Old Colony Planning Council

Robert G. Moran, Jr.
President

Pasquale Ciaramella
Executive Director

70 School Street
Brockton, MA 02301-4097

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August 2, 2010

Mr. Eldon F. Moreira, Chairman
West Bridgewater Board of Selectmen
65 North Main Street
West Bridgewater, MA 02379

Re: Walnut Street Traffic Speed Study

Dear Chairman Moreira,

Per the Town's request through the Old Colony Planning Council's Local Highway Transportation Planning Technical Assistance Program, OCPC has completed a traffic speed study of Walnut Street, in the area of the proposed Walnut Grove development, west of Route 24. In its request letter, the Town indicated their desire for a posted 20 MPH speed limit in the vicinity of a proposed development, particularly around a sharp bend in the roadway just east of Route 24.

The following table summarizes the traffic data collected on Walnut Street in this area. Traffic volume is rather light in this area, and the 85th percentile speed of traffic ranges between 42 and 44 miles per hour between the two count locations and directions of travel.

Table 1: Summary of Recorded Traffic Data along Walnut Street

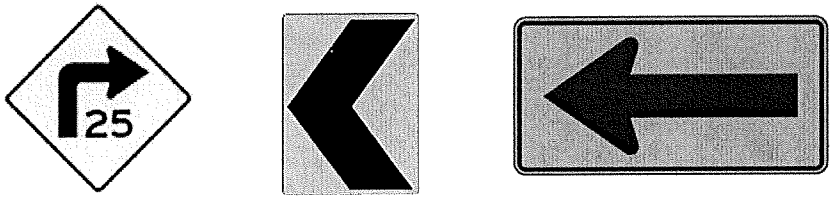
DATE	LOCATION	ADT	Average Speed	85% Speed	10 MPH Pace Speed	% Heavy Vehicles
4/29/2009	**Walnut Street, East of Route 24**					
	Eastbound	733	36 MPH	42 MPH	31 - 40 MPH	5.9%
	Westbound	844	38 MPH	44 MPH	36 - 45 MPH	10.9%
	Total	1,577	37 MPH	44 MPH	31 - 40 MPH	8.6%
4/29/2009	**Walnut Street, east of Manley Street**					
	Eastbound	755	37 MPH	44 MPH	31 - 40 MPH	8.4%
	Westbound	854	37 MPH	43 MPH	31 - 40 MPH	11.8%
	Total	1,609	37 MPH	43 MPH	31 - 40 MPH	10.2%

In Massachusetts, posted speed limits are largely based on the 85th percentile speed of traffic using the roadway, as speed limits are legally required to be reasonable and self-regulating (specific information on speed limits and speed limit setting is enclosed). Therefore, it is unlikely the Massachusetts Department of Transportation would approve a posted 20 MPH speed limit in this area. However, advisory speed signs with yellow backgrounds are advisory and can be posted along a roadway without approval of the State. While these signs are non-enforceable, they can serve a purpose of alerting drivers to a situation (i.e. a sharp curve, a densely populated development, etc) that demands their attention and advises lowering their travel speed.

A review of MassDOT crash data from 2006 through 2008 revealed 12 reported crashes along Walnut Street in West Bridgewater: 2 west of Manley Street; 5 at the intersection of Walnut Street and Manley Street; and 5 east of Manley Street. Figure 1 indicates the location of these crashes. The five crashes east of Manley Street equal a corridor crash rate of 2.23 crashes per million vehicle miles traveled (VMT), below the 2008 Massachusetts average of 4.12 per million VMT for roadways classified as Urban Collectors. The crash rate calculation worksheet is included with this letter.

Old Colony Planning Council recommends enhancing awareness and visibility of the curve on Walnut Street with:

- MUTCD-Compliant Retroreflective Warning Signs, such as Sign W1-1a, W1-8, and W1-6 (pictured)



- Highly visible painted fog lines on roadway edges extending throughout curve
- Sight distance improvements through vegetative clearing

Included with this letter, for the Town's consideration, is guidance on retroreflectivity, as well as suggested low const non-intersection safety fixes from the Massachusetts Traffic Safety Toolbox. Furthermore, it is recommended that traffic data and crash data along Walnut Street be monitored over time, and improvements/mitigation implemented as conditions warrant. Finally, any development along Walnut Street should be mitigated with the installation of sidewalks to enhance mobility, maximize safety, and incorporate all roadway users.

Should you have any questions regarding this analysis or require further assistance, please contact Bill McNulty at wmcnulty@ocpcrpa.org or at (508) 583-1833 x207.

Sincerely,

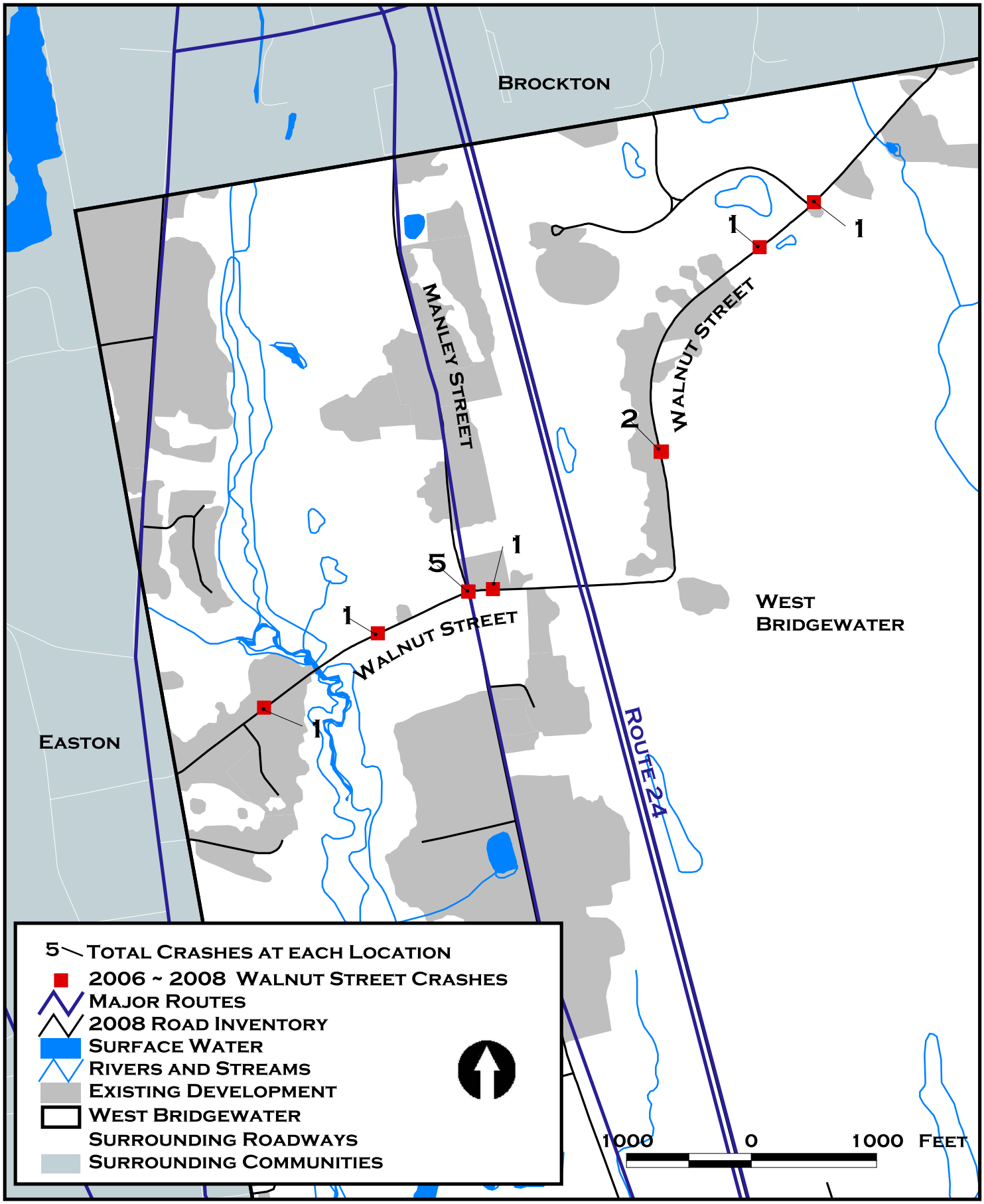
Charles Kilmer
Transportation Program Manager

Cc:
Chief Donald Clark, Police Chief, West Bridgewater Police Department
Mr. Leonard W. Graf, III, Superintendent, West Bridgewater Highway Department
Ms. Elizabeth D. Faricy, Town Administrator, Town of West Bridgewater
Ms. Pamela Haznar, P.E., Project Development Engineer, MassDOT District 5
Mr. Hugh Hurley, Chairman, West Bridgewater Planning Board
Mr. Paul Maloney, P.E., Transportation Planning Engineer, FHWA
Mr. Trey Wadsworth, MPO Liaison, MassDOT Office of Transportation Planning

Enclosures:
Figure 1: Location of Reported Crashes along Walnut Street, West Bridgewater
ATR (Volume, Speed, and Classification) Data for Walnut Street
Crash Rate Calculation Worksheet (MassDOT)
MassDOT Average Crash Rates
2009 MUTCD Chapter 2C – Warning Signs
Massachusetts Traffic Safety Toolbox: Retroreflectivity
Massachusetts Traffic Safety Toolbox: Low Cost Non-Intersection Safety Fixes
Massachusetts Traffic Safety Toolbox: Speed Limits and Speed Limit Setting
Letter of Request

Crashes along Walnut Street, 2006 ~ 2008

Figure 1



Old Colony Planning Council, 70 School Street, Brockton, MA 02301
GIS Data: MassGIS, MassDOT, OCPC

February 17, 2010

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #10
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Manley St

Start	27-Apr-09		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	*	*	*	*	12	1	7	2	*	*	*	*	*	*	10	2
01:00	*	*	*	*	0	1	1	1	*	*	*	*	*	*	0	1
02:00	*	*	*	*	0	0	1	2	*	*	*	*	*	*	0	1
03:00	*	*	*	*	1	4	2	6	*	*	*	*	*	*	2	5
04:00	*	*	*	*	1	9	1	5	*	*	*	*	*	*	1	7
05:00	*	*	*	*	5	21	11	20	*	*	*	*	*	*	8	20
06:00	*	*	*	*	19	54	15	44	*	*	*	*	*	*	17	49
07:00	*	*	*	*	**57**	**86**	**60**	**90**	*	*	*	*	*	*	**58**	**88**
08:00	*	*	*	*	40	64	44	52	*	*	*	*	*	*	42	58
09:00	*	*	*	*	27	37	31	45	*	*	*	*	*	*	29	41
10:00	*	*	*	*	29	35	30	43	*	*	*	*	*	*	30	39
11:00	*	*	*	*	43	44	29	56	*	*	*	*	*	*	36	50
12:00 PM	*	*	*	*	43	58	49	46	*	*	*	*	*	*	46	52
01:00	*	*	*	*	45	48	43	58	*	*	*	*	*	*	44	53
02:00	*	*	*	*	57	32	55	55	*	*	*	*	*	*	56	44
03:00	*	*	*	*	85	87	74	65	*	*	*	*	*	*	80	76
04:00	*	*	*	*	**90**	**91**	**82**	**79**	*	*	*	*	*	*	**86**	**85**
05:00	*	*	*	*	59	54	64	64	*	*	*	*	*	*	62	59
06:00	*	*	*	*	51	46	57	47	*	*	*	*	*	*	54	46
07:00	*	*	*	*	39	31	29	22	*	*	*	*	*	*	34	26
08:00	*	*	*	*	27	22	21	22	*	*	*	*	*	*	24	22
09:00	*	*	*	*	15	13	22	16	*	*	*	*	*	*	18	14
10:00	*	*	*	*	13	12	8	10	*	*	*	*	*	*	10	11
11:00	*	*	*	*	5	6	10	4	*	*	*	*	*	*	8	5
Total	0	0	0	0	763	856	746	854	0	0	0	0	0	0	755	854
Day	0		0		1619		1600		0		0		0		1609	
AM Peak					07:00	07:00	07:00	07:00							07:00	07:00
Vol.					57	86	60	90							58	88
PM Peak					16:00	16:00	16:00	16:00							16:00	16:00
Vol.					90	91	82	79							86	85

Comb. Total	0	0	1619	1600	0	0	0	1609

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Brockton, MA 02301
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Recorder #: Jamar #10
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Manley St

Start Time	27-Apr-09 Mon	28-Apr-09 Tue	29-Apr-09 Wed	30-Apr-09 Thu	01-May-09 Fri	02-May-09 Sat	03-May-09 Sun	Week Average
12:00 AM	*	*	13	9	*	*	*	11
01:00	*	*	1	2	*	*	*	2
02:00	*	*	0	3	*	*	*	2
03:00	*	*	5	8	*	*	*	6
04:00	*	*	10	6	*	*	*	8
05:00	*	*	26	31	*	*	*	28
06:00	*	*	73	59	*	*	*	66
07:00	*	*	**143**	**150**	*	*	*	**146**
08:00	*	*	104	96	*	*	*	100
09:00	*	*	64	76	*	*	*	70
10:00	*	*	64	73	*	*	*	68
11:00	*	*	87	85	*	*	*	86
12:00 PM	*	*	101	95	*	*	*	98
01:00	*	*	93	101	*	*	*	97
02:00	*	*	89	110	*	*	*	100
03:00	*	*	172	139	*	*	*	156
04:00	*	*	**181**	**161**	*	*	*	**171**
05:00	*	*	113	128	*	*	*	120
06:00	*	*	97	104	*	*	*	100
07:00	*	*	70	51	*	*	*	60
08:00	*	*	49	43	*	*	*	46
09:00	*	*	28	38	*	*	*	33
10:00	*	*	25	18	*	*	*	22
11:00	*	*	11	14	*	*	*	12
Total	0	0	1619	1600	0	0	0	1608
Percentage	0.0%	0.0%	100.7%	99.5%	0.0%	0.0%	0.0%	
AM Peak			07:00	07:00				07:00
Vol.			143	150				146
PM Peak			16:00	16:00				16:00
Vol.			181	161				171

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Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Manley St

EB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
04/29/09	0	0	0	1	2	3	4	0	2	0	0	0	0	0	12
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
04:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
05:00	0	0	0	0	2	1	1	0	1	0	0	0	0	0	5
06:00	0	0	1	2	3	9	4	0	0	0	0	0	0	0	19
07:00	0	1	1	4	14	18	13	4	2	0	0	0	0	0	57
08:00	0	0	0	2	16	13	4	2	2	1	0	0	0	0	40
09:00	0	0	0	2	8	5	10	2	0	0	0	0	0	0	27
10:00	0	0	1	7	4	8	8	1	0	0	0	0	0	0	29
11:00	0	0	0	5	10	14	11	2	1	0	0	0	0	0	43
12 PM	2	0	0	2	11	22	5	0	0	1	0	0	0	0	43
13:00	0	0	1	9	13	10	7	4	0	1	0	0	0	0	45
14:00	0	0	0	3	22	24	5	3	0	0	0	0	0	0	57
15:00	4	0	0	5	24	35	15	2	0	0	0	0	0	0	85
16:00	1	0	1	7	27	27	23	2	2	0	0	0	0	0	90
17:00	0	0	0	0	13	31	11	2	2	0	0	0	0	0	59
18:00	2	0	0	2	9	25	8	4	1	0	0	0	0	0	51
19:00	0	0	1	4	10	13	8	3	0	0	0	0	0	0	39
20:00	0	0	1	2	7	12	3	2	0	0	0	0	0	0	27
21:00	0	0	1	2	5	3	3	1	0	0	0	0	0	0	15
22:00	0	0	0	0	3	5	3	1	0	1	0	0	0	0	13
23:00	0	0	0	1	3	0	0	1	0	0	0	0	0	0	5
Total	9	1	8	60	206	278	148	36	13	4	0	0	0	0	763

Daily

15th Percentile :	31 MPH
50th Percentile :	37 MPH
85th Percentile :	43 MPH
95th Percentile :	47 MPH
Mean Speed(Average) :	37 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	484
Percent in Pace :	63.4%
Number of Vehicles > 30 MPH :	685
Percent of Vehicles > 30 MPH :	89.8%

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Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Manley St

EB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
04/30/09	0	0	0	2	1	2	2	0	0	0	0	0	0	0	7
01:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
03:00	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
04:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
05:00	0	0	0	1	2	6	1	1	0	0	0	0	0	0	11
06:00	0	0	0	0	3	7	5	0	0	0	0	0	0	0	15
07:00	2	0	0	3	15	21	12	5	2	0	0	0	0	0	60
08:00	0	0	1	0	10	14	13	3	2	1	0	0	0	0	44
09:00	0	0	0	4	11	13	3	0	0	0	0	0	0	0	31
10:00	0	0	0	3	5	17	1	2	2	0	0	0	0	0	30
11:00	1	0	0	1	13	8	5	1	0	0	0	0	0	0	29
12 PM	1	0	2	4	16	13	7	4	1	1	0	0	0	0	49
13:00	1	0	0	6	9	11	12	3	1	0	0	0	0	0	43
14:00	0	0	2	2	17	17	14	2	1	0	0	0	0	0	55
15:00	0	0	2	2	21	32	13	2	2	0	0	0	0	0	74
16:00	0	0	0	2	26	28	22	2	2	0	0	0	0	0	82
17:00	0	0	0	3	18	23	12	5	3	0	0	0	0	0	64
18:00	2	0	1	1	12	22	14	4	1	0	0	0	0	0	57
19:00	0	0	0	0	11	8	10	0	0	0	0	0	0	0	29
20:00	0	0	1	2	6	9	3	0	0	0	0	0	0	0	21
21:00	0	0	0	1	7	6	7	1	0	0	0	0	0	0	22
22:00	0	0	0	2	4	2	0	0	0	0	0	0	0	0	8
23:00	1	0	0	3	2	2	1	0	0	1	0	0	0	0	10
Total	8	0	9	42	210	262	158	37	17	3	0	0	0	0	746

Daily

15th Percentile :	32 MPH
50th Percentile :	37 MPH
85th Percentile :	44 MPH
95th Percentile :	48 MPH
Mean Speed(Average) :	37 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	472
Percent in Pace :	63.3%
Number of Vehicles > 30 MPH :	687
Percent of Vehicles > 30 MPH :	92.1%

Grand Total	17	1	17	102	416	540	306	73	30	7	0	0	0	0	1509

Overall

15th Percentile :	32 MPH
50th Percentile :	37 MPH
85th Percentile :	44 MPH
95th Percentile :	48 MPH
Mean Speed(Average) :	37 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	956
Percent in Pace :	63.4%
Number of Vehicles > 30 MPH :	1372
Percent of Vehicles > 30 MPH :	90.9%

Old Colony Planning Council
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Brockton, MA 02301
508-583-1833

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Station ID:
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Date Start: 29-Apr-09
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Walnut St, east of Manley St

WB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
04/29/09	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
01:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	2	1	1	0	0	0	0	0	0	4
04:00	0	0	0	1	4	0	3	1	0	0	0	0	0	0	9
05:00	0	0	1	1	5	7	4	3	0	0	0	0	0	0	21
06:00	0	0	0	5	18	22	7	2	0	0	0	0	0	0	54
07:00	1	0	0	5	29	30	17	3	1	0	0	0	0	0	86
08:00	0	0	0	3	19	27	9	5	1	0	0	0	0	0	64
09:00	0	0	0	3	14	11	9	0	0	0	0	0	0	0	37
10:00	0	0	1	1	11	15	6	1	0	0	0	0	0	0	35
11:00	0	1	2	2	12	19	8	0	0	0	0	0	0	0	44
12 PM	0	0	0	3	17	24	11	2	1	0	0	0	0	0	58
13:00	0	0	0	4	15	18	10	1	0	0	0	0	0	0	48
14:00	0	0	0	4	10	9	6	3	0	0	0	0	0	0	32
15:00	2	0	1	7	26	37	9	4	1	0	0	0	0	0	87
16:00	4	0	3	3	18	33	23	4	1	2	0	0	0	0	91
17:00	0	0	0	0	10	27	8	7	2	0	0	0	0	0	54
18:00	1	1	1	5	11	20	6	1	0	0	0	0	0	0	46
19:00	1	0	0	2	7	11	6	4	0	0	0	0	0	0	31
20:00	0	0	0	2	10	7	2	1	0	0	0	0	0	0	22
21:00	0	0	0	2	5	6	0	0	0	0	0	0	0	0	13
22:00	0	0	0	0	6	1	3	2	0	0	0	0	0	0	12
23:00	0	0	0	0	2	4	0	0	0	0	0	0	0	0	6
Total	9	2	9	53	249	331	148	46	7	2	0	0	0	0	856

Daily

15th Percentile :	32 MPH
50th Percentile :	37 MPH
85th Percentile :	43 MPH
95th Percentile :	47 MPH
Mean Speed(Average) :	37 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	580
Percent in Pace :	67.8%
Number of Vehicles > 30 MPH :	783
Percent of Vehicles > 30 MPH :	91.5%

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Walnut St, east of Manley St

WB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
04/30/09	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2
01:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
03:00	0	0	0	0	1	2	3	0	0	0	0	0	0	0	6
04:00	0	0	0	0	2	1	2	0	0	0	0	0	0	0	5
05:00	0	0	0	1	7	6	4	2	0	0	0	0	0	0	20
06:00	1	0	0	2	12	19	9	1	0	0	0	0	0	0	44
07:00	1	0	3	8	24	29	16	6	2	0	1	0	0	0	90
08:00	1	0	1	1	19	15	9	4	1	1	0	0	0	0	52
09:00	0	0	2	1	15	19	6	2	0	0	0	0	0	0	45
10:00	0	1	2	2	16	16	3	2	1	0	0	0	0	0	43
11:00	2	0	2	6	15	19	8	4	0	0	0	0	0	0	56
12 PM	0	0	1	3	13	14	13	1	1	0	0	0	0	0	46
13:00	1	0	0	4	16	20	12	4	1	0	0	0	0	0	58
14:00	0	0	0	3	16	15	14	7	0	0	0	0	0	0	55
15:00	1	0	1	3	19	21	14	3	2	1	0	0	0	0	65
16:00	0	0	1	3	20	29	19	6	1	0	0	0	0	0	79
17:00	0	0	1	3	20	21	12	7	0	0	0	0	0	0	64
18:00	0	0	0	2	8	19	15	2	1	0	0	0	0	0	47
19:00	0	0	0	1	5	8	7	0	1	0	0	0	0	0	22
20:00	0	0	0	0	9	8	5	0	0	0	0	0	0	0	22
21:00	0	0	1	2	6	6	1	0	0	0	0	0	0	0	16
22:00	0	0	0	0	3	4	1	0	2	0	0	0	0	0	10
23:00	0	0	2	1	1	0	0	0	0	0	0	0	0	0	4
Total	7	1	17	46	249	293	174	51	13	2	1	0	0	0	854

Daily

15th Percentile :	32 MPH
50th Percentile :	37 MPH
85th Percentile :	44 MPH
95th Percentile :	48 MPH
Mean Speed(Average) :	37 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	542
Percent in Pace :	63.5%
Number of Vehicles > 30 MPH :	783
Percent of Vehicles > 30 MPH :	91.7%

Grand Total	16	3	26	99	498	624	322	97	20	4	1	0	0	0	1710

Overall

15th Percentile :	32 MPH
50th Percentile :	37 MPH
85th Percentile :	43 MPH
95th Percentile :	47 MPH
Mean Speed(Average) :	37 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	1122
Percent in Pace :	65.6%
Number of Vehicles > 30 MPH :	1566
Percent of Vehicles > 30 MPH :	91.6%

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #10
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Manley St

EB, WB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
04/29/09	0	0	0	1	2	3	4	1	2	0	0	0	0	0	13
01:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	2	2	1	0	0	0	0	0	0	5
04:00	0	0	0	1	4	0	4	1	0	0	0	0	0	0	10
05:00	0	0	1	1	7	8	5	3	1	0	0	0	0	0	26
06:00	0	0	1	7	21	31	11	2	0	0	0	0	0	0	73
07:00	1	1	1	9	43	48	30	7	3	0	0	0	0	0	143
08:00	0	0	0	5	35	40	13	7	3	1	0	0	0	0	104
09:00	0	0	0	5	22	16	19	2	0	0	0	0	0	0	64
10:00	0	0	2	8	15	23	14	2	0	0	0	0	0	0	64
11:00	0	1	2	7	22	33	19	2	1	0	0	0	0	0	87
12 PM	2	0	0	5	28	46	16	2	1	1	0	0	0	0	101
13:00	0	0	1	13	28	28	17	5	0	1	0	0	0	0	93
14:00	0	0	0	7	32	33	11	6	0	0	0	0	0	0	89
15:00	6	0	1	12	50	72	24	6	1	0	0	0	0	0	172
16:00	5	0	4	10	45	60	46	6	3	2	0	0	0	0	181
17:00	0	0	0	0	23	58	19	9	4	0	0	0	0	0	113
18:00	3	1	1	7	20	45	14	5	1	0	0	0	0	0	97
19:00	1	0	1	6	17	24	14	7	0	0	0	0	0	0	70
20:00	0	0	1	4	17	19	5	3	0	0	0	0	0	0	49
21:00	0	0	1	4	10	9	3	1	0	0	0	0	0	0	28
22:00	0	0	0	0	9	6	6	3	0	1	0	0	0	0	25
23:00	0	0	0	1	5	4	0	1	0	0	0	0	0	0	11
Total	18	3	17	113	455	609	296	82	20	6	0	0	0	0	1619

Daily

15th Percentile :	32 MPH
50th Percentile :	37 MPH
85th Percentile :	43 MPH
95th Percentile :	47 MPH
Mean Speed(Average) :	37 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	1064
Percent in Pace :	65.7%
Number of Vehicles > 30 MPH :	1468
Percent of Vehicles > 30 MPH :	90.7%

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #10
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Manley St

EB, WB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
04/30/09	0	0	0	2	2	2	3	0	0	0	0	0	0	0	9
01:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
02:00	0	0	0	0	1	1	0	1	0	0	0	0	0	0	3
03:00	0	0	0	0	1	3	4	0	0	0	0	0	0	0	8
04:00	0	0	0	0	2	1	2	1	0	0	0	0	0	0	6
05:00	0	0	0	2	9	12	5	3	0	0	0	0	0	0	31
06:00	1	0	0	2	15	26	14	1	0	0	0	0	0	0	59
07:00	3	0	3	11	39	50	28	11	4	0	1	0	0	0	150
08:00	1	0	2	1	29	29	22	7	3	2	0	0	0	0	96
09:00	0	0	2	5	26	32	9	2	0	0	0	0	0	0	76
10:00	0	1	2	5	21	33	4	4	3	0	0	0	0	0	73
11:00	3	0	2	7	28	27	13	5	0	0	0	0	0	0	85
12 PM	1	0	3	7	29	27	20	5	2	1	0	0	0	0	95
13:00	2	0	0	10	25	31	24	7	2	0	0	0	0	0	101
14:00	0	0	2	5	33	32	28	9	1	0	0	0	0	0	110
15:00	1	0	3	5	40	53	27	5	4	1	0	0	0	0	139
16:00	0	0	1	5	46	57	41	8	3	0	0	0	0	0	161
17:00	0	0	1	6	38	44	24	12	3	0	0	0	0	0	128
18:00	2	0	1	3	20	41	29	6	2	0	0	0	0	0	104
19:00	0	0	0	1	16	16	17	0	1	0	0	0	0	0	51
20:00	0	0	1	2	15	17	8	0	0	0	0	0	0	0	43
21:00	0	0	1	3	13	12	8	1	0	0	0	0	0	0	38
22:00	0	0	0	2	7	6	1	0	2	0	0	0	0	0	18
23:00	1	0	2	4	3	2	1	0	0	1	0	0	0	0	14
Total	15	1	26	88	459	555	332	88	30	5	1	0	0	0	1600

Daily

15th Percentile :	32 MPH
50th Percentile :	37 MPH
85th Percentile :	44 MPH
95th Percentile :	48 MPH
Mean Speed(Average) :	37 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	1014
Percent in Pace :	63.4%
Number of Vehicles > 30 MPH :	1470
Percent of Vehicles > 30 MPH :	91.9%

Grand Total	33	4	43	201	914	1164	628	170	50	11	1	0	0	0	3219

Overall

15th Percentile :	32 MPH
50th Percentile :	37 MPH
85th Percentile :	43 MPH
95th Percentile :	48 MPH
Mean Speed(Average) :	37 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	2078
Percent in Pace :	64.6%
Number of Vehicles > 30 MPH :	2938
Percent of Vehicles > 30 MPH :	91.3%

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #10
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Manley St

EB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total	Truck Total
04/29/09	0	9	3	0	0	0	0	0	0	0	0	0	0	12	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
04:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
05:00	0	5	0	0	0	0	0	0	0	0	0	0	0	5	0
06:00	0	11	4	1	1	2	0	0	0	0	0	0	0	19	4
07:00	0	33	22	0	2	0	0	0	0	0	0	0	0	57	2
08:00	0	21	14	0	5	0	0	0	0	0	0	0	0	40	5
09:00	0	21	5	0	1	0	0	0	0	0	0	0	0	27	1
10:00	0	17	9	0	3	0	0	0	0	0	0	0	0	29	3
11:00	0	26	12	0	2	1	0	0	2	0	0	0	0	43	5
12 PM	0	29	11	0	3	0	0	0	0	0	0	0	0	43	3
13:00	1	22	17	0	2	2	0	1	0	0	0	0	0	45	5
14:00	0	39	11	1	6	0	0	0	0	0	0	0	0	57	7
15:00	2	56	20	1	5	0	0	0	1	0	0	0	0	85	7
16:00	1	64	22	1	2	0	0	0	0	0	0	0	0	90	3
17:00	1	33	23	0	2	0	0	0	0	0	0	0	0	59	2
18:00	0	34	14	1	2	0	0	0	0	0	0	0	0	51	3
19:00	0	26	11	0	2	0	0	0	0	0	0	0	0	39	2
20:00	0	19	6	0	2	0	0	0	0	0	0	0	0	27	2
21:00	0	10	4	0	0	1	0	0	0	0	0	0	0	15	1
22:00	0	9	3	0	1	0	0	0	0	0	0	0	0	13	1
23:00	0	4	1	0	0	0	0	0	0	0	0	0	0	5	0
Total	5	490	212	5	41	6	0	1	3	0	0	0	0	763	56
Percent	0.7%	64.2%	27.8%	0.7%	5.4%	0.8%	0.0%	0.1%	0.4%	0.0%	0.0%	0.0%	0.0%		7.3%
AM Peak		07:00	07:00	06:00	08:00	06:00			11:00					07:00	08:00
Vol.		33	22	1	5	2			2					57	5
PM Peak	15:00	16:00	17:00	14:00	14:00	13:00		13:00	15:00					16:00	14:00
Vol.	2	64	23	1	6	2		1	1					90	7

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #10
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Manley St

EB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total	Truck Total
04/30/09	0	4	2	1	0	0	0	0	0	0	0	0	0	7	1
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
03:00	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0
04:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
05:00	0	4	5	2	0	0	0	0	0	0	0	0	0	11	2
06:00	0	12	3	0	0	0	0	0	0	0	0	0	0	15	0
07:00	0	36	20	1	3	0	0	0	0	0	0	0	0	60	4
08:00	0	25	14	0	4	0	0	1	0	0	0	0	0	44	5
09:00	1	12	11	0	5	1	0	0	1	0	0	0	0	31	7
10:00	0	16	12	0	1	1	0	0	0	0	0	0	0	30	2
11:00	0	17	7	1	3	1	0	0	0	0	0	0	0	29	5
12 PM	0	29	15	0	5	0	0	0	0	0	0	0	0	49	5
13:00	0	29	10	0	3	1	0	0	0	0	0	0	0	43	4
14:00	0	37	12	1	5	0	0	0	0	0	0	0	0	55	6
15:00	1	46	19	1	5	1	0	0	1	0	0	0	0	74	8
16:00	2	57	20	1	1	0	0	1	0	0	0	0	0	82	3
17:00	0	43	14	0	6	1	0	0	0	0	0	0	0	64	7
18:00	0	35	19	0	3	0	0	0	0	0	0	0	0	57	3
19:00	1	17	7	0	4	0	0	0	0	0	0	0	0	29	4
20:00	0	11	8	0	1	0	0	1	0	0	0	0	0	21	2
21:00	0	20	0	0	2	0	0	0	0	0	0	0	0	22	2
22:00	0	8	0	0	0	0	0	0	0	0	0	0	0	8	0
23:00	0	6	3	0	1	0	0	0	0	0	0	0	0	10	1
Total	5	467	203	8	52	6	0	3	2	0	0	0	0	746	71
Percent	0.7%	62.6%	27.2%	1.1%	7.0%	0.8%	0.0%	0.4%	0.3%	0.0%	0.0%	0.0%	0.0%		9.5%
AM Peak	09:00	07:00	07:00	05:00	09:00	09:00		08:00	09:00					07:00	09:00
Vol.	1	36	20	2	5	1		1	1					60	7
PM Peak	16:00	16:00	16:00	14:00	17:00	13:00		16:00	15:00					16:00	15:00
Vol.	2	57	20	1	6	1		1	1					82	8
Grand Total	10	957	415	13	93	12	0	4	5	0	0	0	0	1509	127
Percent	0.7%	63.4%	27.5%	0.9%	6.2%	0.8%	0.0%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%		8.4%

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #10
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Manley St

WB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total	Truck Total
04/29/09	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	2	2	0	0	0	0	0	0	0	0	0	0	4	0
04:00	0	6	2	0	1	0	0	0	0	0	0	0	0	9	1
05:00	0	16	4	0	1	0	0	0	0	0	0	0	0	21	1
06:00	0	37	7	1	7	1	0	1	0	0	0	0	0	54	10
07:00	1	58	19	3	4	1	0	0	0	0	0	0	0	86	8
08:00	0	43	13	1	6	1	0	0	0	0	0	0	0	64	8
09:00	0	27	4	0	6	0	0	0	0	0	0	0	0	37	6
10:00	0	24	9	0	1	1	0	0	0	0	0	0	0	35	2
11:00	0	26	12	1	3	1	0	0	1	0	0	0	0	44	6
12 PM	0	36	15	1	6	0	0	0	0	0	0	0	0	58	7
13:00	0	27	14	0	5	2	0	0	0	0	0	0	0	48	7
14:00	0	17	9	2	4	0	0	0	0	0	0	0	0	32	6
15:00	0	49	26	3	5	2	0	2	0	0	0	0	0	87	12
16:00	0	63	19	0	7	0	0	0	2	0	0	0	0	91	9
17:00	0	29	17	1	7	0	0	0	0	0	0	0	0	54	8
18:00	0	26	13	0	7	0	0	0	0	0	0	0	0	46	7
19:00	1	24	5	0	1	0	0	0	0	0	0	0	0	31	1
20:00	0	17	4	0	1	0	0	0	0	0	0	0	0	22	1
21:00	0	12	0	0	1	0	0	0	0	0	0	0	0	13	1
22:00	0	8	2	0	1	1	0	0	0	0	0	0	0	12	2
23:00	0	5	1	0	0	0	0	0	0	0	0	0	0	6	0
Total	2	554	197	13	74	10	0	3	3	0	0	0	0	856	103
Percent	0.2%	64.7%	23.0%	1.5%	8.6%	1.2%	0.0%	0.4%	0.4%	0.0%	0.0%	0.0%	0.0%		12.0%
AM Peak	07:00	07:00	07:00	07:00	06:00	06:00		06:00	11:00					07:00	06:00
Vol.	1	58	19	3	7	1		1	1					86	10
PM Peak	19:00	16:00	15:00	15:00	16:00	13:00		15:00	16:00					16:00	15:00
Vol.	1	63	26	3	7	2		2	2					91	12

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #10
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Manley St

WB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total	Truck Total
04/30/09	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0
01:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
02:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0
03:00	0	4	2	0	0	0	0	0	0	0	0	0	0	6	0
04:00	0	2	2	0	1	0	0	0	0	0	0	0	0	5	1
05:00	0	10	7	0	3	0	0	0	0	0	0	0	0	20	3
06:00	0	28	10	2	4	0	0	0	0	0	0	0	0	44	6
07:00	0	62	20	3	4	0	0	0	1	0	0	0	0	90	8
08:00	0	35	12	0	3	0	0	1	1	0	0	0	0	52	5
09:00	0	19	19	0	6	0	0	0	1	0	0	0	0	45	7
10:00	0	23	12	3	4	1	0	0	0	0	0	0	0	43	8
11:00	0	31	19	0	5	0	0	1	0	0	0	0	0	56	6
12 PM	0	31	10	0	4	1	0	0	0	0	0	0	0	46	5
13:00	0	36	16	0	5	1	0	0	0	0	0	0	0	58	6
14:00	0	39	7	2	7	0	0	0	0	0	0	0	0	55	9
15:00	2	39	15	5	2	2	0	0	0	0	0	0	0	65	9
16:00	0	43	24	4	8	0	0	0	0	0	0	0	0	79	12
17:00	0	44	15	1	3	1	0	0	0	0	0	0	0	64	5
18:00	1	31	11	0	4	0	0	0	0	0	0	0	0	47	4
19:00	0	18	2	0	2	0	0	0	0	0	0	0	0	22	2
20:00	0	16	3	2	1	0	0	0	0	0	0	0	0	22	3
21:00	0	14	2	0	0	0	0	0	0	0	0	0	0	16	0
22:00	0	9	1	0	0	0	0	0	0	0	0	0	0	10	0
23:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4	0
Total	3	542	210	22	66	6	0	2	3	0	0	0	0	854	99
Percent	0.4%	63.5%	24.6%	2.6%	7.7%	0.7%	0.0%	0.2%	0.4%	0.0%	0.0%	0.0%	0.0%		11.6%
AM Peak		07:00	07:00	07:00	09:00	10:00		08:00	07:00					07:00	07:00
Vol.		62	20	3	6	1		1	1					90	8
PM Peak	15:00	17:00	16:00	15:00	16:00	15:00								16:00	16:00
Vol.	2	44	24	5	8	2								79	12
Grand Total	5	1096	407	35	140	16	0	5	6	0	0	0	0	1710	202
Percent	0.3%	64.1%	23.8%	2.0%	8.2%	0.9%	0.0%	0.3%	0.4%	0.0%	0.0%	0.0%	0.0%		11.8%

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #10
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Manley St

EB, WB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total	Truck Total
04/29/09	0	10	3	0	0	0	0	0	0	0	0	0	0	13	0
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	3	2	0	0	0	0	0	0	0	0	0	0	5	0
04:00	0	7	2	0	1	0	0	0	0	0	0	0	0	10	1
05:00	0	21	4	0	1	0	0	0	0	0	0	0	0	26	1
06:00	0	48	11	2	8	3	0	1	0	0	0	0	0	73	14
07:00	1	91	41	3	6	1	0	0	0	0	0	0	0	143	10
08:00	0	64	27	1	11	1	0	0	0	0	0	0	0	104	13
09:00	0	48	9	0	7	0	0	0	0	0	0	0	0	64	7
10:00	0	41	18	0	4	1	0	0	0	0	0	0	0	64	5
11:00	0	52	24	1	5	2	0	0	3	0	0	0	0	87	11
12 PM	0	65	26	1	9	0	0	0	0	0	0	0	0	101	10
13:00	1	49	31	0	7	4	0	1	0	0	0	0	0	93	12
14:00	0	56	20	3	10	0	0	0	0	0	0	0	0	89	13
15:00	2	105	46	4	10	2	0	2	1	0	0	0	0	172	19
16:00	1	127	41	1	9	0	0	0	2	0	0	0	0	181	12
17:00	1	62	40	1	9	0	0	0	0	0	0	0	0	113	10
18:00	0	60	27	1	9	0	0	0	0	0	0	0	0	97	10
19:00	1	50	16	0	3	0	0	0	0	0	0	0	0	70	3
20:00	0	36	10	0	3	0	0	0	0	0	0	0	0	49	3
21:00	0	22	4	0	1	1	0	0	0	0	0	0	0	28	2
22:00	0	17	5	0	2	1	0	0	0	0	0	0	0	25	3
23:00	0	9	2	0	0	0	0	0	0	0	0	0	0	11	0
Total	7	1044	409	18	115	16	0	4	6	0	0	0	0	1619	159
Percent	0.4%	64.5%	25.3%	1.1%	7.1%	1.0%	0.0%	0.2%	0.4%	0.0%	0.0%	0.0%	0.0%		9.8%
AM Peak	07:00	07:00	07:00	07:00	08:00	06:00		06:00	11:00					07:00	06:00
Vol.	1	91	41	3	11	3		1	3					143	14
PM Peak	15:00	16:00	15:00	15:00	14:00	13:00		15:00	16:00					16:00	15:00
Vol.	2	127	46	4	10	4		2	2					181	19

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #10
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Manley St

EB, WB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total	Truck Total
04/30/09	0	6	2	1	0	0	0	0	0	0	0	0	0	9	1
01:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2	0
02:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0
03:00	0	4	4	0	0	0	0	0	0	0	0	0	0	8	0
04:00	0	3	2	0	1	0	0	0	0	0	0	0	0	6	1
05:00	0	14	12	2	3	0	0	0	0	0	0	0	0	31	5
06:00	0	40	13	2	4	0	0	0	0	0	0	0	0	59	6
07:00	0	98	40	4	7	0	0	0	1	0	0	0	0	150	12
08:00	0	60	26	0	7	0	0	2	1	0	0	0	0	96	10
09:00	1	31	30	0	11	1	0	0	2	0	0	0	0	76	14
10:00	0	39	24	3	5	2	0	0	0	0	0	0	0	73	10
11:00	0	48	26	1	8	1	0	1	0	0	0	0	0	85	11
12 PM	0	60	25	0	9	1	0	0	0	0	0	0	0	95	10
13:00	0	65	26	0	8	2	0	0	0	0	0	0	0	101	10
14:00	0	76	19	3	12	0	0	0	0	0	0	0	0	110	15
15:00	3	85	34	6	7	3	0	0	1	0	0	0	0	139	17
16:00	2	100	44	5	9	0	0	1	0	0	0	0	0	161	15
17:00	0	87	29	1	9	2	0	0	0	0	0	0	0	128	12
18:00	1	66	30	0	7	0	0	0	0	0	0	0	0	104	7
19:00	1	35	9	0	6	0	0	0	0	0	0	0	0	51	6
20:00	0	27	11	2	2	0	0	1	0	0	0	0	0	43	5
21:00	0	34	2	0	2	0	0	0	0	0	0	0	0	38	2
22:00	0	17	1	0	0	0	0	0	0	0	0	0	0	18	0
23:00	0	10	3	0	1	0	0	0	0	0	0	0	0	14	1
Total	8	1009	413	30	118	12	0	5	5	0	0	0	0	1600	170
Percent	0.5%	63.1%	25.8%	1.9%	7.4%	0.8%	0.0%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%		10.6%
AM Peak	09:00	07:00	07:00	07:00	09:00	10:00		08:00	09:00					07:00	09:00
Vol.	1	98	40	4	11	2		2	2					150	14
PM Peak	15:00	16:00	16:00	15:00	14:00	15:00		16:00	15:00					16:00	15:00
Vol.	3	100	44	6	12	3		1	1					161	17
Grand Total	15	2053	822	48	233	28	0	9	11	0	0	0	0	3219	329
Percent	0.5%	63.8%	25.5%	1.5%	7.2%	0.9%	0.0%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%		10.2%

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #12
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Amvets Mem Hwy (24)

Start	27-Apr-09		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB
12:00 AM	*	*	*	*	1	11	1	7	*	*	*	*	*	*	1	9
01:00	*	*	*	*	1	0	1	1	*	*	*	*	*	*	1	0
02:00	*	*	*	*	0	0	2	1	*	*	*	*	*	*	1	0
03:00	*	*	*	*	4	1	5	1	*	*	*	*	*	*	4	1
04:00	*	*	*	*	9	1	5	1	*	*	*	*	*	*	7	1
05:00	*	*	*	*	22	5	22	12	*	*	*	*	*	*	22	8
06:00	*	*	*	*	53	21	44	16	*	*	*	*	*	*	48	18
07:00	*	*	*	*	**84**	**60**	**85**	**60**	*	*	*	*	*	*	**84**	**60**
08:00	*	*	*	*	58	35	48	42	*	*	*	*	*	*	53	38
09:00	*	*	*	*	36	26	42	24	*	*	*	*	*	*	39	25
10:00	*	*	*	*	33	30	39	27	*	*	*	*	*	*	36	28
11:00	*	*	*	*	43	43	54	32	*	*	*	*	*	*	48	38
12:00 PM	*	*	*	*	61	42	44	44	*	*	*	*	*	*	52	43
01:00	*	*	*	*	49	42	58	44	*	*	*	*	*	*	54	43
02:00	*	*	*	*	33	59	53	52	*	*	*	*	*	*	43	56
03:00	*	*	*	*	**88**	82	67	78	*	*	*	*	*	*	78	80
04:00	*	*	*	*	88	**87**	**84**	**82**	*	*	*	*	*	*	**86**	**84**
05:00	*	*	*	*	58	58	61	65	*	*	*	*	*	*	60	62
06:00	*	*	*	*	45	43	51	51	*	*	*	*	*	*	48	47
07:00	*	*	*	*	29	35	22	30	*	*	*	*	*	*	26	32
08:00	*	*	*	*	22	27	20	21	*	*	*	*	*	*	21	24
09:00	*	*	*	*	13	17	14	21	*	*	*	*	*	*	14	19
10:00	*	*	*	*	11	12	10	8	*	*	*	*	*	*	10	10
11:00	*	*	*	*	8	5	8	9	*	*	*	*	*	*	8	7
Total	0	0	0	0	849	742	840	729	0	0	0	0	0	0	844	733
Day	0		0		1591		1569		0		0		0		1577	
AM Peak					07:00	07:00	07:00	07:00							07:00	07:00
Vol.					84	60	85	60							84	60
PM Peak					15:00	16:00	16:00	16:00							16:00	16:00
Vol.					88	87	84	82							86	84

Comb. Total	0	0	1591	1569	0	0	0	1577

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #12
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Amvets Mem Hwy (24)

Start Time	27-Apr-09 Mon	28-Apr-09 Tue	29-Apr-09 Wed	30-Apr-09 Thu	01-May-09 Fri	02-May-09 Sat	03-May-09 Sun	Week Average
12:00 AM	*	*	12	8	*	*	*	10
01:00	*	*	1	2	*	*	*	2
02:00	*	*	0	3	*	*	*	2
03:00	*	*	5	6	*	*	*	6
04:00	*	*	10	6	*	*	*	8
05:00	*	*	27	34	*	*	*	30
06:00	*	*	74	60	*	*	*	67
07:00	*	*	**144**	**145**	*	*	*	**144**
08:00	*	*	93	90	*	*	*	92
09:00	*	*	62	66	*	*	*	64
10:00	*	*	63	66	*	*	*	64
11:00	*	*	86	86	*	*	*	86
12:00 PM	*	*	103	88	*	*	*	96
01:00	*	*	91	102	*	*	*	96
02:00	*	*	92	105	*	*	*	98
03:00	*	*	170	145	*	*	*	158
04:00	*	*	**175**	**166**	*	*	*	**170**
05:00	*	*	116	126	*	*	*	121
06:00	*	*	88	102	*	*	*	95
07:00	*	*	64	52	*	*	*	58
08:00	*	*	49	41	*	*	*	45
09:00	*	*	30	35	*	*	*	32
10:00	*	*	23	18	*	*	*	20
11:00	*	*	13	17	*	*	*	15
Total	0	0	1591	1569	0	0	0	1579
Percentage	0.0%	0.0%	100.8%	99.4%	0.0%	0.0%	0.0%	
AM Peak			07:00	07:00				07:00
Vol.			144	145				144
PM Peak			16:00	16:00				16:00
Vol.			175	166				170

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #12
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Amvets Mem Hwy (24)

WB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
04/29/09	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
01:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	2	1	1	0	0	0	0	0	4
04:00	0	0	0	0	2	3	3	1	0	0	0	0	0	0	9
05:00	0	0	0	1	3	11	4	2	1	0	0	0	0	0	22
06:00	2	1	0	2	10	18	15	5	0	0	0	0	0	0	53
07:00	0	0	2	4	9	38	21	7	3	0	0	0	0	0	84
08:00	1	0	0	1	3	22	22	7	2	0	0	0	0	0	58
09:00	0	2	0	4	8	8	11	3	0	0	0	0	0	0	36
10:00	1	0	1	1	1	18	9	2	0	0	0	0	0	0	33
11:00	0	1	3	2	5	17	15	0	0	0	0	0	0	0	43
12 PM	1	1	0	2	12	28	14	2	1	0	0	0	0	0	61
13:00	1	0	0	2	12	20	13	1	0	0	0	0	0	0	49
14:00	0	1	1	0	10	10	8	2	0	1	0	0	0	0	33
15:00	5	0	1	4	20	32	17	5	3	0	1	0	0	0	88
16:00	2	1	1	2	11	26	36	7	1	1	0	0	0	0	88
17:00	1	0	0	1	9	17	21	9	0	0	0	0	0	0	58
18:00	0	0	0	3	8	17	14	3	0	0	0	0	0	0	45
19:00	0	1	0	3	5	10	9	1	0	0	0	0	0	0	29
20:00	0	0	2	1	5	10	3	0	1	0	0	0	0	0	22
21:00	1	0	0	1	4	5	2	0	0	0	0	0	0	0	13
22:00	0	0	0	1	2	2	5	1	0	0	0	0	0	0	11
23:00	0	0	0	0	3	4	1	0	0	0	0	0	0	0	8
Total	15	8	11	35	142	317	246	59	13	2	1	0	0	0	849

Daily

15th Percentile :	33 MPH
50th Percentile :	39 MPH
85th Percentile :	44 MPH
95th Percentile :	48 MPH
Mean Speed(Average) :	38 MPH
10 MPH Pace Speed :	36-45 MPH
Number in Pace :	563
Percent in Pace :	66.3%
Number of Vehicles > 30 MPH :	780
Percent of Vehicles > 30 MPH :	91.9%

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #12
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Amvets Mem Hwy (24)

WB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
04/30/09	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
01:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
03:00	0	0	0	0	0	0	3	2	0	0	0	0	0	0	5
04:00	0	0	0	0	1	1	3	0	0	0	0	0	0	0	5
05:00	0	0	0	1	6	6	7	1	1	0	0	0	0	0	22
06:00	0	0	2	3	11	22	3	2	1	0	0	0	0	0	44
07:00	0	0	2	2	14	29	24	9	4	1	0	0	0	0	85
08:00	0	1	0	1	10	15	17	2	2	0	0	0	0	0	48
09:00	1	2	0	4	2	21	11	0	1	0	0	0	0	0	42
10:00	0	0	1	2	6	18	11	1	0	0	0	0	0	0	39
11:00	0	0	2	2	8	29	8	5	0	0	0	0	0	0	54
12 PM	2	0	2	3	9	13	9	6	0	0	0	0	0	0	44
13:00	2	0	2	6	8	24	16	0	0	0	0	0	0	0	58
14:00	1	1	2	5	7	16	16	4	1	0	0	0	0	0	53
15:00	4	1	0	2	12	26	19	3	0	0	0	0	0	0	67
16:00	1	0	1	2	16	30	25	7	2	0	0	0	0	0	84
17:00	1	1	0	1	9	26	14	7	1	1	0	0	0	0	61
18:00	0	1	0	3	3	20	14	7	2	1	0	0	0	0	51
19:00	0	1	1	1	2	11	5	1	0	0	0	0	0	0	22
20:00	0	0	2	0	5	6	6	1	0	0	0	0	0	0	20
21:00	0	0	1	2	3	5	3	0	0	0	0	0	0	0	14
22:00	0	1	0	0	1	4	2	0	1	1	0	0	0	0	10
23:00	0	0	0	1	3	2	2	0	0	0	0	0	0	0	8
Total	12	9	18	41	137	327	218	58	16	4	0	0	0	0	840

Daily

15th Percentile :	32 MPH
50th Percentile :	39 MPH
85th Percentile :	44 MPH
95th Percentile :	48 MPH
Mean Speed(Average) :	38 MPH
10 MPH Pace Speed :	36-45 MPH
Number in Pace :	545
Percent in Pace :	64.9%
Number of Vehicles > 30 MPH :	760
Percent of Vehicles > 30 MPH :	90.5%

Grand Total	27	17	29	76	279	644	464	117	29	6	1	0	0	0	1689

Overall

15th Percentile :	32 MPH
50th Percentile :	39 MPH
85th Percentile :	44 MPH
95th Percentile :	48 MPH
Mean Speed(Average) :	38 MPH
10 MPH Pace Speed :	36-45 MPH
Number in Pace :	1108
Percent in Pace :	65.6%
Number of Vehicles > 30 MPH :	1540
Percent of Vehicles > 30 MPH :	91.2%

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #12
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Amvets Mem Hwy (24)

EB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
04/29/09	0	0	0	0	2	2	5	2	0	0	0	0	0	0	11
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
04:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
05:00	0	0	1	1	1	1	0	0	1	0	0	0	0	0	5
06:00	0	0	0	3	7	8	3	0	0	0	0	0	0	0	21
07:00	4	0	2	4	15	23	10	2	0	0	0	0	0	0	60
08:00	0	0	0	0	9	16	6	2	2	0	0	0	0	0	35
09:00	1	1	0	3	5	13	2	1	0	0	0	0	0	0	26
10:00	0	0	2	2	9	11	4	2	0	0	0	0	0	0	30
11:00	1	0	2	6	14	13	6	1	0	0	0	0	0	0	43
12 PM	1	0	1	4	11	23	1	0	1	0	0	0	0	0	42
13:00	0	2	6	4	7	17	5	0	1	0	0	0	0	0	42
14:00	1	0	0	4	21	27	6	0	0	0	0	0	0	0	59
15:00	0	2	4	7	25	33	10	1	0	0	0	0	0	0	82
16:00	4	1	2	2	22	38	15	3	0	0	0	0	0	0	87
17:00	0	1	1	1	15	28	12	0	0	0	0	0	0	0	58
18:00	0	0	3	2	15	16	4	1	2	0	0	0	0	0	43
19:00	0	0	2	7	10	12	3	1	0	0	0	0	0	0	35
20:00	0	1	2	2	13	6	2	0	1	0	0	0	0	0	27
21:00	0	0	0	4	5	4	3	0	1	0	0	0	0	0	17
22:00	0	0	0	0	3	6	1	0	1	1	0	0	0	0	12
23:00	0	0	0	2	1	0	0	2	0	0	0	0	0	0	5
Total	12	8	28	58	210	297	99	19	10	1	0	0	0	0	742

Daily

15th Percentile :	31 MPH
50th Percentile :	36 MPH
85th Percentile :	41 MPH
95th Percentile :	45 MPH
Mean Speed(Average) :	36 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	507
Percent in Pace :	68.3%
Number of Vehicles > 30 MPH :	636
Percent of Vehicles > 30 MPH :	85.7%

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #12
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Amvets Mem Hwy (24)

EB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
04/30/09	1	0	0	1	2	0	3	0	0	0	0	0	0	0	7
01:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
03:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
04:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
05:00	0	0	0	3	5	2	2	0	0	0	0	0	0	0	12
06:00	0	0	0	0	7	5	4	0	0	0	0	0	0	0	16
07:00	1	0	2	4	14	18	15	4	2	0	0	0	0	0	60
08:00	2	0	1	0	13	16	7	1	1	1	0	0	0	0	42
09:00	0	0	1	2	10	9	2	0	0	0	0	0	0	0	24
10:00	1	0	2	4	8	11	1	0	0	0	0	0	0	0	27
11:00	0	1	0	2	10	15	4	0	0	0	0	0	0	0	32
12 PM	0	0	1	7	14	11	9	2	0	0	0	0	0	0	44
13:00	4	0	1	4	11	15	6	3	0	0	0	0	0	0	44
14:00	2	1	3	5	9	18	13	1	0	0	0	0	0	0	52
15:00	2	2	3	9	25	29	7	1	0	0	0	0	0	0	78
16:00	1	0	2	6	21	36	12	3	1	0	0	0	0	0	82
17:00	1	1	1	2	19	26	10	4	1	0	0	0	0	0	65
18:00	1	0	3	1	12	20	11	2	1	0	0	0	0	0	51
19:00	1	0	1	4	6	13	5	0	0	0	0	0	0	0	30
20:00	0	1	0	3	7	7	3	0	0	0	0	0	0	0	21
21:00	0	0	0	0	5	6	9	1	0	0	0	0	0	0	21
22:00	0	0	0	3	1	4	0	0	0	0	0	0	0	0	8
23:00	0	0	0	1	3	4	1	0	0	0	0	0	0	0	9
Total	17	6	21	61	203	266	125	23	6	1	0	0	0	0	729

Daily

15th Percentile :	31 MPH
50th Percentile :	37 MPH
85th Percentile :	42 MPH
95th Percentile :	45 MPH
Mean Speed(Average) :	36 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	469
Percent in Pace :	64.3%
Number of Vehicles > 30 MPH :	624
Percent of Vehicles > 30 MPH :	85.6%

Grand Total	29	14	49	119	413	563	224	42	16	2	0	0	0	0	1471

Overall

15th Percentile :	31 MPH
50th Percentile :	36 MPH
85th Percentile :	42 MPH
95th Percentile :	45 MPH
Mean Speed(Average) :	36 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	976
Percent in Pace :	66.3%
Number of Vehicles > 30 MPH :	1260
Percent of Vehicles > 30 MPH :	85.7%

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #12
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Amvets Mem Hwy (24)

WB, EB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
04/29/09	0	0	0	0	2	2	6	2	0	0	0	0	0	0	12
01:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	3	1	1	0	0	0	0	0	5
04:00	0	0	0	0	2	3	3	2	0	0	0	0	0	0	10
05:00	0	0	1	2	4	12	4	2	2	0	0	0	0	0	27
06:00	2	1	0	5	17	26	18	5	0	0	0	0	0	0	74
07:00	4	0	4	8	24	61	31	9	3	0	0	0	0	0	144
08:00	1	0	0	1	12	38	28	9	4	0	0	0	0	0	93
09:00	1	3	0	7	13	21	13	4	0	0	0	0	0	0	62
10:00	1	0	3	3	10	29	13	4	0	0	0	0	0	0	63
11:00	1	1	5	8	19	30	21	1	0	0	0	0	0	0	86
12 PM	2	1	1	6	23	51	15	2	2	0	0	0	0	0	103
13:00	1	2	6	6	19	37	18	1	1	0	0	0	0	0	91
14:00	1	1	1	4	31	37	14	2	0	1	0	0	0	0	92
15:00	5	2	5	11	45	65	27	6	3	0	1	0	0	0	170
16:00	6	2	3	4	33	64	51	10	1	1	0	0	0	0	175
17:00	1	1	1	2	24	45	33	9	0	0	0	0	0	0	116
18:00	0	0	3	5	23	33	18	4	2	0	0	0	0	0	88
19:00	0	1	2	10	15	22	12	2	0	0	0	0	0	0	64
20:00	0	1	4	3	18	16	5	0	2	0	0	0	0	0	49
21:00	1	0	0	5	9	9	5	0	1	0	0	0	0	0	30
22:00	0	0	0	1	5	8	6	1	1	1	0	0	0	0	23
23:00	0	0	0	2	4	4	1	2	0	0	0	0	0	0	13
Total	27	16	39	93	352	614	345	78	23	3	1	0	0	0	1591

Daily

15th Percentile :	31 MPH
50th Percentile :	38 MPH
85th Percentile :	44 MPH
95th Percentile :	47 MPH
Mean Speed(Average) :	37 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	966
Percent in Pace :	60.7%
Number of Vehicles > 30 MPH :	1416
Percent of Vehicles > 30 MPH :	89.0%

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #12
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Amvets Mem Hwy (24)

WB, EB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
04/30/09	1	0	0	1	2	1	3	0	0	0	0	0	0	0	8
01:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
02:00	0	0	0	0	1	1	1	0	0	0	0	0	0	0	3
03:00	0	0	0	0	0	1	3	2	0	0	0	0	0	0	6
04:00	0	0	0	0	1	1	3	1	0	0	0	0	0	0	6
05:00	0	0	0	4	11	8	9	1	1	0	0	0	0	0	34
06:00	0	0	2	3	18	27	7	2	1	0	0	0	0	0	60
07:00	1	0	4	6	28	47	39	13	6	1	0	0	0	0	145
08:00	2	1	1	1	23	31	24	3	3	1	0	0	0	0	90
09:00	1	2	1	6	12	30	13	0	1	0	0	0	0	0	66
10:00	1	0	3	6	14	29	12	1	0	0	0	0	0	0	66
11:00	0	1	2	4	18	44	12	5	0	0	0	0	0	0	86
12 PM	2	0	3	10	23	24	18	8	0	0	0	0	0	0	88
13:00	6	0	3	10	19	39	22	3	0	0	0	0	0	0	102
14:00	3	2	5	10	16	34	29	5	1	0	0	0	0	0	105
15:00	6	3	3	11	37	55	26	4	0	0	0	0	0	0	145
16:00	2	0	3	8	37	66	37	10	3	0	0	0	0	0	166
17:00	2	2	1	3	28	52	24	11	2	1	0	0	0	0	126
18:00	1	1	3	4	15	40	25	9	3	1	0	0	0	0	102
19:00	1	1	2	5	8	24	10	1	0	0	0	0	0	0	52
20:00	0	1	2	3	12	13	9	1	0	0	0	0	0	0	41
21:00	0	0	1	2	8	11	12	1	0	0	0	0	0	0	35
22:00	0	1	0	3	2	8	2	0	1	1	0	0	0	0	18
23:00	0	0	0	2	6	6	3	0	0	0	0	0	0	0	17
Total	29	15	39	102	340	593	343	81	22	5	0	0	0	0	1569

Daily

15th Percentile :	31 MPH
50th Percentile :	38 MPH
85th Percentile :	44 MPH
95th Percentile :	47 MPH
Mean Speed(Average) :	37 MPH
10 MPH Pace Speed :	34-43 MPH
Number in Pace :	936
Percent in Pace :	59.7%
Number of Vehicles > 30 MPH :	1384
Percent of Vehicles > 30 MPH :	88.2%

Grand Total	56	31	78	195	692	1207	688	159	45	8	1	0	0	0	3160

Overall

15th Percentile :	31 MPH
50th Percentile :	38 MPH
85th Percentile :	44 MPH
95th Percentile :	47 MPH
Mean Speed(Average) :	37 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	1899
Percent in Pace :	60.1%
Number of Vehicles > 30 MPH :	2800
Percent of Vehicles > 30 MPH :	88.6%

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #12
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Amvets Mem Hwy (24)

WB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total	Truck Total
04/29/09	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	2	2	0	0	0	0	0	0	0	0	0	0	4	0
04:00	0	6	1	0	2	0	0	0	0	0	0	0	0	9	2
05:00	0	16	4	0	2	0	0	0	0	0	0	0	0	22	2
06:00	0	36	9	1	6	1	0	0	0	0	0	0	0	53	8
07:00	1	55	20	3	4	1	0	0	0	0	0	0	0	84	8
08:00	0	39	14	1	3	1	0	0	0	0	0	0	0	58	5
09:00	0	25	5	0	6	0	0	0	0	0	0	0	0	36	6
10:00	0	24	7	0	1	1	0	0	0	0	0	0	0	33	2
11:00	0	28	11	0	3	1	0	0	0	0	0	0	0	43	4
12 PM	0	39	16	1	5	0	0	0	0	0	0	0	0	61	6
13:00	0	26	17	0	4	2	0	0	0	0	0	0	0	49	6
14:00	0	18	9	2	4	0	0	0	0	0	0	0	0	33	6
15:00	2	45	30	3	4	1	0	2	0	0	0	0	0	87	10
16:00	0	62	16	0	8	0	0	0	1	0	0	0	0	87	9
17:00	0	31	18	1	8	0	0	0	0	0	0	0	0	58	9
18:00	2	25	12	0	6	0	0	0	0	0	0	0	0	45	6
19:00	1	21	5	0	2	0	0	0	0	0	0	0	0	29	2
20:00	0	18	2	0	2	0	0	0	0	0	0	0	0	22	2
21:00	0	11	1	0	1	0	0	0	0	0	0	0	0	13	1
22:00	0	8	2	0	0	1	0	0	0	0	0	0	0	11	1
23:00	0	7	1	0	0	0	0	0	0	0	0	0	0	8	0
Total	6	544	202	12	71	9	0	2	1	0	0	0	0	847	95
Percent	0.7%	64.2%	23.8%	1.4%	8.4%	1.1%	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%		11.2%
AM Peak	07:00	07:00	07:00	07:00	06:00	06:00								07:00	06:00
Vol.	1	55	20	3	6	1								84	8
PM Peak	15:00	16:00	15:00	15:00	16:00	13:00		15:00	16:00					15:00	15:00
Vol.	2	62	30	3	8	2		2	1					87	10

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #12
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Amvets Mem Hwy (24)

WB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total	Truck Total
04/30/09	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
01:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
02:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0
03:00	0	3	2	0	0	0	0	0	0	0	0	0	0	5	0
04:00	0	2	2	0	1	0	0	0	0	0	0	0	0	5	1
05:00	0	10	9	0	3	0	0	0	0	0	0	0	0	22	3
06:00	0	29	9	2	4	0	0	0	0	0	0	0	0	44	6
07:00	0	51	26	3	4	0	0	0	1	0	0	0	0	85	8
08:00	0	33	11	0	2	0	0	1	1	0	0	0	0	48	4
09:00	0	21	18	0	3	0	0	0	0	0	0	0	0	42	3
10:00	0	25	9	0	4	1	0	0	0	0	0	0	0	39	5
11:00	0	28	19	0	6	0	0	1	0	0	0	0	0	54	7
12 PM	0	29	10	0	4	1	0	0	0	0	0	0	0	44	5
13:00	0	35	16	0	6	1	0	0	0	0	0	0	0	58	7
14:00	0	40	6	2	5	0	0	0	0	0	0	0	0	53	7
15:00	1	42	16	4	2	1	0	0	1	0	0	0	0	67	8
16:00	0	47	27	4	6	0	0	0	0	0	0	0	0	84	10
17:00	0	41	15	1	3	1	0	0	0	0	0	0	0	61	5
18:00	2	28	15	0	6	0	0	0	0	0	0	0	0	51	6
19:00	0	20	1	0	1	0	0	0	0	0	0	0	0	22	1
20:00	0	16	2	1	1	0	0	0	0	0	0	0	0	20	2
21:00	0	12	2	0	0	0	0	0	0	0	0	0	0	14	0
22:00	0	9	1	0	0	0	0	0	0	0	0	0	0	10	0
23:00	0	7	0	0	1	0	0	0	0	0	0	0	0	8	1
Total	3	531	217	17	62	5	0	2	3	0	0	0	0	840	89
Percent	0.4%	63.2%	25.8%	2.0%	7.4%	0.6%	0.0%	0.2%	0.4%	0.0%	0.0%	0.0%	0.0%		10.6%
AM Peak		07:00	07:00	07:00	11:00	10:00		08:00	07:00					07:00	07:00
Vol.		51	26	3	6	1		1	1					85	8
PM Peak	18:00	16:00	16:00	15:00	13:00	12:00			15:00					16:00	16:00
Vol.	2	47	27	4	6	1			1					84	10
Grand Total	9	1075	419	29	133	14	0	4	4	0	0	0	0	1687	184
Percent	0.5%	63.7%	24.8%	1.7%	7.9%	0.8%	0.0%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%		10.9%

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #12
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Amvets Mem Hwy (24)

EB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total	Truck Total
04/29/09	0	8	3	0	0	0	0	0	0	0	0	0	0	11	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
04:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
05:00	0	5	0	0	0	0	0	0	0	0	0	0	0	5	0
06:00	0	12	6	1	0	2	0	0	0	0	0	0	0	21	3
07:00	0	38	21	0	1	0	0	0	0	0	0	0	0	60	1
08:00	0	20	11	0	4	0	0	0	0	0	0	0	0	35	4
09:00	0	21	4	0	1	0	0	0	0	0	0	0	0	26	1
10:00	0	18	10	0	2	0	0	0	0	0	0	0	0	30	2
11:00	0	28	12	0	2	0	0	0	1	0	0	0	0	43	3
12 PM	0	33	8	0	1	0	0	0	0	0	0	0	0	42	1
13:00	0	22	15	0	2	2	0	1	0	0	0	0	0	42	5
14:00	0	44	9	1	5	0	0	0	0	0	0	0	0	59	6
15:00	0	59	20	1	2	0	0	0	0	0	0	0	0	82	3
16:00	0	68	16	1	2	0	0	0	0	0	0	0	0	87	3
17:00	0	38	19	0	1	0	0	0	0	0	0	0	0	58	1
18:00	0	32	9	0	2	0	0	0	0	0	0	0	0	43	2
19:00	0	24	10	0	1	0	0	0	0	0	0	0	0	35	1
20:00	0	20	6	0	1	0	0	0	0	0	0	0	0	27	1
21:00	0	14	2	0	0	1	0	0	0	0	0	0	0	17	1
22:00	0	12	0	0	0	0	0	0	0	0	0	0	0	12	0
23:00	0	4	1	0	0	0	0	0	0	0	0	0	0	5	0
Total	0	522	182	4	27	5	0	1	1	0	0	0	0	742	38
Percent	0.0%	70.4%	24.5%	0.5%	3.6%	0.7%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%		5.1%
AM Peak		07:00	07:00	06:00	08:00	06:00			11:00					07:00	08:00
Vol.		38	21	1	4	2			1					60	4
PM Peak		16:00	15:00	14:00	14:00	13:00		13:00						16:00	14:00
Vol.		68	20	1	5	2		1						87	6

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #12
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Amvets Mem Hwy (24)

EB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total	Truck Total
04/30/09	0	4	2	0	1	0	0	0	0	0	0	0	0	7	1
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
03:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
04:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
05:00	0	7	3	0	0	2	0	0	0	0	0	0	0	12	2
06:00	0	13	3	0	0	0	0	0	0	0	0	0	0	16	0
07:00	0	37	19	0	3	1	0	0	0	0	0	0	0	60	4
08:00	0	25	12	0	4	0	0	0	0	0	0	0	0	41	4
09:00	0	12	9	0	2	1	0	0	0	0	0	0	0	24	3
10:00	0	14	11	0	1	1	0	0	0	0	0	0	0	27	2
11:00	0	19	9	1	2	1	0	0	0	0	0	0	0	32	4
12 PM	0	27	15	0	2	0	0	0	0	0	0	0	0	44	2
13:00	0	31	10	0	3	0	0	0	0	0	0	0	0	44	3
14:00	0	36	12	0	4	0	0	0	0	0	0	0	0	52	4
15:00	0	53	18	1	4	1	0	0	1	0	0	0	0	78	7
16:00	0	64	15	1	2	0	0	0	0	0	0	0	0	82	3
17:00	0	43	19	0	3	0	0	0	0	0	0	0	0	65	3
18:00	0	36	14	0	1	0	0	0	0	0	0	0	0	51	1
19:00	0	19	10	0	1	0	0	0	0	0	0	0	0	30	1
20:00	0	13	7	0	1	0	0	0	0	0	0	0	0	21	1
21:00	0	18	0	0	3	0	0	0	0	0	0	0	0	21	3
22:00	0	8	0	0	0	0	0	0	0	0	0	0	0	8	0
23:00	0	7	2	0	0	0	0	0	0	0	0	0	0	9	0
Total	0	489	191	3	37	7	0	0	1	0	0	0	0	728	48
Percent	0.0%	67.2%	26.2%	0.4%	5.1%	1.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%		6.6%
AM Peak		07:00	07:00	11:00	08:00	05:00								07:00	07:00
Vol.		37	19	1	4	2								60	4
PM Peak		16:00	17:00	15:00	14:00	15:00			15:00					16:00	15:00
Vol.		64	19	1	4	1			1					82	7
Grand Total	0	1011	373	7	64	12	0	1	2	0	0	0	0	1470	86
Percent	0.0%	68.8%	25.4%	0.5%	4.4%	0.8%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%		5.9%

Old Colony Planning Council
70 School Street
Brockton, MA 02301
508-583-1833

Community: West Bridgewater
Com #_U/RFC: 322_U6
Recorder #: Jamar #12
Tube Layout: L6 Basic

Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Amvets Mem Hwy (24)

WB, EB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total	Truck Total
04/29/09	0	9	3	0	0	0	0	0	0	0	0	0	0	12	0
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	3	2	0	0	0	0	0	0	0	0	0	0	5	0
04:00	0	7	1	0	2	0	0	0	0	0	0	0	0	10	2
05:00	0	21	4	0	2	0	0	0	0	0	0	0	0	27	2
06:00	0	48	15	2	6	3	0	0	0	0	0	0	0	74	11
07:00	1	93	41	3	5	1	0	0	0	0	0	0	0	144	9
08:00	0	59	25	1	7	1	0	0	0	0	0	0	0	93	9
09:00	0	46	9	0	7	0	0	0	0	0	0	0	0	62	7
10:00	0	42	17	0	3	1	0	0	0	0	0	0	0	63	4
11:00	0	56	23	0	5	1	0	0	1	0	0	0	0	86	7
12 PM	0	72	24	1	6	0	0	0	0	0	0	0	0	103	7
13:00	0	48	32	0	6	4	0	1	0	0	0	0	0	91	11
14:00	0	62	18	3	9	0	0	0	0	0	0	0	0	92	12
15:00	2	104	50	4	6	1	0	2	0	0	0	0	0	169	13
16:00	0	130	32	1	10	0	0	0	1	0	0	0	0	174	12
17:00	0	69	37	1	9	0	0	0	0	0	0	0	0	116	10
18:00	2	57	21	0	8	0	0	0	0	0	0	0	0	88	8
19:00	1	45	15	0	3	0	0	0	0	0	0	0	0	64	3
20:00	0	38	8	0	3	0	0	0	0	0	0	0	0	49	3
21:00	0	25	3	0	1	1	0	0	0	0	0	0	0	30	2
22:00	0	20	2	0	0	1	0	0	0	0	0	0	0	23	1
23:00	0	11	2	0	0	0	0	0	0	0	0	0	0	13	0
Total	6	1066	384	16	98	14	0	3	2	0	0	0	0	1589	133
Percent	0.4%	67.1%	24.2%	1.0%	6.2%	0.9%	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%		8.4%
AM Peak	07:00	07:00	07:00	07:00	08:00	06:00			11:00					07:00	06:00
Vol.	1	93	41	3	7	3			1					144	11
PM Peak	15:00	16:00	15:00	15:00	16:00	13:00		15:00	16:00					16:00	15:00
Vol.	2	130	50	4	10	4		2	1					174	13

Old Colony Planning Council
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Community: West Bridgewater
Com #_U/RFC: 322_U6
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Station ID:
Site Code: 322
Date Start: 29-Apr-09
Date End: 30-Apr-09
Walnut St, east of Amvets Mem Hwy (24)

WB, EB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total	Truck Total
04/30/09	0	5	2	0	1	0	0	0	0	0	0	0	0	8	1
01:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2	0
02:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0
03:00	0	3	3	0	0	0	0	0	0	0	0	0	0	6	0
04:00	0	3	2	0	1	0	0	0	0	0	0	0	0	6	1
05:00	0	17	12	0	3	2	0	0	0	0	0	0	0	34	5
06:00	0	42	12	2	4	0	0	0	0	0	0	0	0	60	6
07:00	0	88	45	3	7	1	0	0	1	0	0	0	0	145	12
08:00	0	58	23	0	6	0	0	1	1	0	0	0	0	89	8
09:00	0	33	27	0	5	1	0	0	0	0	0	0	0	66	6
10:00	0	39	20	0	5	2	0	0	0	0	0	0	0	66	7
11:00	0	47	28	1	8	1	0	1	0	0	0	0	0	86	11
12 PM	0	56	25	0	6	1	0	0	0	0	0	0	0	88	7
13:00	0	66	26	0	9	1	0	0	0	0	0	0	0	102	10
14:00	0	76	18	2	9	0	0	0	0	0	0	0	0	105	11
15:00	1	95	34	5	6	2	0	0	2	0	0	0	0	145	15
16:00	0	111	42	5	8	0	0	0	0	0	0	0	0	166	13
17:00	0	84	34	1	6	1	0	0	0	0	0	0	0	126	8
18:00	2	64	29	0	7	0	0	0	0	0	0	0	0	102	7
19:00	0	39	11	0	2	0	0	0	0	0	0	0	0	52	2
20:00	0	29	9	1	2	0	0	0	0	0	0	0	0	41	3
21:00	0	30	2	0	3	0	0	0	0	0	0	0	0	35	3
22:00	0	17	1	0	0	0	0	0	0	0	0	0	0	18	0
23:00	0	14	2	0	1	0	0	0	0	0	0	0	0	17	1
Total	3	1020	408	20	99	12	0	2	4	0	0	0	0	1568	137
Percent	0.2%	65.1%	26.0%	1.3%	6.3%	0.8%	0.0%	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%		8.7%
AM Peak		07:00	07:00	07:00	11:00	05:00		08:00	07:00					07:00	07:00
Vol.		88	45	3	8	2		1	1					145	12
PM Peak	18:00	16:00	16:00	15:00	13:00	15:00			15:00					16:00	15:00
Vol.	2	111	42	5	9	2			2					166	15
Grand Total	9	2086	792	36	197	26	0	5	6	0	0	0	0	3157	270
Percent	0.3%	66.1%	25.1%	1.1%	6.2%	0.8%	0.0%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%		8.6%

MassHighway

SEGMENT CRASH RATE WORKSHEET

CITY/TOWN : West Bridgewater COUNT DATE : 2006-2008

DISTRICT : 5

~ SEGMENT DATA ~

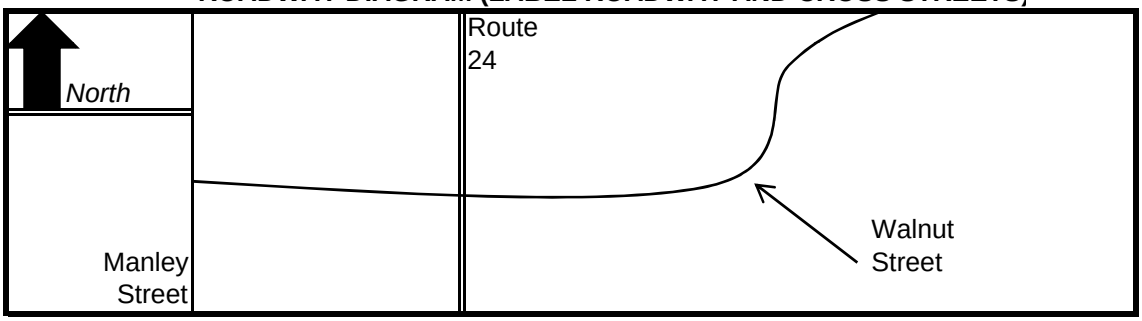
ROADWAY NAME: Walnut Street

START POINT: Manley Street

END POINT: Brockton City Line

FUNCTIONAL CLASSIFICATION OF ROADWAY Urban Collector

ROADWAY DIAGRAM (LABEL ROADWAY AND CROSS STREETS)



AVERAGE DAILY TRAFFIC

SEGMENT LENGTH IN MILES (**L**):	**1.3**
AVERAGE DAILY TRAFFIC VOLUME (**V**):	1,577

TOTAL # OF CRASHES:	# OF YEARS :	AVERAGE # OF CRASHES PER YEAR (**A**) :
5	3	**1.67**

CRASH RATE **2.23** RATE = (A * 1,000,000) / (L * V * 365)

Comments :

Project Title & Date:

MassDOT Highway Division

Average Crash Rates

Crash information queried on January 29, 2010

Intersection - Crashes per million entering vehicles

Location	Signalized Intersections	Unsignalized Intersections
Statewide	0.82	0.62
District 1*	0.92*	0.40*
District 2	0.83	0.67
District 3	0.93	0.68
District 4	0.78	0.59
District 5	0.77	0.62

* - District 1 should use Statewide Rates due to low sample total

2008 Functional Classification - crashes per million vehicle miles traveled

Roadway Functional Classification	Rural	Urban
Statewide	0.97	2.31
Interstate	0.48	0.64
Principal arterial	0.47	2.30
Rural minor arterial or urban principal arterial	1.16	2.89
Urban minor arterial or rural major collector	1.51	4.07
Urban collector or rural minor collector	2.62	4.12
Local	1.40	2.13

Notes on Functional Classification Data

- Crash rates are based solely on Geocoded Crashes (*approximately 83% of all Crashes in the system but not uniformly Geocoded by Functional Classification*)
- If a crash occurred at an intersection or along two different functional classifications, the crash was assigned to the higher order roadway.
- Source of VMTs: http://www.fhwa.dot.gov/policyinformation/statistics/2008/vm2.cfm

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.**

Table 2C-1. Categories of Warning Signs and Plaques

Category	Group	Section	Signs or Plaques	Sign Designations
Roadway Related	Changes in Horizontal Alignment	2C.07	Turn, Curve, Reverse Turn, Reverse Curve, Winding Road, Hairpin Curve, 270-Degree Curve	W1-1,2,3,4,5,11,15
		2C.08	Advisory Speed	W13-1P
		2C.09	Chevron Alignment	W1-8
		2C.10	Combination Horizontal Alignment/Advisory Speed	W1-1a,2a
		2C.11	Combination Horizontal Alignment/Intersection	W1-10,10a,10b,10c,10d
		2C.12	Large Arrow (one direction)	W1-6
		2C.13	Truck Rollover	W1-13
		2C.14	Advisory Exit or Ramp Speed	W13-2,3
		2C.15	Combination Horizontal Alignment/Advisory Exit or Ramp Speed	W13-6,7
	Vertical Alignment	2C.16	Hill	W7-1,1a,2P,2bP,3P,3aP,3bP
		2C.17	Truck Escape Ramp	W7-4,4b,4c,4dP,4eP,4fP
		2C.18	Hill Blocks View	W7-6
	Cross Section	2C.19	Road Narrows	W5-1
		2C.20,21	Narrow Bridge, One Lane Bridge	W5-2,3
		2C.22,23,25	Divided Highway, Divided Highway Ends, Double Arrow	W6-1,2; W12-1
		2C.24	Freeway or Expressway Ends, All Traffic Must Exit	W19-1,2,3,4,5
		2C.26	Dead End, No Outlet	W14-1,1a,2,2a
		2C.27	Low Clearance	W12-2,2a
	Roadway Surface Condition	2C.28,29	Bump, Dip, Speed Hump	W8-1,2; W17-1
		2C.30	Pavement Ends	W8-3
		2C.31	Shoulder, Uneven Lanes	W8-4,9,11,17,17P,23,25
		2C.32	Slippery When Wet, Loose Gravel, Rough Road, Bridge Ices Before Road, Fallen Rocks	W8-5,7,8,13,14
		2C.33	Grooved Pavement, Metal Bridge Deck	W8-15,15P,16
		2C.34	No Center Line	W8-12
	Weather	2C.35	Road May Flood, Flood Gauge, Gusty Winds Area, Fog Area	W8-18,19,21,22
Traffic Related	Advance Traffic Control	2C.36-39	Stop Ahead, Yield Ahead, Signal Ahead, Be Prepared To Stop, Speed Reduction, Drawbridge Ahead, Ramp Meter Ahead	W3-1,2,3,4,5,5a,6,7,8
	Traffic Flow	2C.40-45	Merge, No Merge Area, Lane Ends, Added Lane, Two-Way Traffic, Right Lane Exit Only Ahead, No Passing Zone	W4-1,2,3,5,5P,6; W6-3; W9-1,2,7; W14-3
	Intersections	2C.46	Cross Road, Side Road, T, Y, Circular Intersection, Side Roads	W2-1,2,3,4,5,6,7,8; W16-12P,17P
		2C.47	Large Arrow (two directions)	W1-7
		2C.48	Oncoming Extended Green	W25-1,2
	Vehicular Traffic	2C.49	Truck Crossing, Truck (symbol), Emergency Vehicle, Tractor, Bicycle, Golf Cart, Horse-Drawn Vehicle, Trail Crossing	W8-6; W11-1,5,5a,8,10, 11,12P,14,15,15P,15a; W16-13P
	Non-Vehicular	2C.50,51	Pedestrian, Deer, Cattle, Snowmobile, Equestrian, Wheelchair, Large Animals, Playground	W11-2,3,4,6,7,9,16,17,18,19, 20,21,22; W15-1; W16-13P
	New	2C.52	New Traffic Pattern Ahead	W23-2
Other Supplemental Plaques	Location	2C.53	Downward Diagonal Arrow, Ahead	W16-7P,9P
	HOV	2C.53	High-Occupancy Vehicle	W16-11P
	Distance	2C.55	XX Feet, XX Miles, Next XX Feet, Next XX Miles	W7-3aP; W16-2P,2aP,3P,3aP,4P
	Arrow	2C.56	Advance Arrow, Directional Arrow	W16-5P,6P
	Street Name Plaque	2C.58	Advance Street Name	W16-8P,8aP
	Intersection	2C.59	Cross Traffic Does Not Stop	W4-4P,4aP,4bP
	Share The Road	2C.60	Share The Road	W16-1P
	Photo Enforced	2C.61	Photo Enforced	W16-10P,10aP
	New	2C.62	New	W16-15P

Table 2C-2. Warning Sign and Plaque Sizes (Sheet 1 of 3)

Sign or Plaque	Sign Designation	Section	Conventional Road		Expressway	Freeway	Minimum	Oversized
			Single Lane	Multi-Lane				
Horizontal Alignment	W1-1,2,3,4,5	2C.07	30 x 30*	36 x 36	36 x 36	36 x 36	—	48 x 48
Combination Horizontal Alignment/Advisory Speed	W1-1a,2a	2C.10	36 x 36	36 x 36	48 x 48	48 x 48	—	48 x 48
One-Direction Large Arrow	W1-6	2C.12	48 x 24	48 x 24	60 x 30	60 x 30	—	60 x 30
Two-Direction Large Arrow	W1-7	2C.47	48 x 24	48 x 24	—	—	—	60 x 30
Chevron Alignment	W1-8	2C.09	18 x 24	18 x 24	30 x 36	36 x 48	—	24 x 30
Combination Horizontal Alignment/Intersection	W1-10,10a, 10b,10c,10d, 10e	2C.11	36 x 36	36 x 36	36 x 36	48 x 48	—	—
Hairpin Curve	W1-11	2C.07	30 x 30	30 x 30	36 x 36	48 x 48	—	48 x 48
Truck Rollover	W1-13	2C.13	36 x 36	36 x 36	36 x 36	48 x 48	—	36 x 36
270-degree Loop	W1-15	2C.07	30 x 30	30 x 30	36 x 36	48 x 48	—	48 x 48
Intersection Warning	W2-1, 2,3,4,5,6,7,8	2C.46	30 x 30	30 x 30	36 x 36	—	24 x 24	48 x 48
Advanced Traffic Control	W3-1,2,3	2C.36	30 x 30	30 x 30	48 x 48	48 x 48	30 x 30	—
Be Prepared to Stop	W3-4	2C.36	36 x 36	36 x 36	48 x 48	48 x 48	30 x 30	—
Reduced Speed Limit Ahead	W3-5	2C.38	36 x 36	36 x 36	48 x 48	48 x 48	—	—
XX MPH Speed Zone Ahead	W3-5a	2C.38	36 x 36	36 x 36	48 x 48	48 x 48	—	—
Draw Bridge	W3-6	2C.39	36 x 36	36 x 36	48 x 48	—	—	60 x 60
Ramp Meter Ahead	W3-7	2C.37	36 x 36	36 x 36	—	—	—	—
Ramp Metered When Flashing	W3-8	2C.37	36 x 36	36 x 36	—	—	—	—
Merge	W4-1	2C.40	36 x 36	36 x 36	48 x 48	48 x 48	30 x 30*	—
Lane Ends	W4-2	2C.42	36 x 36	36 x 36	48 x 48	48 x 48	30 x 30*	—
Added Lane	W4-3	2C.41	36 x 36	36 x 36	48 x 48	48 x 48	30 x 30*	—
Cross Traffic Does Not Stop (plaque)	W4-4P	2C.59	24 x 12	24 x 12	36 x 18	—	—	48 x 24
Traffic From Left (Right) Does Not Stop (plaque)	W4-4aP	2C.59	24 x 12	24 x 12	36 x 18	—	—	48 x 24
Oncoming Traffic Does Not Stop (plaque)	W4-4bP	2C.59	24 x 12	24 x 12	36 x 18	—	—	48 x 24
Entering Roadway Merge	W4-5	2C.40	36 x 36	36 x 36	48 x 48	—	—	—
No Merge Area (plaque)	W4-5P	2C.40	18 x 24	18 x 24	24 x 30	—	—	—
Entering Roadway Added Lane	W4-6	2C.41	36 x 36	36 x 36	48 x 48	—	—	—
Road Narrows	W5-1	2C.19	36 x 36	36 x 36	48 x 48	48 x 48	30 x 30*	—
Narrow Bridge	W5-2	2C.20	36 x 36	36 x 36	48 x 48	48 x 48	30 x 30*	—
One Lane Bridge	W5-3	2C.21	36 x 36	36 x 36	48 x 48	48 x 48	30 x 30*	—
Divided Highway	W6-1	2C.22	36 x 36	36 x 36	48 x 48	48 x 48	—	—
Divided Highway Ends	W6-2	2C.23	36 x 36	36 x 36	48 x 48	48 x 48	—	—
Two-Way Traffic	W6-3	2C.44	36 x 36	36 x 36	48 x 48	48 x 48	—	—
Hill	W7-1	2C.16	30 x 30*	36 x 36	36 x 36	36 x 36	24 x 24*	48 x 48
Hill with Grade	W7-1a	2C.16	30 x 30*	36 x 36	36 x 36	36 x 36	24 x 24*	48 x 48
Use Low Gear (plaque)	W7-2P	2C.57	24 x 18	24 x 18	—	—	—	—
Trucks Use Lower Gear (plaque)	W7-2bP	2C.57	24 x 18	24 x 18	—	—	—	—
XX% Grade (plaque)	W7-3P	2C.57	24 x 18	24 x 18	—	—	—	—
Next XX Miles (plaque)	W7-3aP	2C.55	24 x 18	24 x 18	—	—	—	—
XX% Grade, XX Miles (plaque)	W7-3bP	2C.57	24 x 18	24 x 18	—	—	—	—
Runaway Truck Ramp XX Miles	W7-4	2C.17	78 x 48	78 x 48	78 x 48	78 x 48	—	—
Runaway Truck Ramp (with arrow)	W7-4b	2C.17	78 x 60	78 x 60	78 x 60	78 x 60	—	—
Truck Escape Ramp	W7-4c	2C.17	78 x 60	78 x 60	78 x 60	78 x 60	—	—
Sand, Gravel, Paved (plaques)	W7-4dP, 4eP,4fP	2C.17	24 x 12	24 x 12	24 x 12	24 x 12	—	—
Hill Blocks View	W7-6	2C.18	30 x 30*	36 x 36	36 x 36	—	—	48 x 48
Bump or Dip	W8-1,2	2C.28	30 x 30*	36 x 36	36 x 36	48 x 48	24 x 24*	48 x 48

Table 2C-2. Warning Sign and Plaque Sizes (Sheet 2 of 3)

Sign or Plaque	Sign Designation	Section	Conventional Road		Expressway	Freeway	Minimum	Oversized
			Single Lane	Multi-Lane				
Pavement Ends	W8-3	2C.30	36 x 36	36 x 36	48 x 48	—	30 x 30*	—
Soft Shoulder	W8-4	2C.31	36 x 36	36 x 36	48 x 48	48 x 48	24 x 24*	48 x 48
Slippery When Wet	W8-5	2C.32	30 x 30*	36 x 36	36 x 36	48 x 48	24 x 24*	48 x 48
Road Condition (plaques)	W8-5P,5bP,5cP	2C.32	24 x 18	24 x 18	30 x 24	36 x 30	—	36 x 30
Ice	W8-5aP	2C.32	24 x 12	24 x 12	30 x 18	30 x 18	—	—
Truck Crossing	W8-6	2C.49	36 x 36	36 x 36	36 x 36	48 x 48	24 x 24*	48 x 48
Loose Gravel	W8-7	2C.32	36 x 36	36 x 36	36 x 36	—	24 x 24*	48 x 48
Rough Road	W8-8	2C.32	36 x 36	36 x 36	36 x 36	48 x 48	24 x 24*	48 x 48
Low Shoulder	W8-9	2C.31	36 x 36	36 x 36	36 x 36	48 x 48	24 x 24*	48 x 48
Uneven Lanes	W8-11	2C.32	36 x 36	36 x 36	36 x 36	48 x 48	—	48 x 48
No Center Line	W8-12	2C.34	36 x 36	36 x 36	36 x 36	48 x 48	—	—
Bridge Ices Before Road	W8-13	2C.32	36 x 36	36 x 36	36 x 36	48 x 48	24 x 24*	48 x 48
Fallen Rocks	W8-14	2C.32	30 x 30*	36 x 36	36 x 36	48 x 48	24 x 24*	48 x 48
Grooved Pavement	W8-15	2C.33	30 x 30*	36 x 36	36 x 36	48 x 48	24 x 24*	48 x 48
Motorcycle (plaque)	W8-15P	2C.33	24 x 18	24 x 18	30 x 24	36 x 30	—	36 x 30
Metal Bridge Deck	W8-16	2C.33	30 x 30*	36 x 36	36 x 36	48 x 48	24 x 24*	48 x 48
Shoulder Drop Off (symbol)	W8-17	2C.31	30 x 30*	36 x 36	36 x 36	48 x 48	24 x 24*	48 x 48
Shoulder Drop-Off (plaque)	W8-17P	2C.31	24 x 18	24 x 18	30 x 24	36 x 30	—	36 x 30
Road May Flood	W8-18	2C.35	36 x 36	36 x 36	36 x 36	48 x 48	24 x 24*	48 x 48
Flood Gauge	W8-19	2C.35	12 x 72	12 x 72	—	—	—	—
Gusty Winds Area	W8-21	2C.35	36 x 36	36 x 36	36 x 36	48 x 48	24 x 24*	48 x 48
Fog Area	W8-22	2C.35	36 x 36	36 x 36	36 x 36	48 x 48	24 x 24*	48 x 48
No Shoulder	W8-23	2C.31	36 x 36	36 x 36	36 x 36	48 x 48	24 x 24*	48 x 48
Shoulder Ends	W8-25	2C.31	30 x 30*	36 x 36	36 x 36	48 x 48	24 x 24*	48 x 48
Left (Right) Lane Ends	W9-1	2C.42	36 x 36	36 x 36	36 x 36	48 x 48	30 x 30*	48 x 48
Lane Ends Merge Left (Right)	W9-2	2C.42	36 x 36	36 x 36	36 x 36	48 x 48	30 x 30*	48 x 48
Right (Left) Lane Exit Only Ahead	W9-7	2C.43	132 x 72	132 x 72	132 x 72	132 x 72	—	—
Bicycle	W11-1	2C.49	30 x 30	30 x 30	36 x 36	—	24 x 24*	48 x 48
Pedestrian	W11-2	2C.50	30 x 30*	36 x 36	36 x 36	—	24 x 24*	48 x 48
Large Animals	W11-3,4,16,17,18,19,20,21,22	2C.50	30 x 30*	36 x 36	36 x 36	—	24 x 24*	48 x 48
Farm Vehicle	W11-5,5a	2C.49	30 x 30*	36 x 36	36 x 36	—	24 x 24*	48 x 48
Snowmobile	W11-6	2C.50	30 x 30*	36 x 36	36 x 36	—	24 x 24*	48 x 48
Equestrian	W11-7	2C.50	30 x 30*	36 x 36	36 x 36	—	24 x 24*	48 x 48
Emergency Vehicle	W11-8	2C.49	30 x 30*	36 x 36	36 x 36	—	24 x 24*	48 x 48
Handicapped	W11-9	2C.50	30 x 30*	36 x 36	36 x 36	—	—	48 x 48
Truck	W11-10	2C.49	30 x 30*	36 x 36	36 x 36	—	24 x 24*	48 x 48
Golf Cart	W11-11	2C.49	30 x 30*	36 x 36	36 x 36	—	24 x 24*	48 x 48
Emergency Signal Ahead (plaque)	W11-12P	2C.49	36 x 30	36 x 30	36 x 30	—	—	—
Horse-Drawn Vehicle	W11-14	2C.49	30 x 30*	36 x 36	36 x 36	—	24 x 24*	48 x 48
Bicycle / Pedestrian	W11-15	2C.49	30 x 30*	36 x 36	36 x 36	—	24 x 24*	48 x 48
Trail Crossing	W11-15a	2C.49	30 x 30*	36 x 36	36 x 36	—	24 x 24*	48 x 48
Trail X-ing (plaque)	W11-15P	2C.49	24 x 18	24 x 18	30 x 24	—	—	36 x 30
Double Arrow	W12-1	2C.25	30 x 30*	36 x 36	36 x 36	—	—	—
Low Clearance (with arrows)	W12-2	2C.27	36 x 36	36 x 36	48 x 48	48 x 48	30 x 30*	—
Low Clearance	W12-2a	2C.27	78 x 24	78 x 24	—	—	—	—
Advisory Speed (plaque)	W13-1P	2C.08	18 x 18	18 x 18	24 x 24	30 x 30	—	30 x 30
Advisory Exit or Ramp Speed	W13-2,3	2C.14	24 x 30	24 x 30	36 x 48	36 x 48	—	48 x 60
Combination Horizontal Alignment/Advisory Exit or Ramp Speed	W13-6,7	2C.15	24 x 42	24 x 42	36 x 60	36 x 60	—	48 x 84
Dead End, No Outlet	W14-1,2	2C.26	30 x 30*	36 x 36	36 x 36	—	24 x 24*	48 x 48

Table 2C-2. Warning Sign and Plaque Sizes (Sheet 3 of 3)

Sign or Plaque	Sign Designation	Section	Conventional Road		Expressway	Freeway	Minimum	Oversized
			Single Lane	Multi-Lane				
Dead End, No Outlet (with arrow)	W14-1a,2a	2C.26	36 x 8	36 x 8	—	—	—	—
No Passing Zone (pennant)	W14-3	2C.45	48 x 48 x 36	48 x 48 x 36	—	—	40 x 40 x 30	64 x 64 x 48
Playground	W15-1	2C.51	30 x 30*	36 x 36	36 x 36	—	24 x 24*	48 x 48
Share the Road (plaque)	W16-1P	2C.60	18 x 24	18 x 24	24 x 30	—	—	24 x 30
XX Feet	W16-2P	2C.55	24 x 18	24 x 18	—	—	—	30 x 24
XX Ft	W16-2aP	2C.55	24 x 12	24 x 12	—	—	—	30 x 18
XX Miles (2-line plaque)	W16-3P	2C.55	30 x 24	30 x 24	—	—	—	—
XX Miles (1-line plaque)	W16-3aP	2C.55	30 x 12	30 x 12	—	—	—	—
Next XX Feet (plaque)	W16-4P	2C.55	30 x 24	30 x 24	—	—	—	—
Supplemental Arrow (plaque)	W16-5P,6P	2C.56	24 x 18	24 x 18	—	—	—	—
Downward Diagonal Arrow (plaque)	W16-7P	2C.50	24 x 12	24 x 12	—	—	—	30 x 18
Advance Street Name (1-line plaque)	W16-8P	2C.58	Varies x 8	Varies x 8	—	—	—	—
Advance Street Name (2-line plaque)	W16-8aP	2C.58	Varies x 15	Varies x 15	—	—	—	—
Ahead (plaque)	W16-9P	2C.50	24 x 12	24 x 12	30 x 18	—	—	—
Photo Enforced (symbol plaque)	W16-10P	2C.61	24 x 12	24 x 12	36 x 18	—	—	48 x 24
Photo Enforced (plaque)	W16-10aP	2C.61	24 x 18	24 x 18	36 x 30	—	—	48 x 36
HOV (plaque)	W16-11P	2G.09	24 x 12	24 x 12	30 x 18	—	—	30 x 18
Traffic Circle (plaque)	W16-12P	2C.46	24 x 18	24 x 18	—	—	—	—
When Flashing (plaque)	W16-13P	2C.50	24 x 18	24 x 18	—	—	—	—
New (plaque)	W16-15P	2C.62	24 x 12	24 x 12	—	—	—	—
Roundabout (plaque)	W16-17P	2C.46	24 x 12	24 x 12	—	—	—	—
NOTICE	W16-18P	2A.15	24 x 12	24 x 12	—	—	—	—
Speed Hump	W17-1	2C.29	30 x 30*	36 x 36	—	—	24 x 24*	48 x 48
Freeway Ends XX Miles	W19-1	2C.24	—	—	—	144 x 48	—	—
Expressway Ends XX Miles	W19-2	2C.24	—	—	144 x 48	—	—	—
Freeway Ends	W19-3	2C.24	—	—	—	48 x 48	—	—
Expressway Ends	W19-4	2C.24	—	—	48 x 48	—	—	—
All Traffic Must Exit	W19-5	2C.24	—	—	90 x 48	90 x 48	—	—
New Traffic Pattern Ahead	W23-2	2C.52	36 x 36	36 x 36	—	—	—	—
Traffic Signal Extended Green	W25-1,2	2C.48	24 x 30	24 x 30	—	—	—	—

* The minimum size required for diamond-shaped warning signs facing traffic on multi-lane conventional roads shall be 36 x 36 per Section 2C.04

Notes: 1. Larger signs may be used when appropriate
2. Dimensions in inches are shown as width x height

Support:

02 Section 2A.11 contains information regarding the applicability of the various columns in Table 2C-2.

Standard:

03 **Except as provided in Paragraph 5, the minimum size for all diamond-shaped warning signs facing traffic on a multi-lane conventional road where the posted speed limit is higher than 35 mph shall be 36 x 36 inches.**

04 **The minimum size for supplemental warning plaques that are not included in Table 2C-2 shall be as shown in Table 2C-3.**

Table 2C-3. Minimum Size of Supplemental Warning Plaques

Size of Warning Sign	Size of Supplemental Plaque			
	Rectangular			Square
	1 Line	2 Lines	Arrow	
24 x 24	24 x 12	24 x 18	24 x 12	18 x 18
30 x 30				
36 x 36	30 x 18	30 x 24	30 x 18	24 x 24
48 x 48				

Notes: 1. Larger supplemental plaques may be used when appropriate
2. Dimensions in inches are shown as width x height

Option:

05 If a diamond-shaped warning sign is placed on the left-hand side of a multi-lane roadway to supplement the installation of the same warning sign on the right-hand side of the roadway, the minimum size identified in the Single Lane column in Table 2C-2 may be used.

06 Signs and plaques larger than those shown in Tables 2C-2 and 2C-3 may be used (see Section 2A.11).

Guidance:

07 *The minimum size for all diamond-shaped warning signs facing traffic on exit and entrance ramps should be the size identified in Table 2C-2 for the mainline roadway classification (Expressway or Freeway). If a minimum size is not provided in the Freeway Column, the Expressway size should be used. If a minimum size is not provided in the Freeway or the Expressway Column, the Oversized size should be used.*

Section 2C.05 Placement of Warning Signs

Support:

01 For information on placement of warning signs, see Sections 2A.16 to 2A.21.

02 The time needed for detection, recognition, decision, and reaction is called the Perception-Response Time (PRT). Table 2C-4 is provided as an aid for determining warning sign location. The distances shown in Table 2C-4 can be adjusted for roadway features, other signing, and to improve visibility.

Guidance:

03 *Warning signs should be placed so that they provide an adequate PRT. The distances contained in Table 2C-4 are for guidance purposes and should be applied with engineering judgment. Warning signs should not be placed too far in advance of the condition, such that drivers might tend to forget the warning because of other driving distractions, especially in urban areas.*

Table 2C-4. Guidelines for Advance Placement of Warning Signs

Posted or 85th-Percentile Speed	Advance Placement Distance[1]								
	Condition A: Speed reduction and lane changing in heavy traffic[2]	Condition B: Deceleration to the listed advisory speed (mph) for the condition							
		0[3]	10[4]	20[4]	30[4]	40[4]	50[4]	60[4]	70[4]
20 mph	225 ft	100 ft[6]	N/A[5]	—	—	—	—	—	—
25 mph	325 ft	100 ft[6]	N/A[5]	N/A[5]	—	—	—	—	—
30 mph	460 ft	100 ft[6]	N/A[5]	N/A[5]	—	—	—	—	—
35 mph	565 ft	100 ft[6]	N/A[5]	N/A[5]	N/A[5]	—	—	—	—
40 mph	670 ft	125 ft	100 ft[6]	100 ft[6]	N/A[5]	—	—	—	—
45 mph	775 ft	175 ft	125 ft	100 ft[6]	100 ft[6]	N/A[5]	—	—	—
50 mph	885 ft	250 ft	200 ft	175 ft	125 ft	100 ft[6]	—	—	—
55 mph	990 ft	325 ft	275 ft	225 ft	200 ft	125 ft	N/A[5]	—	—
60 mph	1,100 ft	400 ft	350 ft	325 ft	275 ft	200 ft	100 ft[6]	—	—
65 mph	1,200 ft	475 ft	450 ft	400 ft	350 ft	275 ft	200 ft	100 ft[6]	—
70 mph	1,250 ft	550 ft	525 ft	500 ft	450 ft	375 ft	275 ft	150 ft	—
75 mph	1,350 ft	650 ft	625 ft	600 ft	550 ft	475 ft	375 ft	250 ft	100 ft[6]

[1] The distances are adjusted for a sign legibility distance of 180 feet for Condition A. The distances for Condition B have been adjusted for a sign legibility distance of 250 feet, which is appropriate for an alignment warning symbol sign. For Conditions A and B, warning signs with less than 6-inch legend or more than four words, a minimum of 100 feet should be added to the advance placement distance to provide adequate legibility of the warning sign.

[2] Typical conditions are locations where the road user must use extra time to adjust speed and change lanes in heavy traffic because of a complex driving situation. Typical signs are Merge and Right Lane Ends. The distances are determined by providing the driver a PRT of 14.0 to 14.5 seconds for vehicle maneuvers (2005 AASHTO Policy, Exhibit 3-3, Decision Sight Distance, Avoidance Maneuver E) minus the legibility distance of 180 feet for the appropriate sign.

[3] Typical condition is the warning of a potential stop situation. Typical signs are Stop Ahead, Yield Ahead, Signal Ahead, and Intersection Warning signs. The distances are based on the 2005 AASHTO Policy, Exhibit 3-1, Stopping Sight Distance, providing a PRT of 2.5 seconds, a deceleration rate of 11.2 feet/second^2, minus the sign legibility distance of 180 feet.

[4] Typical conditions are locations where the road user must decrease speed to maneuver through the warned condition. Typical signs are Turn, Curve, Reverse Turn, or Reverse Curve. The distance is determined by providing a 2.5 second PRT, a vehicle deceleration rate of 10 feet/second^2, minus the sign legibility distance of 250 feet.

[5] No suggested distances are provided for these speeds, as the placement location is dependent on site conditions and other signing. An alignment warning sign may be placed anywhere from the point of curvature up to 100 feet in advance of the curve. However, the alignment warning sign should be installed in advance of the curve and at least 100 feet from any other signs.

[6] The minimum advance placement distance is listed as 100 feet to provide adequate spacing between signs.

04 *Minimum spacing between warning signs with different messages should be based on the estimated PRT for driver comprehension of and reaction to the second sign.*

05 *The effectiveness of the placement of warning signs should be periodically evaluated under both day and night conditions.*

Option:

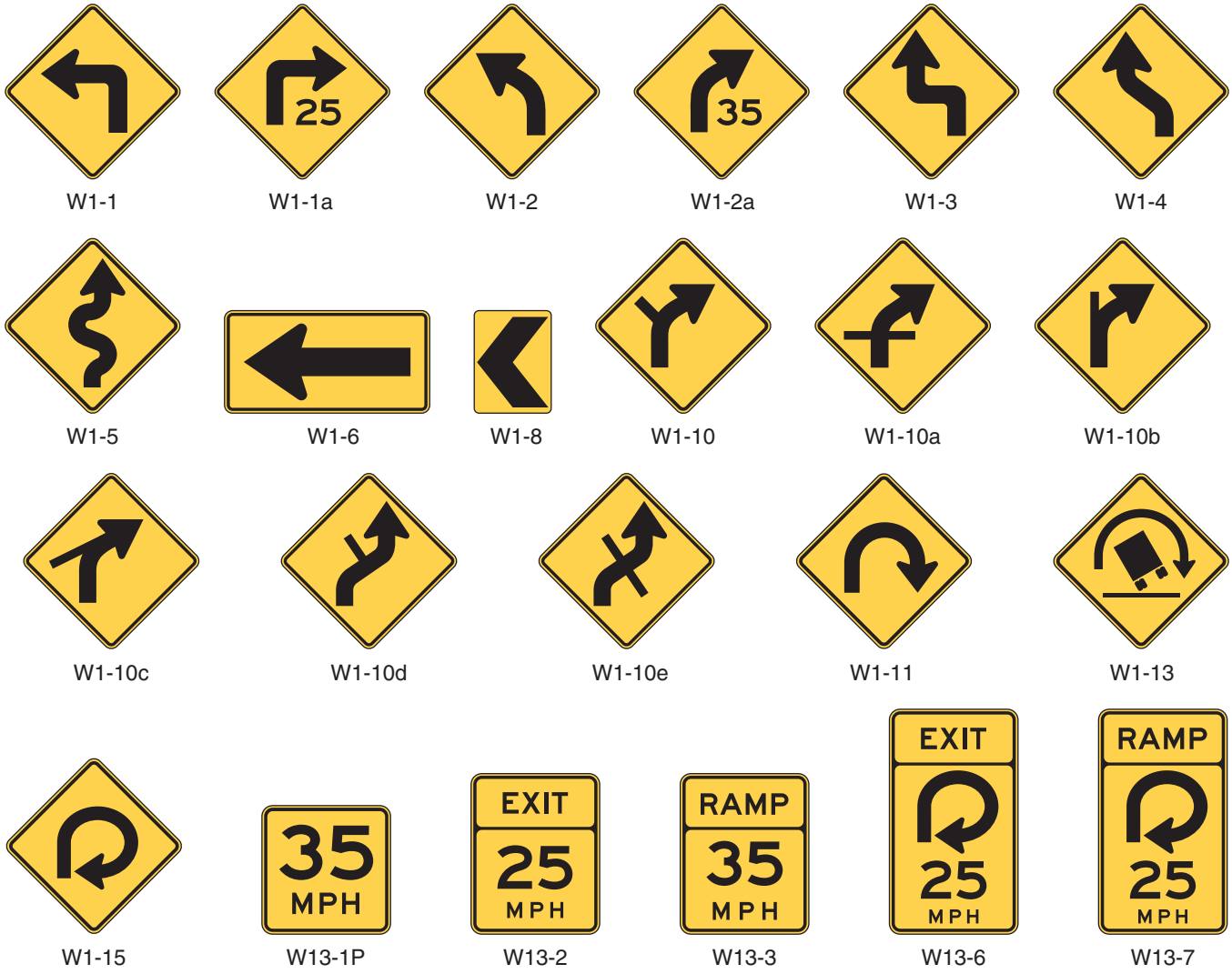
06 Warning signs that advise road users about conditions that are not related to a specific location, such as Deer Crossing or SOFT SHOULDER, may be installed in an appropriate location, based on engineering judgment, since they are not covered in Table 2C-4.

Section 2C.06 Horizontal Alignment Warning Signs

Support:

01 A variety of horizontal alignment warning signs (see Figure 2C-1), pavement markings (see Chapter 3B), and delineation (see Chapter 3F) can be used to advise motorists of a change in the roadway alignment. Uniform application of these traffic control devices with respect to the amount of change in the roadway alignment conveys a consistent message establishing driver expectancy and promoting effective roadway operations. The design and application of horizontal alignment warning signs to meet those requirements are addressed in Sections 2C.06 through 2C.15.

Figure 2C-1. Horizontal Alignment Signs and Plaques



W1-1 W1-1a W1-2 W1-2a W1-3 W1-4

W1-5 W1-6 W1-8 W1-10 W1-10a W1-10b

W1-10c W1-10d W1-10e W1-11 W1-13

W1-15 W13-1P W13-2 W13-3 W13-6 W13-7

Note: Turn arrows and reverse turn arrows may be substituted for the curve arrows and reverse curve arrows on the W1-10 series signs where appropriate.

Standard:

02 **In advance of horizontal curves on freeways, on expressways, and on roadways with more than 1,000 AADT that are functionally classified as arterials or collectors, horizontal alignment warning signs shall be used in accordance with Table 2C-5 based on the speed differential between the roadway's posted or statutory speed limit or 85th-percentile speed, whichever is higher, or the prevailing speed on the approach to the curve, and the horizontal curve's advisory speed.**

Option:

03 Horizontal Alignment Warning signs may also be used on other roadways or on arterial and collector roadways with less than 1,000 AADT based on engineering judgment.

Section 2C.07 Horizontal Alignment Signs (W1-1 through W1-5, W1-11, W1-15)

Standard:

01 **If Table 2C-5 indicates that a horizontal alignment sign (see Figure 2C-1) is required, recommended, or allowed, the sign installed in advance of the curve shall be a Curve (W1-2) sign unless a different sign is recommended or allowed by the provisions of this Section.**

02 **A Turn (W1-1) sign shall be used instead of a Curve sign in advance of curves that have advisory speeds of 30 mph or less (see Figure 2C-2).**

Guidance:

03 *Where there are two changes in roadway alignment in opposite directions that are separated by a tangent distance of less than 600 feet, the Reverse Turn (W1-3) sign should be used instead of multiple Turn (W1-1) signs and the Reverse Curve (W1-4) sign should be used instead of multiple Curve (W1-2) signs.*

Option:

04 A Winding Road (W1-5) sign may be used instead of multiple Turn (W1-1) or Curve (W1-2) signs where there are three or more changes in roadway alignment each separated by a tangent distance of less than 600 feet.

05 A NEXT XX MILES (W7-3aP) supplemental distance plaque (see Section 2C.55) may be installed below the Winding Road sign where continuous roadway curves exist for a specific distance.

06 If the curve has a change in horizontal alignment of 135 degrees or more, the Hairpin Curve (W1-11) sign may be used instead of a Curve or Turn sign.

07 If the curve has a change of direction of approximately 270 degrees, such as on a cloverleaf interchange ramp, the 270-degree Loop (W1-15) sign may be used instead of a Curve or Turn sign.

Guidance:

08 *When the Hairpin Curve sign or the 270-degree Loop sign is installed, either a One-Direction Large Arrow (W1-6) sign or Chevron Alignment (W1-8) signs should be installed on the outside of the turn or curve.*

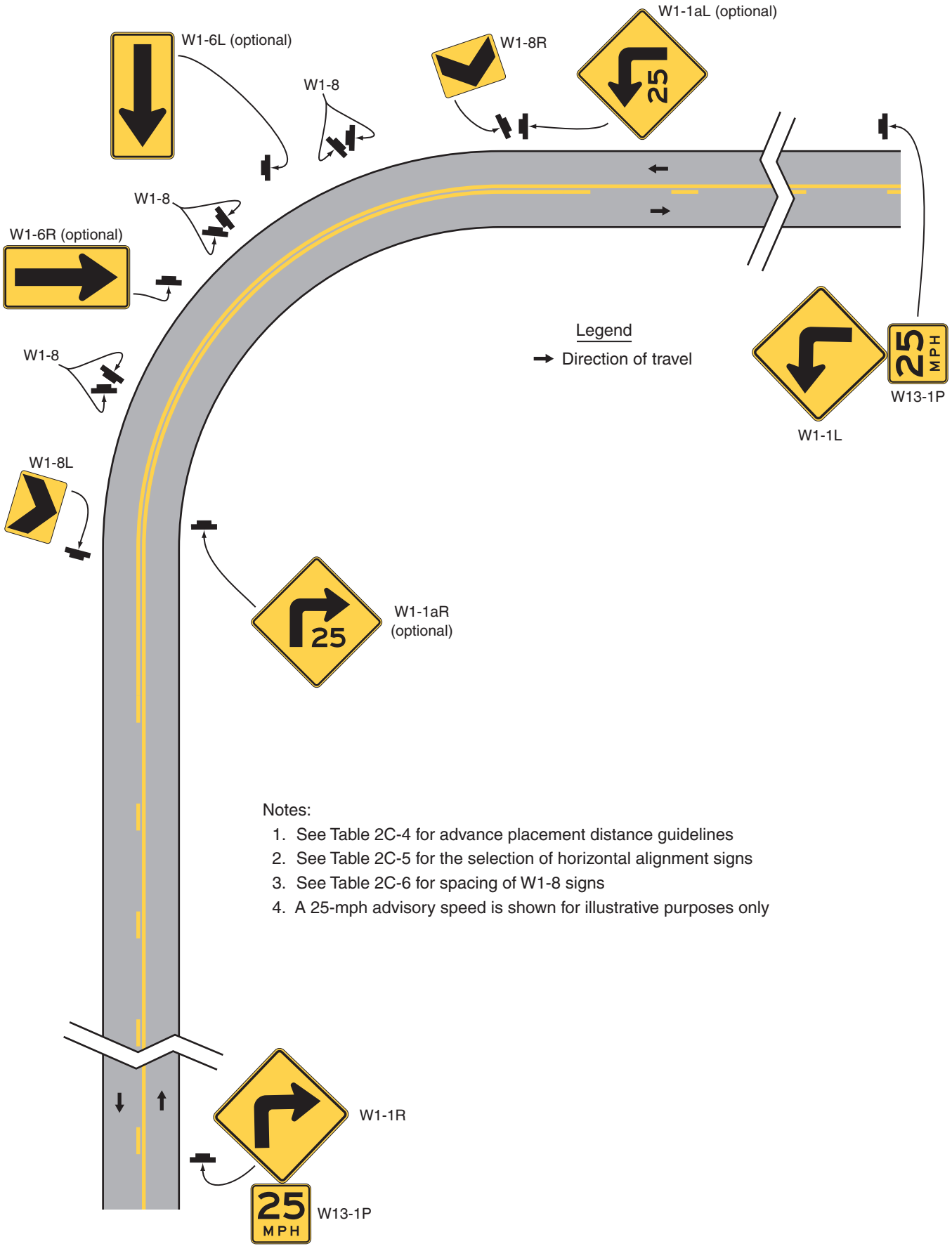
Table 2C-5. Horizontal Alignment Sign Selection

Type of Horizontal Alignment Sign	Difference Between Speed Limit and Advisory Speed				
	5 mph	10 mph	15 mph	20 mph	25 mph or more
Turn (W1-1), Curve (W1-2), Reverse Turn (W1-3), Reverse Curve (W1-4), Winding Road (W1-5), and Combination Horizontal Alignment/Intersection (W10-1) (see Section 2C.07 to determine which sign to use)	Recommended	Required	Required	Required	Required
Advisory Speed Plaque (W13-1P)	Recommended	Required	Required	Required	Required
Chevrons (W1-8) and/or One Direction Large Arrow (W1-6)	Optional	Recommended	Required	Required	Required
Exit Speed (W13-2) and Ramp Speed (W13-3) on exit ramp	Optional	Optional	Recommended	Required	Required

Note: Required means that the sign and/or plaque shall be used, recommended means that the sign and/or plaque should be used, and optional means that the sign and/or plaque may be used.

See Section 2C.06 for roadways with less than 1,000 ADT.

Figure 2C-2. Example of Warning Signs for a Turn



Notes:

1. See Table 2C-4 for advance placement distance guidelines
2. See Table 2C-5 for the selection of horizontal alignment signs
3. See Table 2C-6 for spacing of W1-8 signs
4. A 25-mph advisory speed is shown for illustrative purposes only

Section 2C.08 Advisory Speed Plaque (W13-1P)

Option:

01 The Advisory Speed (W13-1P) plaque (see Figure 2C-1) may be used to supplement any warning sign to indicate the advisory speed for a condition.

Standard:

02 **The use of the Advisory Speed plaque for horizontal curves shall be in accordance with the information shown in Table 2C-5. The Advisory Speed plaque shall also be used where an engineering study indicates a need to advise road users of the advisory speed for other roadway conditions.**

03 **If used, the Advisory Speed plaque shall carry the message XX MPH. The speed displayed shall be a multiple of 5 mph.**

04 **Except in emergencies or when the condition is temporary, an Advisory Speed plaque shall not be installed until the advisory speed has been determined by an engineering study.**

05 **The Advisory Speed plaque shall only be used to supplement a warning sign and shall not be installed as a separate sign installation.**

06 **The advisory speed shall be determined by an engineering study that follows established engineering practices.**

Support:

07 Among the established engineering practices that are appropriate for the determination of the recommended advisory speed for a horizontal curve are the following:

A. An accelerometer that provides a direct determination of side friction factors
B. A design speed equation
C. A traditional ball-bank indicator using the following criteria:
    1. 16 degrees of ball-bank for speeds of 20 mph or less
    2. 14 degrees of ball-bank for speeds of 25 to 30 mph
    3. 12 degrees of ball-bank for speeds of 35 mph and higher

08 The 16, 14, and 12 degrees of ball-bank criteria are comparable to the current AASHTO horizontal curve design guidance. Research has shown that drivers often exceed existing posted advisory curve speeds by 7 to 10 mph.

Guidance:

09 *The advisory speed should be determined based on free-flowing traffic conditions.*

10 *Because changes in conditions, such as roadway geometrics, surface characteristics, or sight distance, might affect the advisory speed, each location should be evaluated periodically or when conditions change.*

Section 2C.09 Chevron Alignment Sign (W1-8)

Standard:

01 **The use of the Chevron Alignment (W1-8) sign (see Figures 2C-1 and 2C-2) to provide additional emphasis and guidance for a change in horizontal alignment shall be in accordance with the information shown in Table 2C-5.**

Option:

02 When used, Chevron Alignment signs may be used instead of or in addition to standard delineators.

Standard:

03 **The Chevron Alignment sign shall be a vertical rectangle. No border shall be used on the Chevron Alignment sign.**

04 **If used, Chevron Alignment signs shall be installed on the outside of a turn or curve, in line with and at approximately a right angle to approaching traffic. Chevron Alignment signs shall be installed at a minimum height of 4 feet, measured vertically from the bottom of the sign to the elevation of the near edge of the traveled way.**

Guidance:

05 *The approximate spacing of Chevron Alignment signs on the turn or curve measured from the point of curvature (PC) should be as shown in Table 2C-6.*

06 *If used, Chevron Alignment signs should be visible for a sufficient distance to provide the road user with adequate time to react to the change in alignment.*

Standard:

07 **Chevron Alignment signs shall not be placed on the far side of a T-intersection facing traffic on the stem approach to warn drivers that a through movement is not physically possible, as this is the function of a Two-Direction (or One-Direction) Large Arrow sign.**

08 **Chevron Alignment signs shall not be used to mark obstructions within or adjacent to the roadway, including the beginning of guardrails or barriers, as this is the function of an object marker (see Section 2C.63).**

Table 2C-6. Typical Spacing of Chevron Alignment Signs on Horizontal Curves

Advisory Speed	Curve Radius	Sign Spacing
15 mph or less	Less than 200 feet	40 feet
20 to 30 mph	200 to 400 feet	80 feet
35 to 45 mph	401 to 700 feet	120 feet
50 to 60 mph	701 to 1,250 feet	160 feet
More than 60 mph	More than 1,250 feet	200 feet

Note: The relationship between the curve radius and the advisory speed shown in this table should not be used to determine the advisory speed.

Section 2C.10 Combination Horizontal Alignment/Advisory Speed Signs (W1-1a, W1-2a)

Option:

01 The Turn (W1-1) sign or the Curve (W1-2) sign may be combined with the Advisory Speed (W13-1P) plaque (see Section 2C.08) to create a combination Turn/Advisory Speed (W1-1a) sign or combination Curve/Advisory Speed (W1-2a) sign (see Figure 2C-1).

02 The combination Horizontal Alignment/Advisory Speed sign may be used to supplement the advance Horizontal Alignment warning sign and Advisory Speed plaque based upon an engineering study.

Standard:

03 **If used, the combination Horizontal Alignment/Advisory Speed sign shall not be used alone and shall not be used as a substitute for a Horizontal Alignment warning sign and Advisory Speed plaque at the advance warning location. The combination Horizontal Alignment/Advisory Speed sign shall only be used as a supplement to the advance Horizontal Alignment warning sign. If used, the combination Horizontal Alignment/Advisory Speed sign shall be installed at the beginning of the turn or curve.**

Guidance:

04 *The advisory speed displayed on the combination Horizontal Alignment/Advisory Speed sign should be based on the advisory speed for the horizontal curve using recommended engineering practices (see Section 2C.08).*

Section 2C.11 Combination Horizontal Alignment/Intersection Signs (W1-10 Series)

Option:

01 The Turn (W1-1) sign or the Curve (W1-2) sign may be combined with the Cross Road (W2-1) sign or the Side Road (W2-2 or W2-3) sign to create a combination Horizontal Alignment/Intersection (W1-10 series) sign (see Figure 2C-1) that depicts the condition where an intersection occurs within or immediately adjacent to a turn or curve.

Guidance:

02 *Elements of the combination Horizontal Alignment/Intersection sign related to horizontal alignment should comply with the provisions of Section 2C.07, and elements related to intersection configuration should comply with the provisions of Section 2C.46. The symbol design should approximate the configuration of the intersecting roadway(s). No more than one Cross Road or two Side Road symbols should be displayed on any one combination Horizontal Alignment/Intersection sign.*

Standard:

03 **The use of the combination Horizontal Alignment/Intersection sign shall be in accordance with the appropriate Turn or Curve sign information shown in Table 2C-5.**

Section 2C.12 One-Direction Large Arrow Sign (W1-6)

Option:

01 A One-Direction Large Arrow (W1-6) sign (see Figure 2C-1) may be used either as a supplement or alternative to Chevron Alignment signs in order to delineate a change in horizontal alignment (see Figure 2C-2).

02 A One-Direction Large Arrow (W1-6) sign may be used to supplement a Turn or Reverse Turn sign (see Figure 2C-2) to emphasize the abrupt curvature.

Standard:

03 **The One-Direction Large Arrow sign shall be a horizontal rectangle with an arrow pointing to the left or right.**

04 **The use of the One-Direction Large Arrow sign shall be in accordance with the information shown in Table 2C-5.**

05 **If used, the One-Direction Large Arrow sign shall be installed on the outside of a turn or curve in line with and at approximately a right angle to approaching traffic.**

06 **The One-Direction Large Arrow sign shall not be used where there is no alignment change in the direction of travel, such as at the beginnings and ends of medians or at center piers.**

07 **The One-Direction Large Arrow sign directing traffic to the right shall not be used in the central island of a roundabout.**

Guidance:

08 *If used, the One-Direction Large Arrow sign should be visible for a sufficient distance to provide the road user with adequate time to react to the change in alignment.*

Section 2C.13 Truck Rollover Warning Sign (W1-13)

Option:

01 A Truck Rollover Warning (W1-13) sign (see Figure 2C-1) may be used to warn drivers of vehicles with a high center of gravity, such as trucks, tankers, and recreational vehicles, of a curve or turn where geometric conditions might contribute to a loss of control and a rollover as determined by an engineering study.

Support:

02 Among the established engineering practices that are appropriate for the determination of the truck rollover potential of a horizontal curve are the following:

A. An accelerometer that provides a direct determination of side friction factors
B. A design speed equation
C. A traditional ball-bank indicator using 10 degrees of ball-bank

Standard:

03 **If a Truck Rollover Warning (W1-13) sign is used, it shall be accompanied by an Advisory Speed (W13-1P) plaque indicating the recommended speed for vehicles with a higher center of gravity.**

Option:

04 The Truck Rollover Warning sign may be displayed as a static sign, as a static sign supplemented by a flashing warning beacon, or as a changeable message sign activated by the detection of an approaching vehicle with a high center of gravity that is traveling in excess of the recommended speed for the condition.

Support:

05 The curved arrow on the Truck Rollover Warning sign shows the direction of roadway curvature. The truck tips in the opposite direction.

Section 2C.14 Advisory Exit and Ramp Speed Signs (W13-2 and W13-3)

Standard:

01 **Advisory Exit Speed (W13-2) and Advisory Ramp Speed (W13-3) signs (see Figure 2C-1) shall be vertical rectangles. The use of Advisory Exit Speed and Advisory Ramp Speed signs on freeway and expressway ramps shall be in accordance with the information shown in Table 2C-5.**

Guidance:

02 *If used, the Advisory Exit Speed sign should be installed along the deceleration lane and the advisory speed displayed should be based on an engineering study. When a Truck Rollover (W1-13) sign (see Section 2C.13) is also installed for the ramp, the advisory exit speed should be based on the truck advisory speed for the horizontal alignment using recommended engineering practices.*

03 *If used, the Advisory Exit Speed sign should be visible in time for the road user to decelerate and make an exiting maneuver.*

Support:

04 table 2C-4 lists recommended advance sign placement distances for deceleration to various advisory speeds.

Guidance:

05 *If used, the Advisory Ramp Speed sign should be installed on the ramp to confirm the ramp advisory speed.*

06 *If used, Chevron Alignment (W1-8) signs and/or One-Direction Large Arrow (W1-6) signs should be installed on the outside of the exit curve as described in Sections 2C.09 and 2C.12.*

Option:

07 Where there is a need to remind road users of the recommended advisory speed, a horizontal alignment warning sign with an advisory speed plaque may be installed at or beyond the beginning of the exit curve or on the outside of the curve, provided that it is apparent that the sign applies only to exiting traffic. These signs may also be used at intermediate points along the ramp, especially if the ramp curvature changes and the subsequent curves on the ramp have a different advisory speed than the initial ramp curve.

Support:

08 Figure 2C-3 shows an example of advisory speed signing for an exit ramp.

Section 2C.15 Combination Horizontal Alignment/Advisory Exit and Ramp Speed Signs (W13-6 and W13-7)

Option:

01 A horizontal alignment sign (see Section 2C.07) may be combined with an Advisory Exit Speed or Advisory Ramp Speed sign to create a combination Horizontal Alignment/Advisory Exit Speed (W13-6) sign or a combination Horizontal Alignment/Advisory Ramp Speed (W13-7) sign (see Figure 2C-1). These combination signs may be used where the severity of the exit ramp curvature might not be apparent to road users in the deceleration lane or where the curvature needs to be specifically identified as being on the exit ramp rather than on the mainline.

Section 2C.16 Hill Signs (W7-1, W7-1a)

Guidance:

01 *The Hill (W7-1) sign (see Figure 2C-4) should be used in advance of a downgrade where the length, percent of grade, horizontal curvature, and/or other physical features require special precautions on the part of road users.*

02 *The Hill sign and supplemental grade (W7-3P) plaque (see Section 2C.57) used in combination, or the W7-1a sign used alone, should be installed in advance of downgrades for the following conditions:*

A. 5% grade that is more than 3,000 feet in length,
B. 6% grade that is more than 2,000 feet in length,
C. 7% grade that is more than 1,000 feet in length,
D. 8% grade that is more than 750 feet in length, or
E. 9% grade that is more than 500 feet in length.

03 *These signs should also be installed for steeper grades or where crash experience and field observations indicate a need.*

04 *Supplemental plaques (see Section 2C.57) and larger signs should be used for emphasis or where special hill characteristics exist. On longer grades, the use of the Hill sign with a distance (W7-3aP) plaque or the combination distance/grade (W7-3bP) plaque at periodic intervals of approximately 1-mile spacing should be considered.*

Standard:

05 **If the percent grade is displayed on a supplemental plaque, the plaque shall be placed below the Hill (W7-1) sign.**

Option:

06 A USE LOW GEAR (W7-2P) or TRUCKS USE LOWER GEAR (W7-2bP) supplemental plaque (see Figure 2C-4) may be used to indicate a situation where downshifting as well as braking might be advisable.

Section 2C.17 Truck Escape Ramp Signs (W7-4 Series)

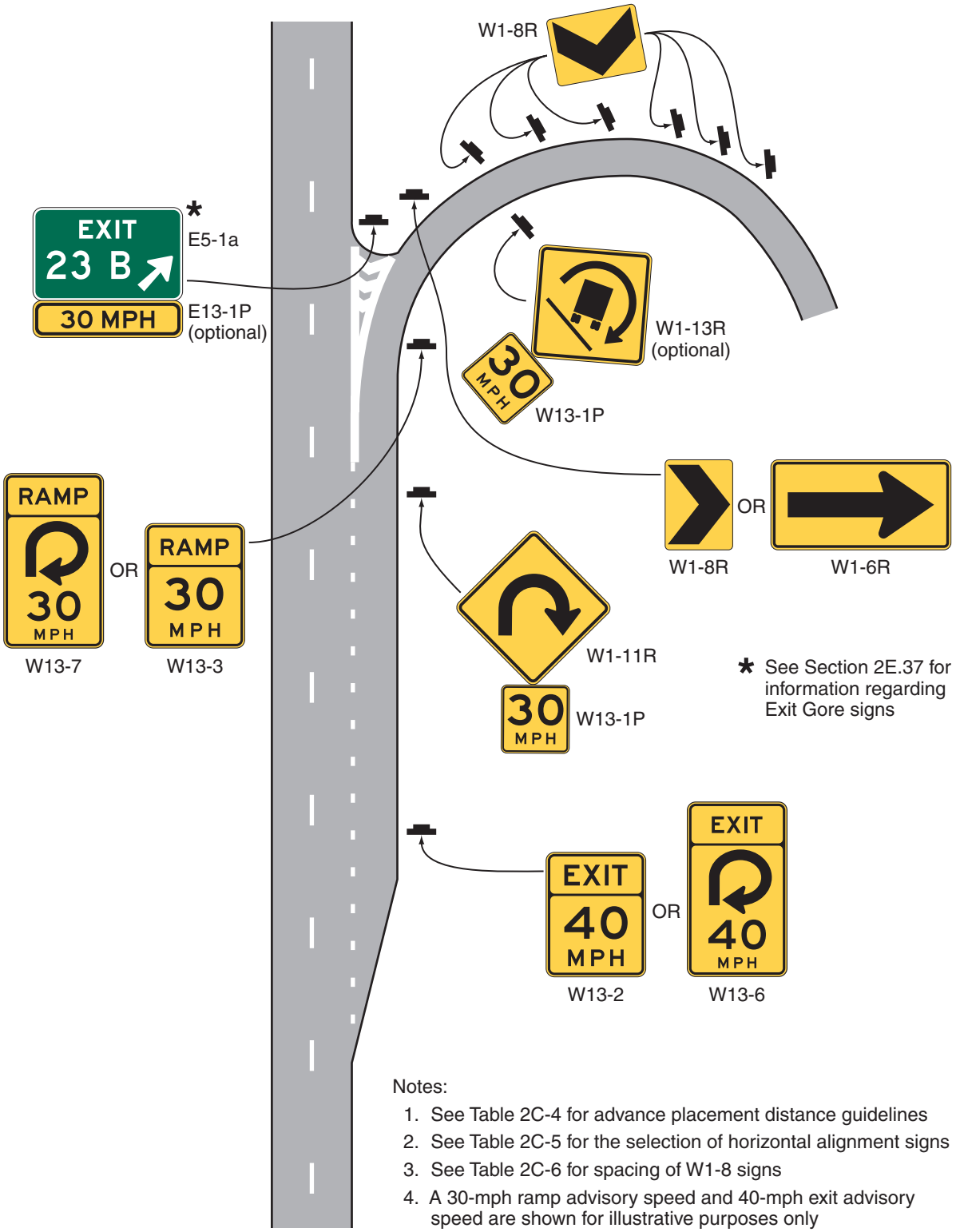
Guidance:

01 *Where applicable, truck escape (or runaway truck) ramp advance warning signs (see Figure 2C-4) should be located approximately 1 mile, and 1/2 mile in advance of the grade, and of the ramp. A sign also should be placed at the gore. A RUNAWAY VEHICLES ONLY (R4-10) sign (see Section 2B.35) should be installed near the ramp entrance to discourage other road users from entering the ramp. No Parking (R8-3) signs should be placed near the ramp entrance.*

Standard:

02 **When truck escape ramps are installed, at least one of the W7-4 series signs shall be used.**

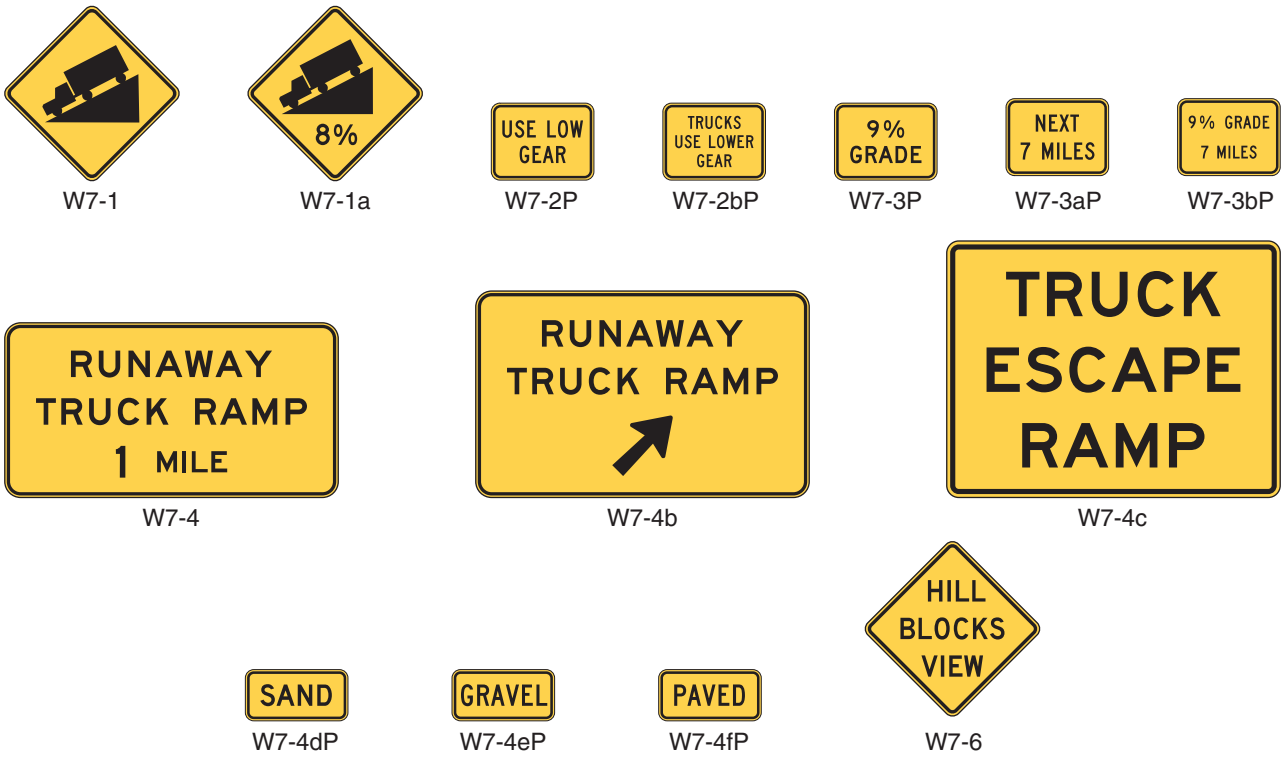
Figure 2C-3. Example of Advisory Speed Signing for an Exit Ramp



Notes:

1. See Table 2C-4 for advance placement distance guidelines
2. See Table 2C-5 for the selection of horizontal alignment signs
3. See Table 2C-6 for spacing of W1-8 signs
4. A 30-mph ramp advisory speed and 40-mph exit advisory speed are shown for illustrative purposes only

Figure 2C-4. Vertical Grade Signs and Plaques



W7-1 W7-1a W7-2P W7-2bP W7-3P W7-3aP W7-3bP W7-4 W7-4b W7-4c W7-4dP W7-4eP W7-4fP W7-6

Option:

03 A SAND (W7-4dP), GRAVEL (W7-4eP), or PAVED (W7-4fP) supplemental plaque (see Figure 2C-4) may be used to describe the ramp surface. State and local highway agencies may develop appropriate word message signs for the specific situation.

Section 2C.18 HILL BLOCKS VIEW Sign (W7-6)

Option:

01 A HILL BLOCKS VIEW (W7-6) sign (see Figure 2C-4) may be used in advance of a crest vertical curve to advise road users to reduce speed as they approach and traverse the hill as only limited stopping sight distance is available.

Guidance:

02 *When a HILL BLOCKS VIEW sign is used, it should be supplemented by an Advisory Speed (W13-1P) plaque indicating the recommended speed for traveling over the hillcrest based on available stopping sight distance.*

Section 2C.19 ROAD NARROWS Sign (W5-1)

Guidance:

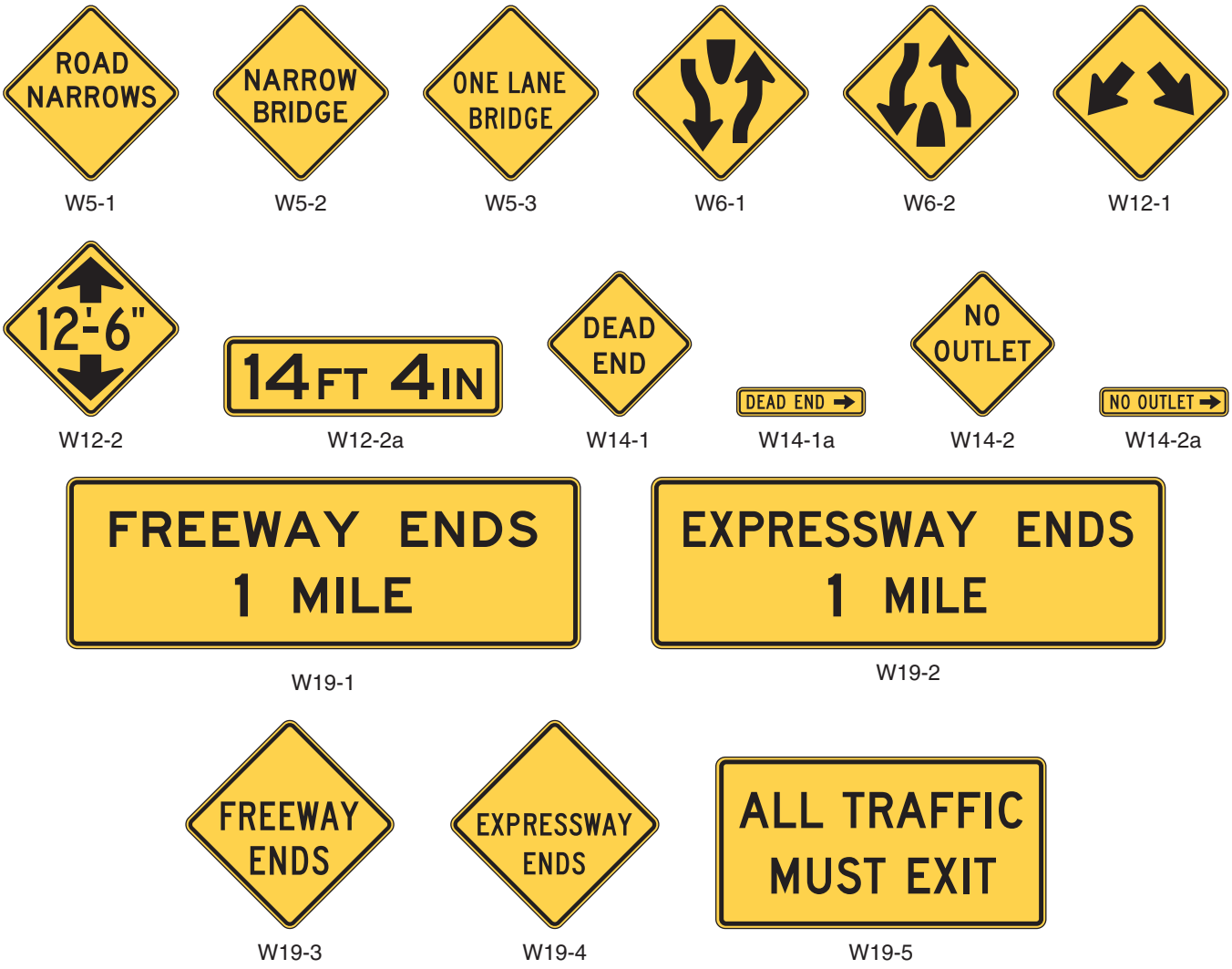
01 *Except as provided in Paragraph 2, a ROAD NARROWS (W5-1) sign (see Figure 2C-5) should be used in advance of a transition on two-lane roads where the pavement width is reduced abruptly to a width such that vehicles traveling in opposite directions cannot simultaneously travel through the narrow portion of the roadway without reducing speed.*

Option:

02 The ROAD NARROWS (W5-1) sign may be omitted on low-volume local streets that have speed limits of 30 mph or less.

03 Additional emphasis may be provided by the use of object markers and delineators (see Sections 2B.63 through 2B.65 and Chapter 3F). The Advisory Speed (W13-1P) plaque (see Section 2C.08) may be used to indicate the recommended speed.

Figure 2C-5. Miscellaneous Warning Signs



Section 2C.20 NARROW BRIDGE Sign (W5-2)

Guidance:

01 *A NARROW BRIDGE (W5-2) sign (see Figure 2C-5) should be used in advance of any bridge or culvert having a two-way roadway clearance width of 16 to 18 feet, or any bridge or culvert having a roadway clearance less than the width of the approach travel lanes.*

02 *Additional emphasis should be provided by the use of object markers, delineators, and/or pavement markings.*

Option:

03 A NARROW BRIDGE sign may be used in advance of a bridge or culvert on which the approach shoulders are narrowed or eliminated.

Section 2C.21 ONE LANE BRIDGE Sign (W5-3)

Guidance:

01 *A ONE LANE BRIDGE (W5-3) sign (see Figure 2C-5) should be used on two-way roadways in advance of any bridge or culvert:*

A. Having a clear roadway width of less than 16 feet, or
B. Having a clear roadway width of less than 18 feet when commercial vehicles constitute a high proportion of the traffic, or
C. Having a clear roadway width of 18 feet or less where the sight distance is limited on the approach to the structure.

02 *Additional emphasis should be provided by the use of object markers, delineators, and/or pavement markings.*

Section 2C.22 Divided Highway Sign (W6-1)

Guidance:

01 *A Divided Highway (W6-1) sign (see Figure 2C-5) should be used on the approaches to a section of highway (not an intersection or junction) where the opposing flows of traffic are separated by a median or other physical barrier.*

Standard:

02 **The Divided Highway (W6-1) sign shall not be used instead of a Keep Right (R4-7 series) sign on the approach end of a median island.**

Section 2C.23 Divided Highway Ends Sign (W6-2)

Guidance:

01 *A Divided Highway Ends (W6-2) sign (see Figure 2C-5) should be used in advance of the end of a section of physically divided highway (not an intersection or junction) as a warning of two-way traffic ahead.*

02 *The Two-Way Traffic (W6-3) sign (see Section 2C.44) should be used to give warning and notice of the transition to a two-lane, two-way section.*

Section 2C.24 Freeway or Expressway Ends Signs (W19 Series)

Option:

01 A FREEWAY ENDS XX MILES (W19-1) sign or a FREEWAY ENDS (W19-3) sign (see Figure 2C-5) may be used in advance of the end of a freeway.

02 An EXPRESSWAY ENDS XX MILES (W19-2) sign or an EXPRESSWAY ENDS (W19-4) sign (see Figure 2C-5) may be used in advance of the end of an expressway.

03 The rectangular W19-1 and W19-2 signs may be post-mounted or may be mounted overhead for increased emphasis.

Guidance:

04 *If the reason that the freeway is ending is that the next portion of the freeway is not yet constructed and as a result all traffic must use an exit ramp to leave the freeway, an ALL TRAFFIC MUST EXIT (W19-5) sign (see Figure 2C-5) should be used in addition to the Freeway Ends signs in advance of the downstream end of the freeway.*

Section 2C.25 Double Arrow Sign (W12-1)

Option:

01 The Double Arrow (W12-1) sign (see Figure 2C-5) may be used to advise road users that traffic is permitted to pass on either side of an island, obstruction, or gore in the roadway. Traffic separated by this sign may either rejoin or change directions.

Guidance:

02 *If used on an island, the Double Arrow sign should be mounted near the approach end.*

03 *If used in front of a pier or obstruction, the Double Arrow sign should be mounted on the face of, or just in front of, the obstruction. Where stripe markings are used on the obstruction, they should be discontinued to leave a 3-inch space around the outside of the sign.*

Section 2C.26 DEAD END/NO OUTLET Signs (W14-1, W14-1a, W14-2, W14-2a)

Option:

01 The DEAD END (W14-1) sign (see Figure 2C-5) may be used at the entrance of a single road or street that terminates in a dead end or cul-de-sac. The NO OUTLET (W14-2) sign (see Figure 2C-5) may be used at the entrance to a road or road network from which there is no other exit.

02 DEAD END (W14-1a) or NO OUTLET (W14-2a) signs (see Figure 2C-5) may be used in combination with Street Name (D3-1) signs (see Section 2D.43) to warn turning traffic that the cross street ends in the direction indicated by the arrow.

03 At locations where the cross street does not have a name, the W14-1a or W14-2a signs may be used alone in place of a street name sign.

Standard:

04 **The DEAD END (W14-1a) and NO OUTLET (W14-2a) signs shall be horizontal rectangles with an arrow pointing to the left or right.**

05 **When the W14-1 or W14-2 sign is used, the sign shall be posted as near as practical to the entry point or at a sufficient advance distance to permit the road user to avoid the dead end or no outlet condition by turning at the nearest intersecting street.**

06 **The DEAD END (W14-1a) or NO OUTLET (W14-2a) signs shall not be used instead of the W14-1 or W14-2 signs where traffic can proceed straight through the intersection into the dead end street or no outlet area.**

Section 2C.27 Low Clearance Signs (W12-2 and W12-2a)

Standard:

01 **The Low Clearance (W12-2) sign (see Figure 2C-5) shall be used to warn road users of clearances less than 12 inches above the statutory maximum vehicle height.**

Guidance:

02 *The actual clearance should be displayed on the Low Clearance sign to the nearest 1 inch not exceeding the actual clearance. However, in areas that experience changes in temperature causing frost action, a reduction, not exceeding 3 inches, should be used for this condition.*

03 *Where the clearance is less than the legal maximum vehicle height, the W12-2 sign with a supplemental distance plaque should be placed at the nearest intersecting road or wide point in the road at which a vehicle can detour or turn around.*

04 *In the case of an arch or other structure under which the clearance varies greatly, two or more signs should be used as necessary on the structure itself to give information as to the clearances over the entire roadway.*

05 *Clearances should be evaluated periodically, particularly when resurfacing operations have occurred.*

Option:

06 The Low Clearance sign may be installed on or in advance of the structure. If a sign is placed on the structure, it may be a rectangular shape (W12-2a) with the appropriate legend (see Figure 2C-5).

Section 2C.28 BUMP and DIP Signs (W8-1, W8-2)

Guidance:

01 *BUMP (W8-1) and DIP (W8-2) signs (see Figure 2C-6) should be used to give warning of a sharp rise or depression in the profile of the road.*

Option:

02 These signs may be supplemented with an Advisory Speed plaque (see Section 2C.08).

Standard:

03 **The DIP sign shall not be used at a short stretch of depressed alignment that might momentarily hide a vehicle.**

Guidance:

04 *A short stretch of depressed alignment that might momentarily hide a vehicle should be treated as a no-passing zone when center line striping is provided on a two-lane or three-lane road (see Section 3B.02).*

Section 2C.29 SPEED HUMP Sign (W17-1)

Guidance:

01 *The SPEED HUMP (W17-1) sign (see Figure 2C-6) should be used to give warning of a vertical deflection in the roadway that is designed to limit the speed of traffic.*

02 *If used, the SPEED HUMP sign should be supplemented by an Advisory Speed plaque (see Section 2C.08).*

Option:

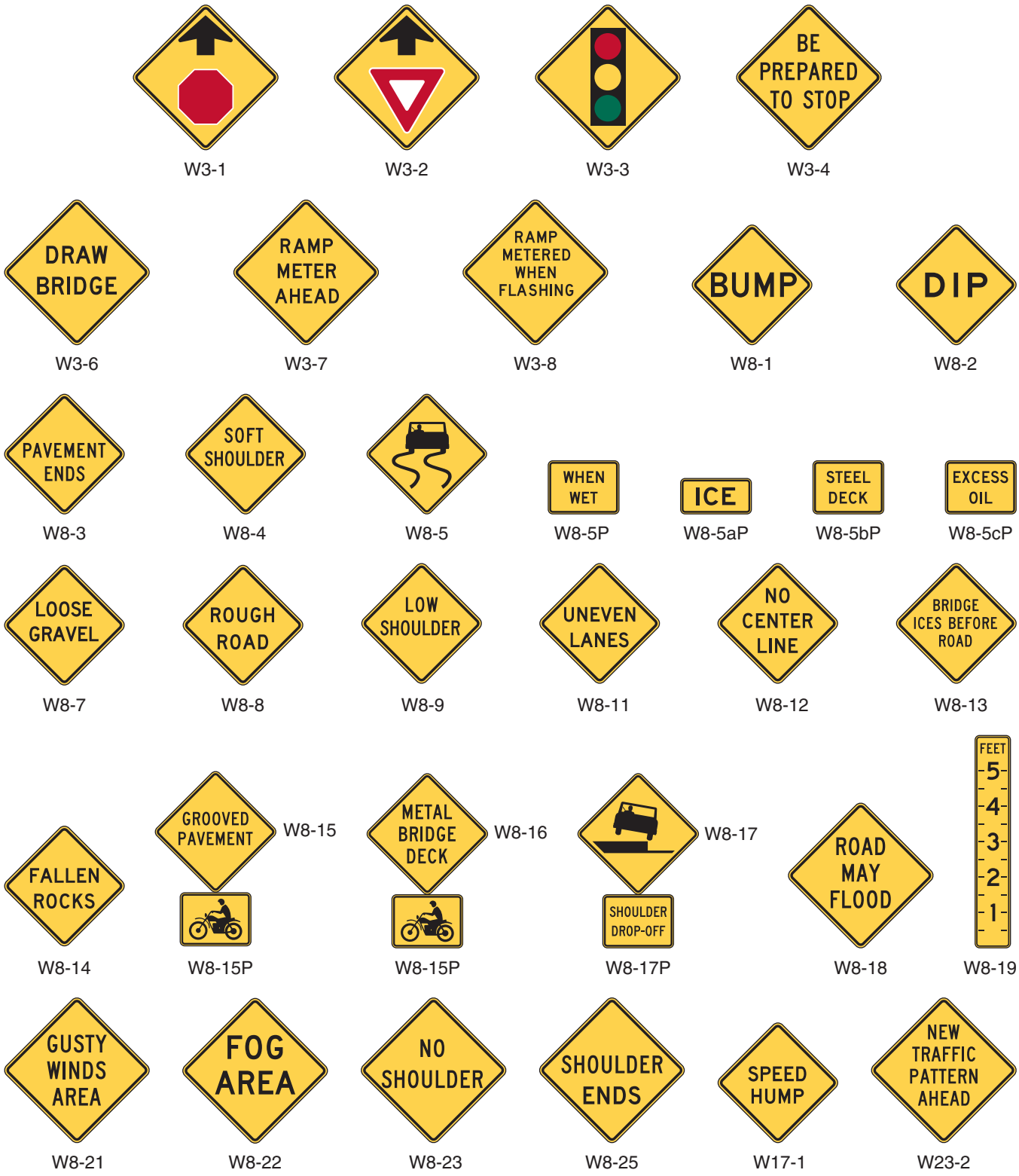
03 If a series of speed humps exists in close proximity, an Advisory Speed plaque may be eliminated on all but the first SPEED HUMP sign in the series.

04 The legend SPEED BUMP may be used instead of the legend SPEED HUMP on the W17-1 sign.

Support:

05 Speed humps generally provide more gradual vertical deflection than speed bumps. Speed bumps limit the speed of traffic more severely than speed humps. Other forms of speed humps include speed tables and raised intersections. However, these differences in engineering terminology are not well known by the public, so for signing purposes these terms are interchangeable.

Figure 2C-6. Roadway and Weather Condition and Advance Traffic Control Signs and Plaques



Section 2C.30 PAVEMENT ENDS Sign (W8-3)

Guidance:

01 *A PAVEMENT ENDS (W8-3) word message sign (see Figure 2C-6) should be used where a paved surface changes to either a gravel treated surface or an earth road surface.*

Option:

02 An Advisory Speed plaque (see Section 2C.08) may be used when the change in roadway condition requires a reduced speed.

Section 2C.31 Shoulder Signs (W8-4, W8-9, W8-17, W8-23, and W8-25)

Option:

01 The SOFT SHOULDER (W8-4) sign (see Figure 2C-6) may be used to warn of a soft shoulder condition.

02 The LOW SHOULDER (W8-9) sign (see Figure 2C-6) may be used to warn of a shoulder condition where there is an elevation difference of less than 3 inches between the shoulder and the travel lane.

Guidance:

03 *The Shoulder Drop Off (W8-17) sign (see Figure 2C-6) should be used where an unprotected shoulder drop-off, adjacent to the travel lane, exceeds 3 inches in depth for a significant continuous length along the roadway, based on engineering judgment.*

Option:

04 A SHOULDER DROP-OFF (W8-17P) supplemental plaque (see Figure 2C-6) may be mounted below the W8-17 sign.

05 The NO SHOULDER (W8-23) sign (see Figure 2C-6) may be used to warn road users that a shoulder does not exist along a portion of the roadway.

06 The SHOULDER ENDS (W8-25) sign (see Figure 2C-6) may be used to warn road users that a shoulder is ending.

Standard:

07 **When used, shoulder signs shall be placed in advance of the condition (see Table 2C-4).**

Guidance:

08 *Additional shoulder signs should be placed at appropriate intervals along the road where the condition continually exists.*

Section 2C.32 Surface Condition Signs (W8-5, W8-7, W8-8, W8-11, W8-13, and W8-14)

Option:

01 The Slippery When Wet (W8-5) sign (see Figure 2C-6) may be used to warn of unexpected slippery conditions. Supplemental plaques with legends such as ICE, WHEN WET, STEEL DECK, or EXCESS OIL may be used with the W8-5 sign to indicate the reason that the slippery conditions might be present.

02 The LOOSE GRAVEL (W8-7) sign (see Figure 2C-6) may be used to warn of loose gravel on the roadway surface.

03 The ROUGH ROAD (W8-8) sign (see Figure 2C-6) may be used to warn of a rough roadway surface.

04 An UNEVEN LANES (W8-11) sign (see Figure 2C-6) may be used to warn of a difference in elevation between travel lanes.

05 The BRIDGE ICES BEFORE ROAD (W8-13) sign (see Figure 2C-6) may be used in advance of bridges to advise bridge users of winter weather conditions. The BRIDGE ICES BEFORE ROAD sign may be removed or covered during seasons of the year when its message is not relevant.

06 The FALLEN ROCKS (W8-14) sign (see Figure 2C-6) may be used in advance of an area that is adjacent to a hillside, mountain, or cliff where rocks frequently fall onto the roadway.

Guidance:

07 *When used, Surface Condition signs should be placed in advance of the beginning of the affected section (see Table 2C-4), and additional signs should be placed at appropriate intervals along the road where the condition exists.*

Section 2C.33 Warning Signs and Plaques for Motorcyclists (W8-15, W8-15P, and W8-16)

Support:

01 The signs and plaques described in this Section are intended to give motorcyclists advance notice of surface conditions that might adversely affect their ability to maintain control of their motorcycle under wet or dry conditions. The use of some of the advance surface condition warning signs described in Section 2C.32, such as Slippery When Wet, LOOSE GRAVEL, or ROUGH ROAD, can also be helpful to motorcyclists if those conditions exist.

Option:

02 If a portion of a street or highway features a roadway pavement surface that is grooved or textured instead of smooth, such as a grooved skid resistance treatment for a horizontal curve or a brick pavement surface, a GROOVED PAVEMENT (W8-15) sign (see Figure 2C-6) may be used to provide advance warning of this condition to motorcyclists, bicyclists, and other road users. Alternate legends such as TEXTURED PAVEMENT or BRICK PAVEMENT may also be used on the W8-15 sign.

03 If a bridge or a portion of a bridge includes a metal or grated surface, a METAL BRIDGE DECK (W8-16) sign (see Figure 2C-6) may be used to provide advance warning of this condition to motorcyclists, bicyclists, and other road users.

04 A Motorcycle (W8-15P) plaque (see Figure 2C-6) may be mounted below or above a W8-15 or W8-16 sign if the warning is intended to be directed primarily to motorcyclists.

Section 2C.34 NO CENTER LINE Sign (W8-12)

Option:

01 The NO CENTER LINE (W8-12) sign (see Figure 2C-6) may be used to warn of a roadway without center line pavement markings.

Section 2C.35 Weather Condition Signs (W8-18, W8-19, W8-21, and W8-22)

Option:

01 The ROAD MAY FLOOD (W8-18) sign (see Figure 2C-6) may be used to warn road users that a section of roadway is subject to frequent flooding. A Depth Gauge (W8-19) sign (see Figure 2C-6) may also be installed within a roadway section that frequently floods.

Standard:

02 **If used, the Depth Gauge sign shall be in addition to the ROAD MAY FLOOD sign and shall indicate the depth of the water at the deepest point on the roadway.**

Option:

03 The GUSTY WINDS AREA (W8-21) sign (see Figure 2C-6) may be used to warn road users that wind gusts frequently occur along a section of highway that are strong enough to impact the stability of trucks, recreational vehicles, and other vehicles with high centers of gravity. A NEXT XX MILES (W7-3a) supplemental plaque may be mounted below the W8-21 sign to inform road users of the length of roadway that frequently experiences strong wind gusts.

04 The FOG AREA (W8-22) sign (see Figure 2C-6) may be used to warn road users that foggy conditions frequently reduce visibility along a section of highway. A NEXT XX MILES (W7-3a) supplemental plaque may be mounted below the W8-22 sign to inform road users of the length of roadway that frequently experiences foggy conditions.

Section 2C.36 Advance Traffic Control Signs (W3-1, W3-2, W3-3, W3-4)

Standard:

01 **The Advance Traffic Control symbol signs (see Figure 2C-6) include the Stop Ahead (W3-1), Yield Ahead (W3-2), and Signal Ahead (W3-3) signs. These signs shall be installed on an approach to a primary traffic control device that is not visible for a sufficient distance to permit the road user to respond to the device (see Table 2C-4). The visibility criteria for a traffic control signal shall be based on having a continuous view of at least two signal faces for the distance specified in Table 4D-2.**

Support:

02 Figure 2A-4 shows the typical placement of an Advance Traffic Control sign.

03 Permanent obstructions causing the limited visibility might include roadway alignment or structures. Intermittent obstructions might include foliage or parked vehicles.

Guidance:

04 *Where intermittent obstructions occur, engineering judgment should determine the treatment to be implemented.*

Option:

05 An Advance Traffic Control sign may be used for additional emphasis of the primary traffic control device, even when the visibility distance to the device is satisfactory.

06 An advance street name plaque (see Section 2C.58) may be installed above or below an Advance Traffic Control sign.

07 A warning beacon may be used with an Advance Traffic Control sign.

08 A BE PREPARED TO STOP (W3-4) sign (see Figure 2C-6) may be used to warn of stopped traffic caused by a traffic control signal or in advance of a section of roadway that regularly experiences traffic congestion.

Standard:

09 **When a BE PREPARED TO STOP sign is used in advance of a traffic control signal, it shall be used in addition to a Signal Ahead sign and shall be placed downstream from the Signal Ahead (W3-3) sign.**

Option:

10 The BE PREPARED TO STOP sign may be supplemented with a warning beacon (see Section 4L.03).

Guidance:

11 *When the warning beacon is interconnected with a traffic control signal or queue detection system, the BE PREPARED TO STOP sign should be supplemented with a WHEN FLASHING (W16-13P) plaque (see Figure 2C-12).*

Support:

12 Section 2C.40 contains information regarding the use of a NO MERGE AREA (W4-5P) supplemental plaque in conjunction with a Yield Ahead sign.

Section 2C.37 Advance Ramp Control Signal Signs (W3-7 and W3-8)

Option:

01 A RAMP METER AHEAD (W3-7) sign (see Figure 2C-6) may be used to warn road users that a freeway entrance ramp is metered and that they will encounter a ramp control signal (see Chapter 4I).

Guidance:

02 *When the ramp control signals are operated only during certain periods of the day, a RAMP METERED WHEN FLASHING (W3-8) sign (see Figure 2C-6) should be installed in advance of the ramp control signal near the entrance to the ramp, or on the arterial on the approach to the ramp, to alert road users to the presence and operation of ramp meters.*

Standard:

03 **The RAMP METERED WHEN FLASHING sign shall be supplemented with a warning beacon (see Section 4L.03) that flashes when the ramp control signal is in operation.**

Section 2C.38 Reduced Speed Limit Ahead Signs (W3-5, W3-5a)

Guidance:

01 *A Reduced Speed Limit Ahead (W3-5 or W3-5a) sign (see Figure 2C-7) should be used to inform road users of a reduced speed zone where the speed limit is being reduced by more than 10 mph, or where engineering judgment indicates the need for advance notice to comply with the posted speed limit ahead.*

Standard:

02 **If used, Reduced Speed Limit Ahead signs shall be followed by a Speed Limit (R2-1) sign installed at the beginning of the zone where the speed limit applies.**

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

Figure 2C-7. Reduced Speed Limit Ahead Signs

W3-5

W3-5a

Section 2C.39 DRAW BRIDGE Sign (W3-6)

Standard:

01 **A DRAW BRIDGE (W3-6) sign (see Figure 2C-6) shall be used in advance of movable bridge signals and gates (see Section 4J.02) to give warning to road users, except in urban conditions where such signing would not be practical.**

Section 2C.40 Merge Signs (W4-1, W4-5)

Option:

01 A Merge (W4-1) sign (see Figure 2C-8) may be used to warn road users on the major roadway that merging movements might be encountered in advance of a point where lanes from two separate roadways converge as a single traffic lane and no turning conflict occurs.

02 A Merge sign may also be installed on the side of the entering roadway to warn road users on the entering roadway of the merge condition.

Guidance:

03 *The Merge sign should be installed on the side of the major roadway where merging traffic will be encountered and in such a position as to not obstruct the road user's view of entering traffic.*

04 *Where two roadways of approximately equal importance converge, a Merge sign should be placed on each roadway.*

05 *When a Merge sign is to be installed on an entering roadway that curves before merging with the major roadway, such as a ramp with a curving horizontal alignment as it approaches the major roadway, the Entering Roadway Merge (W4-5) sign (see Figure 2C-8) should be used to better portray the actual geometric conditions to road users on the entering roadway.*

06 *The Merge sign should not be used where two roadways converge and merging movements are not required.*

07 *The Merge sign should not be used in place of a Lane Ends sign (see Section 2C.42) where lanes of traffic moving on a single roadway must merge because of a reduction in the actual or usable pavement width.*

Option:

08 An Entering Roadway Merge (W4-5) sign with a NO MERGE AREA (W4-5P) supplemental plaque (see Figure 2C-8) mounted below it may be used to warn road users on an entering roadway that they will encounter an abrupt merging situation without an acceleration lane at the downstream end of the ramp.

09 A Merge (W4-1) sign with a NO MERGE AREA (W4-5P) supplemental plaque mounted below it may be used to warn road users on the major roadway that traffic on an entering roadway will encounter an abrupt merging situation without an acceleration lane at the downstream end of the ramp.

Figure 2C-8. Merging and Passing Signs and Plaques

W4-1 W4-2 W4-3 W4-5 W4-5P W4-6

W6-3 W9-1 W9-2 W9-7 W14-3

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

Section 2C.41 Added Lane Signs (W4-3, W4-6)

Guidance:

01 *The Added Lane (W4-3) sign (see Figure 2C-8) should be installed in advance of a point where two roadways converge and merging movements are not required. When possible, the Added Lane sign should be placed such that it is visible from both roadways; if this is not possible, an Added Lane sign should be placed on the side of each roadway.*

02 *When an Added Lane sign is to be installed on a roadway that curves before converging with another roadway that has a tangent alignment at the point of convergence, the Entering Roadway Added Lane (W4-6) sign (see Figure 2C-8) should be used to better portray the actual geometric conditions to road users on the curving roadway.*

Section 2C.42 Lane Ends Signs (W4-2, W9-1, W9-2)

Guidance:

01 *The LANE ENDS MERGE LEFT (RIGHT) (W9-2) sign or the Lane Ends (W4-2) sign should be used to warn of the reduction in the number of traffic lanes in the direction of travel on a multi-lane highway (see Figure 2C-8).*

Option:

02 The RIGHT (LEFT) LANE ENDS (W9-1) sign (see Figure 2C-8) may be used in advance of the Lane Ends (W4-2) sign or the LANE ENDS MERGE LEFT (RIGHT) (W9-2) sign as additional warning or to emphasize that the traffic lane is ending and that a merging maneuver will be required.

Guidance:

03 *If used, the RIGHT (LEFT) LANE ENDS (W9-1) sign should be installed adjacent to the Lane-Reduction Arrow pavement markings.*

Option:

04 On one-way streets or on divided highways where the width of the median will permit, two Lane Ends signs may be placed facing approaching traffic, one on the right-hand side and the other on the left-hand side or median.

Support:

05 Section 3B.09 contains information regarding the use of pavement markings in conjunction with a lane reduction.

Guidance:

06 *Where an extra lane has been provided for slower moving traffic (see Section 2B.31), a Lane Ends word sign or a Lane Ends (W4-2) symbol sign should be installed in advance of the downstream end of the extra lane.*

07 *Lane Ends signs should not be installed in advance of the downstream end of an acceleration lane.*

Standard:

08 **In dropped lane situations, regulatory signs (see Section 2B.20) shall be used to inform road users that a through lane is becoming a mandatory turn lane. The W4-2, W9-1, and W9-2 signs shall not be used in dropped lane situations.**

Section 2C.43 RIGHT (LEFT) LANE EXIT ONLY AHEAD Sign (W9-7)

Option:

01 The RIGHT (LEFT) LANE EXIT ONLY AHEAD (W9-7) sign (see Figure 2C-8) may be used to provide advance warning to road users that traffic in the right-hand (left-hand) lane of a roadway that is approaching a grade-separated interchange will be required to depart the roadway on an exit ramp at the next interchange.

Standard:

02 **The W9-7 sign shall be a horizontal rectangle with a black legend and border on a yellow background.**

Guidance:

03 *If used, the W9-7 sign should be installed upstream from the first overhead guide sign that contains an EXIT ONLY sign panel or upstream from the first RIGHT (LEFT) LANE MUST EXIT (R3-33) regulatory sign, whichever is farther upstream from the exit.*

Support:

04 Section 2B.23 contains information regarding a regulatory sign that can also be used for lane drops at grade-separated interchanges.

Section 2C.44 Two-Way Traffic Sign (W6-3)

Guidance:

01 *A Two-Way Traffic (W6-3) sign (see Figure 2C-8) should be used to warn road users of a transition from a multi-lane divided section of roadway to a two-lane, two-way section of roadway.*

02 *A Two-Way Traffic (W6-3) sign with an AHEAD (W16-9P) plaque (see Figure 2C-12) should be used to warn road users of a transition from a one-way street to a two-lane, two-way section of roadway (see Figure 2B-14).*

Option:

03 The Two-Way Traffic sign may be used at intervals along a two-lane, two-way roadway and may be used to supplement the Divided Highway (Road) Ends (W6-2) sign discussed in Section 2C.23.

Section 2C.45 NO PASSING ZONE Sign (W14-3)

Standard:

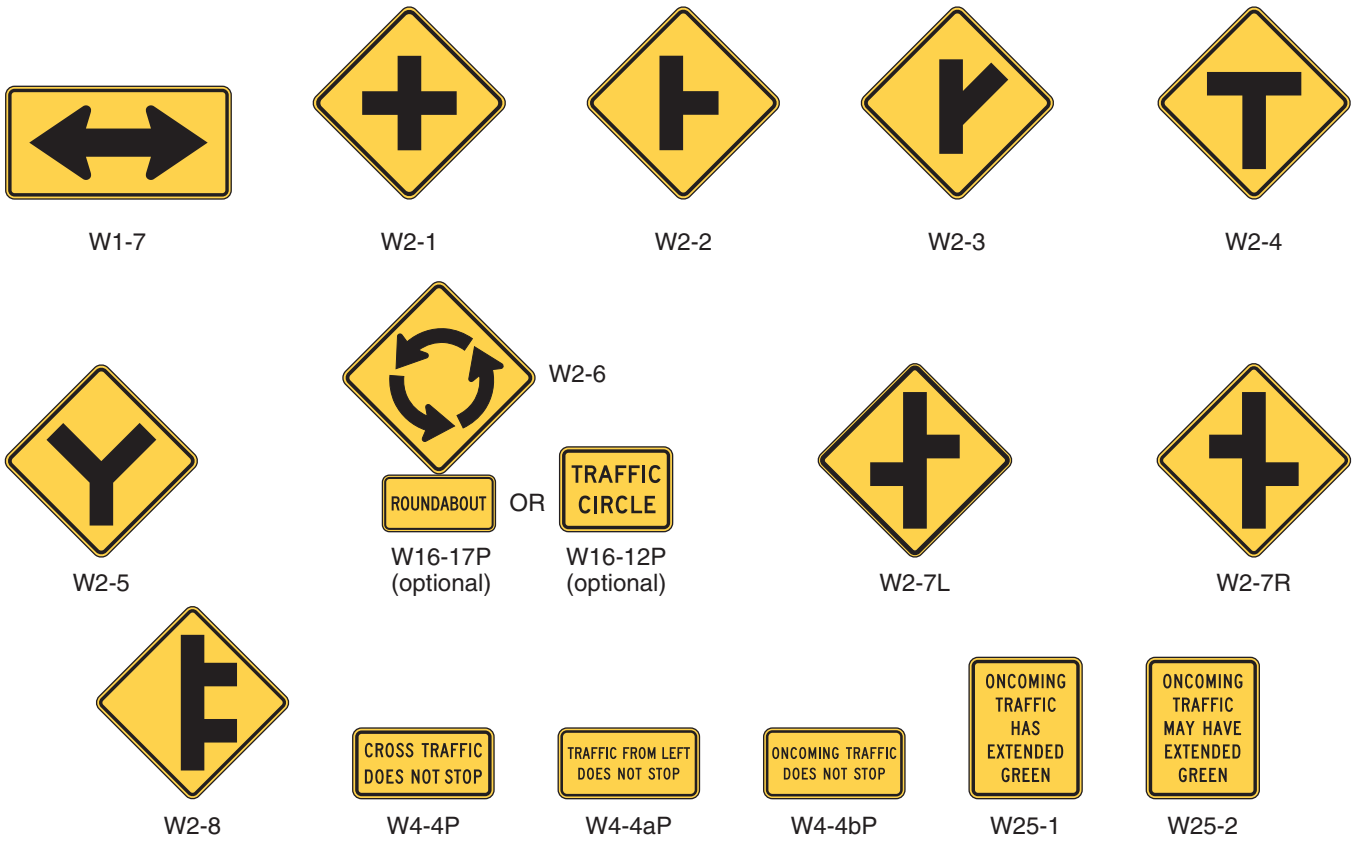
01 **The NO PASSING ZONE (W14-3) sign (see Figure 2C-8) shall be a pennant-shaped isosceles triangle with its longer axis horizontal and pointing to the right. When used, the NO PASSING ZONE sign shall be installed on the left side of the roadway at the beginning of no-passing zones identified by pavement markings or DO NOT PASS signs or both (see Sections 2B.28 and 3B.02).**

Section 2C.46 Intersection Warning Signs (W2-1 through W2-8)

Option:

01 A Cross Road (W2-1) symbol, Side Road (W2-2 or W2-3) symbol, T-Symbol (W2-4), or Y-Symbol (W2-5) sign (see Figure 2C-9) may be used in advance of an intersection to indicate the presence of an intersection and the possibility of turning or entering traffic.

Figure 2C-9. Intersection Warning Signs and Plaques



02 The Circular Intersection (W2-6) symbol sign (see Figure 2C-9) may be installed in advance of a circular intersection (see Figures 2B-21 through 2B-23).

Guidance:

03 *If an approach to a roundabout has a statutory or posted speed limit of 40 mph or higher, the Circular Intersection (W2-6) symbol sign should be installed in advance of the circular intersection.*

Option:

04 An educational plaque (see Figure 2C-9) with a legend such as ROUNDABOUT (W16-17P) or TRAFFIC CIRCLE (W16-12P) may be mounted below a Circular Intersection symbol sign.

05 The relative importance of the intersecting roadways may be shown by different widths of lines in the symbol.

06 An advance street name plaque (see Section 2C.58) may be installed above or below an Intersection Warning sign.

Guidance:

07 *The Intersection Warning sign should illustrate and depict the general configuration of the intersecting roadway, such as cross road, side road, T-intersection, or Y-intersection.*

08 *Intersection Warning signs, other than the Circular Intersection (W2-6) symbol sign and the T-intersection (W2-4) symbol sign should not be used on approaches controlled by STOP signs, YIELD signs, or signals.*

09 *If an Intersection Warning sign is used where the side roads are not opposite of each other, the Offset Side Roads (W2-7) symbol sign (see Figure 2C-9) should be used instead of the Cross Road symbol sign.*

10 *If an Intersection Warning sign is used where two closely-spaced side roads are on the same side of the highway, the Double Side Roads (W2-8) symbol sign (see Figure 2C-9) should be used instead of the Side Road symbol sign.*

11 *No more than two side road symbols should be displayed on the same side of the highway on a W2-7 or W2-8 symbol sign, and no more than three side road symbols should be displayed on a W2-7 or W2-8 symbol sign.*

Support:

12 Figure 2A-4 shows the typical placement of an Intersection Warning sign.

Section 2C.47 Two-Direction Large Arrow Sign (W1-7)

Standard:

01 **The Two-Direction Large Arrow (W1-7) sign (see Figure 2C-9) shall be a horizontal rectangle.**

02 **If used, it shall be installed on the far side of a T-intersection in line with, and at approximately a right angle to, traffic approaching from the stem of the T-intersection.**

03 **The Two-Direction Large Arrow sign shall not be used where there is no change in the direction of travel such as at the beginnings and ends of medians or at center piers.**

04 **The Two-Direction Large Arrow sign directing traffic to the left and right shall not be used in the central island of a roundabout.**

Guidance:

05 *The Two-Direction Large Arrow sign should be visible for a sufficient distance to provide the road user with adequate time to react to the intersection configuration.*

Section 2C.48 Traffic Signal Signs (W25-1, W25-2)

Standard:

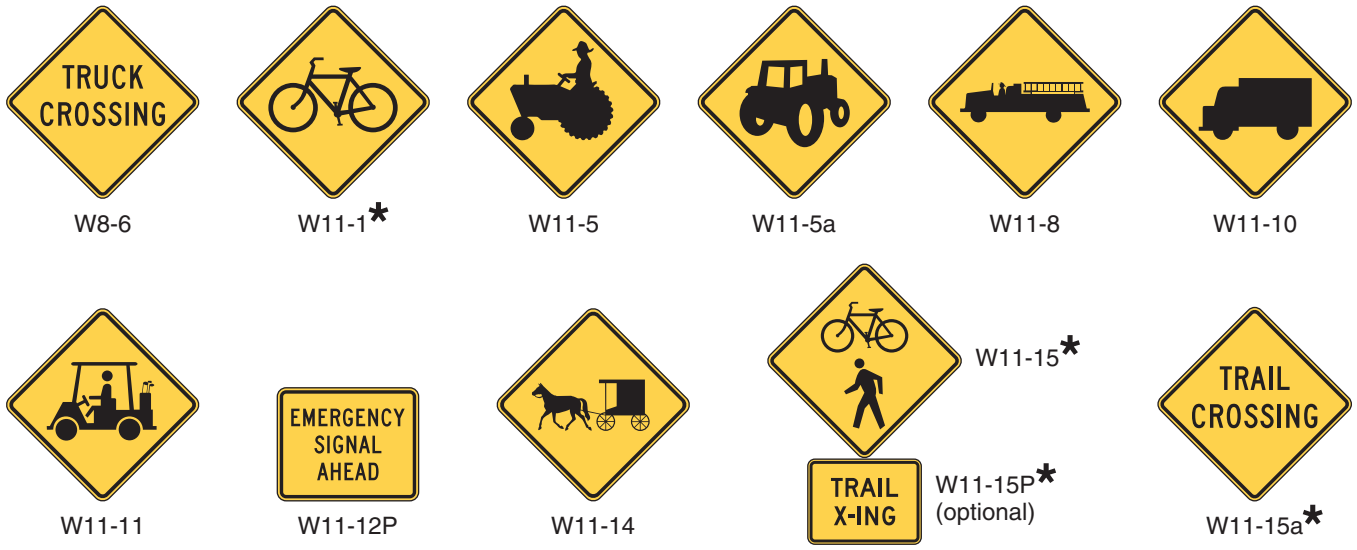
01 **At locations where either a W25-1 or a W25-2 sign is required based on the provisions in Section 4D.05, the W25-1 or W25-2 sign (see Figure 2C-9) shall be installed near the left-most signal head. The W25-1 and W25-2 signs shall be vertical rectangles.**

Section 2C.49 Vehicular Traffic Warning Signs (W8-6, W11-1, W11-5, W11-5a, W11-8, W11-10, W11-11, W11-12P, W11-14, W11-15, and W11-15a)

Option:

01 Vehicular Traffic Warning (W8-6, W11-1, W11-5, W11-5a, W11-8, W11-10, W11-11, W11-12P, W11-14, W11-15, and W11-15a) signs (see Figure 2C-10) may be used to alert road users to locations where unexpected entries into the roadway by trucks, bicyclists, farm vehicles, emergency vehicles, golf carts, horse-drawn vehicles, or other vehicles might occur. The TRUCK CROSSING (W8-6) word message sign may be used as an alternate to the Truck Crossing (W11-10) symbol sign.

Figure 2C-10. Vehicular Traffic Warning Signs and Plaques



* A fluorescent yellow-green background color may be used for this sign or plaque.

Support:

02 These locations might be relatively confined or might occur randomly over a segment of roadway.

Guidance:

03 *Vehicular Traffic Warning signs should be used only at locations where the road user's sight distance is restricted, or the condition, activity, or entering traffic would be unexpected.*

04 *If the condition or activity is seasonal or temporary, the Vehicular Traffic Warning sign should be removed or covered when the condition or activity does not exist.*

Option:

05 The combined Bicycle/Pedestrian (W11-15) sign may be used where both bicyclists and pedestrians might be crossing the roadway, such as at an intersection with a shared-use path. A TRAIL X-ING (W11-15P) supplemental plaque (see Figure 2C-10) may be mounted below the W11-15 sign. The TRAIL CROSSING (W11-15a) sign may be used to warn of shared-use path crossings where pedestrians, bicyclists, and other user groups might be crossing the roadway.

06 The W11-1, W11-15, and W11-15a signs and their related supplemental plaques may have a fluorescent yellow-green background with a black legend and border.

07 Supplemental plaques (see Section 2C.53) with legends such as AHEAD, XX FEET, NEXT XX MILES, or SHARE THE ROAD may be mounted below Vehicular Traffic Warning signs to provide advance notice to road users of unexpected entries.

Guidance:

08 *If used in advance of a pedestrian and bicycle crossing, a W11-15 or W11-15a sign should be supplemented with an AHEAD or XX FEET plaque to inform road users that they are approaching a point where crossing activity might occur.*

Standard:

09 **If a post-mounted W11-1, W11-11, W11-15, or W11-15a sign is placed at the location of the crossing point where golf carts, pedestrians, bicyclists, or other shared-use path users might be crossing the roadway, a diagonal downward pointing arrow (W16-7P) plaque (see Figure 2C-12) shall be mounted below the sign. If the W11-1, W11-11, W11-15, or W11-15a sign is mounted overhead, the W16-7P supplemental plaque shall not be used.**

Option:

10 The crossing location identified by a W11-1, W11-11, W11-15, or W11-15a sign may be defined with crosswalk markings (see Section 3B.18).

Standard:

11 **The Emergency Vehicle (W11-8) sign (see Figure 2C-10) with the EMERGENCY SIGNAL AHEAD (W11-12P) supplemental plaque (see Figure 2C-10) shall be placed in advance of all emergency-vehicle traffic control signals (see Chapter 4G).**

Option:

12 The Emergency Vehicle (W11-8) sign, or a word message sign indicating the type of emergency vehicle (such as rescue squad), may be used in advance of the emergency-vehicle station when no emergency-vehicle traffic control signal is present.

13 A Warning Beacon (see Section 4L.03) may be used with any Vehicular Traffic Warning sign to indicate specific periods when the condition or activity is present or is likely to be present, or to provide enhanced sign conspicuity.

14 A supplemental WHEN FLASHING (W16-13P) plaque (see Figure 2C-12) may be used with any Vehicular Traffic Warning sign that is supplemented with a Warning Beacon to indicate specific periods when the condition or activity is present or is likely to be present.

Section 2C.50 Non-Vehicular Warning Signs (W11-2, W11-3, W11-4, W11-6, W11-7, W11-9, and W11-16 through W11-22)

Option:

01 Non-Vehicular Warning (W11-2, W11-3, W11-4, W11-6, W11-7, W11-9, and W11-16 through W11-22) signs (see Figure 2C-11) may be used to alert road users in advance of locations where unexpected entries into the roadway might occur or where shared use of the roadway by pedestrians, animals, or equestrians might occur.

Support:

02 These conflicts might be relatively confined, or might occur randomly over a segment of roadway.

Guidance:

03 *If used in advance of a pedestrian, snowmobile, or equestrian crossing, the W11-2, W11-6, W11-7, and W11-9 signs should be supplemented with plaques (see Section 2C.55) with the legend AHEAD or XX FEET to inform road users that they are approaching a point where crossing activity might occur.*

Figure 2C-11. Non-Vehicular Warning Signs

* A fluorescent yellow-green background color may be used for this sign or plaque.

Standard:

04 **If a post-mounted W11-2, W11-6, W11-7, or W11-9 sign is placed at the location of the crossing point where pedestrians, snowmobilers, or equestrians might be crossing the roadway, a diagonal downward pointing arrow (W16-7P) plaque (see Figure 2C-12) shall be mounted below the sign. If the W11-2, W11-6, W11-7, or W11-9 sign is mounted overhead, the W16-7P plaque shall not be used.**

Option:

05 A Pedestrian Crossing (W11-2) sign may be placed overhead or may be post-mounted with a diagonal downward pointing arrow (W16-7P) plaque at the crosswalk location where Yield Here To (Stop Here For) Pedestrians signs (see Section 2B.11) have been installed in advance of the crosswalk.

Standard:

06 **If a W11-2 sign has been post-mounted at the crosswalk location where a Yield Here To (Stop Here For) Pedestrians sign is used on the approach, the Yield Here To (Stop Here For) Pedestrians sign shall not be placed on the same post as or block the road user's view of the W11-2 sign.**

Option:

07 An advance Pedestrian Crossing (W11-2) sign with an AHEAD or a distance supplemental plaque may be used in conjunction with a Yield Here To (Stop Here For) Pedestrians sign on the approach to the same crosswalk.

08 The crossing location identified by a W11-2, W11-6, W11-7, or W11-9 sign may be defined with crosswalk markings (see Section 3B.18).

09 The W11-2 and W11-9 signs and their related supplemental plaques may have a fluorescent yellow-green background with a black legend and border.

Guidance:

10 *When a fluorescent yellow-green background is used, a systematic approach featuring one background color within a zone or area should be used. The mixing of standard yellow and fluorescent yellow-green backgrounds within a selected site area should be avoided.*

Option:

11 A Warning Beacon (see Section 4L.03) may be used with any Non-Vehicular Warning sign to indicate specific periods when the condition or activity is present or is likely to be present, or to provide enhanced sign conspicuity.

12 A supplemental WHEN FLASHING (W16-13P) plaque (see Figure 2C-12) may be used with any Non-Vehicular Warning sign that is supplemented with a Warning Beacon to indicate specific periods when the condition or activity is present or is likely to be present.

Section 2C.51 Playground Sign (W15-1)

Option:

01 The Playground (W15-1) sign (see Figure 2C-11) may be used to give advance warning of a designated children's playground that is located adjacent to the road.

02 The Playground sign may have a fluorescent yellow-green background with a black legend and border.

Guidance:

03 *If the access to the playground area requires a roadway crossing, the application of crosswalk pavement markings (see Section 3B.18) and Non-Vehicular Warning signs (see Section 2C.50) should be considered.*

Section 2C.52 NEW TRAFFIC PATTERN AHEAD Sign (W23-2)

Option:

01 A NEW TRAFFIC PATTERN AHEAD (W23-2) sign (see Figure 2C-6) may be used on the approach to an intersection or along a section of roadway to provide advance warning of a change in traffic patterns, such as revised lane usage, roadway geometry, or signal phasing.

Guidance:

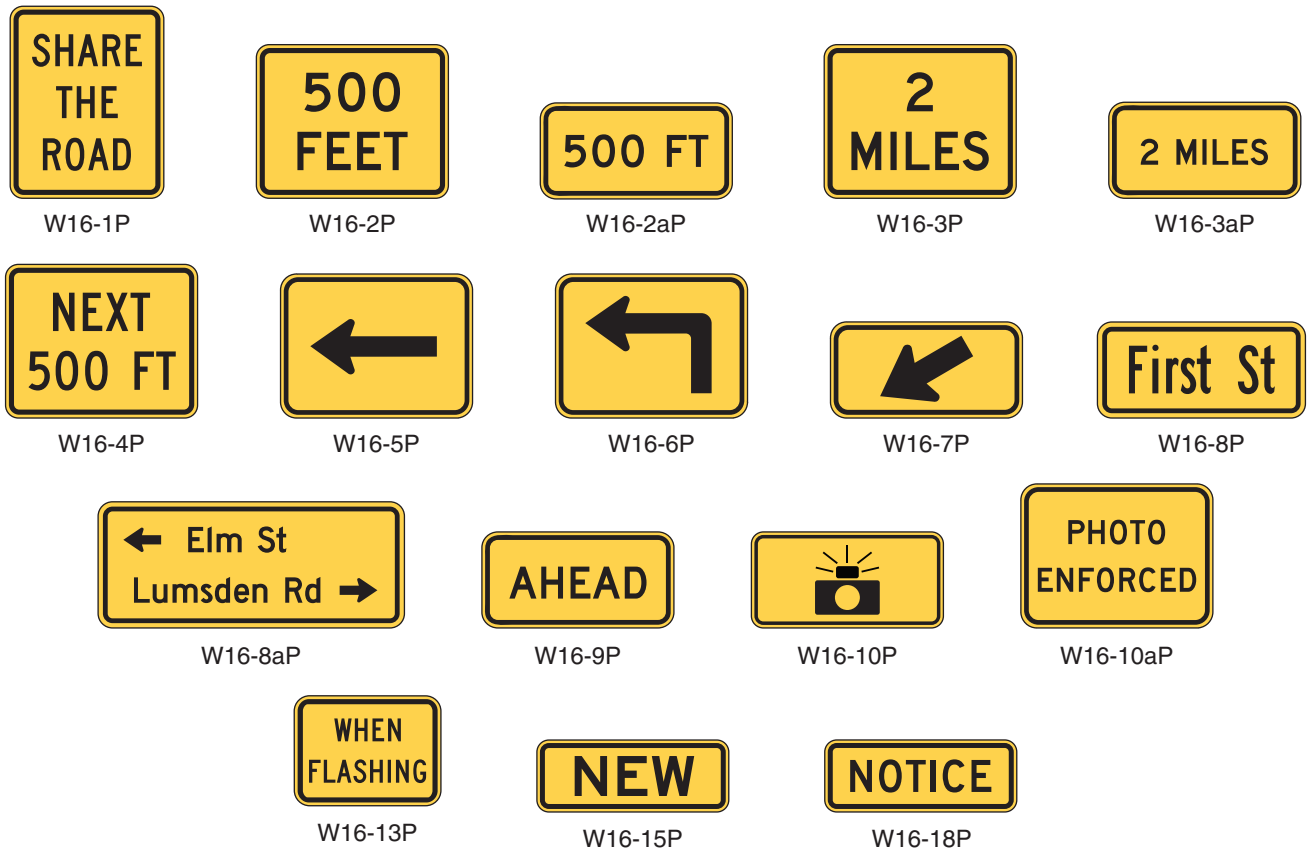
02 *The NEW TRAFFIC PATTERN AHEAD sign should be removed when the traffic pattern returns to normal, when the changed pattern is no longer considered to be new, or within six months.*

Section 2C.53 Use of Supplemental Warning Plaques

Option:

01 A supplemental warning plaque (see Figure 2C-12) may be displayed with a warning or regulatory sign when engineering judgment indicates that road users require additional warning information beyond that contained in the main message of the warning or regulatory sign.

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.*

Standard:

02 **Supplemental Arrow plaques shall have the same legend design as the Advance Turn Arrow and Directional Arrow auxiliary signs (see Sections 2D.26 and 2D.28) except that they shall have a black legend and border on a yellow or fluorescent yellow-green background, as appropriate.**

Section 2C.57 Hill-Related Plaques (W7-2 Series, W7-3 Series)

Guidance:

01 *Hill-Related (W7-2 series, W7-3 series) plaques (see Figure 2C-4) or other appropriate legends and larger signs should be used for emphasis or where special hill characteristics exist.*

02 *On longer grades, the use of the distance plaque (W7-3aP or W7-3bP) at periodic intervals of approximately 1-mile spacing should be considered.*

Section 2C.58 Advance Street Name Plaque (W16-8P, W16-8aP)

Option:

01 An Advance Street Name (W16-8P or W16-8aP) plaque (see Figure 2C-12) may be used with any Intersection sign (W2 series, W10-2, W10-3, or W10-4) or Advance Traffic Control (W3 series) sign to identify the name of the intersecting street.

Standard:

02 **The lettering on Advance Street Name plaques shall be composed of a combination of lower-case letters with initial upper-case letters.**

03 **If two street names are used on the Advance Street Name plaque, a directional arrow pointing in the direction of the street shall be placed next to each street name. Arrows pointing to the left shall be placed to the left of the street name, and arrows pointing to the right shall be placed to the right of the street name.**

Guidance:

04 *If two street names are used on the Advance Street Name plaque, the street names and associated arrows should be displayed in the following order:*

- *A. For a single intersection, the name of the street to the left should be displayed above the name of the street to the right; or*
- *B. For two sequential intersections, such as where the plaque is used with an Offset Side Roads (W2-7) or a Double Side Road (W2-8) symbol sign, the name of the first street encountered should be displayed above the name of the second street encountered, and the arrow associated with the second street encountered should be an advance arrow, such as the arrow shown on the W16-6P arrow plaque (see Figure 2C-12).*

Section 2C.59 CROSS TRAFFIC DOES NOT STOP Plaque (W4-4P)

Option:

01 The CROSS TRAFFIC DOES NOT STOP (W4-4P) plaque (see Figure 2C-9) may be used in combination with a STOP sign when engineering judgment indicates that conditions are present that are causing or could cause drivers to misinterpret the intersection as an all-way stop.

02 Alternative messages (see Figure 2C-9) such as TRAFFIC FROM LEFT (RIGHT) DOES NOT STOP (W4-4aP) or ONCOMING TRAFFIC DOES NOT STOP (W4-4bP) may be used when such messages more accurately describe the traffic controls established at the intersection.

Guidance:

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

Standard:

04 **If a W4-4P plaque or a plaque with an alternative message is used, it shall be mounted below the STOP sign.**

Section 2C.60 SHARE THE ROAD Plaque (W16-1P)

Option:

01 In situations where there is a need to warn drivers to watch for other slower forms of transportation traveling along the highway, such as bicycles, golf carts, horse-drawn vehicles, or farm machinery, a SHARE THE ROAD (W16-1P) plaque (see Figure 2C-12) may be used.

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*

of the near edge of the traveled way, should be 4 feet.

06 *When used to mark obstructions more than 8 feet from the shoulder or curb, the clearance from the ground to the bottom of the object marker should be at least 4 feet.*

07 *Object markers should not present a vertical or horizontal clearance obstacle for pedestrians.*

Option:

08 When object markers or markings are applied to an obstruction that by its nature requires a lower or higher mounting, the vertical mounting height may vary according to need.

Support:

09 Section 9B.26 contains information regarding the use of object markers on shared-use paths.

Section 2C.64 Object Markers for Obstructions Within the Roadway

Standard:

01 **Obstructions within the roadway shall be marked with a Type 1 or Type 3 object marker. In addition to markers on the face of the obstruction, warning of approach to the obstruction shall be given by appropriate pavement markings (see Section 3B.10).**

Option:

02 To provide additional emphasis, a Type 1 or Type 3 object marker may be installed at or near the approach end of a median island.

03 To provide additional emphasis, large surfaces such as bridge piers may be painted with diagonal stripes, 12 inches or greater in width, similar in design to the Type 3 object marker.

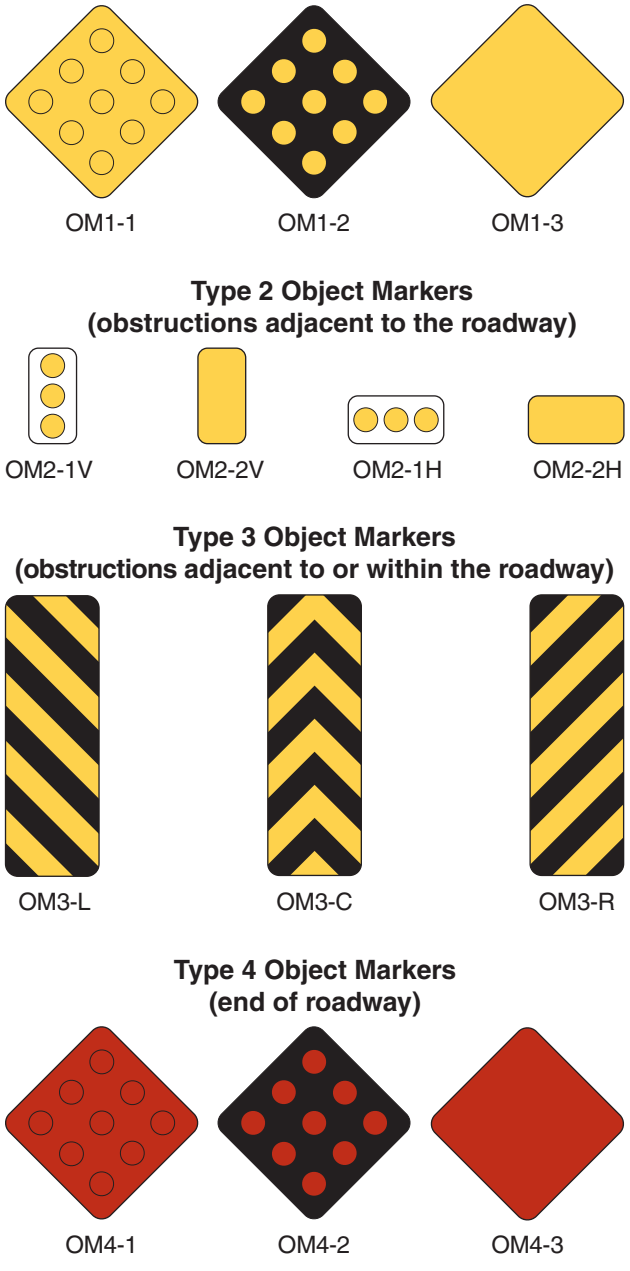
Standard:

04 **The alternating black and retroreflective yellow stripes (OM3-L, OM3-R) shall be sloped down at an angle of 45 degrees toward the side on which traffic is to pass the obstruction. If traffic can pass to either side of the obstruction, the alternating black and retroreflective yellow stripes (OM3-C) shall form chevrons that point upwards.**

Option:

05 Appropriate signs (see Sections 2B.32 and 2C.25) directing traffic to one or both sides of the obstruction may be used instead of the object marker.

Figure 2C-13. Object Markers



Section 2C.65 Object Markers for Obstructions Adjacent to the Roadway

Support:

01 Obstructions not actually within the roadway are sometimes so close to the edge of the road that they need a marker. These include underpass piers, bridge abutments, handrails, ends of traffic barriers, utility poles, and culvert headwalls. In other cases there might not be a physical object involved, but other roadside conditions exist, such as narrow shoulders, drop-offs, gores, small islands, and abrupt changes in the roadway alignment, that might make it undesirable for a road user to leave the roadway, and therefore would create a need for a marker.

Standard:

02 **If a Type 2 or Type 3 object marker is used to mark an obstruction adjacent to the roadway, the edge of the object marker that is closest to the road user shall be installed in line with the closest edge of the obstruction.**

03 **Where Type 3 object markers are applied to the approach ends of guardrail and other roadside appurtances, sheeting without a substrate shall be directly affixed to the approach end of the guardrail in a rectangular shape conforming to the size of the approach end of the guardrail with alternating black and retroreflective yellow stripes sloping downward at a angle of 45 degrees toward the side of the obstruction on which traffic is to pass.**

04 **Type 1 and Type 4 object markers shall not be used to mark obstructions adjacent to the roadway.**

Guidance:

05 *Standard warning signs in this Chapter should also be used where applicable.*

Section 2C.66 Object Markers for Ends of Roadways

Support:

01 The Type 4 object marker is used to warn and alert road users of the end of a roadway in other than construction or maintenance areas.

Standard:

02 **If an object marker is used to mark the end of a roadway, a Type 4 object marker shall be used.**

Option:

03 The Type 4 object marker may be used in instances where there are no alternate vehicular paths.

04 Where conditions warrant, more than one marker, or a larger marker with or without a Type 3 Barricade (see Section 2B.67), may be used at the end of the roadway.

Standard:

05 **The minimum mounting height, measured vertically from the bottom of a Type 4 object marker to the elevation of the near edge of the traveled way, shall be 4 feet.**

Guidance:

06 *Appropriate advance warning signs in this Chapter should be used.*

Retroreflectivity

Background

According to the Federal Highway Administration (FHWA), while only 25 percent of travel occurs at night, more than half of traffic fatalities occur during nighttime hours. In Massachusetts, nearly half of all fatal crashes occur during the nighttime. Poor visibility may be a contributing factor in nighttime crashes. Headlights and roadway lighting help to illuminate the roadway, but are often not enough to meet the needs of nighttime drivers. For this reason, FHWA recommends the use of retroreflective traffic control devices so that at night a driver can see a sign or pavement marking sooner and can then take appropriate actions.

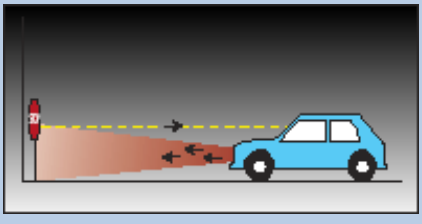
Did You Know?
The FHWA estimates that up to half of the 58 million traffic signs in the U.S. are beyond their useful lifespan (estimated at 10 years) from a retroreflectivity standpoint.

Retroreflective Signs and Pavement Markings

Retroreflective materials used on signs, pavement markings, and other traffic control devices can provide additional visual cues on wet pavements and in the nighttime driving environment helping to meet the needs of nighttime drivers. Retroreflective materials, which use small glass beads and microprismatic reflectors mixed into the paint, have the ability to reflect light and enable a vehicle operator to see traffic control devices more easily at night. The Manual on Uniform Traffic Control Devices (MUTCD) states that all signs and pavement markings shall be retroreflective or have adequate ambient lighting. Fortunately, most traffic signs and pavement markings use retroreflective technology.

Retroreflective paint can be useful and effective and can be used in nearly all instances to reflect a vehicle's headlights thus adding conspicuity. According to the MUTCD, pavement markings shall be installed with the proper retroreflective color as per Section 3A.04. Similarly, all regulatory, warning, and guide signs must use retroreflective or other illuminating materials displaying the same color during both night and day, unless specifically stated otherwise in the MUTCD Section 2A.11. Additionally, it is important to note that the installation procedure is critical in order to obtain the full benefit of retroreflective materials. For example, the height and lateral placement of a sign are critical components of the installation. Please see the MUTCD for additional information regarding the installation procedures of retroreflective signs.

As shown in the adjacent picture, the headlight from a vehicle shines on a retroreflective sign and the message on the sign bounces back to the driver.



Source: FHWA

For more information contact:
MassHighway
Traffic Engineering
(617) 973-8484

Last Revised:
January 2008

Retroreflectivity

Retroreflective STOP Sign *(Source: minimumreflectivity.org*

Measuring Retroreflectivity

As of January 2008, the FHWA has established guidelines for maintaining minimum retroreflectivity levels on traffic signs, which are available in the online version of the MUTCD in Section 2A.09. Signage that does not provide adequate retroreflectivity should be upgraded. In the field, retroreflectivity can be measured in two ways:

1. A precise measurement can be attained with a retroreflectometer. This device is pointed at a sign or pavement marking and measures the light from the object that has been scattered and reflected back to the meter. The actual units for this measure are candela per square meter per incident lux ($cd/lx/m^2$).
2. A more subjective, yet commonly used method, is to gauge retroreflectivity through a simple visual inspection at night.

Costs for Retroreflective Devices

When considering retroreflective devices, considerations in the overall cost include the type of traffic control device (e.g., paint, signs, etc.), the associated installation costs, as well as the level of retroreflective properties. It is also worth noting that costs may vary across manufacturers and with the quantity of an order. Based upon these variations in cost, it is recommended that several alternatives be considered when ordering retroreflective materials, including paint and signage. The following are some devices and the associated prices*:

- Retroreflective delineator—$22.75 per device
- Retroreflective warning signs—$18 per square foot
- Retroreflective location and guide signs—$20 per square foot
- Retroreflective street name signs —$100 per sign
- Retroreflective paint—$1.70 per square foot

*prices included are from the MassHighway Weighted Average Bid Prices as of January 2008. These prices reflect the relative costs for retroreflective materials, and will generally be lower than what a municipality may expect to pay.

Resources

Massachusetts Traffic Safety Toolbox Series

This series of fact sheets provides information on safety improvements that can be implemented at the local level. Information on problem areas, possible countermeasures, and implementation considerations is included in each fact sheet which can be found at www.mass.gov/mhd/safetytoolbox/

The Manual on Uniform Traffic Control Devices (MUTCD)

Published by the FHWA, the MUTCD defines the standards used by transportation professionals nationwide to install and maintain traffic control devices on all streets and highways. The most recent version (2003) can be found at http://mutcd.fhwa.dot.gov/

EOT Massachusetts Executive Office of Transportation

MassHighway

U.S. Department of Transportation Federal Highway Administration

University of Massachusetts Transportation Center

For more information contact:
MassHighway
Traffic Engineering
(617) 973-8484

Last Revised:
January 2008

Low Cost Non-Intersection Safety Improvements

Background

In 2006, there were 430 fatalities in vehicular crashes in Massachusetts with over half of these fatalities occurring at non-intersection locations. As a result, targeting safety at these non-intersection locations has been the focus of safety-related projects at all levels; however, it is often at the local level where the most significant impacts are realized. This fact sheet provides insight regarding low cost safety fixes for non-intersection crash locations. Recognizing that resources are often limited, an emphasis is provided on the identification of strategies that will yield effective results which are easily implemented from both a time and cost perspective.

Research Has Shown…

Post mounted delineators and chevrons can reduce run-off road crashes by up to 58% and 31%, respectively. (*Source: Low Cost Local Road Safety Solutions by American Traffic Safety Services Association and National Association of County Engineers)*

Low Cost Safety Countermeasure Development

When attempting to improve safety at non-intersection locations consider some general strategies such as the following:

- Identify crash countermeasures that are likely to influence crashes based upon the dominant crash type.
- Select alternatives, assess the economic costs, and implement the appropriate countermeasure(s).
- Evaluate countermeasures to ensure no adverse consequences occur during and after implementation.

Countermeasure Considerations
Technically feasible – Is the countermeasure feasible for the particular location? Does it comply with existing guidelines and/or standards?
Advantageous Cost/Benefit – Does the benefit of the countermeasure outweigh the costs? Are there more cost-effective strategies to consider?
Affordable and Practical – Is the countermeasure practical considering the identified problem? Can it be funded?
Acceptable – Will the public accept the countermeasure politically and within the community? Will there be educational needs for the public?
Legal – Is the countermeasure legal to use? For example, speed limits are regularly revised without proper authorization, and STOP signs are used without meeting the appropriate MUTCD warrants.
Compatible with other roadway features – Does the countermeasure disrupt other safety features, which may result in unintended consequences?

For more information contact:
MassHighway
Traffic Engineering
(617) 973-8484

Last Revised:
January 2008

Low Cost Non-Intersection Safety Improvements

Although large-scale treatments can be used, there are also many effective low cost countermeasures that can be implemented. This fact sheet targets some of the common safety challenges at non-intersection locations, and places an emphasis on identifying low-cost improvements that could likely be implemented in a short timeframe (i.e., less than a year). Although several definitions exist for low cost improvements, such as the FHWA definition of less than $50,000, the information below is based upon treatments under $15,000.

Identified Safety Challenge	Potential Countermeasures
Horizontal curve issues	• Provide advance warning signage. • Add chevrons along the curve. • Add embedded pavement markings and enhanced curve delineation. • Add roadside reflectors to delineate curves. • Increase/add pavement markings to provide 6-inch centerlines and/or edgelines.
Sight distance issues	• Trim or clear trees or bushes obstructing various access points or existing signage. • Add warning signs advising of potential hazards.
Run-off-road crashes at known location	• Enhance delineation through improved pavement markers or roadside reflectors. • Provide adequate clear zone to minimize crash consequences. • Add guard rail to limit roadway departures.
Edge drop-off	• Add and maintain fill to prevent drop-off at roadside which limits vehicle ability to re-enter the roadway upon departure. • Identify drop-off cause (e.g., drainage) and improve.
Drainage-related issues	• Ensure adequate drainage . • Clear/clean catch basins with regularity.
Weather-related crashes	• Alter or increase winter weather treatment program. • Utilize warning signs to identify possible hazardous locations for motorists. • Employ changeable message signs to alert motorists of winter weather conditions.
Pedestrian crossings	• Adequately mark with advance signage and yield lines any non-intersection pedestrian crosswalks.

For more information contact:
MassHighway
Traffic Engineering
(617) 973-8484

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January 2008

Low Cost Non-Intersection Safety Improvements

Identified Safety Challenge	Potential Countermeasures
Maintenance issues	• Clear brush which may inhibit roadway operations or obstruct existing roadway signage. • Sweep roadways and shoulders regularly. • Fill roadway cracks and potholes. • Replace worn pavement markings and faded signs.
Tree or utility pole crashes	• Relocate or remove existing trees or poles in problematic locations. • Add reflectors to trees or poles. • Add guard rail shielding existing trees or poles.
Speed-related crashes	• Ensure roadways are properly posted in accordance with existing speed regulations (check with MassHighway for existing regulations). • Consider traffic calming measures to reduce speeds. • Consider experimental optical speed measures. • Restripe to provide narrower lanes. • Ensure regular enforcement of appropriate speed limits.
Parking	• Restrict parking at selected locations including constrained cross-section, near intersections, and on the approaches to pedestrian crosswalks.
Passing issues	• Restrict and enforce passing when adequate passing sight distance is not provided.

Resources

NCHRP 500 Series – Implementation of AASHTO Strategic Highway Safety Plan
This series of guidebooks provides recommendations and countermeasures aimed at targeting specific safety problems along roadways, and is found at http://safety.transportation.org/guides.aspx

Massachusetts Traffic Safety Toolbox Series
This series of fact sheets provides information on safety improvements that can be implemented at the local level. Information on problem areas, possible countermeasures, and implementation considerations is included in each fact sheet which can be found at www.mass.gov/mhd/safetytoolbox/

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Last Revised:
January 2008

Speed Limits & Speed Limit Setting

Background

The National Highway Traffic Safety Administration (NHTSA) defines speeding as "travelling in excess of the posted speed limit" or "driving too fast for conditions." Nationally, speed-related crashes account for 30 percent of all fatal crashes, resulting in over 13,000 fatalities annually and a societal cost exceeding $40 billion. The numbers in Massachusetts are similar where 33 percent of the 442 fatalities in 2005 were speed-related. In Massachusetts, 58 percent of speed-related fatalities occurred on roadways with a posted speed limit of 35 mph or less, and 80 percent of speed-related fatalities occurred on a roadway with a posted speed limit of 45 mph or less. From an engineering standpoint *properly posted* speed limits represent the front lines of speed management. This fact sheet provides basic information regarding speed limits and guidance on proper speed limit setting and sign posting.

Did You Know?
According to NHTSA approximately 86% of 2003 speed-related fatalities occurred on non-interstate roadways

Speed Laws in Massachusetts

Within the Massachusetts General Laws (MGL) there are two sections that deal specifically with speed limits.

MGL Chapter 90, Section 18 allows for the posting of numerical limits on the typical speed limit sign. This law also indicates that this limit must be based on engineering study and needs approval via a Special Speed Regulation approved by the Registry of Motor Vehicles and MassHighway. Please note that all regulatory speed limit signs not posted under this procedure are in violation of the law and are not legally enforceable.*

Typical Speed Limit Sign (R2-1)

MGL Chapter 90, Section 17 applies to unposted roadways and specifically states that *it shall be prima facie evidence of a rate of speed greater than is reasonable and proper as aforesaid (1) if a motor vehicle is operated on a divided highway outside a thickly settled or business district at a rate of speed exceeding fifty miles per hour for a distance of a quarter of a mile, or (2) on any other way outside a thickly settled or business district at a rate of speed exceeding forty miles per hour for a distance of a quarter of a mile, or (3) inside a thickly settled or business district at a rate of speed exceeding thirty miles per hour for a distance of one-eighth of a mile, or (4) within a school zone which may be established by a city or town as provided in section two of chapter eighty-five at a rate of speed exceeding twenty miles per hour.*

* Please note there are special speed law provisions in the MGL for the Massachusetts Turnpike and Department of Conservation and Recreation (DCR) [formerly the Metropolitan District Commission (MDC)] Roads.

For more information contact:
MassHighway
Traffic Engineering
(617) 973-8484

Last Revised:
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Speed Limits & Speed Limit Setting

Setting Speed Limits

Municipalities should contact MassHighway to request speed limit posting on state-owned roadways. It is the responsibility of the municipality to follow the procedures for locally-owned roadways, which require approval by both MassHighway and the Registry of Motor Vehicles (RMV). When considering the establishment of speed limits there are two primary sources it is imperative you review which will provide specific guidance on speed zoning: (1) Procedures for Speed Zoning on State and Municipal Roads, and (2) The Manual on Uniform Traffic Control Devices (MUTCD Section 2B.13). The establishment of a speed limit is *required* to be based upon engineering study, and any resulting posting must be in increments of 5 mph. One major basis for the setting of speed limits is that most motorists are able to select a reasonable and safe speed. Using the 85th %ile speed as a baseline, the proposed speed limit may be adjusted based upon additional factors, including, road characteristics (e.g., shoulder condition, grade, alignment, and sight distance), the pace speed, roadside development and environment, parking practices and pedestrian activity, and reported crash experience.

Please Note

Research has shown that only changing a posted speed limit does not result in significant changes to the roadway speeds. In fact, this holds true for both increases and decreases to the posted limit.

Engineering Study

An engineering study from the municipality must contain both the collected data and analysis of this data. Data collection includes:

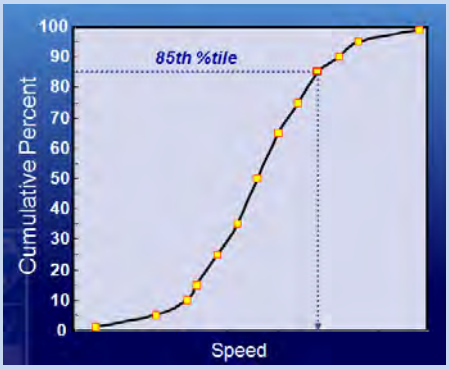
1. Preliminary study of conditions;
2. Speed calculations of curves (MassHighway responsibility);
3. Speed observations;
4. Studies of crash distributions; and
5. Trial runs over the location.

Speed observations are determined from a spot speed study and are representative of the motorists "opinion" regarding the speed limit. Speeds from 100 free flow vehicles (drivers choosing their own speed, i.e., not in queue) should be captured in each direction. Data analysis includes:

1. Safe speed range;
2. Selecting speed limits/lengths of zone;
3. Advisory speeds; and
4. Rechecks with trial runs.

What is the 85th %ile Speed?

This is the speed at which or below 85% of the vehicles are travelling . Speeds are typically assumed to be normally distributed which results in a probability distribution as shown below. Knowing this distribution allows for the targeting of egregious violators. Additionally, studies have shown that as vehicle speeds deviate from the mean the risk of a crash increases; using the 85th %ile method lessens variation of speeds within a traffic stream.



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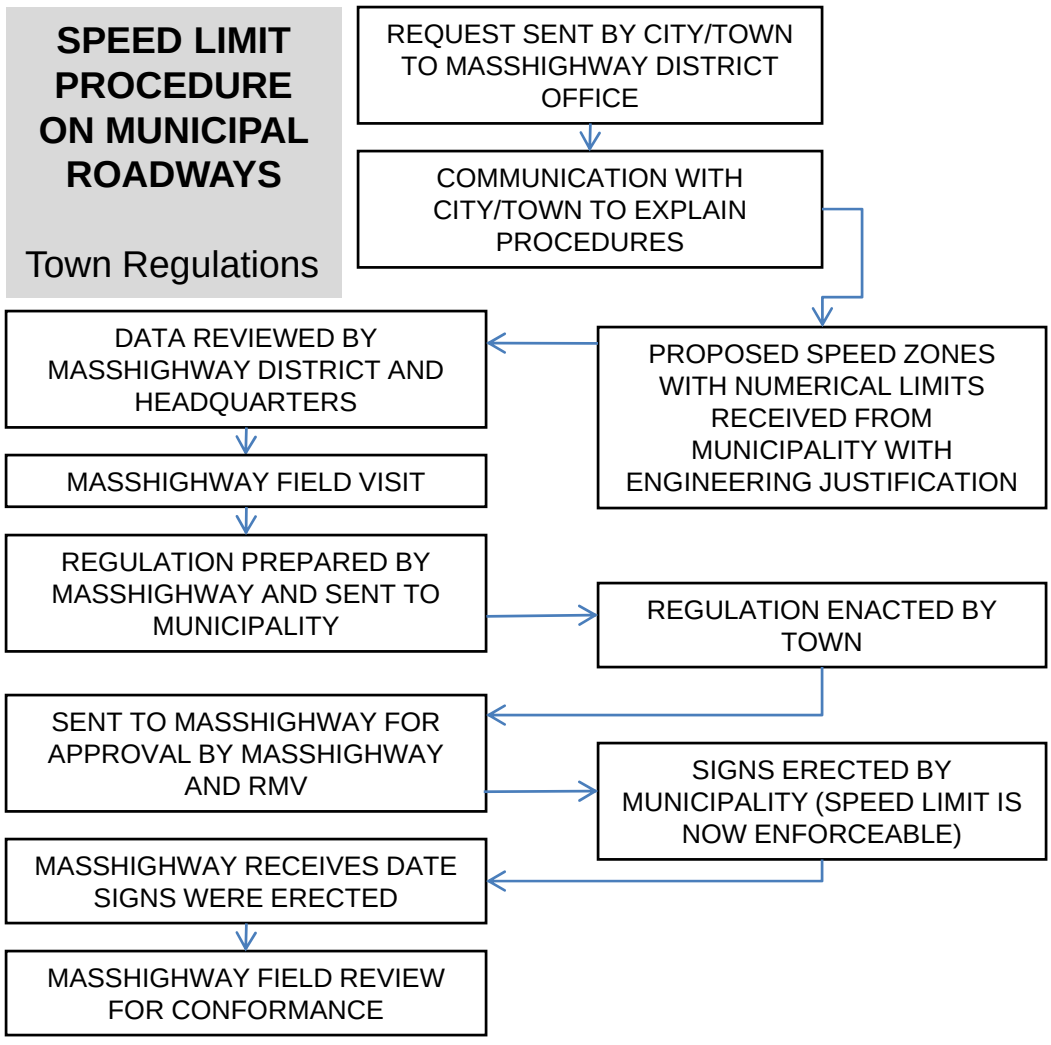
January 2008

Speed Limits & Speed Limit Setting

Important Reminder!
Advisory speed signage should be used when engineering judgment indicates the need to advise road users of a recommended speed for a given condition (e.g., an exit, a ramp or a curve). Please note that advisory speed limits are not enforceable. Additional information on advisory speed limits is available in the MUTCD Sections 2C. 36 & 2C. 46.

SPEED LIMIT PROCEDURE ON MUNICIPAL ROADWAYS

Town Regulations



Resources

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Procedures for Speed Zoning on State and Municipal Roads
These procedures provide specifications for speed zoning in Massachusetts and can be found at http://www.mhd.state.ma.us/downloads/manuals/speedZoning.pdf

The Manual on Uniform Traffic Control Devices (MUTCD)
Published by the FHWA, the MUTCD defines the standards used by transportation professionals nationwide to install and maintain traffic control devices on all streets and highways. The most recent version (2003) can be found at http://mutcd.fhwa.dot.gov/

For more information contact:
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Traffic Engineering
(617) 973-8484

Last Revised:
January 2008

Board of Selectmen

65 North Main Street
West Bridgewater,
Massachusetts 02379
Telephone (508) 894-1267
Fax (508) 894-1269

April 10, 2006

RECEIVED APR 21 2006

Mr. Pat Ciaramella
OCPC
70 School Street
Brockton, MA 02301

Re: Traffic Count and Study for Walnut Street

Dear Pat:

In OCPC's report regarding the Over-55 Community of Walnut Grove, it is mentioned that the Speed Limit at the bend near the proposed complex should be lowered to 20 MPH.

In order for the 20 MPH posting to occur, the Selectmen voted at their meeting of April 4th, to begin the process by asking OCPC to do the necessary traffic and speed study.

Thank you.

Sincerely,

Elizabeth D. Faricy
Administrator

/dl
cc: Board of Selectmen
Planning Board
Inspector of Buildings

Enclosure: OCPC March 14th letter