALS

## CHAPTER 4L. FLASHING BEACONS

### Section 4L.03 Warning Beacons

Support:

01 Typical applications of Warning Beacons include the following:

A. At obstructions in or immediately adjacent to the roadway;

B. As supplemental emphasis to warning signs;

C. As emphasis for midblock crosswalks;

D. As supplemental emphasis to regulatory signs, except STOP, DO NOT ENTER, WRONG WAY, and SPEED LIMIT signs; and

E. In conjunction with a regulatory or warning sign that includes the phrase WHEN FLASHING in its legend to indicate that the regulation is in effect or that the condition is present only at certain times.

**Standard:**

02 **A Warning Beacon shall consist of one or more signal sections of a standard traffic signal face with a flashing CIRCULAR YELLOW signal indication in each signal section.**

03 **A Warning Beacon shall be used only to supplement an appropriate warning or regulatory sign or marker.**

04 **Warning Beacons, if used at intersections, shall not face conflicting vehicular approaches.**

05 **If a Warning Beacon is suspended over the roadway, the clearance above the pavement shall ~~be a minimum of 15 feet and a maximum of 19 feet~~ comply with the requirements of Section 4D.15.**

*Guidance:*

06 *The condition or regulation justifying Warning Beacons should largely govern their location with respect to the roadway.*

07 *If an obstruction is in or adjacent to the roadway, illumination of the lower portion or the beginning of the obstruction or a sign on or in front of the obstruction, in addition to the beacon, should be considered.*

08 *Warning Beacons should be operated only during those periods or times when the condition or regulation exists.*

Option:

09 Warning Beacons that are actuated by pedestrians, bicyclists, or other road users may be used as appropriate to provide additional warning to vehicles approaching a crossing or other location.

10 If Warning Beacons have more than one signal section, they may be flashed either alternately or simultaneously.

11 A flashing yellow beacon interconnected with a traffic signal controller assembly may be used with a traffic signal warning sign (see Section 2C.36)."

**MOA Traffic Policies**

MOA will adhere to MUTCD and ATM.


Part 7

# PART 7
# TRAFFIC CONTROL FOR SCHOOL AREAS

## CHAPTER 7A. GENERAL

### Section 7A.01 Need for Standards

Support:

10 Reduced speed limit signs for school areas and crossings are included in this Manual solely for the purpose of standardizing signing for these zones and not as an endorsement of mandatory reduced speed zones.

11 "School", ~~and~~ "school zone", "school area", and "school district" are defined in Section 1A.13.

### MOA Traffic Policies

**Public Schools**—School zones shall be determined for each school based on walking routes and the school boundaries. In general, school zones should be limited to roadways immediately adjacent to the school grounds or at designated crossings. Appendix A lists the schools within the MOA. Once it is determined a school zone is warranted along a roadway, the type traffic control shall follow the requirements outlined in ATM Table 7A-101—Urban School Area Traffic Control. Placement of required signs, marking, and other traffic control shall conform to the MUTCD, 2009 Edition including Revision 1 and Revision 2 and the current edition of the ATM, 2016. Appendix B has contact information for the MOA Traffic Department.

Figure 1. School Crosswalk with Overhead Flashing Beacon and Signing for Scenic Park Elementary

**Private Schools**—School zones for private schools shall follow the same requirements as for public schools. However, school zones should only be considered for private schools which have registered with the State Department of Education.

## CHAPTER 7B. SIGNS

### Section 7B.07 Sign Color for School Warning Signs

**Standard:**

Figure 2. Reduced Speed Limit Assembly for Scenic Park Elementary


01 **School warning signs, including the "SCHOOL" portion of the School Speed Limit (S5-1) sign and including any supplemental plaques used in association with these warning signs, shall have a fluorescent yellow-green background with a black legend and border unless otherwise provided in this Manual for a specific sign.**

**MOA Traffic Policies**

MOA will adhere to MUTCD and ATM except with the following modification:

All new school zone signs, as outlined in the MUTCD, within the MOA shall be black on a fluorescent yellow-green background.

### Section 7B.08 School Sign (S1-1) and Plaques

Support:

01 Many state and local jurisdictions find it beneficial to advise road users that they are approaching a school that is adjacent to a highway, where additional care is needed, even though no school crossing is involved and the speed limit remains unchanged. Additionally, some jurisdictions designate school zones that have a unique legal standing in that fines for speeding or other traffic violations within designated school zones are increased or special enforcement techniques such as photo radar systems are used. It is important and sometimes legally necessary to mark the beginning and end points of these designated school zones so that the road user is given proper notice.

02 The School (S1-1) sign (see Figure 7B-1) has the following four applications:

**(S1-1)**

A. School Area—The S1-1 sign can be used to warn road users that they are approaching a school area that might include school buildings or grounds, a school crossing, or school related activity adjacent to the highway.

B. School Zone—The S1-1 sign can be used to identify the location of the beginning of a designated school zone (see Section 7B.09).

C. School Advance Crossing—If combined with an AHEAD (W16-9P) plaque or an XX FEET (W16-2P or W16-2aP) plaque to comprise the School Advance Crossing assembly, the S1-1 sign can be used to warn road users that they are approaching a crossing where schoolchildren cross the roadway (see Section 7B.11).

D. School Crossing—If combined with a diagonal downward pointing arrow (W16-7P) plaque to comprise the School Crossing assembly, the S1-1 sign can be used to warn approaching road users of the location of a crossing where schoolchildren cross the roadway (see Section 7B.12)."

Support:

02A Figure 7B-100 contains information regarding the application and placement of the School Sign (S1-1).

**MOA Traffic Policies**

MOA will adhere to MUTCD and ATM except with the following modification:

School (S1-1) signs for in-street School Advance Warning shall not be reduced in size. The S1-1 sign shall be a minimum of 36-in by 36-in. See Appendix E for list of signs and sign sizes.

ATM Figure 7B-100 shall not be used to identify school zone sign locations. Typical school zone sign locations are shown in Figures 4 through 10 of this manual.

## Section 7B.09 School Zone Sign (S1-1) and Plaques (S4-3P, S4-7P) and END SCHOOL ZONE Sign (S5-2)

**(S5-2)**

**Standard:**

01 **If a school zone has been designated ~~under State or local statute~~ as described in Section 7A.02, a School (S1-1) sign (see Figure 7B-1) shall be installed ~~to identify the beginning point(s) of the designated school zone~~ not less than 150 feet nor more than 700 feet in advance of the school grounds or school crossings (see ~~Figure 7B-2~~ Figure7B-100).**

Support:

01A "School grounds" typically refer to school property. However, when school property frontage is lengthy, school grounds may be interpreted as the area where students frequently cross the road.

Option:

02 A School Zone (S1-1) sign may be supplemented with a SCHOOL (S4-3P) plaque (see Figure 7B-1).

03 A School Zone (S1-1) sign may be supplemented with an ALL YEAR (S4-7P) plaque (see Figure 7B-1) if the school operates on a 12-month schedule.

04 The downstream end of a designated school zone may be identified with an END SCHOOL ZONE (S5-2) sign (~~see Figures 7B-1 and 7B-2~~ Figure 7B-100).

05 If a school zone is located on a cross street in close proximity to the intersection, a School Zone (S1-1) sign with supplemental arrow (W16-5P or W16-6P) plaque may be installed on each approach of the street or highway to warn road users making a turn onto the cross street that they will encounter a school zone soon after making the turn.

**MOA Traffic Policies**

MOA will adhere to MUTCD and ATM except with the following modifications:

All school zones shall end with an END SCHOOL ZONE (S5-2) sign. A standard SPEED LIMIT (R2-1) sign showing the speed for a section of roadway which follows the school zone may be mounted above the S5-2 sign.

ATM Figure 7B-100 shall not be used to identify school zone sign locations. Typical school zone sign locations are shown in Figures 4 through 10 of this manual.

## Section 7B.10 Higher Fines Zone Signs (R2-10, R2-11) and Plaques

**Standard:**

**(R2-6p)**

01 **"Where increased fines are imposed for traffic violations within a designated school zone, a BEGIN HIGHER FINES ZONE (R2-10) sign (see Figure 7B-1) or a FINES HIGHER (R2-6P), FINES DOUBLE (R2-6aP), or XX FINE (R2-6bP) plaque**

**(see Figure 2B-3) shall be installed as a supplement to the School Zone (S1-1) sign to identify the beginning point of the higher fines zone (see ~~Figures 7B-2 and 7B-3~~Figure 7B-100).**

Option:

02 Where appropriate, one of the following plaques may be mounted below the sign that identifies the beginning point of the higher fines zone:

A. An S4-1P plaque (see Figure 7B-1) specifying the times that the higher fines are in effect,

B. A WHEN CHILDREN ARE PRESENT (S4-2P) plaque (see Figure 7B-1), or

C. A WHEN FLASHING (S4-4P) plaque (see Figure 7B-1) if used in conjunction with a yellow flashing beacon.

**Standard:**

03 **Where a BEGIN HIGHER FINES ZONE (R2-10) sign or a FINES HIGHER (R2-6P) plaque supplementing a School Zone (S1-1) sign is posted to notify road users of increased fines for traffic violations, an END HIGHER FINES ZONE (R2-11) sign (see Figure 7B-1) or an END SCHOOL ZONE (S5-2) sign shall be installed at the downstream end of the zone to notify road users of the termination of the increased fines zone (see ~~Figures 7B-2 and 7B-3~~ Figure 7B-100).**

**MOA Traffic Policies**

MOA will adhere to MUTCD and ATM except with the following modifications:

The FINES HIGHER (R2-6P) sign and BEGIN HIGHER FINES ZONE (R2-10) sign may be placed on the DRUG FREE SCHOOL ZONE (S6-100) sign assembly.

ATM Figure 7B-100 shall not be used to identify school zone sign locations. Typical school zone sign locations are shown in Figures 4 through 10 of this manual.

## Section 7B.11 School Advance Crossing Assembly

**(School Advance Crossing Assembly)**

**Standard:**

01 **"The School Advance Crossing assembly (see Figure 7B-1) shall consist of a School (S1-1) sign supplemented with an AHEAD (W16-9P) plaque or an XX FEET (W16-2P or W16-2aP) plaque.**

02 **Except as provided in Paragraph 3, a School Advance Crossing assembly shall be used in advance (see Table 2C-4 for advance placement guidelines) of the first School Crossing assembly (see Section 7B.12) that is encountered in each direction as traffic approaches a school crosswalk (see ~~Figure 7B-4~~ Figure 7B-100).**

Option:

03 The School Advance Crossing assembly may be omitted (see Figure 7B-5) where a School Zone (S1-1) sign (see Section 7B.09) is installed to identify the beginning of a school zone in advance of the School Crossing assembly.

04 If a school crosswalk is located on a cross street in close proximity to an intersection, a School Advance Crossing assembly with a supplemental arrow (W16-5P or W16-6P) plaque may be installed on each approach of the street or highway to warn road users making a turn onto the cross street that they will encounter a school crosswalk soon after making the turn.

05 A 12-inch reduced size in-street School (S1-1) sign (see Figure 7B-6), installed in compliance with the mounting height and special mounting support requirements for In-Street Pedestrian Crossing (R1-6 ~~or R1-6a~~) signs (see Section 2B.12), may be used in advance of a school crossing to supplement the post-mounted school warning signs. A 12 x 6-inch reduced size AHEAD (W16-9P) plaque may be mounted below the reduced size in-street School (S1-1) sign.

**MOA Traffic Policies**

MOA will adhere to MUTCD and ATM except with the following modification:

School (S1-1) signs for in-street School Advance Warning shall not be reduced in size. The S1-1 sign shall be a minimum of 36-in by 36-in. The School (S1-1) and AHEAD (W16-9P) sign may be constructed using a single sheet of material. See Appendix E for list of signs and sign sizes.

ATM Figure 7B-100 shall not be used to identify school zone sign locations. Typical school zone sign locations are shown in Figures 4 through 10 of this manual.

## Section 7B.12 School Crossing Assembly

**(School Crossing Assembly)**

**Standard:**

01 **If used, the School Crossing assembly (see Figure 7B-1) shall be installed at the school crossing (see ~~Figure 7B-4 or 7B-5~~ Figure 7B-100), or as close to it as possible, and shall consist of a School (S1-1) sign supplemented with a diagonal downward pointing arrow (W16-7P) plaque to show the location of the crossing.**

02 **The School Crossing assembly shall not be used at crossings other than those adjacent to schools and those on established school pedestrian routes.**

03 **The School Crossing assembly shall not be installed on approaches controlled by a STOP or YIELD sign.**

Option:

04 The In-Street Pedestrian Crossing (R1-6 ~~or R1-6a~~) sign (see Section 2B.12 and Figure 7B-6) or the In-Street Schoolchildren Crossing (R1-6b ~~or R1-6c~~) sign (see Figure 7B-6) may be used at unsignalized school crossings. If used at a school crossing, a 12 x 4-inch SCHOOL (S4-3P) plaque (see Figure 7B-6) may be mounted above the sign. The STATE LAW legend on the R1-6 series signs maybe omitted.

05 The Overhead Pedestrian Crossing (R1-9 ~~or R1-9a~~) sign (see Section 2B.12 and Figure 2B-2) may be modified to replace the standard pedestrian symbol with the standard schoolchildren symbol and may be used at unsignalized school crossings. The STATE LAW legend on the R1-9 series signs may be omitted.

06 A 12-inch reduced size in-street School (S1-1) sign (see Figure 7b-7) may be used at an unsignalized school crossing instead of the In-Street Pedestrian Crossing (R1-6 ~~or R1-6a~~) or the In-Street Schoolchildren Crossing (R1-6b ~~or R1-6c~~) sign. A 12 x 6-inch reduced size diagonal downward pointing arrow (W16-7P) plaque may be mounted below the reduced size in-street School (S1-1) sign.

**Standard:**

07 **If an In-Street Pedestrian Crossing sign, an In-Street Schoolchildren Crossing sign, or a reduced size in-street School (S1-1) sign is placed in the roadway, the sign support shall comply with the mounting height and special mounting support requirements for In-Street Pedestrian Crossing (R1-6 ~~or R1-6a~~) signs (see Section 2B.12).**

08 **The In-Street Pedestrian Crossing sign, the In-Street Schoolchildren Crossing sign, the Overhead Pedestrian Crossing sign, and the reduced size in-street School (S1-1) sign shall not be used at signalized locations.**

**MOA Traffic Policies**

MOA will adhere to MUTCD and ATM except with the following modification:

School (S1-1) signs for in-street School Advance Warning shall not be reduced in size. The S1-1 sign shall be a minimum of 36-in by 36-in. See Appendix E for list of signs and sign sizes.

ATM Figure 7B-100 shall not be used to identify school zone sign locations. Typical school zone sign locations are shown in Figures 4 through 10 of this manual.

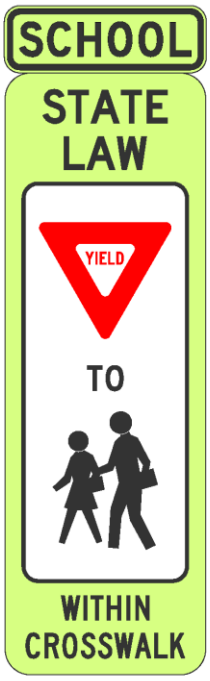
The in-street pedestrian crossing (type and style shall be as shown in figure below and is similar to the R1-6b) sign may be placed in accordance with the following criteria:

1) May not be located on streets of arterial or higher classification,

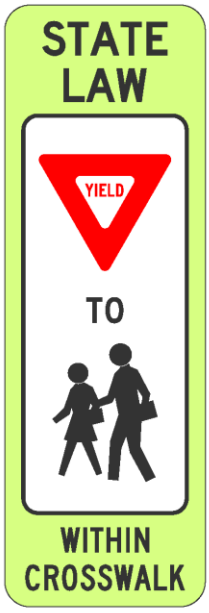
2) Placement must be in the center of the roadway adjacent to marked pedestrian crossing locations, and

3) Must be placed only during active school crossing times not to exceed:
   a. 30 minutes before to 10 minutes after school begins, and
   b. 10 minutes before to 30 minutes after school ends.

Figure 3. In-Street Pedestrian Crossing Signs




**(R1-6)**




**(R1-6b)**

Figure 4. Sample Advance School Sign Locations

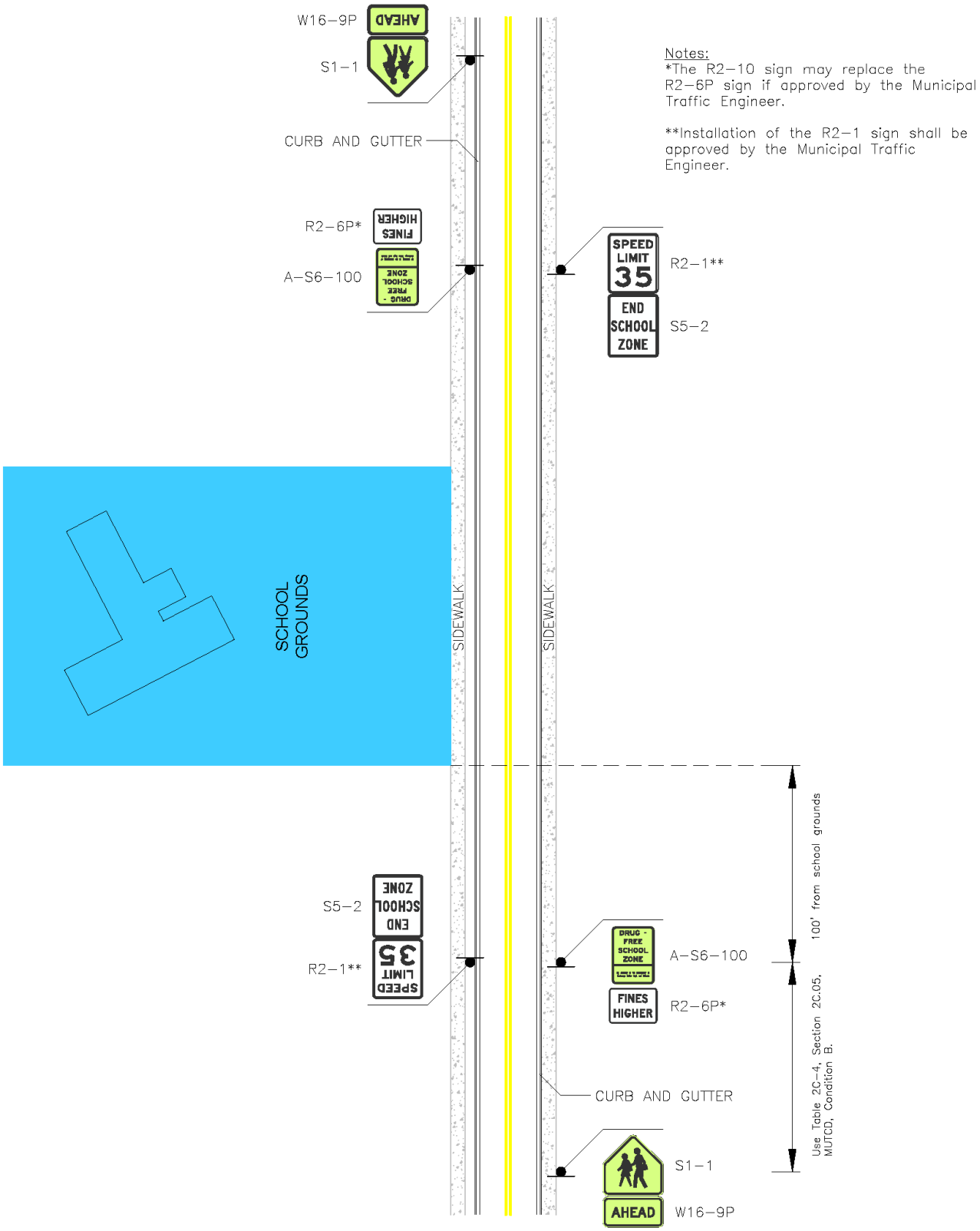


Figure 5. Sample Advance School Sign with Crossing Sign Locations

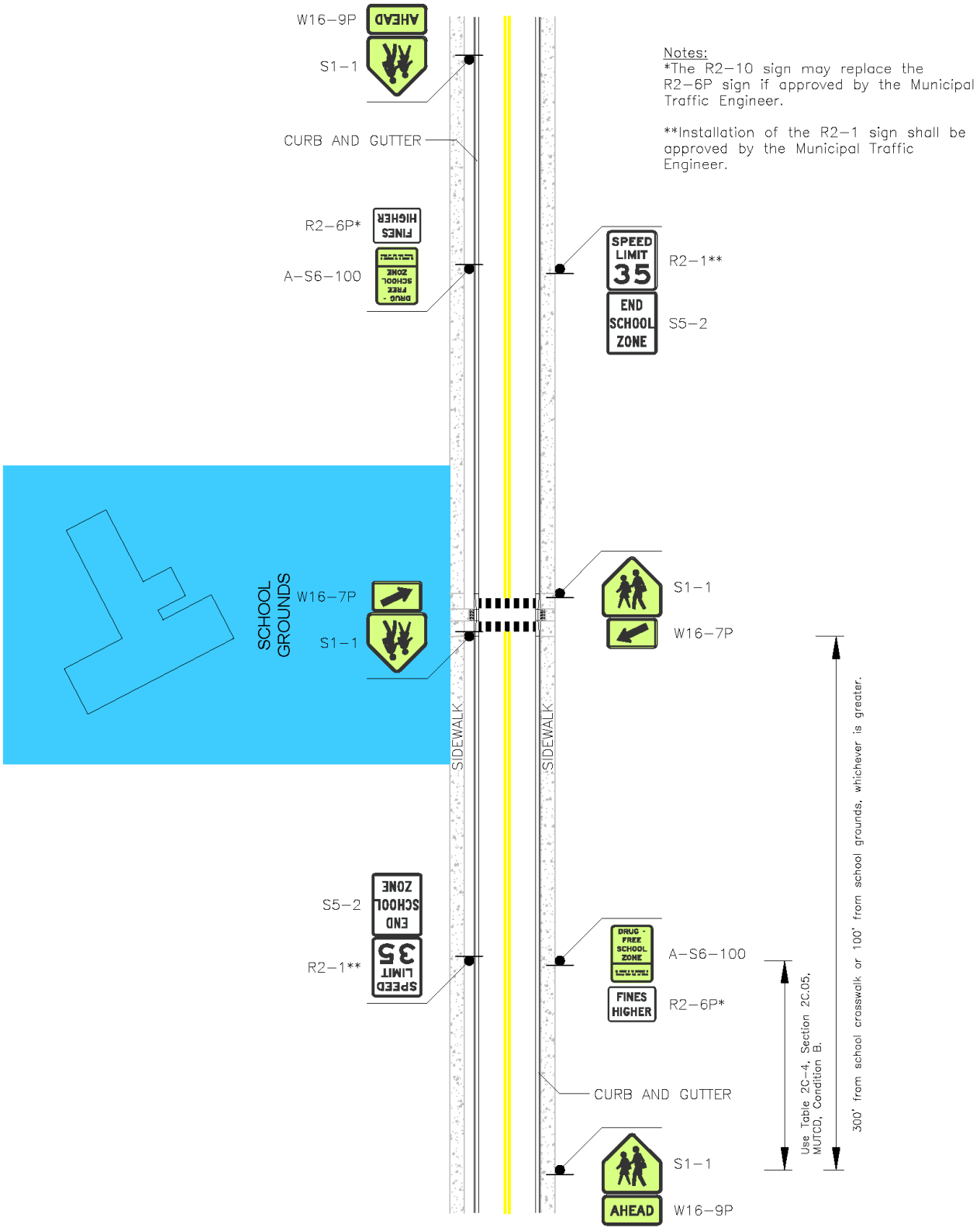


Figure 6. Sample 20 MPH When Flashing Sign Locations

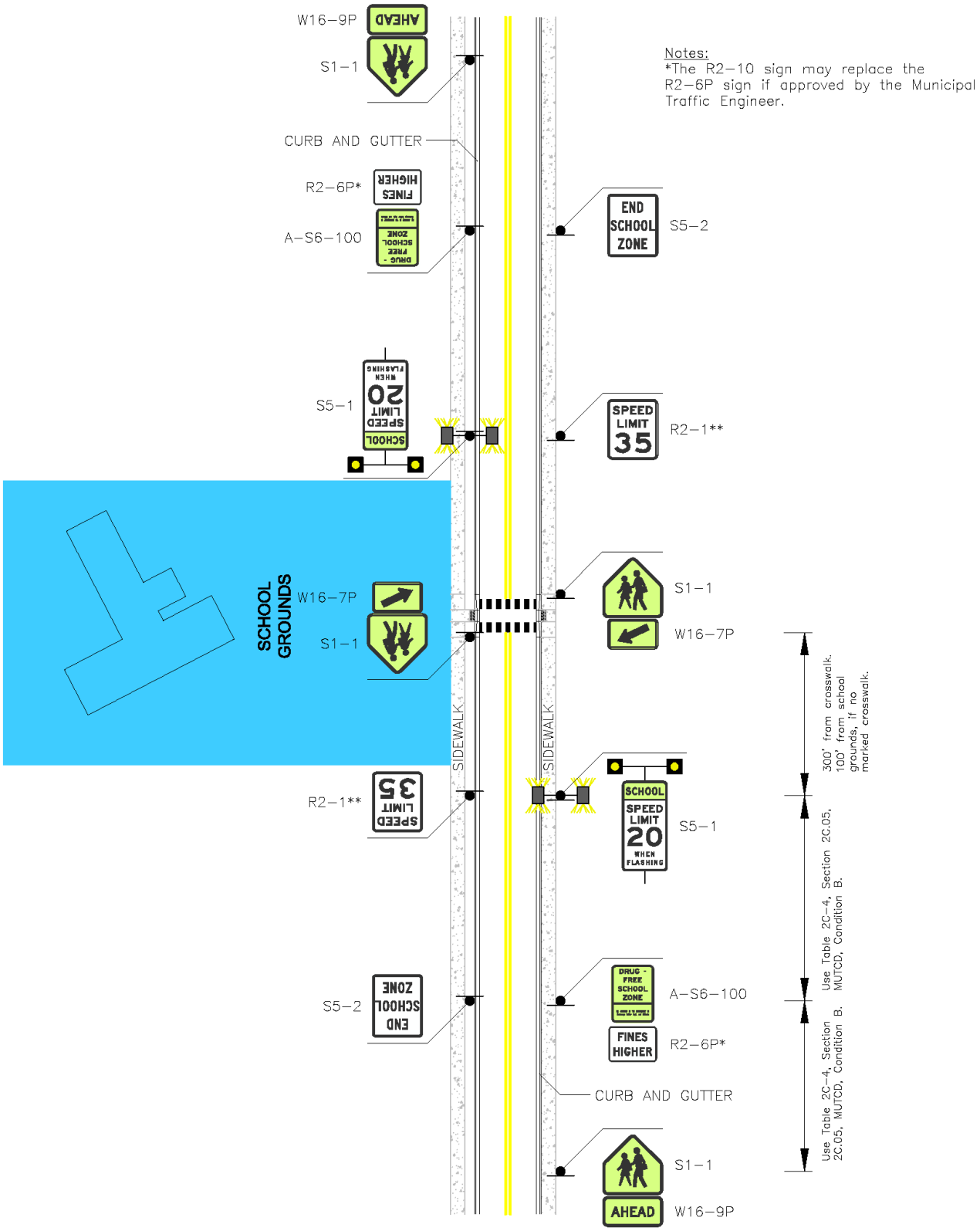


Figure 7. Sample Two-Way Stop Sign Locations

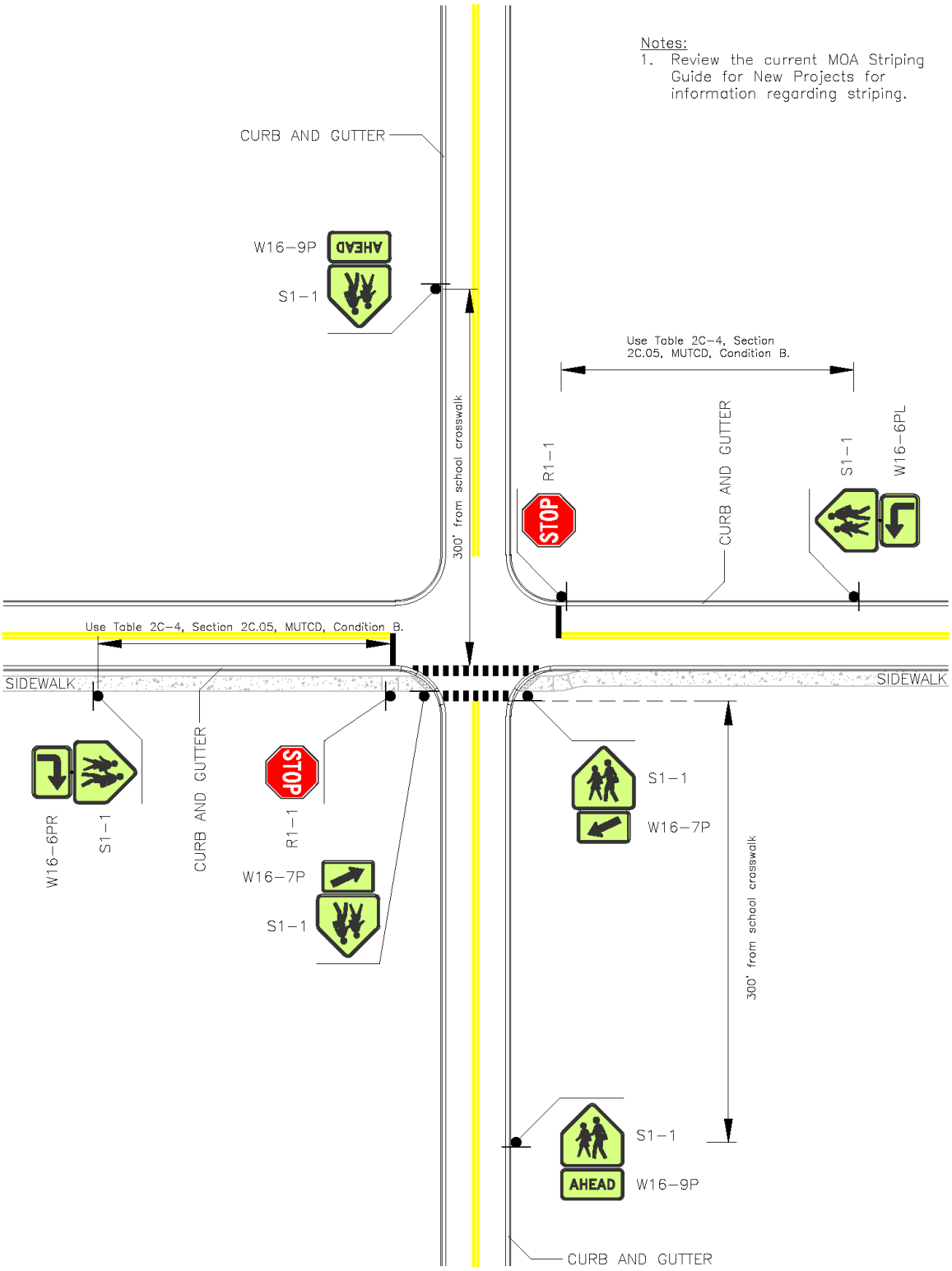


Figure 8. Sample Four-Way Stop Sign Locations

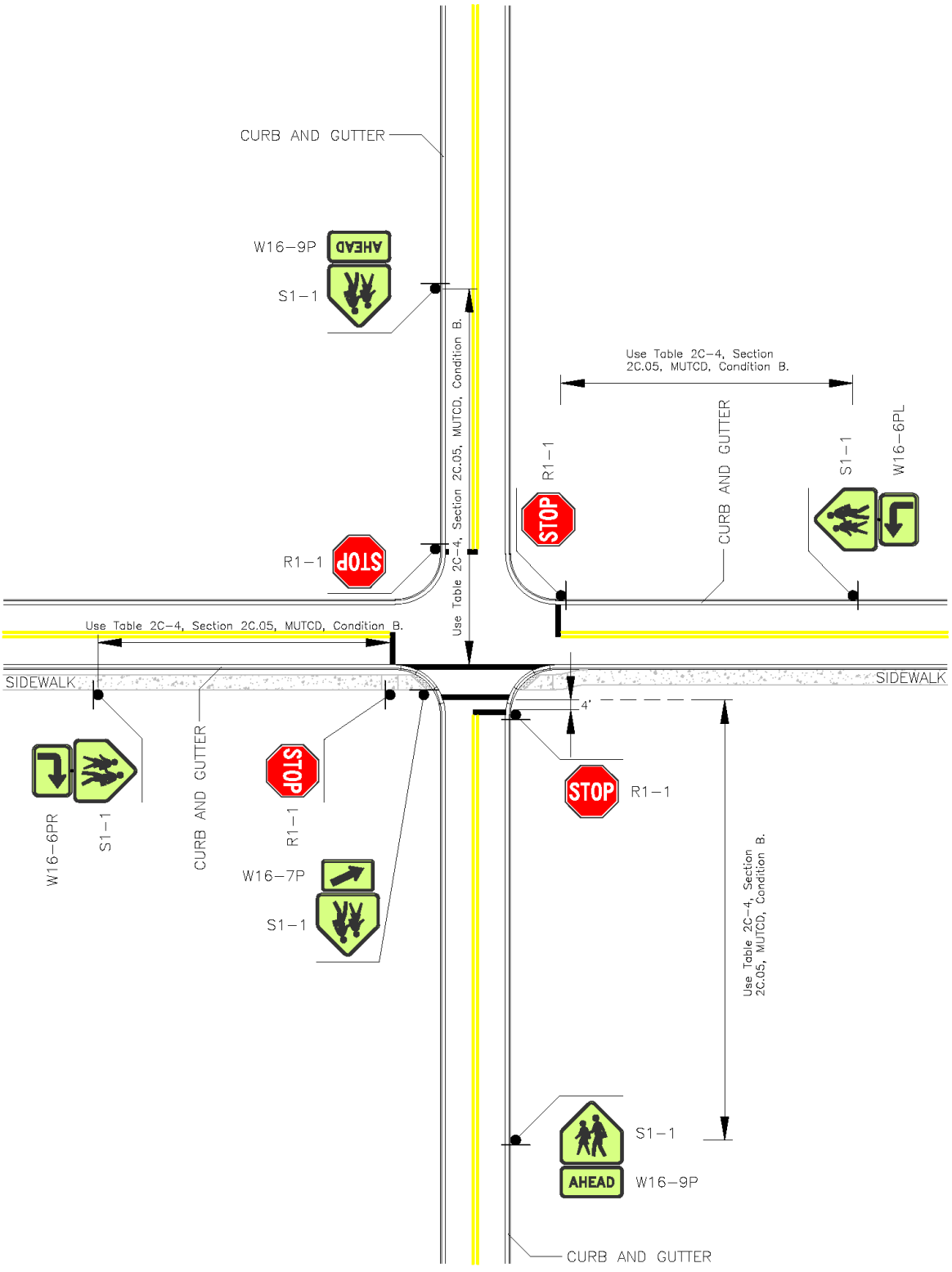


Figure 9. Sample Signalized Intersection Sign Locations

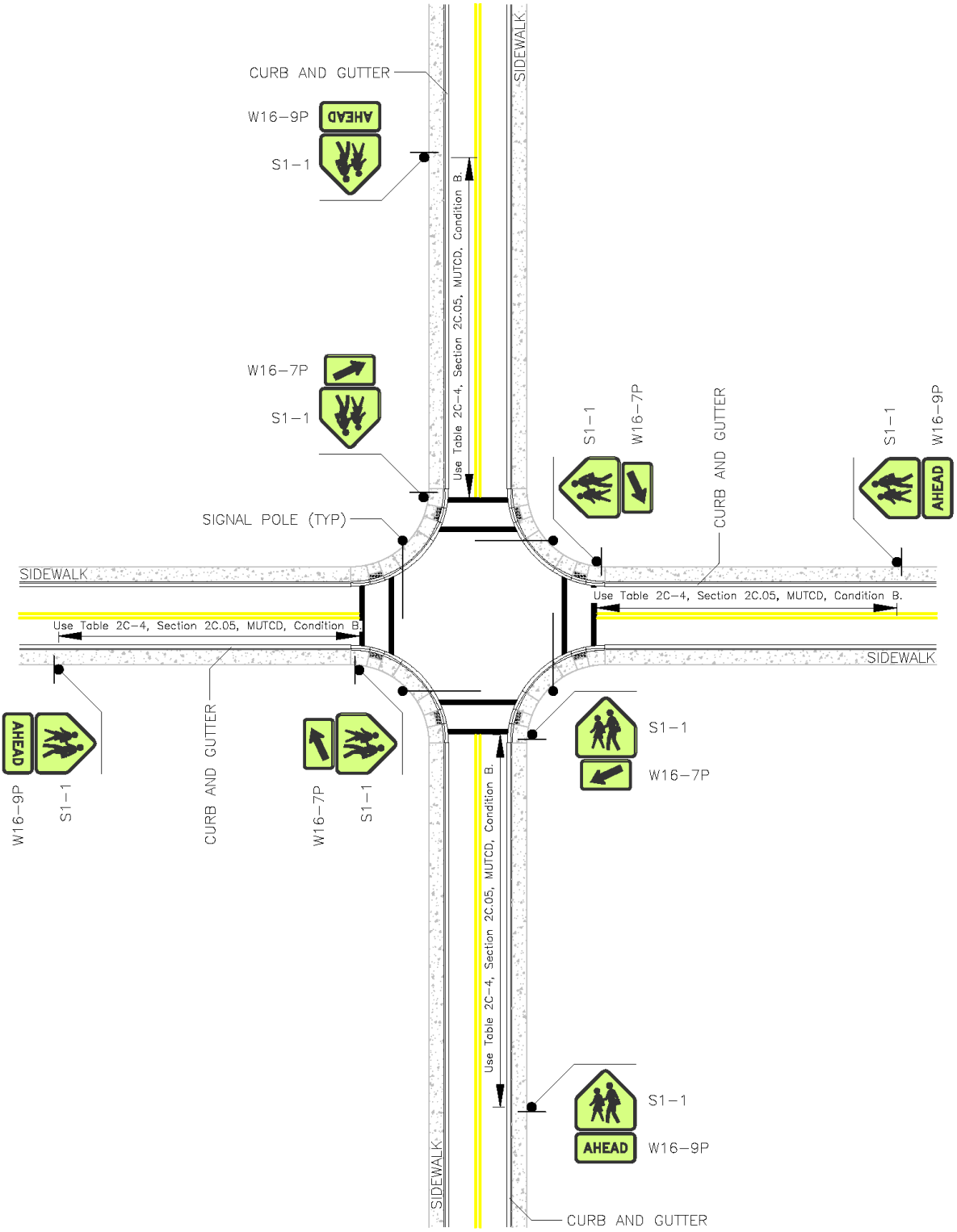
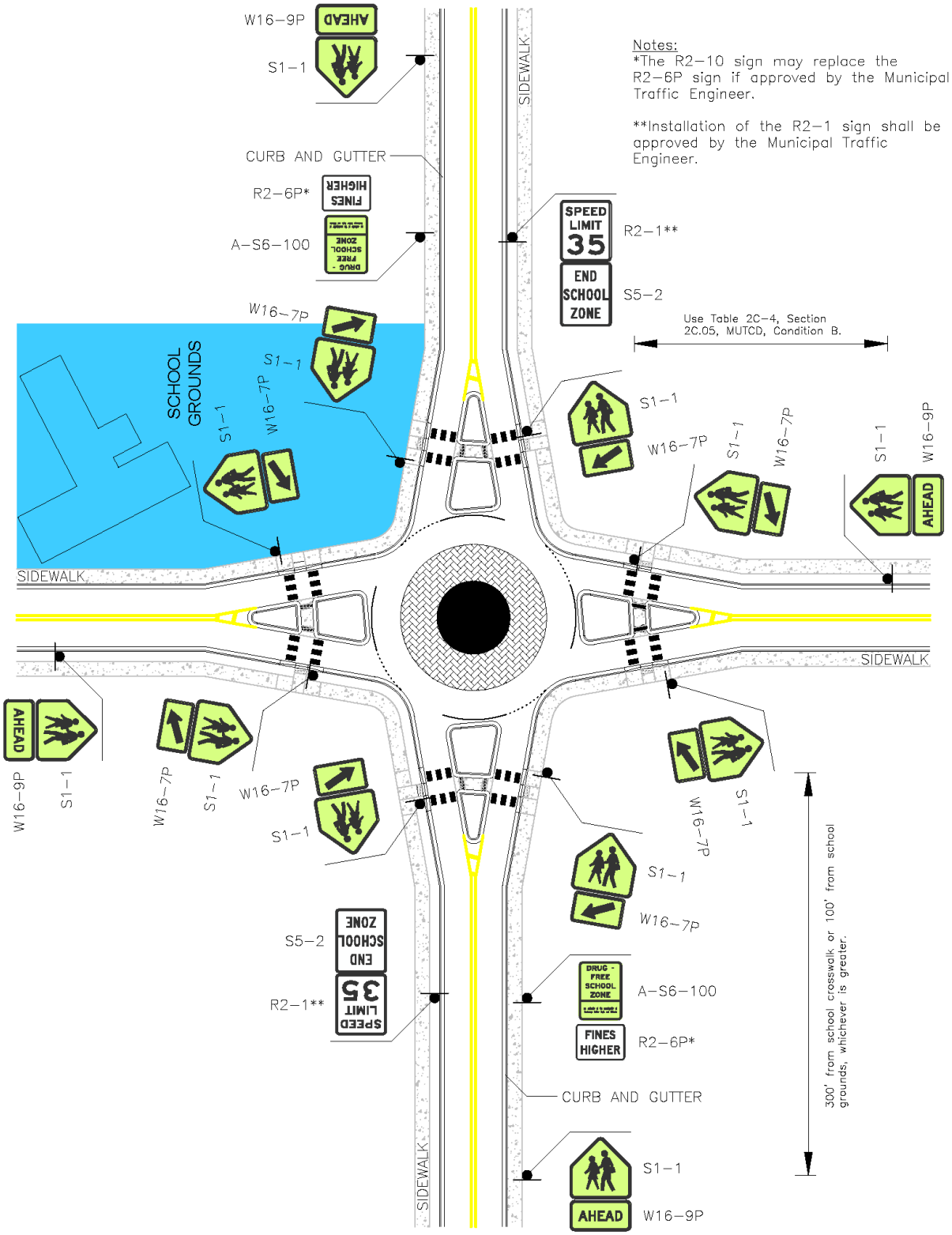
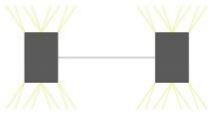


Figure 10. Sample Roundabout Sign Locations



## Section 7B.15 School Speed Limit Assembly (S4-1P, S4-2P, S4-3P, S4-4P, S4-6P, S5-1) and END SCHOOL SPEED LIMIT Sign (S5-3)


**(Reduced Speed Limit Assembly with Flashing Beacons)**



**(Flashing Beacons)**


**(S5-1)**


**(S6-100 with R2-1)**

**Standard:**

01 **A School Speed Limit assembly (see Figure 7B-1) or a School Speed Limit (S5-1) sign (see Figure 7B-1) shall be used to indicate the speed limit where a reduced school speed limit zone has been established based upon an engineering study or where a reduced school speed limit is specified for such areas by statute. The School Speed Limit assembly or School Speed Limit sign shall be placed at or as near as practical to the point where the reduced school speed limit zone begins (see Figures 7B-3 and 7B-5).**

02 **If a reduced school speed limit zone has been established, a School (S1-1) sign shall be installed in advance (see Table 2C-4 for advance placement guidelines) of the first school Speed Limit sign assembly or S5-1 sign that is encountered in each direction as traffic approaches the reduced school speed limit zone (see Figures 7B-3 and 7B-5).**

03 **Where increased fines are imposed for traffic violations within a reduced school speed limit zone, a FINES HIGHER (R2-6P), FINES DOUBLE (R2-6aP), or $XX FINE (R2-6bP) plaque (see Figure 2B-3) shall be installed as a supplement to the reduced school speed limit sign to notify road users.**

04 **Except as provided in Paragraph 5, the downstream end of an authorized and posted reduced school speed limit zone shall be identified with an END SCHOOL SPEED LIMIT (S5-3) sign (see Figures 7B-1 and 7B-5).**

Option:

05 If a reduced school speed limit zone ends at the same point as a higher fines zone, an END SCHOOL ZONE (S5-2) sign may be used instead of a combination of an END HIGHER FINES ZONE (R2-11) sign and END SCHOOL SPEED LIMIT (S5-3) sign.

06 A standard Speed Limit sign showing the speed limit for the section of highway that is downstream from the authorized and posted reduced school speed limit zone may be mounted on the same post above the END SCHOOL SPEED LIMIT (S5-2) sign or the END SCHOOL ZONE (S5-2) sign.

*Guidance:*

*07* ~~*The beginning point of a reduced school speed limit zone should be at least 200 feet in advance of the school grounds, a school crossing, or other school related activities; however, this 200-foot distance should be increased if the reduced school speed limit is 30 mph or higher.*~~

07A *The reduced speed school zone should begin at a point approximately 300 feet from the school crosswalk, if there is one. If a marked crosswalk is not present, the reduced speed school zone should begin at a point at approximately 100 feet in advance of the school area.*

07B *The School Speed Limit (S5-1) sign should be supplemented by a Speed Limit Beacon consisting of three signal sections with a flashing CIRCULAR YELLOW signal indication of 8-inch*

*diameter in each signal section. The signal sections should be mounted vertically directly above the S5-1 sign. The bottom two beacons should be illuminated alternatively and face oncoming traffic. The top flashing beacon should face the opposite direction to indicate when the beacon is in operation.*

**Standard:**

08 **The School Speed Limit assembly shall be either a fixed-message sign assembly or a changeable message sign.**

09 **The fixed-message School Speed Limit assembly shall consist of a top plaque (S4-3P) with the legend SCHOOL, a Speed Limit (R2-1) sign, and a bottom plaque (S4-1P, S4-2P, S4-4P, OR S4-6P) indicating the specific periods of the day and/or days of the week that the special school speed limit is in effect (see Figure 7B-1).**

Option:

10 Changeable message signs (see Chapter 2L and Section 6F.60) may be used to inform drivers of the school speed limit. If the sign is internally illuminated, it may have a white legend on a black background. Changeable message signs with flashing beacons may be used for situations where greater emphasis of the special school speed is needed.

*Guidance:*

11 *Even though it might not always be practical because of special features to make changeable message signs conform in all respects to the standards in this Manual for fixed-message signs, during the periods that the school speed limit is in effect, their basic shape, message, legend layout, and colors should comply with the standards for fixed-message signs.*

12 *A confirmation light or device to indicate that the speed limit message is in operation should be considered for inclusion on the back of the changeable message sign.*

**Standard:**

13 **Fluorescent yellow-green pixels shall be used when the "SCHOOL" message is displayed on a changeable message sign for a school speed limit.**

Option:

14 Changeable message signs may use blank-out messages or other methods in order to display the school speed limit only during the periods it applies.

15 Changeable message signs that display the speed of approaching drivers (see Section 2B.13) may be used in a school speed limit zone.

16 A Speed Limit Sign Beacon (see Section 4L.04) also may be used, with a WHEN FLASHING legend, to identify the periods that the school speed limit is in effect."

**MOA Traffic Policies**

MOA will adhere to MUTCD and ATM except with the following modifications:

Within the MOA, the S5-1 School Speed Limit sign shall be used. The size of the sign shall conform to the MUTCD. The remainder of the sign, SPEED LIMIT 20 WHEN FLASHING, shall be black lettering on a white background. The S4-1P, S4-2P, S4-4P, and S4-6P signs shall not be used within the MOA.

A SPEED LIMIT (R2-1) sign may be installed at the beginning of all school zones with the Municipal Traffic Engineer's approval. An additional SPEED LIMIT sign may also be placed at the end of school zones with the Municipal Traffic Engineer's approval.

The SCHOOL SPEED LIMIT 20 WHEN FLASHING sign (S5-1) shall be installed with four (4) signal heads with 8- or 12-inch diameter, as determined by the Municipal Traffic Engineer, yellow lenses. They shall be mounted directly above the S5-1 sign. Two beacons shall be illuminated alternately with two facing oncoming vehicular traffic and two facing opposing vehicular traffic to indicate when the speed reductions are in effect.

ATM Figure 7B-100 shall not be used to identify school zone sign locations. Typical school zone sign locations are shown in Figures 4 through 10 of this manual.


**Section 7B.16 Reduced School Speed Limit Ahead Sign (S4-5, S4-5a)**

*Guidance:*

01 *"A Reduced School Speed Limit Ahead (S4-5, S4-5a) sign (see Figure 7B-1) should be used to inform road users of a reduced speed zone where the speed limit is being reduced by ~~more than 10 mph~~ 20 mph or more, or where engineering judgment indicates that advance notice would be appropriate.*

**(S4-5)**

**Standard:**

02 **If used, the Reduced School Speed Limit Ahead sign shall be followed by a School Speed Limit sign or a School Speed Limit assembly.**

03 **The speed limit displayed on the Reduced School Speed Limit Ahead sign shall be identical to the speed limit displayed on the subsequent School Speed Limit sign or School Speed Limit assembly."**

**MOA Traffic Policies**

MOA will adhere to MUTCD and ATM except with the following modification:

The REDUCED SCHOOL SPEED ZONE AHEAD sign (S4-5, S4-5a) shall be used on street approaches which enter a roadway within a school zone containing a "**20 MPH When Flashing"** zone. The REDUCED SCHOOL SPEED ZONE AHEAD sign will have arrows indicating the direction the "**20 MPH When Flashing"** zone extends.

[This is a new section. There is no corresponding section in the MUTCD.]

**Section 7B.100 DRUG FREE SCHOOL ZONE Sign (S6-100)**


**(S6-100 with R2-1)**

**Standard:**

01 **Alaska Statute 28.01.010(d) states, " The municipality shall post a sign indicating that the school is a drug-free school zone at each location in which it has installed a sign identifying the location of a school." Accordingly, signs conveying this message shall be placed below, or near, all School Advance Warning (S1-1) signs.**

Support:

The posting of this sign is a municipal, not a state, responsibility.

Option:

The sign may be the S6-100 shown in the ASDS or another sign that conveys the required message."

**MOA Traffic Policies**

MOA will adhere to MUTCD and ATM except with the following modification:

MOA shall replace the DRUG FREE SCHOOL ZONE S6-100 ATM sign code with A-S6-100. All school zones shall include the installation of the DRUG FREE SCHOOL ZONE (A-S6-100) plate. The DRUG FREE SCHOOL ZONE (A-S6-100) sign should be mounted above the FINES HIGHER (R2-

6P) sign, BEGIN HIGHER FINES ZONE (R2-10) sign, or SPEED LIMIT (R2-1) sign assemblies. The S6-100 sign shall not be placed at school crossing locations. The plate shall be black lettering on a fluorescent yellow-green background.

ATM Figure 7B-100 shall not be used to identify school zone sign locations. Typical school zone sign locations are shown in Figures 4 through 10 of this manual.

## CHAPTER 7C. MARKINGS

### Section 7C.02 Crosswalk Markings

*Guidance:*

01 *Crosswalks should be marked at all intersections on established routes to a school where there is substantial conflict between motorists, bicyclists, and student movements; where students are encouraged to cross between intersections; where students would not otherwise recognize the proper place to cross; or where motorists or bicyclists might not expect students to cross (see Figure 7A-1).*

02 *Crosswalk lines should not be used indiscriminately. An engineering study considering the factors described in Section 3B.18 should be performed before a marked crosswalk is installed at a location away from a traffic control signal or an approach controlled by a STOP or YIELD sign.*

*03* *Because non-intersection school crossings are generally unexpected by the road user, warning signs (see Section 7B.11 and 7B.12) should be installed for all marked school crosswalks at non-intersection locations. Adequate visibility of students by approaching motorists and of approaching motorists by students should be provided by parking prohibitions or other appropriate measures.*

Support:

04 Section 3B.18 contains provisions regarding placement and design of crosswalks, and section 3B.16 contains provisions regarding the placement and design of the stop lines and yield lines that are associated with them. Provisions regarding the cur markings that can be used to establish parking regulations on the approaches to crosswalks are contained in Section 3B.23.

**Standard:**

04A **Crosswalk markings shall be placed at officially designated school crossings.**

04B **School crosswalks shall be installed in accordance with the applicable provisions of Section 3B.18.**

**MOA Traffic Policies**

MOA will adhere to MUTCD and ATM. The MOA will use the Longitudinal Crosswalk with Gaps (ATM Figure 3B-101) at uncontrolled school crossing locations unless otherwise specified by the Traffic Engineer.

### Section 7C.03 Pavement Word, Symbol, and Arrow Markings

Option:

01 If used, the School word marking may extend to the width of two approach lanes (see Figure 7C-1).

*Guidance:*

02 *If the two-lane SCHOOL word marking is used, the letters should be 10 feet or more in height.*

Support:

03 Section 3B.20 contains provisions regarding other word, symbol, and arrow pavement markings that can be used to guide, warn, or regulate traffic.

**MOA Traffic Policies**

MOA will adhere to MUTCD and ATM except with the following modification:

MOA will not use pavement word marking within school zones.

## CHAPTER 7D. CROSSING SUPERVISION

### Section 7D.05 Operating Procedures for Adult Crossing Guards


**Standard:**

01 **Adult crossing guards shall not direct traffic in the usual law enforcement regulatory sense. In the control of traffic, they shall pick opportune times to create a sufficient gap in the traffic flow. At these times, they shall stand in the roadway to indicate that pedestrians are about to use or are using the crosswalk, and that all vehicular traffic must stop.**

02 **Adult crossing guards shall use a STOP paddle. The STOP paddle shall be the primary hand-signaling device.**

03 **The STOP (R1-1) paddle shall be an octagonal shape. The background of the STOP face shall be red with at least 6-inch series upper-case white letters and border. The paddle shall be at least 18 inches in size and have the word message STOP on both sides. The paddle shall be retroreflectorized or illuminated when used during hours of darkness.**

Option:

04 The STOP paddle may be modified to improve conspicuity by incorporating white or red flashing lights on both sides of the paddle. Among the types of flashing lights that may be used are individual LEDs or groups of LEDs.

05 The white or red flashing lights or LEDs may be arranged in any of the following patterns:

A. Two white or red lights centered vertically above and below the STOP legend,

B. Two white or red lights centered horizontally on each side of the STOP legend,

C. One white or red light centered below the STOP legend,

D. A series of eight or more small white or red lights having a diameter or ¼ inch or less along the outer edge of the paddle, arranged in an octagonal pattern at the eight corners of the STOP paddle (more than eight lights may be used only if the arrangement of the lights is such that it clearly conveys the octagonal shape of the STOP paddle), or

E. A series of white lights forming the shapes of the letters in the legend.

**Standard:**

**06** **If flashing lights are used on the STOP paddle, the flash rate shall be at least 50, but no more than 60, flash periods per minute."**

**MOA Traffic Policies**

MOA will adhere to MUTCD and ATM except with the following modifications:

**Public Schools—**Whenever a crossing guard is deemed necessary by the Hazardous Transportation Committee (HTC), it shall follow the rules as set forth by the MUTCD, the MOA Traffic Department, and the Anchorage School District (ASD).

Crossing guards shall be provided by the ASD if the HTC deems the crossing as hazardous. This is determined by an in depth engineering evaluation of the vehicle gaps, traffic volumes, traffic type,

speed limit, pedestrian age level, roadway width, traffic control devices, and pedestrian obstacles. If the roadway is deemed hazardous, busing should be considered as a first option. If busing is not an option, crossing guards shall be provided.

**Private Schools—**Private schools shall submit a request for a crossing guard in writing to the HTC.

The request should include the following information:

1. Name and location of school,
2. Location where the crossing guard is requested,
3. Approximate number of students using the crossing, and
4. Times of crossing guard operation.

If the roadway on which the crossing is located is currently considered a hazardous route by the HTC, the MOA Traffic Department will determine if the requested location is a safe and reasonable location for a crossing guard. If the location is not currently considered a hazardous route, the request will be reviewed by the HTC to determine if the location meets the warrants as described above for public schools.

If the investigation determines a crossing guard is justified, the HTC will issue approval. The approval will include the location of the crossing guard, the necessary training, and the requirements the crossing guard shall follow.

**Crossing Guard Guidelines**

In general, crossing guards should be located at signalized or stop controlled intersections whenever possible. Crossing guards shall follow guidelines detailed in the MUTCD sections 6E and 7D which includes the following:

1. Shall not direct traffic in the usual law enforcement regulatory sense,
2. Shall wear high-visibility retroreflective safety apparel labeled as ANSI 107-2004 standard performance for Class 2 as described in Section 6E.02,
3. The paddle shall be at least 18 inch in size and have the word STOP on both sides,
4. The STOP paddle shall be retroreflective,
5. The background of the STOP paddle shall be red and shall be at least 6-inch series capitol white letters and border, and
6. The STOP paddle may be incorporate flashing lights in the manner described in the MUTCD Section 7D.05.

If the crossing guard is located at a signalized intersection, the crossing guard shall cross with the pedestrian phase of the signal. Appendix B includes a copy of the MUTCD Section 6E and a crossing-guard equipment checklist.

**Required Training**

If the crossing guard is located on a collector or greater roadway and is not located at a signalized crossing or within a flashing 20 miles per hour school zone, the crossing guard is required to be a certified flagger.


# References

# REFERENCES

Manual on Uniform Traffic Control Devices, 2009 Edition Including Revision 1 and Revision 2
US Department of Transportation, Federal Highway Administration
May 2012

2016 Alaska Traffic Manual Supplement
Alaska Department of Transportation and Public Facilities
June 2016

Traffic Control Devices Handbook, 2nd Edition
Institute of Transportation Engineers
2013

Traffic Controls for School Zones
Utah Department of Transportation
Division of Traffic and Safety
December 2011

SCHOOL
SPEED
LIMIT
20
WHEN
FLASHING
AHEAD

# APPENDIX A

## Schools Within the Municipality of Anchorage

## Municipality of Anchorage School Classifications

| Elementary School Names | Improvement Area Class A[1a] | Improvement Area Class B[1b] |
|---|---|---|
| Abbott Loop | X | - |
| Airport Heights | X | - |
| Alpenglow | X | - |
| Aurora | X | - |
| Baxter | X | - |
| Bayshore | X | - |
| Bear Valley | - | X |
| Birchwood ABC | - | X |
| Bowman | X | - |
| Campbell | X | - |
| Chester Valley | X | - |
| Chinook | X | - |
| Chugach Optional | X | - |
| Chugiak | - | X |
| College Gate | X | - |
| Creekside Park | X | - |
| Denali | X | - |
| Eagle River | X | - |
| Fairview | X | - |
| Fire Lake | X | - |
| Girdwood | - | X |
| Gladys Wood | X | - |
| Government Hill | X | - |
| Homestead | X | - |
| Huffman | - | X |
| Inlet View | X | - |
| Kasuun | X | - |
| Kincaid | X | - |
| Klatt | - | X |
| Lake Hood | X | - |
| Lake Otis | X | - |
| Mountain View | X | - |
| Mt. Iliamna | X | - |
| Mt. Spurr | X | - |
| Muldoon | X | - |
| North Star | X | - |
| Northern Lights ABC | X | - |
| Northwood ABC | X | - |
| Nunaka Valley | X | - |
| O'Malley | - | X |
| Ocean View | X | - |
| Orion | X | - |
| Ptarmigan | X | - |
| Rabbit Creek | X | - |
| Ravenwood | - | X |
| Rogers Park | X | - |
| Russian Jack | X | - |
| Sand Lake | X | - |
| Scenic Park | X | - |
| Spring Hill | X | - |
| Susitna | X | - |
| Taku | X | - |

| Elementary School Names (Continued) | Improvement Area Class A[1a] | Improvement Area Class B[1b] |
|---|---|---|
| Trailside | - | X |
| Tudor | X | - |
| Turnagain | X | - |
| Tyson | X | - |
| Ursa Major | X | - |
| Ursa Minor | X | - |
| Williwaw | X | - |
| Willow Crest | X | - |
| Wonder Park | X | - |

| Middle School Names | Improvement Area Class A[1a] | Improvement Area Class B[1b] |
|---|---|---|
| Begich | X | - |
| Central | X | - |
| Clark | X | - |
| Goldenview | - | X |
| Gruening | X | - |
| Hanshew | X | - |
| Mears | X | - |
| Mirror Lake | - | X |
| Romig | X | - |
| Wendler | X | - |

| High School Names | Improvement Area Class A[1a] | Improvement Area Class B[1b] |
|---|---|---|
| Bartlett | X | - |
| Chugiak | - | X |
| Dimond | X | - |
| Eagle River | - | X |
| East | X | - |
| Service | - | X |
| South | X | - |
| West | X | - |

| Charter School Names | Improvement Area Class A[1a] | Improvement Area Class B[1b] |
|---|---|---|
| Alaska Native Cultural | X | - |
| Aquarian | X | - |
| Eagle Academy | X | - |
| Family Partnership | X | - |
| Frontier | X | - |
| Highland Tech | X | - |
| Rilke Schule | X | - |
| Winterberry | X | - |

| Alternative School Names | Improvement Area Class A[1a] | Improvement Area Class B[1b] |
|---|---|---|
| ACE/ACT Program | X | - |
| Avail Program | X | - |
| Benson Secondary | X | - |
| Crossroads | X | - |
| King Career Center | X | - |
| McLaughlin Secondary | X | - |
| New Path High School | X | - |
| Polaris | X | - |
| Save High School | X | - |
| Steller Secondary | X | - |
| Whaley | X | - |

Notes: 1. Definitions

a. The class A improvement area includes areas of denser population and/or intensive development, and thus requires a more urbanized level of improvements.

b. The class B improvement area includes areas that are less densely populated and/or intensely developed, and thus require a less urbanized level of improvements.

2. The "X" denotes the Improvement Area Class that the school is associated with.

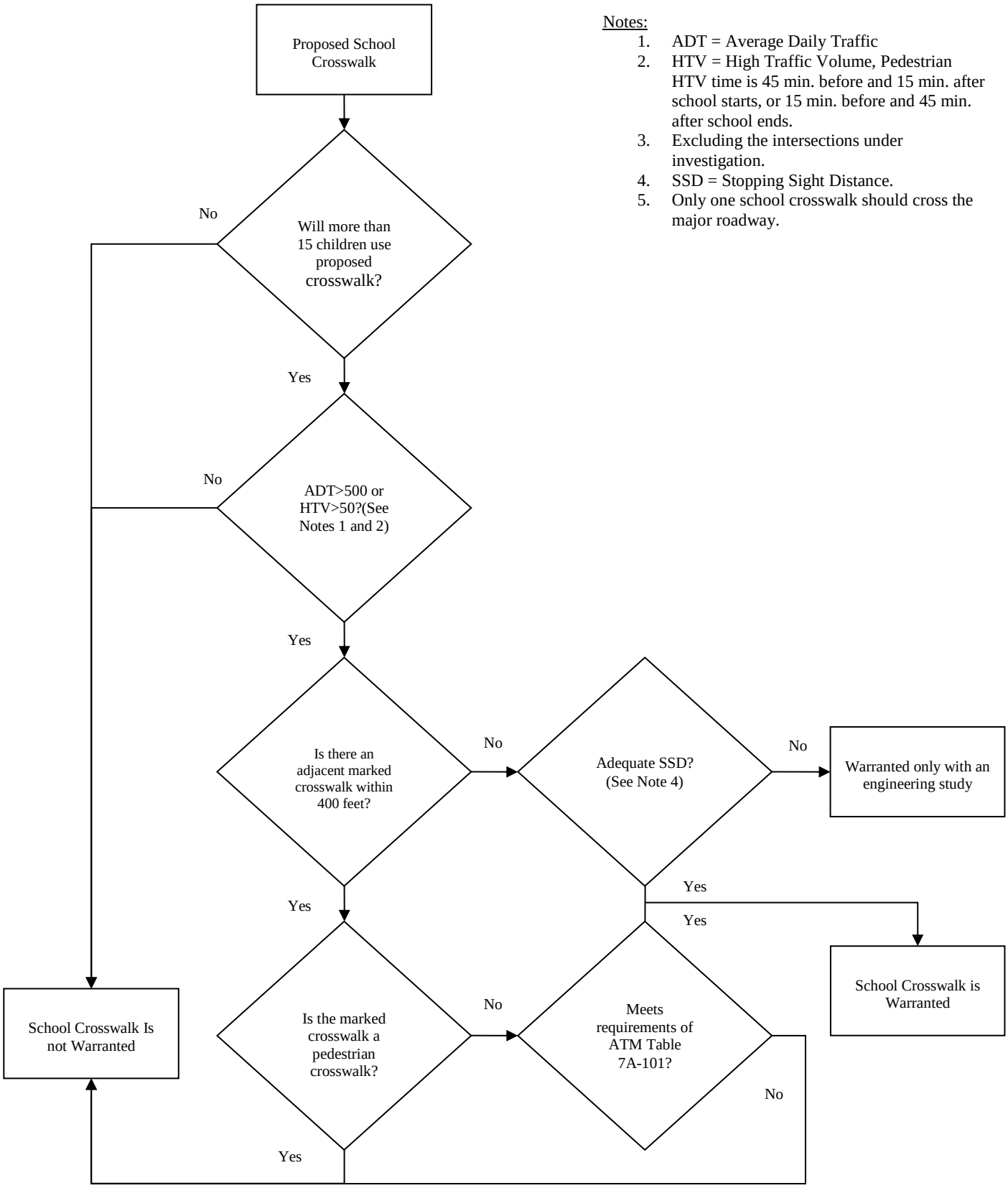
3. The "-" denotes the Improvement Area Class that the school is not associated with.

SCHOOL
SPEED
LIMIT
20
WHEN
FLASHING
AHEAD

# APPENDIX B

## Warrant Flow Charts

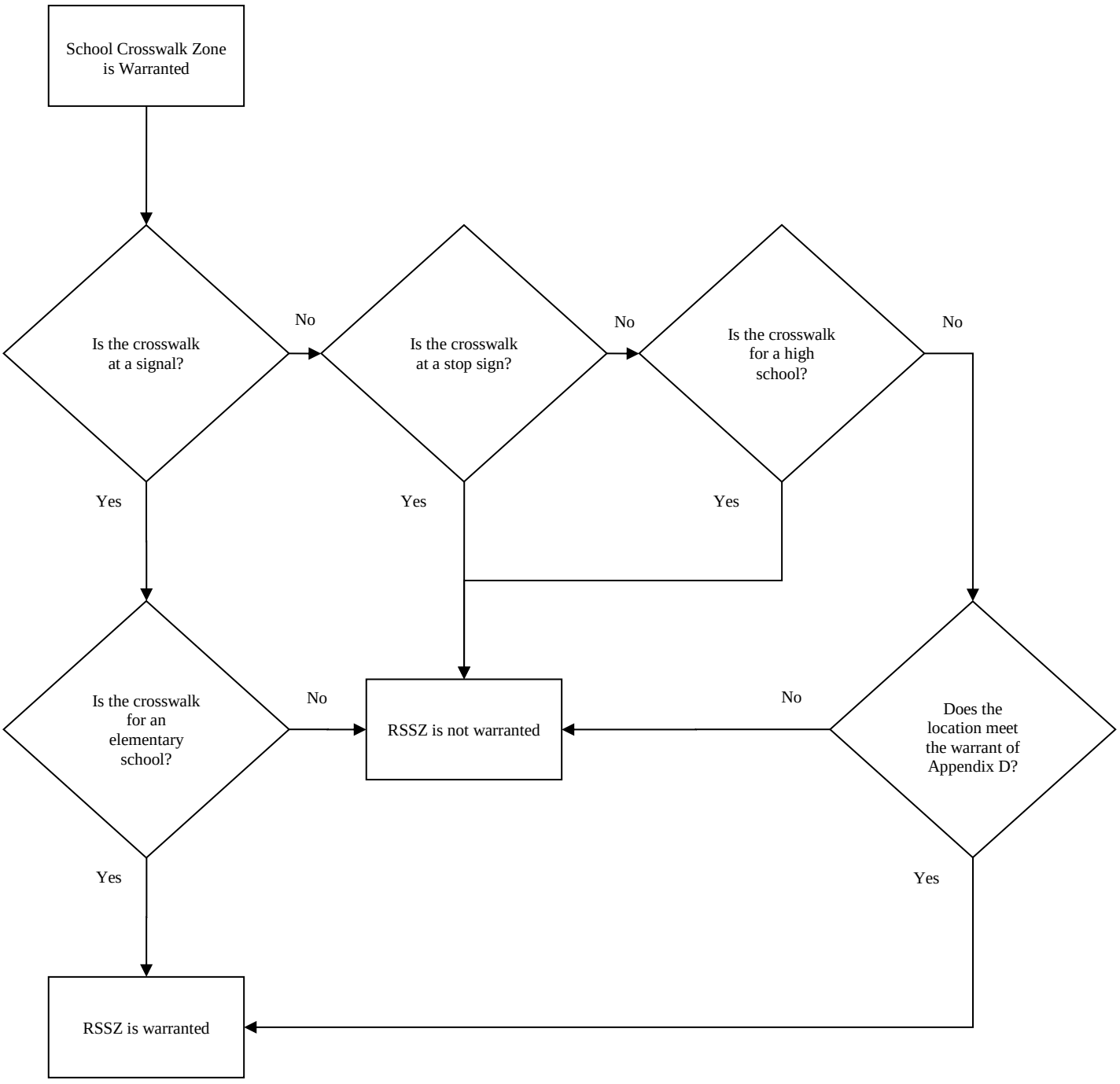
# Process for Warranting a School Crosswalk Zone




Notes:

1. ADT = Average Daily Traffic
2. HTV = High Traffic Volume, Pedestrian HTV time is 45 min. before and 15 min. after school starts, or 15 min. before and 45 min. after school ends.
3. Excluding the intersections under investigation.
4. SSD = Stopping Sight Distance.
5. Only one school crosswalk should cross the major roadway.

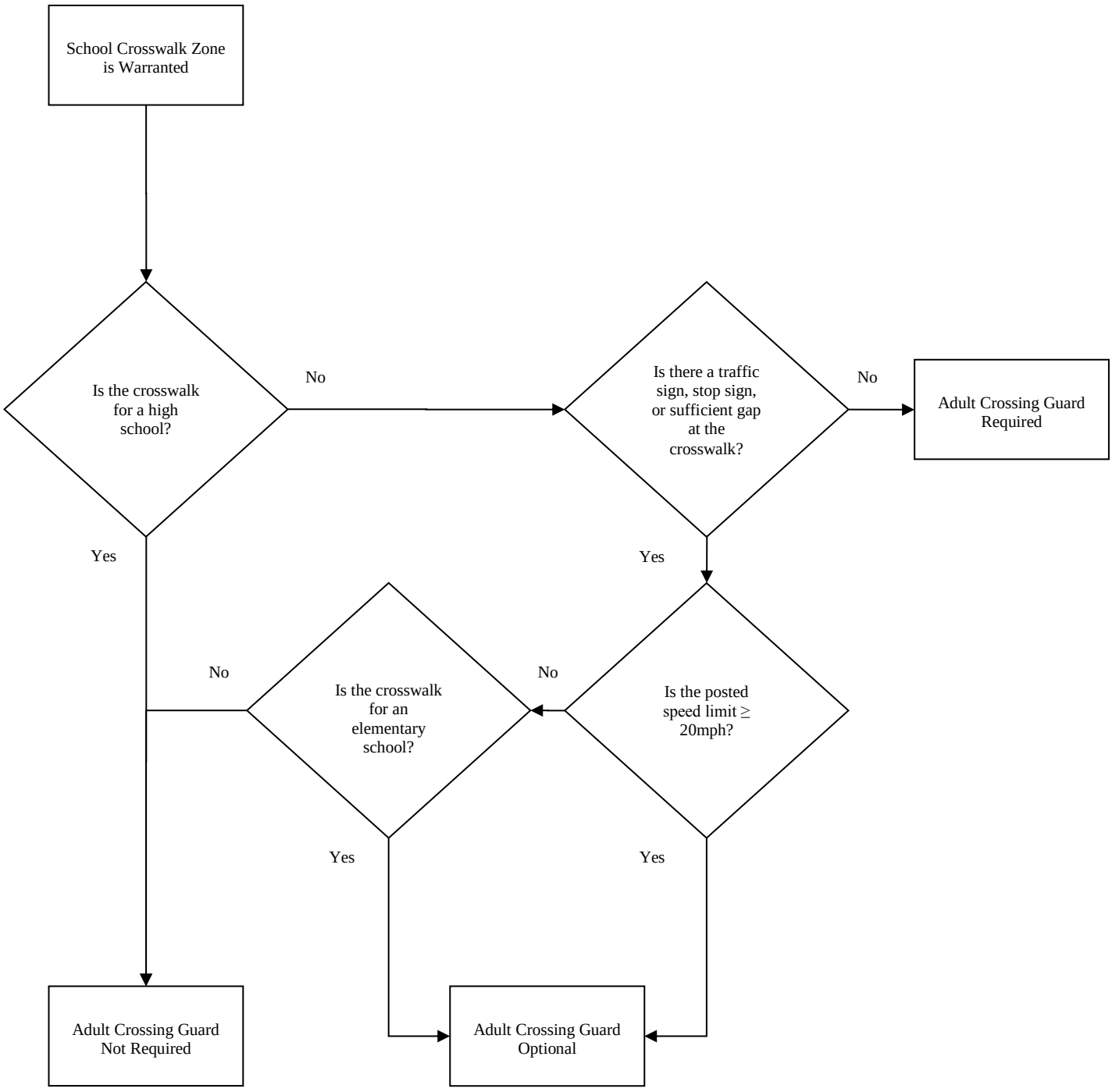
Process for Warranting a Reduced Speed Zone (RSSZ)




Note:

1. RSSZ = Reduced Speed School Zone
2. RSSZ only warranted when speed limit is ≥ 20 mph.

Requirements for Adult Crossing Guards at School Crosswalks



## Appendix C

# APPENDIX C

## School Zone Checklist

School Zone Checklist

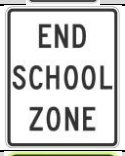
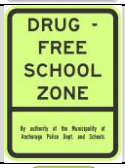
| Issue | Yes | No | NA |
|---|---|---|---|
| **SIGNING** | | | |
| **General Sign items** | | | |
| Signs meet standards for design, color, and retroreflectivity? | | | |
| Sign/Assemblies are placed at a minimum height of 7 feet? (to bottom of lowest sign or plaque) | | | |
| Sign/Assemblies are placed at the proper lateral offset per MASS Division 70, Section 70.11? (spacing to edge of sign) | | | |
| **A. School Advance Crossing Assembly** | | | |
| Assembly includes the S1-1 sign with an AHEAD (W16-9P) plaque? | | | |
| ALL YEAR (S4-7P) plaque is between the S1-1 and W16-9P for a year-round school? | | | |
| Assembly is located at the proper spacing according to Figures 4 through 10 in the School Area Traffic Safety Manual? | | | |
| **B. School Speed Limit Assembly (Only used in Reduced Speed School Zones)** | | | |
| Assembly includes only the S5-1 sign with Speed Limit Sign Beacons? | | | |
| Assembly is located at the proper spacing according to Figures 4 through 10 in the School Area Traffic Safety Manual? | | | |
| Speed Limit Sign Displays 20 MPH? | | | |
| Speed Limit Sign Beacons Flashes yellow left-right? | | | |
| **C. School Crossing Assembly** | | | |
| Assembly includes the DIAGONAL ARROW (W16-7P) plaque mounted directly beneath the S1-1 sign and above the? | | | |
| Assembly is located at the crosswalk, or as close as possible? | | | |
| Is the approach controlled by a STOP or YIELD sign? (if so, the assembly shall not be used) | | | |
| **D. DRUG FREE SCHOOL ZONE Sign** | | | |
| Is the sign installed at each location in which a sign identifying the location of a school is installed? | | | |
| Sign is mounted above a standard SPEED LIMIT (R2-1) or FINES HIGHER (R2-6P) sign? | | | |
| **E. END SCHOOL SPEED LIMIT Sign** | | | |
| Sign is located at the proper spacing according to Figures 4 through 10 in the School Area Traffic Safety Manual? | | | |
| Sign is mounted below a standard SPEED LIMIT (R2-1) sign? | | | |
| **F. BEGIN HIGHER FINES ZONE Sign** | | | |
| Is the sign installed at the beginning point of the school zone? | | | |
| Get approval to mount a SPEED LIMIT (R2-1) sign with the FINES HIGHER (R2-6P) sign? | | | |
| **G. Reduced Speed School Zone Ahead Sign (Recommended for more than 20 MPH reduction, optional use otherwise in Reduced Speed School Zones)** | | | |
| Sign is located at the proper spacing according to Figures 4 through 10 in the School Area Traffic Safety Manual? | | | |
| Sign is placed within view of street approaches, which enter a roadway within the school zone containing a **20MPH When Flashing** zone? | | | |
| Reduced Speed School Zone Ahead Sign displays 20 mph? | | | |
| Does the sign have arrows indicating the direction the 20 when flashing zone extends? | | | |

| Issue | Yes | No | NA |
|---|---|---|---|
| **SIGNING continued** | | | |
| **H. SCHOOL BUS STOP AHEAD Sign** | | | |
| Is the sign located at a location where the top flashing lights of a school bus are just visible, no more than 700 feet from the school bus stop? | | | |
| **I. SCHOOL BUS TURN AHEAD (optional)** | | | |
| Is the sign located at the proper spacing according to Figures 4 through 10 in the School Area Traffic Safety Manual? | | | |
| **TRAFFIC SIGNALS** | | | |
| **J. Beacons** | | | |
| Are SPEED LIMIT 20 WHEN FLASHING (S5-1) signs installed with four signal heads, with two heads facing oncoming vehicular traffic and two heads opposing vehicular traffic?<br>1. Are the heads 8- or 12-inch diameter with yellow lenses?<br>2. Are the flashers mounted directly above the S5-1 signs?<br>3. Do beacons illuminate alternately to indicate when speed reductions are in effect?<br>4. Are the beacons which face on-coming traffic mounted at least 12" from the top of the sign face? | | | |
| Are beacons used with overhead S1-1 sign?<br>1. Do the beacons meet the requirements of Warrant 5, from Section 4C.06 of the MUTCD?<br>2. 12-inch beacon with yellow lens located on both sides of sign and facing oncoming and opposing traffic?<br>3. Mounted at least 12-inches from the outside edge of the sign?<br>4. Does the clearance above the roadway comply with the requirements of MASS Detail 80-58?<br>5. Do beacons illuminate alternately to indicate when schoolchildren are using the crossing? | | | |
| **K. Pedestrian Crossing Signals** | | | |
| Does the pedestrian crossing signal meet the requirements of Warrant 5, from Section 4C.06 of the MUTCD? | | | |
| Does the clearance above the roadway comply with the requirements of MASS Detail 80-58? | | | |
| Pedestrian movement across the street is controlled by standard pedestrian signal indications? | | | |
| **PAVEMENT MARKINGS** | | | |
| **L. School Crosswalk** | | | |
| Is the school crosswalk placed at officially designated school crossing? | | | |
| Does the crosswalk use 24-inch wide solid white markings? | | | |
| Does the crosswalk extend the full width of the road? | | | |
| Transverse crosswalk lines used at approaches controlled by traffic signals or stop signs?<br>1. Marked crosswalk 10 feet from inside edge to inside edge of transverse lines? | | | |
| **M. Stop Lines** | | | |
| Is a stop line placed 40 feet in advance of a school crosswalk at pedestrian crossing signals? | | | |

Appendix D

# APPENDIX D

## Sign Table

| Sign | Sign Designation | Section[4] | Conventional Road[2,3] | Oversized[1,2] | Sample |
|---|---|---|---|---|---|
| School | S1-1 | 7B.08 | 36 x 36 | 48 x 48 |  |
| School Bus Stop Ahead | S3-1 | 7B.13 | 36 x 36 | 48 x 48 |  |
| School Bus Turn Ahead | S3-2 | 7B.14 | 36 x 36 | 48 x 48 |  |
| Reduced School Speed Limit Ahead | S4-5, S4-5a | 7B.16 | 36 x 36 | 48 x 48 |  |
| School Speed Limit 20 When Flashing | S5-1 | 7B.15 | 24 x 48 | 36 x 72 |  |
| End School Zone | S5-2 | 7B.09 | 24 x 30 | 36 x 48 |  |
| Drug Free School Zone | A-S6-100 | 7B.100[5] | 24 x 18 | 36 x 30 |  |
| In-Street Ped Crossing | R1-6b | 7B.11, 7B.12 | 12 x 36 | – |  |
| Speed Limit | R2-1 | 7B.15 | 24 x 30 | 36 x 48 |  |
| Begin Higher Fines Zone | R2-10 | 7B.10 | 24 x 30 | 36 x 48 |  |
| End Higher Fines Zone | R2-11 | 7B.10 | 24 x 30 | 36 x 48 |  |

| Plaque | Sign Designation | Section[4] | Conventional Road[2,3] | Oversized[1,2] | Sample |
|---|---|---|---|---|---|
| Fines Higher | R2-6P | 7B.10 | 24 x 18 | 36 x 24 |   |
| XX FT | W16-2aP | 7B.08 | 24 x 12 | 30 x 18 |   |
| Turn Arrow | W16-5P | 7B.08, 7B.09, 7B.11 | 24 x 12 | 30 x 18 |  |
| Advance Turn Arrow | W16-6P | 7B.08, 7B.09, 7B.11 | 24 x 12 | 30 x 18 |  |
| Diagonal Arrow | W16-7P | 7B.12 | 24 x 12 | 30 x 18 |  |
| Ahead | W16-9P | 7B.11 | 24 x 12 | 30 x 18 |   |

Notes:
1. Larger sizes may be used when appropriate.
2. Dimensions are shown in inches and are shown as width x height.
3. Minimum sign sizes for multi-lane conventional roads shall be as shown in the Conventional Road column.
4. The Section column is based on MUTCD and ATM sections.
5. This section is located within the ATM only.

Appendix E

# APPENDIX E

## Warrant for Reduced Speed School Zone

# WARRANT FOR REDUCED SPEED SCHOOL ZONE

A Reduced Speed School Zone **shall not** be installed under the following conditions.

1. The school pedestrian volume is 15 or less during the evaluation period; or,
2. The ADT on the roadway is less than 500 and the hourly volume during the evaluation period is less than 50; or,
3. The posted speed exceeds 50 mph; or,
4. The school crosswalk is at a roundabout, traffic signal, or STOP (R1-1) sign (except as allowed in Sections 7A.03 and 7B.15).

A Reduced Speed School Zone should not be installed when the Stopping Sight Distance for the school crosswalk is less than the minimum defined in AASHTO's most recent edition of *A Policy on Geometric Design of Highways and Streets.*

Minimum points required to warrant a Reduced Speed School Zone is 16 in an urban area, or 12 for an isolated rural community of under 10,000 population.

## CATAGORIES:

| | | |
|---|---|---|
| **Average Time Between Useable Gaps** | Maximum | 10 Points |
| **School Pedestrian Volume** | Maximum | 10 Points |
| **85$^{th}$ Percentile Approach Speed** | Maximum | 5 Points |
| **Average Demand Per Gap** | Maximum | 8 Points |

## DEFINITIONS:

1. **School Pedestrian Volume** – Includes all children between ages 5 and 18 that use the school crossing.
2. **Evaluation Period (EP)** – From forty-five (45) minutes before school starts in the morning until fifteen (15) minutes after school starts or from fifteen (15) minutes before school ends until forty-five (45) minutes after school ends.
3. **Minimum Usable Gap Time (MUGT)** – The minimum gap in traffic required for a single or group of school pedestrians to safely cross a given street width, determined as follows:

   $MUGT = \frac{W}{3.0} + 5.0$ = crossing time in seconds

   where:

   W = Crosswalk width in feet

   3.0 = juvenile pedestrian walking speed in feet/second

   5.0 = perception, reaction, and clearance time in seconds

4. **Total Usable Gap (G)—**The summation of Usable Gaps during the Evaluation Period, measured in seconds. A Usable Gap is any gap in traffic equal to or greater than the MUGT.
5. **Maximum Number of Usable Gaps (MNUG)—**Ratio of Total Usable Gap Time to MUGT during the Evaluation Period.

   $MNUG = \frac{G}{MUGT} = \frac{Total\ Usable\ Gap\ Time\ During\ EP\ (Seconds)}{Minimum\ Usable\ Gap\ Time\ (Seconds)}$

6. **A "Demand"—**The arrival of one or more school pedestrians at the school crossing. The arrival of a single child is considered one demand. The arrival of a group of children is also considered one demand.

**WARRANT:**

1. **Average Time Between Usable Gaps (M)**

   Determine M by dividing EP (minutes) by the MNUG.

   $$M = \frac{EP}{MNUG} = \frac{Evaluation\ Period\ (Minute)}{Maximum\ Number\ of\ Usable\ Gaps}$$

| POINT ASSIGNMENT | |
|---|---|
| **M (minutes)** | **Points** |
| Less than 1 | 0 |
| 1.00 – 1.25 | 2 |
| 1.26 – 1.67 | 4 |
| 1.68 – 2.50 | 6 |
| 2.51 – 5.00 | 8 |
| Over 5 | 10 |

   Maximum Points = 10

2. **School Pedestrian Volume**

   Determine total number of school pedestrians (ages 5 to 18) crossing at the study location during the EP.

| POINT ASSIGNMENT | | |
|---|---|---|
| **Urban** | **Rural** | **Points** |
| 10 or less | 10 or less | 0 |
| 11 - 30 | 11 - 20 | 2 |
| 31 – 50 | 21 – 35 | 4 |
| 51 – 70 | 36 – 50 | 6 |
| 71 – 90 | 51 – 65 | 8 |
| Over 90 | Over 65 | 10 |

   Maximum Points = 10

3. **85th percentile approach Speed**

| POINT ASSIGNMENT | |
|---|---|
| **$85^{th}$ Percentile Approach Speed** | **Points** |
| 20 and under | 0 |
| 21 -25 | 1 |
| 26 – 30 | 2 |
| 31 – 35 | 3 |
| 36 – 40 | 4 |
| 41 – 45 | 5 |
| 46 – 50 | 0 |

   Maximum Points = 5

4. **Average Demand Per Gap (D)**

   Determine D by dividing Total Demands (TD) by the MNUG. The arrival of a single child is considered one demand. The arrival of a group of children is also considered one demand.

   $$D = \frac{TD}{MNUG} = \frac{Total\ Demands}{Maximum\ Number\ of\ Usable\ Gaps}$$

| POINT ASSIGNMENT | |
|---|---|
| **Average Demand per Gap** | **Points** |
| 1 or less | 0 |
| 1.00 – 1.67 | 2 |
| 1.68 – 2.33 | 4 |
| 2.34 – 3.00 | 6 |
| Over 3.00 | 8 |

Maximum Points = 8

After point values are determined for steps 1 through 4, the sum of steps 1 through 4 are compared to the following standard to determine if a reduced speed school zone is warranted:

1. Minimum 16 points in an urban area; or,
2. Minimum 12 points in an isolated, rural community with population under 10,000.

**SURVEY METHODS:**

1. Personnel Requirements: One person
2. Equipment: Stop Watch and Field Data Form
3. Type of Survey:
    a. Count school-age pedestrians within the Crosswalk area during the EP to determine the School Pedestrian Volume. The EP may be either in the morning or in the afternoon.
    b. Obtain the 85th percentile approach speed. IF the 85th percentile approach speed is unknown, the posted speed limit may be used.
    c. Record (in seconds), on the field data form, each gap greater than or equal to the MUGT during the EP.
    d. Record, on the field data form, M, the school age pedestrian volume, the approach speed, and D.
    e. Evaluate the individual warrants, assign points, and tabulate points to determine if a reduced school speed zone is justified.

Reduced Speed School Zone Warrant Evaluation Worksheet

**MOA REDUCED SPEED SCHOOL ZONE WARRANT EVALUATION WORKSHEET**

| | | |
|---|---|---|
| **ROUTE:** _____ **MP:** _____ | **STUDY NUMBER:** _____ | **COMMUNITY:** _____ |
| **DATE:** _____ | **BEGIN TIME:** _____ | **WEATHER:** _____ |
| **REGION:** | **END TIME:** | **INVESTIGATOR:** |

**1. MINIMUM No. USABLE GAP TIME (MUGT)**

WIDTH OF STREET (W) / 3.0FT/SEC + 5.0 =

[ ] **FT**

[ ] / **3.0 FT/SEC** **+5.0** **=** [ ] SEC

**2. MAXIMUM NO. OF USABLE GAPS (MNUG)**

TOTAL USABLE GAP TIME DURING EP (SEC) / MUGT (SEC) =

[ ] / [ ] = [ ]

**3. AVERAGE DEMANDS PER GAP (D)**

TOTAL DEMAND DURING EP (TD) / MNUG =

[ ] / [ ] = [ ]

**4. AVERAGE TIME BETWEEN USABLE GAPS (MIN)**

EVALUATION PERIOD (EP, MINUTES) / MNUG =

[ ] / [ ] = [ ]

| WARRANT | ACTUAL VALUE | ASSIGNED POINTS | MAXIMUM POINTS |
|---|---|---|---|
| **1. AVEARGE TIME BETWEEN GAPS (MIN):** | | | 10 |
| **2. SCHOOL PEDESTRIAN VOLUME (NUMBER):** | | | 10 |
| **3. 85TH PERCENTILE APPROACH SPEED (MPH):** | | | 5 |
| **4. AVERAGE DEMAND PER GAP (D):** | | | 8 |
| | **TOTAL:** | | 33 |

**STANDARD (Urban) = 16**

**STANDARD (Rural, isolated, population < 10,000) = 12**

**WARRANTED? YES OR NO**

**Sketch:**

(Utah Department of Transportation Division of Traffic and Safety, 2011)

## Usable Gap Times Worksheet

| MOA USABLE GAP TIMES FOR SCHOOL PEDESTRIAN VOLUME WORKSHEET | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| TIME | USABLE GAP TIME (SEC) | TIME | USABLE GAP TIME (SEC) | TIME | USABLE GAP TIME (SEC) | TIME | USABLE GAP TIME (SEC) | TIME | USABLE GAP TIME (SEC) |
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| | | | | | | | | | |
| Subtotal: | | Subtotal: | | Subtotal: | | Subtotal: | | Subtotal: | |

**Total Usable Gap Time during EP = _____ Seconds (summation of the subtotals)**

| SCHOOL PEDESTRIAN VOLUE AND DEMAND TALLY (Five Minute Intervals for 60 Minutes) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Interval 1 | Interval 2 | Interval 3 | Interval 4 | Interval 5 | Interval 6 | Interval 7 | Interval 8 | Interval 9 |
| PEDS | | | | | | | | | |
| DEMANDS | | | | | | | | | |
| | Interval 10 | Interval 11 | Interval 12 | Remarks: | | | | | |
| PEDS | | | | | | | | | |
| DEMANDS | | | | | | | | | |

(Utah Department of Transportation Division of Traffic and Safety, 2011)

Appendix F

# APPENDIX F

## Crossing Guard Control and Crossing Guard Checklist

# CHAPTER 6E. CROSSING GUARD CONTROL[1]

## Section 6E.07 Crossing Guard Procedure

Support:

The use of paddle and flags by crossing guards is illustrated in Figure 6E-3.

**Standard:**

**[Crossing Guards] shall use a STOP/SLOW paddle, a flag, or an Automated Flagger Assistance Device (AFAD) to control road users approaching a TTC zone. The use of hand movements alone without a paddle, flag, or AFAD to control road users shall be prohibited except for law enforcement personnel or emergency responders at incident scenes as described in Section 6I.01.**

**The following methods of signaling with paddles shall be used:**

**A. To stop road users, the [crossing guard] shall face road users and aim to STOP paddle face toward road users in a stationary position with the arm extended horizontally away from the body. The free arm shall be held with the palm of the hand above shoulder level toward approaching traffic.**

**B. To direct stopped road users to proceed, the [crossing guard] shall face road users with the SLOW paddle face aimed toward road users in a stationary position with the arm extend horizontally away from the body. The flagger shall motion with the free hand for road users to proceed.**

**C. To alert or slow traffic, the [crossing guard] shall face road users with the SLOW paddle face aimed toward road users in a stationary position with the arm extended horizontally away from the body.**

Option:

To further alert or slow traffic, the [crossing guard] holding the SLOW paddle face toward road users may motion up and down the free hand, palm down.

**Standard:**

**The following methods of signaling with a flag shall be used:**

**A. To stop road users, the [crossing guard] shall face road users and extend the flag staff horizontally across the road users' lane in a stationary position so that the full area of the flag is visibly hanging below the staff. The free arm shall be held with the palm of the hand above shoulder level toward approaching traffic.**

**B. To direct stopped road users to proceed, the [crossing guard] shall face road users with the flag and arm lowered from the view of the road users, and shall motion with the free hand for road users to proceed. Flags shall not be used to signal road users to proceed.**

**C. To alert or slow traffic, the [crossing guard] shall face road users and slowly wave the flag in a sweeping motion of the extended arm from shoulder level to straight down without raising the arm above a horizontal position. The flagger shall keep the free hand down.**

*Guidance:*

*The [crossing guard] should stand either on the shoulder adjacent to the road user being controlled or in the closed lane prior to stopping road users. A [crossing guard] should only stand in the lane being*

[1] References to "Flagger(s)" removed and revised to read "[crossing Guard(s)]." Some sections may not necessarily apply.

*used by moving road users after road users have stopped. The [crossing guard] should be clearly visible to the first approaching road user at all times. The [crossing guard] also should be visible to other road users. The [crossing guard] should be stationed sufficiently in advance of the [students] to warn them (for example, with audible warning devices such as horn or whistles) of approaching danger by out-of-control vehicles. The [crossing guard] should stand alone, away from other workers, work vehicles, or equipment.*

Option:

At spot lane closures where adequate sight distance is available for the reasonably safe handling of traffic, the use of one *[crossing guard]* may be sufficient.

*When a single [crossing guard] is used, the [crossing guard] should be stationed on the shoulder opposite the spot lane closure or work space, or in a position where good visibility and traffic control can be maintained at all times."*

**MOA Traffic Policies**

The Crossing Guard should be stationed on the side of the road from which children would be arriving, assist the children crossing the road, then returning to the arrival side of the street.

**Section 6E.08 [Crossing Guard] Stations**

**Standard:**

**[Crossing guard] stations shall be located such that approaching road users will have sufficient distance to stop at an intended stopping point.**

*Guidance:*

Option:

The distances shown in Table 6E-1, which provides information regarding the stopping sight distance as a function of speed, may be used for the location of a [crossing guard] station. These distances may be increased for downgrades and other conditions that affect stopping distance.

*Guidance:*

*[Crossing guard] stations should be located such that an errant vehicle has additional space to stop without entering the work space. The flagger should identify an escape route that can be used to avoid being struck by an errant vehicle.*

Figure 6E-3. Use of Hand-Signaling Devices by Crossing Guards

**Preferred Method: STOP/SLOW Paddle**

18-inches minimum

**TO STOP TRAFFIC**


R1-1

**Standard:**

**Except in emergency situations, [Crossing guard] stations shall be preceded by an advance warning sign or signs. Except in emergency situations, [Crossing guard] stations shall be illuminated at night."**

Table 6E-1. Stopping Sight Distance as a Function of Speed

| Speed* | Distance |
|---|---|
| 20 mph | 115 feet |
| 25 mph | 155 feet |
| 30 mph | 200 feet |
| 35 mph | 250 feet |
| 40 mph | 305 feet |
| 45 mph | 360 feet |
| 50 mph | 425 feet |
| 55 mph | 495 feet |
| 60 mph | 570 feet |

*Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed.

Crossing Guard Equipment Checklist:

| Equipment | Yes/No |
|---|---|
| **High visibility retroreflective safety vest/apparel (always on outer layer).** | |
| Labeled as ANSI 107-2004 standard performance for Class 2 or better. | |
| **STOP (R1-1) Paddle.** | |
| Minimum size of 18 inches. | |
| Red background. | |
| The word STOP on both sides of the paddle. | |
| STOP letters are 6 inch series capital white letters and orders. | |
| Paddle is retroreflective. | |
| Flashing lights incorporated as described in Section 7D.05 of the MUTCD (optional). | |
| **Weather resistant equipment (i.e. proper attire for season, rain coat, winter jacket, gloves, hat, shoes, etc.).** | |

Appendix G

# APPENDIX G

## Municipality of Anchorage
## Contact Information

# Municipality of Anchorage Contact Information and Hours of Operation

**Physical Address**

**MOA Traffic Department**
4700 Elmore Road, 2nd Floor
Anchorage, AK 99507

**Mailing Address**

**MOA Traffic Department**
Post Office Box 196650
Anchorage, AK 99519

**Phone:** (907) 343-8406
**Fax:** (907) 343-8488

**Hours of Operation**

Monday-Friday
7:30AM to 4:30PM
(Except Municipal Holidays)


SCHOOL
SPEED
LIMIT
20
WHEN
FLASHING


AHEAD