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June 8, 2018

North Carolina Board of Examiners for Engineers and Surveyors
4601 Six Forks Rd, Suite 310
Raleigh, NC 27609

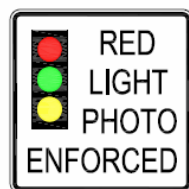
Re: V2018-026 – American Traffic Solutions: Uncertified Plans and Unlicensed Practice of Engineering in North Carolina

Dear NCBELS,

After reading the June 5, 2018 article in Wilmington's *Port City Daily*, I now have an idea of what you seek. You wish to see the word "engineering" on these red-light camera installation plans or know that elements within the plans require "engineering". To help fulfill your quest, let me point out a handful of elements on these plans which require engineering:

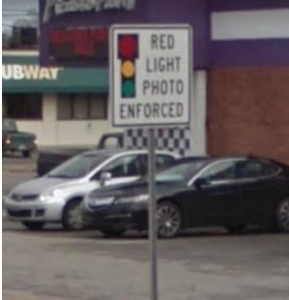
1. **Signage.** Many of the plans specify the photo-enforced sign to be used in conjunction with the camera. North Carolina red-light camera statute 160A-300.1 mandates the sign to be an "advance warning sign." There is a federal *engineering* standard which pertains to all warning signs. Manual of Uniform Traffic Control Devices (MUTCD 2C.02) standard is that "The use of warning signs shall be based on an *engineering* study or on *engineering* judgment." (For context, see Exhibits A and B).

Many Wilmington red-light camera installation plans tell the builder to use this sign:



DETAIL "B"
PROPOSED SIGN TO BE INSTALLED BY WILMINGTON

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This sign is at north-bound S 17th at Dawson. This is at Todd Platzer's intersection. Platzer is the witness in V2018-026.

Many of Wilmington's plans depict these signs. The S 17th at Dawson plan does not depict the sign, but the sign is still present on the ground.

Here is the same sign in Raleigh. This one is at Six Forks @ Rowan. Look out your NCBEL's window and behold:



Greenville uses a different sign. All Greenville plans tell the builder to use this sign:



From installation plans to engineering, here are the bullets:

- Many of the Wilmington plans and all of the Greenville plans tell the builder what sign to use.
- “Any traffic control photographic system installed on a street or highway must be identified by appropriate advance warning sign.” -- NCGS 160A-300.1 (b1).
- “The use of warning signs shall be based on an **engineering** study or on **engineering** judgment.” --- MUTCD 2C.02 (01), NCGS 136-30.

Connect the dots:

The red-light camera plans shall be based on engineering study or engineering judgement.

Existing Engineering Failure in Raleigh and Wilmington

Did you notice the difference between Wilmington’s signs and Greenville’s signs?
Wilmington and Raleigh use the wrong signs.

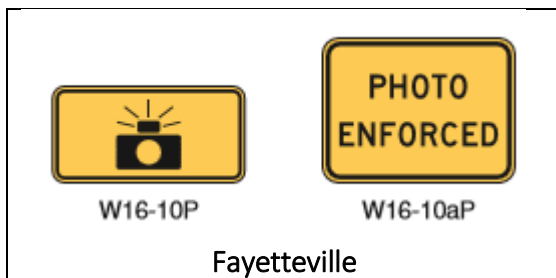


NCGS 160A-300.1 and Session Law 2001-286 require cities to use warning signs. White signs are *regulatory* signs. Yellow signs are *warning* signs. It is difference between MUTCD Section 2B and 2C. Everyone is supposed to be using the yellow warning signs.

Wilmington's and Raleigh's signs not advance warning signs.

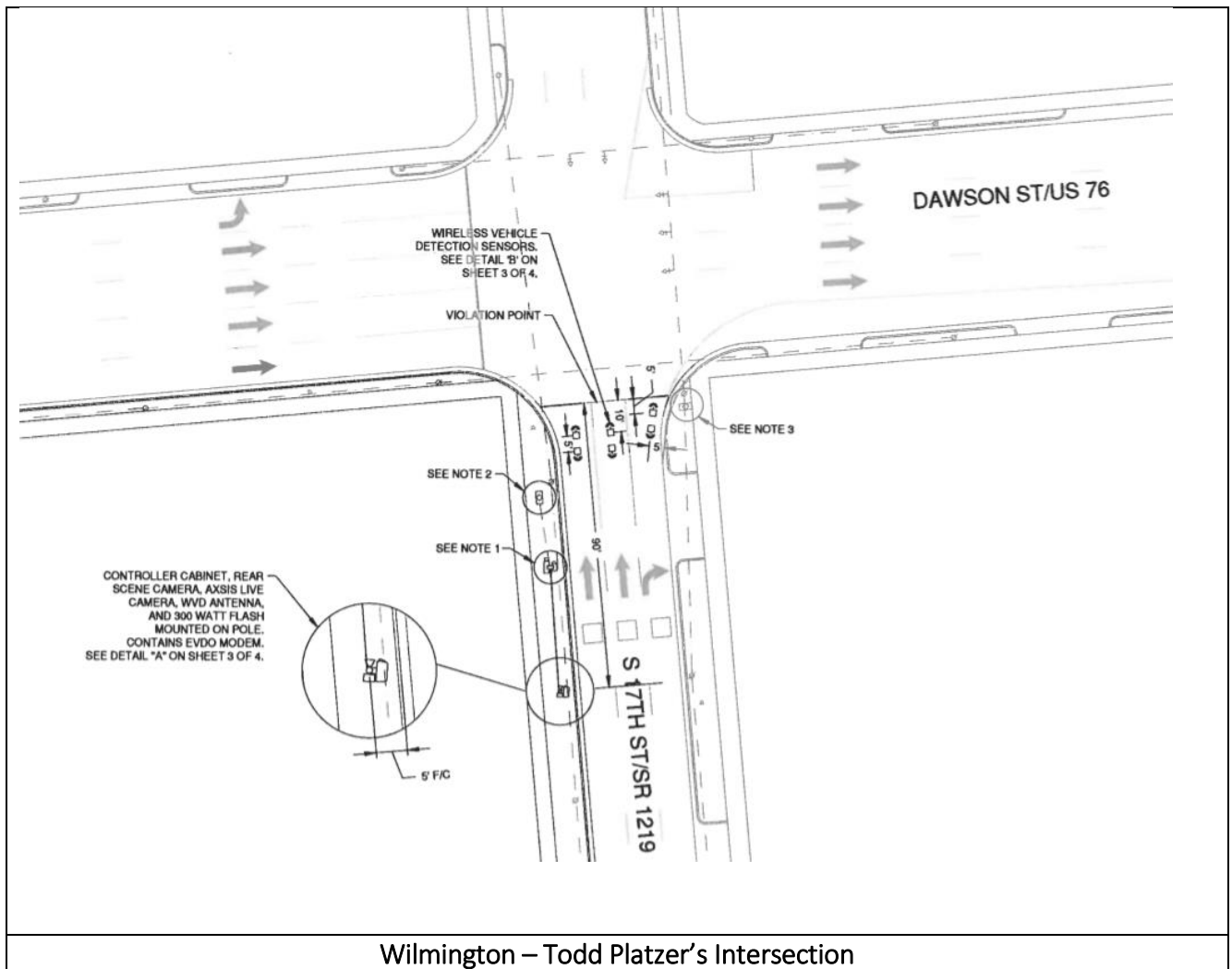
By using the wrong sign, Raleigh and Wilmington do not satisfy the statutory engineering requirements. Because of this seeming innocuous engineering failure in signage alone, there has not been one red-light camera citation that Raleigh or Wilmington issued that has been legal.

Greenville's and Fayetteville's signs are advance warning signs. Those signs are legal. As for Fayetteville, though American Traffic Solutions has chosen to conceal its Fayetteville plans, I drove around Fayetteville and saw that Fayetteville uses these legal signs:



2. **Violation Point.** Every plan shows the violation point. See the Wilmington RLC plan on the next page. The violation point is where the red-light camera flashes and begins to ticket drivers.

The violation point is a function of intersection geometry, and intersection geometry is the exclusive domain of the licensed professional engineer. Only a P.E. can design intersections. State laws define intersection entry points differently, and so the violation points move accordingly. (Traffic signal plans do not show violation points. Only RLC plans do.) To accommodate weird geometries, such as line of sight issues, the engineer can change the default location of the violation point. The violation point also moves if the stop bar does not exist or has worn off.



3. **The Location of the Camera.** Every plan shows the location of the camera. Look for it above. You cannot put a camera just anywhere. You cannot put one in middle of the road or in a sidewalk. And the distances from the intersection to the camera to the *advance warning signs* are the responsibility of a licensed professional engineer.

Let me give you a poignant example from Fayetteville, North Carolina. Fayetteville has the singular distinction of being the only city in the world that has killed a person by dropping a red-light camera on the person's head. Fayetteville put a red-light camera in the highway median. A drunk driver drove into the median, hit the pole and the camera fell off. The camera landed on the passenger's head. 24 year-old Mary Elizabeth May died.

<https://www.wral.com/crash-into-red-light-camera-injures-1/1423998/>

<http://www.legacy.com/Obituaries.asp?Page=LifeStory&PersonId=88244908>

No one should place heavy suspended objects on a pole in a highway median. Such decisions directly affect the life of the public. Not just anyone can make such decisions. The decisions fall under the responsible charge of a P.E. because the P.E. is responsible for the entire intersection, including cameras, signs and all.

4. **The Red-Light Camera Installation Plan Itself.** Let us not strain out the gnat and swallow the camel. So here is the camel. The very existence of the red-light camera installation plan first requires that the yellow change interval has been determined by engineering practices--MUTCD 4D.26 (3). Therefore, one cannot even install a camera, let alone draw up a plan, without first double-checking that the yellow change interval has been determined by engineering practices. The person drawing up the plan has to know engineering practices to double-check engineering practices; otherwise, he puts the public at risk.

In North Carolina, yellow change intervals have been determined by practices, but not engineering practices. NCGS 89C-3 (6) – “application of physics.” You know this is my core beef.

5. **Systems Engineering Requiring a P.E.** NCGS 160A-300.1 defines the red-light camera as a traffic control device working in tandem with the traffic signal. In systems engineering, this is a classic example of a system of systems (“SOS”). The person drawing up the red-light camera installation plan is extending the functionality of the traffic signal. A traffic signal with extensions is a hybrid traffic signal. Any traffic signal, whether original configuration or hybrid, is still a traffic signal, and as such remains in the responsible charge of the licensed professional engineer.

North Carolina law and the Raleigh installation plans reflect the system of systems beautifully. Many of Raleigh’s red-light camera installation plans are explicitly called “Signal Upgrades”. The plans are certified by a P.E. by a firm licensed to practice engineering in North Carolina. This is as it is supposed to be.

There are many more elements on these plans that require engineering. I listed only a few.
And by the way, I found "Zaitooni, P.E." on two Wilmington plans:

16th at Wooster

Market St at 17th Street

Sincerely,



Brian Ceccarelli, PE
License 043760

Subscribed and sworn to before me, this 8 day of June, 2018.





Signature of Notary

Greg O Clemmons

Printed Name of Notary

NOTARY PUBLIC
My Commission expires: 10-01, 2018

EXHIBIT A

North Carolina Laws

Document Links:

[Start of Document](#)

[HISTORY:](#)

[NOTES:](#)

GENERAL STATUTES OF NORTH CAROLINA

*** Statutes current through the 2009 Regular Session ***

*** Annotations current through September 18, 2009 ***

CHAPTER 160A. CITIES AND TOWNS
ARTICLE 15. STREETS, TRAFFIC AND PARKING

Go to the North Carolina Code Archive Directory

N.C. Gen. Stat. § 160A-300.1 (2009)

§ 160A-300.1. Use of traffic control photographic systems

(a) A traffic control photographic system is an electronic system consisting of a photographic, video, or electronic camera and a vehicle sensor installed to work in conjunction with an official traffic control device to automatically produce photographs, video, or digital images of each vehicle violating a standard traffic control statute or ordinance.

(b) Any traffic control photographic system or any device which is a part of that system, as described in subdivision (a) of this section, installed on a street or highway which is a part of the State highway system shall meet requirements established by the North Carolina Department of Transportation. Any traffic control system installed on a municipal street shall meet standards established by the municipality and shall be consistent with any standards set by the Department of Transportation.

(b1) Any traffic control photographic system installed on a street or highway must be identified by appropriate advance warning signs conspicuously posted not more than 300 feet from the location of the traffic control photographic system. All advance warning signs shall be consistent with a statewide standard adopted by the Department of Transportation in conjunction with local governments authorized to install traffic control photographic systems.

(c) Municipalities may adopt ordinances for the civil enforcement of [G.S. 20-158](#) by means of a traffic control photographic system, as described in subsection (a) of this section. Notwithstanding the provisions of [G.S. 20-176](#), in the event that a municipality adopts an ordinance pursuant to this section, a violation of [G.S. 20-158](#) at a location at which a traffic control photographic system is in operation shall not be an infraction. An ordinance authorized by this subsection shall provide that:

(1) The owner of a vehicle shall be responsible for a violation unless the owner can furnish evidence that the vehicle was, at the time of the violation, in the care, custody, or control of another person. The owner of the vehicle shall not be responsible for the violation if the owner of the vehicle, within 30 days after notification of the violation, furnishes the officials or agents of the municipality which issued the citation either of the following:

a. An affidavit stating the name and address of the person or company who had the care, custody, and control of the vehicle.

b. An affidavit stating that the vehicle involved was, at the time, stolen. The affidavit must be supported with evidence that supports the affidavit, including insurance or police report information.

(1a) Subdivision (1) of this subsection shall not apply, and the registered owner of the vehicle shall not be responsible for the violation, if notice of the violation is given to the registered owner of the vehicle more than 90 days after the date of the violation.

(2) A violation detected by a traffic control photographic system shall be deemed a noncriminal violation for which a civil penalty of fifty dollars (\$ 50.00) shall be assessed, and for which no points authorized by [G.S. 20-16\(c\)](#) shall be

assigned to the owner or driver of the vehicle nor insurance points as authorized by [G.S. 58-36-65](#).

(3) The owner of the vehicle shall be issued a citation which shall clearly state the manner in which the violation may be challenged, and the owner shall comply with the directions on the citation. The citation shall be processed by officials or agents of the municipality and shall be forwarded by personal service or first-class mail to the address given on the motor vehicle registration. If the owner fails to pay the civil penalty or to respond to the citation within the time period specified on the citation, the owner shall have waived the right to contest responsibility for the violation, and shall be subject to a civil penalty not to exceed one hundred dollars (\$ 100.00). The municipality may establish procedures for the collection of these penalties and may enforce the penalties by civil action in the nature of debt.

(4) The municipality shall institute a nonjudicial administrative hearing to review objections to citations or penalties issued or assessed under this section.

(c1) The duration of the yellow light change interval at intersections where traffic control photographic systems are in use shall be no less than the yellow light change interval duration specified in the Design Manual developed by the Signals and Geometrics Section of the North Carolina Department of Transportation.

(d) This section applies only to the Cities of Albemarle, Charlotte, Durham, [Fayetteville](#), Greensboro, [Greenville](#), High Point, Locust, Lumberton, Newton, Rocky Mount, and [Wilmington](#), to the Towns of Chapel Hill, Cornelius, Huntersville, Matthews, Nags Head, Pineville, and Spring Lake, and to the municipalities in Union County.

HISTORY: 1997-216, ss. 1, 2; 1999-17, s. 1; 1999-181, ss. 1, 2; 1999-182, s. 2; 1999-456, s. 48(c); 2000-37, s. 1; 2000-97, s. 2; 2001-286, ss. 1, 2; 2001-487, s. 37; 2003-86, s. 1; 2003-380, s. 2; 2007-341, s. 2.

NOTES: LOCAL MODIFICATION. --City of Albemarle: 2007-341, s. 1; city of Charlotte: 2007-341, s. 1; city of Durham: 2007-341, s. 1; city of Fayetteville: 2007-341, s. 1; city of Locust: 2007-341, s. 1; city of Rocky Mount: 2007-341, s. 1; town of Chapel Hill: 2000-97, s. 2(b); municipalities in Union County: 2007-341, s.1.

USE OF TRAFFIC CONTROL PHOTOGRAPHIC SYSTEMS IN WAKE COUNTY AND THE CITY OF CONCORD. --Sessions Laws 2001-286, ss. 3, 4, as amended by Session Laws 2003-380, s. 3, enacted local laws governing the use of traffic control photographic systems in Wake County and the City of Concord.

EDITOR'S NOTE. --Session Laws 1997-216, s. 1, effective June 23, 1997, enacted this section and s. 2 made it effective as to the city of Charlotte. Session Laws 1999-17, s. 1, effective April 17, 1999, added the city of Fayetteville. Session Laws 1999-181, effective January 1, 2000, in s. 1, added subsection (b1), added "nor insurance points as authorized by [G.S. 58-36-65](#)" at the end of subdivision (c)(2), and in s. 2, added the cities of Greensboro, High Point, and Rocky Mount. Session Laws 1999-182, effective January 1, 2000, in s. 1 made the same changes as were made by Session Laws 1999-181, s. 1, and in s. 2 added Charlotte, Fayetteville, Greenville, Wilmington, and Greensboro and the towns of Huntersville, Matthews, and Cornelius. Session Laws 1999-456, s. 48(c), effective August 13, 1999, and designed to resolve duplicate enactments by Session Laws 1999-181 and 1999-182, repealed Session Laws 1999-182, ss. 1 and 2, and rewrote Session Laws 1997-216, s. 2, as amended by Session Laws 1999-17 and Session Laws 1999-181, to add the city of Wilmington, and the towns of Cornelius, Huntersville, and Matthews. Session Laws 2000-37, s. 1, effective June 30, 2000, added the cities of Greenville and Lumberton, and the town of Pineville. Session Laws 2000-97, s. 2, effective July 10, 2000, added the town of Chapel Hill. The section has been codified at the direction of the Revisor of Statutes.

EFFECT OF AMENDMENTS. --Session Laws 2007-341, s. 2, effective September 1, 2007, and applicable to offenses committed on or after that date, inserted "Locust" in subsection (d).

LEGAL PERIODICALS. --For recent development, "Picture It: **Red Light Cameras** Abide by the Law of the Land," see [80 N.C.L. Rev. 1879 \(2002\)](#).

LexisNexis 50 State Surveys, Legislation & Regulations

Speed Detection & Traffic Control Devices

CASE NOTES

DUE PROCESS. --Because [G.S. 160A-300.1\(c\)\(4\)](#) and a city ordinance promulgated pursuant to it provided an adequate method to challenge the legality of a city's program to catch red-light violators by use of automatic cameras

EXHIBIT B

Select Pages from the MUTCD

Manual on Uniform Traffic Control Devices

for Streets and Highways

2009 Edition

Including Revision 1 dated May 2012
and Revision 2 dated May 2012



CHAPTER 2C. WARNING SIGNS AND OBJECT MARKERS

Section 2C.01 Function of Warning Signs

Support:

- 01 Warning signs call attention to unexpected conditions on or adjacent to a highway, street, or private roads open to public travel and to situations that might not be readily apparent to road users. Warning signs alert road users to conditions that might call for a reduction of speed or an action in the interest of safety and efficient traffic operations.

Section 2C.02 Application of Warning Signs

Standard:

- 01 **The use of warning signs shall be based on an engineering study or on engineering judgment.**

Guidance:

- 02 *The use of warning signs should be kept to a minimum as the unnecessary use of warning signs tends to breed disrespect for all signs. In situations where the condition or activity is seasonal or temporary, the warning sign should be removed or covered when the condition or activity does not exist.*

Option:

- 03 Consistent with the provisions of Chapter 2L, changeable message signs may be used to display a warning message.
- 04 Consistent with the provisions of Chapter 4L, a Warning Beacon may be used in combination with a standard warning sign.

Support:

- 05 The categories of warning signs are shown in Table 2C-1.
- 06 Warning signs provided in this Manual cover most of the conditions that are likely to be encountered. Additional warning signs for low-volume roads (as defined in Section 5A.01), temporary traffic control zones, school areas, grade crossings, and bicycle facilities are discussed in Parts 5 through 10, respectively.
- 07 Section 1A.09 contains information regarding the assistance that is available to jurisdictions that do not have engineers on their staffs who are trained and/or experienced in traffic control devices.

Section 2C.03 Design of Warning Signs

Standard:

- 01 **Except as provided in Paragraph 2 or unless specifically designated otherwise, all warning signs shall be diamond-shaped (square with one diagonal vertical) with a black legend and border on a yellow background. Warning signs shall be designed in accordance with the sizes, shapes, colors, and legends contained in the “Standard Highway Signs and Markings” book (see Section 1A.11).**

Option:

- 02 A warning sign that is larger than the size shown in the Oversized column in Table 2C-2 for that particular sign may be diamond-shaped or may be rectangular or square in shape.
- 03 Except for symbols on warning signs, minor modifications may be made to the design provided that the essential appearance characteristics are met. Modifications may be made to the symbols shown on combined horizontal alignment/intersection signs (see Section 2C.11) and intersection warning signs (see Section 2C.46) in order to approximate the geometric configuration of the intersecting roadway(s).
- 04 Word message warning signs other than those provided in this Manual may be developed and installed by State and local highway agencies.
- 05 Warning signs regarding conditions associated with pedestrians, bicyclists, and playgrounds may have a black legend and border on a yellow or fluorescent yellow-green background.

Standard:

- 06 **Warning signs regarding conditions associated with school buses and schools and their related supplemental plaques shall have a black legend and border on a fluorescent yellow-green background (see Section 7B.07).**

Section 2C.04 Size of Warning Signs

Standard:

- 01 **Except as provided in Section 2A.11, the sizes for warning signs shall be as shown in Table 2C-2.**

Standard:

- 02 A W16-1P plaque shall not be used alone. If a W16-1P plaque is used, it shall be mounted below either a Vehicular Traffic Warning sign (see Section 2C.49) or a Non-Vehicular Warning sign (see Section 2C.50). The background color of the W16-1P plaque shall match the background color of the warning sign with which it is displayed.

Section 2C.61 Photo Enforced Plaque (W16-10P)**Option:**

- 01 A Photo Enforced (W16-10P) plaque or a PHOTO ENFORCED (W16-10aP) word message plaque (see Figure 2C-12) may be mounted below a warning sign to advise road users that the regulations associated with the condition being warned about (such as a traffic control signal or a toll plaza) are being enforced by photographic equipment.

Standard:

- 02 If used below a warning sign, the Photo Enforced (W16-10P or W16-10aP) plaque shall be a rectangle with a black legend and border on a yellow background.

Section 2C.62 NEW Plaque (W16-15P)**Option:**

- 01 A NEW (W16-15P) plaque (see Figure 2C-12) may be mounted above a regulatory sign when a new regulation takes effect in order to alert road users to the new traffic regulation. A NEW plaque may also be mounted above an advance warning sign (such as a Signal Ahead sign for a newly-installed traffic control signal) for a new traffic regulation.

Standard:

- 02 The NEW plaque shall not be used alone.
03 The NEW plaque shall be removed no later than 6 months after the regulation has been in effect.

Section 2C.63 Object Marker Design and Placement Height**Support:**

- 01 Type 1, 2, and 3 object markers are used to mark obstructions within or adjacent to the roadway. Type 4 object markers are used to mark the end of a roadway.

Standard:

- 02 When used, object markers (see Figure 2C-13) shall not have a border and shall consist of an arrangement of one or more of the following types:

Type 1—a diamond-shaped sign, at least 18 inches on a side, consisting of either a yellow (OM1-1) or black (OM1-2) sign with nine yellow retroreflective devices, each with a minimum diameter of 3 inches, mounted symmetrically on the sign, or an all-yellow retroreflective sign (OM1-3).

Type 2—either a marker (OM2-1V or OM2-1H) consisting of three yellow retroreflective devices, each with a minimum diameter of 3 inches, arranged either horizontally or vertically on a white sign measuring at least 6 x 12 inches; or an all-yellow horizontal or vertical retroreflective sign (OM2-2V or OM2-2H), measuring at least 6 x 12 inches.

Type 3—a striped marker, 12 x 36 inches, consisting of a vertical rectangle with alternating black and retroreflective yellow stripes sloping downward at an angle of 45 degrees toward the side of the obstruction on which traffic is to pass. The minimum width of the yellow and black stripes shall be 3 inches.

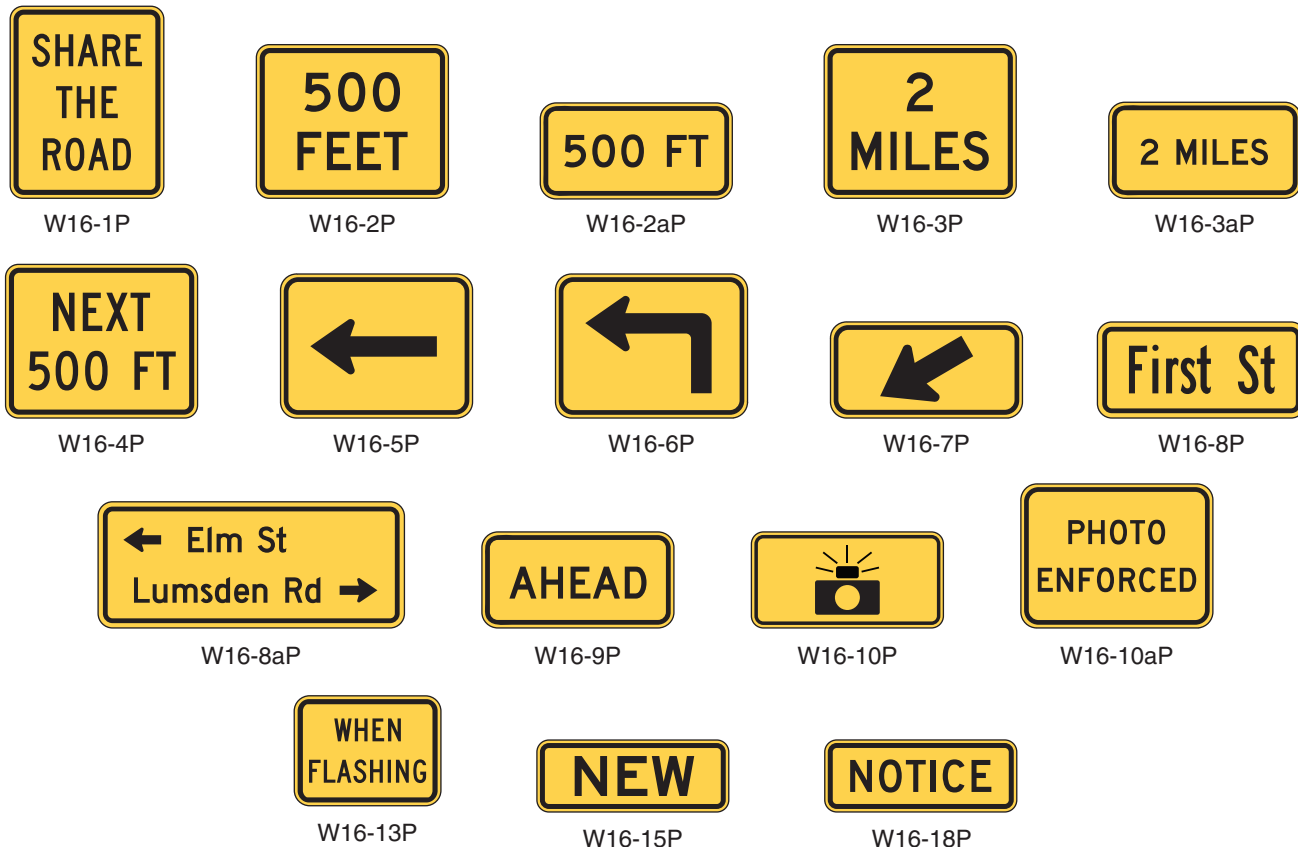
Type 4—a diamond-shaped sign, at least 18 inches on a side, consisting of either a red (OM4-1) or black (OM4-2) sign with nine red retroreflective devices, each with a minimum diameter of 3 inches, mounted symmetrically on the sign, or an all-red retroreflective sign (OM4-3).

Support:

- 03 A better appearance can be achieved if the black stripes are wider than the yellow stripes.
04 Type 3 object markers with stripes that begin at the upper right side and slope downward to the lower left side are designated as right object markers (OM3-R). Object markers with stripes that begin at the upper left side and slope downward to the lower right side are designated as left object markers (OM3-L).

Guidance:

- 05 When used for marking obstructions within the roadway or obstructions that are 8 feet or less from the shoulder or curb, the minimum mounting height, measured from the bottom of the object marker to the elevation

Figure 2C-12. Supplemental Warning Plaques

Note: The background color (yellow or fluorescent yellow-green) shall match the color of the warning sign that it supplements.

Standard:

- 02 Supplemental warning plaques shall be used only in combination with warning or regulatory signs. They shall not be mounted alone or displayed alone. If used, a supplemental warning plaque shall be installed on the same post(s) as the warning or regulatory sign that it supplements.
- 03 Unless otherwise provided in this Manual for a particular plaque, supplemental warning plaques shall be mounted below the sign they supplement.

Section 2C.54 Design of Supplemental Warning Plaques

Standard:

- 01 A supplemental warning plaque used with a warning sign shall have the same legend, border, and background color as the warning sign with which it is displayed. A supplemental warning plaque used with a regulatory sign shall have a black legend and border on a yellow background.
- 02 Supplemental warning plaques shall be square or rectangular.

Section 2C.55 Distance Plaques (W16-2 Series, W16-3 Series, W16-4P, W7-3aP)

Option:

- 01 The Distance Ahead (W16-2 series and W16-3 series) plaques (see Figure 2C-12) may be used to inform the road user of the distance to the condition indicated by the warning sign.
- 02 The Next Distance (W7-3aP and W16-4P) plaques (see Figures 2C-4 and 2C-12) may be used to inform road users of the length of roadway over which the condition indicated by the warning sign exists.

Section 2C.56 Supplemental Arrow Plaques (W16-5P, W16-6P)

Guidance:

- 01 If the condition indicated by a warning sign is located on an intersecting road and the distance between the intersection and condition is not sufficient to provide adequate advance placement of the warning sign, a Supplemental Arrow (W16-5P or W16-6P) plaque (see Figure 2C-12) should be used below the warning sign.