Design Guidelines

There are general guidelines to follow in the design of highway signs in order to conform to basic standards. Many of these guidelines are mentioned in various sections of the Manual on Uniform Traffic Control Devices (MUTCD), while others are derived from accepted practice in sign design and layout. Highway signs with standardized designs conforming to the general guidelines (like most regulatory, warning, emergency management, school, railroad-highway grade crossing, and bicycle signs), are contained in this book and are shown with different standard sizes depending on the type of highway or facility where the sign is intended to be used.

Although some guide signs also have been standardized and are included in this book, most guide signs need to be designed separately because of the variability in message or legend. For most guide signs, there can be no rigid standardized sizes.

Sign Dimension

Message variability controls overall sign dimensions. Whenever practicable, the overall dimensions of the sign plates should be in multiples of 6 inches (150 mm).

The use of a small*er* than "nominal" size for the various four types of roadway sign may sometimes be justified. For instance, a sign mounted over a particular roadway lane to which it applies may have to be limited in width to the lane width. In some cases, vertical clearances may limit the vertical dimension of the sign. On the other hand, a larger than "*nominal*" sign may be desirable where greater legibility or emphases is needed. When a variation in the "standard" size is necessary, a reduced or enlarged (as the case may be) letter height, interline, and edge spacing may be used but should be as nearly comparable to standards as possible.

Letter Style

Type of letters used shall be those shown in the Standard Alphabets for Highway Signs book. As a guide to choice of alphabets, tests have show that, for any given legend, better legibility can be obtained by using a relatively wide spacing between letters than by using wider and taller letters with a cramped space.

Sign lettering is normally uppercase letters except that destination names may be in lowercase lettering, with initial uppercase. The initial uppercase letters used in conjunction with lowercase letters will be Series E(M) and shall be approximately 1½ times the "loop" height of the lowercase letters.

Use of the Series B alphabet are for street name signs, parking signs, and other similar signs where limited breadth and stroke widths are required for design purposes.

Size of Lettering

For guide signs on expressways and freeways, the prescribed numeral and letter sizes, according to interchange classification and component of sign legend, appear in Tables 2E-1 through 2E-4 of the MUTCD. The minimum sizes specified should be exceeded where conditions indicate a need for greater legibility.

For conventional roads in rural districts on major routes, the principal legend on guide signs shall be in letters at least 6 inches (150 mm) in height. On low-volume roads and on urban streets with speeds of 25 mph (40 km/h), the principal legend shall be in letters at least 4 inches (100 mm) high.

Lettering on street name signs should be at least 6 inches (150 mm) high (MUTCD, Section 2D.38). Supplementary lettering to indicate type of street or section of city may be in smaller lettering but at least 3 inches (75 mm) high.

An accepted "rule-of-thumb" to follow for legibility for signs other than Interstate is to have 1 inch (25 mm) of letter height for every 40 feet (12 m) of desired legibility.

Amount of Legend

The MUTCD states that regardless of letter size, the legend on a guide sign must be kept to a minimum to be instantly legible. For example, on expressways, the legend on a guide sign should only have two destinations and the directional copy. Directional copy, not exceeding three lines,

may include symbols, route numbers, arrows, cardinal directions, interchange number(s), and other exit instructions. Conventional road guide signs should be limited to three lines of principal legend which includes only place names, route numbers, and street names.

Arrows

In the Appendix, two sets of arrows are illustrated for use in highway signs. With few exceptions, which include guide signs, the "standard arrow" is for all types of signs. The "Up" and "Down" arrows are to be used for guide signs and recommended applications are stated in Sections 2D.8 and 2E.18 of the MUTCD.

Borders

With few exceptions, the MUTCD requires all signs to have a border of the same color as the legend. A dark border should be set in from the edge, while a white border should extend to the edge of the panel.

A suitable border for 30-inch (750 mm) signs with a light background should be from one-half to three-quarters of an inch (13 to 19 mm) in width, one-half inch (13 mm) from the edge. For similar signs with a white border, a width of one inch (25 mm) is appropriate. For other signs, the border widths should be of similar proportions but should not exceed the stroke width of the major lettering of the sign. For guide signs, smaller than 6 feet by 10 feet (1,800 x 3,000 mm), a width of approximately 1¼ inch (19 mm) may be used; for those exceeding 6 feet by 10 feet (1800 mm x 3000 mm), the border should be 2 inches (50 mm) wide; and for unusually large signs, a border of 3 inches (75 mm) wide is appropriate.

The corners of all sign borders shall be rounded and, where practicable, the corners of the sign panels should also be rounded to fit the border, except for STOP signs. On guide signs, corner radii of sign borders should be approximately one-eight of the lesser side dimension except that the radii should not exceed 12 inches (300 mm) on any sign. The area outside the corner radius on large guide signs may need to be trimmed.

Spacing

Interline spacing should be approximately three-fourths the average of capital or uppercase letter heights in adjacent lines of letters.

The spacing to the top and bottom borders should be approximately equal to the average of the letter height of the adjacent line of letters. The lateral spacing to the vertical borders should be essentially the same as the height of the largest letter.

Spacing between words, words and arrow, a letter and arrow, or a word and number in a line copy should be approximately 1 to 1½ times the uppercase letter height used in that line of copy.

An example in the design of a guide sign using the above guidelines is shown on the following pages.

Diagrammatic Signs

Design of diagrammatic signs follow the same principles and guidelines previously covered plus additional guidelines necessary for the details related to the graphic components. Diagrammatic signs shall be designed in accordance with the following criteria:

1. The graphic legend shall be of a plan view showing a simplified off-ramp arrangement.

2. Only one destination may be shown for each arrowhead, with a maximum of two destinations per sign.

3. The graphic should not depict deceleration lanes. A black on yellow "EXIT ONLY" panel should be used to supplement a lane drop graphic.

4. The shaft for the exit ramp movement should be shorter than, but not separated from, the through movement graphic.

5. Arrow shafts should contain lane lines where appropriate and route shields shall not be used as a substitute for arrowheads.

6. Route shields, cardinal directions, and destinations should be clearly related to the arrowhead, and the arrowhead should point toward the route shield for the off movement.

7. The cardinal direction should generally be placed adjacent to the route shield and the destination should be placed below and justified with the route shield.

8. Exit number panels should be located toward the top left edge of the sign for a left exit and toward the top right edge for right exits.

The above guidelines were based upon the results of a research project conducted by the Federal Highway Administration. This research generated ideals for the various diagrammatic design features. These ideal features have been modified so that more economical designs could not be obtained.

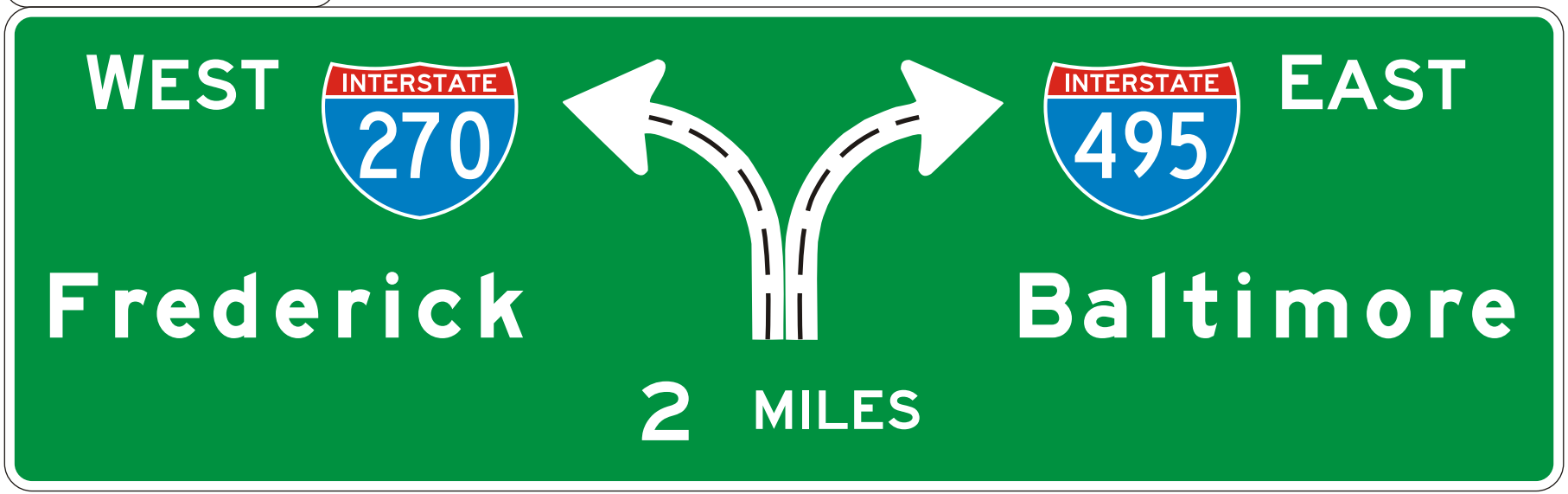
Specific design standards for graphic components are presented in the table below and other recommended features are shown in the design illustrations in the following pages. The illustrations shown were designed through a trial and error procedure and will provide the designer with the guides and elements needed to design an economical diagrammatic sign while maintaining a clear and simple message.

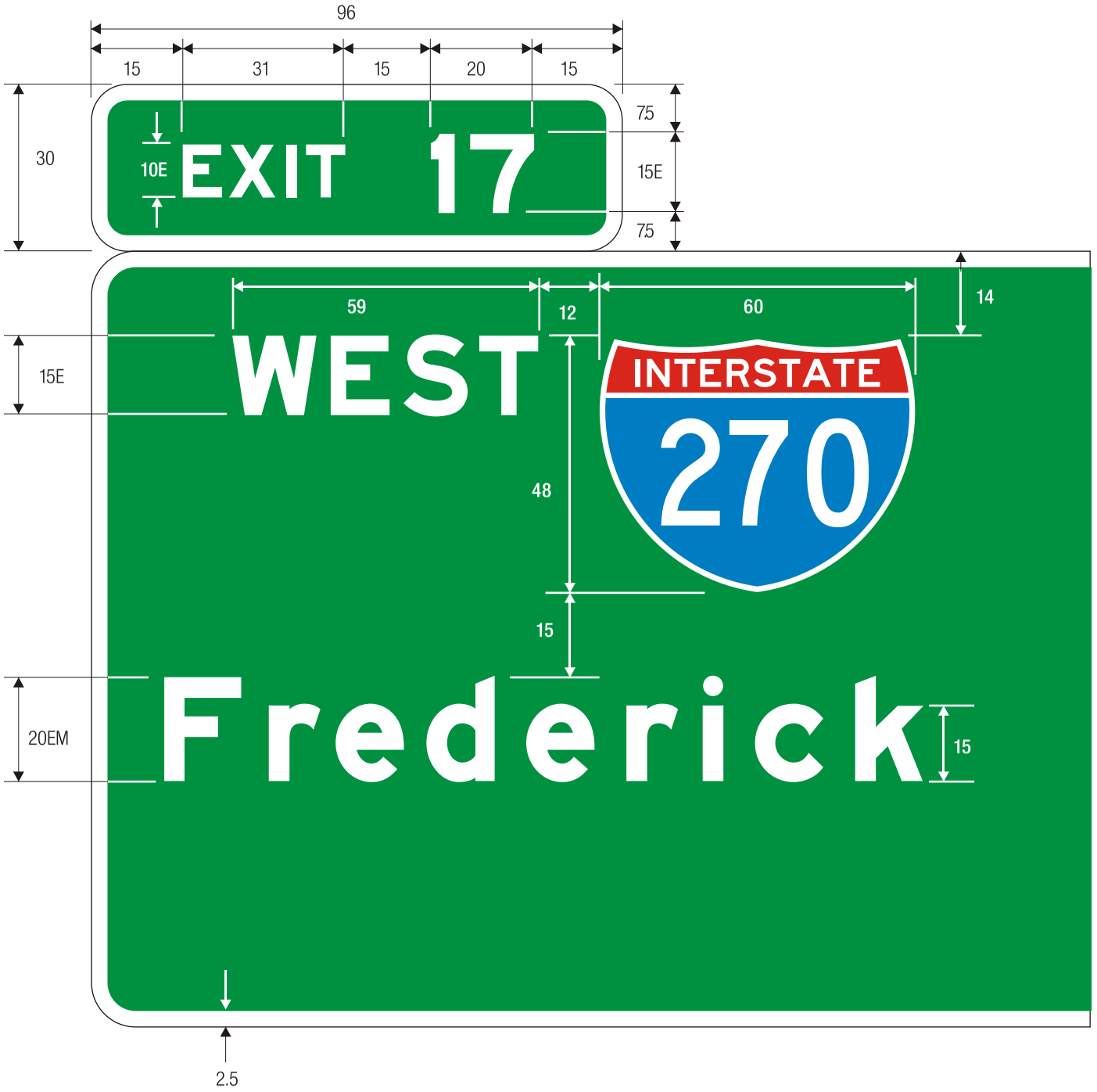
GRAPHIC COMPONENT	SIZE
Lane Width	5" (125 mm) *
Lane Lines	1" x 6" (25 x 150 mm)
Space between Lane Lines	6" (150 mm)
Arrowheads	Standard "Up" Arrow
Stem Height (to upper point of depature—minimum)	30" (750 mm)
Space between arrowhead and route shield and between route shield and cardinal direction	12" (300 mm)*

* Wider lane widths appear to better meet the needs of older drivers.

E1-3

Optional




96
15
31
15
20
15
30
10E
EXIT 17
75
15E
75
59
12
60
14
15E
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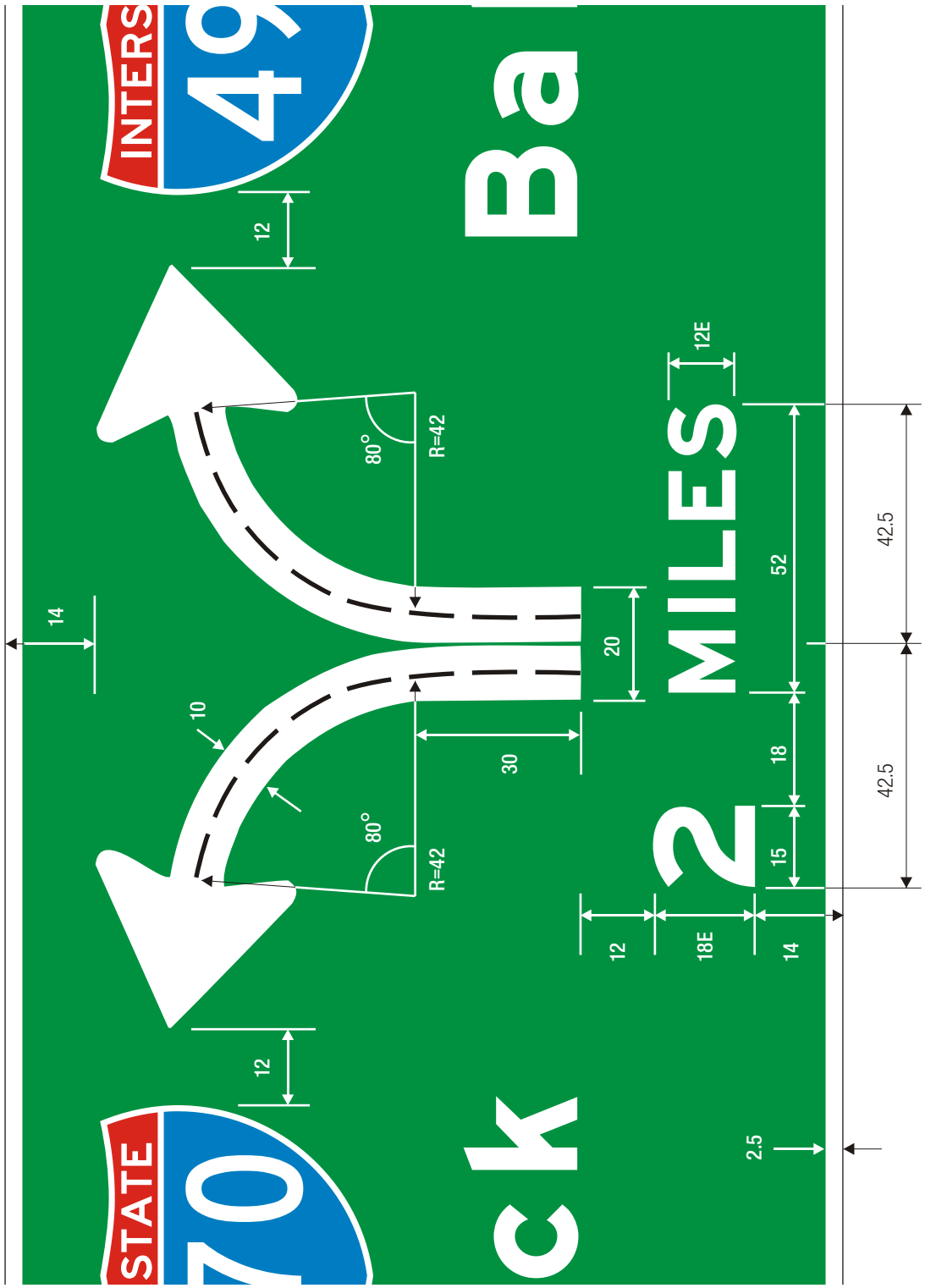
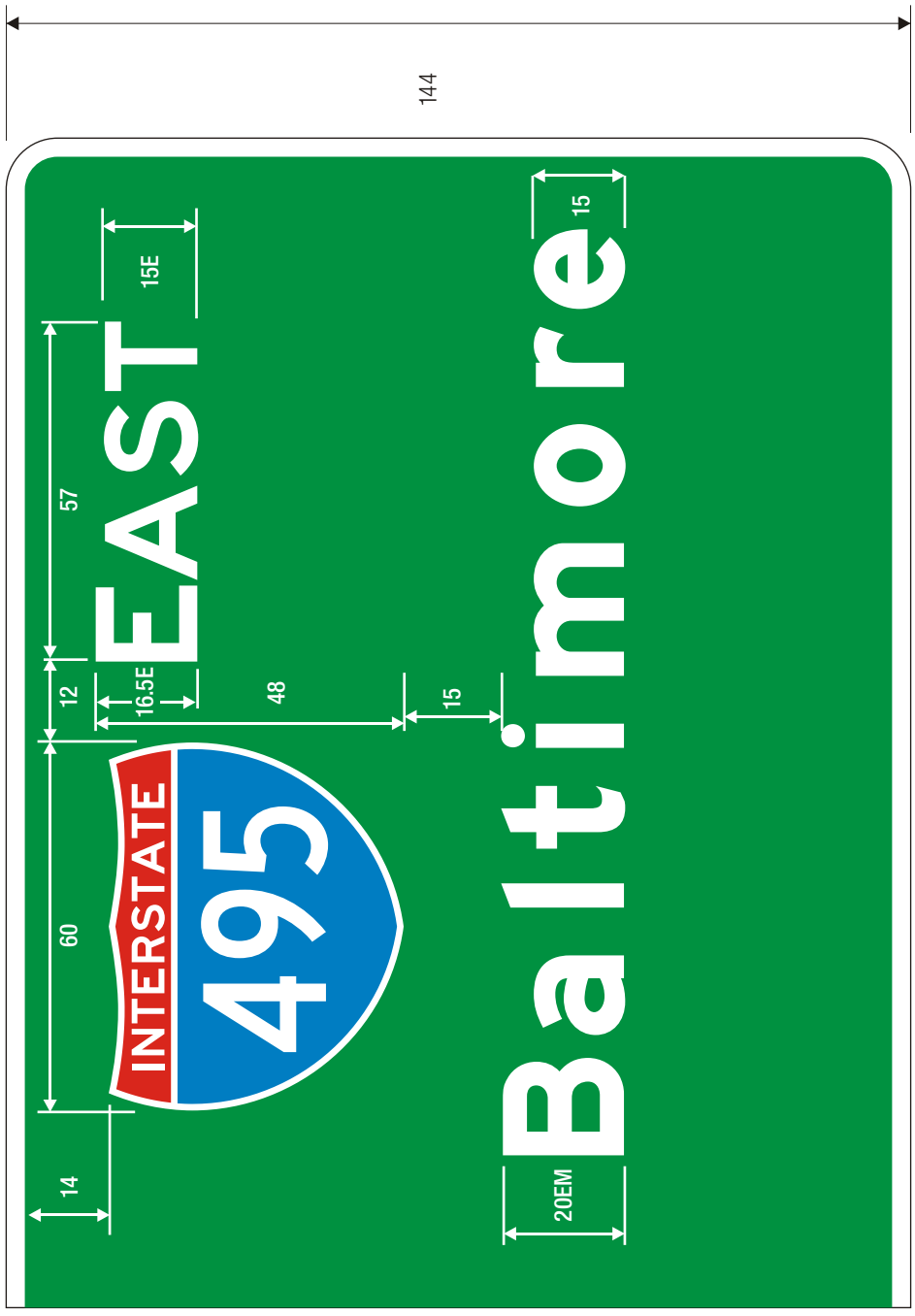
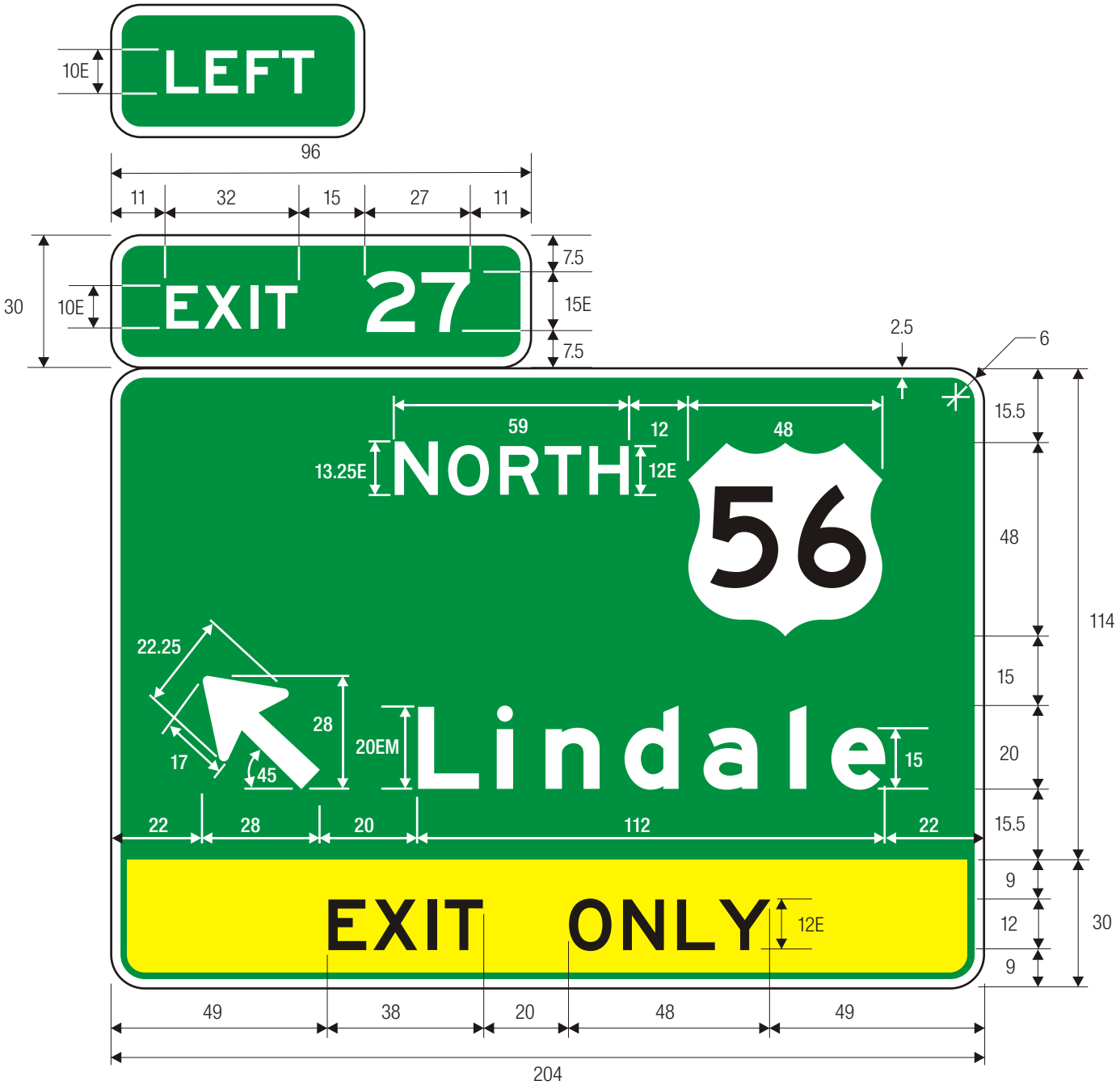
INTERSTATE
270
48
15
20EM
Frederick
15
2.5

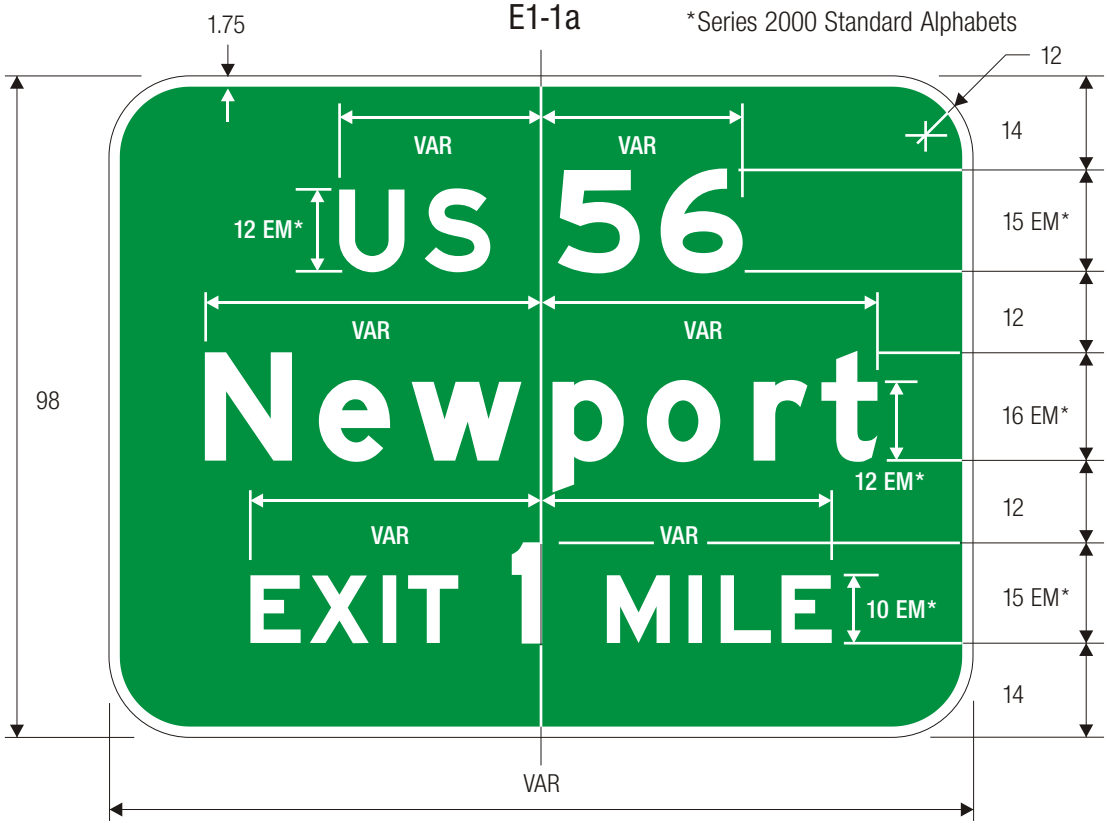

INTERS
49
Ba
12
14
10
80°
R=42
20
30
2 MILES
12E
52
42.5
18
15
42.5
12
18E
14
2.5
STATE
70
ck
12


144
Baltimore
20EM
15
EAST
15E
57
12
16.5E
48
15
INTERSTATE
495
60
14


LEFT
10E
96
11
32
15
27
11
EXIT 27
30
10E
7.5
15E
7.5
2.5
6
59
12
48
13.25E
NORTH
12E
56
15.5
48
114
15
20
15.5
9
12
9
30
22.25
28
17
45
20EM
Lindale
15
22
28
20
112
22
EXIT ONLY
12E
49
38
20
48
49
204

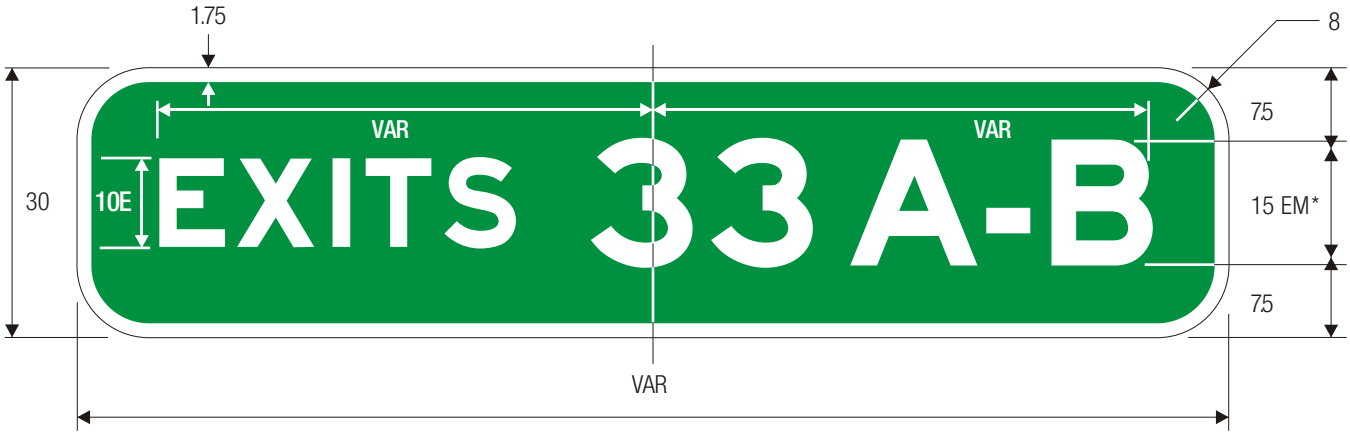
E1-1a

*Series 2000 Standard Alphabets

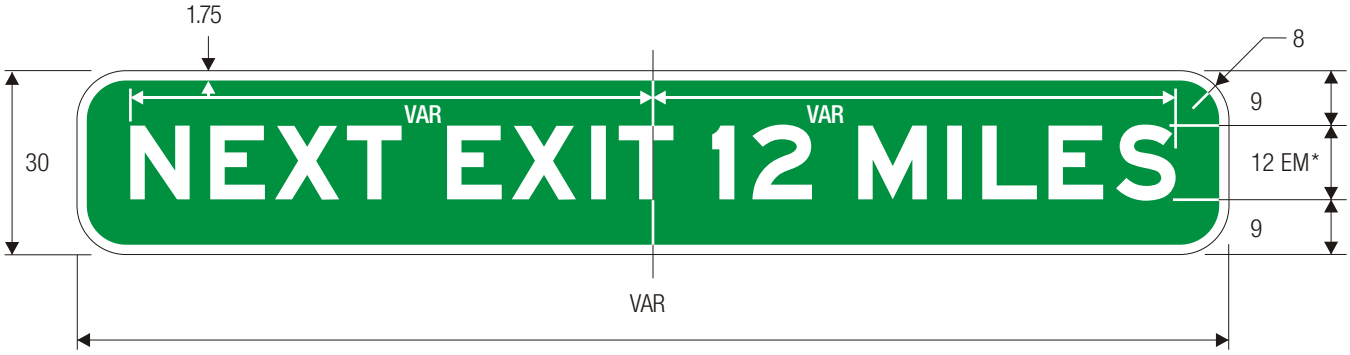


E1-2

COLORS: LEGEND —WHITE (RETROREFLECTIVE)
BACKGROUND —GREEN (RETROREFLECTIVE)



E1-5



E2-1

*Series 2000 Standard Alphabets.

E2-1a

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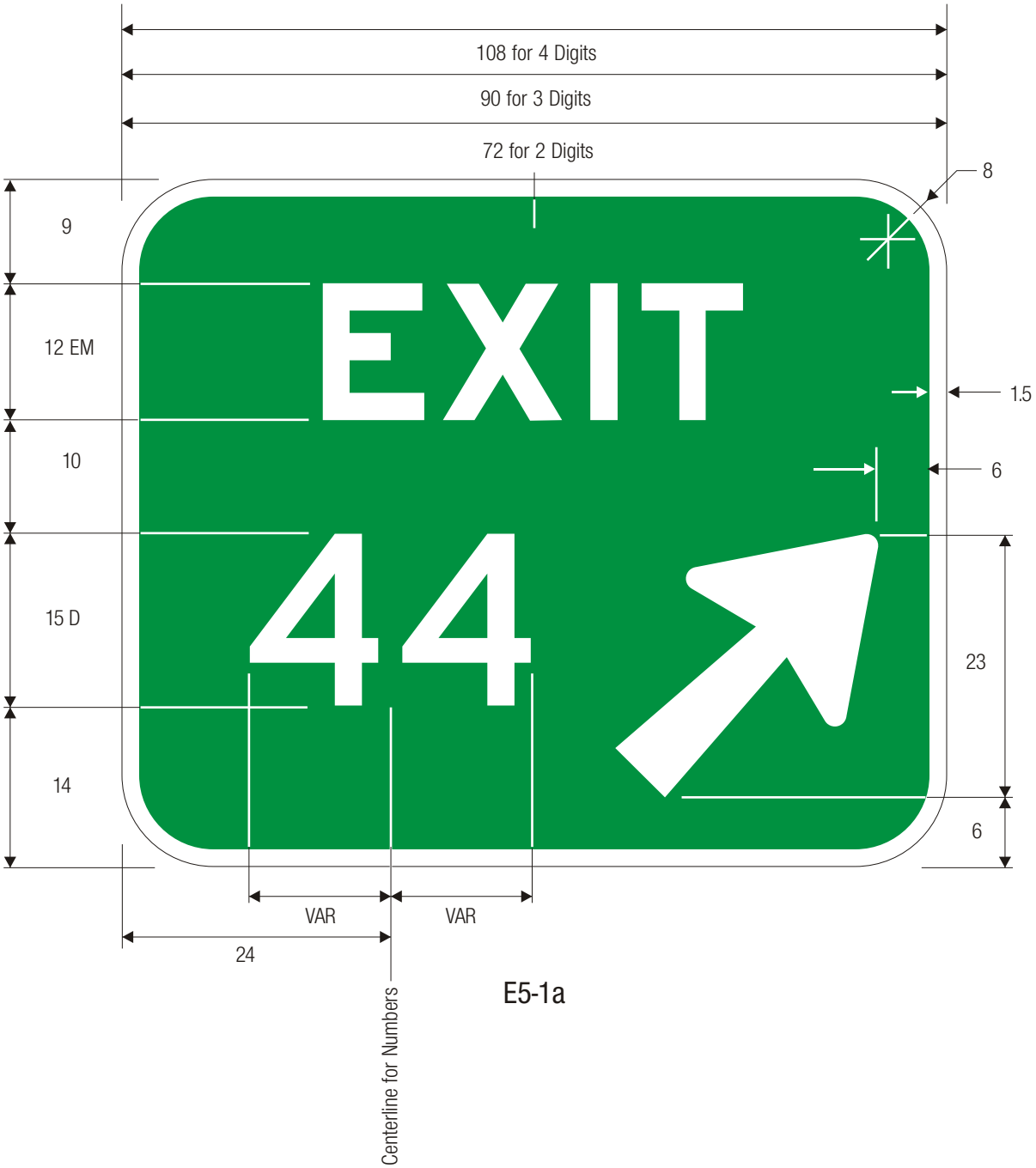

E5-1a

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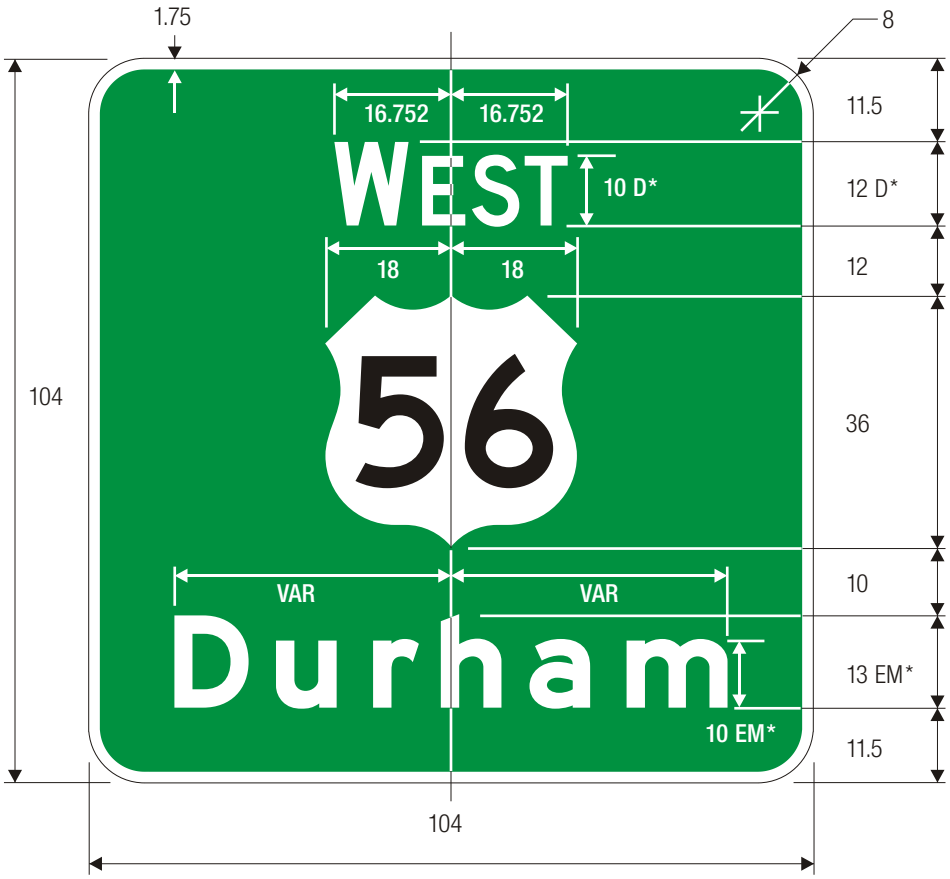
BACKGROUND —GREEN (RETROREFLECTIVE)



E6-2

E6-2a

*Series 2000 Standard Alphabets.

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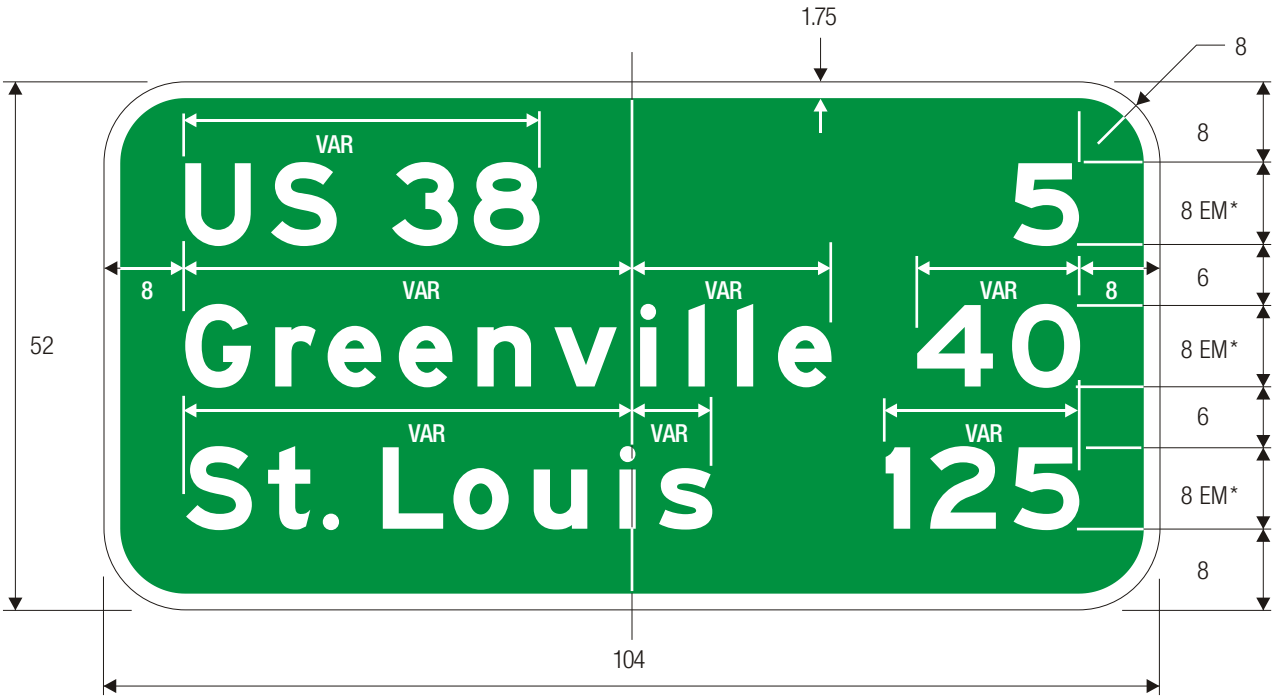
BACKGROUND —GREEN (RETROREFLECTIVE)



E7

*Series 2000 Standard Alphabets.

COLORS: LEGEND —WHITE (RETROREFLECTIVE)
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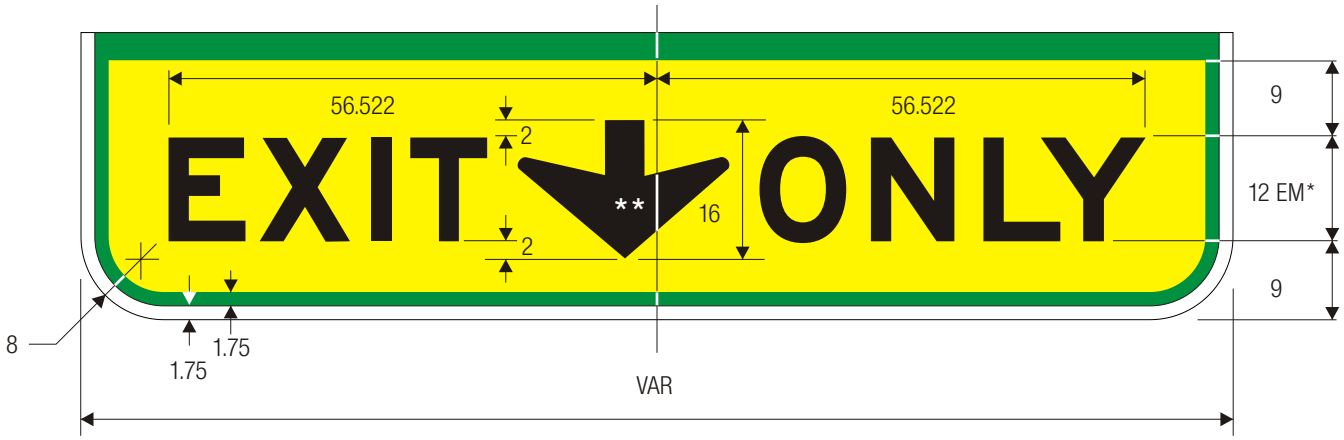
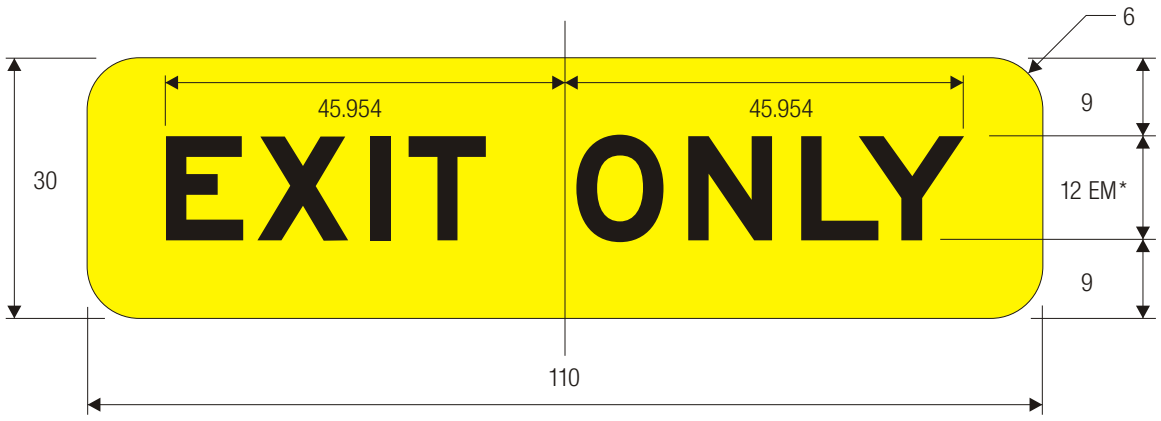


E11-1



E11-1a

*Series 2000 Standard Alphabets.
**See page 6-3 for symbol design.

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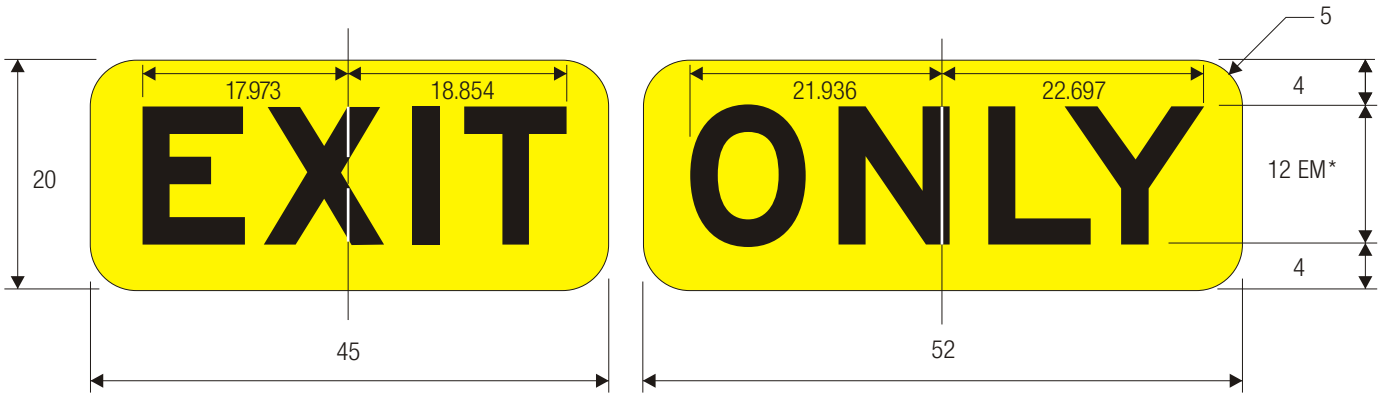
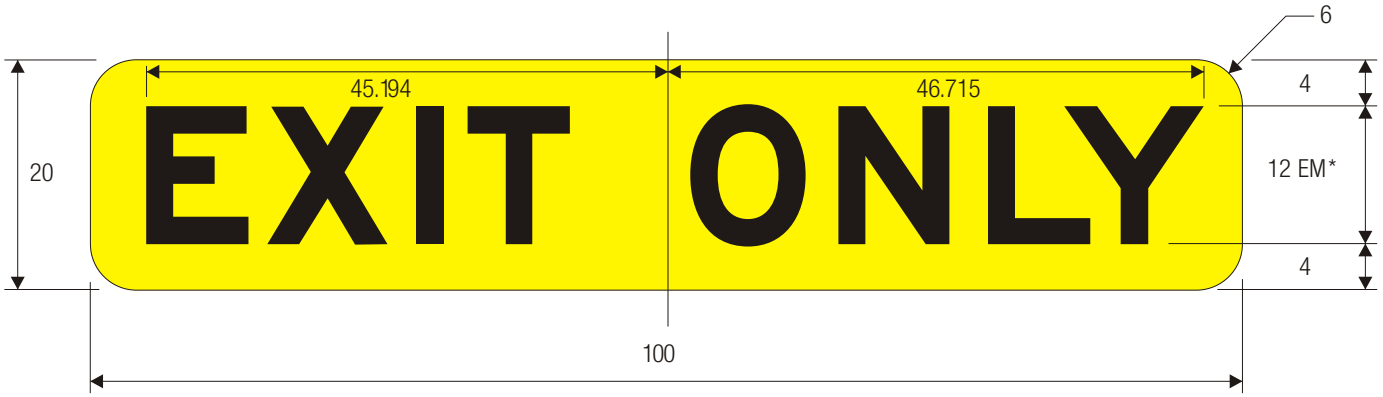
BACKGROUND —YELLOW (RETROREFLECTIVE)

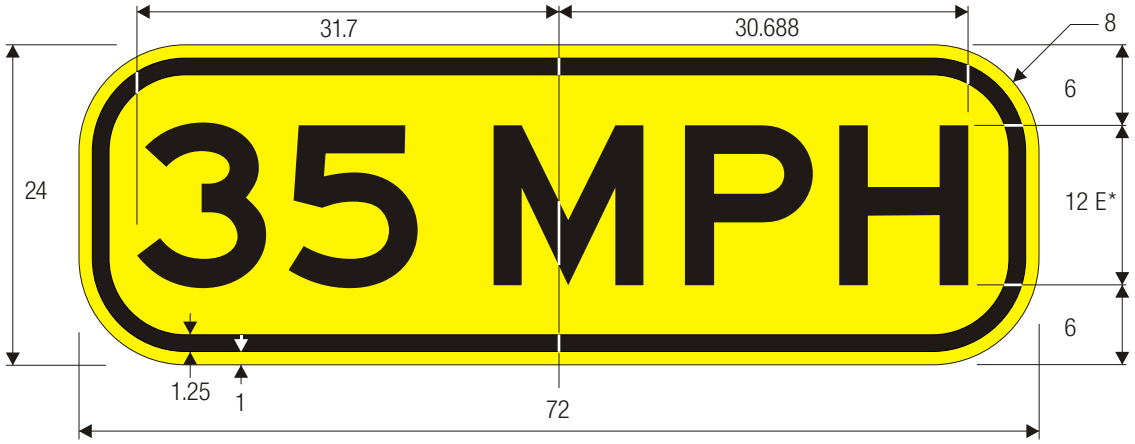


E11-1b

*Series 2000 Standard Alphabets.



E11-1c



E13-1

COLORS: LEGEND —BLACK
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