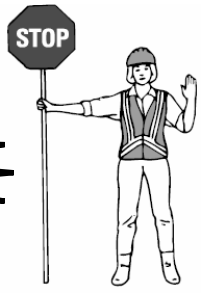
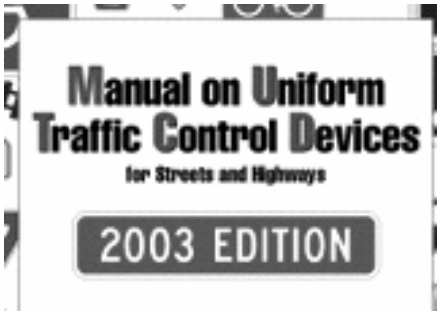
Work Zone
Traffic Control Guidelines

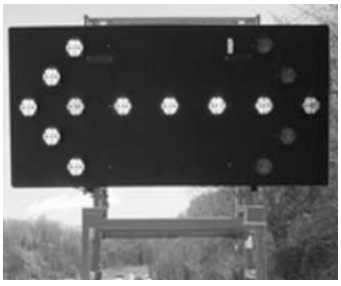
PUBLICATION 213
(67 PA CODE, CHAPTER 212)

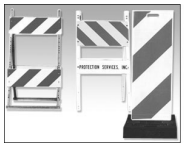
Think Safety First



PENNDOT







Application

Publication 213 applies to contractors; utilities; Federal, State, county, township and municipal governments; and others performing applicable construction, maintenance or utility/permit work on highways or so closely adjacent to a highway that workers, equipment or materials encroach on the highway or interfere with the normal movement of traffic.

The traffic control figures shown in this publication are normally applicable for both urban and rural areas. Since it is not practical to provide detailed guidelines for all the situations that may conceivably arise, applications are presented for only the most common situations. These are minimum desirable applications for normal situations, and additional protection may be needed when special complexities or potential hazards prevail. The protection prescribed for each situation shall be consistent with the general provisions of *67 Pa. Code, Chapter 212, Official Traffic Control Devices* and the national *Manual On Uniform Traffic Control Devices* as issued by the Federal Highway Administration and should be based on common sense; engineering judgment; the speed and volume of traffic; the duration of the operation; the exposure to potential hazards; the physical features of the highway including horizontal alignment, vertical alignment and the presence of intersections and driveways; and other important factors.

TYPE OF HIGHWAY	CONDITION	FIGURE NUMBER		
		SHORT-TERM OPERATION		LONG-TERM STATIONARY OPERATION
		STATIONARY	MOBILE	
	Work Area Adjacent to Any Roadway	PATA 5	PATA 6	PATA 24
	Numerous Nighttime Work Areas on or Beyond the Shoulder			PATA 25
TWO-LANE, TWO-WAY HIGHWAYS	Minor Encroachment	PATA 7		
	Major Encroachment	PATA 8		
	Work Area in the Center of the Roadway	PATA 9a		
	Work Area in the Center of an Intersection	PATA 9b		
	Surveying Along Centerline of Road with Low Traffic Volumes	PATA 9c		
	Flagging	PATA 10a	PATA 11a*,11f	PATA 26a
	Intersection Flagging	PATA 10b		
	Single Flagger	PATA 10c	PATA 11b*	PATA 26b
	Stop Sign-Controlled Lane Closure	PATA 10d		PATA 26c
	Self-Regulating Lane Closure	PATA 10e		PATA 26d
	Flagger at One End, AFAD at the Other End	PATA 10AFAD-1		
	AFAD With Flagger at Both Ends	PATA 10AFAD-2		
	AFAD At Both Ends, Single Flagger Centrally Located	PATA 10AFAD-3		
	Road Closure	PATA 11d*,11e*	PATA 11c*	
	Moving Lane Closure		PATA 12	
	Temporary Traffic Control Signals			PATA 26e L
	Portable Traffic Control Signals	PATA 26e PS		PATA 26e PL
	Temporary Roadway			PATA 27
	Automated Flagger Assistance Device	PATA 42a,b,&c		
THREE LANE, TWO-WAY HIGHWAYS WITH PASSING	Work Area in the Single-Lane Approach	PATA 13a	PATA 12	PATA 28
	Work Area in Both Lanes of the Two-Lane Approach	PATA 13b		
	Work Area in One-Lane Approach and Left Lane of Two-Lane Approach	PATA 13c		
	Work Area in the Left or Right Lane of the Two-Lane Approach	PATA 16	PATA 16, 23	PATA 31
THREE-LANE, TWO-WAY HIGHWAYS WITH A CENTER LANE, LEFT TURN ONLY PATTERN	Work Area in One of the Through Lanes	PATA 14	PATA 12	PATA 29
	Work Area in the Two-Way Left Turn Lane	PATA 15	PATA 15	PATA 30
OTHER MULTILANE, UNDIVIDED HIGHWAYS	Work Area in the Left or Right Lane	PATA 16	PATA 16, 23	PATA 31
	Work Area in the Center Lane of a Three-Lane Approach	PATA 19	PATA 23	PATA 34
	Work Area Requiring the Closure of One Side of a Four-Lane Undivided Highway	PATA 17		PATA 32
	Work Area in a Two-Way Left Turn Lane	PATA 15	PATA 15	PATA 30
DIVIDED OR ONE-WAY HIGHWAY	Work Area in the Left or Right Lane	PATA 18	PATA 18, 23	PATA 33
	Work Area in the Center Lane of a Three-Lane, One-Way Roadway	PATA 19	PATA 23	PATA 34
	Work Area in Two Adjacent Lanes	PATA 20		PATA 35
	Lane Closure Near a Freeway or Exressway Exit Ramp	PATA 21		PATA 36
	Lane Closure Near a Freeway or Expressway Entrance Ramp	PATA 22		PATA 37
	Two-Way Traffic on One Roadway of a Normally Divided Highway			PATA 38
	Detour of a Numbered Traffic Route			PATA 39a
	Detour of an Unnumbered Traffic Route			PATA 39b
	Sidewalk Detour or Diversion			PATA 40
	Crosswalk Closures and Pedestrian Detours			PATA 41
	Temporary Bituminous Rumble Strip Patterns			PATA 42

Short-Term Stationary Operation -- Work that occupies a location up to 24 hours.
Long-Term Stationary Operation -- Work that occupies a location more than 24 hours.
Mobile Operation -- Any operation that moves intermittently or continuously.

* Daylight Only

REFERENCE GUIDE FOR TYPICAL FIGURES

PUBLICATION 213
GENERAL NOTES, TABLES AND LEGEND
(COMMON TO ALL PATA STANDARD FIGURES)

LEGEND

- Work space
- Sign
- Channelizing device
- Shadow vehicle with a flashing or revolving yellow light
- Direction of travel
- S — Normal Speed Limit in advance of the work zone
- L — Taper length
- Type B Light
- Type III Barricade
- Flashing Arrow Panel
- Automated Flagger Assistance Device
- Flagger with a W21-10 Sign, a protective helmet, and a (high visibility) safety vest

GENERAL NOTES

1. All distances may be adjusted slightly to fit field conditions.
2. All signs shall be 36" x 36" for conventional roadways and 48" x 48" for expressways and freeways unless otherwise noted.
3. Traffic Control Plans may deviate from the typical applications shown in this publication to allow for conditions and requirements of a particular site or jurisdiction.
4. The three categories for work duration of temporary traffic control are:
   a. Short-Term Stationary Operation - Work that occupies a location up to 24 hours.
   b. Long-Term Stationary Operation - Work that occupies a location more than 24 hours.
   c. Mobile Operation - Work that moves intermittently or continuously.
5. The UTILITY WORK AHEAD (W21-7), SURVEY CREW (W21-6), and BRIDGE INSPECTION AHEAD (W21-11) signs may be used as an alternate to the ROAD WORK AHEAD sign (W20-1) where appropriate.
6. Neither work activity nor storage of equipment, vehicles, or material should occur within a buffer space.
7. The needs and control of all road users through the work zone (including motorists, bicyclists, pedestrians and persons with disabilities in accordance with the Americans with Disabilities Act of 1990) shall be an essential part of highway construction, utility work, maintenance operations, and the management of traffic incidents.
8. Sign sheeting shall be of an approved type and listed in Publication 35 (Bulletin 15). Sheeting for freeways and expressways shall be fluorescent orange.
9. See MUTCD Chapter 6 and Publication 212 for additional guidelines and requirements.

PUBLICATION 213
GENERAL NOTES, TABLES AND LEGEND
(COMMON TO ALL PATA STANDARD FIGURES)

TABLE 1.

FORMULAS FOR DETERMINING TAPER LENGTHS

S	L
40 MPH or less	$L = \frac{WS^2}{60}$
45 MPH or more	L = WS

W = width of offset in feet

TABLE 2.

MERGING TAPER LENGTH

S MPH	W (ft)	L (ft)
25	10	100
	11	110
	12	130
30	10	150
	11	170
	12	180
35	10	200
	11	220
	12	250
40	10	270
	11	290
	12	320
45	10	450
	11	500
	12	540
50	10	500
	11	550
	12	600
55	10	550
	11	610
	12	660
60	10	600
	11	660
	12	720
65	10	650
	11	720
	12	780

W = width of offset in feet

TABLE 3.

OTHER TAPER LENGTHS

Type of Taper	L
Merging Taper	L Min.
Shifting Taper	0.5L Min.
Shoulder Taper	0.33L Min
One-Lane, Two-Way Traffic Taper	100' Max.
Downstream Taper	100' Max./Lane

TABLE 4.

ADVISORY SPEED FOR FREEWAYS AND EXPRESSWAYS

S	Work Area Speed Limit	Advisory Speed in Advance of the Work Area Signs from Beginning of Work Area			
MPH	MPH	4th	3rd	2nd	1st
65	55		55	55	55
65	50*	55	55	50	50
65	45*	55	50	45	45
55	45	50	50	45	45
55	40*	50	45	40	40
55	35*	50	45	40	35
50	40	45	45	40	40
50	35*	45	40	35	35
50	30*	45	40	35	30
45	35	-	40	35	35
45	30*	-	40	35	30
45	25*	-	35	30	25
40	30	-	35	30	30
40	25*	-	35	30	25

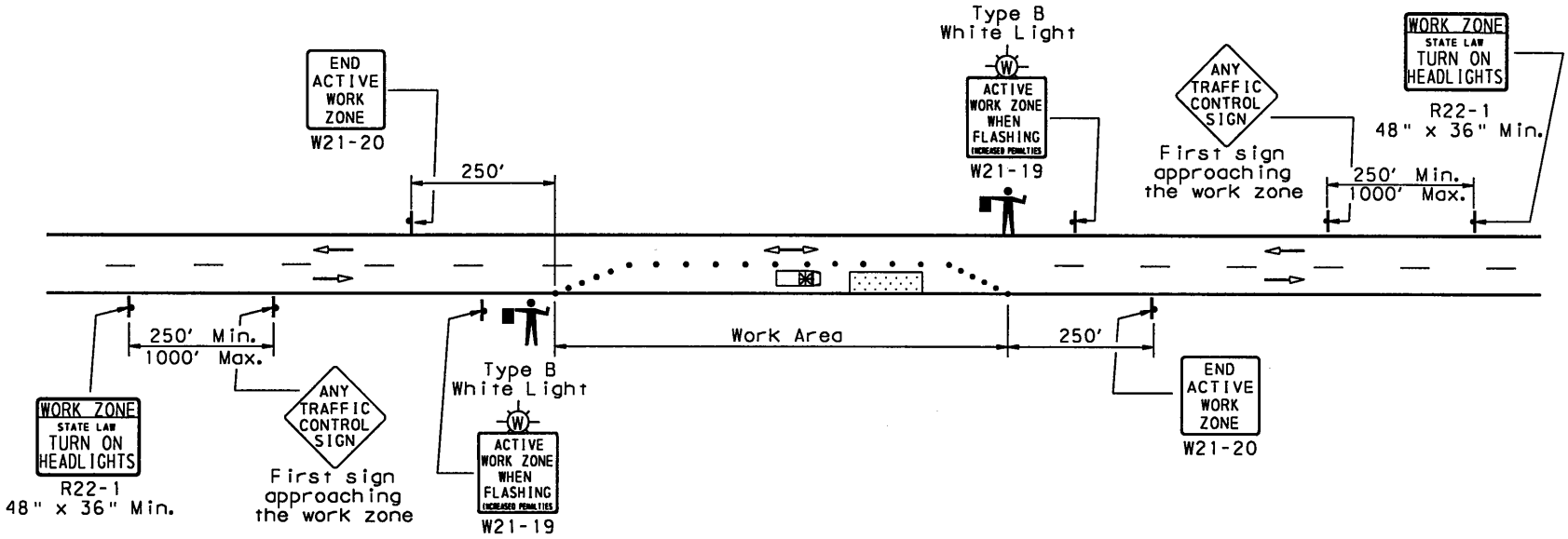
* Work area speed limits less than 25 MPH or a reduction of more than 10 MPH below the normal speed limit should be used only when required by restrictive features in the work zone and require prior approval. See Publication 212 for further guidelines.

TABLE 5.

FLASHING ARROW PANEL GUIDELINES

Panel Type	Size (inches)	Application
A	48x24	Low-speed urban Typically 25-30 MPH
B	60x30	Intermediate-speed facility, typically 35-40 MPH Mobile Operations
C	96x48	Freeway and Expressway Other high-speed, high-volume roadways Typically 45 MPH or greater
D	Length of Arrow=48 Width of Arrowhead=24	Low-speed urban, typically 25-30 MPH Short-term work not to exceed one daylight period For use on authorized vehicles only

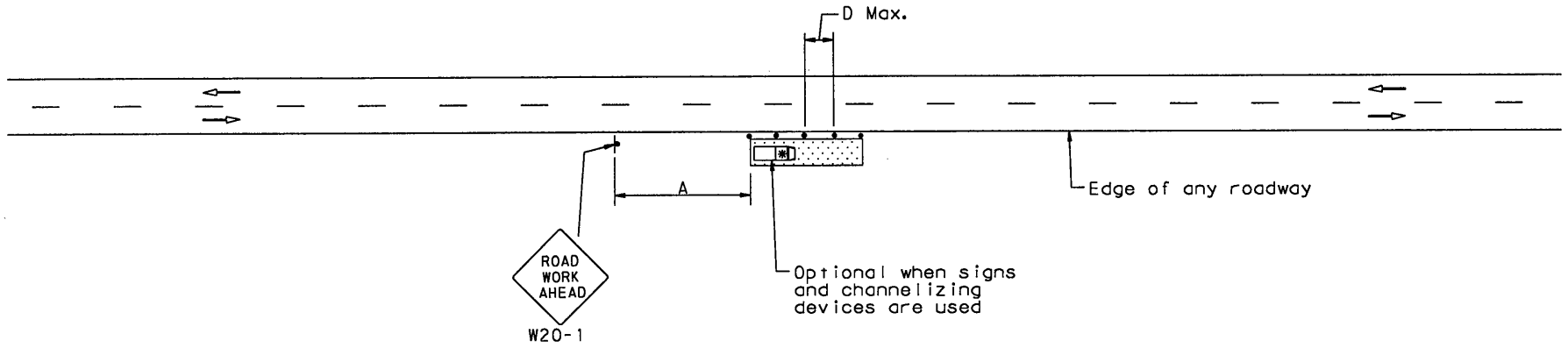
PUBLICATION 213
ACT 229 GUIDELINES
(COMMON TO ALL PATA STANDARD FIGURES)



ACT 229 GUIDELINES

1. The installation of the R22-1, W21-19 and W21-20 signs and the flashing white lights are not required for any of the following situations:
   a. Mobile operations.
   b. Operations 1 hour or less in duration.
   c. Stationary work where the daily duration of the construction, maintenance, or utility operation is less than 12 hours and all traffic-control devices are removed from the highway at the completion of the daily operation.
   d. The speed limit is 45 MPH or less.
   e. The work is in response to emergency work or conditions such as a major storm.
2. When used, erect the R22-1 Sign as the first sign on each primary approach to the work zone, generally at a distance of 250' to 1000' prior to the first warning sign.
3. When used, erect the W21-19 Sign as close as practical to the beginning of the active work zone.

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
ADJACENT TO ANY ROADWAY

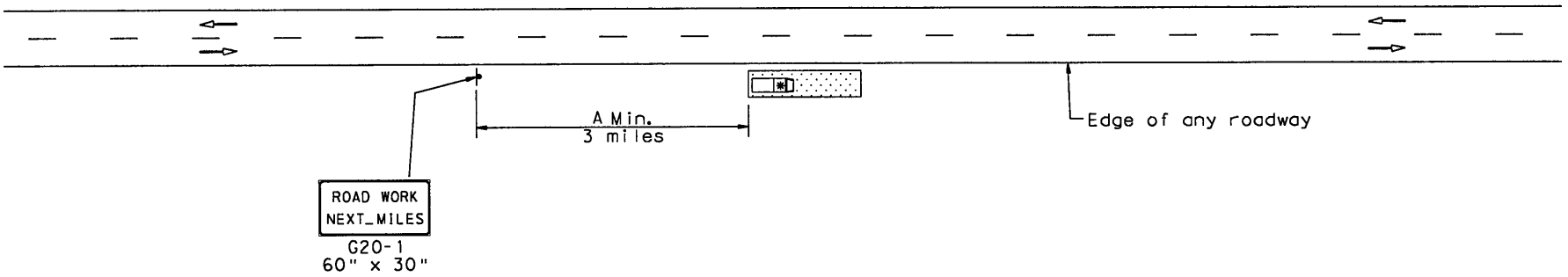


All Highways (except freeway and expressway)		
	A	D
MPH	ft	ft
25	250	50
30	300	60
35	350	70
40	400	80
45	450	90
50	500	100
55	550	110
Alternate Spacing for High Density Urban		
25	100	50
30	100	60
Freeway and Expressway		
50	1000	100
55	1000	110
60	1000	120
65	1000	130

NOTES

1. Traffic control devices are not required if the work space is outside the highway right-of-way, behind barrier, more than 2' behind curb, or 15' or more from the edge of any roadway.
2. For divided highways and one-way highways where it is physically possible, advance warning signs should also be placed on the left-hand side of the roadway.
3. The W20-1 Sign may be replaced with other appropriate signs (Low Shoulder sign, No Guide Rail sign, and so forth).
4. For operations 60 minutes or less, all traffic control devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.

PUBLICATION 213
SHORT-TERM MOBILE OPERATION
ADJACENT TO ANY ROADWAY

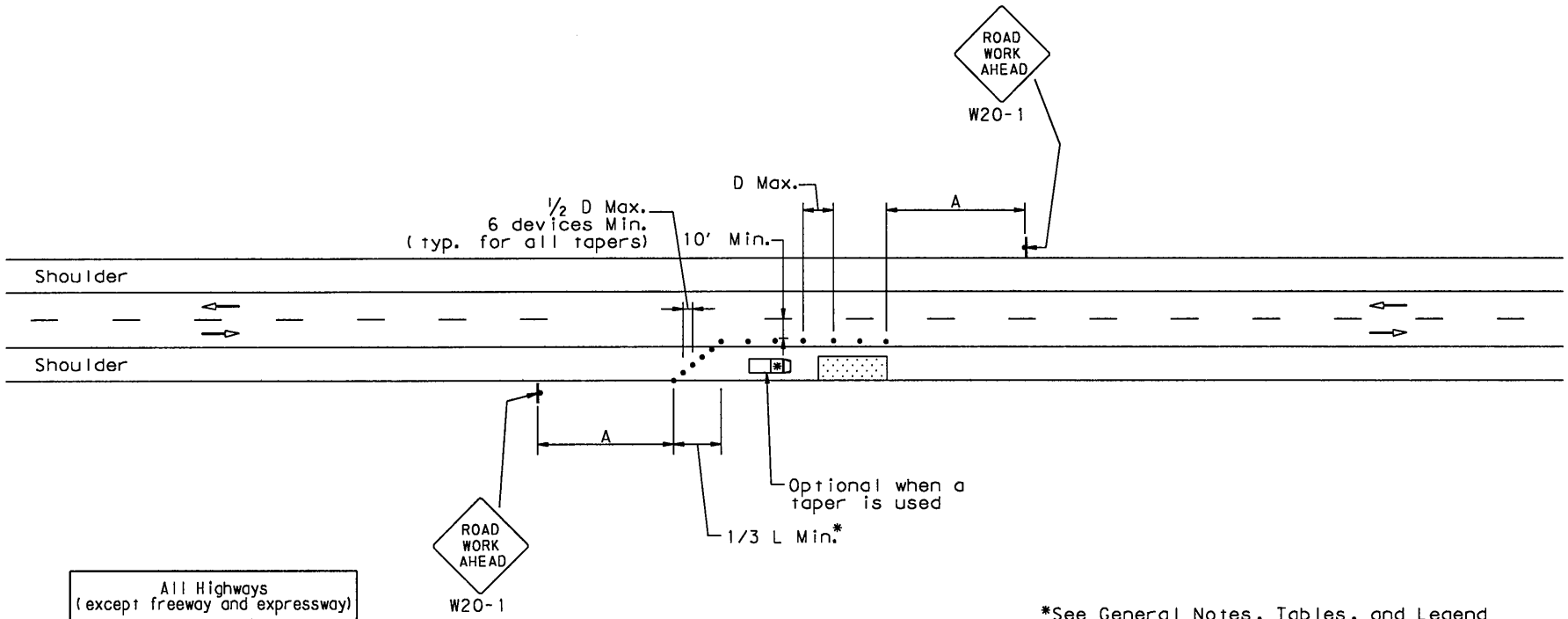


All Highways (except freeway and expressway)	
	A
MPH	ft
25	250
30	300
35	350
40	400
45	450
50	500
55	550
Alt. Spacing for High Density Urban	
25	100
30	100
Freeway and Expressway	
50	1000
55	1000
60	1000
65	1000

NOTES

1. This figure applies for operations that move intermittently or continuously at an average speed of more than 1 MPH (88 ft/min).
2. Traffic control devices are not required if the work space is outside the highway right-of-way, behind barrier, more than 2' behind curb, or 15' or more from the edge of any roadway.
3. For divided highways and one-way highways where it is physically possible, advance warning signs should also be placed on the left-hand side of the roadway.
4. For operations 60 minutes or less, all traffic control devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.
5. For a work area greater than 3 miles, a second G20-1 sign may be installed at the end of the first 3 mile segment.

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - MINOR ENCROACHMENT



All Highways (except freeway and expressway)		
	A	D
MPH	ft	ft
25	250	50
30	300	60
35	350	70
40	400	80
45	450	90
50	500	100
55	550	110
Alternate Spacing for High Density Urban		
25	100	50
30	100	60

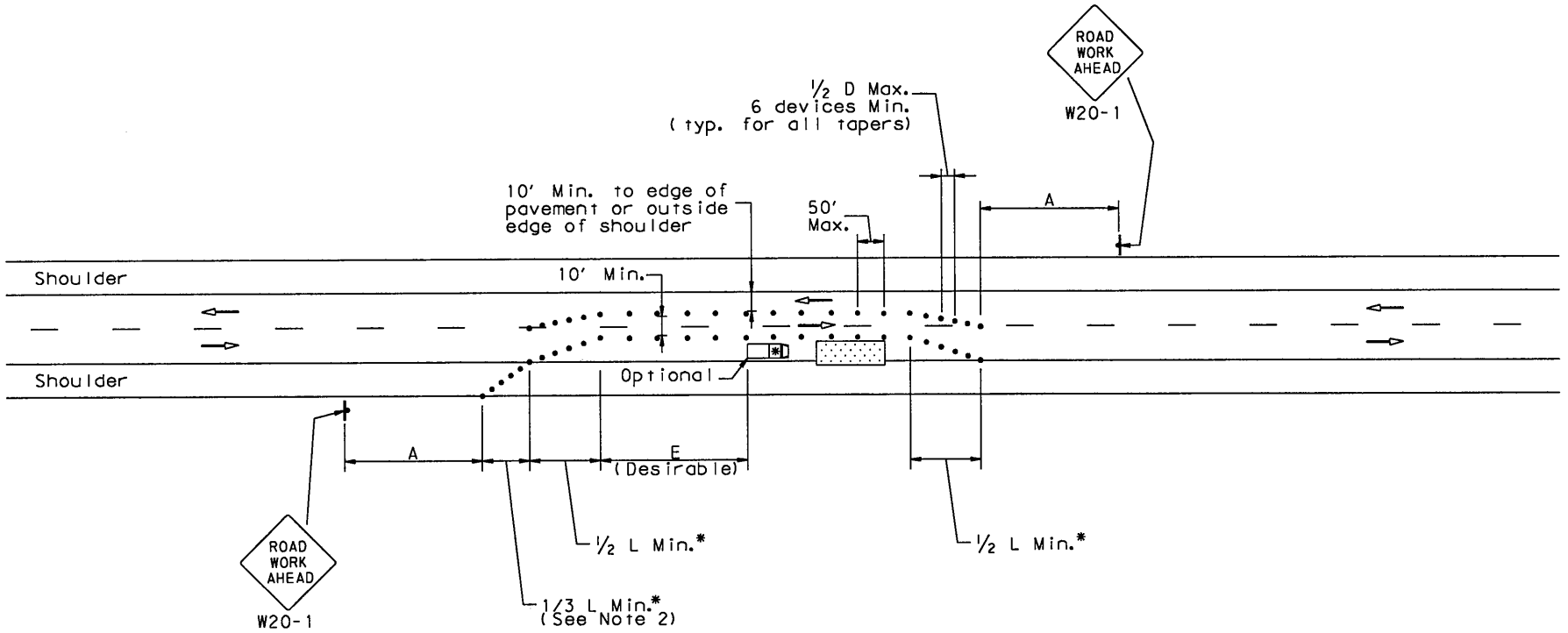
*See General Notes, Tables, and Legend Drawing for Taper Length (L).

NOTES

1. If the work area is completely within a parking lane and parking is present, the taper or the vehicle with an activated or revolving yellow light is not required.
2. When paved shoulders having a width of 8' or more are closed, channelizing devices should be used to close the shoulder in advance of the shifting taper.
3. For operations of 15 minutes or less:
   a. The W20-1 Sign is not required.
   b. All channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is present in advance of the work space.
4. Additional signs may be appropriate (Road Narrows sign, No Guide Rail sign, and so forth).

PATA
7

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - MAJOR ENCROACHMENT



*See General Notes, Tables, and Legend Drawing for Taper Length (L).

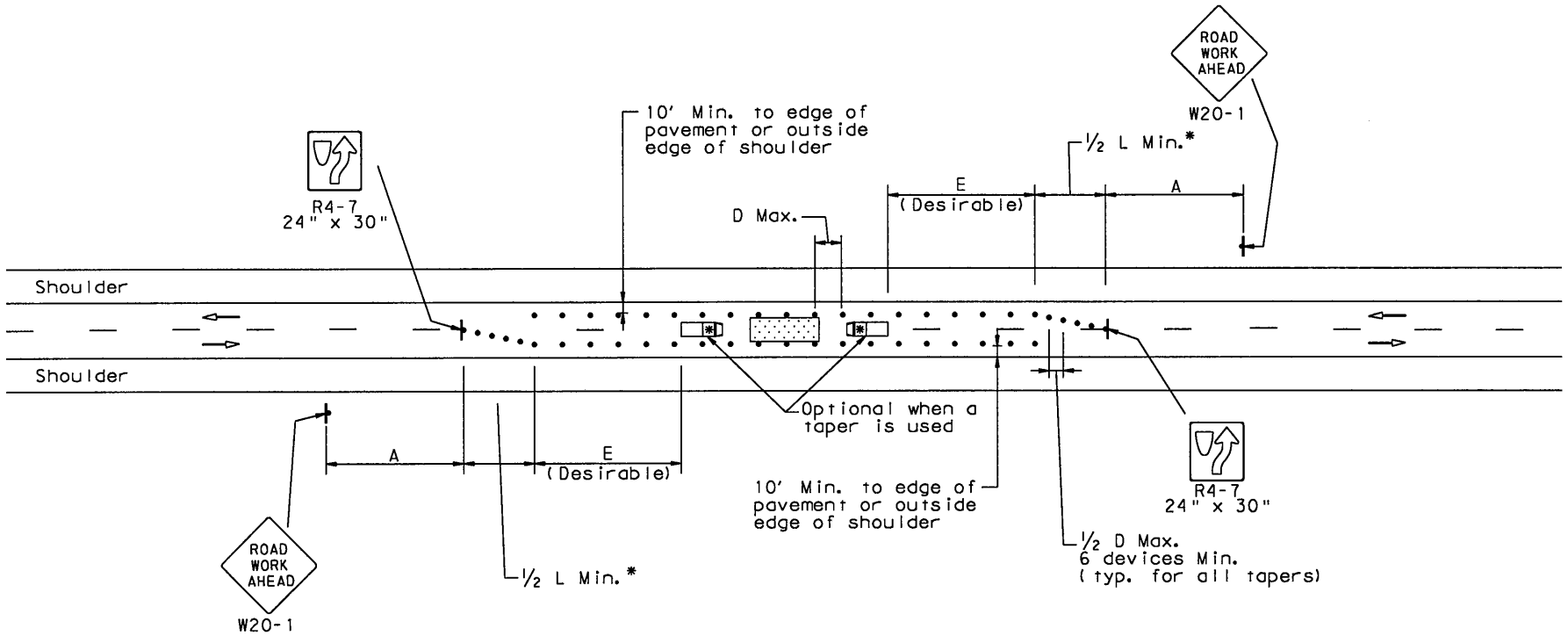
All Highways (except freeway and expressway)			
	A	D	E
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

NOTES

1. Where traffic is required to use a shoulder, it must be a paved shoulder that is in good condition both during the period it is being used by traffic and also after the work is completed.
2. When paved shoulders having a width of 8 ft or more are closed, channelizing devices should be used to close the shoulder in advance of the shifting taper.
3. Parking shall be prohibited where required. Coordinate with local authorities.

PATA
8

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - WORK AREA IN THE CENTER OF THE ROADWAY



*See General Notes, Tables, and Legend Drawing for Taper Length (L).

All Highways (except freeway and expressway)			
	A	D	E
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

NOTES

1. Where traffic is required to use a shoulder, it must be a paved shoulder that is in good condition both during the period it is being used by traffic and also after the work is completed.
2. The lanes on either side of the center work space should have a minimum width of 10 ft as measured from the near edge of the channelizing devices to the edge of pavement or the outside edge of paved shoulder.
3. Channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is present in advance of the work area and two, 10 ft minimum width lanes can be maintained past the work area.
4. Parking shall be prohibited where required. Coordinate with local authorities.

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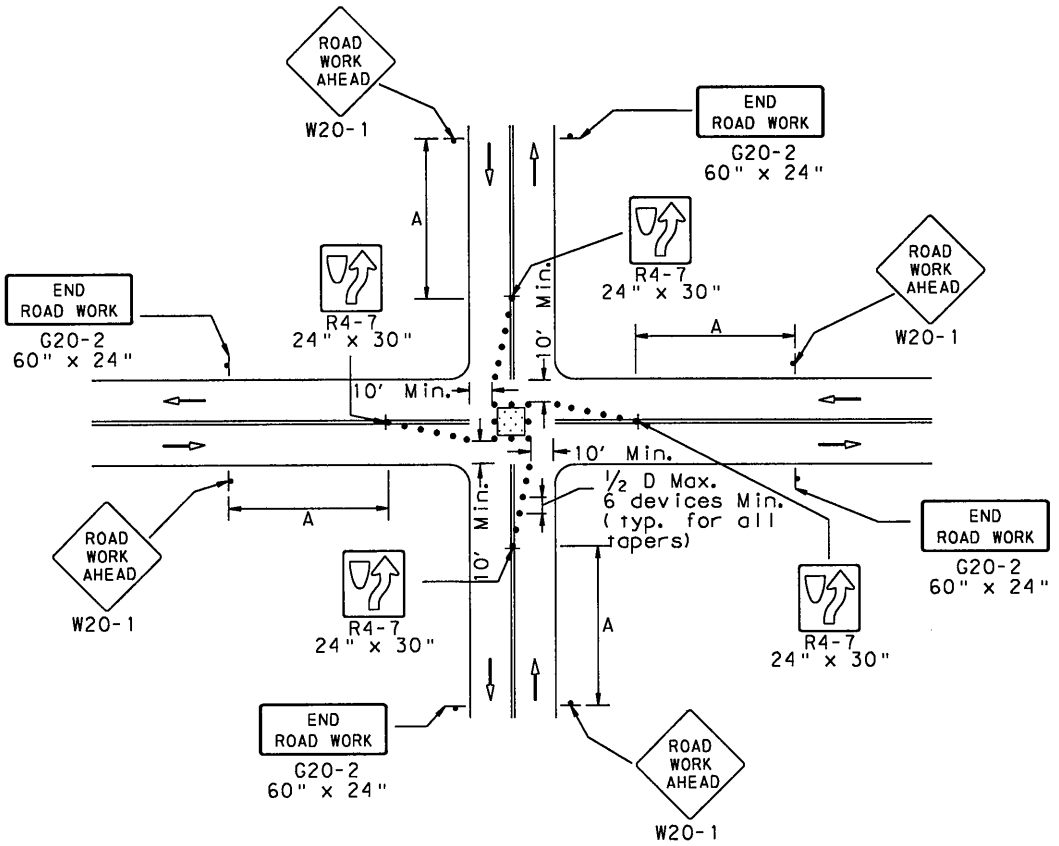
PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - WORK AREA IN THE CENTER OF AN INTERSECTION



All Highways (except freeway and expressway)		
	A	D
MPH	ft	ft
25	250	50
30	300	60
35	350	70
40	400	80
45	450	90
50	500	100
55	550	110
Alternate Spacing for High Density Urban		
25	100	50
30	100	60

NOTES

1. For operations 15 minutes or less in duration, channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is present in the work area.
2. All lanes should be a minimum of 10 ft in width as measured to the near face of the channelizing device.
3. When vehicular traffic does not include longer and wider heavy commercial vehicles, a minimum lane width of 9 ft may be used.
4. Left turns may be prohibited as required by geometric conditions.
5. Use 1/2 L for all tapers.

PATA
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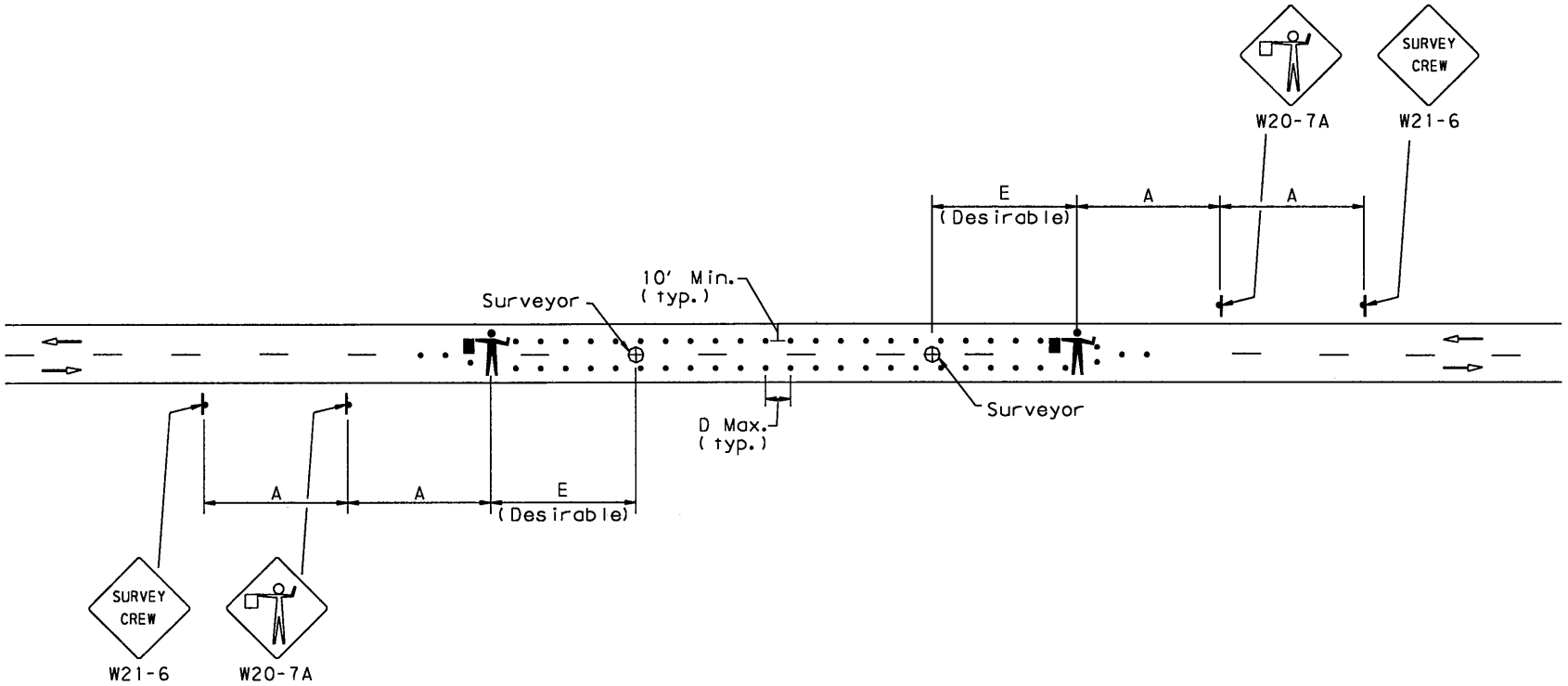
PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
SURVEYING ALONG CENTERLINE OF ROAD WITH LOW TRAFFIC VOLUMES



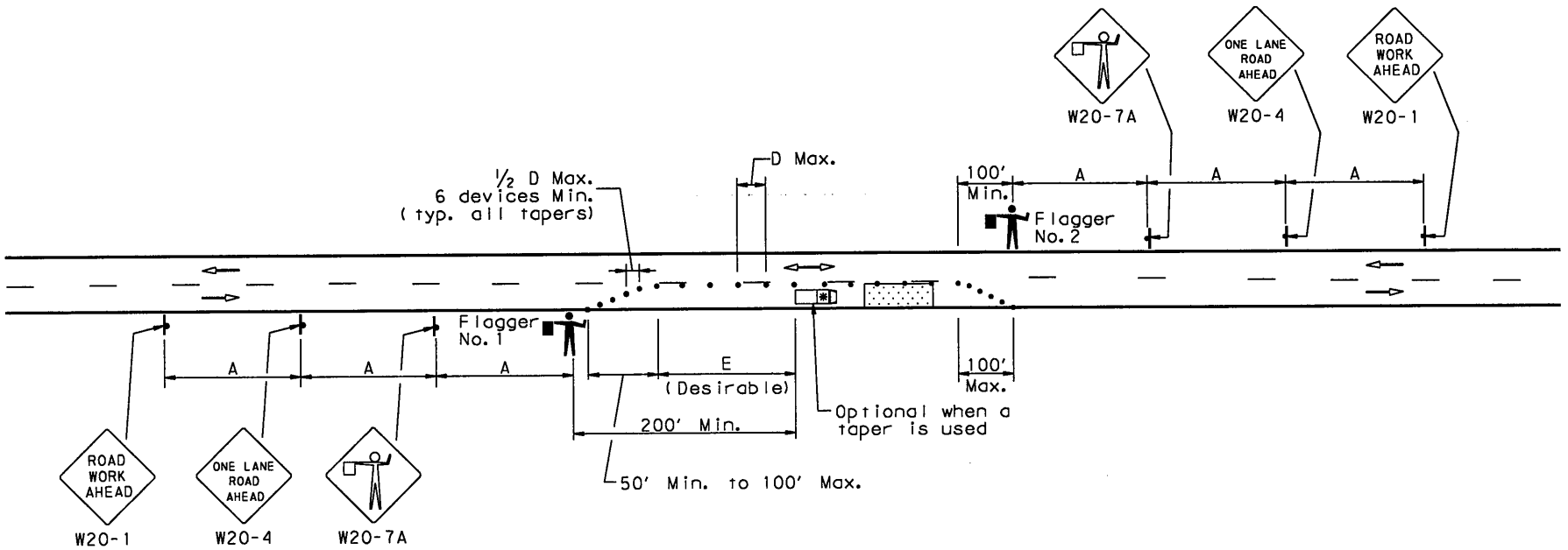
All Highways(except freeway and expressway)			
MPH	A ft	D ft	E* ft
25	250	50	155
30	300	60	200
35	350	70	250
40	Not recommended for speeds over 35 MPH.		
45			
50			
55			
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

*Distances may be increased for downgrades or other conditions that affect stopping sight distance.

NOTES

1. Cones should be placed 6 in to 12 in on either side of the centerline.
2. Workers in the roadway should wear high-visibility safety apparel as described in MUTCD Section 6D.03.
3. As shown on this figure, a flagger should be used to warn workers who cannot watch road users.
4. This figure should be used only for surveying the centerline of roads with low traffic volumes. For surveying the centerline of a high-volume road, one lane shall be closed as shown in PATA 10a.
5. Road Work Ahead Signs (W20-1) may be used in place of the Survey Crew Signs (W21-6).
6. If the work is along the shoulder, the flagger may be omitted.
7. A Be Prepared To Stop Sign (W3-4) may be added to the sign series. When used, it should be located before the W20-7A Sign.
8. Channelizing devices may be omitted for cross-section survey.
9. Spacing of channelizing devices should not exceed a distance in feet equal to ½ D when used for the taper channelization and a distance in feet equal to D when used for tangent channelization.

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - FLAGGING



All Highways (except freeway and expressway)			
	A	D	E*
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

*Distances may be increased for downgrades or other conditions that affect stopping sight distance.

NOTES

1. All flaggers must be in communication with each other.
2. Each flagger should be clearly visible to traffic for a minimum distance of E.
3. At night, flagger stations shall be illuminated, except in emergencies.
4. For operations 60 minutes or less, a taper is not required if a vehicle with an activated flashing or revolving yellow light is located between Flagger No.1 and the work space.
5. For operations of 15 minutes or less:
   a. The W20-1 and W20-4 Signs are not required.
   b. All channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is present in advance of the work space.
   c. The W20-7A Sign may be eliminated if the flagger is clearly visible to traffic for a minimum distance of E.
6. The buffer space should be extended so that the two-way traffic taper is placed before a horizontal (or crest vertical) curve to provide adequate sight distance for the flagger and a queue of stopped vehicles.
7. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.

PATA
10a

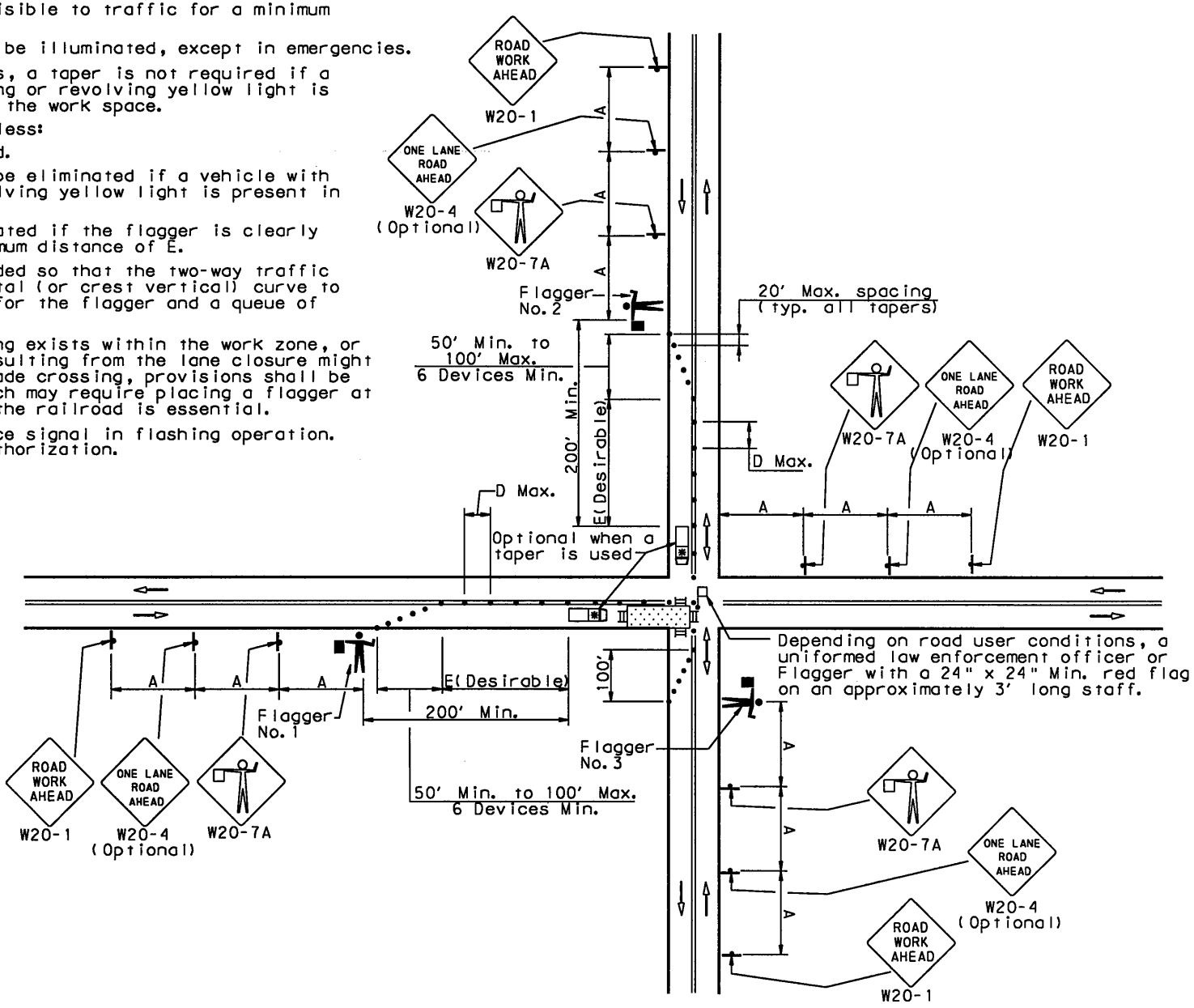
PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - INTERSECTION FLAGGING

NOTES

1. All flaggers must be in communication with each other.
2. Each flagger should be clearly visible to traffic for a minimum distance of E.
3. At night, flagger stations shall be illuminated, except in emergencies.
4. For operations 60 minutes or less, a taper is not required if a vehicle with an activated flashing or revolving yellow light is located between Flagger No. 1 and the work space.
5. For operations of 15 minutes or less:
   a. The W20-1 Sign is not required.
   b. All channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is present in advance of the work space.
   c. The W20-7A Sign may be eliminated if the flagger is clearly visible to traffic for a minimum distance of E.
6. The buffer space should be extended so that the two-way traffic taper is placed before a horizontal (or crest vertical) curve to provide adequate sight distance for the flagger and a queue of stopped vehicles.
7. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.
8. At signalized intersections, place signal in flashing operation. Contact local authorities for authorization.

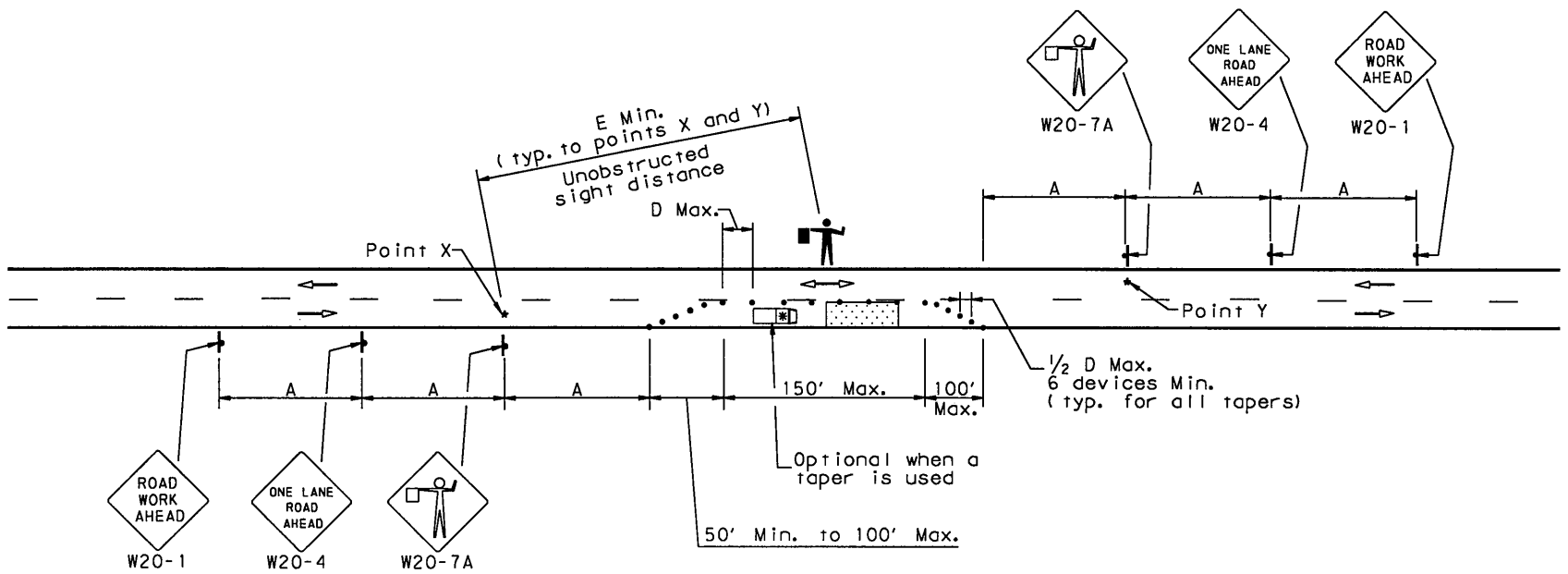
All Highways (except freeway and expressway)			
MPH	A ft	D ft	E* ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

*Distances may be increased for downgrades or other conditions that affect stopping sight distance.



PATA 10b

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - SINGLE FLAGGER



All Highways (except freeway and expressway)			
	A	D	E*
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

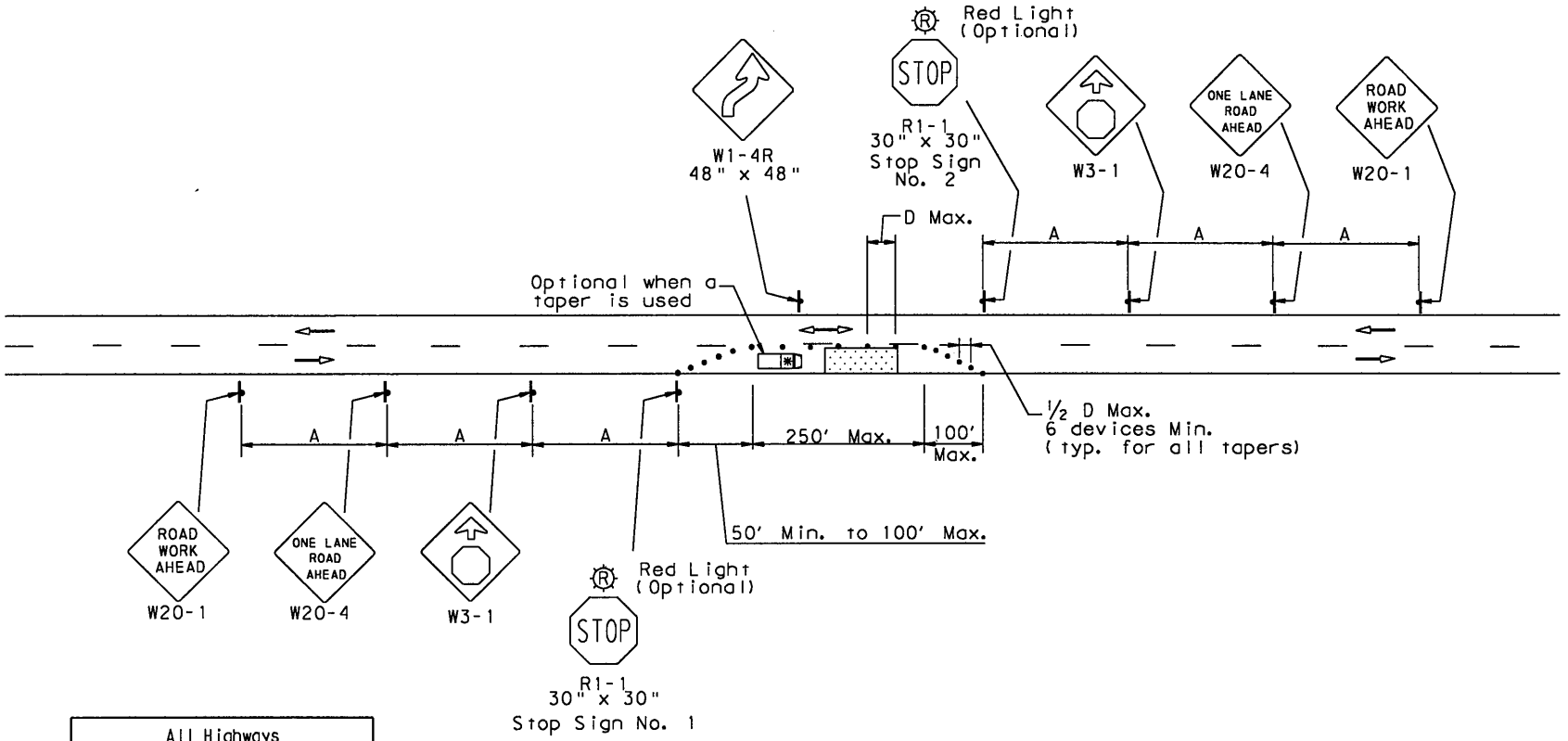
*Distances may be increased for downgrades or other conditions that affect stopping sight distance.

NOTES

1. This figure applies when all of the following conditions are satisfied:
   a. Sight distance between the flagger and any vehicle between Points X and Y will be unobstructed.
   b. The length of the one-lane section (not including any taper) is not greater than approximately 150 ft.
   c. The ADT is not greater than approximately 1500, or the average 5-minute traffic volume during the period of work is 12 vehicles or less.
2. Flagger should be clearly visible to traffic for a minimum distance of E.
3. At night, flagger station shall be illuminated, except in emergencies.
4. For operations 60 minutes or less, a taper is not required if a vehicle with an activated flashing or revolving yellow light is located in the closed lane in advance of the work space.
5. For operations of 15 minutes or less:
   a. The W20-1 and W20-4 Signs are not required.
   b. All channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is present in advance of the work space.
   c. The W20-7A Sign may be eliminated if the flagger is clearly visible to traffic for a minimum distance of E.
6. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.

PATA 10c

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - STOP SIGN-CONTROLLED LANE CLOSURE



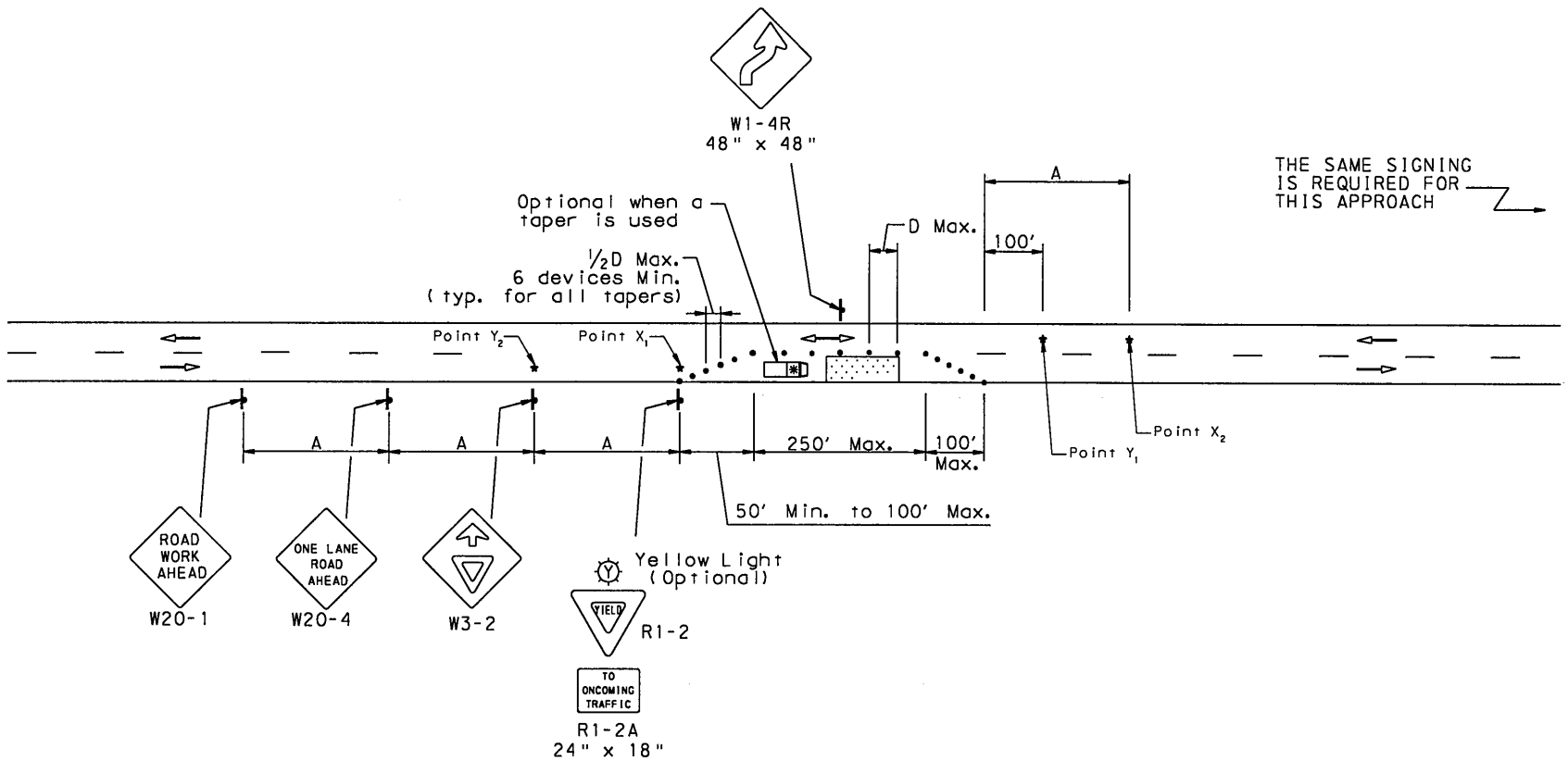
All Highways (except freeway and expressway)		
	A	D
MPH	ft	ft
25	250	50
30	300	60
35	350	70
40	400	80
45	450	90
50	500	100
55	550	110
Alternate Spacing for High Density Urban		
25	100	50
30	100	60

NOTES

1. This figure applies when all of the following conditions are satisfied:
   a. Sight distance between the Stop Signs will be unobstructed.
   b. The length of the one-lane section (not including any taper) is not greater than approximately 250 ft.
   c. The ADT is not greater than approximately 1500, or the average 5-minute traffic volume during the period of work is 12 vehicles or less.
2. For operations 60 minutes or less in duration, a taper is not required if a vehicle with an activated flashing or revolving yellow light is located in the closed lane between Stop Sign No. 1 and the work area. If a taper is not used, Stop Sign No. 1 may be located approximately 50 ft from the rear of the vehicle with an activated flashing or revolving yellow light.

PATA
10d

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - SELF-REGULATING LANE CLOSURE



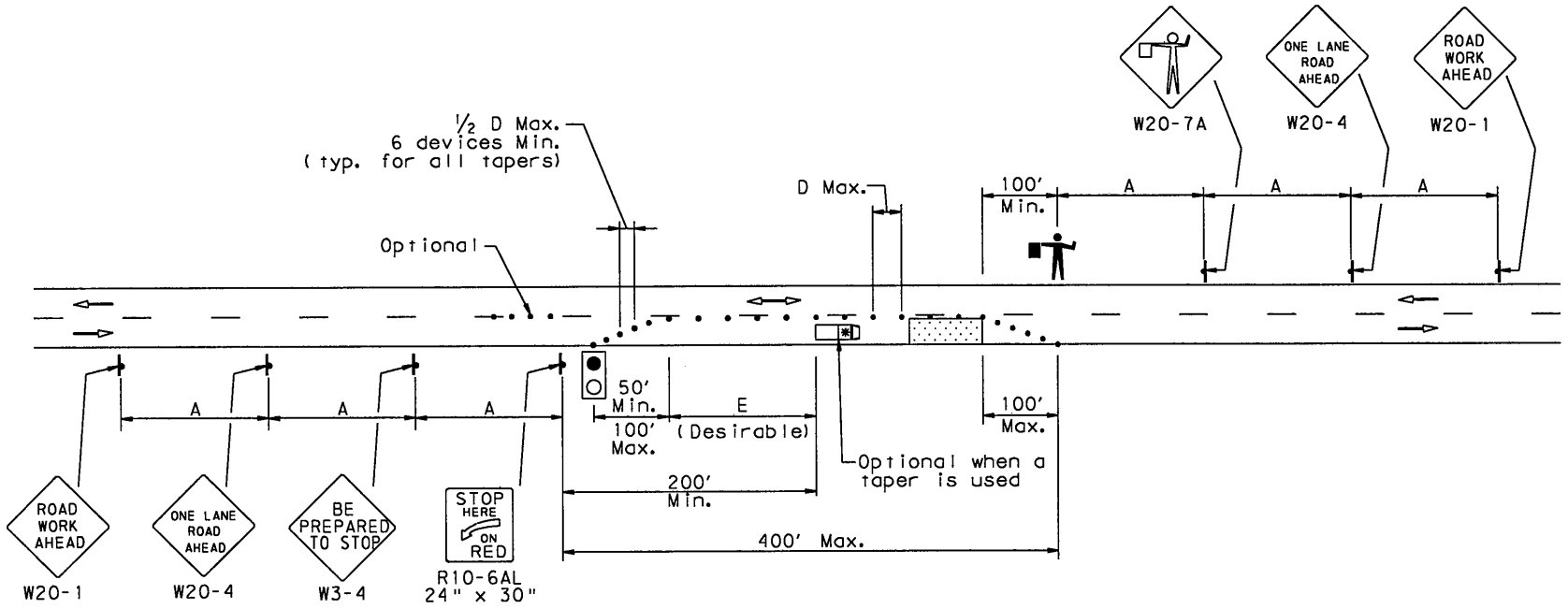
All Highways (except freeway and expressway)		
	A	D
MPH	ft	ft
25	250	50
30	300	60
35	350	70
40	400	80
45	450	90
50	500	100
55	550	110
Alternate Spacing for High Density Urban		
25	100	50
30	100	60

NOTES

1. This figure applies when all of the following conditions are satisfied:
   a. Sight distance between X_1 and X_2, and between Y_1 and Y_2, will be unabstructed.
   b. The length of the one-lane section (not including any taper) is not greater than approximately 250 ft.
   c. The ADT is not greater than approximately 750, or the average 5-minute traffic volume during the period of work is 6 vehicles or less.
2. For operations 60 minutes or less in duration, a taper is not required if a vehicle with an activated flashing or revolving yellow light is located in the closed lane as shown. If a taper is not used, Point X_1 shall be approximately 150 ft from the rear of the vehicle with an activated flashing or revolving yellow light.

PATA
10e

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION - TWO-LANE, TWO-WAY ROADWAY
RED/YELLOW AFAD - FLAGGER AT ONE END, AFAD AT THE OTHER END

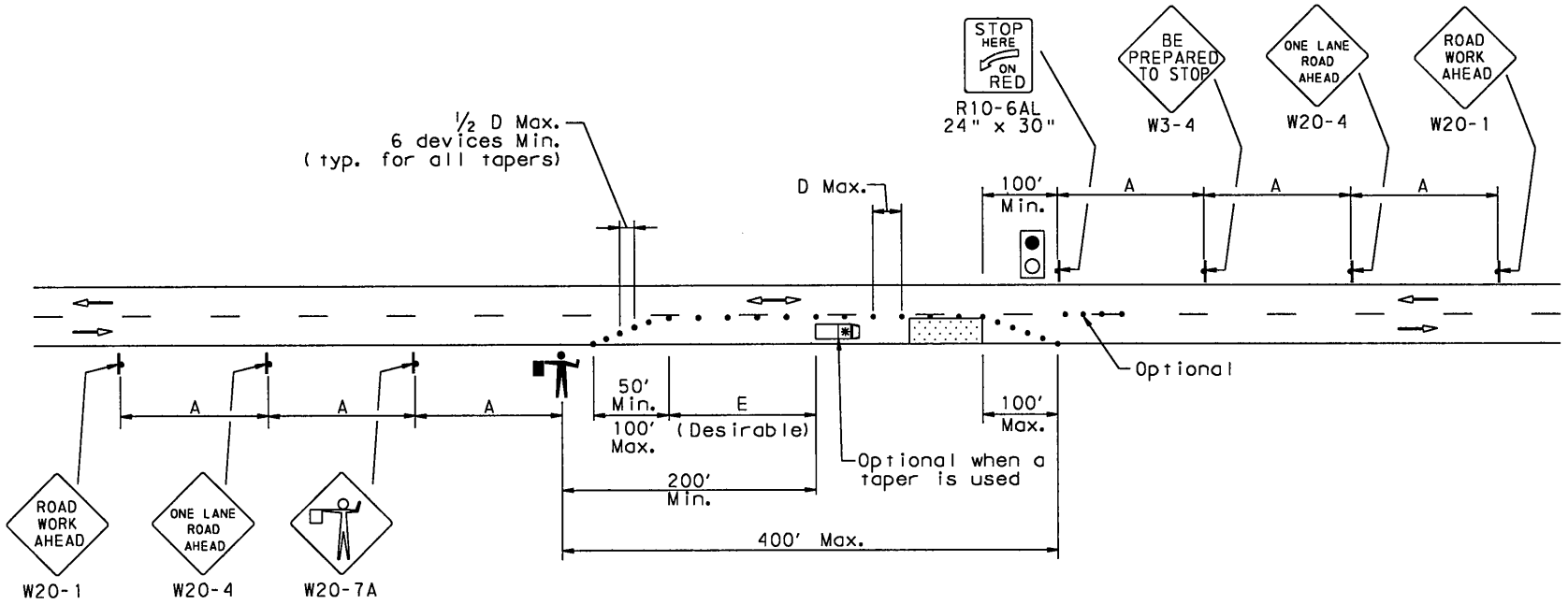


All Highways (except freeway and expressway)			
	A	D	E*
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

*Distances may be increased for downgrades or other conditions that affect stopping sight distance.

SEE SHEET 2 OF 2 FOR NOTES.

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION - TWO-LANE, TWO-WAY ROADWAY
RED/YELLOW AFAD - FLAGGER AT ONE END, AFAD AT THE OTHER END



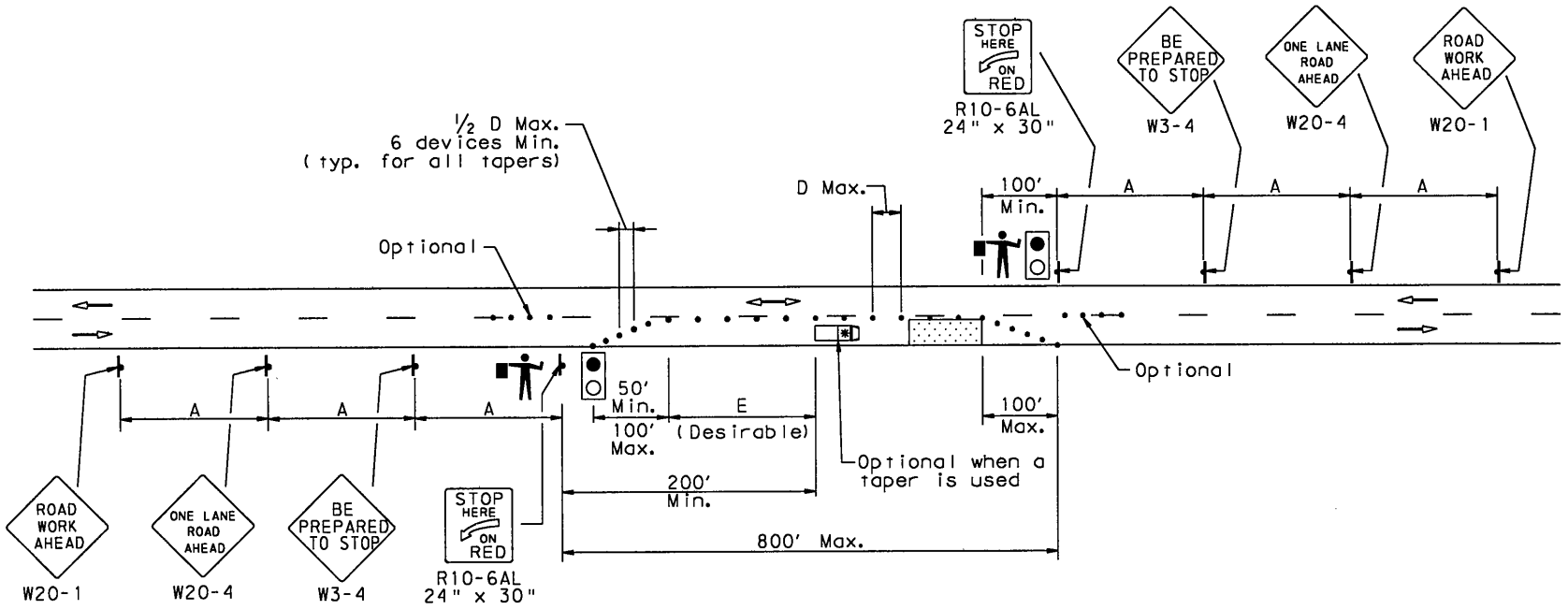
All Highways (except freeway and expressway)			
	A	D	E*
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

*Distances may be increased for downgrades or other conditions that affect stopping sight distance.

NOTES

1. The flagger and Automated Flagger Assitance Device (AFAD) should be clearly visible to traffic for a distance of 10 times the speed limit in feet.
2. At night, the flagger stations shall be illuminated, except in emergencies.
3. The buffer space should be extended so that the two-way traffic taper is placed before a horizontal (or crest vertical) curve to provide adequate sight distance for the flagger and a queue of stopped vehicles.
4. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION - TWO-LANE, TWO-WAY ROADWAY
RED/YELLOW AFAD - AFAD WITH FLAGGER AT BOTH ENDS



All Highways (except freeway and expressway)			
	A	D	E*
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

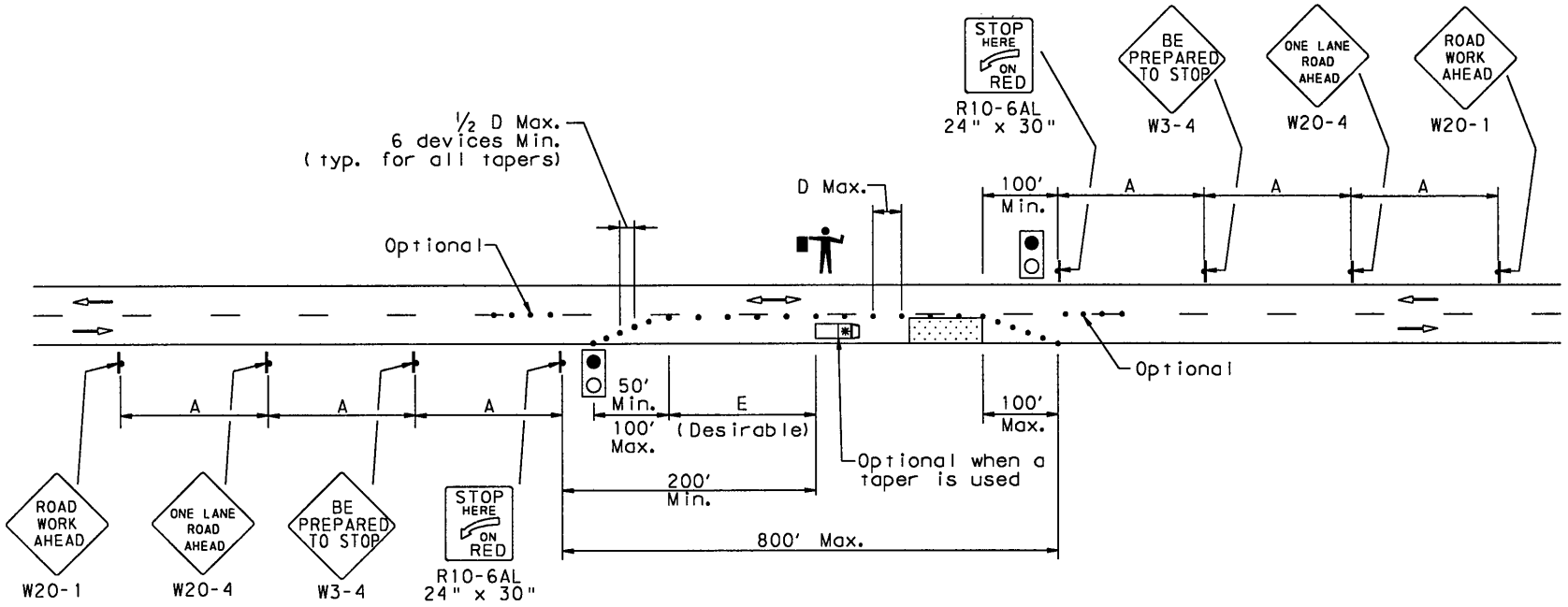
*Distances may be increased for downgrades or other conditions that affect stopping sight distance.

NOTES

1. All flaggers must be in communication with each other.
2. Each Automated Flagger Assistance Device (AFAD) should be clearly visible to traffic for a distance of 10 times the speed limit in feet.
3. At night, the flagger stations shall be illuminated, except in emergencies.
4. The buffer space should be extended so that the two-way traffic taper is placed before a horizontal (or crest vertical) curve to provide adequate sight distance for the flagger and a queue of stopped vehicles.
5. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.

PATA
10AFAD-2

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION - TWO-LANE, TWO-WAY ROADWAY
RED/YELLOW AFAD - AFAD AT BOTH ENDS, SINGLE FLAGGER CENTRALLY LOCATED



All Highways (except freeway and expressway)			
	A	D	E*
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

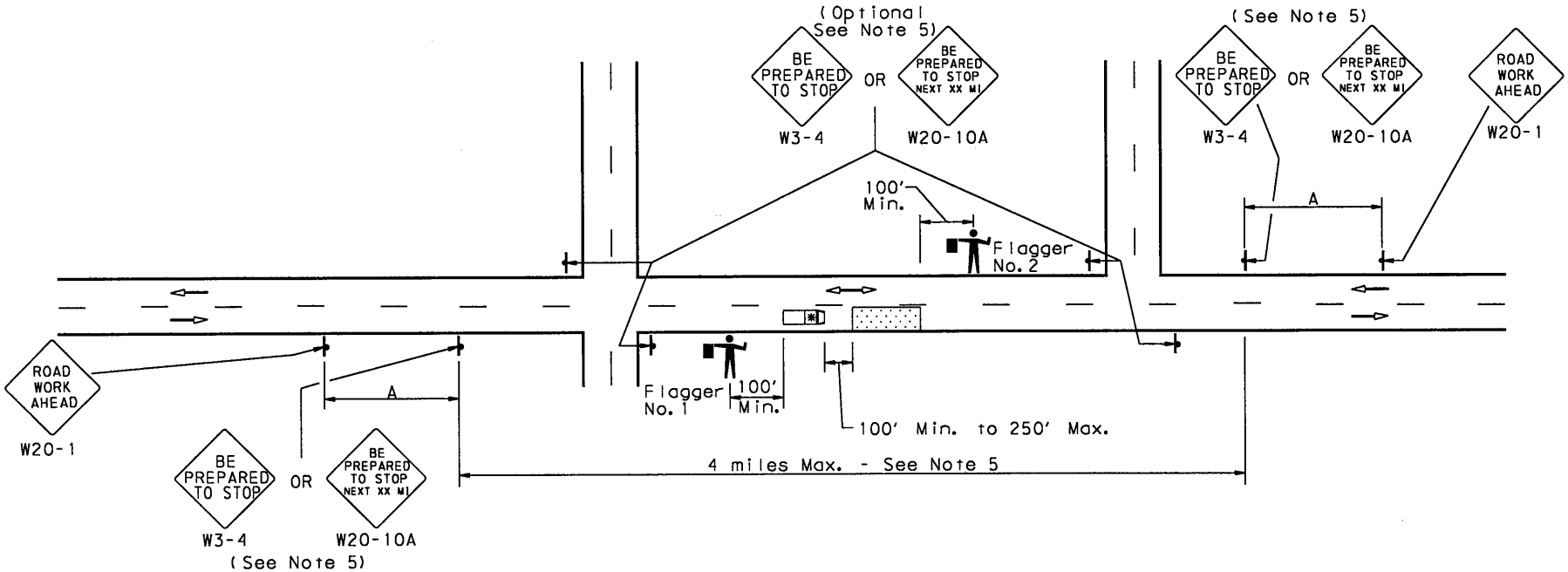
*Distances may be increased for downgrades or other conditions that affect stopping sight distance.

NOTES

1. Each Automated Flagger Assistance Device (AFAD) should be clearly visible to traffic for a distance of 10 times the speed limit in feet.
2. At night, the flagger stations shall be illuminated, except in emergencies.
3. The buffer space should be extended so that the two-way traffic taper is placed before a horizontal (or crest vertical) curve to provide adequate sight distance for the flagger and a queue of stopped vehicles.
4. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.

PATA
10AFAD-3

PUBLICATION 213
SHORT-TERM MOBILE OPERATION
TWO-LANE, TWO-WAY ROADWAY - FLAGGING



All Highways (except freeway and expressway)		
	A	E*
MPH	ft	ft
25	250	155
30	300	200
35	350	250
40	400	305
45	450	360
50	500	425
55	550	495
Alternate Spacing for High Density Urban		
25	100	155
30	100	200

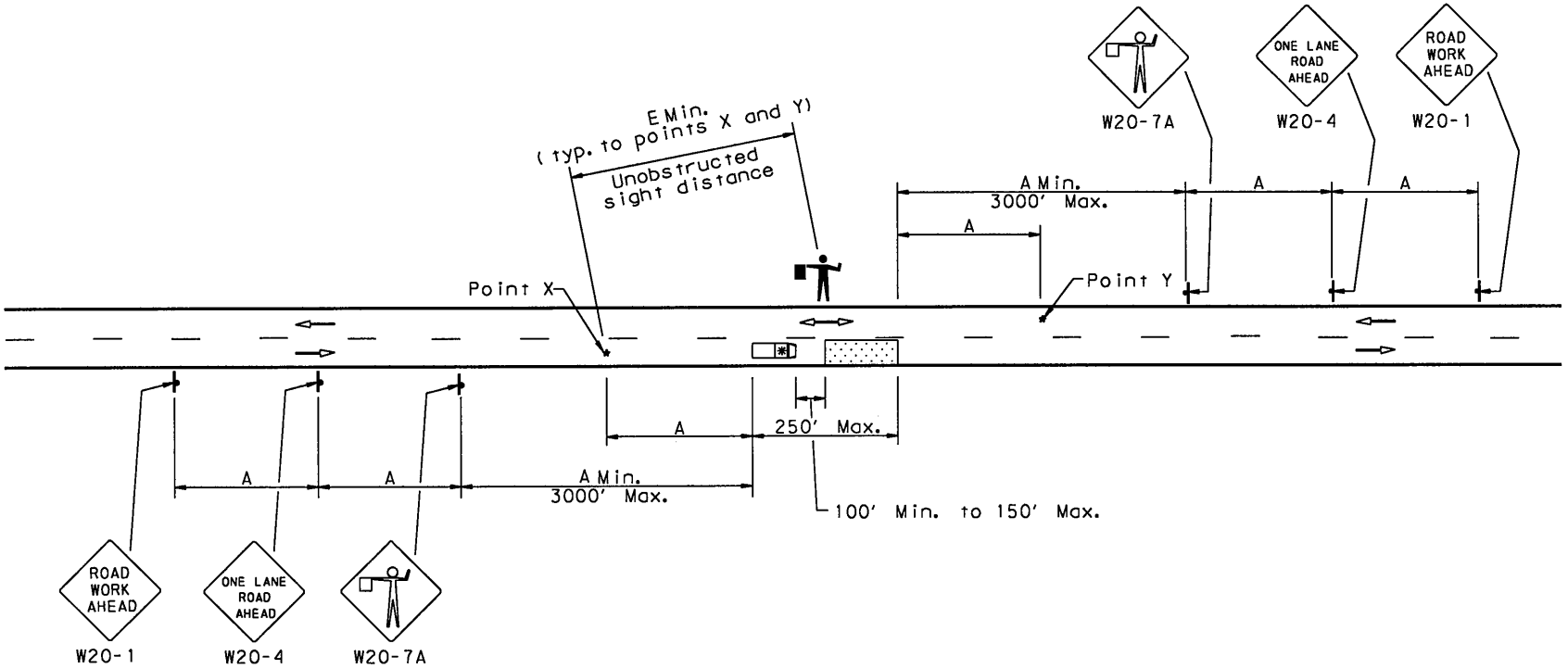
*Distances may be increased for downgrades or other conditions that affect stopping sight distance.

NOTES

1. This figure applies for daylight operations that move intermittently or continuously at an average speed of less than 1 MPH (88 ft/min).
2. All flaggers must be in communication with each other.
3. Each flagger should be clearly visible to traffic for a minimum distance of E.
4. The distance between a flagger and the W3-4 Sign shall be a minimum of A and maximum of 1 mile. The distance between a flagger and the W20-10A Sign shall be a minimum of A and a maximum of 2 miles. The flagger may be located in advance of the W3-4 or W20-10A Sign when flagging on an approach or within an intersection if all of the following conditions are met:
   a. A vehicle with an activated flashing or revolving yellow light is present.
   b. The operation will be 15 minutes or less in duration.
   c. Flagger should be clearly visible to traffic for a minimum distance of E or there is a Stop Sign on the approach to the flagger.
   d. The ADT entering the intersection is not greater than approximately 1500, or the average 5-minute traffic volume during the period of work is 12 vehicles or less.
5. Interim W20-10A Signs will be required for any projects over 2 miles in length. However, if there will be no flaggers after the W3-4 or W20-10A Sign, the W3-4 or W20-10A Sign should be removed or turned away from traffic. The signing for intersection roads is optional but when signed, a W3-4 or W20-10A Sign shall be installed on the roadway where work is taking place on each side of the intersecting road as indicated.
6. Additional flaggers may be required when working within or adjacent to an intersection.
7. For surface treatment operations W21-5-1 Signs should be installed. The first sign in each direction should be placed where the W20-1 Signs are shown and the W20-1 Signs moved A distance upstream.
8. A pilot vehicle is recommended for use with surface treatment operations on roads with ADTs of approximately 1000 or more.
9. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.

PATA 11a

PUBLICATION 213
SHORT-TERM MOBILE OPERATION
TWO-LANE, TWO-WAY ROADWAY - SINGLE FLAGGER



All Highways (except freeway and expressway)		
	A	E*
MPH	ft	ft
25	250	155
30	300	200
35	350	250
40	400	305
45	450	360
50	500	425
55	550	495
Alternate Spacing for High Density Urban		
25	100	155
30	100	200

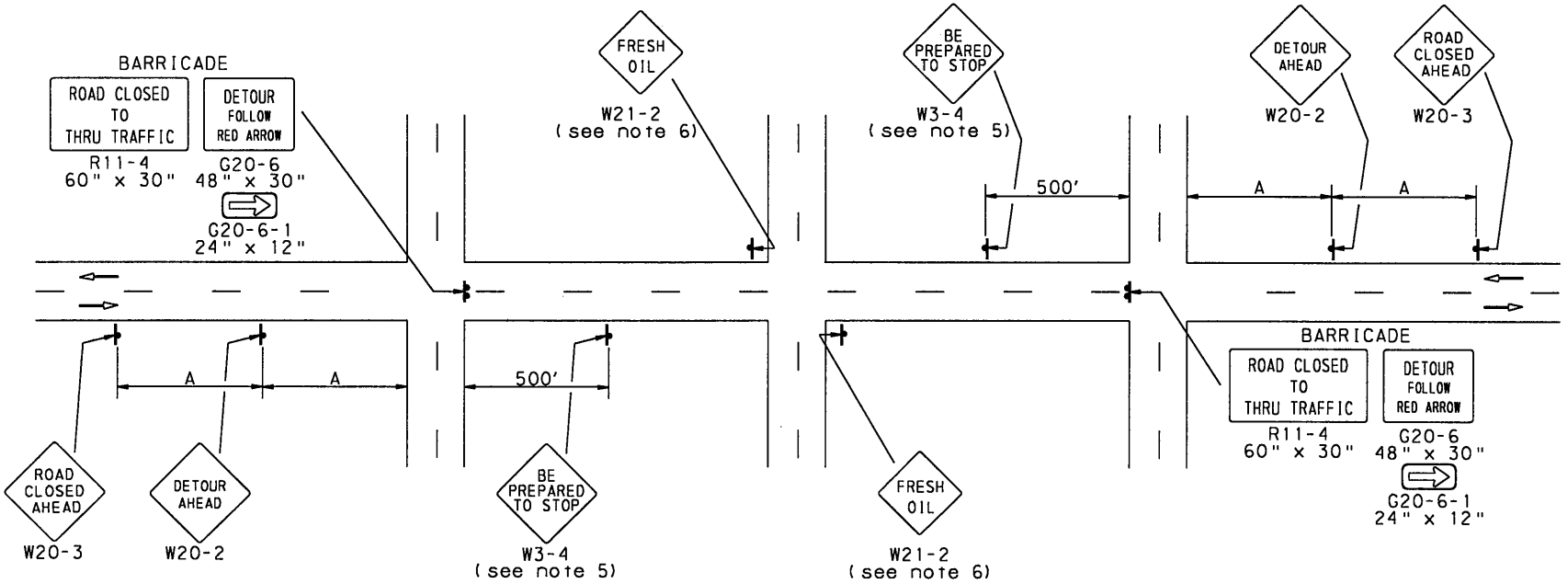
*Distances may be increased for downgrades or other conditions that affect stopping sight distance.

NOTES

1. This figure applies for daylight operations when all of the following conditions are satisfied:
   a. The operation moves intermittently or continuously at an average speed of less than 1 MPH (88 ft/min).
   b. Sight distance between the flagger and any vehicle between Points X and Y will be unobstructed.
   c. The length of the one-lane section is not greater than approximately 250'.
   d. The ADT is not greater than approximately 1500, or the average 5-minute traffic volume during the period of work is 12 vehicles or less.
2. Flagger should be clearly visible to traffic for a minimum distance of E.
3. For operations of 15 minutes or less:
   a. The W20-1 and W20-4 Signs are not required.
   b. The W20-7A Sign may be eliminated if the flagger is clearly visible to traffic for a minimum distance of E.
4. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.

PATA 11b

PUBLICATION 213
SHORT-TERM MOBILE OPERATION
TWO-LANE, TWO-WAY ROADWAY - ROAD CLOSURE



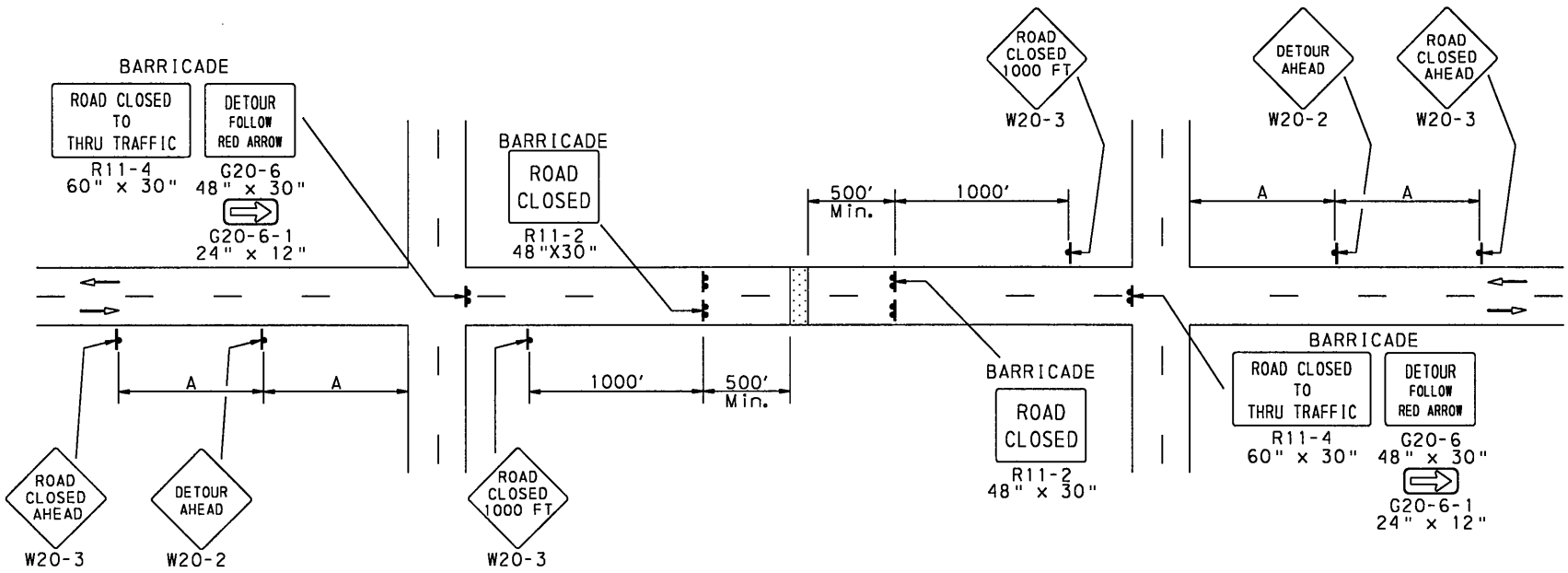
All Highways (except freeway and expressway)	
	A
MPH	ft
25	250
30	300
35	350
40	400
45	450
50	500
55	550
Alt. Spacing for High Density Urban	
25	100
30	100

NOTES

1. This figure applies for operations that move intermittently at an average speed of 1 MPH or less.
2. This setup is to be used during daylight hours only and only on roadways with ADT's of 1500 or less.
3. Hours of work should not interfere with rush hour traffic or school bus schedules and the work site must be capable of accommodating emergency vehicles with as little delay as possible.
4. Flaggers may be needed with the operations to control local traffic and at intersections. Flaggers must be in communication with each other.
5. The maximum distance between a flagger with the operation and a W3-4 Sign is 2 miles. Interim W3-4 Signs will be required for any project over 2 miles in length; however, if there will be no flaggers between the W3-4 Sign and the R11-4 Sign, the W3-4 Sign should be removed or turned away from traffic.
6. The signing of intersecting roads with W21-2 Signs is required when the ADT of the intersecting road is 200 or greater.
7. Roads used as alternate routes should be owned and maintained by the Commonwealth (Department projects only).
8. At locations where there are overlapping detours or several detours within the same area, street names may be added to the G20-6 and G20-6-1 Signs, or signs with different colored arrows may be used to designate the different detour routes. The design and application of signs displaying colored arrows shall comply with Publication 236M.
9. The G20-6 and G20-6-1 Signs are for illustrative purpose only. See PATA 39a and 39b.

PATA
11c

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - ROAD CLOSURE



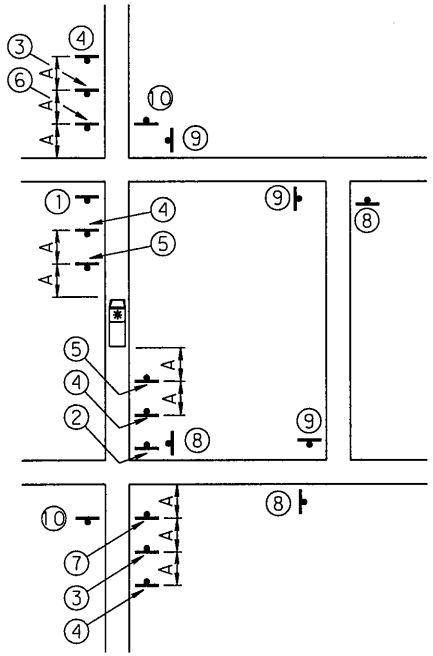
All Highways (except freeway and expressway)	
	A
MPH	ft
25	250
30	300
35	350
40	400
45	450
50	500
55	550
Alt. Spacing for High Density Urban	
25	100
30	100

NOTES

1. This figure applies for stationary operations where it is not feasible to maintain alternate one direction traffic flow.
2. This setup is to be used during daylight hours only and only on roadways with ADT's of 1500 or less.
3. Hours of work should not interfere with rush hour traffic or school bus schedules and the work site must be capable of accommodating emergency vehicles with as little delay as possible.
4. Roads used as alternate routes should be owned and maintained by the Commonwealth (Department projects only).
5. At locations where there are overlapping detours or several detours within the same area, street names may be added to the G20-6 and G20-6-1 Signs, or signs with different colored arrows may be used to designate the different detour routes. The design and application of signs displaying colored arrows shall comply with 236M.
6. The G20-6 and G20-6-1 Signs are for illustrative purpose only. See PATA 39a and 39b.

PATA
11d

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - ROAD CLOSURE



① ROAD CLOSED
R11-2
48" x 30"
DETOUR
M4-10L
36" x 12"

② ROAD CLOSED
R11-2
48" x 30"
DETOUR
M4-10R
36" x 12"

③ DETOUR AHEAD
W20-2

④ ROAD CLOSED AHEAD
W20-3

⑤ ROAD WORK AHEAD
W20-1

⑥ DETOUR
M4-9SL
30" x 24"

⑦ DETOUR
M4-9SR
30" x 24"

⑧ DETOUR
M4-9L
30" x 24"

⑨ DETOUR
M4-9R
30" x 24"

⑩ END DETOUR
M4-8A
24" x 18"

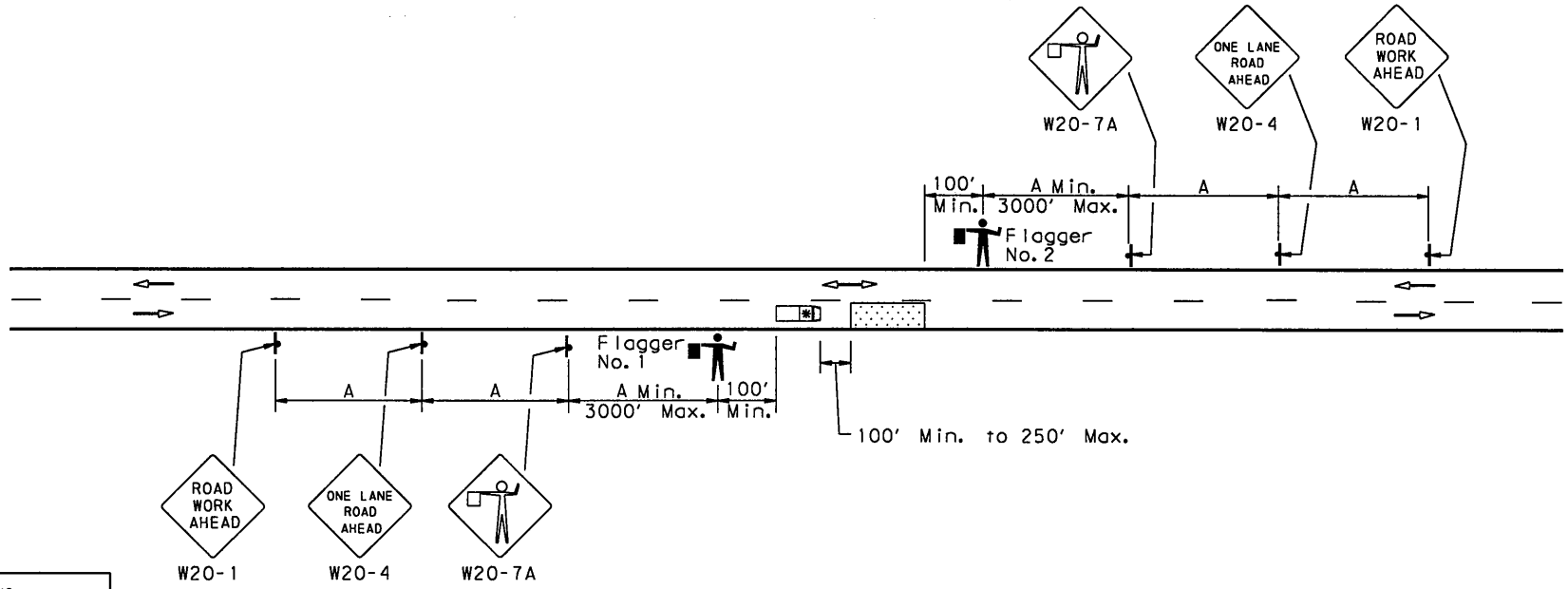
All Highways (except freeway and expressway)	
	A
MPH	ft
25	250
30	300
35	350
40	400
45	450
50	500
55	550
Alt. Spacing for High Density Urban	
25	100
30	100

NOTES

1. This figure applies for stationary operations where it is not feasible to maintain alternate one direction traffic flow.
2. This setup is to be used during daylight hours only and only on roadways with ADT's of 1500 or less.
3. Hours of work should not interfere with rush hour traffic or school bus schedules and the work site must be capable of accommodating emergency vehicles with as little delay as possible.
4. Roads used as alternate routes should be owned and maintained by the Commonwealth (Department projects only).
5. At locations where there are overlapping detours or several detours within the same area, street names may be added to the G20-6 and G20-6-1 Signs, or signs with different colored arrows may be used to designate the different detour routes. The design and application of signs displaying colored arrows shall comply with 236M.

PATA
11e

PUBLICATION 213
SHORT-TERM MOBILE OPERATION
TWO-LANE, TWO-WAY ROADWAY - FLAGGING



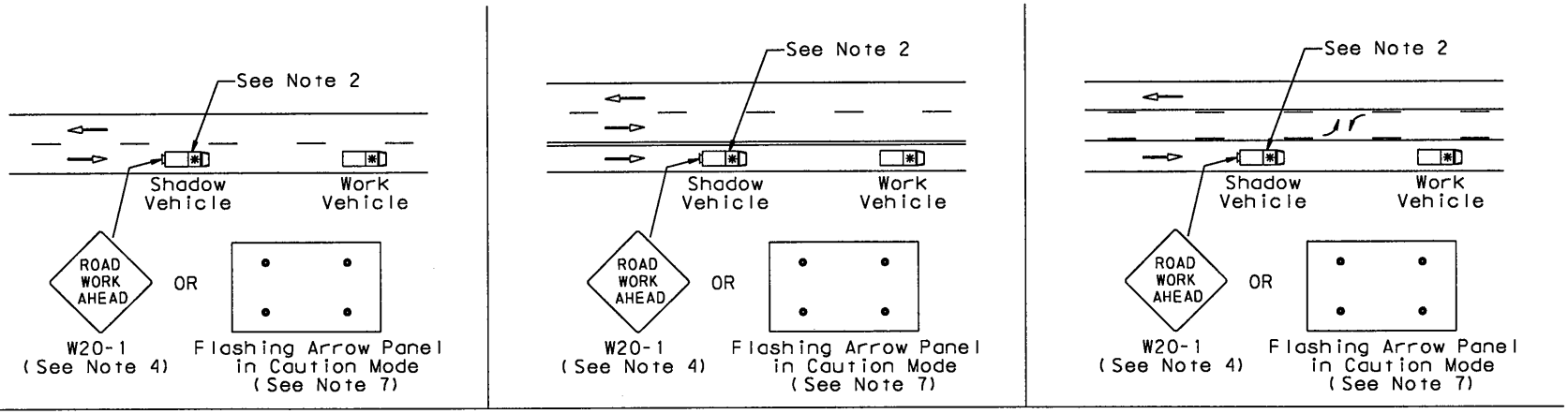
All Highways (except freeway and expressway)		
	A	E*
MPH	ft	ft
25	250	155
30	300	200
35	350	250
40	400	305
45	450	360
50	500	425
55	550	495
Alternate Spacing for High Density Urban		
25	100	155
30	100	200

*Distances may be increased for downgrades or other conditions that affect stopping sight distance.

NOTES

1. This figure applies for operations that move intermittently or continuously at an average speed of less than 1 MPH (88 ft/min).
2. All flaggers must be in communication with each other.
3. Each flagger should be clearly visible to traffic for a minimum distance of E.
4. At night, flagger stations shall be illuminated, except in emergencies.
5. For operations of 15 minutes or less:
   a. The W20-1 and W20-4 Signs are not required.
   b. The W20-7A Sign may be eliminated if the flagger is clearly visible to traffic for a minimum distance of E.
6. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.

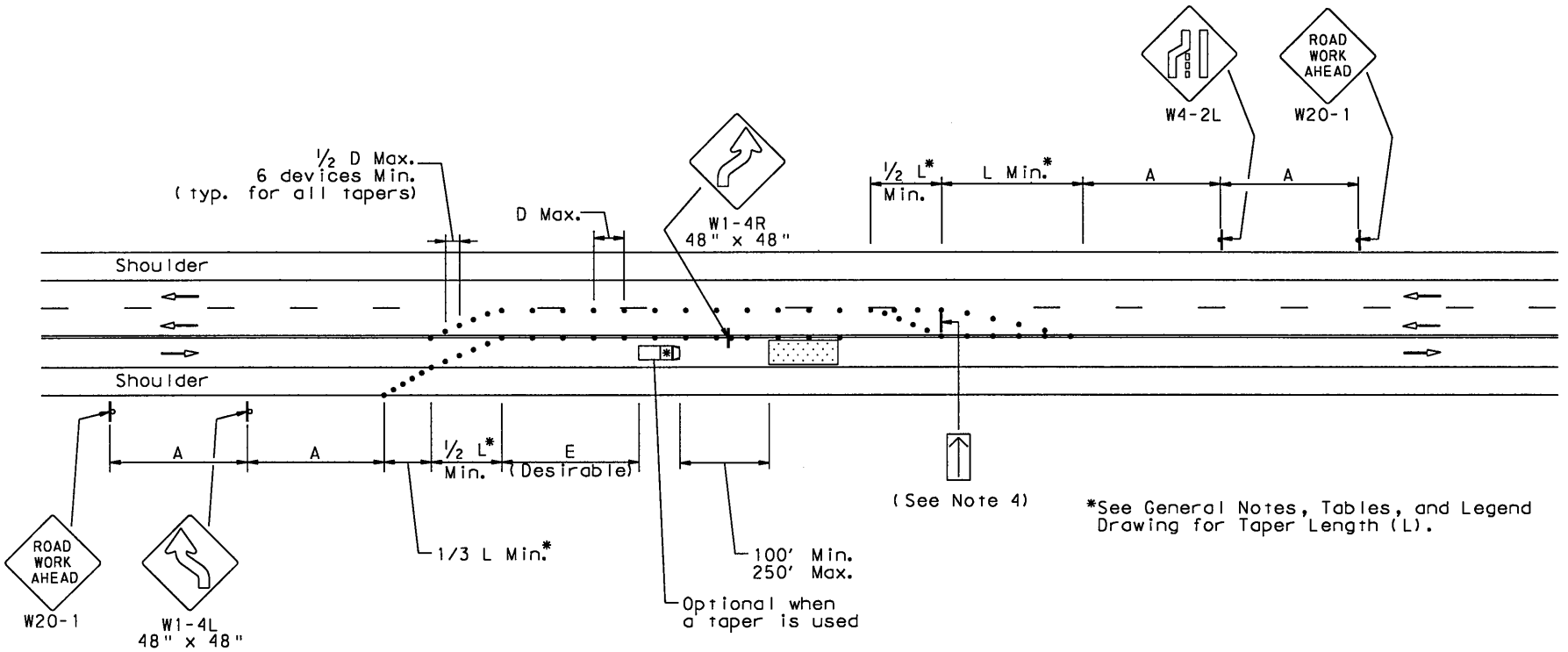
PUBLICATION 213
SHORT-TERM MOBILE OPERATION
TWO-LANE, TWO-WAY ROADWAY OR ONE-LANE APPROACH OF A THREE-LANE, TWO-WAY ROADWAY



All Highways (except freeway and expressway)	
	A
MPH	ft
25	250
30	300
35	350
40	400
45	450
50	500
55	550
Alt. Spacing for High Density Urban	
25	100
30	100

NOTES
1. This figure applies for operations that move intermittently or continuously at an average speed of 1 MPH or more.
2. The shadow vehicle shall be positioned so that it is visible from behind for a minimum distance of A. The shadow vehicle should slow down in advance of vertical or horizontal curves that restrict sight distance.
3. Where passing is not permitted for extended lengths, the shadow and work vehicles should pull over periodically, when it is reasonable and safe, in order to allow "backed-up" or queued traffic to resume its normal speed.
4. Other appropriate standard signs may be used instead of the W20-1 Sign.
5. The shadow vehicle should be equipped with two high-intensity flashing lights mounted on the rear, adjacent to the sign.
6. A truck-mounted attenuator may be used on the shadow vehicle and/or on the work vehicle.
7. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
THREE-LANE, TWO-WAY ROADWAY WITH PASSING - WORK AREA IN THE SINGLE APPROACH

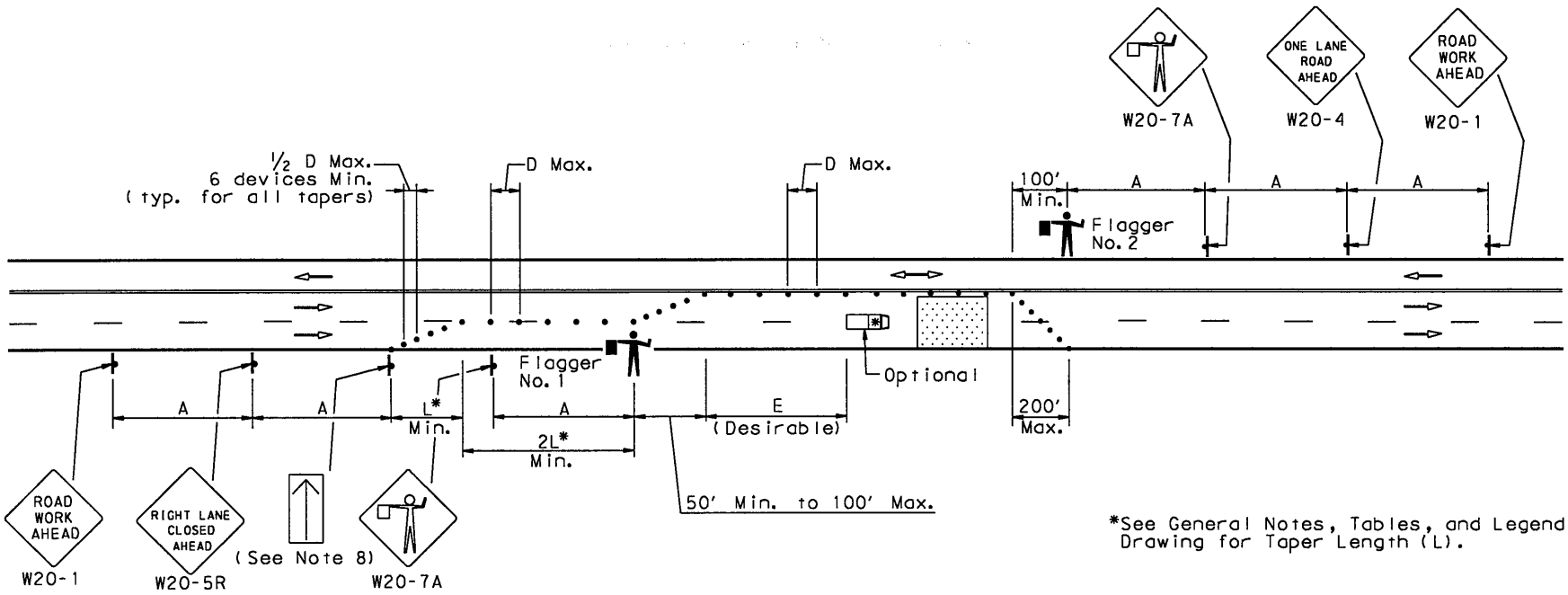


All Highways (except freeway and expressway)			
	A	D	E
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

NOTES

1. When paved shoulders having a width of 8 ft or more are closed, channelizing devices should be used to close the shoulder in advance of the shifting taper.
2. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.
3. If the length of the tangent section between beginning and ending tapers is more than 600 ft, use two W1-4 Signs as shown. If the distance is 600 ft or less, use a W24-1 Sign.
4. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
THREE-LANE, TWO-WAY ROADWAY WITH PASSING - WORK AREA IN BOTH LANES OF TWO-LANE APPROACH - WITH FLAGGERS



*See General Notes, Tables, and Legend Drawing for Taper Length (L).

All Highways (except freeway and expressway)			
	A	D	E**
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

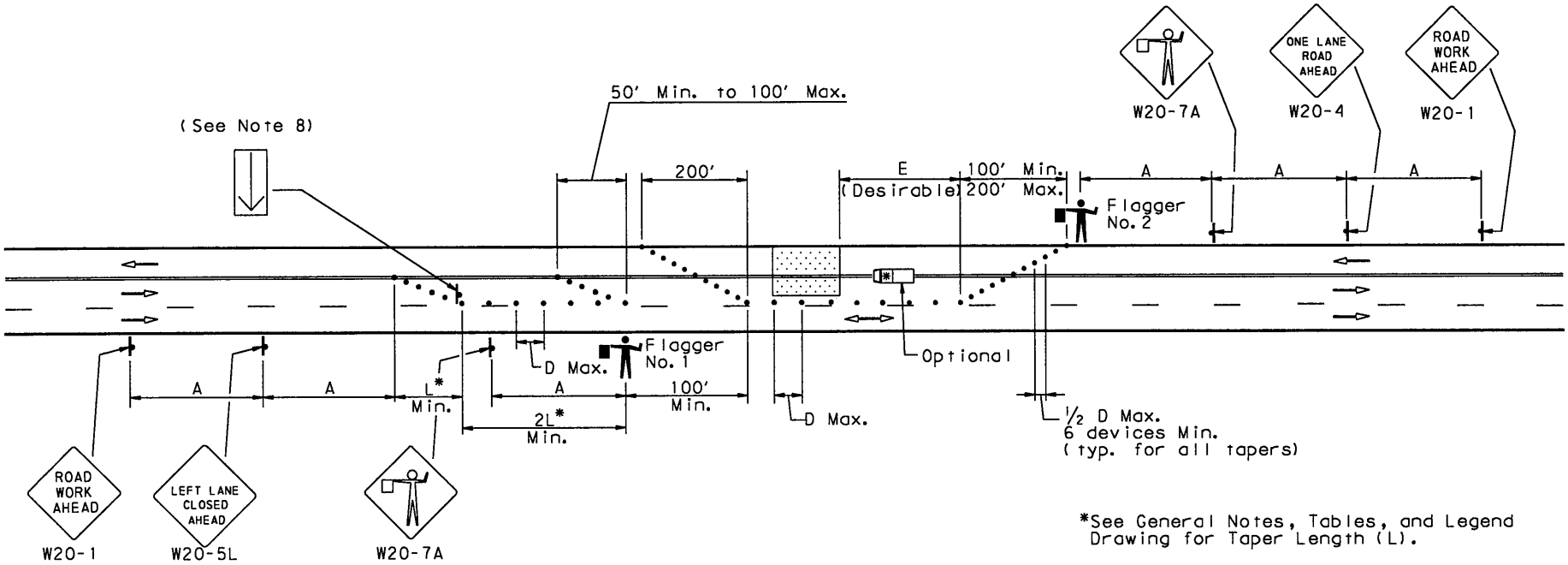
** Distances may be increased for downgrades or other conditions that affect stopping sight distance.

NOTES

1. All flaggers must be in communication with each other.
2. Each flagger should be clearly visible to traffic for a minimum distance of E.
3. At night, flagger stations shall be illuminated, except in emergencies.
4. For operations 60 minutes or less, a taper is not required if a vehicle with an activated flashing or revolving yellow light is located between Flagger No. 1 and the work space.
5. For operations of 15 minutes or less:
   a. The W20-1 and W20-4 Signs are not required.
   b. All channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is present in advance of the work space.
   c. The W20-7A Sign may be eliminated if the flagger is clearly visible to traffic for a minimum distance of E.
6. The buffer space should be extended so that the two-way traffic taper is placed before a horizontal (or crest vertical) curve to provide adequate sight distance for the flagger and a queue of stopped vehicles.
7. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.
8. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PATA 13b

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
THREE-LANE, TWO-WAY ROADWAY WITH PASSING - WORK AREA IN ONE-LANE APPROACH AND LEFT LANE OF TWO-WAY APPROACH - WITH FLAGGERS



*See General Notes, Tables, and Legend Drawing for Taper Length (L).

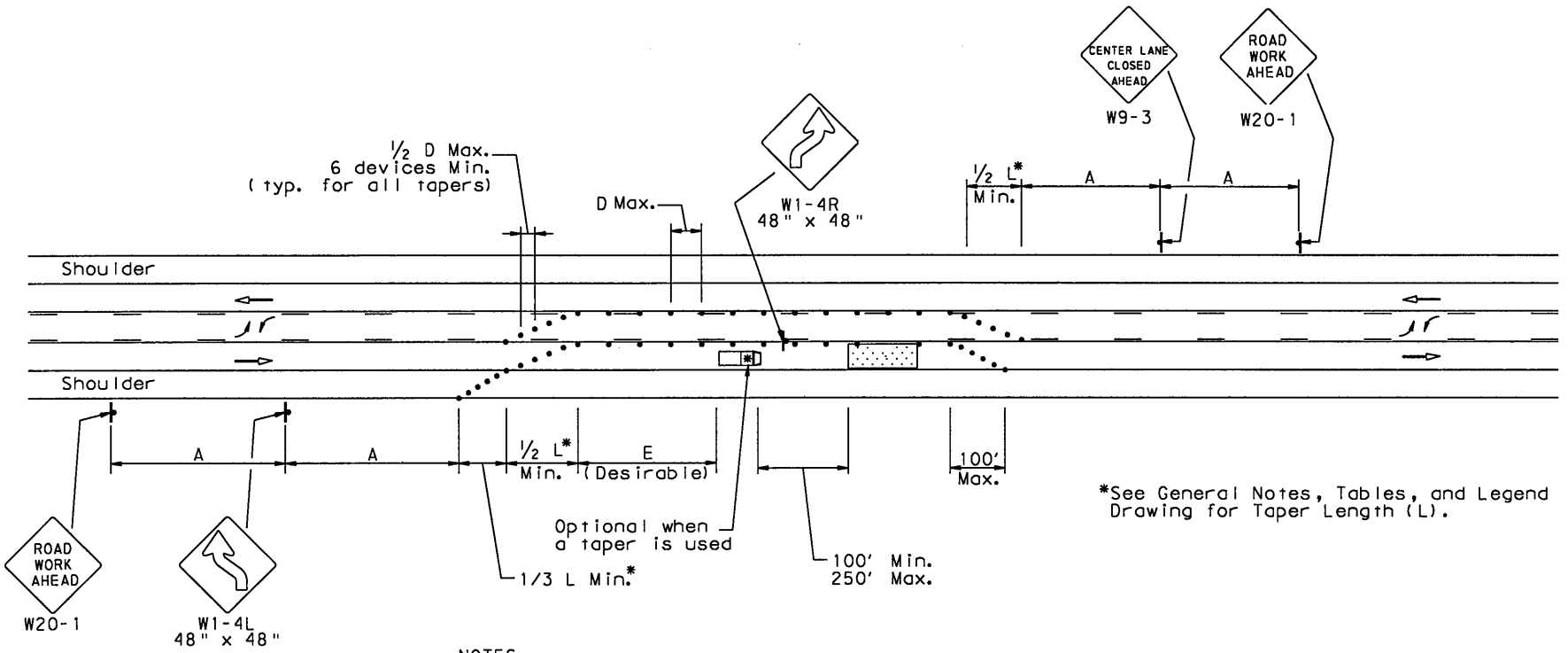
All Highways (except freeway and expressway)			
	A	D	E**
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

** Distances may be increased for downgrades or other conditions that affect stopping sight distance.

NOTES

1. All flaggers must be in communication with each other.
2. Each flagger should be clearly visible to traffic for a minimum distance of E.
3. At night, flagger stations shall be illuminated, except in emergencies.
4. For operations 60 minutes or less, a taper is not required if a vehicle with an activated flashing or revolving yellow light is located between Flagger No. 1 and the work space.
5. For operations of 15 minutes or less:
   a. The W20-1 and W20-4 Signs are not required.
   b. All channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is present in advance of the work space.
   c. The W20-7A Sign may be eliminated if the flagger is clearly visible to traffic for a minimum distance of E.
6. The buffer space should be extended so that the two-way traffic taper is placed before a horizontal (or crest vertical) curve to provide adequate sight distance for the flagger and a queue of stopped vehicles.
7. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.
8. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION - THREE-LANE, TWO-WAY ROADWAY WITH
A CENTER LANE, LEFT TURN ONLY PATTERN - WORK AREA IN ONE OF THE THROUGH LANES

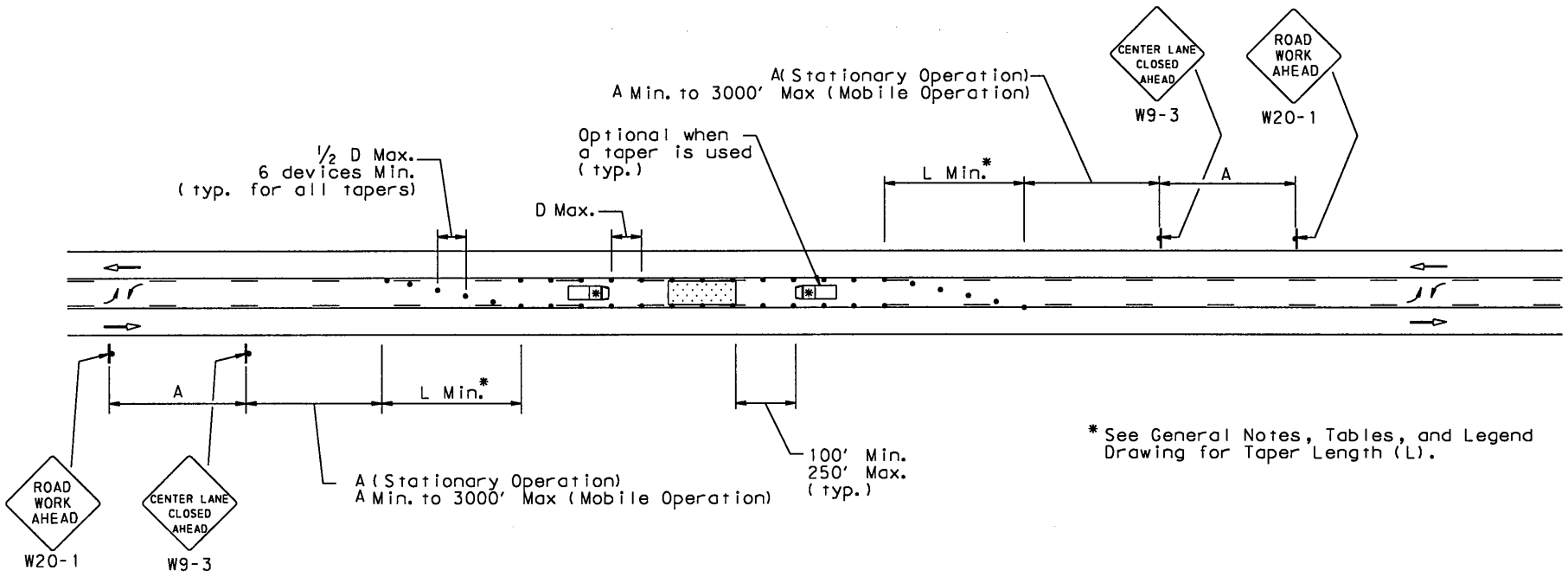


All Highways (except freeway and expressway)			
	A	D	E
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

NOTES

1. When paved shoulders having a width of 8 ft or more are closed, channelizing devices should be used to close the shoulder in advance of the shifting taper.
2. For operations 60 minutes or less, a taper is not required if a vehicle with an activated flashing or revolving yellow light is located in advance of the work space.
3. For operations of 15 minutes or less:
   a. The W20-1, W9-3, W1-4L, and W1-4R Signs are not required.
   b. All channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is present in advance of the work space.
4. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.
5. If the length of the tangent section between beginning and ending tapers is more than 600 ft, use two W1-4 Signs as shown. If the distance is 600 ft or less, use a W24-1 Sign.
6. Where speed or volume is higher, additional signing such as the Left Lane Closed XX ft Sign (W20-5L) or Be Prepared To Stop Sign (W3-4) should be used between the signs shown.

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION OR MOBILE OPERATION
WORK AREA IN A TWO-WAY LEFT TURN LANE



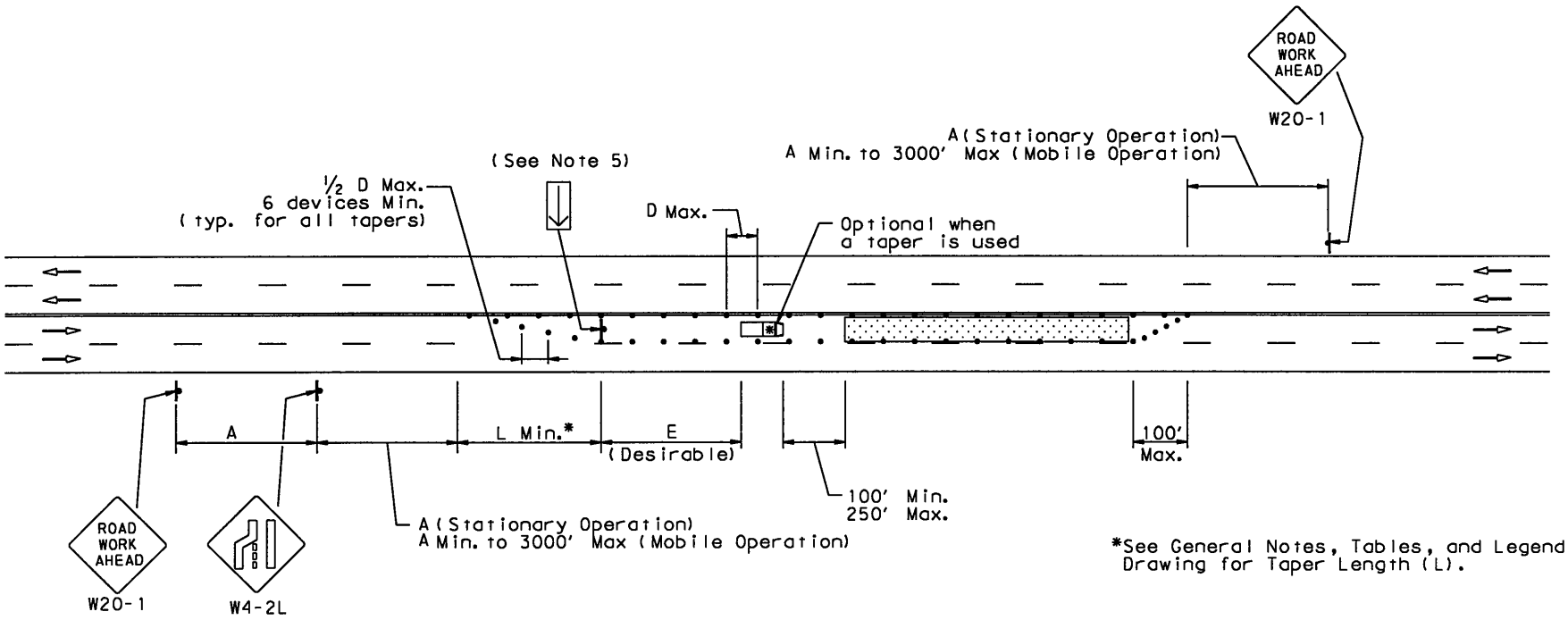
* See General Notes, Tables, and Legend Drawing for Taper Length (L).

All Highways (except freeway and expressway)		
	A	D
MPH	ft	ft
25	250	50
30	300	60
35	350	70
40	400	80
45	450	90
50	500	100
55	550	110
Alternate Spacing for High Density Urban		
25	100	50
30	100	60

NOTES

1. For stationary operations 60 minutes or less, or for mobile operations that move intermittently or continuously at an average speed of 1 MPH or less, a taper is not required if a vehicle with an activated flashing or revolving yellow light is located in advance of the work space.
2. For operations of 15 minutes or less:
   a. The W20-1 and W9-3 Signs are not required.
   b. All channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is present in advance of the work space.
3. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.
4. Where speed or volume is higher, additional signing such as the Center Lane Closed XX ft Sign (W9-3) or Be Prepared To Stop Sign (W3-4) should be used between the signs shown.

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION OR MOBILE OPERATION
MULTILANE, UNDIVIDED HIGHWAY - WORK AREA IN THE LEFT OR RIGHT LANE



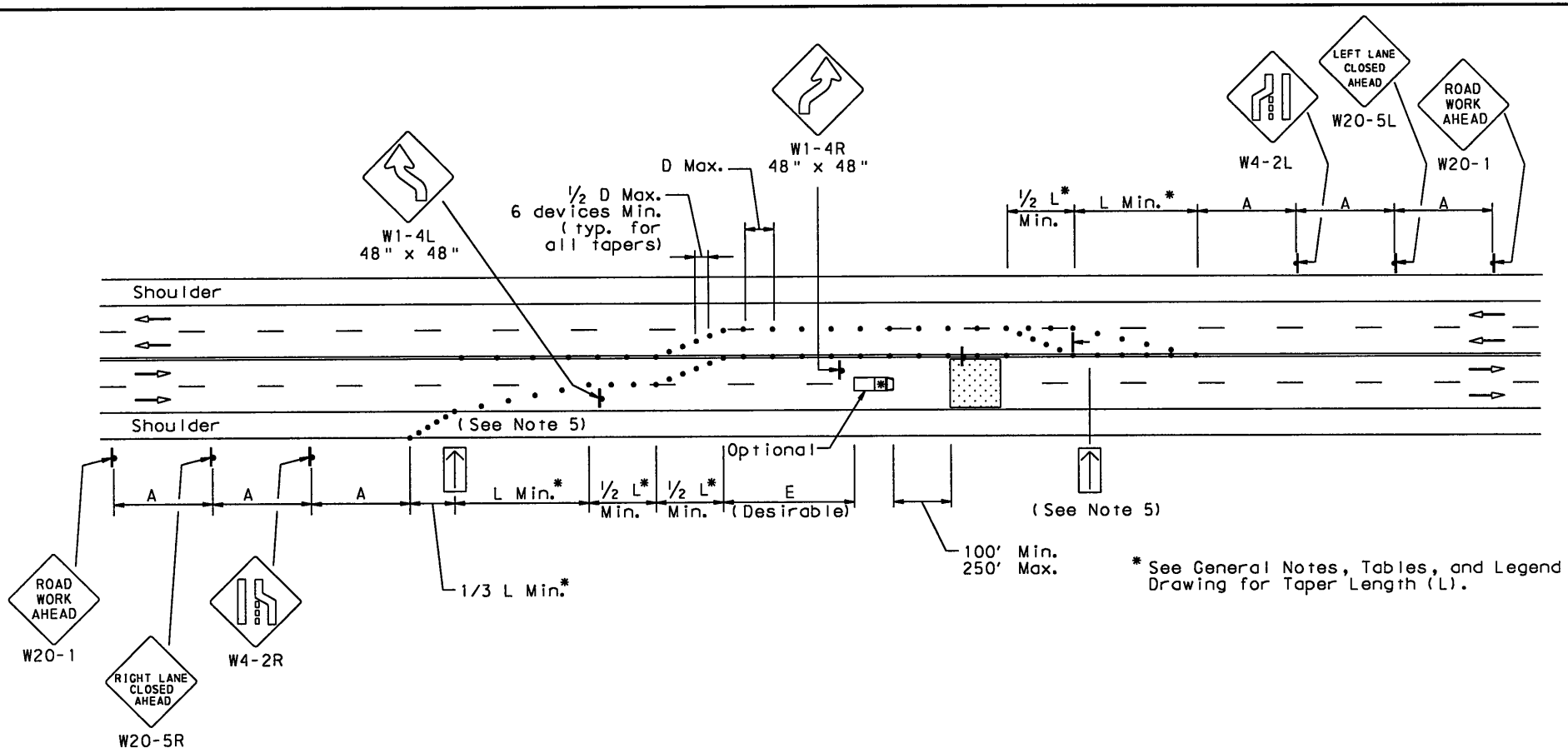
*See General Notes, Tables, and Legend Drawing for Taper Length (L).

All Highways (except freeway and expressway)			
	A	D	E
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

NOTES

1. For right lane closures, signs in the opposite direction of travel are not required.
2. For stationary operations 60 minutes or less in duration, or for mobile operations that move intermittently or continuously at an average speed of 1 MPH or less,
   a. The W20-1 Sign in the opposite direction of travel is not required.
   b. A vehicle with an arrow panel, or a vehicle with a Temporary Arrow Sign (G40-1) and associated Striped Panel Sign (G40-2), may be used instead of the taper. The vehicle should be positioned so that it is visible from behind for a minimum distance of A.
3. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.
4. Where speed or volume is higher, additional signing such as the Left Lane Closed XX ft Sign (W20-5L) or Be Prepared To Stop Sign (W3-4) should be used between the signs shown.
5. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION - FOUR-LANE, UNDIVIDED HIGHWAY
WORK AREA REQUIRING THE CLOSURE OF ONE SIDE OF THE ROADWAY



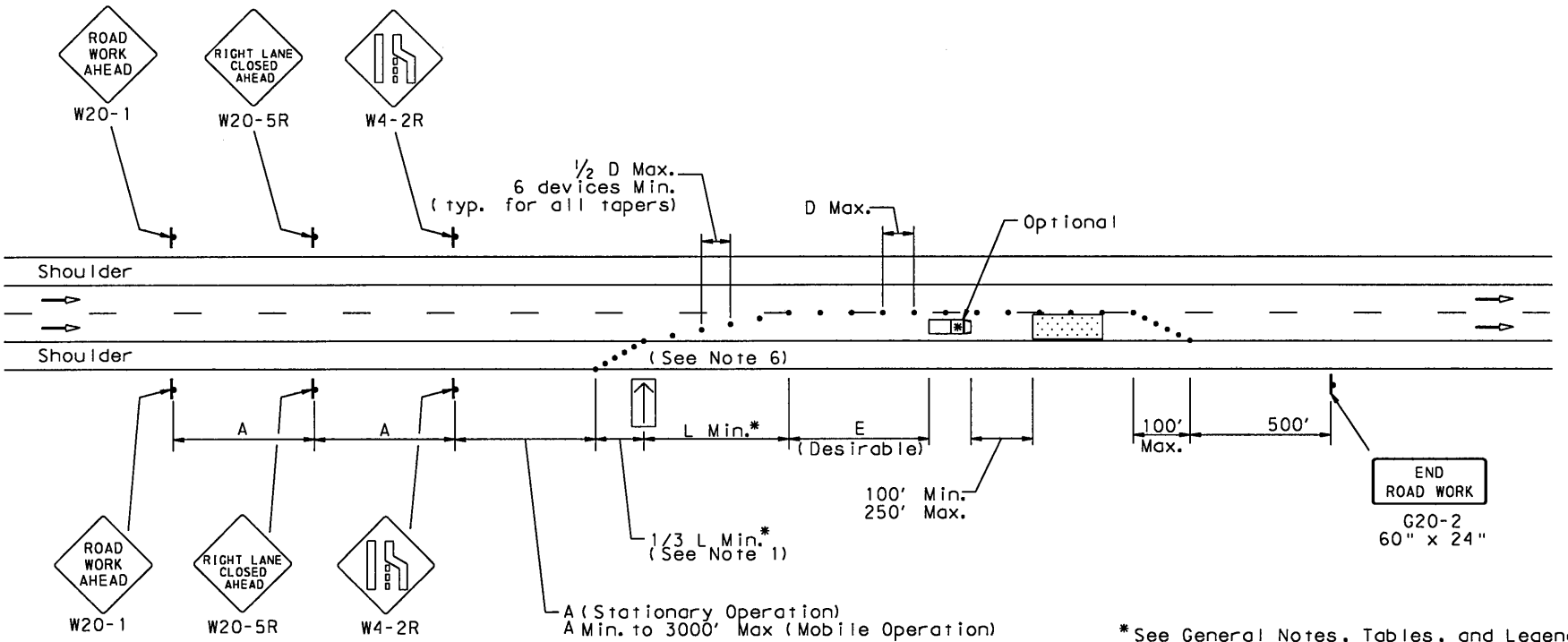
* See General Notes, Tables, and Legend Drawing for Taper Length (L).

All Highways (except freeway and expressway)			
	A	D	E
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

NOTES

1. When paved shoulders having a width of 8 ft or more are closed, channelizing devices should be used to close the shoulder in advance of the merging taper.
2. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.
3. If the length of the tangent section between beginning and ending tapers is more than 600 ft, use two W1-4 Signs as shown. If the distance is 600 ft or less, use a W24-1 Sign.
4. Where speed or volume is higher, additional signing such as the Left Lane Closed XX ft Sign (W20-5L) or Be Prepared To Stop Sign (W3-4) should be used between the signs shown.
5. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION OR MOBILE OPERATION
DIVIDED OR ONE-WAY HIGHWAY - WORK AREA IN THE LEFT OR RIGHT LANE



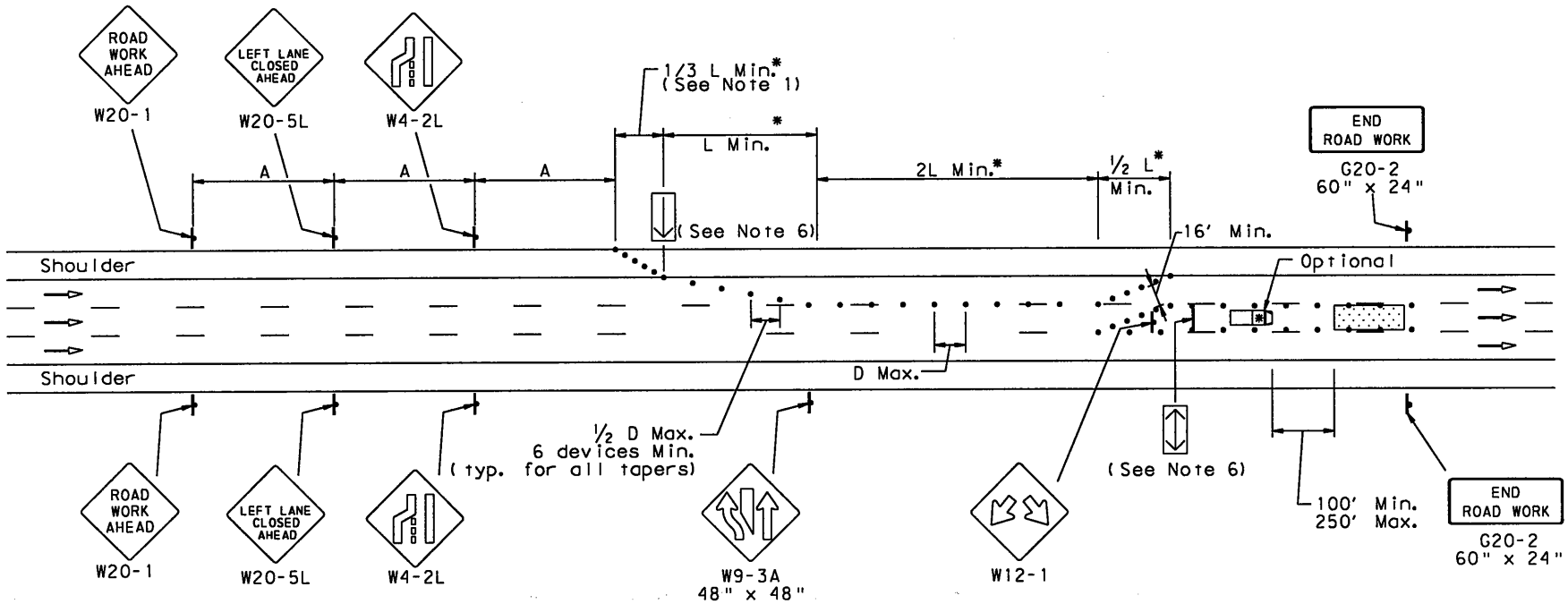
*See General Notes, Tables, and Legend Drawing for Taper Length (L).

All Highways (except freeway and expressway)			
	A	D	E
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200
Freeway and Expressway			
50	1000	100	425
55	1000	110	495
60	1000	120	570
65	1000	130	645

NOTES

1. When paved shoulders having a width of 8 ft or more are closed, channelizing devices should be used to close the shoulder in advance of the merging taper.
2. For left lane closures, the W20-5L Sign shall be used instead of the W20-5R Sign.
3. For stationary operations 60 minutes or less in duration, or for mobile operations that move intermittently or continuously at an average speed of 1 MPH or less, a vehicle with an arrow panel, or a vehicle with a Temporary Arrow Sign (G40-1) and associated Striped Panel Sign (G40-2), may be used instead of the taper. The vehicle should be positioned so that it is visible from behind for a minimum distance of A.
4. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.
5. Where speed or volume is higher, additional signing such as the Right Lane Closed XX ft Sign (W20-5R) or Be Prepared To Stop Sign (W3-4) should be used between the signs shown.
6. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
THREE-LANE, ONE-WAY ROADWAY - WORK AREA IN THE CENTER LANE



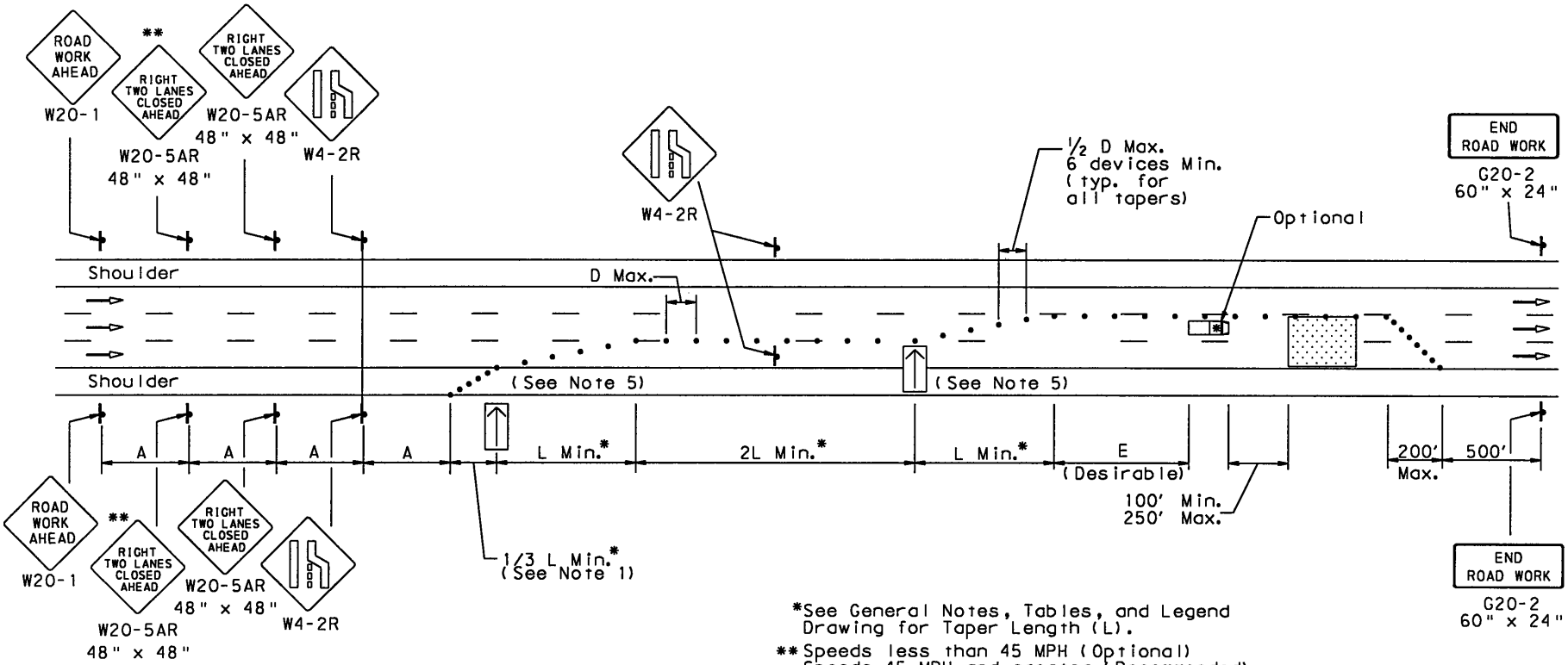
All Highways (except freeway and expressway)		
	A	D
MPH	ft	ft
25	250	50
30	300	60
35	350	70
40	400	80
45	450	90
50	500	100
55	550	110
Alternate Spacing for High Density Urban		
25	100	50
30	100	60
Freeway and Expressway		
50	1000	100
55	1000	110
60	1000	120
65	1000	130

*See General Notes, Tables, and Legend Drawing for Taper Length (L).

NOTES

1. When paved shoulders having a width of 8 ft or more are closed, channelizing devices should be used to close the shoulder in advance of the merging taper.
2. A reversed pattern, beginning with a right lane closure, may also be used.
3. The advance left (or right) lane closure is not required for conventional highways, for freeways and expressways with low traffic volumes, for any highway where geometrics or signing considerations indicate a lane closure is inappropriate, or for any highway when the duration of the operation is 60 minutes or less. Center Lane Closed Ahead Signs (W9-3) shall be used instead of W20-5L (or W20-5R) Signs when the advance left (or right) lane closure is not installed. For operations 60 minutes or less in duration, a vehicle with an arrow panel may be used instead of the taper. The vehicle should be positioned so that it is visible from behind for a minimum distance of A.
4. If a paved shoulder having a minimum width of 10 ft and sufficient strength is available, the left and center lanes may be closed and motor vehicle traffic carried around the work space on the right lane and a right shoulder. When a shoulder lane is used that cannot adequately accommodate trucks, trucks may be directed to used the normal travel lanes.
5. Where speed or volume is higher, additional signing such as the Left Lane Closed XX ft Sign (W20-5L) or Be Prepared To Stop Sign (W3-4) should be used between the signs shown.
6. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
DIVIDED OR ONE-WAY HIGHWAY - WORK AREA IN TWO ADJACENT LANES



*See General Notes, Tables, and Legend Drawing for Taper Length (L).

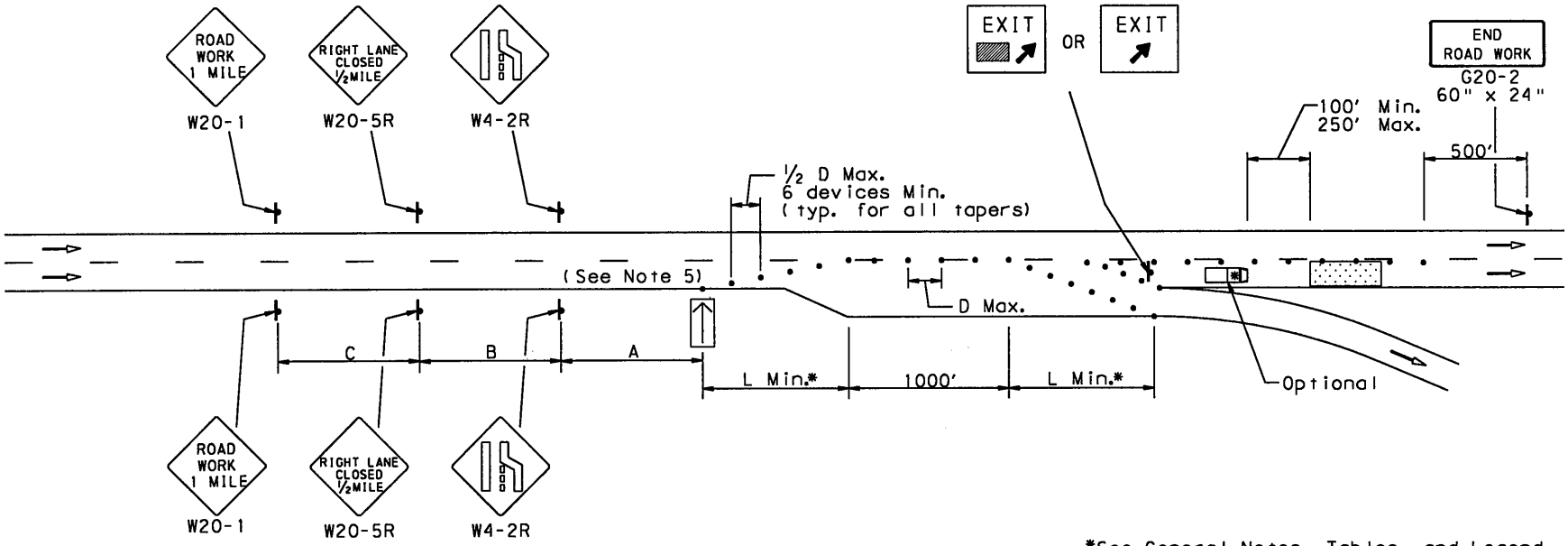
** Speeds less than 45 MPH (Optional)
Speeds 45 MPH and greater (Recommended)

All Highways (except freeway and expressway)			
	A	D	E
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200
Freeway and Expressway			
50	1000	100	425
55	1000	110	495
60	1000	120	570
65	1000	130	645

NOTES

1. When paved shoulders having a width of 8 ft or more are closed, channelizing devices should be used to close the shoulder in advance of the merging taper.
2. If the two left lanes are closed, the Left Two Lanes Closed Ahead Sign (W20-5AL) shall be used instead of the W20-5AR Sign.
3. Where speed or volume is higher, additional signing such as the Right Lane Closed XX ft Sign (W20-5R) or Be Prepared To Stop Sign (W3-4) should be used between the signs shown.
4. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.
5. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
LANE CLOSURE NEAR A FREEWAY OR EXRESSWAY EXIT RAMP



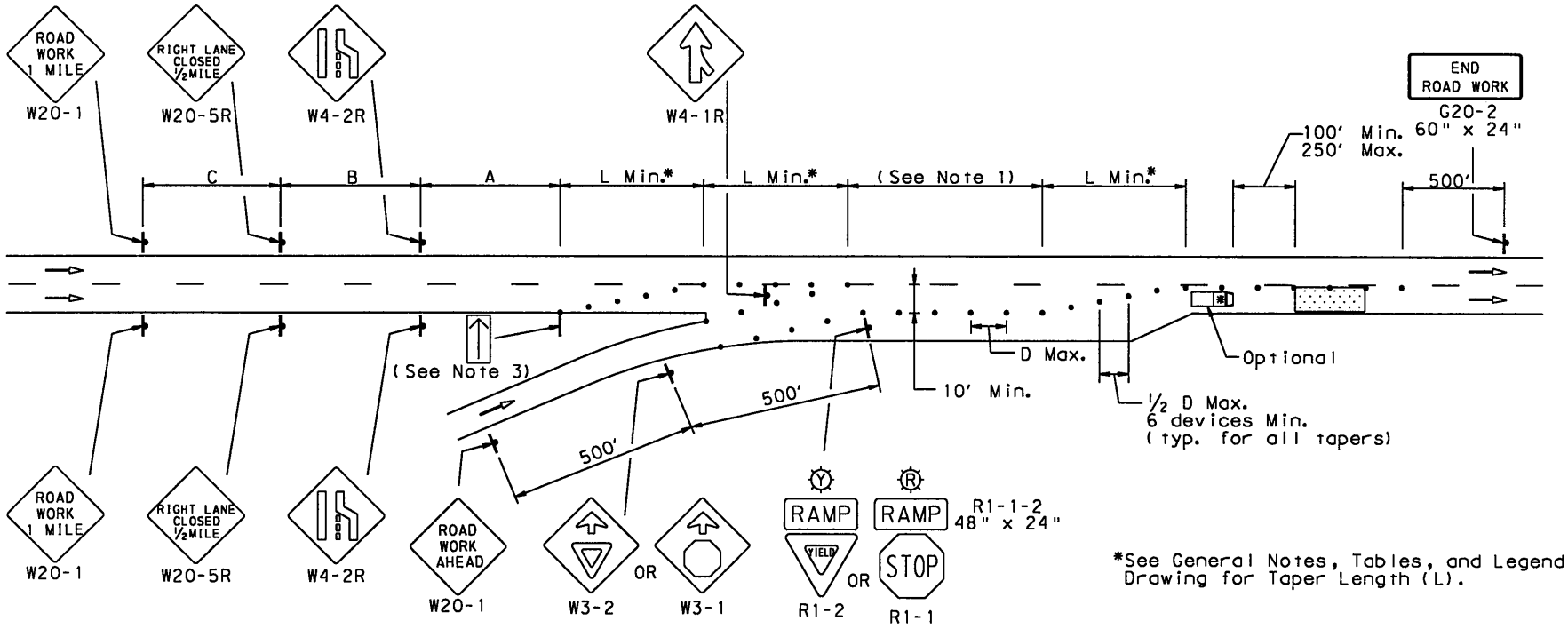
*See General Notes, Tables, and Legend Drawing for Taper Length (L).

Freeway and Expressway				
	A	B	C	D
MPH	ft	ft	ft	ft
50	1000	1500	2640	100
55	1000	1500	2640	110
60	1000	1500	2640	120
65	1000	1500	2640	130

NOTES

1. In locations with heavy ramp traffic, the channelizing devices in advance of the ramp may be eliminated if special advance signing is erected to indicate that the right lane is a mandatory exit only lane.
2. The temporary EXIT sign shall be located in the temporary gore. It shall be mounted a minimum of 7 ft from the pavement surface to the bottom of the sign.
3. The guide signs should indicate that the ramp is open, and where the temporary ramp is located. However, if the ramp is closed, guide signs should indicate that the ramp is closed.
4. When the exit ramp is closed, a black on orange EXIT CLOSED panel should be placed diagonally across the interchange/intersection guide signs.
5. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
LANE CLOSURE NEAR A FREEWAY OR EXPRESSWAY ENTRANCE RAMP

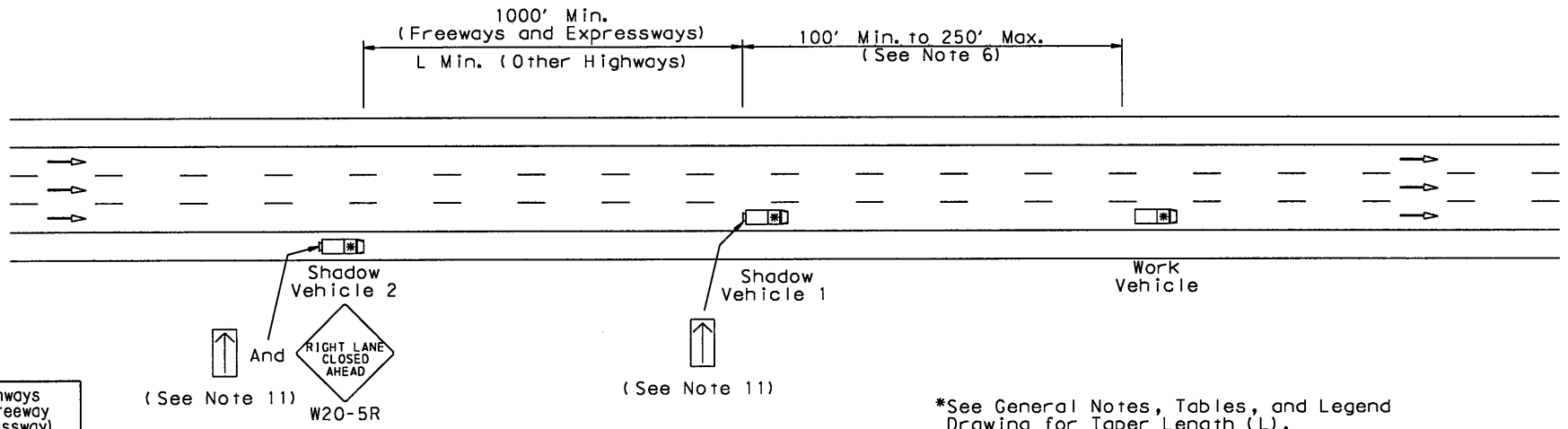


*See General Notes, Tables, and Legend Drawing for Taper Length (L).

NOTES
1. An acceleration lane of sufficient length should be provided whenever possible.
2. Where inadequate acceleration distance exists for the temporary entrance, the Yield (R1-2) and Yield Ahead (W3-2) Signs shall be replaced with Stop (R1-1) and Stop Ahead (W3-1) Signs.
3. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

Freeway and Expressway				
	A	B	C	D
MPH	ft	ft	ft	ft
50	1000	1500	2640	100
55	1000	1500	2640	110
60	1000	1500	2640	120
65	1000	1500	2640	130

PUBLICATION 213
MOBILE OPERATION - DIVIDED HIGHWAY, ONE-WAY HIGHWAY,
OR TWO OR MORE LANE APPOACH OF AN UNDIVIDED HIGHWAY - WORK AREA IN THE LEFT, CENTER, OR RIGHT LANE



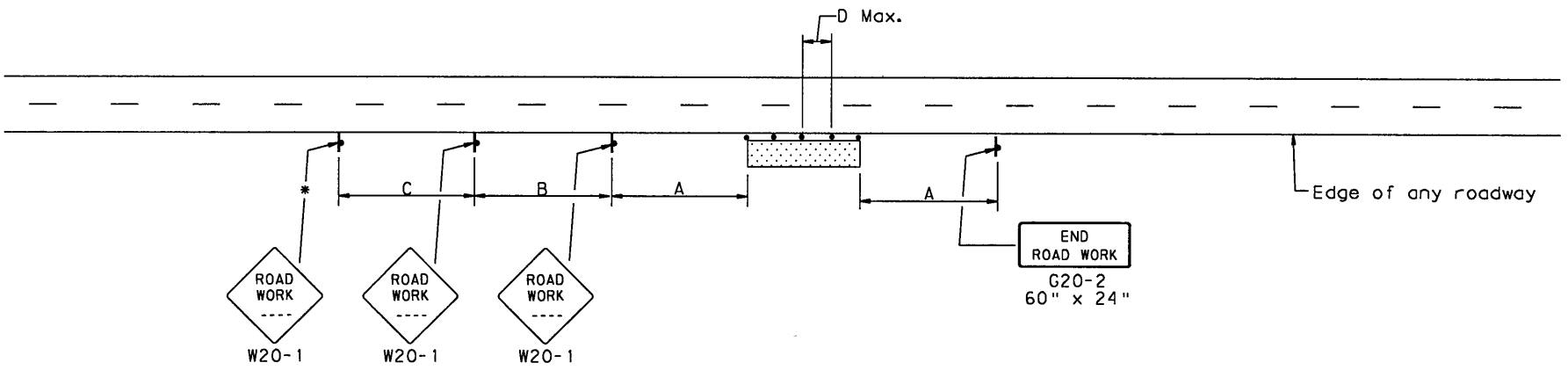
*See General Notes, Tables, and Legend Drawing for Taper Length (L).

All Highways (except freeway and expressway)	
	A
MPH	ft
25	250
30	300
35	350
40	400
45	450
50	500
55	550
Alt. Spacing for High Density Urban	
25	100
30	100
Freeway & Expressway	
50	1000
55	1000
60	1000
65	1000

NOTES

1. This figure applies for operations that move intermittently or continuously at an average speed of more than 1 MPH.
2. If the shoulder along the highway is not wide enough to locate Shadow Vehicle 2 completely off the travel portion of the highway (less than 10 ft in width), Shadow Vehicle 2 should not be included as part of the setup, except when it is necessary to encroach on the travel portion of the highway when crossing a bridge or other area with inadequate shoulder width.
3. When the work vehicle occupies the far left lane or an interior lane, the appropriate lane closure sign should be used in place of the W20-5R Sign on Shadow Vehicle 2. The lane closure sign on Shadow Vehicle 2 should be placed so as not to obscure the arrow panel.
4. When the work vehicle occupies an interior lane (a lane other than the far right or far left) of a directional roadway with a right shoulder 10 ft or more in width, Shadow Vehicle 2 should drive in the right shoulder with a sign indicating that work is taking place in the interior lane.
5. Shadow Vehicle 2 shall be positioned so that it is visible from behind for a minimum distance of A.
6. Whenever adequate stopping sight distance exists to the rear, the shadow vehicle should maintain the minimum distance from the work vehicle and proceed at the same speed. The shadow vehicle should slow down in advance of vertical or horizontal curves.
7. The shadow vehicles should also be equipped with two high-intensity flashing lights mounted on the rear, adjacent to the sign.
8. Additional shadow vehicles to warn and reduce the speed of oncoming or opposing vehicular traffic may be used. Law enforcement vehicles may be used for this purpose.
9. Work should normally be accomplished during off-peak hours.
10. Shadow vehicles and work vehicle may be equipped with a truck-mounted attenuator.
11. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
ADJACENT TO ANY ROADWAY



* Additional signs may be used based on engineering judgement.

	A	B	C
Conventional Roadways	500 ft	500 ft	500 ft
Expressways and Freeways	1000 ft	1500 ft	2640 ft

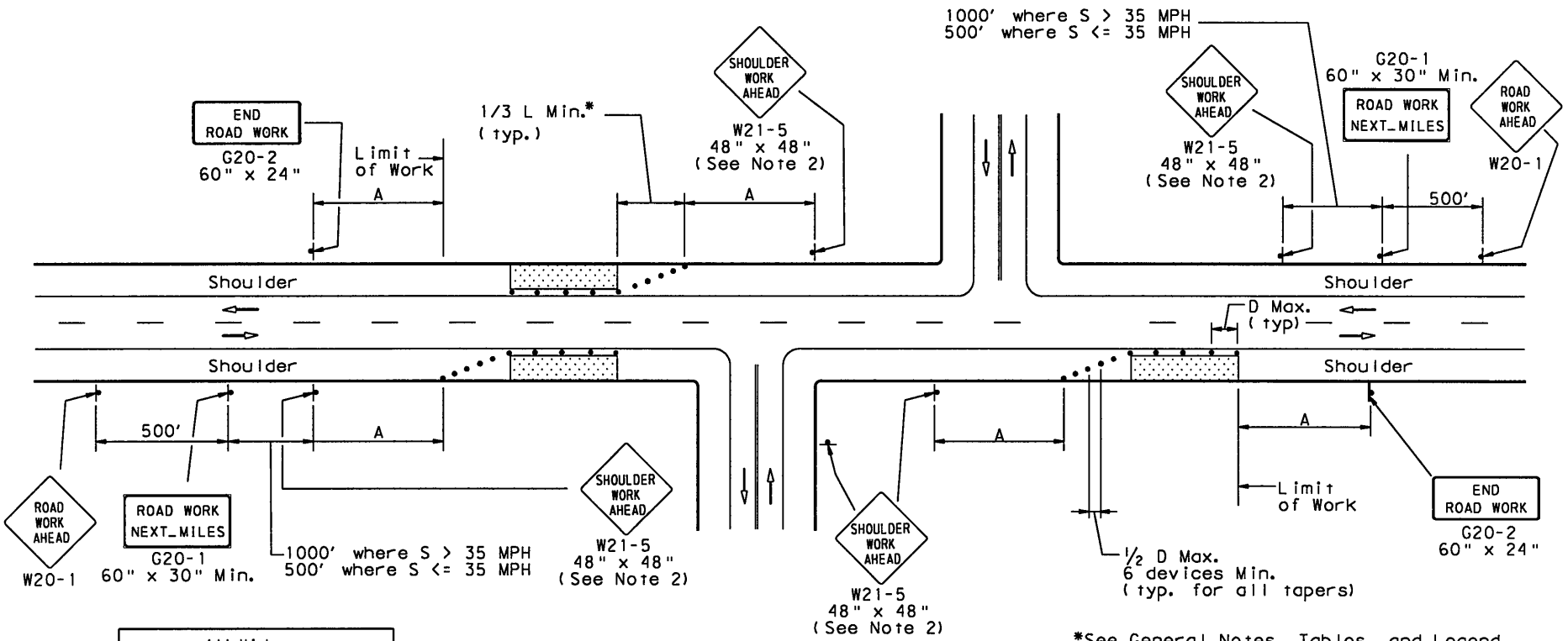
S	D
MPH	(ft)
25	50
30	60
35	70
40	80
45	90
50	100
55	110
60	120
65	130

NOTES

1. Traffic control devices are not required if the work space is outside the highway right-of-way, behind barrier, more than 2 ft behind curb, or 15 ft or more from the edge of any roadway.
2. For divided highways and one-way highways where it is physically possible, advance warning signs should also be placed on the left-hand side of the roadway.
3. The ROAD WORK 500 FT Sign may be replaced with other appropriate signs (Low Shoulder Sign, No Guide Rail Sign, and so forth).

PATA 24

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
NUMEROUS NIGHTTIME WORK AREAS ON OR BEYOND THE SHOULDER



*See General Notes, Tables, and Legend Drawing for Taper Length (L).

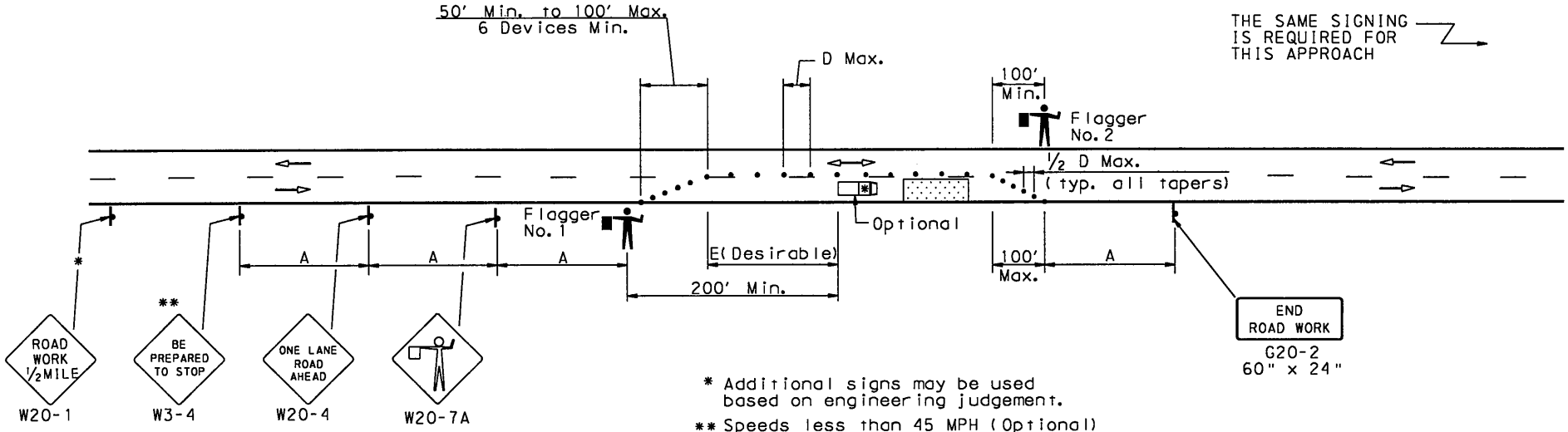
All Highways (except freeway and expressway)		
	A	D
MPH	ft	ft
25	250	50
30	300	60
35	350	70
40	400	80
45	450	90
50	500	100
55	550	110
Alternate Spacing for High Density Urban		
25	100	50
30	100	60
Freeway and Expressway		
50	1000	100
55	1000	110
60	1000	120
65	1000	130

NOTES

1. For divided highways and one-way highways where it is physically possible, advance warning signs should also be placed on the left-hand side of the roadway.
2. The W21-5 Sign may be replaced with other appropriate signs (Low Shoulder Sign, No Guide Rail Sign, and so forth).
3. The W21-5 Sign on an intersecting roadway is not required if drivers emerging from that roadway will encounter another advance warning sign prior to the work space.
4. A W21-5BL Sign should be used on limited-access highways where there is no opportunity for disabled vehicles to pull off the roadway.
5. If drivers cannot see a pull-off area beyond the closed shoulder, information regarding the length of the shoulder closure should be provided in feet or miles, as appropriate.
6. Based on engineering judgement, a temporary barrier with proper delineation and end treatment may be used instead of longitudinal channelizing devices. The channelized taper is still required.
7. During daylight, each work area shall be treated as a short-term operation.

PATA 25

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - FLAGGING



* Additional signs may be used based on engineering judgement.

** Speeds less than 45 MPH (Optional)
Speeds 45 MPH and greater (Recommended)

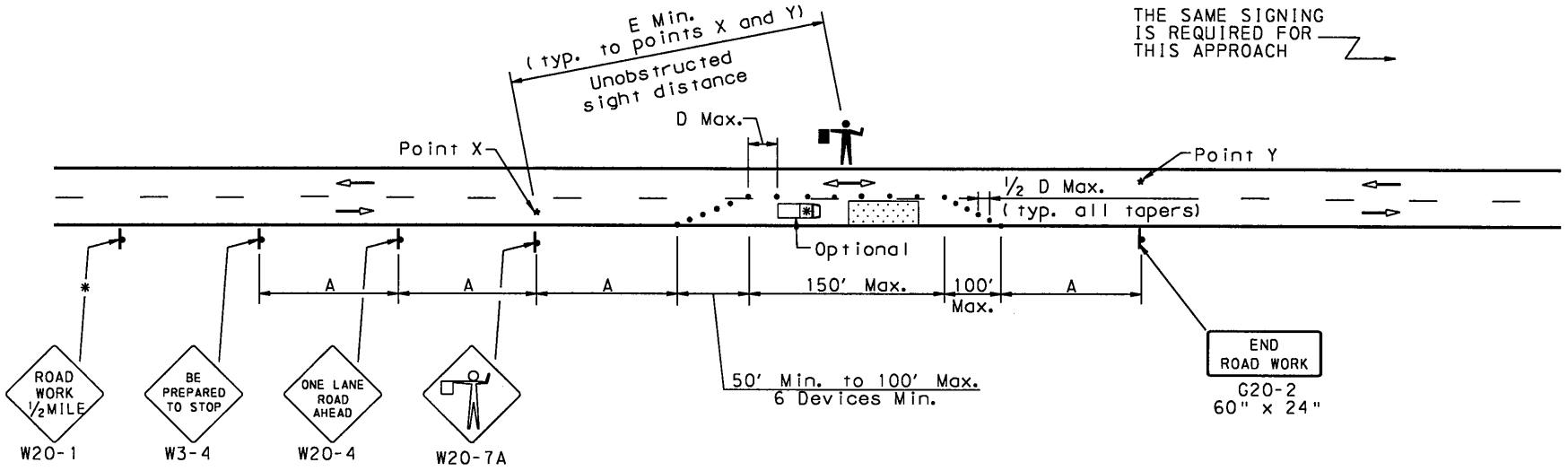
All Highways (except freeway and expressway)			
	A	D	E***
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

*** Distances may be increased for downgrades or other conditions that affect stopping sight distance.

NOTES

1. All flaggers must be in communication with each other.
2. Each flagger should be clearly visible to traffic for a minimum distance of E.
3. At night, flagger stations shall be illuminated, except in emergencies.
4. The buffer space should be extended so that the two-way traffic taper is placed before a horizontal (or crest vertical) curve to provide adequate sight distance for the flagger and a queue of stopped vehicles.
5. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - SINGLE FLAGGER



All Highways (except freeway and expressway)			
	A	D	E**
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

For speeds greater than 45 MPH, use Figure PATA 26a.

** Distances may be increased for downgrades or other conditions that affect stopping sight distance.

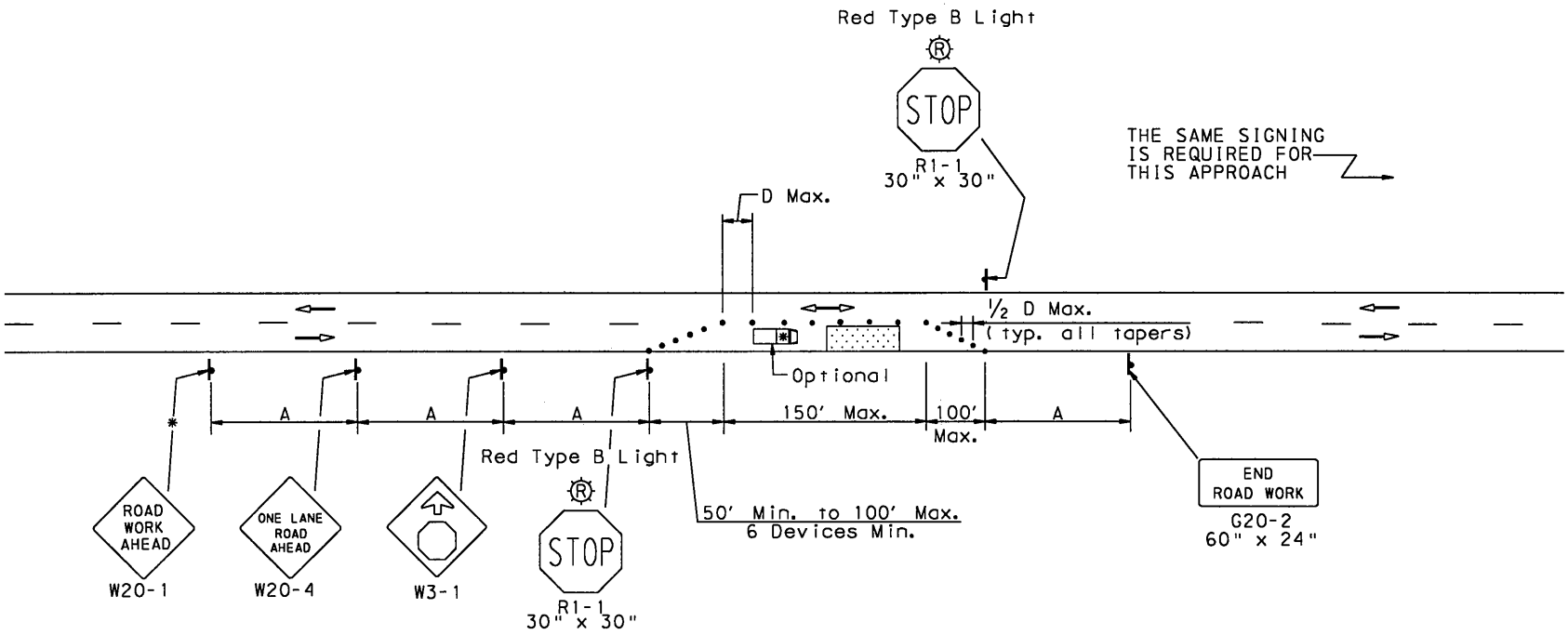
* Additional signs may be used based on engineering judgement.

NOTES

1. This figure applies when all of the following conditions are satisfied:
   a. Sight distance between the flagger and any vehicle between Points X and Y will be unobstructed.
   b. The length of the one-lane section (not including any taper) is not greater than approximately 150 ft.
   c. The ADT is not greater than approximately 1500, or the average 5-minute traffic volume during the period of work is 12 vehicles or less.
2. Flagger should be clearly visible to traffic for a minimum distance of E.
3. At night, flagger station shall be illuminated, except in emergencies.
4. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.

PATA 26b

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - STOP SIGN-CONTROLLED LANE CLOSURE



* Additional signs may be used based on engineering judgement.

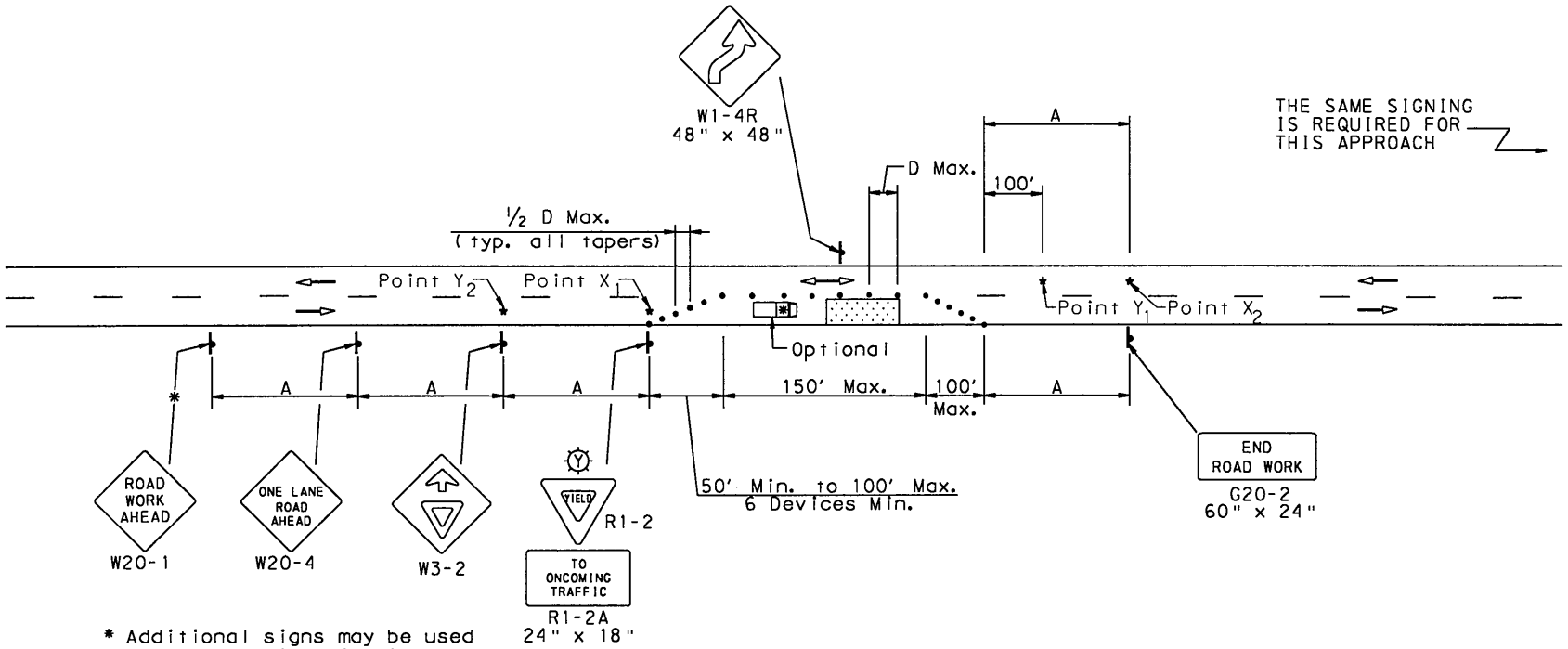
All Highways (except freeway and expressway)		
	A	D
MPH	ft	ft
25	250	50
30	300	60
35	350	70
40	400	80
45	450	90
50	500	100
55	550	110
Alt. Spacing for High Density Urban		
25	100	50
30	100	60

NOTES

1. This figure applies when all of the following conditions are satisfied:
   a. Sight distance between the Stop Signs will be unobstructed.
   b. The length of the one-lane section (not including any taper) is not greater than approximately 150 ft.
   c. The ADT is not greater than approximately 1500.
2. The length of the one-lane section and ADT may be increased if a study indicates that a satisfactory level of service can be maintained.
3. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.

PATA
26c

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - SELF-REGULATING LANE CLOSURE



* Additional signs may be used based on engineering judgement.

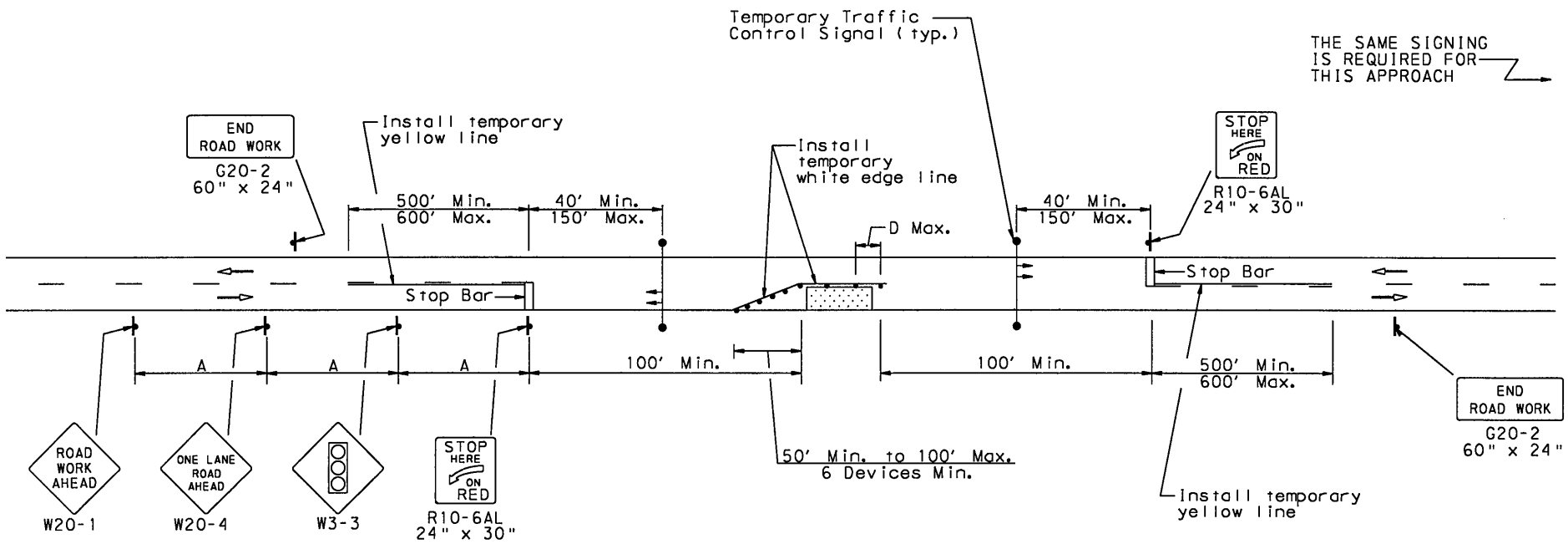
All Highways (except freeway and expressway)		
	A	D
MPH	ft	ft
25	250	50
30	300	60
35	350	70
40	400	80
45	450	90
50	500	100
55	550	110
Alt. Spacing for High Density Urban		
25	100	50
30	100	60

NOTES

1. This figure applies when all of the following conditions are satisfied:
   a. Sight distance between X_1 and X_2, and between Y_1 and Y_2, will be unabstructed.
   b. The length of the one-lane section (not including any taper) is not greater than approximately 150 ft.
   c. The ADT is not greater than approximately 750.
2. The length of the one-lane section and ADT may be increased if a study indicates that a satisfactory level of service can be maintained.
3. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.

PATA
26d

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - TEMPORARY TRAFFIC CONTROL SIGNALS



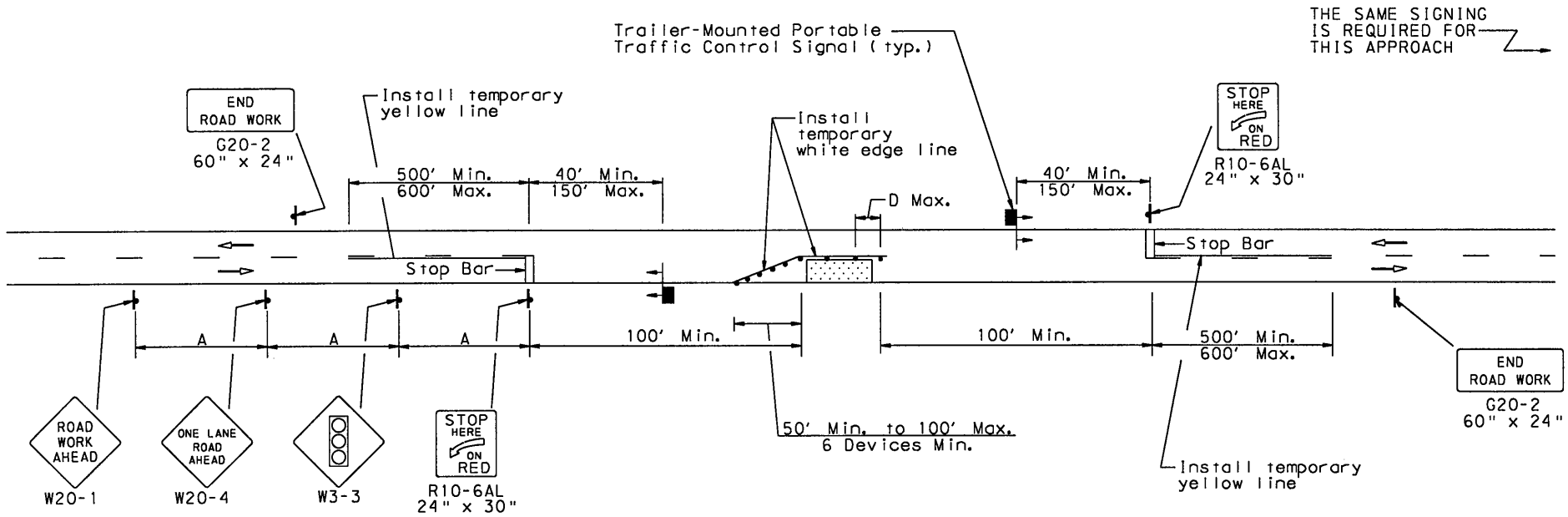
All Highways (except freeway and expressway)		
	A	D
MPH	ft	ft
25	250	50
30	300	60
35	350	70
40	400	80
45	450	90
50	500	100
55	550	110
Alternate Spacing for High Density Urban		
25	100	50
30	100	60

NOTES

1. Remove conflicting pavement markings.
2. The design and application of the temporary traffic control signals shall comply with the most current version of Publications 212 and 149M.
3. Stop bars shall be installed with temporary traffic control signals. Existing conflicting pavement markings and raised pavement markers between stop bars shall be removed. After temporary traffic control signals are removed, the stop bars shall be removed and the permanent pavement markings restored.
4. When the temporary traffic control signal is changed to flashing mode, either manually or automatically, red signal indications shall be flashed to both approaches.

PATA
26e L

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - PORTABLE TRAFFIC CONTROL SIGNALS



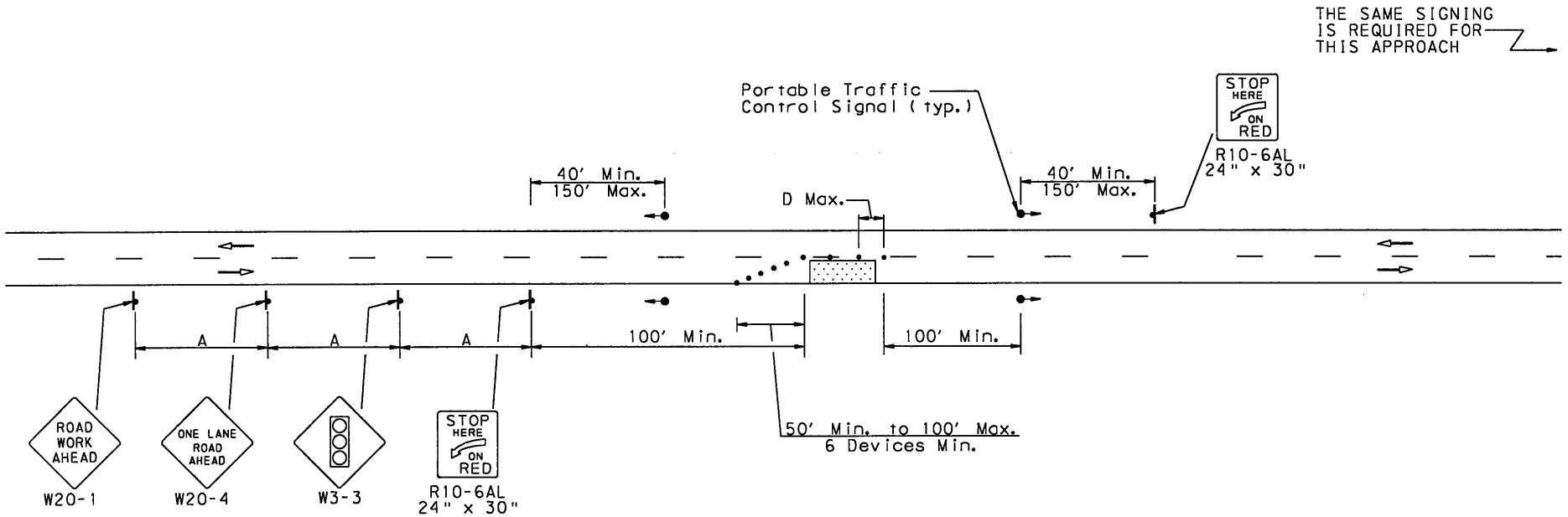
All Highways (except freeway and expressway)		
	A	D
MPH	ft	ft
25	250	50
30	300	60
35	350	70
40	400	80
45	450	90
50	500	100
55	550	110
Alternate Spacing for High Density Urban		
25	100	50
30	100	60

NOTES

1. Remove conflicting pavement markings.
2. The use of portable traffic control signals in Pennsylvania for long-term operations shall comply with the provisions of this figure.
3. Advance written approval must be obtained from PennDOT prior to using portable traffic signals on any public highway. A PennDOT portable traffic signal permit will be required, and a copy must be maintained on-site during the period of portable signal usage.
4. Refer to Appendix A of this publication for additional notes and permit information pertaining to portable traffic signals.
5. The design and application of the portable traffic control signals shall comply with the most current version of Publications 212, 213, and 149M.
6. Stop bars shall be installed with portable traffic control signals for long-term operations. Existing conflicting pavement markings and raised pavement markers between stop bars shall be removed. After portable traffic control signals are removed, the stop bars shall be removed and the permanent pavement markings restored.

PATA
26e PL

PUBLICATION 213
SHORT-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - PORTABLE TRAFFIC CONTROL SIGNALS



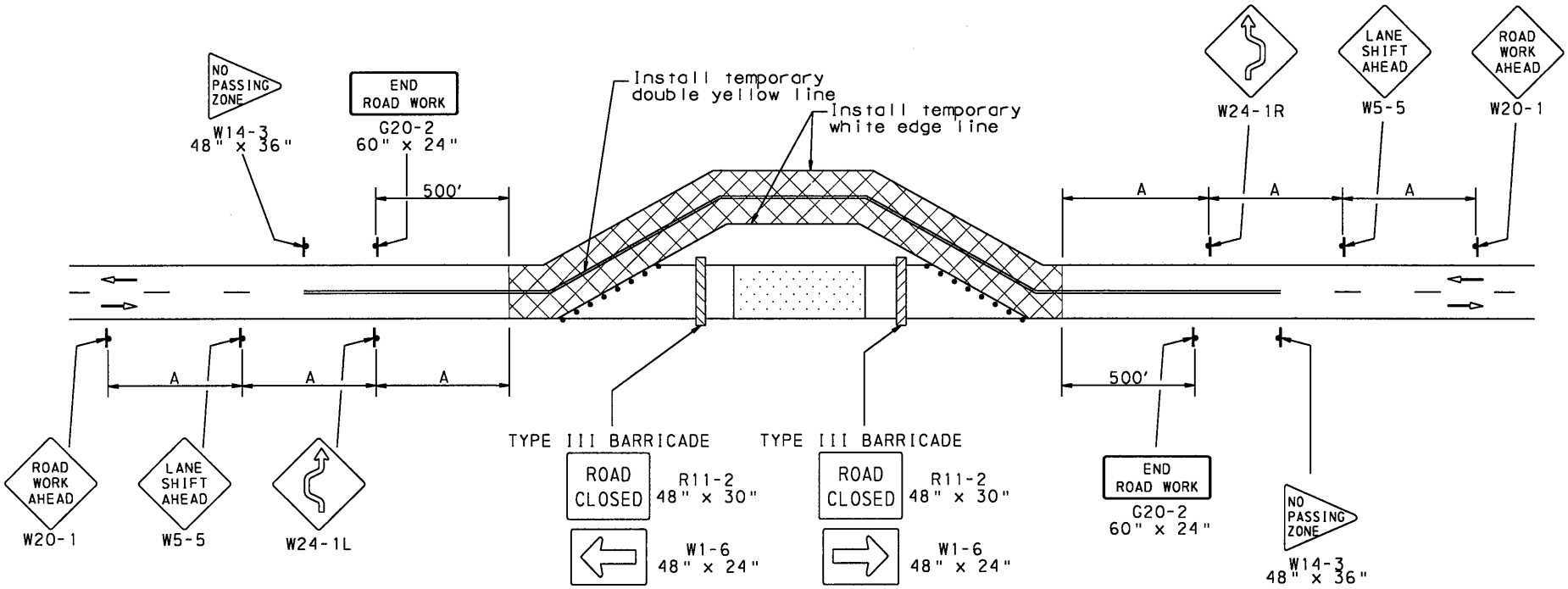
All Highways (except freeway and expressway)		
	A	D
MPH	ft	ft
25	250	50
30	300	60
35	350	70
40	400	80
45	450	90
50	500	100
55	550	110
Alternate Spacing for High Density Urban		
25	100	50
30	100	60

NOTES

1. The use of portable traffic control signals in Pennsylvania for short-term operations shall comply with the provisions of this figure.
2. Advance written approval must be obtained from PennDOT prior to using portable traffic signals on any public highway. A PennDOT portable traffic signal permit will be required, and a copy must be maintained on-site during the period of portable signal usage.
3. Refer to Appendix A of this publication for additional notes and permit information pertaining to portable traffic signals.
4. The design and application of the portable traffic control signals shall comply with the most current version of Publications 212, 213, and 149M.

PATA
26e PS

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
TWO-LANE, TWO-WAY ROADWAY - TEMPORARY ROADWAY



All Highways (except freeway and expressway)	
	A
MPH	ft
25	250
30	300
35	350
40	400
45	450
50	500
55	550
Alt. Spacing for High Density Urban	
25	100
30	100

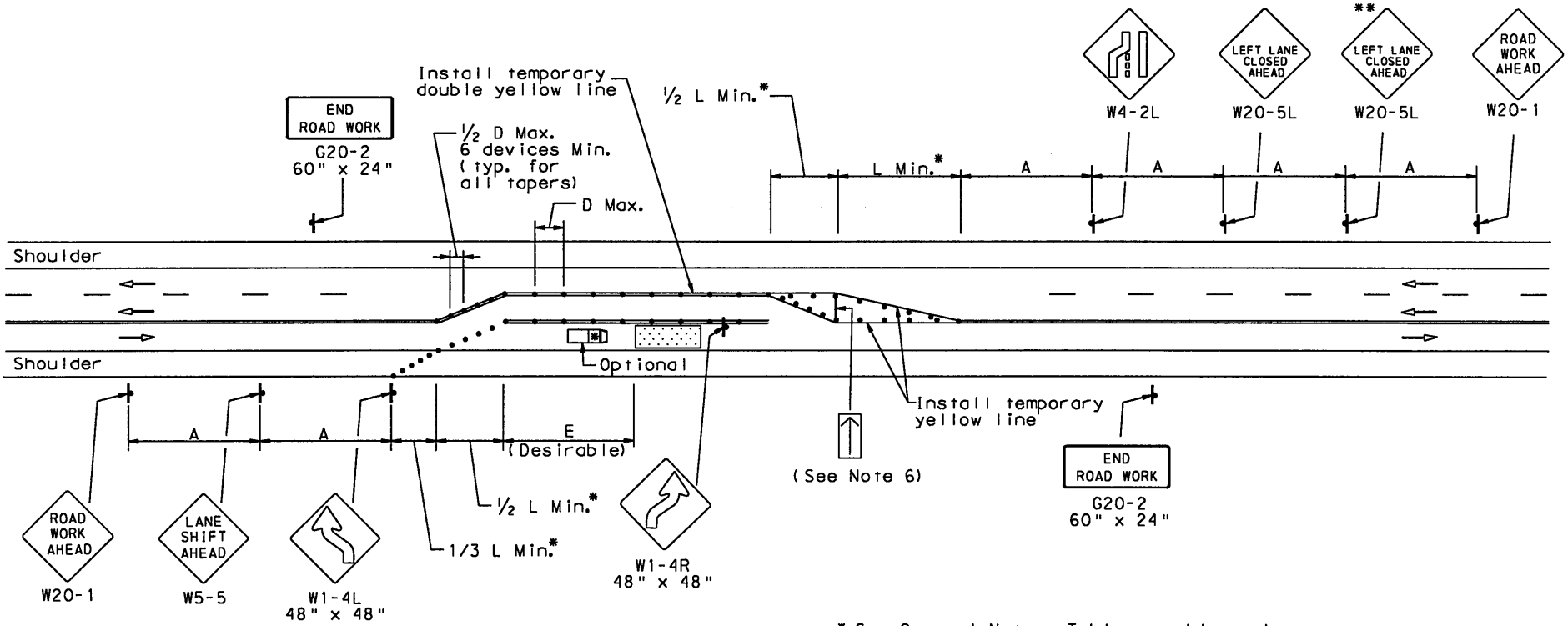
Temporary Pavement

NOTES

1. Remove conflicting pavement markings.
2. All temporary barriers and end treatments shall be crashworthy.
3. A no passing zone shall be established when an existing no passing zone is not present.
4. If the tangent distance along the temporary diversion is more than 600 ft, an appropriate Reverse Curve Sign (W1-4L or W1-4R) should be used in place of the W24-1L or W24-1R, and a second Reverse Curve Sign (opposite of the first) should be used in advance of the second reverse curve back to the original alignment.
5. When the tangent section of the diversion is more than 600 ft, and the diversion has sharp curves with recommended speeds of 30 MPH or less, Reverse Turn Signs (W1-3L or W1-3R) should be used in lieu of the Reverse Curve Signs (W1-4L or W1-4R) respectively.
6. Where the temporary pavement and old pavement are different colors, the temporary pavement should start on the tangent of the existing pavement and end on the tangent of the existing pavement.
7. Delineators should be placed along the temporary roadway where needed.

PATA
27

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
THREE-LANE, TWO-WAY ROADWAY WITH PASSING - WORK AREA IN THE SINGLE APPROACH



All Highways (except freeway and expressway)			
	A	D	E
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

* See General Notes, Tables, and Legend Drawing for Taper Length (L).

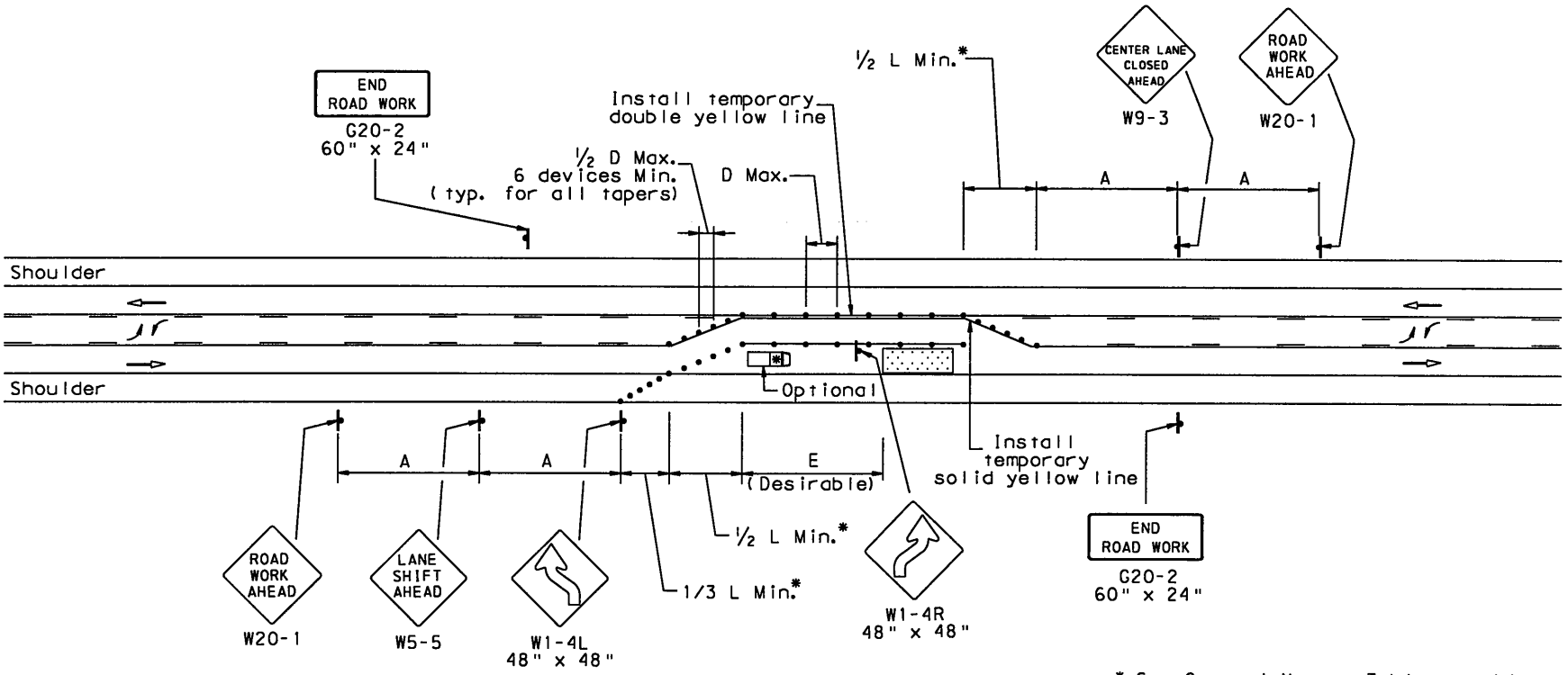
** Speeds less than 45 MPH (Optional)
Speeds 45 MPH and greater (Recommended).

NOTES

1. Remove conflicting pavement markings.
2. When paved shoulders having a width of 8 ft or more are closed, channelizing devices should be used to close the shoulder in advance of the shifting taper.
3. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.
4. Where speed or volume is higher, additional signing such as Left Lane Closed XX ft Sign (W20-5L) or Be Prepared To Stop Sign (W3-4) should be used between the signs shown.
5. Where channelizing devices are used instead of pavement markings, the spacing should be ½ D Max.
6. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PUBLICATION 213

LONG-TERM STATIONARY OPERATION - THREE-LANE, TWO-WAY ROADWAY WITH CENTER LANE, LEFT TURN ONLY PATTERN WORK AREA IN ONE OF THE THROUGH LANES



* See General Notes, Tables, and Legend Drawing for Taper Length (L).

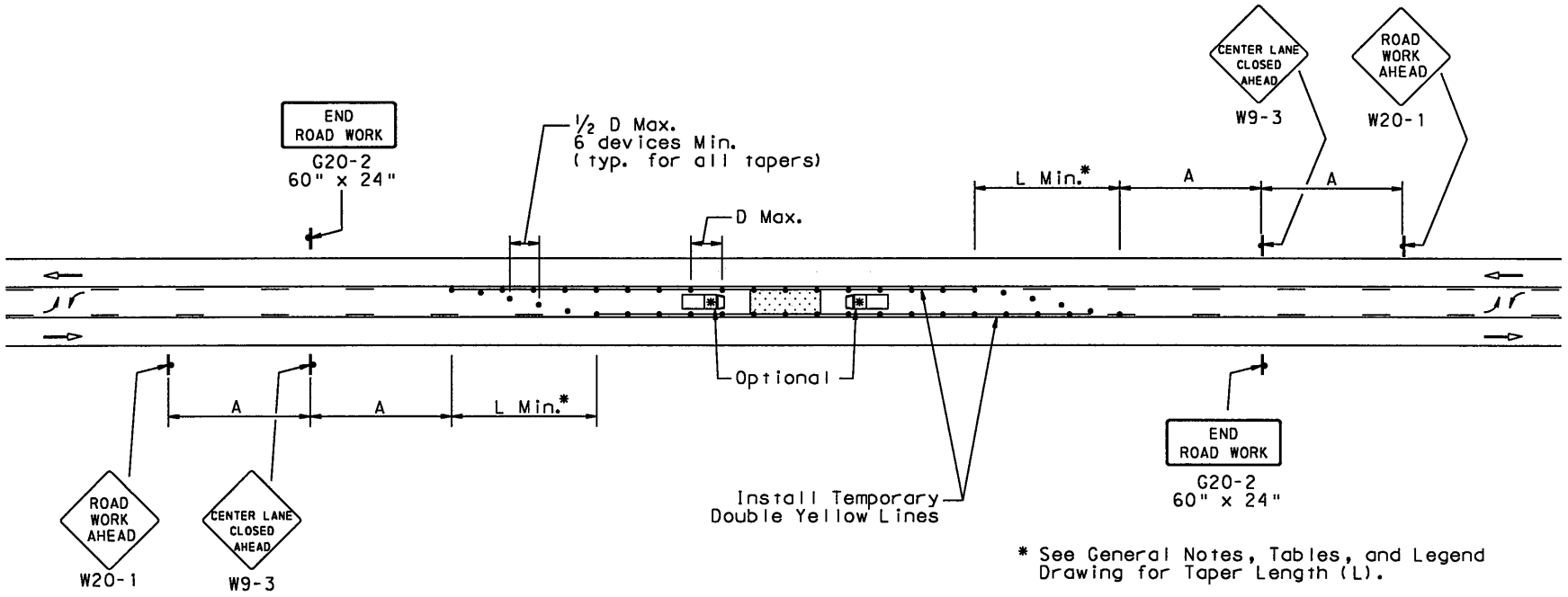
All Highways (except freeway and expressway)			
	A	D	E
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

NOTES

1. Remove conflicting pavement markings.
2. When paved shoulders having a width of 8 ft or more are closed, channelizing devices should be used to close the shoulder in advance of the shifting taper.
3. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.
4. Where speed or volume is higher, additional signing such as Center Lane Closed XX ft Sign (W9-3) or Be Prepared To Stop Sign (W3-4) should be used between the signs shown.
5. Where channelizing devices are used instead of pavement markings, the spacing should be ½ D Max.

PATA 29

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
WORK AREA IN A TWO-WAY LEFT TURN LANE



* See General Notes, Tables, and Legend Drawing for Taper Length (L).

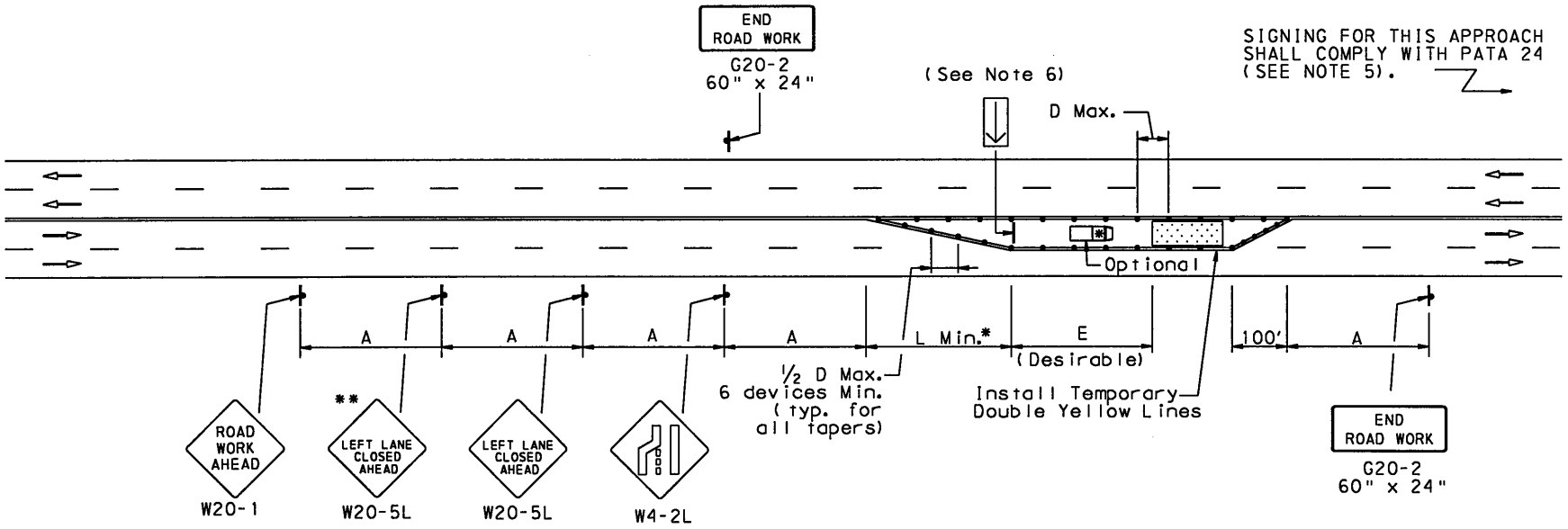
All Highways (except freeway and expressway)		
	A	D
MPH	ft	ft
25	250	50
30	300	60
35	350	70
40	400	80
45	450	90
50	500	100
55	550	110
Alternate Spacing for High Density Urban		
25	100	50
30	100	60

NOTES

1. Remove conflicting pavement markings.
2. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.
3. Where speed or volume is higher, additional signing such as Center Lane Closed XX ft Sign (W9-3) or Be Prepared To Stop Sign (W3-4) should be used between the signs shown.
4. Where channelizing devices are used instead of pavement markings, the spacing should be ½ D Max.

PATA 30

PUBLICATION 213
LONG-TERM STATIONARY OPERATION - MULTILANE, UNDIVIDED HIGHWAY
WORK AREA IN THE LEFT OR RIGHT LANE



* See General Notes, Tables, and Legend Drawing for Taper Length (L).

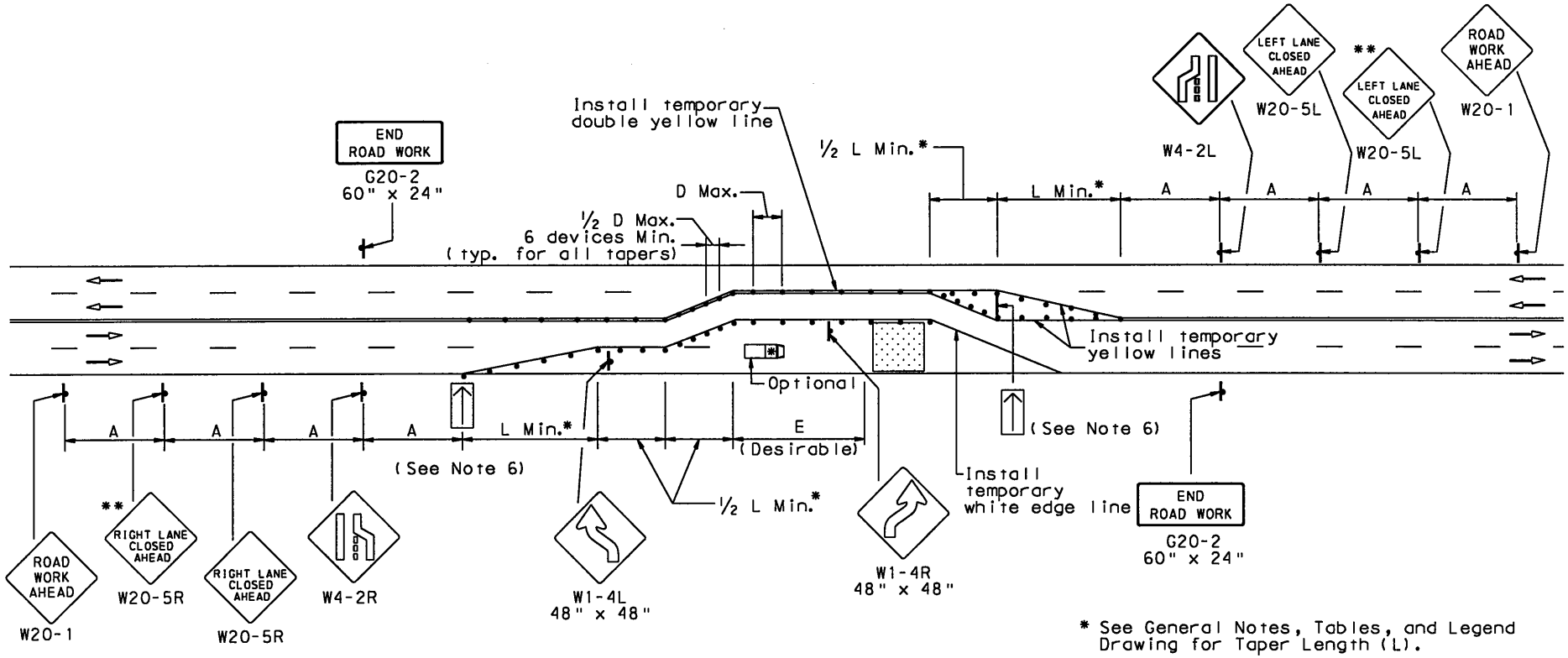
** Speeds less than 45 MPH (Optional)
Speeds 45 MPH and greater (Recommended).

All Highways (except freeway and expressway)			
	A	D	E
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

NOTES

1. Remove conflicting pavement markings.
2. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.
3. Where speed or volume is higher, additional signing such as Left Lane Closed XX ft Sign (W20-5L) or Be Prepared To Stop Sign (W3-4) should be used between the signs shown.
4. Where channelizing devices are used instead of pavement markings, the spacing should be 1/2 D Max.
5. For right lane closures, signing is not required for the opposite approach. Right Lane Closed Signs (W20-5R) shall be used instead of the Left Lane Closed Signs (W20-5L), and Pavement Width Transition - Right Lane Ends Signs (W4-2R) shall be used instead of Pavement Width Transition - Left Lane Ends Signs (W4-2L).
6. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PUBLICATION 213
LONG-TERM STATIONARY OPERATION - FOUR-LANE, UNDIVIDED HIGHWAY
WORK AREA REQUIRING CLOSURE OF ONE SIDE OF THE ROADWAY



* See General Notes, Tables, and Legend Drawing for Taper Length (L).

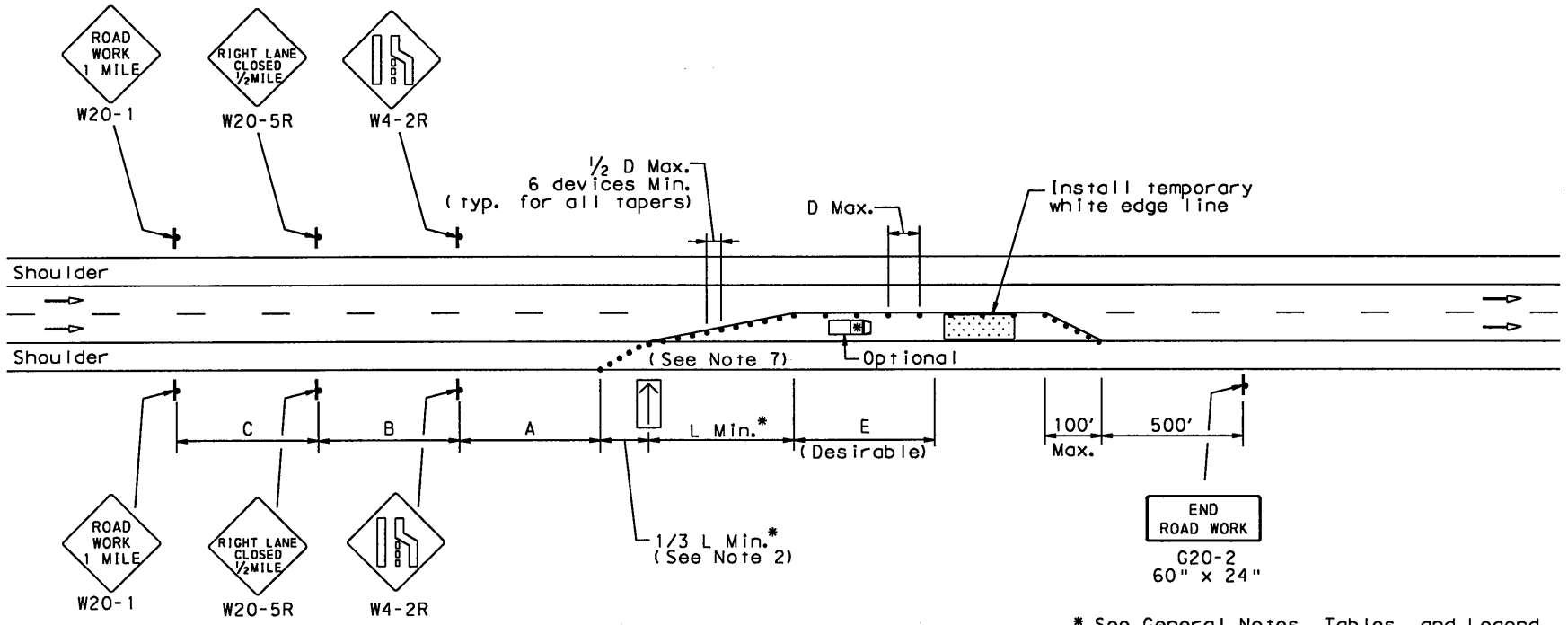
** Speeds less than 45 MPH (Optional)
Speeds 45 MPH and greater (Recommended).

All Highways (except freeway and expressway)			
	A	D	E
MPH	ft	ft	ft
25	250	50	155
30	300	60	200
35	350	70	250
40	400	80	305
45	450	90	360
50	500	100	425
55	550	110	495
Alternate Spacing for High Density Urban			
25	100	50	155
30	100	60	200

NOTES

1. Remove conflicting pavement markings.
2. When paved shoulders having a width of 8 ft or more are closed, channelizing devices should be used to close the shoulder in advance of the shifting taper (see PATA 7).
3. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.
4. Where speed or volume is higher, additional signing such as Left Lane Closed XX ft Sign (W20-5L) or Be Prepared To Stop Sign (W3-4) should be used between the signs shown.
5. Where channelizing devices are used instead of pavement markings, the spacing should be ½ D Max.
6. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
DIVIDED OR ONE-WAY HIGHWAY - WORK AREA IN THE LEFT OR RIGHT LANE



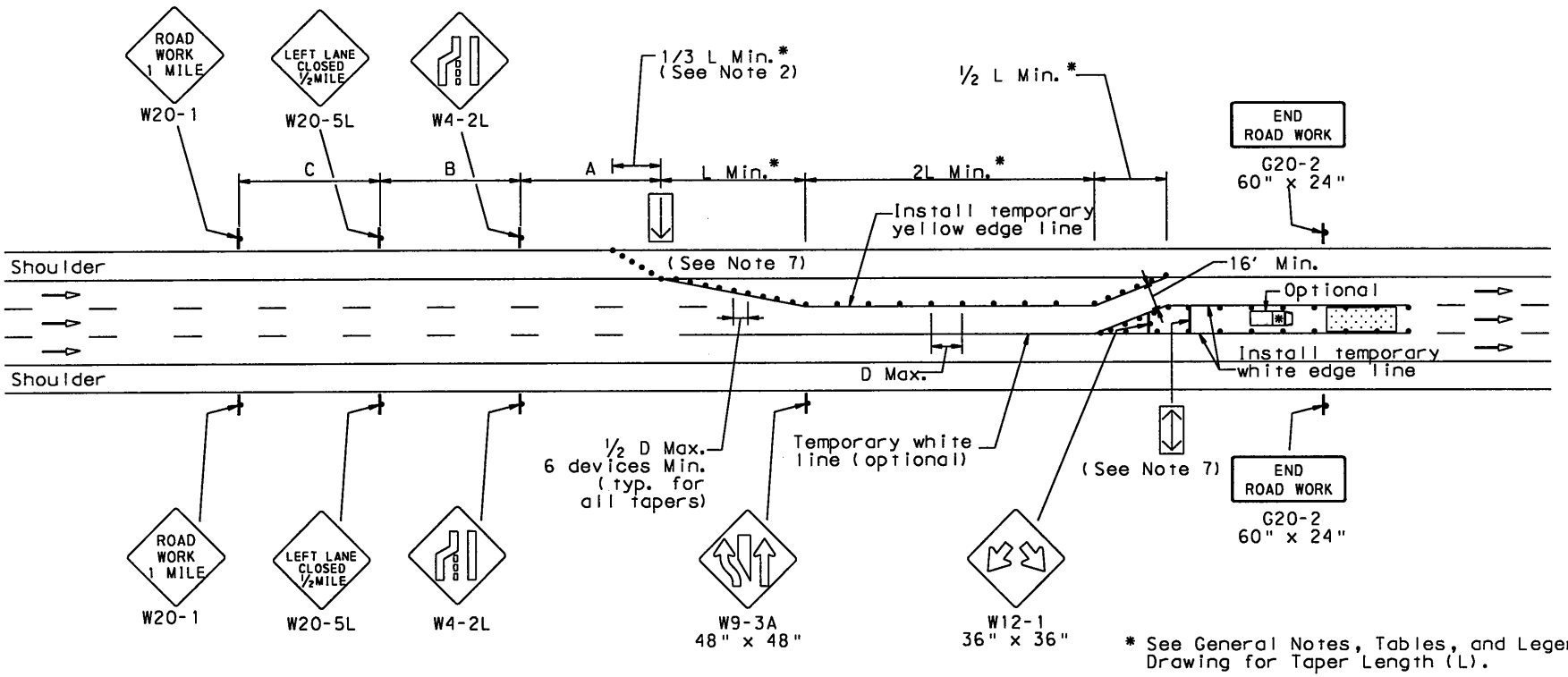
* See General Notes, Tables, and Legend Drawing for Taper Length (L).

Freeway and Expressway					
	A	B	C	D	E
MPH	ft	ft	ft	ft	ft
50	1000	1500	2640	100	425
55	1000	1500	2640	110	495
60	1000	1500	2640	120	570
65	1000	1500	2640	130	645

NOTES

1. Remove conflicting pavement markings.
2. When paved shoulders having a width of 8 ft or more are closed, channelizing devices should be used to close the shoulder in advance of the merging taper.
3. For left lane closures, the Left Lane Closed Sign (W20-5L) shall be used in place of the W20-5R Sign, and the Pavement Width Transistion-Left Lane Ends Sign (W4-2L) shall be used in place of the W4-2R Sign.
4. When a highway-rail grade crossing exists within the work zone, or it is anticipated that queues resulting from the lane closure might extend through a highway-rail grade crossing, provisions shall be made to eliminate conflicts, which may require placing a flagger at the crossing. Coordination with the railroad is essential.
5. Where speed or volume is higher, additional signing such as the Right Lane Closed XX ft Sign (W20-5R) or Be Prepared To Stop Sign (W3-4) should be used between the signs shown.
6. Where channelizing devices are used instead of pavement markings, the spacing should be ½ D Max.
7. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
THREE LANE, DIVIDED OR ONE-WAY ROADWAY - WORK AREA IN THE CENTER LANE



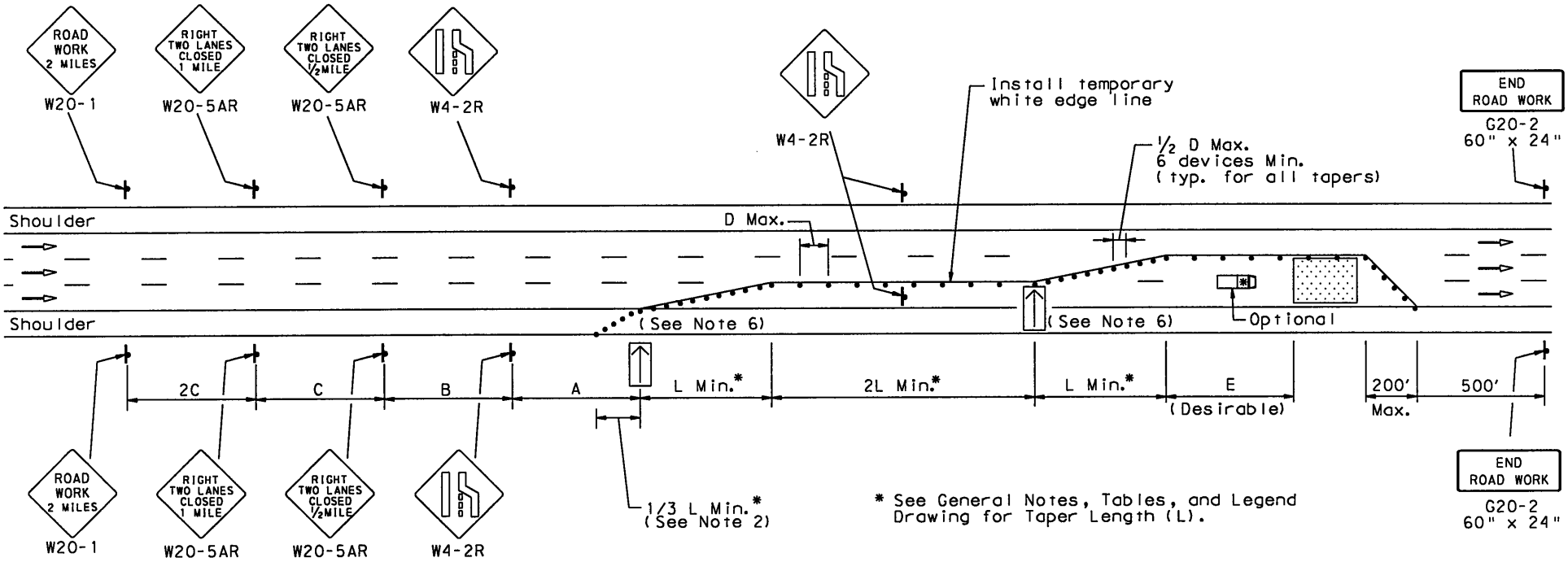
* See General Notes, Tables, and Legend Drawing for Taper Length (L).

Freeway and Expressway				
	A	B	C	D
MPH	ft	ft	ft	ft
50	1000	1500	2640	100
55	1000	1500	2640	110
60	1000	1500	2640	120
65	1000	1500	2640	130

NOTES

1. Remove conflicting pavement markings.
2. When paved shoulders having a width of 8 ft or more are closed, channelizing devices should be used to close the shoulder in advance of the merging taper.
3. A reversed pattern, beginning with a right lane closure, may also be used.
4. The advance left (or right) lane closure is not required for conventional highways, for freeways and expressways with low traffic volumes, or for any highway where geometrics or signing considerations indicate a lane closure is inappropriate. Center Lane Closed Ahead Signs (W9-3) shall be used instead of W20-5L (or W20-5R) Signs when the advance left (or right) lane closure is not installed.
5. Where speed or volume is higher, additional signing such as the Left Lane Closed XX ft Sign (W20-5L) or Be Prepared To Stop Sign (W3-4) should be used between the signs shown.
6. Where channelizing devices are used instead of pavement markings, the spacing should be ½ D Max.
7. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
DIVIDED OR ONE-WAY HIGHWAY - WORK AREA IN TWO ADJACENT LANES

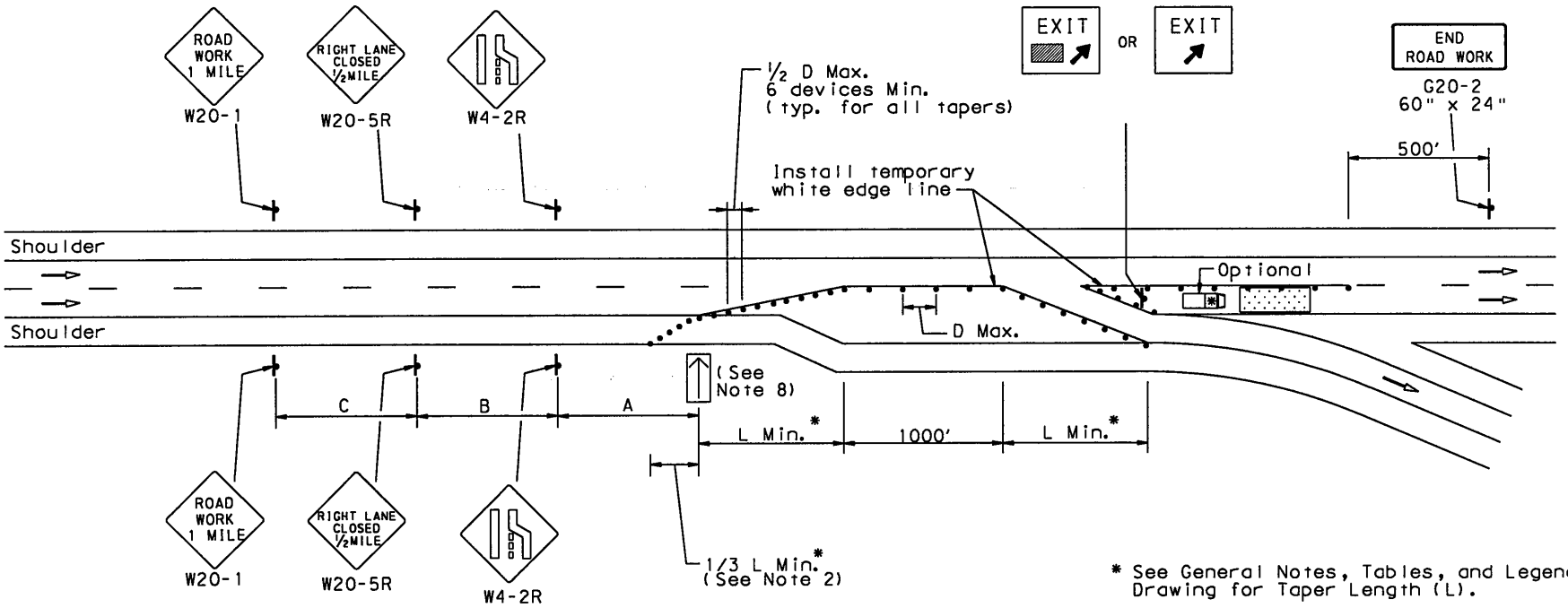


Freeway and Expressway					
	A	B	C	D	E
MPH	ft	ft	ft	ft	ft
50	1000	1500	2640	100	425
55	1000	1500	2640	110	495
60	1000	1500	2640	120	570
65	1000	1500	2640	130	645

NOTES

1. Remove conflicting pavement markings.
2. When paved shoulders having a width of 8 ft or more are closed, channelizing devices should be used to close the shoulder in advance of the merging taper.
3. If the two left lanes are closed, the Left Two Lanes Closed Ahead Sign (W20-5AL) shall be used instead of the W20-5AR Sign.
4. Where speed or volume is higher, additional signing such as Right Two Lanes Closed XX ft Sign (W20-5AR) or Be Prepared To Stop Sign (W3-4) should be used between the signs shown.
5. Where channelizing devices are used instead of pavement markings, the spacing should be ½ D Max.
6. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
LANE CLOSURE NEAR A FREEWAY OR EXPRESSWAY EXIT RAMP



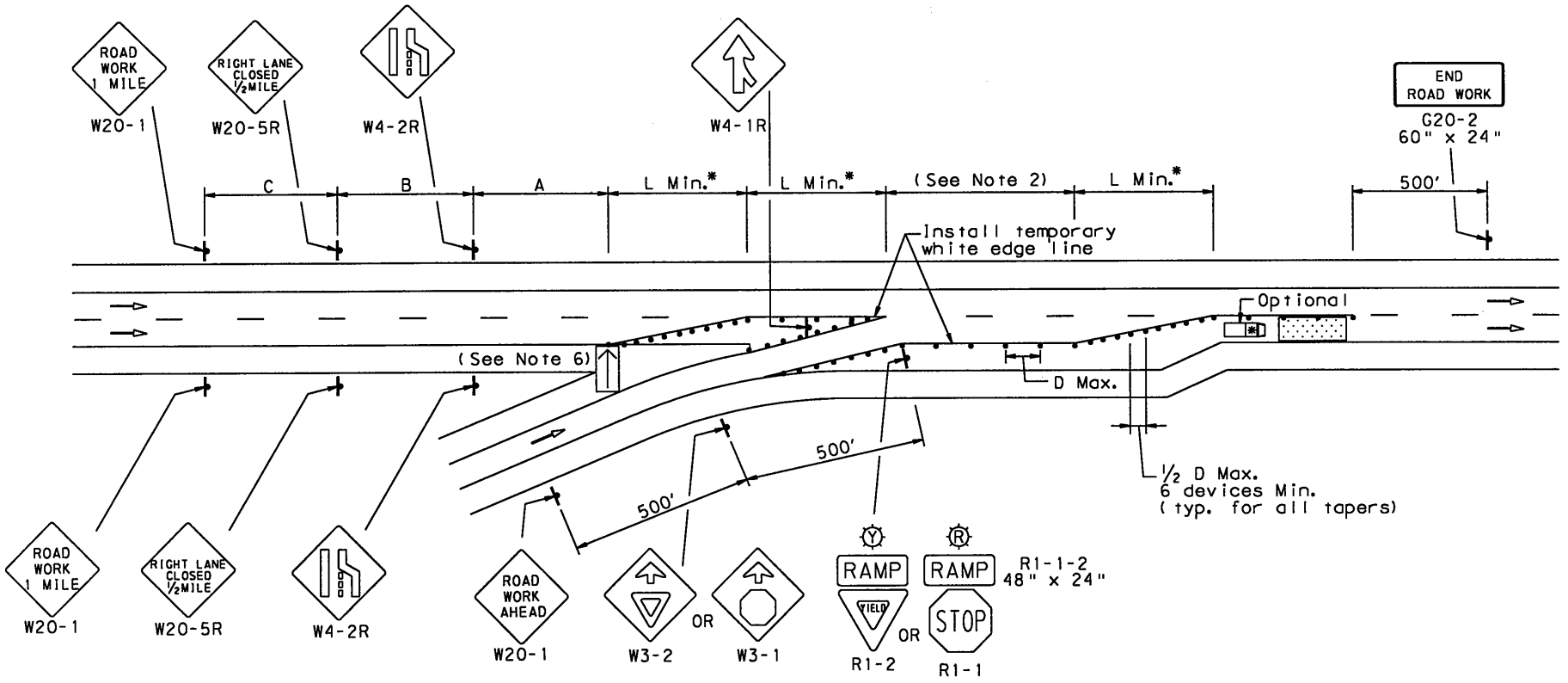
* See General Notes, Tables, and Legend Drawing for Taper Length (L).

Freeway and Expressway				
	A	B	C	D
MPH	ft	ft	ft	ft
50	1000	1500	2640	100
55	1000	1500	2640	110
60	1000	1500	2640	120
65	1000	1500	2640	130

NOTES

1. Remove conflicting pavement markings.
2. When paved shoulders having a width of 8 ft or more are closed, channelizing devices should be used to close the shoulder in advance of the merging taper.
3. The design criteria contained in Publication 13M (Design Manual Part 2-Highway Design) should be used for determining the alignment.
4. In locations with heavy ramp traffic, the channelizing devices in advance of the ramp may be eliminated if special advance signing is erected to indicate that the right lane is a mandatory exit only lane.
5. The temporary EXIT sign shall be located in the temporary gore. It shall be mounted a minimum of 7 ft from the pavement surface to the bottom of the sign.
6. Where speed or volume is higher, additional signing such as the Right Lane Closed XX ft Sign (W20-5R) or Be Prepared To Stop Sign (W3-4) should be used between the signs shown.
7. Where channelizing devices are used instead of pavement markings, the spacing should be ½ D Max.
8. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
LANE CLOSURE NEAR A FREEWAY OR EXPRESSWAY ENTRANCE RAMP



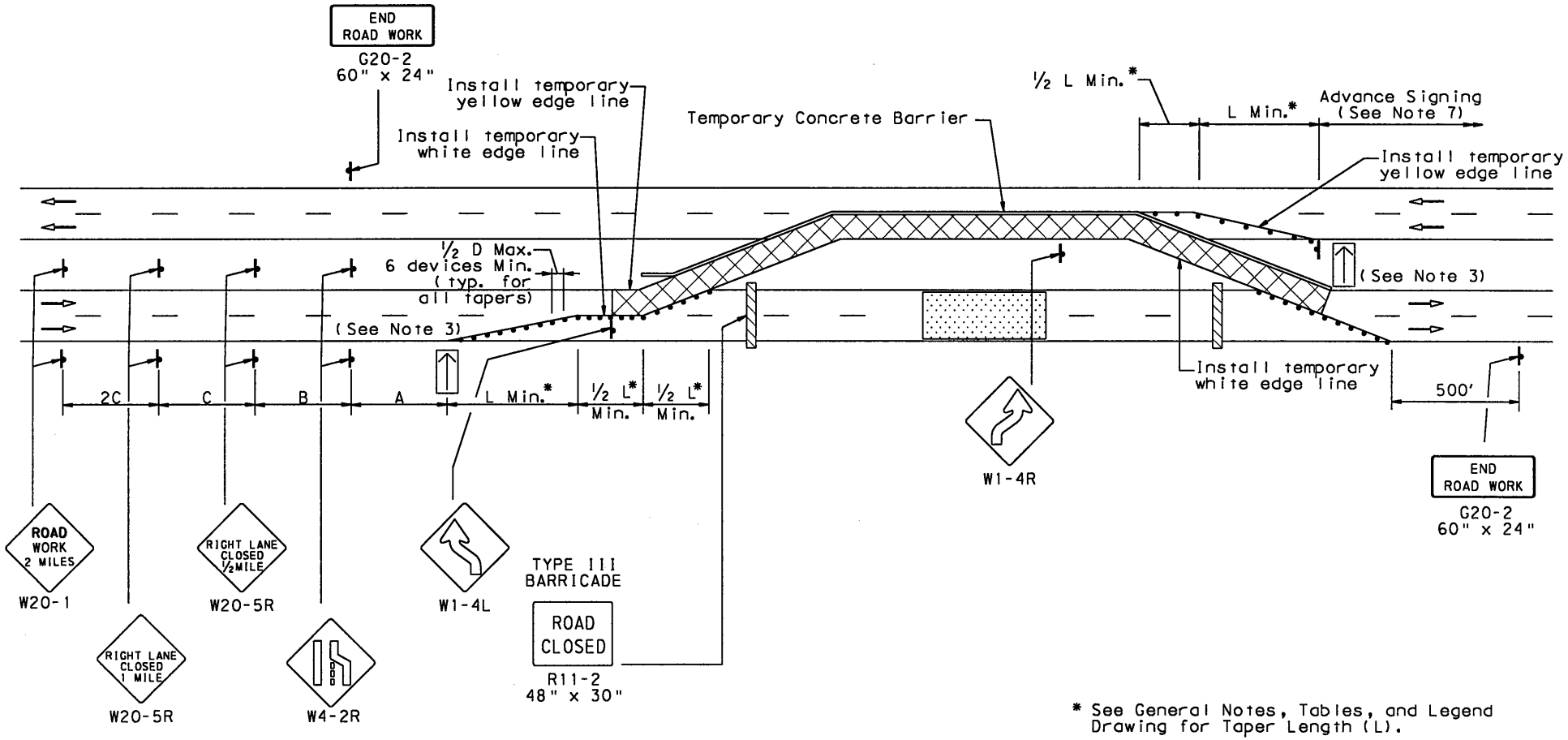
* See General Notes, Tables, and Legend Drawing for Taper Length (L).

Freeway and Expressway				
	A	B	C	D
MPH	ft	ft	ft	ft
50	1000	1500	2640	100
55	1000	1500	2640	110
60	1000	1500	2640	120
65	1000	1500	2640	130

NOTES

1. Remove conflicting pavement markings.
2. An acceleration lane of sufficient length should be provided whenever possible.
3. Where inadequate acceleration distance exists for the temporary entrance, the Yield (R1-2) and Yield Ahead (W3-2) Signs shall be replaced with Stop (R1-1) and Stop Ahead (W3-1) Signs.
4. Where speed or volume is higher, additional signing such as the Right Lane Closed XX ft Sign (W20-5R) or Be Prepared To Stop Sign (W3-4) should be used between the signs shown.
5. Where channelizing devices are used instead of pavement markings, the spacing should be ½ D Max.
6. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
TWO-WAY TRAFFIC ON ONE ROADWAY OF A NORMALLY DIVIDED HIGHWAY



Freeway and Expressway				
	A	B	C	D
MPH	ft	ft	ft	ft
50	1000	1500	2640	100
55	1000	1500	2640	110
60	1000	1500	2640	120
65	1000	1500	2640	130

* See General Notes, Tables, and Legend Drawing for Taper Length (L).

Temporary Pavement

Temporary Concrete Barrier

See Sheet 2 of 2 for notes.

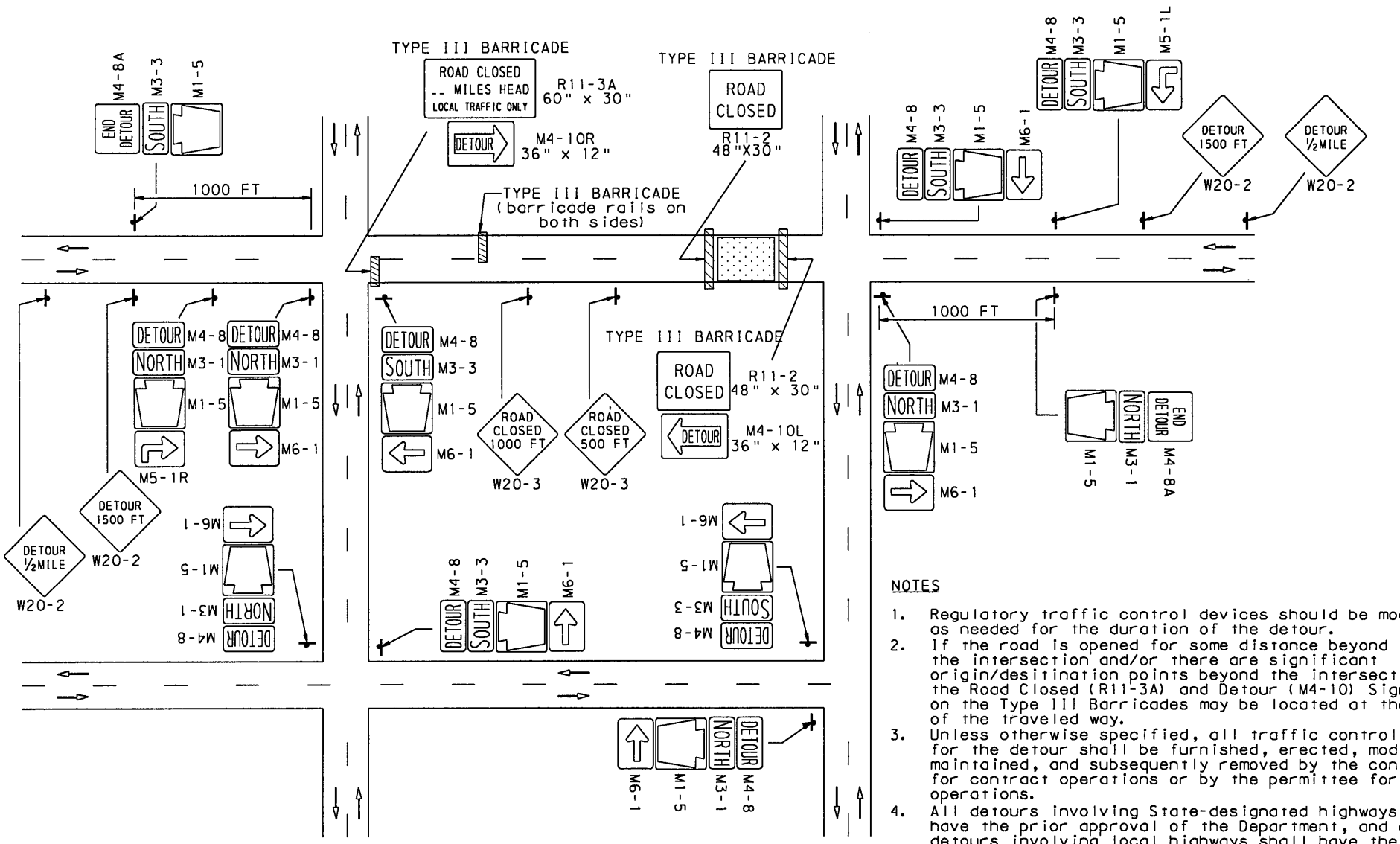
PATA 38

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
TWO-WAY TRAFFIC ON ONE ROADWAY OF A NORMALLY DIVIDED HIGHWAY

NOTES

1. Remove conflicting pavement markings.
2. When paved shoulders having a width of 8 ft or more are closed, channelizing devices should be used to close the shoulder in advance of the merging taper (see PATA 7).
3. See PATA GENERAL, Table 5 for size of the Flashing Arrow Panel.
4. The maximum length of temporary one-lane operation, excluding transitions, should not exceed approximately 3 miles. Temporary one-lane operations longer than approximately 3 miles shall only be permitted if justified by an engineering analyis of crossover locations, traffic operations, safety, and other related factors.
5. The alignment of the crossover may be designed as a reverse curve. When the crossover follows a curved alignment, the design criteria contained in Publication 13M (Design Manual Part 2-Highway Design) should be used.
6. For existing concrete pavements, temporary bituminous overlays should be used as shown to cover misleading pavement joints.
7. Signing for this approach shall follow the same configuration as the other direction, using the W20-5L and W4-2L Signs in place of the W20-5R and W4-2R Signs respectively.
8. Where speed or volume is higher, additional signing such as the Right Lane Closed XX ft Sign (W20-5R) or Be Prepared To Stop Sign (W3-4) should be used between the signs shown.

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
ANY HIGHWAY - DETOUR OF A NUMBERED TRAFFIC ROUTE

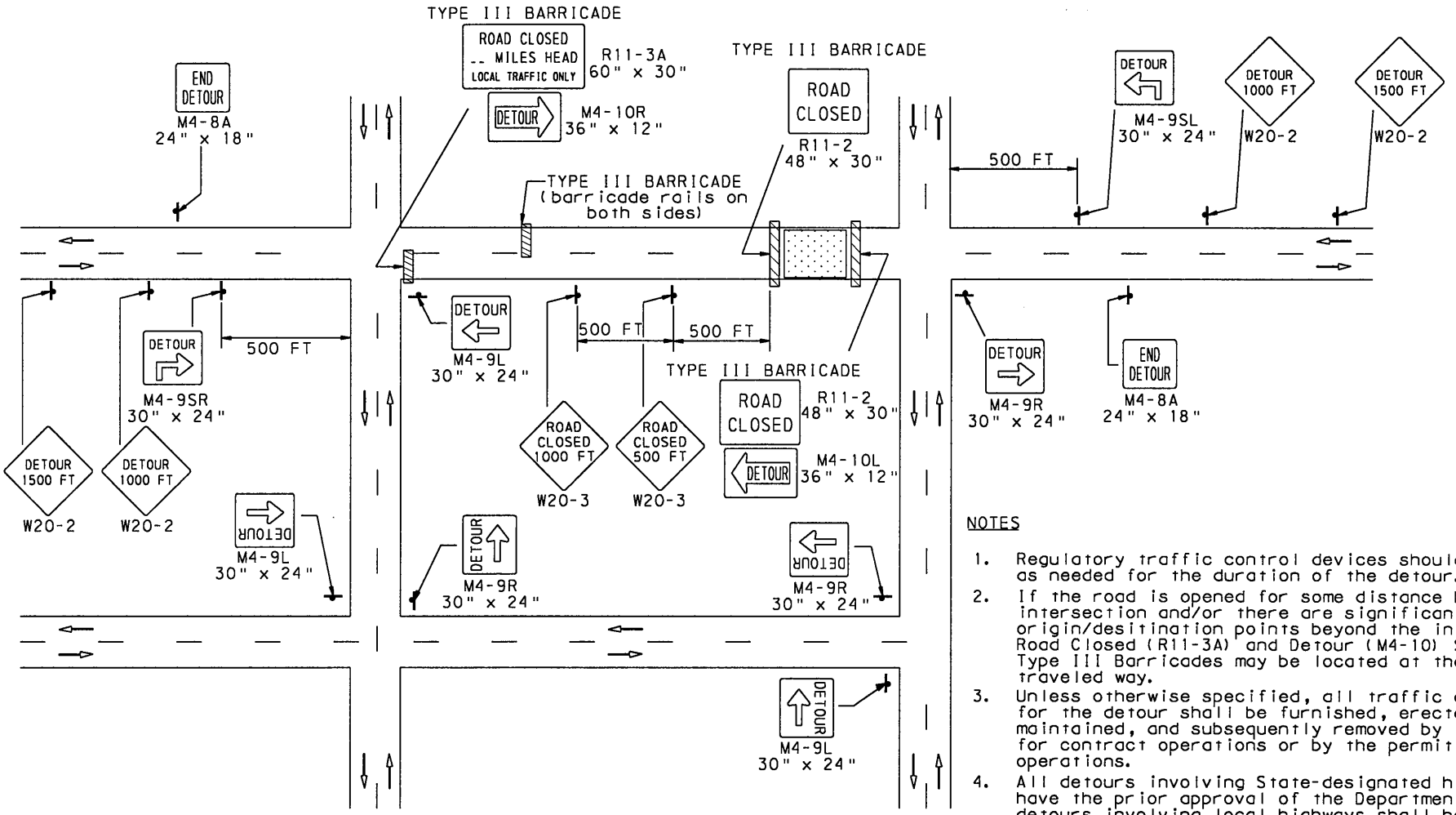


NOTES

1. Regulatory traffic control devices should be modified as needed for the duration of the detour.
2. If the road is opened for some distance beyond the intersection and/or there are significant origin/desitination points beyond the intersection, the Road Closed (R11-3A) and Detour (M4-10) Signs on the Type III Barricades may be located at the edge of the traveled way.
3. Unless otherwise specified, all traffic control devices for the detour shall be furnished, erected, modified, maintained, and subsequently removed by the contractor for contract operations or by the permittee for permit operations.
4. All detours involving State-designated highways shall have the prior approval of the Department, and all detours involving local highways shall have the prior approval of the appropriate local authorities.
5. The size of the Route Marker Assemblies shall comply with Publication 236M.
6. Where speed or volume is higher, additional signing should be used.

PATA
39a

PUBLICATION 213
LONG-TERM STATIONARY OPERATION
ANY HIGHWAY - DETOUR OF AN UNNUMBERED TRAFFIC ROUTE

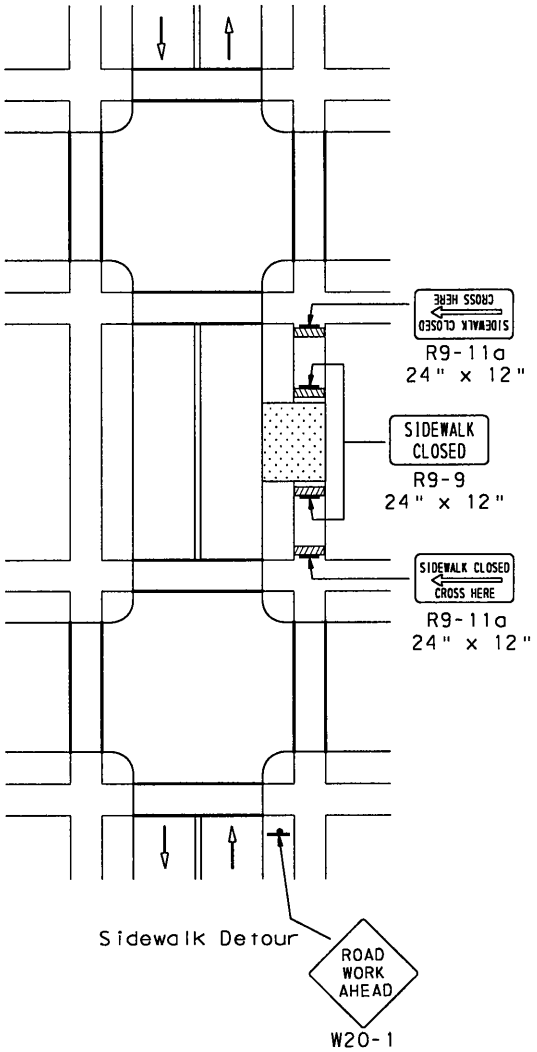


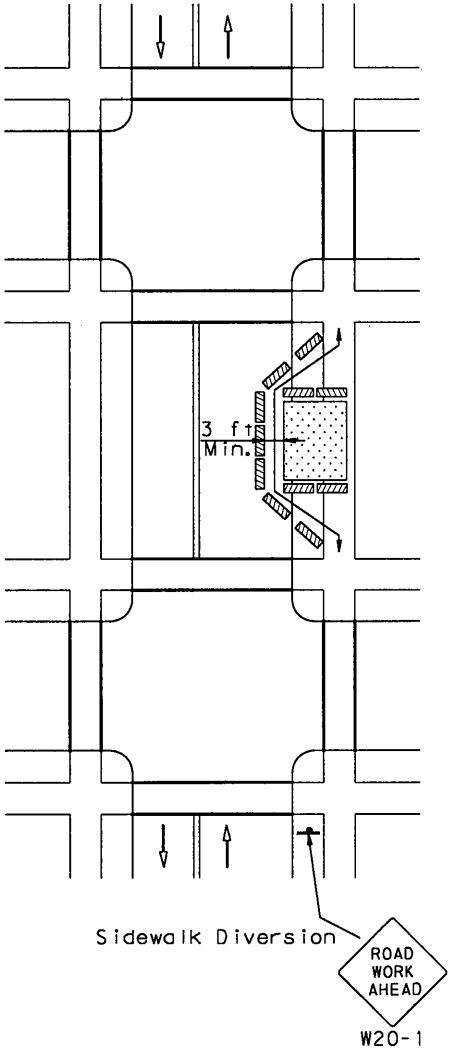
NOTES

1. Regulatory traffic control devices should be modified as needed for the duration of the detour.
2. If the road is opened for some distance beyond the intersection and/or there are significant origin/desitination points beyond the intersection, the Road Closed (R11-3A) and Detour (M4-10) Signs on the Type III Barricades may be located at the edge of the traveled way.
3. Unless otherwise specified, all traffic control devices for the detour shall be furnished, erected, modified, maintained, and subsequently removed by the contractor for contract operations or by the permittee for permit operations.
4. All detours involving State-designated highways shall have the prior approval of the Department, and all detours involving local highways shall have the prior approval of the appropriate local authorities.
5. At locations where there are overlapping detours or several detours within the same area, street names may be added above the M4-9L and M4-9R Signs, or signs with different colored arows may be used to designate the different detour routes. The design and application of signs displaying colored arrows shall comply with Publication 236M.
6. On multi-lane streets, Detour signs with an Advance Turn Arrow should be used in advance of a turn.
7. Where speed or volume is higher, additional signing should be used.

PATA
39b

PUBLICATION 213
SHORT-TERM AND LONG-TERM STATIONARY OPERATION
SIDEWALK DETOUR OR DIVERSION

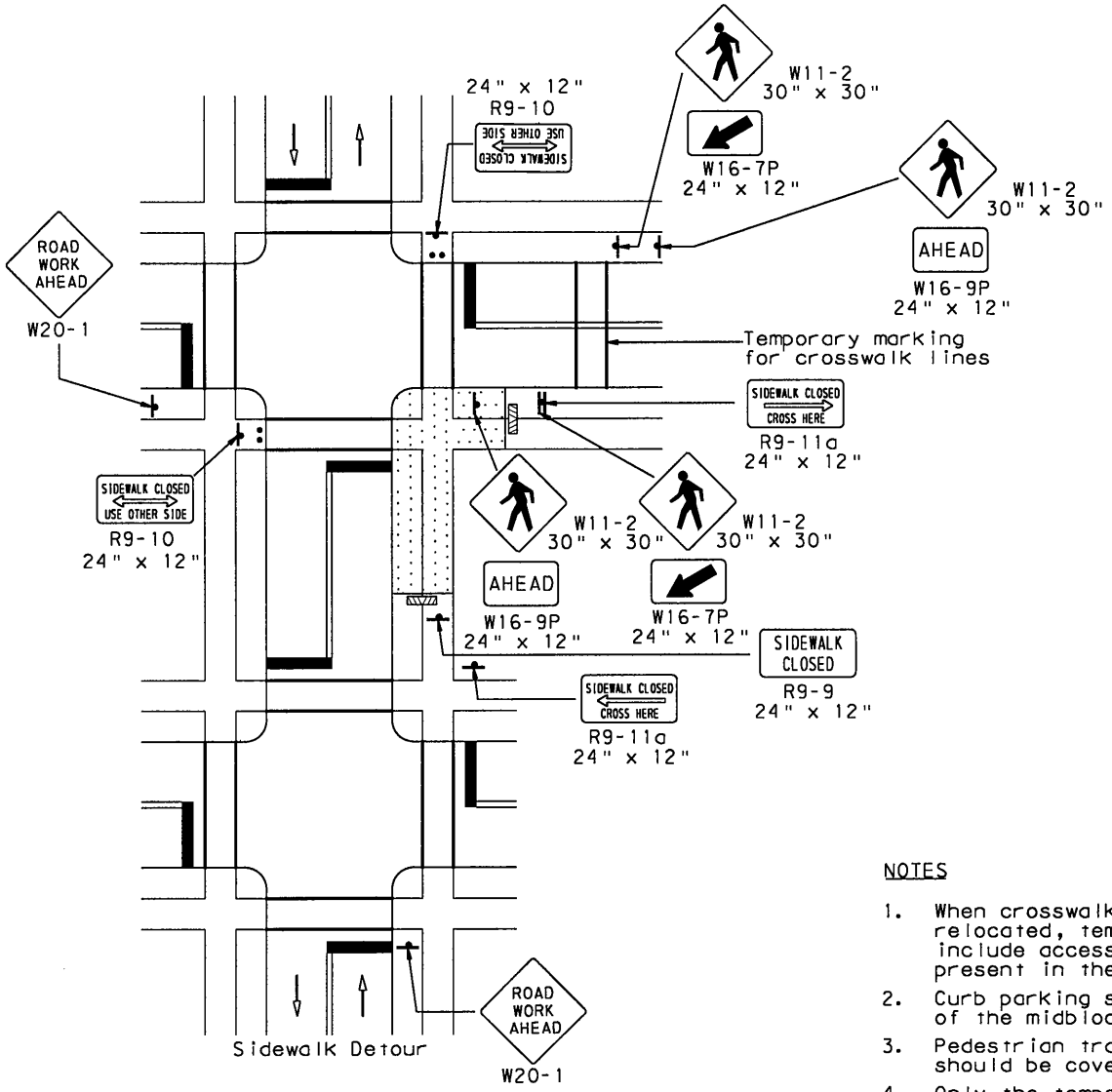




NOTES

1. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.
2. Where high speeds are anticipated, a temporary traffic barrier and, if necessary, a crash cushion should be used to separate the temporary sidewalks from vehicular traffic.
3. Only the temporary traffic control devices related to pedestrians are shown. Other devices, such as lane closure signing or Road Narrows signs, may be used to control vehicular traffic.

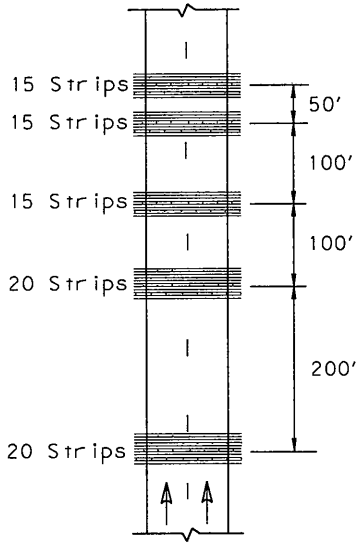
PUBLICATION 213
SHORT-TERM AND LONG-TERM STATIONARY OPERATION
CROSSWALK CLOSURES AND PEDESTRIAN DETOURS



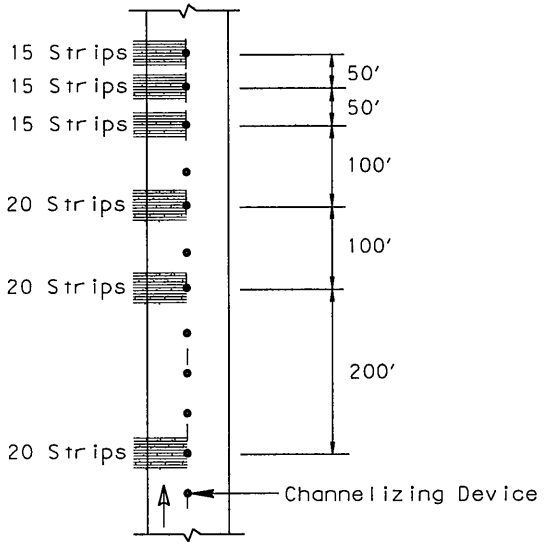
NOTES

1. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.
2. Curb parking shall be prohibited for at least 50 ft in advance of the midblock crosswalk.
3. Pedestrian traffic signal displays controlling closed crosswalks should be covered or deactivated.
4. Only the temporary traffic control devices related to pedestrians are shown. Other devices, such as lane closure signing or Road Narrows signs, may be used to control vehicular traffic.

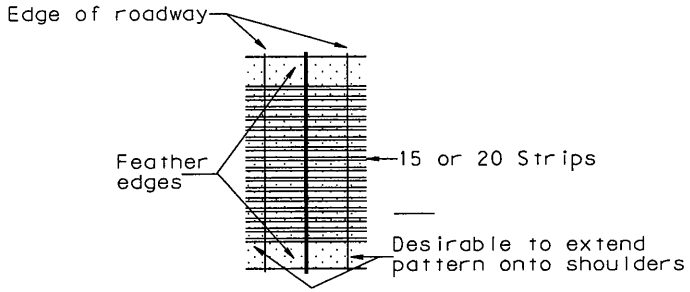
PUBLICATION 213
TEMPORARY BITUMINOUS RUMBLE STRIP PATTERNS



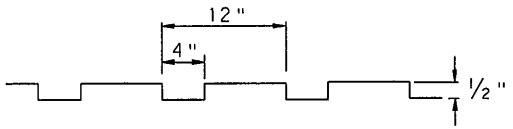
RUMBLE STRIP PATTERN A



RUMBLE STRIP PATTERN B



RUMBLE STRIP AREA
Bituminous overlay



RUMBLE STRIP
Longitudinal Cross Section

Installation Instructions:

½" x 4" plywood strips nailed in place at 12" spacing to form grooves. Apply FJ-1 bituminous overlay, then remove plywood strips.

PATA 42

Appendix

SECTION 1: GENERAL NOTES FOR PORTABLE TRAFFIC CONTROL SIGNALS

1.1 Portable traffic control signals may be used for stationary, short-term operations, which include daylight work areas, emergency nighttime work areas where there is work in active progress, or work areas of relatively short duration where work begins during daylight and continues in active progress during hours of darkness. Work in active progress means that workers, other than flaggers, are present and are actively engaged in performing the necessary work. In addition to work areas, portable traffic control signals may also be authorized for special events and applications that comply with the basic requirements of the applicable figure.

1.2 Unless indicated otherwise, all terms used on PATA 26e PL and PATA 26e PS (such as "short-term operation", "long-term operation", "normal speed limit", etc.) shall be as defined in PennDOT Publications 212 and 213.

1.3 Advance written approval must be obtained from PennDOT prior to using portable traffic signals on any public highway. A PennDOT portable traffic signal permit will be required, and a copy must be maintained on-site during the period of portable signal usage.

1.4 To be considered for approval, a completed application for a permit to operate portable traffic control signals must be submitted to PennDOT's appropriate Engineering District Office. Except as indicated in Notes 2.2 and 2.3, the completed application must be received at least 15 working days prior to the desired beginning date of portable signal usage. The completed application must be accompanied by a site-specific plan indicating the proposed work zone traffic control, portable signal locations, and operation (phasing, timing, etc.) taking into account work operations, roadway geometry, nearby intersections and driveways, and other pertinent factors. The plan should be prepared in accordance with the guidelines contained in PennDOT Publication 149M, and the available sight distance to each signal shall be indicated.

1.5 A minimum of two signal faces on each approach shall be continuously visible to approaching traffic from a point at least the following distance in advance of the portable signal unit:

Normal Speed Limit (MPH)	**Minimum Visibility Distance** (FT)
25	215
30	270
35	325
40	390
45	460
50	540
55	625

1.6 When manual control is used, supplemental signal indicator lamps are required to show the operator the status of the signal indications if the controller does not provide a visual display of the signal indications.

1.7 For manual control, a single operator may be used if the operator has an unobstructed view of both traffic traveling through the one-lane, two-way section and traffic on the approach to each portable signal unit. Otherwise, a separate operator is required at each portable traffic signal unit and communications must be maintained between the operators.

1.8 Signal supports should be a minimum of 2 feet off the edge of travel way. If this is not possible, the supports shall be adequately protected by barrier, guiderail, or channelizing devices.

1.9 The bottom of the housing of a signal face suspended over the roadway shall be a minimum of 15 feet, but not more than 19 feet, above the pavement grade at the center of the roadway. The bottom of the housing of a signal face, not mounted over the roadway, shall be at least 8 feet, but not more than 15 feet, above the sidewalk or pavement grade at the center of the roadway.

1.10 Additional signs and devices shall be installed as required in PennDOT Publications 212 and 213, and as required based on actual site conditions.

1.11 Lamps and signal modules must be replaced in accordance with the manufacturer's recommendations, and a record of this must be maintained by the user.

1.12 When not in operation, signal heads shall be removed from the view of traffic or hooded with an opaque material that covers and hides the signal indications from the view of traffic. All inappropriate signs shall also be removed, covered, folded, or turned so that they are not readable by oncoming traffic when the portable traffic signal is not in operation.

1.13 PennDOT reserves the right to inspect each portable traffic signal usage. PennDOT also reserves the right to revoke a portable traffic signal permit if the user shall at any time willfully or negligently fail to comply with the conditions contained in the permit, or fail to make any changes in the operation of the signal, or to remove it, when so ordered by PennDOT. The user shall not make any change in the operation of the portable traffic signal without prior written approval of PennDOT.

SECTION 2: SHORT-TERM STATIONARY OPERATION OF PORTABLE TRAFFIC CONTROL SIGNALS

2.1 The use of portable traffic control signals in Pennsylvania for short-term operations shall comply with the provisions of PATA 26e PS.

2.2 If all of the following conditions are satisfied (or when applying for blanket approval under Note 2.3), a completed application for a permit to operate portable traffic control signals can be received by PennDOT at least 7 working days prior to the desired beginning date of portable signal usage. In this case, a site-specific plan will not be required.

a. The operation will be a stationary, short-term operation as defined in PennDOT Publications 212 and 213.

b. There will be no at-grade railroad crossing within the one-lane, two-way traffic section (between STOP HERE ON RED signs) and within 300 feet of a portable traffic signal.

c. No roadway approach to a portable traffic signal will be on a downgrade of 5% or more, if the normal speed limit is greater than 35 miles per hour.

d. No more than two approaches to the work zone will be controlled by portable traffic signals.

e. The portable traffic signals will be manually controlled, OR the roadway ADT and length of one-way, two-way traffic section (between STOP HERE ON RED signs) meet one of the following conditions (if fixed time or actuated operation will be used):

Maximum ADT (VEH/DAY) *	Maximum Accompanying Length of One-Lane, Two-Way Traffic Section (FT)
4,000 (6,500*)	1,000
5,000 (7,500*)	750
6,000 (9,000*)	500
7,000 (11,000*)	300

* NOTE: These higher maximum ADT values are only applicable if portable signal usage will be limited to non-peak hours (i.e., other than 7:00 to 9:00 AM and 4:00 to 6:00 PM).

f. The portable traffic signals will be manually controlled, OR there will be no intersections or uncontrolled commercial driveways within the one-lane, two-way traffic section (if fixed time or actuated operation will be used). The proposed method of traffic control for non-commercial driveways shall be indicated on the application.

g. The portable traffic signals will be manually controlled, OR there will be no intersections within 200 feet of each portable signal unit (if fixed time or actuated operation will be used).

2.3 For short-term operations by repeated users of portable traffic control signals, PennDOT's appropriate Engineering District Office, at its discretion, may waive the need for a site-specific plan and/or may issue a blanket portable traffic control signal permit covering multiple locations and dates of operation. These actions will only be considered by PennDOT's Engineering District Office if that user has properly used portable traffic control signals in a safe and efficient manner within that District on numerous past occasions without problems and in compliance with PennDOT requirements.

2.4 Signal heads on the left side of the roadway may not be necessary for portable signal units that have two signal heads and at least one is on a mast arm over the roadway, provided that signal visibility is adequate.

2.5 The length of yellow change intervals is normally in the range from about 3 seconds to 5 seconds. Use a 5-second yellow change interval, or an appropriate alternate value from PennDOT Publication 149M based on actual site conditions.

2.6 An all-red clearance interval must be used. The length of the all-red clearance interval is based on the length of the one-lane, two-way traffic section controlled by the portable signals and the speed of traffic through that section. Unless otherwise indicated by PennDOT, the minimum length of all-red clearance intervals shall be as follows for fixed time and actuated operation:

Length of One-Lane, Two-Way Traffic Section between STOP HERE ON RED SIGNS (FT)	Required Minimum Length of All-Red Clearance Interval (SEC)		
	15 MPH	20 MPH	25 MPH
1,000	45	34	27
950	43	32	26
900	41	31	25
850	39	29	23
800	36	27	22
750	34	26	20
700	32	24	19
650	30	22	18
600	27	20	16
550	25	19	15
500	23	17	14
450	20	15	12
400	18	14	11
350	16	12	10
300	14	10	8

2.7 For fixed time and actuated operation, the minimum green interval provided for each approach shall be 10 seconds, unless otherwise indicated by PennDOT. The length of green intervals should be such as to provide for safe and efficient traffic operations.

SECTION 3: LONG-TERM STATIONARY OPERATION OF PORTABLE TRAFFIC CONTROL SIGNALS

3.1 The use of portable traffic control signals in Pennsylvania for long-term operations shall comply with the provisions of PATA 26e PL.

3.2 Portable traffic signals used for long-term operations shall be trailer-mounted units having at least one signal head on a mast arm over the roadway. Pedestal-mounted portable traffic signal units are not permitted for long-term operations.

3.3 For long-term operations, all signal lenses shall be 12 inches in diameter.

3.4 All portable traffic signal units used for long-term operations must be interconnected via hard wire or radio to ensure fail-safe operation and proper functioning.

3.5 Steps must be taken to ensure continued proper placement and to forestall possible vandalism of the portable traffic signal units. Tires and the "hitch" must be removed from the trailer, and battery enclosures, crank mechanisms for horizontal arms, and other mechanisms to adjust placement or operation must be locked to eliminate any tampering by unauthorized personnel.

3.6 The local police department must be provided with the name and telephone number of an emergency contact person who is available 24 hours per day, 7 days a week during the period of portable traffic signal usage.

3.7 Pedestrian accommodation considerations, winter maintenance activities that could cause damage or dislodgement, and other important considerations may result in the denial to use portable traffic signals for specific long-term operations.

TE-964P (1 - 06)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

Permit No. _____
Sheet 1 of _____

PORTABLE TRAFFIC CONTROL SIGNAL PERMIT

In accordance with the Vehicle Code, the Pennsylvania Department of Transportation (the Department) hereby approves the operation of a portable traffic control signal as follows:

Location:

Date(s) of Operation:

This permit is issued to, and accepted by, _____, hereinafter known as the Permittee, as follows:

The operation and maintenance of this portable traffic control signal by the Permittee shall be in accordance with requirements contained on the attached sheets and application, the Department's figures governing the use of portable traffic signals, and the following special requirements:

All work performed by the Permittee with respect to the operation and maintenance of this portable traffic control signal shall be under and subject to the direction of the Department. The said Permittee shall use due diligence in the execution of the work authorized under this permit and shall not obstruct or endanger travel along the said road. All operations must be conducted so as to permit safe and reasonable free travel at all times over the road within the limits of the work herein permitted.

The Permittee agrees to indemnify, save harmless and defend (if requested) the Commonwealth of Pennsylvania, its agents, representatives and employees, from all suits, actions or claims of any character, name or description, damages, judgments, expenses, attorneys' fees and compensation arising out of personal injury, death or property damage, sustained or alleged to have been sustained in whole or in part by any and all persons whatsoever as a result of or arising out of any act, omission, neglect or misconduct of the Permittee, its officers, agents, contractors or employees, during the period of portable traffic signal usage.

The Department reserves the right to revoke this permit if the Permittee shall at any time willfully or negligently fail to comply with the conditions contained in this permit, or fail to make any changes in the operation of this signal, or to remove it, when so ordered by the Department. The Permittee shall maintain the signal in a safe condition at all times. The Permittee shall not make any change in the operation of this portable traffic control signal without prior written approval of the Department. The Department reserves the right to inspect this portable traffic signal usage at any time.

Date:_____

Approved:_____
Secretary of Transportation
Commonwealth of Pennsylvania

By: _____
District Executive
Pennsylvania Department of Transportation
Engineering District _____

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

APPLICATION FOR PERMIT TO OPERATE PORTABLE TRAFFIC CONTROL SIGNALS

Applicant: _____ Phone No.: _____

Address: _____

_____

WORK LOCATION

County: _____ Municipality: _____

On State Route (SR): _____ Direction: _____

From: Segment: _____ Offset: _____

To: Segment: _____ Offset: _____

On Local Road: _____ Direction: _____

From: _____

To: _____

Normal Speed Limit: _____mph ADT: _____ veh/day

Maximum Length of One-Lane, Two-Way Traffic Section _____ feet
(Between *STOP HERE ON RED* Signs)

Date of Portable Signal Usage: Begin_____ End _____

Description of Proposed Work:

Application for Permit to Operate
Portable Traffic Control Signals (Continued)

Proposed Method of Controlling Traffic Emerging from Driveways within One-Lane, Two-Way Traffic Section:

Portable Traffic Signal Manufacturer: _____ Model: _____

PennDOT Approval No.: _____

Mode of Operation: Manual _____ Fixed Time _____ Actuated _____

Interconnection: Hard Wire ____ Radio _____ None (Quartz Timers) _____

Other (Please describe) _____

Name of Emergency Contact Person: _____ Phone No.: _____
(Must be available 24 hrs./day, 7 days/week during period of portable signal usage.)

In accordance with the Vehicle Code, Pennsylvania Department of Transportation (PennDOT) approval is required prior to using portable traffic signals on any public highway.

To be considered for approval, this completed application must be received by PennDOT's appropriate Engineering District Office at least the following number of working days prior to the desired beginning date of portable signal usage:

7 Working days *if ALL of the criteria in the following table are satisfied (checked), or when applying for blanket approval (as described on the bottom of Page 3).*

15 Working days *if one or more of the criteria in the following table is not satisfied (checked).*

If one or more of the criteria in the following table is not satisfied (checked), this completed application must be accompanied by a site-specific plan indicating the proposed work zone traffic control, portable signal locations, and operation (phasing, timing, etc.) taking into account work operations, roadway geometry, nearby intersections and driveways, and other pertinent factors (unless waived by the Engineering District Office under the blanket approval option described on the bottom of Page 3). The plan should be prepared in accordance with the guidelines contained in PennDOT Publication 149M, and the available sight distance to each signal shall be indicated.

<table>
<tr><th>Check all that apply</th><th>Criteria</th></tr>
<tr><td></td><td>Type of operation will be stationary.</td></tr>
<tr><td></td><td>This will be a "short-term operation" as defined in PennDOT Publications 212 and 213.</td></tr>
<tr><td></td><td>There will be no at-grade railroad crossing within the one-lane, two-way traffic section (between STOP HERE ON RED signs) and within 300 feet of a portable traffic signal.</td></tr>
<tr><td></td><td>No roadway approach to the portable traffic signal will be on a downgrade of 5% or more, if the normal speed limit is greater than 35 miles per hour.</td></tr>
<tr><td></td><td>No more than two approaches to the work zone will be controlled by portable signals.</td></tr>
<tr><td></td><td>The portable traffic signals will be manually controlled, OR the roadway ADT and length of one-way, two-way traffic section (between STOP HERE ON RED signs) meet one of the following conditions (if fixed time or actuated operation will be used):
<table>
<tr><th>Maximum ADT (VEH/DAY) *</th><th>Maximum Accompanying Length of One-Lane, Two-Way Traffic Section (FT)</th></tr>
<tr><td>4,000 (6,500*)</td><td>1,000</td></tr>
<tr><td>5,000 (7,500*)</td><td>750</td></tr>
<tr><td>6,000 (9,000*)</td><td>500</td></tr>
<tr><td>7,000 (11,000*)</td><td>300</td></tr>
</table>
* NOTE: These higher maximum ADT values are only applicable if portable signal usage will be limited to non-peak hours (i.e., other than 7:00 to 9:00 AM and 4:00 to 6:00 PM).</td></tr>
<tr><td></td><td>The portable traffic signals will be manually controlled, OR there will be no intersections or uncontrolled commercial driveways within the one-lane, two-way traffic section (if fixed time or actuated operation will be used).</td></tr>
<tr><td></td><td>The portable traffic signals will be manually controlled, OR there will be no intersections within 200 feet of each portable signal unit (if fixed time or actuated operation will be used).</td></tr>
</table>

For short-term operations by repeated users of portable traffic control signals, PennDOT's appropriate Engineering District Office, at its discretion, may waive the need for a site-specific plan and/or may issue a blanket portable traffic control signal permit covering multiple locations and dates of operation. These actions will only be considered by PennDOT's Engineering District Office if that user has properly used portable traffic control signals in a safe and efficient manner within that District on numerous past occasions without problems and in compliance with PennDOT requirements.

The applicant certifies that the information provided on this application and accompanying documents is true and correct.

The applicant certifies that, if approved, the portable traffic signals will be operated and maintained in compliance with PennDOT's figures governing the use of portable traffic signals and the provisions of the required portable traffic signal permit as issued by PennDOT.

The applicant agrees that it will indemnify, save harmless and defend (if requested) the Commonwealth of Pennsylvania, its agents, representatives and employees, from all suits, actions or claims of any character, name or description, damages, judgments, expenses, attorneys' fees and compensation arising out of personal injury, death or property damage, sustained or alleged to have been sustained in whole or in part by any and all persons whatsoever as a result of or arising out of any act, omission, neglect or misconduct of the applicant, its officers, agents, contractors or employees, during the period of portable traffic signal usage.

BY: _____ _____
Signature of Applicant Date

Sworn before me this _____ day of _____, 20_____

Notary: _____