

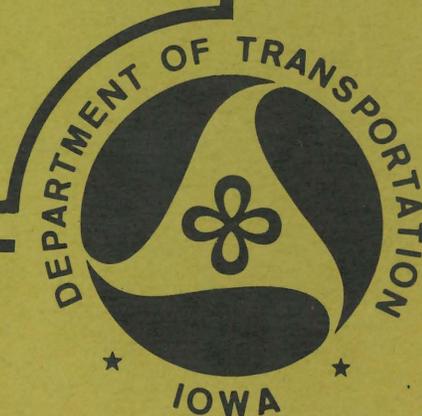
**MANUAL
ON
PAVEMENT MARKING PROGRAM**

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1982

MARCH 1982

**PREPARED
BY OFFICE OF MAINTENANCE
HIGHWAY DIVISION**

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INTRODUCTION

The purpose of this Manual is to provide standard policies, procedures and guidelines for the application of uniform pavement markings on the Interstate and Primary Road Systems throughout the State. The pavement markings specifications and typical details included in this Manual are in accordance with standards in the current edition of the Manual on Uniform Traffic Control Devices for Streets and Highways. Any exceptions to these standards shall be as shown on special layouts provided by the Office of Maintenance. For interpretation of the requirements contained herein, contact should be made with the State Traffic Engineer.

SECTION 1
GENERAL REQUIREMENTS

Operations and Scheduling

The operation of each District Paint Crew shall be under the direction of the Paint Crew Supervisor reporting to a designated Resident Maintenance Engineer or the District Maintenance Engineer.

Work shall commence on approximately April 1, weather and surface conditions permitting, and continue through the season until all necessary pavement markings are completed or winter shutdown stops operations. During the winter months, any needed modification or repair of equipment shall be done to minimize down time when summer operations are under way.

Each District shall determine which routes are to be included in the Annual Pavement Marking Program. Pavement marking renewal shall be done on an as needed basis determined through visual inspection by assigned personnel. Special equipment made available to the Districts may be used to determine which pavement markings need to be repainted.

Primary Extensions and Institutional Roads

Marking of Primary Road Extensions maintained by the Department shall be done at the same time as rural sections on either side of the City. The District Paint Crew will clean these extensions prior to painting.

Cities and State Institutions which have maintenance contracts with the Department may elect to have pavement markings on their Primary Extensions or Institutional Roads done by the District Paint Crew. The District will determine which Cities and Institutions want their pavement markings done by the Department and painting will be done in conjunction with normal pavement markings operations on rural Primary routes near the City or Institution. Local authorities will be responsible for street cleaning on these routes

and for providing required policing, traffic control and line protection.

If a City or Institution prefers to do their own pavement markings on Primary Road Extensions or Institutional Roads, they should be encouraged to do so. In these cases, the Department will reimburse the City or the Institution for the work according to the payment schedule shown in Table 1 below. When the work is done by the City or the Institution, pavement markings shall be included in the Annual Maintenance Contract as Special Maintenance.

Payment Schedule for Pavement Markings Done By Cities Or Institutions (Each Application)			
Type of Extension	Two Lane	Four Lane	Six Lane
Reimbursement per Center Line Mile	\$85.00	\$125.00	\$170.00

Table 1

To qualify for reimbursement, pavement markings must conform to Department of Transportation Standards. Any Primary Road Extensions with a traffic volume in excess of 3,000 vehicles per lane per day qualifies for a second marking at the same rate of reimbursement as listed in Table 1.

In lieu of reimbursement, the City or Institution may at their request be furnished the paint and beads which would ordinarily be used in marking their routes. Quantities will be calculated in accordance with the rates set forth in Section 4, Operations and Equipment. See Table 3 on page 62.

Transverse lines such as stop lines, crosswalks, etc. will not be painted by the District Paint Crew within a City or Institution. This work is the responsibility of the City or Institution and must be done in accordance with provisions in this Manual and the Manual on Uniform Traffic Control Devices.

On any Primary Road Extension where pavement markings will be done by local authorities, marking by the District Paint Crew shall stop at the corporation line.

State Park Roads

State park roads are not part of the Primary Road System. Very few park roads are of a structural quality or width that they would accommodate center lines or no passing lines placed on Primary Roads. Construction in recent years has provided some park roads of quality that could benefit by pavement markings. To provide a uniform statewide policy, no state park roads will be marked until a written request is submitted by the respective District Maintenance Engineer to the State Traffic Engineer who will consult with the State Conservation Commission. Results of this consultation will be forwarded to the District Maintenance Engineer who will implement approved work accordingly.

SECTION 2
PAVEMENT MARKING STANDARDS

Center Lines

For purposes of marking center lines, a two lane roadway shall be defined as any roadway with only one traffic lane available for each direction of travel. Any roadway which is wide enough for four lanes, but where parking is allowed in the outside lanes shall be considered a two lane roadway and shall be marked accordingly. A multilane roadway shall be defined as any roadway with two or more traffic lanes for each direction of travel.

The center line marking for two lane roadways shall be a 4 1/2" broken yellow line composed of 10' foot segments separated by 30' gaps. See marking Type 1 in Figure 1, Standard Paving Markings, for details.

The center line marking for multilane undivided roadways shall be a double yellow center line composed of two (2) 4" solid lines separated by a 10 1/2" space. See marking Type 3 in Figure 1 for details.

All center line markings, including no passing zone lines, where required, shall be continuous with the following exceptions:

1. At one lane bridges (less than 18' roadway) center line markings shall be terminated 200' in advance of each end of the bridge.
2. At the intersection of two Primary roads, center line markings shall terminate at the near side of the intersection and resume on the far side of the intersection.
3. At intersections with city streets, center line markings shall terminate at the property line on the near side of the intersection and resume at the property line on the far side of the intersection.

Various types of intersections and other roadway characteristics may require specific center line markings to suit individual situations. Some of

the commonly encountered situations are covered in Section 3, Typical Pavement Marking Layouts. The State Traffic Engineer will furnish assistance on special pavement marking layouts for individual cases at the request of the District.

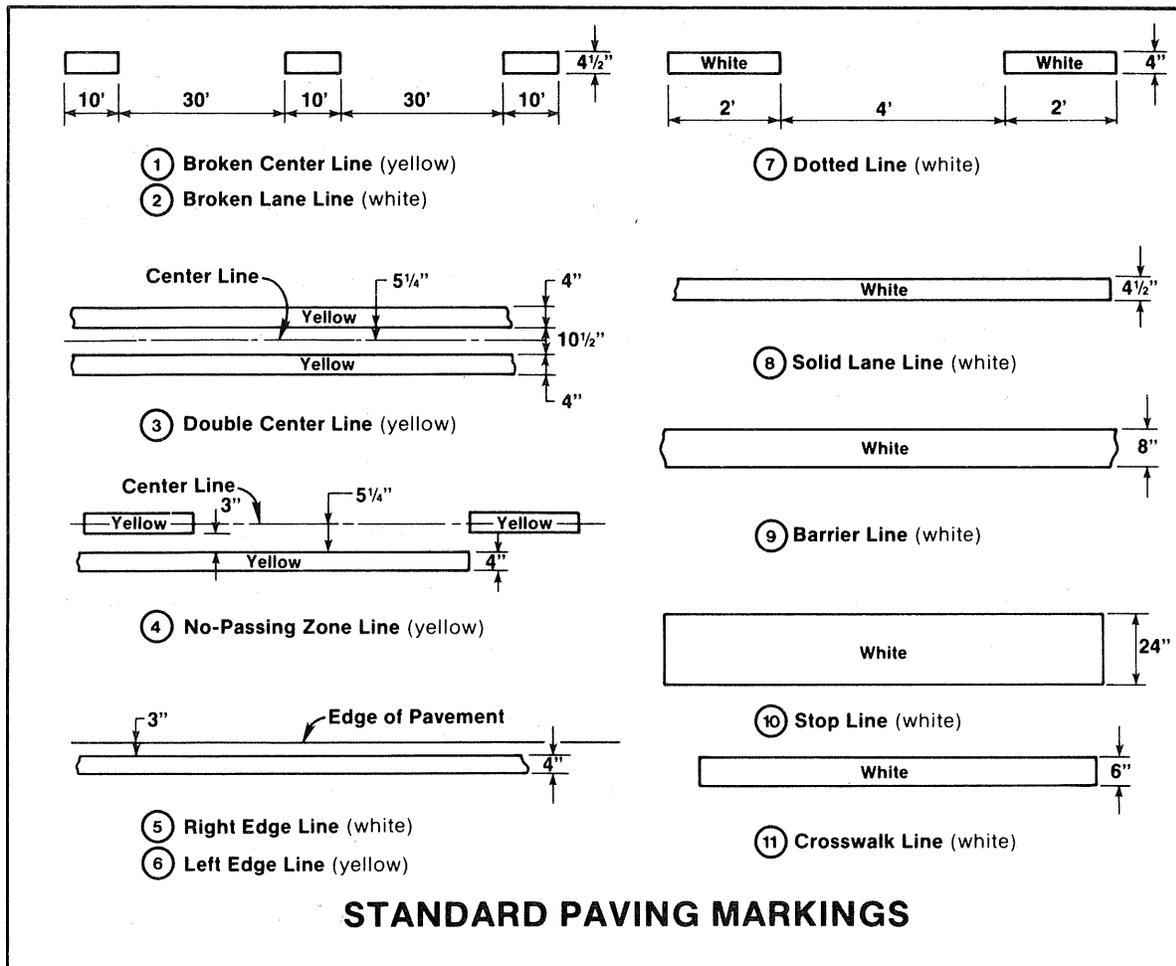


Figure 1

Lane Lines

Lane Lines are normally 4 1/2" broken white lines composed of 10' segments separated by 30' gaps. See marking Type 2 in Figure 1 for details. Lane lines are used to separate two or more lanes of traffic traveling in the same direction on multilane roadways or one-way streets. Only those lanes

which are open to traffic at all time shall be marked. Changing of lanes with care is permitted across a broken lane line.

Where it is advisable to discourage lane changing in critical areas, a 4 1/2" solid white lane line may be used. For areas not covered by a Special Marking Layout, questions on the use and application of solid lane lines should be directed to the State Traffic Engineer.

Lane lines shall be terminated and resumed at the same location as center line markings at Primary junctions and city street intersections.

Suggested minimum lane widths for various widths of roadways are provided in Table 2 below.

Transverse Spacing Of Lane Lines On Multilane Roadways		
Pavement Width	Number of Lanes	Width of Lane
Less than 44'	4	10' minimum
44'	4	11'
48'	4	12'
Over 48'	4 or more*	12' minimum
* For roadways with more than 4 lanes of traffic, the minimum lane width shall be 10 feet. If this requirement cannot be met, special instructions will be provided by the State Traffic Engineer.		

Table 2

No Passing Zone Lines

A no passing zone line consists of a 4" solid yellow line placed 3" to the right of the center line in the lane where the no passing restriction applies. See marking Type 4 in Figure 1 for details. Where a no passing restriction applies for both directions of travel, two (2) 4" solid lines shall be placed 10 1/2" apart and the broken yellow center line eliminated

throughout the length of the two directional no passing zone. For details of two directional no passing zone lines, see marking Type 3 in Figure 1.

No passing zone lines shall be placed at vertical and horizontal curves on two lane roadways where sight distance is inadequate to enter the opposing lane and at other special locations covered in this section. No passing zone locations on two lane roadways shall be established by the District on the basis of a field survey to determine whether sight distance, based on a 3.75' driver eye height, is restricted to 1,000' or less. The beginning of the no passing line shall be 100' in advance of the point where sight distance becomes less than 1,000' and the no passing line shall continue until a driver with an eye height of 3.75' can see the entire roadway ahead.

No passing zone lines shall be extended beyond there normal limit in the following cases:

1. When a no passing zone ends 400' or less in advance of the beginning of another no passing zone in the same direction, the no passing zone lines shall be connected.
2. When a no passing zone ends at a point 300' or less from an at grade intersection, the no passing zone line shall be extended to the intersection.
3. When a no passing zone ends at a point 300' or less from the near end of a narrow bridge, the no passing zone line shall be extended to a point 50' beyond the far end of the bridge.
4. When a no passing zone begins at a point 1,000' or less past the end of a median, the no passing zone line shall be extended to the end of the median and the no passing zone pennant eliminated as shown in Figure 4.
5. When a no passing zone begins at a point 1,000' or less from a stop

line at an intersection, the no passing zone line shall be extended to a point adjacent to the stop line and the no passing zone pennant eliminated as shown in Figure 5.

Special no passing zone lines shall be placed as follows, even when a sight restriction does not exist:

1. For traffic approaching a Primary road intersection where a stop is required, a no passing zone line shall be begin 600' in advance of the stop line. For details, see Figure 2.
2. For traffic approaching a partially channelized intersection where a stop is not required, a no passing zone shall be established to prevent traffic from entering a one-way turning roadway. Normally, the channelization consists of an island or barrel which requires left turning approach traffic to pass to the right of the channelization. The no passing zone line shall begin 600' in advance of the intersection and continue to a point adjacent to the channelizing object. For details, see Figure 3.

Edge Lines

Edge lines shall consist of a 4" solid line placed 3" from the edge of the pavement. White lines are used to mark the right edge of the pavement and yellow lines are used to mark the left edge of the pavement on divided roadways, one-way streets, and ramps. For details, see marking Types 5 and 6 in Figure 1.

Continuous edge lines shall be painted on all rural two lane and four lane undivided Primary routes with a traffic volume of 1,500 vehicles per day or more and a pavement width of at least 20', on all rural four lane divided routes and on all Interstate routes. Some exceptions to these requirements are allowed to provide continuity. Routes currently in the continuous edge

line program are shown on Figures 38 through 43. Any additions or deletions to the continuous edge line program should be submitted by the District Maintenance Engineer to the State Traffic Engineer for approval. Changes will be considered on the basis of District recommendations due to traffic volume changes, pavement widening, jurisdictional transfers and other unusual circumstances. It should be noted that edge line markings at certain locations are required on routes not included in the continuous edge line program such as narrow bridges, changes in pavement width, climbing lanes, and transitions from four lane to two lane sections. These requirements are covered later in this section.

Edge lines shall be painted through driveways and entrances, but shall not be painted through intersections with other highways, local roads or city streets. Examples of edge line treatment for various types of intersections are shown in Figures 6 through 15 in Section 3. Edge lines shall not be placed through median crossovers or public roads, but shall be continuous through crossovers constructed for emergency and authorized vehicle use only.

When entering a city on a route which is in the continuous edge line program, the edge line marking shall stop where a curbed section or parking begins and resume when leaving the city where there is no longer a curbed section or parking. In the absence of a curbed section or parking, edge lines shall be continuous through the city. The above applies only when markings are done by the Department of Transportation. When markings are a city's responsibility, edge lines shall end at the corporation line.

Edge lines shall not be painted on continuously curbed roadways. The edge line shall terminate at the beginning of the curbed roadway and resume at the end of the curbed roadway. This instruction is intended only for roadways

which are continuously curbed on both sides. Instructions for painting curbed channelizing islands or medians will follow later in this section.

On routes which are in the continuous edge line program, the following rules shall apply:

1. When approaching a bridge narrower than the pavement, edge lines shall be placed on a diagonal from a point 300' from the bridge to the gutter line of the bridge. When approaching a bridge wider than the pavement, edge lines shall continue through the bridge at the normal pavement width.
2. At locations where there is an abrupt change in the pavement width, a diagonal edge line shall be placed from the point where the width changes to a point on the edge of the wider pavement 300' from the point where the width changes. For details, see Figure 16 in Section 3.
3. At points where there is a change in width because of a climbing lane, the edge line shall follow the pavement edge. For details see Figures 18 and 19 in Section 3.
4. At locations where there is a change in width because of a transition from a four lane to a two lane section, the edge line shall follow the edge of the pavement. For details, see Figure 22 in Section 3.
5. At channelized intersections, edge lines shall be placed in accordance with Figures 9 and 10 in Section 3.

On routes that are not in the continuous edge line program, the following rules shall apply:

1. Edge lines shall be painted on the approaches to all bridges and underpass which have abutments or pile bents within 3' of the pavement. The edge lines shall extend 300' from the ends of these

- bridges and underpasses. Where the bridge is narrower than the approach pavement, edge lines shall be placed on a diagonal from the 300' point to the gutter line of the bridge and continue across the bridge. Where the bridge is wider than the approach pavement, edge lines shall continue through the bridge at normal pavement width.
2. At locations where there is a change in the width of the pavement of 2' or more, a diagonal edge line shall be placed from the point where the width changes to a point on the edge of the wider pavement 300' from where the width changes. For details, see Figure 17 in Section 3.
 3. At locations where there is a change in the width because of a climbing lane, an edge line shall be placed where the climbing lane terminates. The edge line shall start at a point opposite the symbol transition sign and shall end at a point 100' beyond the end of the transition. For details, see Figures 20 and 21 in Section 3.
 4. At locations where there is a change in width because of a transition from a four lane to a two lane pavement, an edge line shall be placed where the section narrows. The edge line leaving the four lane section shall start at a point opposite the symbol transition sign and shall end 100' beyond the transition. For details, see Figure 23 in Section 3.
 5. At channelized intersections, edge lines shall be placed in accordance with Figures 14 and 15 in Section 3.

On interstate routes, the following rules shall apply:

1. At interchanges, the continuous outside edge line shall be terminated at the beginning of the taper for the deceleration lane. It shall resume on the off-ramp 50' from the beginning of the taper. On the

on-ramp, the edge line shall continue along the ramp and connect with the mainline edge line at the end of the taper. On the mainline, the edge line shall continue at the end of the 8" exit gore line and extend along the mainline from the off-ramp to a point where the 8" gore line for the on-ramp begins. For details, see Figures 24, 25 and 26 in Section 3.

2. Edge lines shall be placed on both sides of all ramps, the right edge line shall be white and the left edge line shall be yellow. For off-ramps, the edge line on the right side shall begin at a point 50 feet from the beginning of the taper and end at the end of the return for the intersected road or connect with the edge line of the intersected road if it is included in the continuous edge line program. The edge line on the left side shall begin at the end of the curb or channelizing line and end at the end of the return for the intersected road or connect with the edge line of the intersected road if it is included in the continuous edge line program. For on-ramps, the edge line on the right side shall begin at the beginning of the return on the intersected road or connect with the edge line of the intersected road if it is included in the continuous edge line program and continue along the ramp to join with the edge line on the mainline at the end of the on-ramp taper. The edge line on the left side shall begin at the beginning of the return for the intersected road or connect with the edge line of the intersected road if it is included in the continuous edge line program and continue along the ramp to the curb or channelizing line.

A dotted line is used as an extension of an edge line at exit ramps on Interstate and Freeway interchanges and at wye type intersections where a

Primary route with edge lines follows a curved section at the intersection. A dotted line shall be a 4" line composed of 2' segments separated by 4' gaps and it shall be the same color as the edge line it extends, which is normally white. See marking Type 7 in Figure 1. For details of dotted line application, see Figures 8, 13, and 24 in Section 3.

Channelizing Line

Where two or more traffic lanes in the same direction are provided, but conditions make lane changing undesirable, a 4 1/2" solid white lane line is used. See marking Type 8 in Figure 1 for details. Common uses of a solid lane line are to separate left and right turning lanes from through lanes at intersections (see Figure 31) and in advance of lane drops on multi-lane roads.

A barrier line is used as a channelizing line in advance of the gore area on exit ramps and to separate ramp traffic from mainline traffic on entrance ramps at interchanges. A barrier line shall be an 8" wide solid white line. For details, see marking Type 9 in Figure 1. At exit ramps, a barrier line shall be placed along both sides of the gore area and at entrance ramps, a barrier line shall be placed along the ramp side of the gore area only. Typical applications of barrier lines at interchanges are shown in Figures 24, 25 and 26 in Section 3.

Stop Lines

A stop line is a 24" solid white line which shall extend across all approach lanes. See marking Type 10 in Figure 1 for details. Stop lines should be used at all stop signs and traffic signals on Primary roads to indicate the point behind which vehicles are required to stop. At a stop sign, the stop line should be placed in line with the stop sign. If the sign cannot be located exactly where vehicles are expected to stop, the stop line

should be placed at the stopping point. The stop line should ordinarily be placed not less than 10' from the edge of the intersected road. Where a special type of stop line is required, such as a stepped line or a skewed line, it will be shown on a signing and pavement marking layout provided to the District. Stop lines shall be placed by the Department of Transportation in rural areas and are a City responsibility within the corporate limits.

Crosswalk Lines

Crosswalk lines are 6" solid white lines marking both edges of the crosswalk. See marking Type 11 in Figure 1 for details. Normally, they are placed a minimum of 6' apart. Crosswalk lines should extend across the full width of the pavement. Most crosswalk lines are located within the corporate limits of a city and are the responsibility of the city to place and maintain.

Interchange Ramps

Typical markings to be placed on entrance and exit ramps at interchanges on Interstate and other multi-lane divided access controlled routes are shown in Figures 24, 25 and 26. Descriptions on the application of edge lines, lane lines and barrier lines for these locations are covered in previous parts of this section. Due to variations in the physical design of entrance and exit ramps and tapers, field conditions may differ from the illustrations. For assistance in determining how a special location shall be marked, contact the State Traffic Engineer.

Two-Way Left Turn Lanes

A two-way left turn lane is a lane reserved in the center of the highway or street for the exclusive use of left turning vehicles. It shall not be used for passing. The lane may be used for making left turns in either direction. A two-way left turn lane shall be marked by a single direction no passing zone line on each edge of the lane. For details, see marking Type 4

in Figure 1. The broken line is to be placed on the inside of the lane and the solid line is to be placed on the outside of the lane adjacent to through traffic. Both markings are to be yellow. For details, See Figure 27.

Approach to Obstructions

Pavement markings shall be used to guide traffic on the approach to obstructions within the roadway. An obstruction may be so located that all traffic must keep to the right of it or it may be between two lanes of traffic moving in the same direction. In either case, markings must be designed to guide traffic away from the obstruction. The use of channelizing lines or no passing markings is generally appropriate. Obstruction approach markings shall consist of a diagonal line or lines extending from the center line or the lane line to a point 1-2' to the right side, or to both sides, of the approach end of the obstruction. For illustrations of markings to be used for the approach to obstructions, see Figure 28.

If traffic is required to pass only to the right of the obstruction, the marking shall consist of a no passing line at least twice the length of the taper shown in Figure 29. Yellow markings may be placed in the triangular area so formed.

If traffic may pass either to the right or left of the obstruction, the markings shall consist of two channelizing lines diverging from the lane line, one to either side of the obstruction for a length equal to the taper shown in Figure 29. In advance of the point of divergence, a wide solid white line or double white line shall be extended in place of the broken lane line for a distance equal to the length of the diverging lines. Additional white markings may be placed in the triangular area between the channelizing lines.

Island and Median Curb Markings

The curbs of islands in the line of traffic flow where the curb serves to

channel traffic to the right of the island shall be painted yellow. When approaching traffic may pass on either side of an island, the island curbs shall be painted white. Standard 6" integral curbs shall be painted from the back of the curb to just above the gutter line. Painting of 9" barrier curbs shall be from the back of the curb to a point approximately three inches above the gutter line using the same width of band as for a 6" curb.

The entire length of long sections of continuous curb parallel to normal traffic flow should not be painted. The nose and all of the taper plus 50' of the parallel portion of the curb shall be painted yellow. If the painted ends as described above are 600' or more apart, do not paint the entire length. A 4" yellow edge line shall be painted along the face of the unpainted curb section.

The Department of Transportation will not paint street curbs in urban areas where such markings define a zone in which parking has been restricted by local ordinance.

Parking Space Markings

Parking space markings shall be white. For details on the type of marking to be used, refer to special pavement marking layouts furnished by the Office of Maintenance, construction plans when a street has been rebuilt, or the Manual on Uniform Traffic Control Devices. Marking of parking spaces shall be in conformance with an agreement between the City and the Department of Transportation, or a City Ordinance. On new projects, the Department of Transportation will mark parking spaces the first time. Normally, further maintenance of parking space markings is a City responsibility.

Word and Symbol Markings

Word and symbol markings shall be white. For details on the shape and dimensions of these markings, see Figures 32, 33 and 34. Word and symbol

markings should be placed only as shown on special pavement marking layouts or as illustrated by the figures in this manual. No others shall be used. These markings are elongated and shall be placed by using a template on the pavement. Word messages should normally be no more than one lane in width.

Railroad Grade Crossing Markings

Pavement markings in advance of a railroad grade crossing shall consist of an X, the letters RR, a no passing line, and certain transverse lines. All markings shall be white except for the no passing line which shall be yellow. They shall be placed in each lane on all paved approaches to crossings where railroad highway grade crossing signals or automatic gates are located and at all other crossings where the prevailing speed of highway traffic is 40 mph or greater. At minor crossings or in urban areas, these markings may be omitted if an engineering study indicates that other devices installed provide suitable protection. Design of railroad crossing pavement markings shall be as illustrated in Figures 36 and 37.

Markings at Abandon Railroad Grade Crossings

A policy on markings at abandon railroad grade crossings has been established and is as follows. Markings, as outlined in the above paragraph, should be placed if continuous rails are in place, regardless of whether the railroad is operating or not. If any portion of the rails at the crossing or on the approaches have been removed or the crossing covered with asphalt, markings need not be placed.

SECTION 3 TYPICAL PAVEMENT MARKING LAYOUTS

This section of the Manual is to provide typical pavement marking layouts to illustrate how various types of markings are to be placed. Included are no passing lines at intersections, edge lines for all classes of highways, markings for climbing lanes and transitions, exit and entrance ramp markings, two way left turn lanes, obstruction markings, legends, railroad crossing markings and edge line maps for each District.

All possible marking details could not be illustrated because of limited space in this Manual. Special marking details are frequently shown on Junction Signing and Marking Layouts. For special circumstances where none of the illustrations or special drawings cover the situation, consult the State Traffic Engineer for instructions.

Figure 2
 TYPICAL PLACEMENT OF NO PASSING LINE
 APPROACHING
 A STOP CONDITION

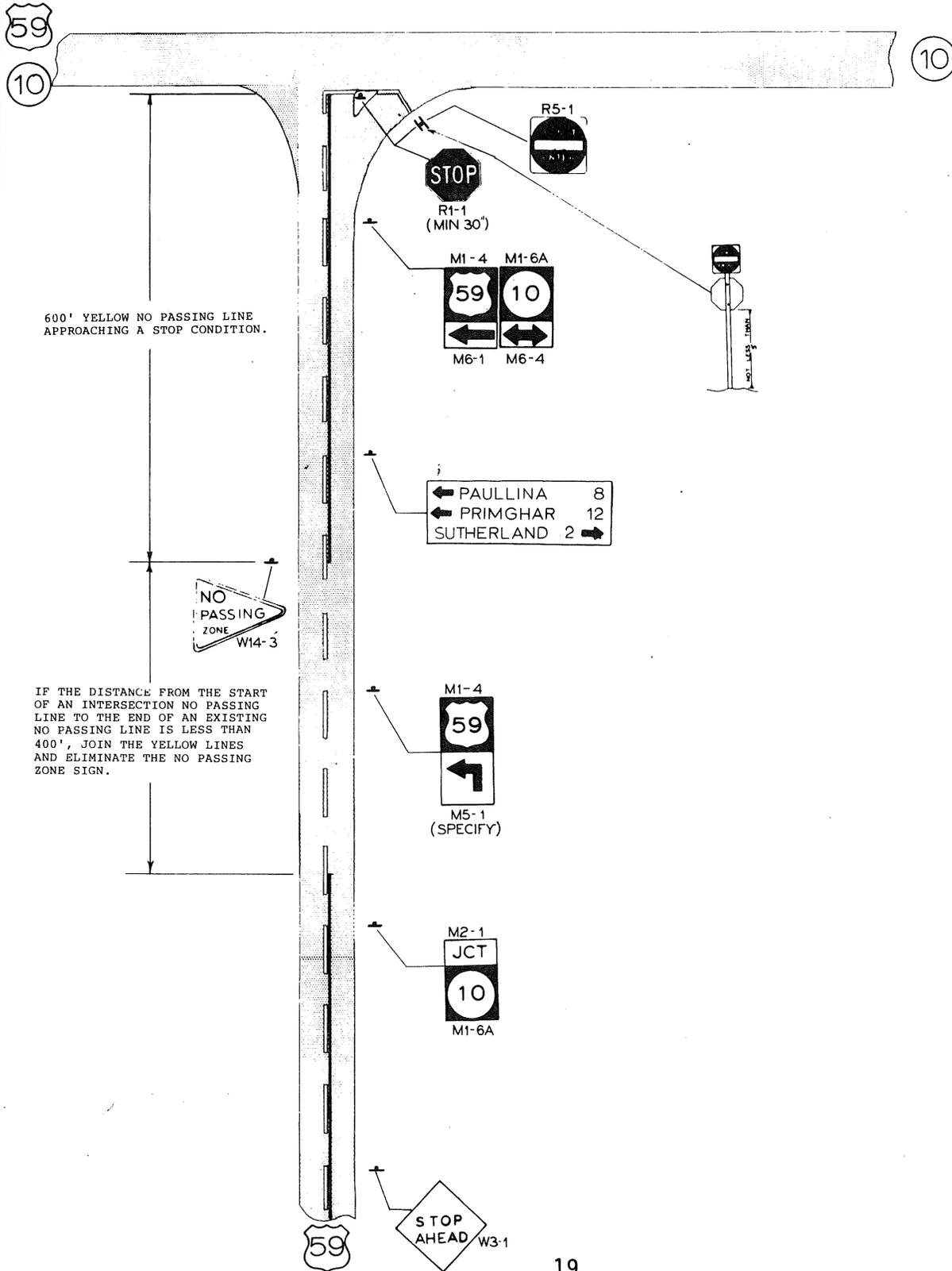


Figure 3
 TYPICAL PLACEMENT OF NO PASSING LINE
 APPROACHING A
 STOP SIGN ISLAND OR BARREL INTERSECTION

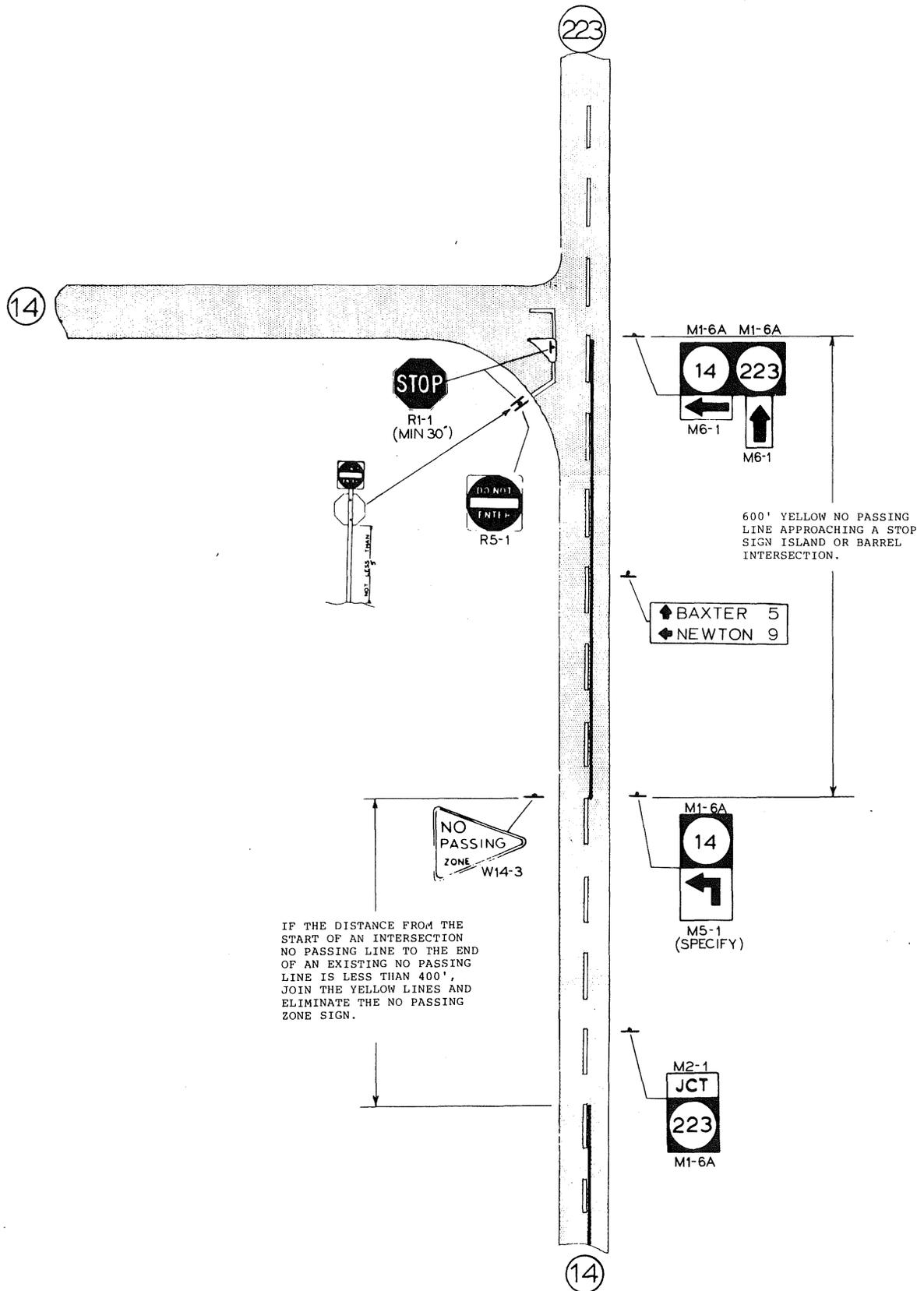


Figure 4

TYPICAL APPLICATION OF A NO PASSING LINE
APPROACHING A CHANNELIZED INTERSECTION

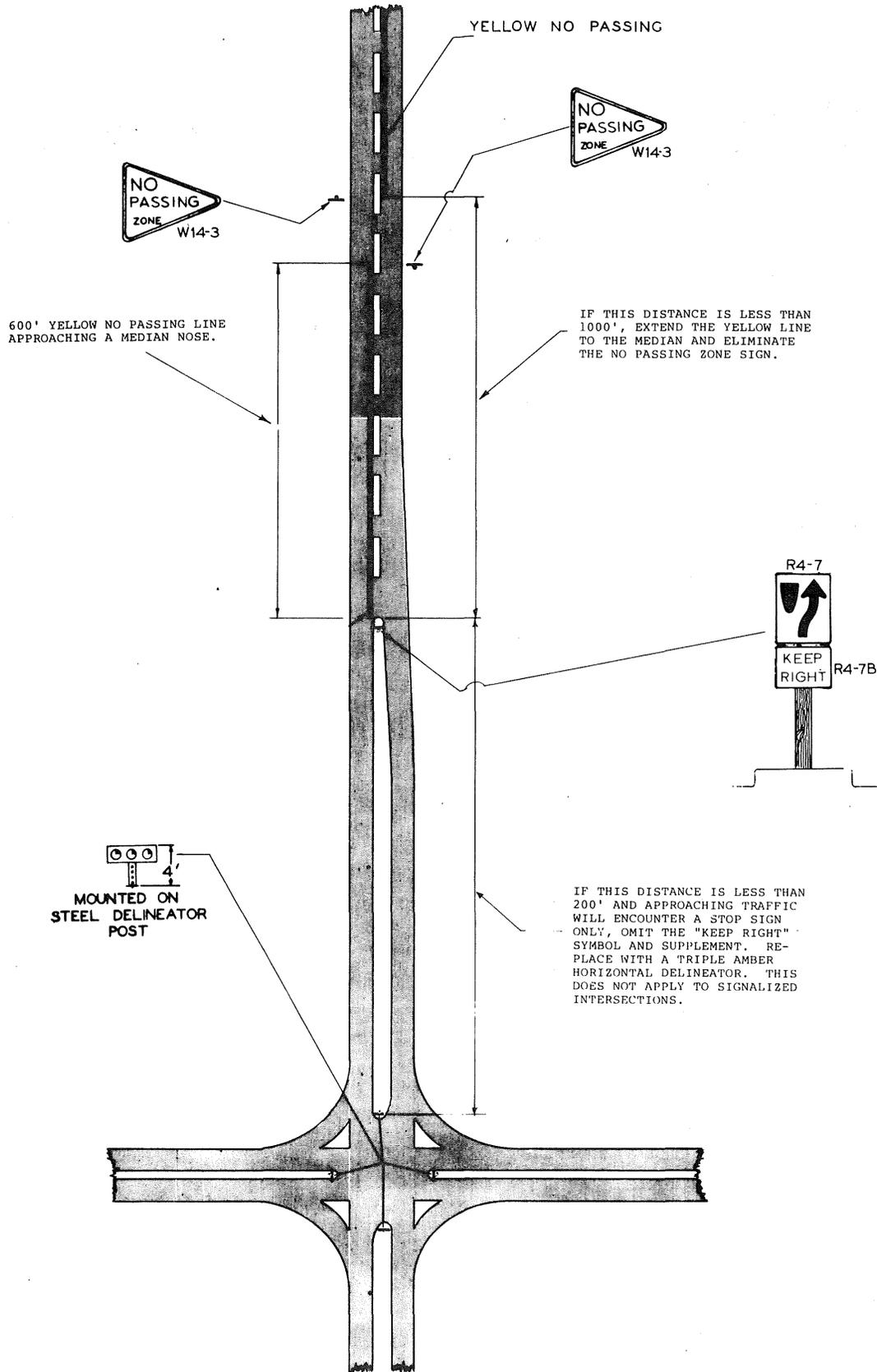


Figure 5
 TYPICAL EXTENSION OF A NO PASSING LINE
 AT
 A STOP CONDITION

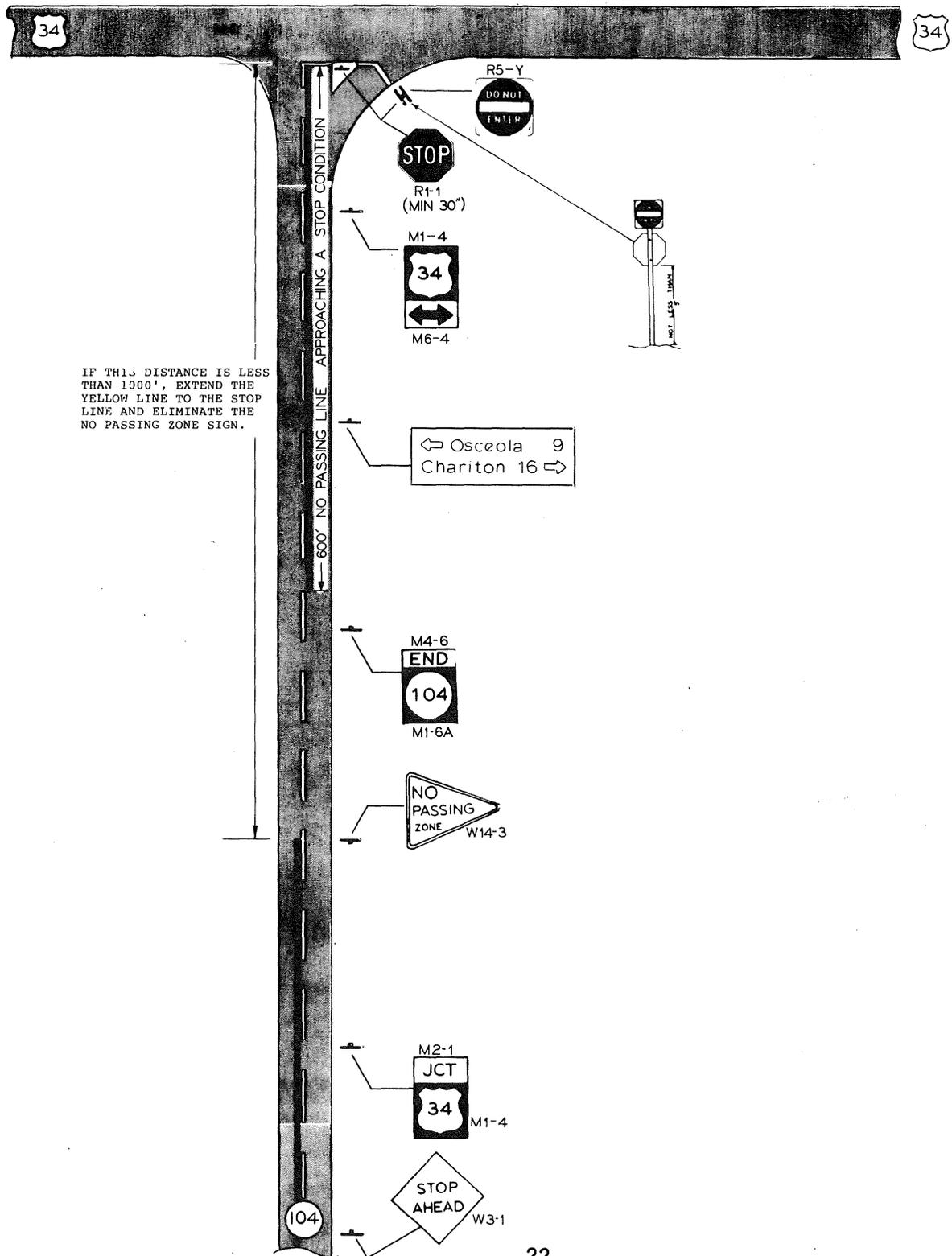


Figure 6
Standard Edge Line Markings
at Intersection With Gravel Road

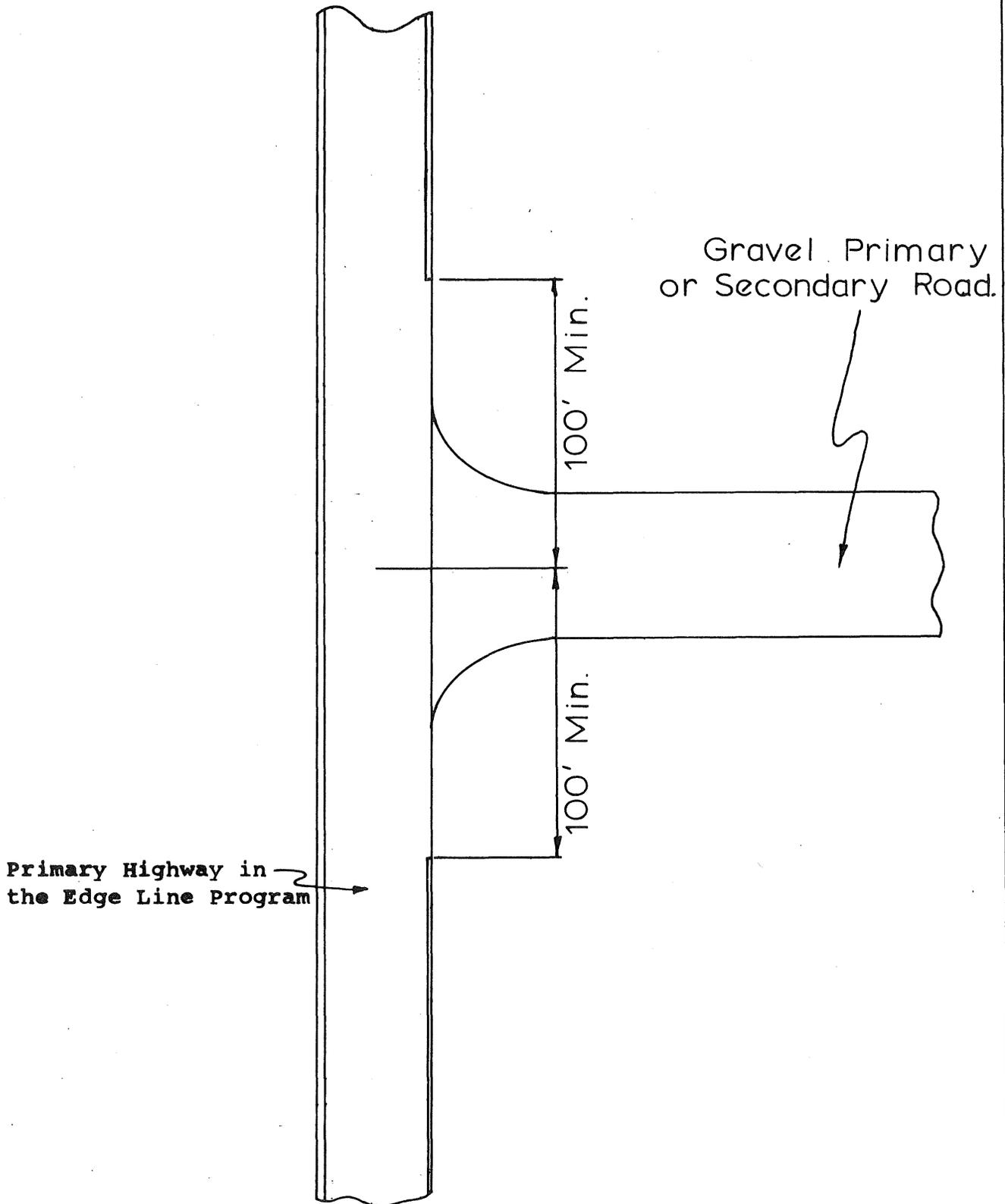


Figure 7
Standard Edge Line Markings
at Intersection of Paved Primary Highways
In the Edge Line Program

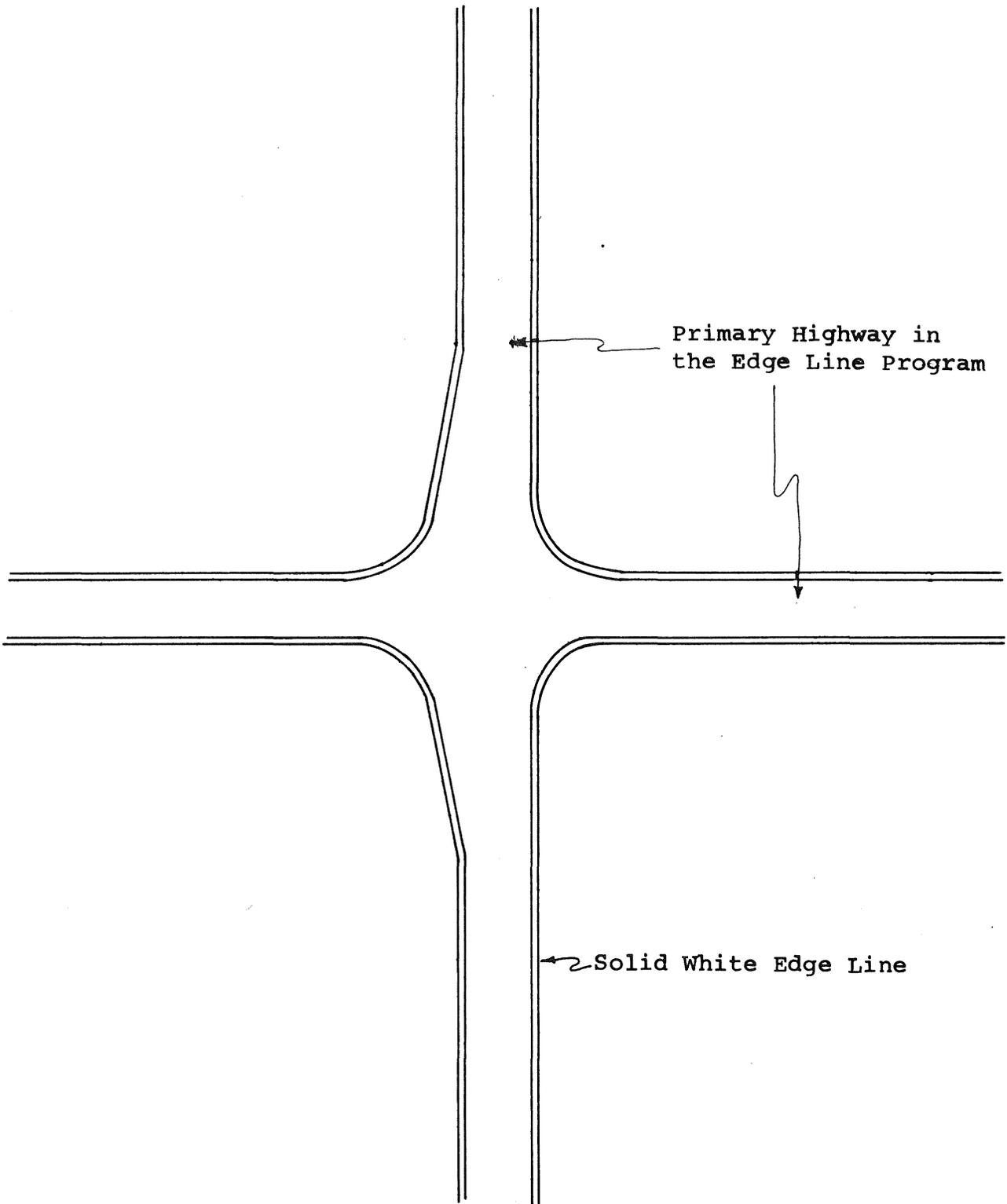


Figure 8
Standard Edge Line Markings
at Intersection With Local Road
With Solid Edge Lines

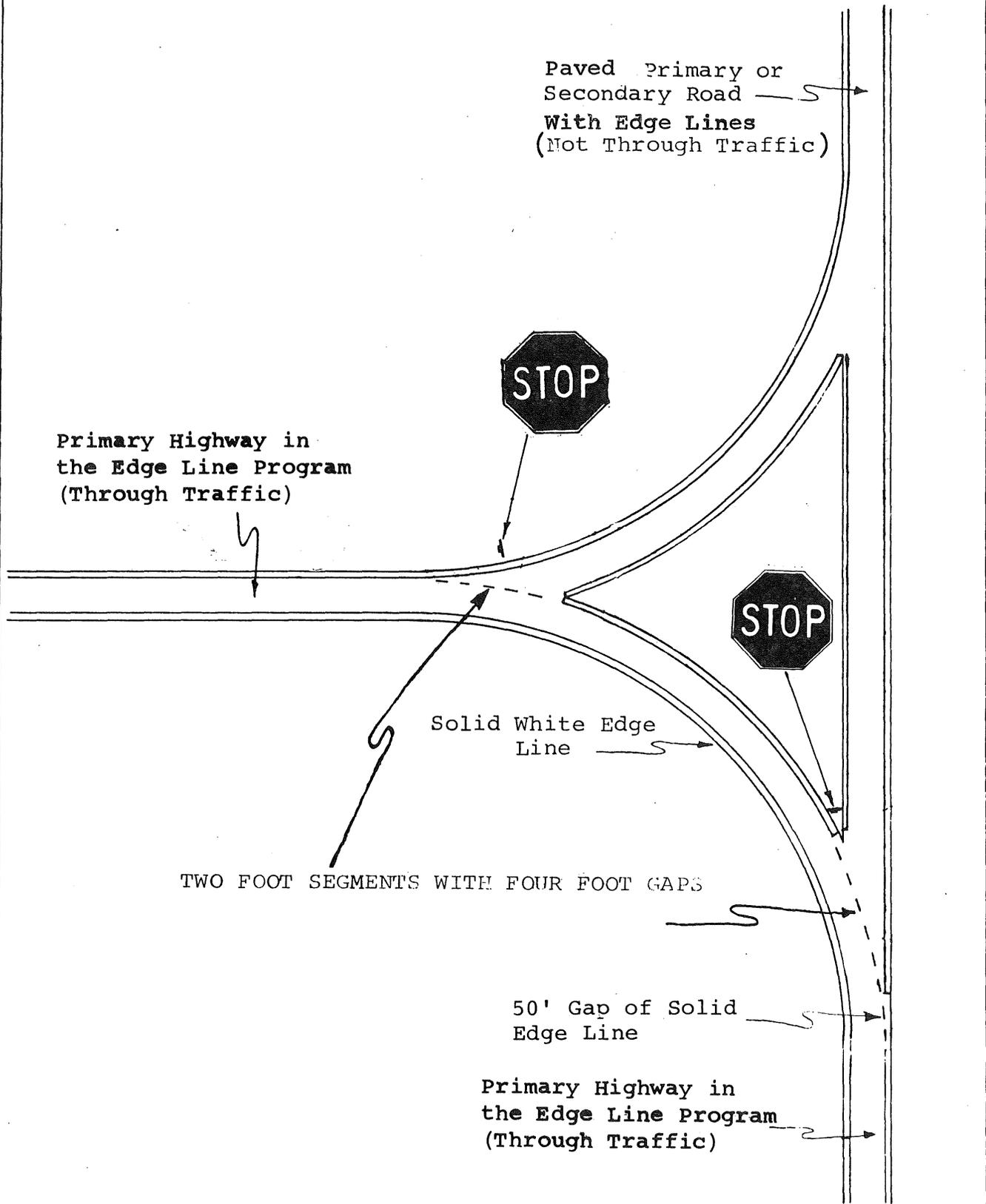


Figure 9
Standard Edge Line Markings
at Channelized Intersection of Paved Primary
Highways In the Edge Line Program

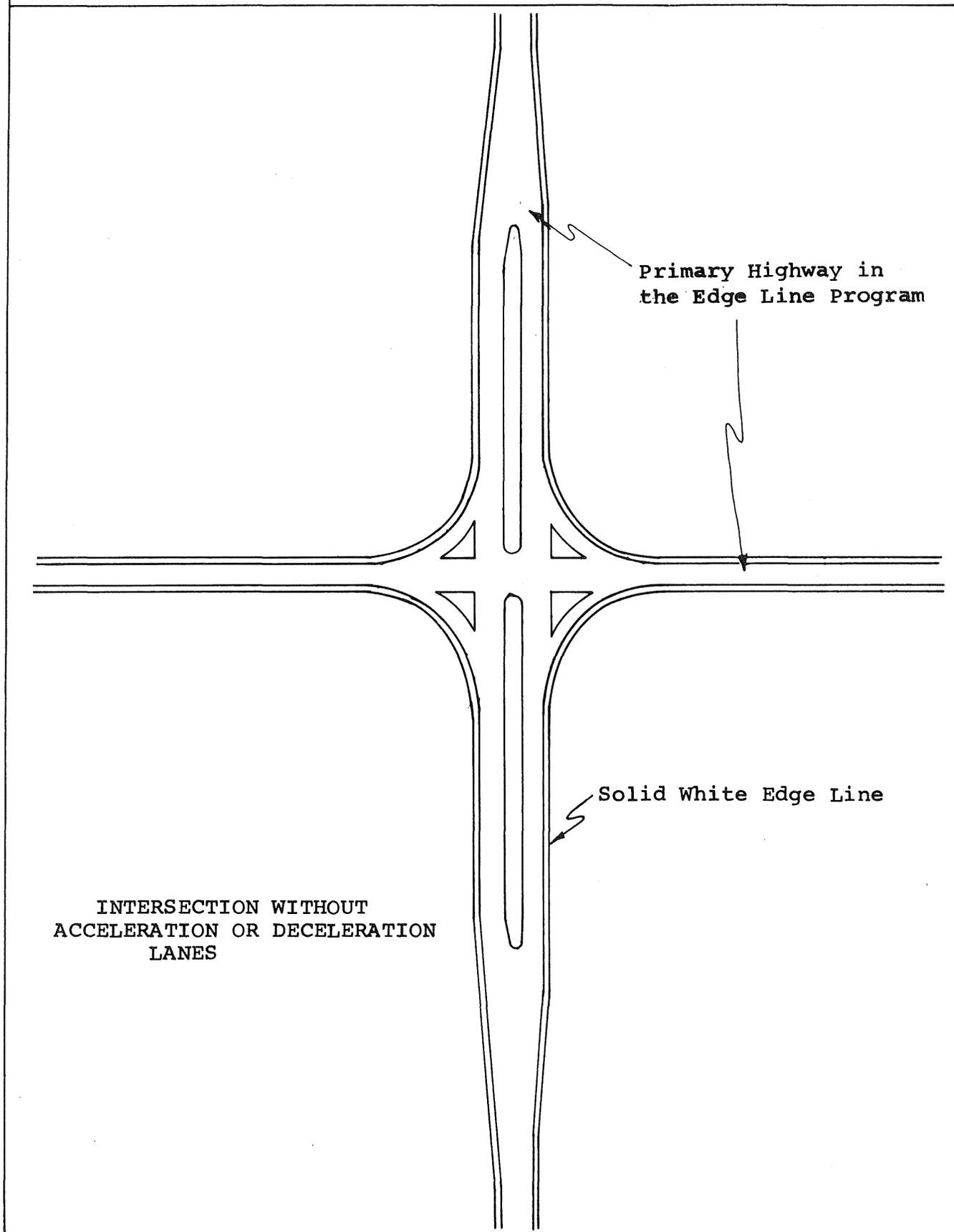


Figure 10
Standard Edge Line Markings
at Flared Channelized Intersection of Paved
Primary Highways In the Edge Line Program

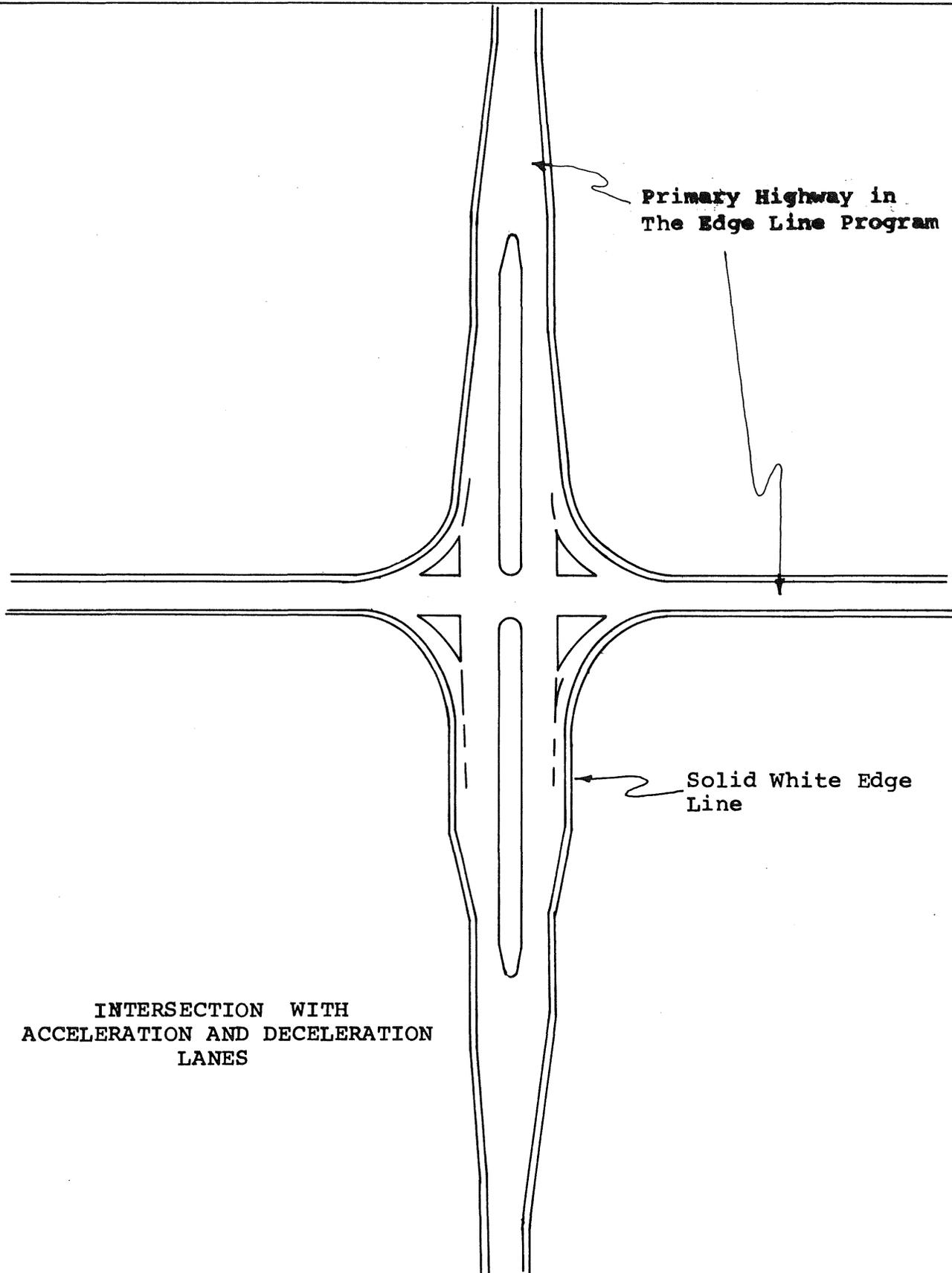


Figure 11
Standard Edge Line Markings
at Intersection of Primary Highway in Edge Line
Program and Highway Not in Edge Line Program

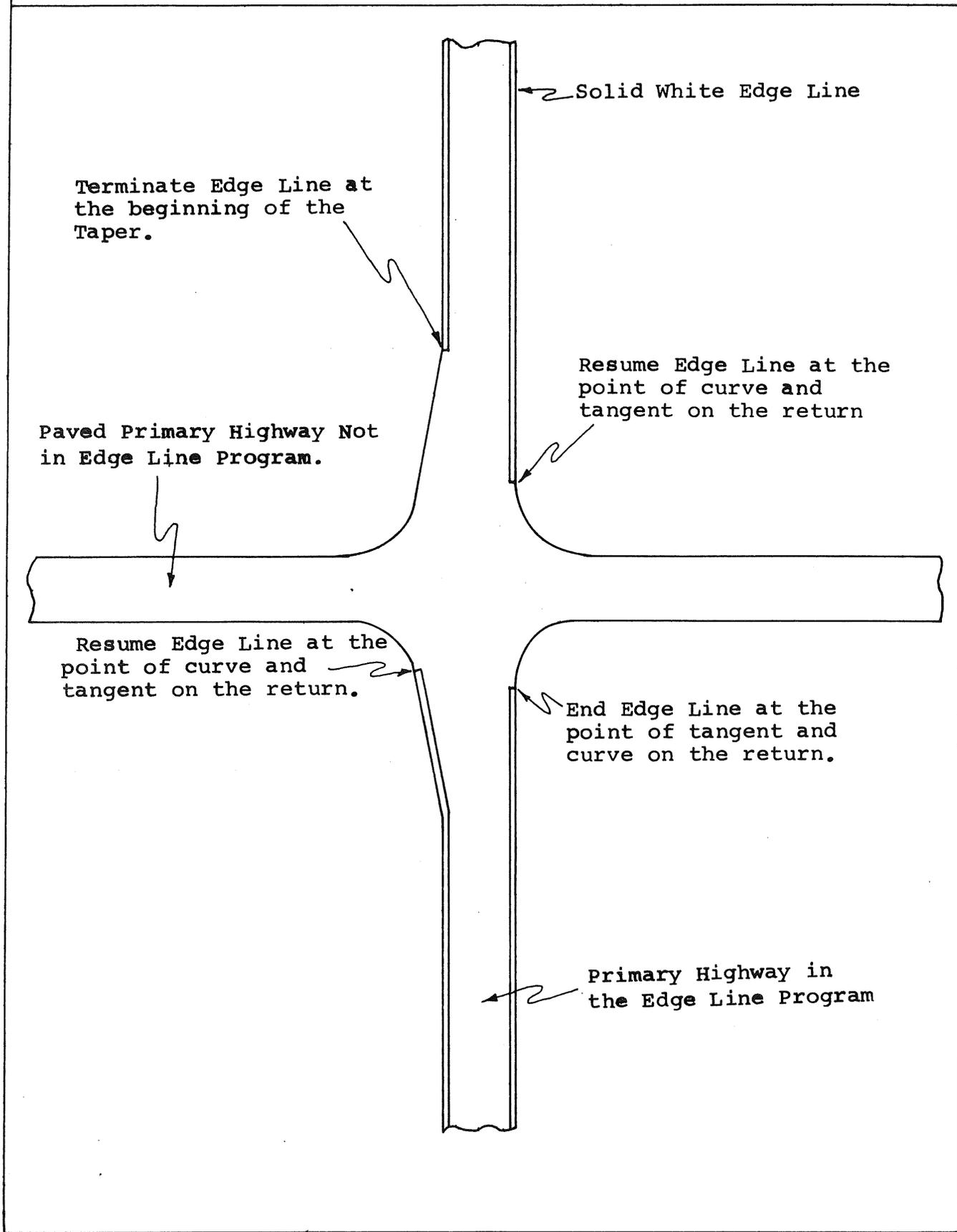


Figure 12
Standard Edge Line Markings
at a "Y" Intersection with a Paved Highway
Not in the Edge Line Program

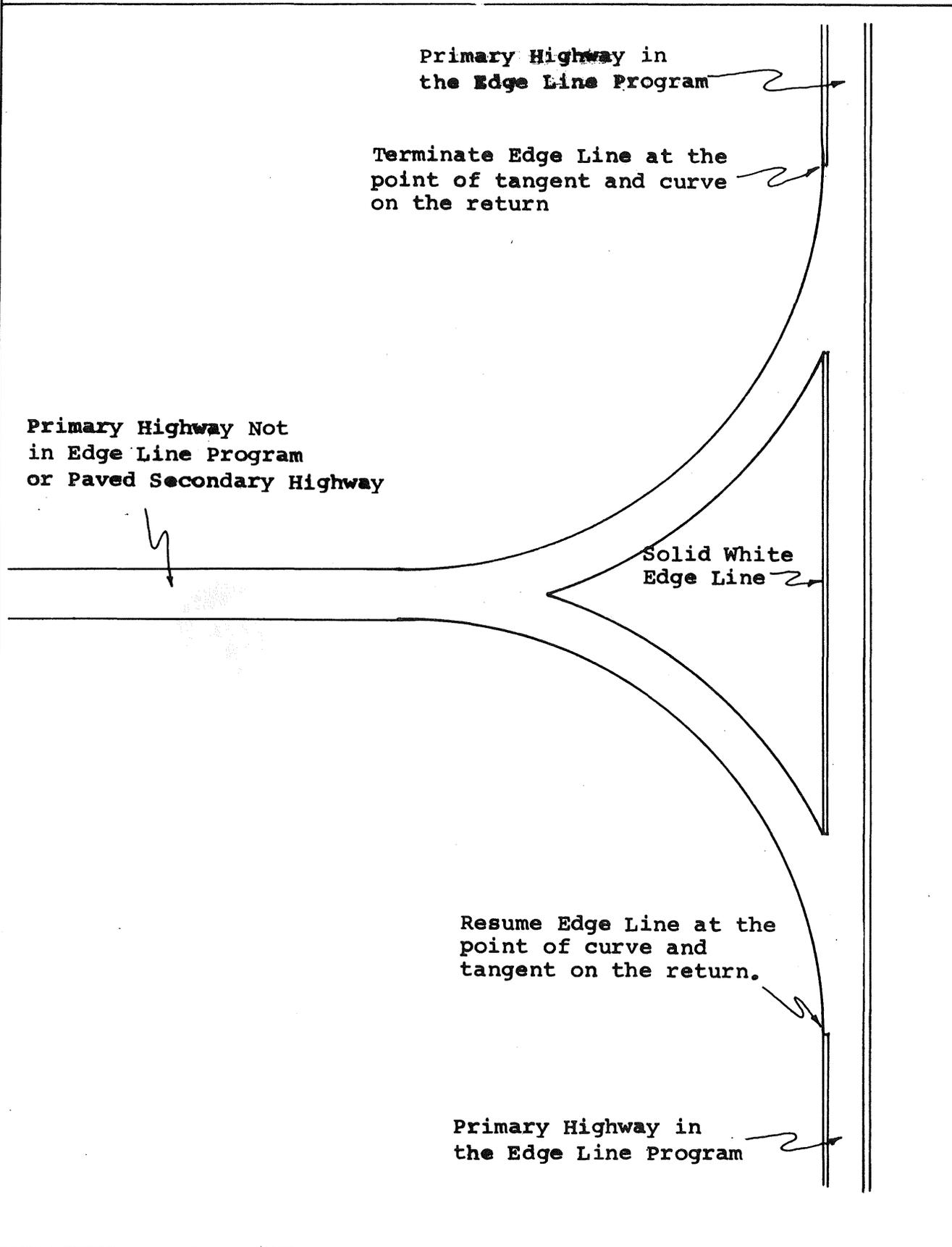


Figure 13
 Standard Edge Line Markings
 at a "Y" Intersection With a Local Road
 Without Edge Lines

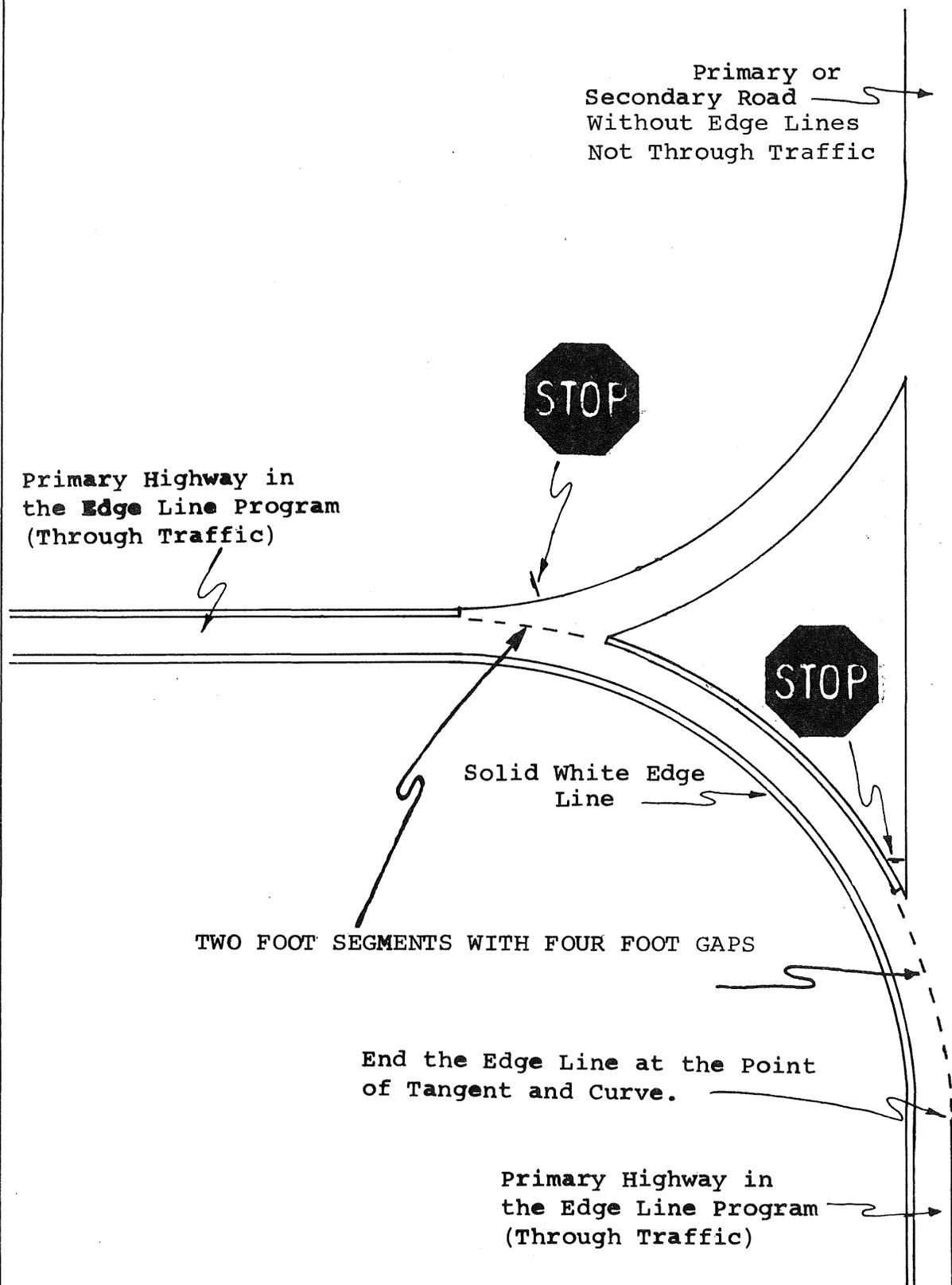


Figure 14
Standard Edge Line Markings
at Channelized Intersection With a Paved Highway
Not in the Edge Line Program

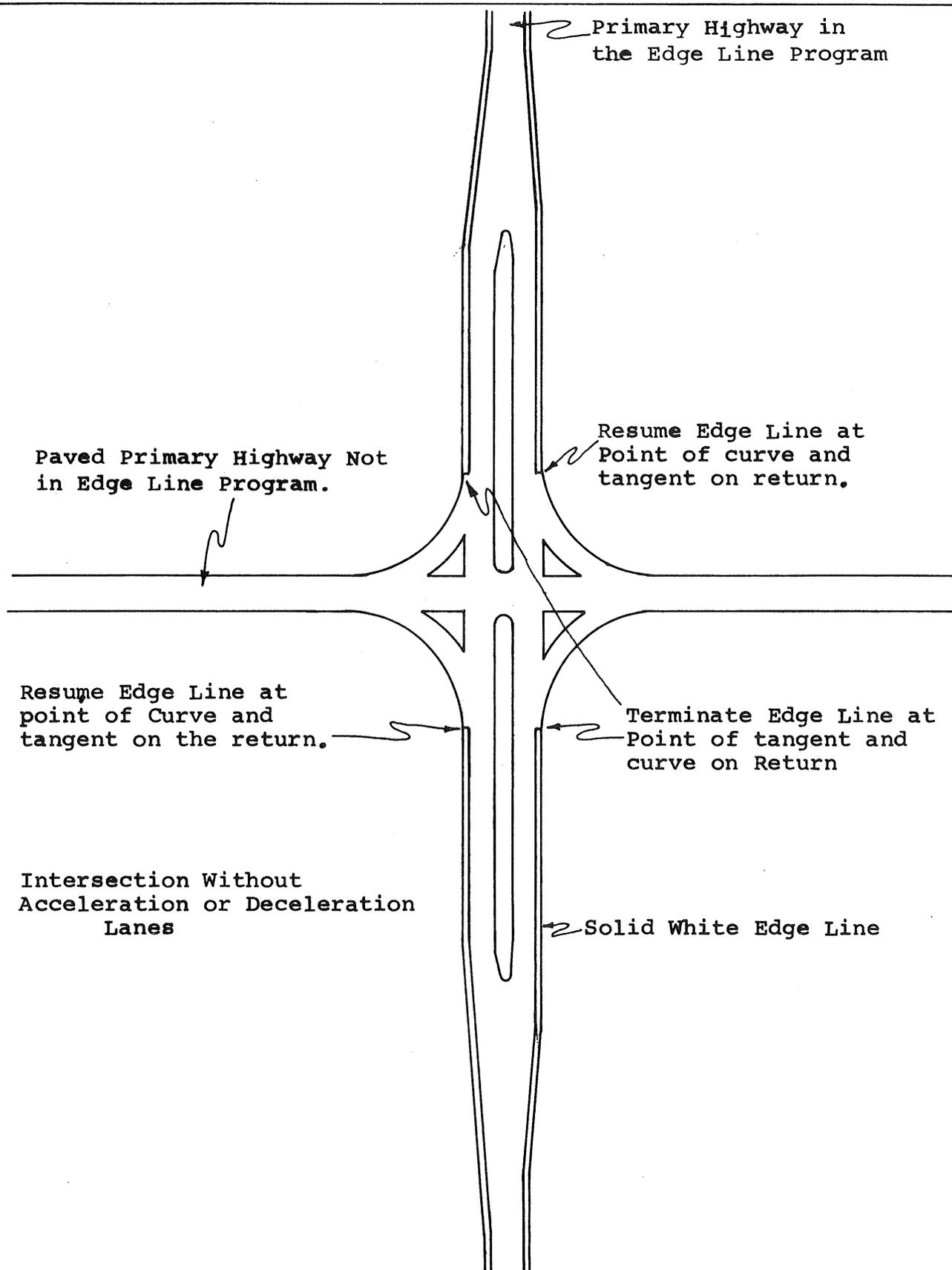


Figure 15
Standard Edge Line Markings
at Flared Channelized Intersection With a
Paved Highway Not in the Edge Line Program

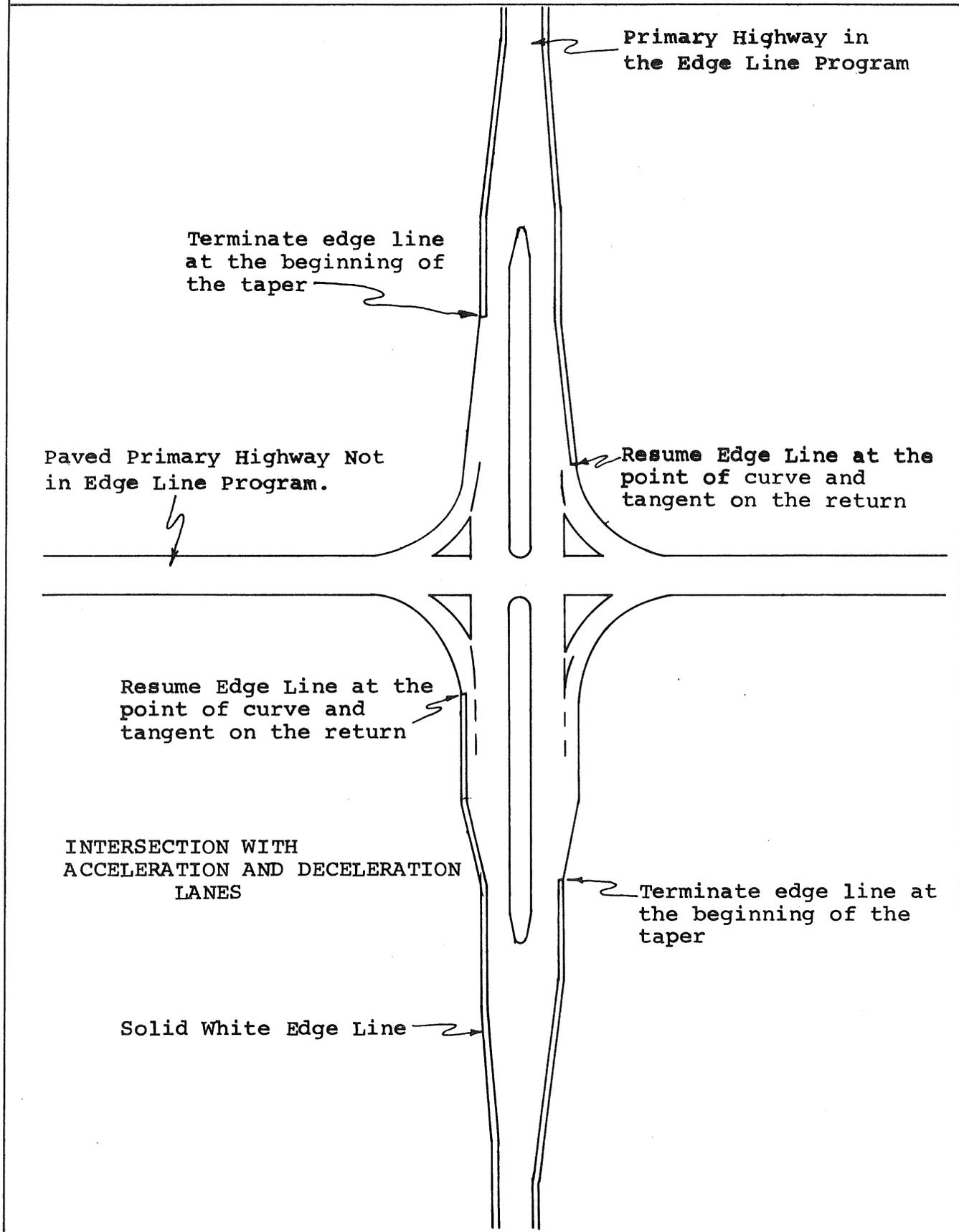


Figure 16

Edge Line

Transitions at Abrupt Changes in Pavement Width
For Highways In the Edge Line Program

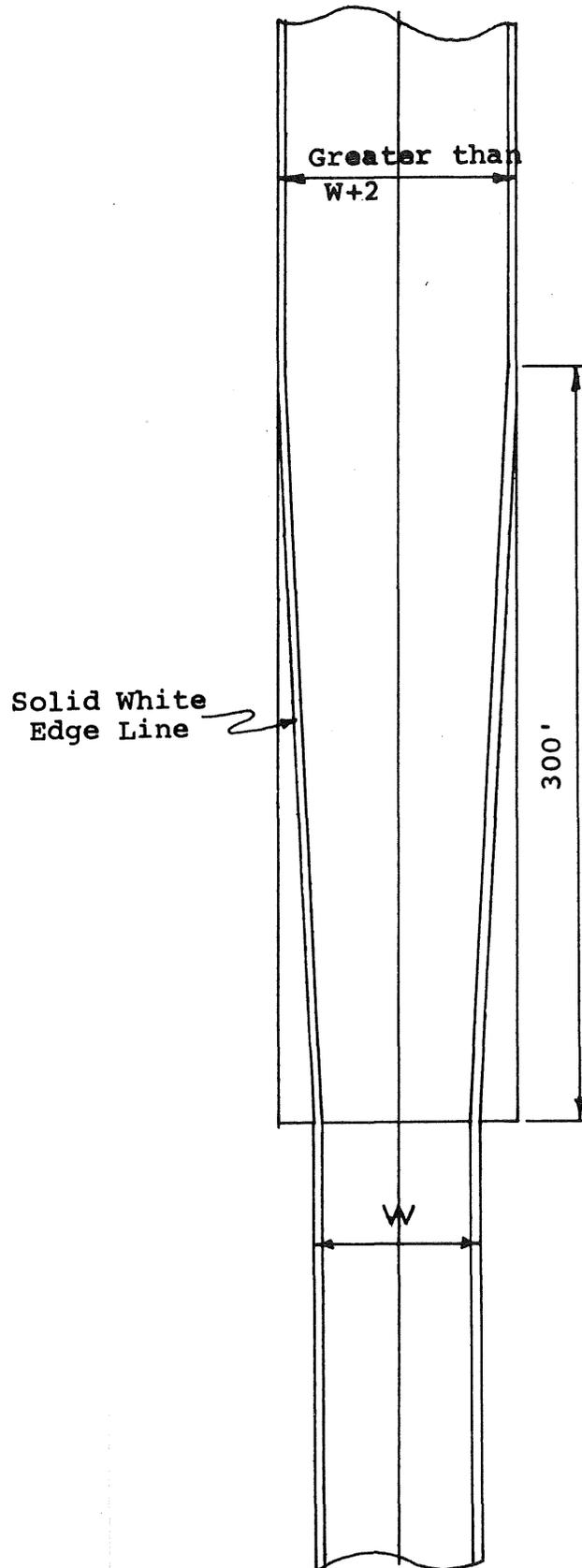


Figure 17

Edge Line

Transitions at Abrupt Changes in Pavement Width
For Highways Not In the Edge Line Program

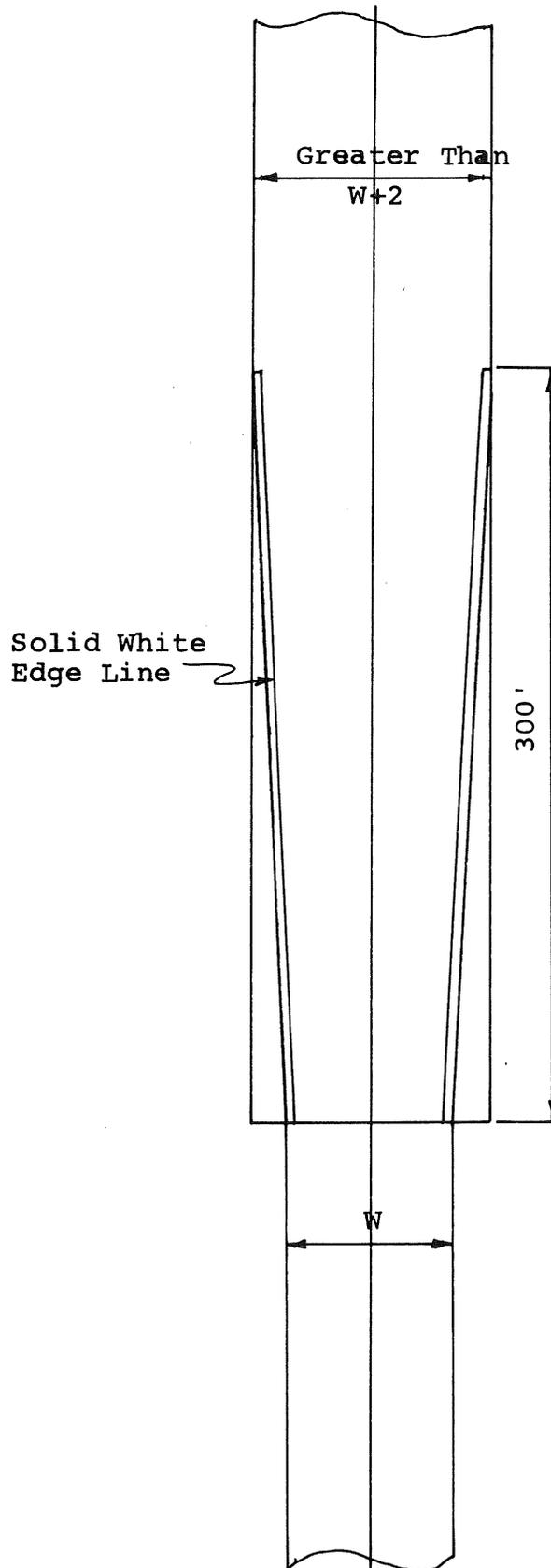
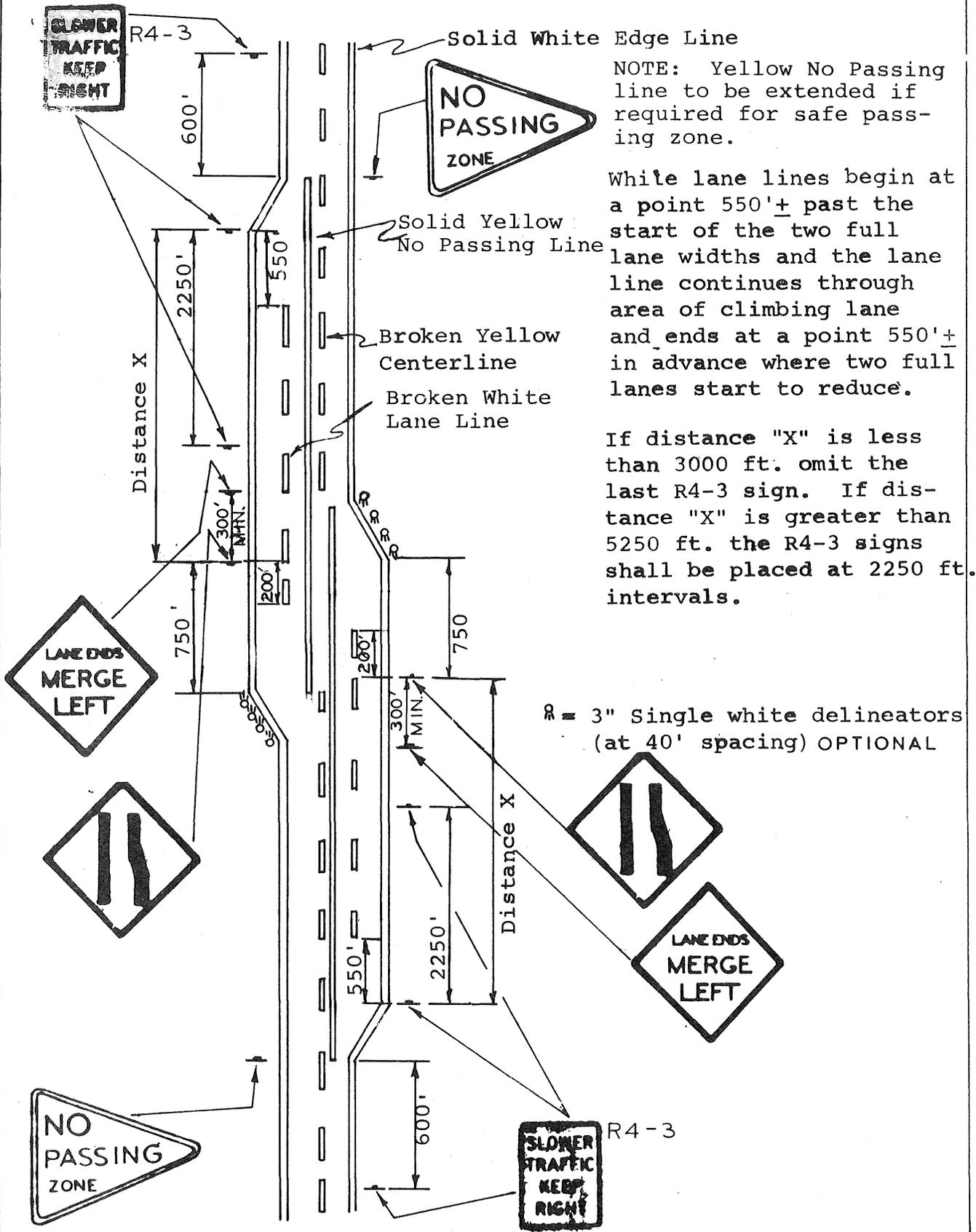


Figure 18
 Signs and Pavement Markings
 For Two Way Climbing Lanes
 Pavements in Edge Line Program



NOTE: Yellow No Passing line to be extended if required for safe passing zone.

White lane lines begin at a point 550'± past the start of the two full lane widths and the lane line continues through area of climbing lane and ends at a point 550'± in advance where two full lanes start to reduce.

If distance "X" is less than 3000 ft. omit the last R4-3 sign. If distance "X" is greater than 5250 ft. the R4-3 signs shall be placed at 2250 ft. intervals.

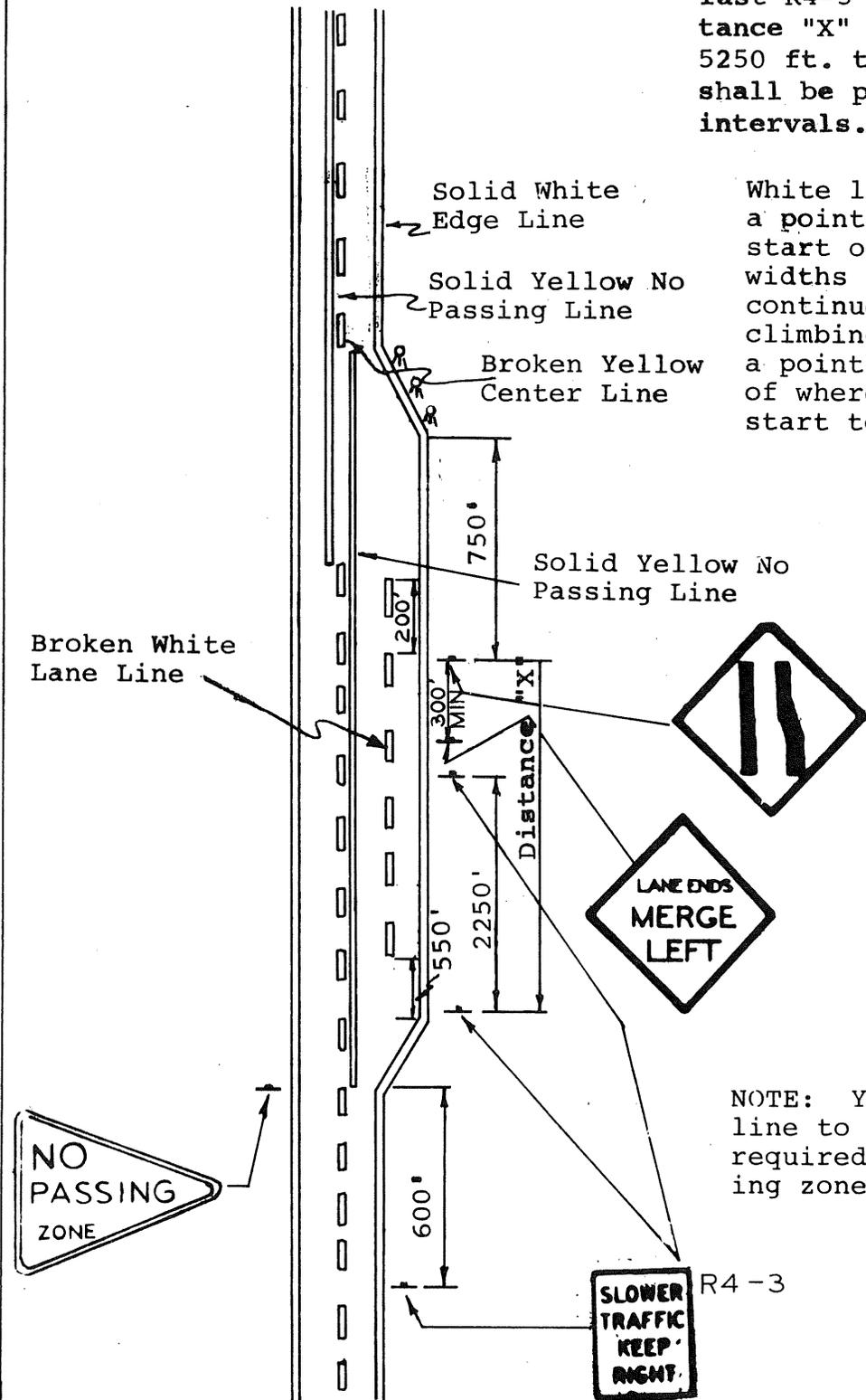
R = 3" Single white delineators (at 40' spacing) OPTIONAL

Figure 19

Signs and Pavement Markings For One Way Climbing Lane Pavements in Edge Line Program

If distance "X" is less than 3000 ft. omit the last R4-3 sign. If distance "X" is greater than 5250 ft. the R4-3 signs shall be placed at 2250 ft. intervals.

White lane lines begin at a point 550'+ past the start of the two full lane widths and the lane line continues through area of climbing lane and ends at a point 550'+ in advance of where two full lanes start to reduce.



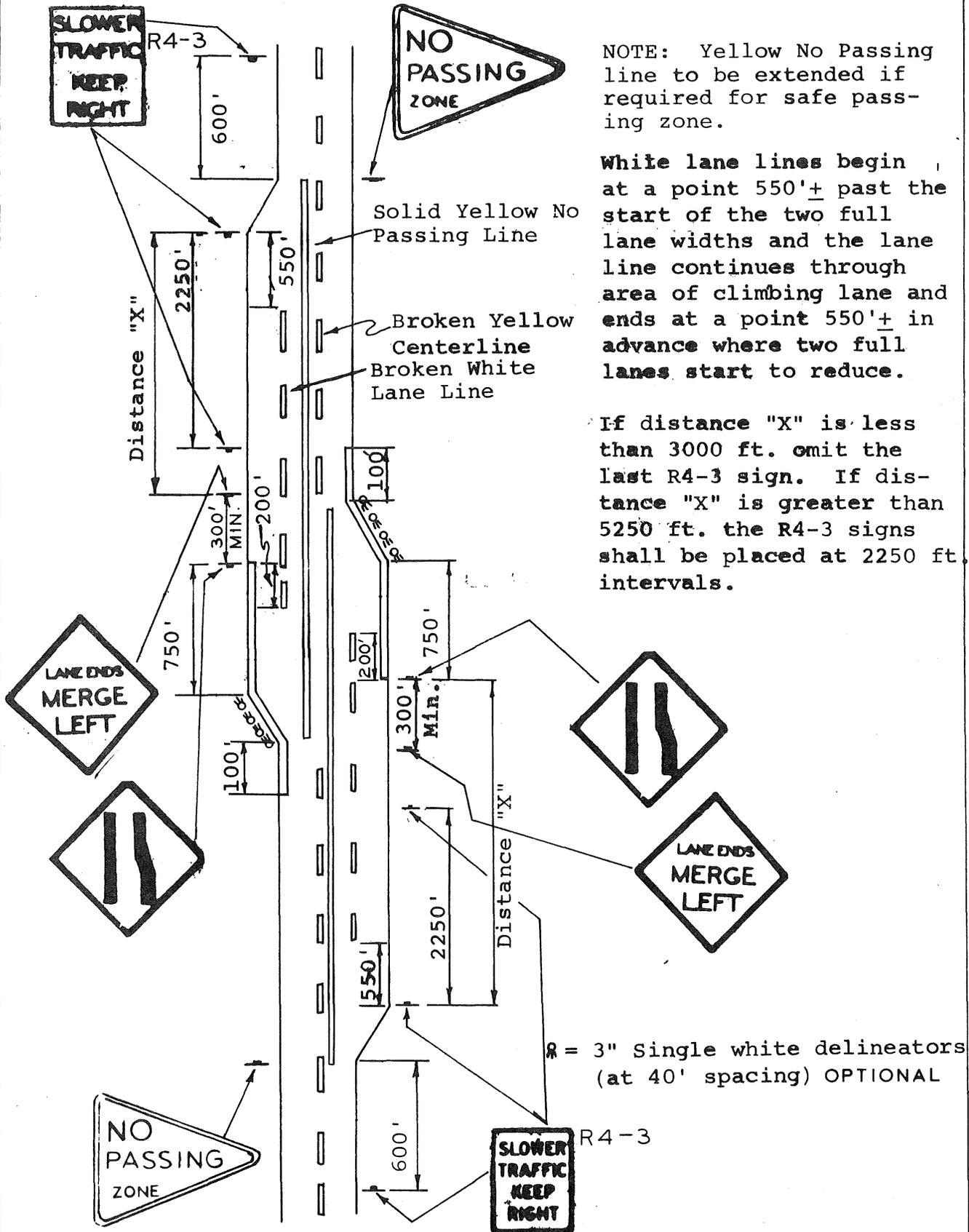
NOTE: Yellow No Passing line to be extended if required for safe passing zone.

⊙ = 3" Single white delineators (at 40' spacing) OPTIONAL

Figure 20

Signs and Pavement Markings
For Two Way Climbing Lanes

Pavements Not in Edge Line Program



NOTE: Yellow No Passing line to be extended if required for safe passing zone.

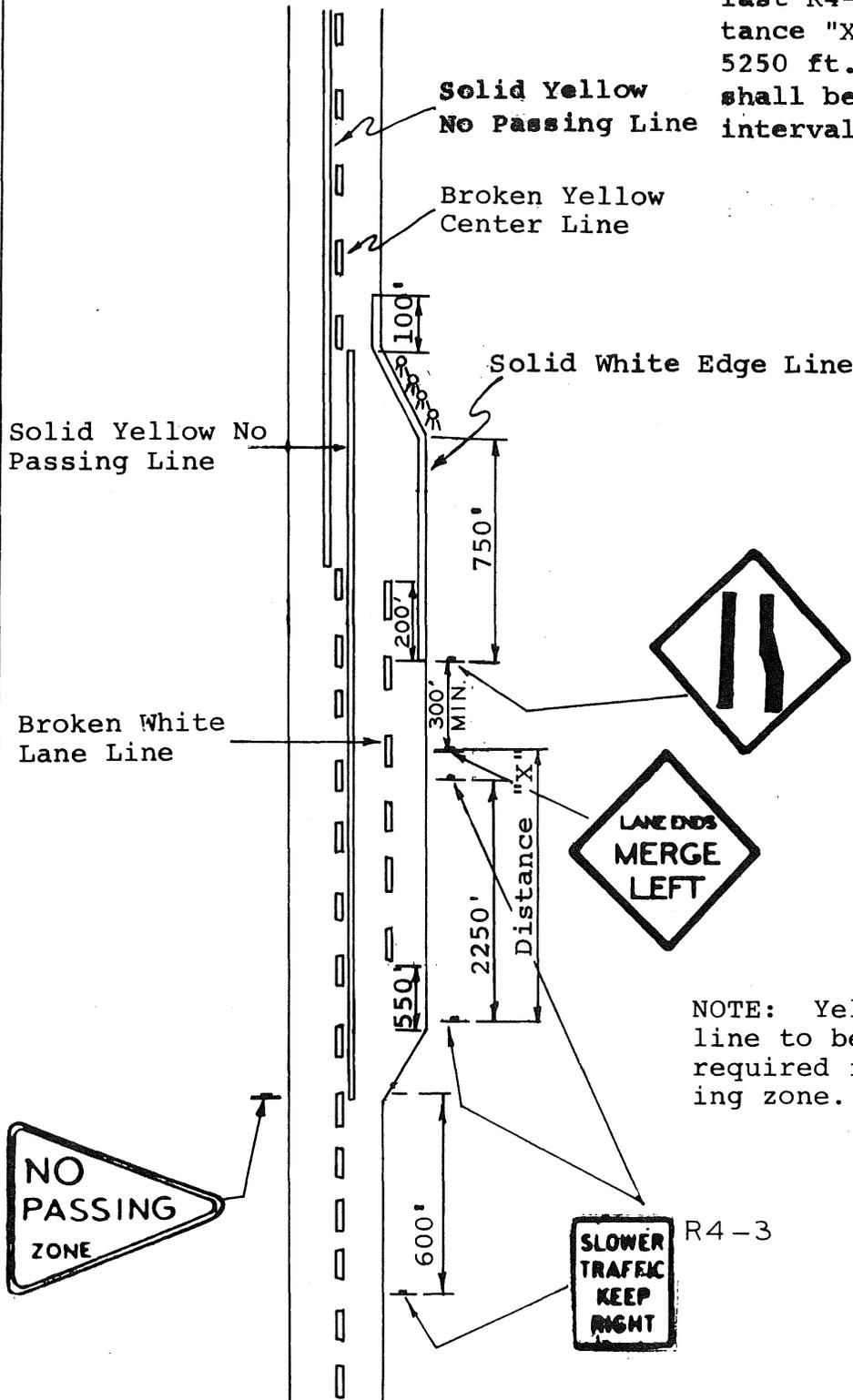
White lane lines begin at a point 550'± past the start of the two full lane widths and the lane line continues through area of climbing lane and ends at a point 550'± in advance where two full lanes start to reduce.

If distance "X" is less than 3000 ft. omit the last R4-3 sign. If distance "X" is greater than 5250 ft. the R4-3 signs shall be placed at 2250 ft. intervals.

R = 3" Single white delineators (at 40' spacing) OPTIONAL

Figure 21
 Signs and Pavement Markings
 For One Way Climbing Lane
 Pavements Not in Edge Line Program

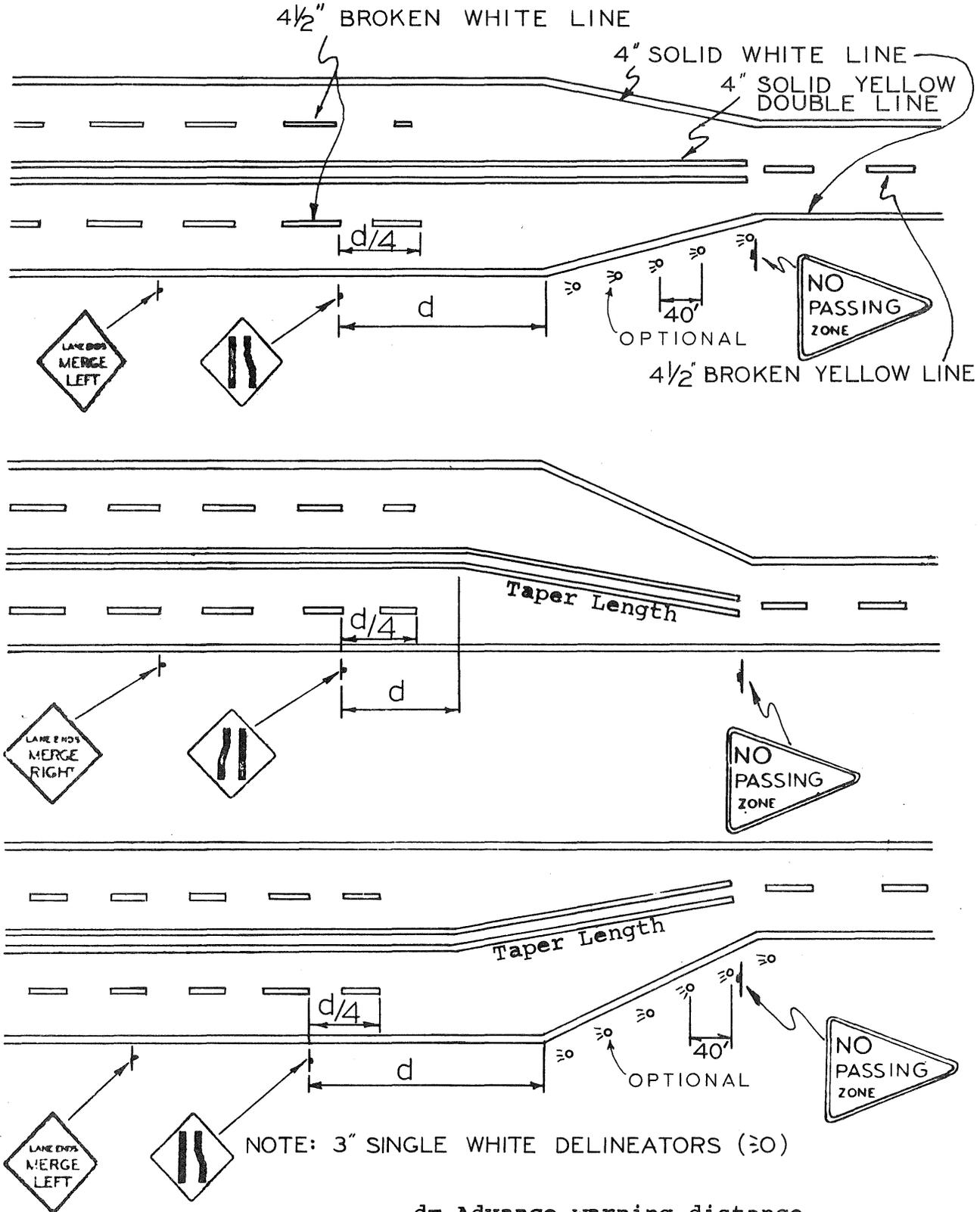
If distance "X" is less than 3000 ft. omit the last R4-3 sign. If distance "X" is greater than 5250 ft. the R4-3 signs shall be placed at 2250 ft. intervals.



NOTE: Yellow No Passing line to be extended if required for safe passing zone.

⊕ = 3" single white delineators (at 40' spacing) (optional)

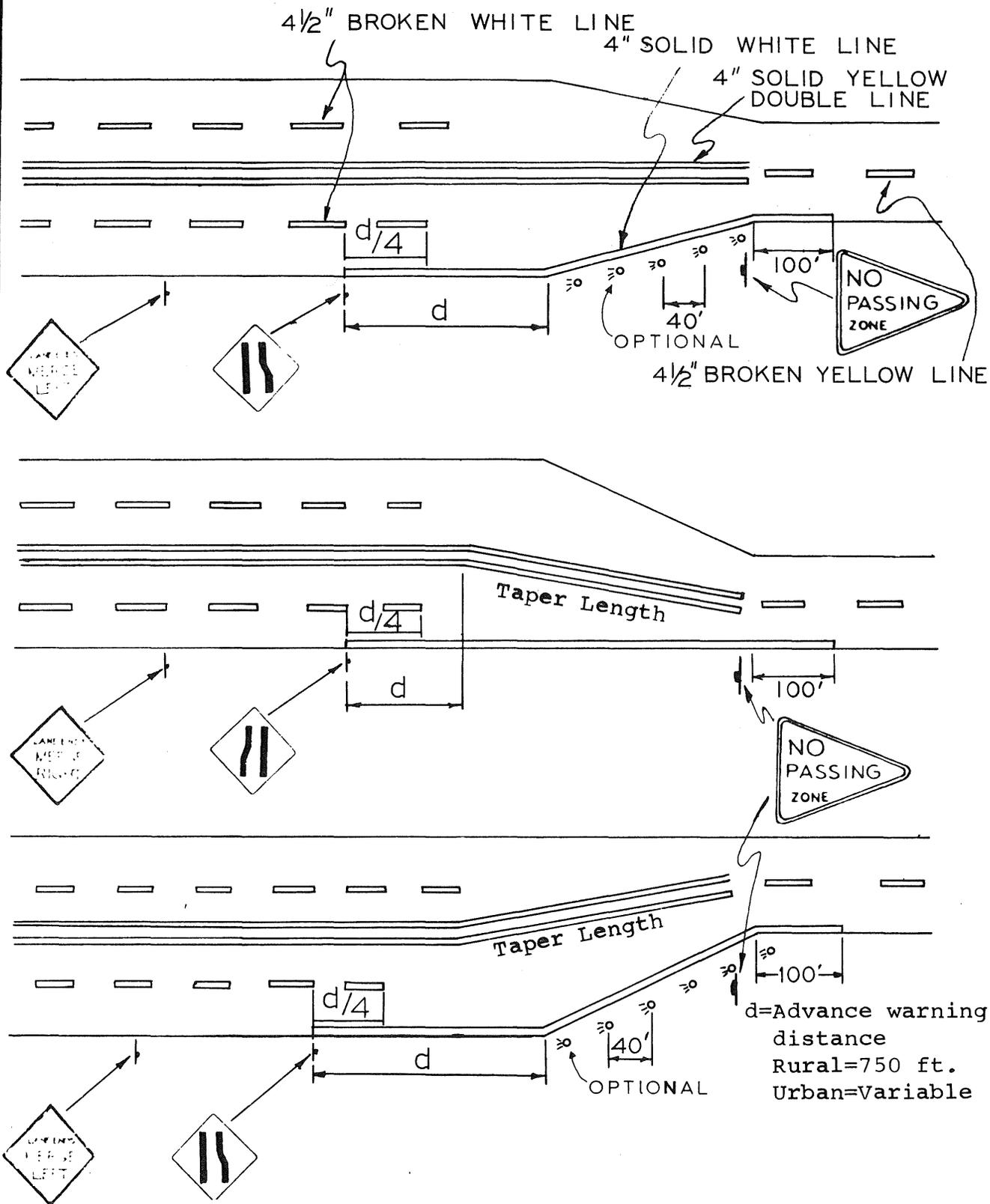
Figure 22
 Standard Pavement Markings
 Transition From Four-Lanes to Two-Lanes
 Pavements in the Edge Line Program



d = Advance warning distance
 Rural = 750'
 Urban = Variable

Taper Length - See Figure 29

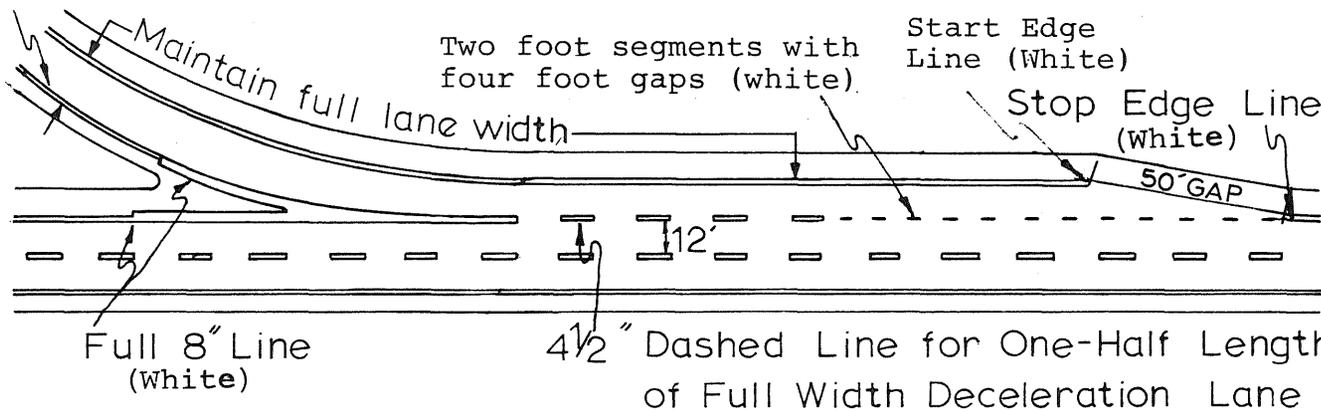
Figure 23
 Standard Pavement Markings
 Transition From Four-Lanes to Two-Lanes
 Pavements Not in the Edge Line Program



Taper Length - See Figure 29

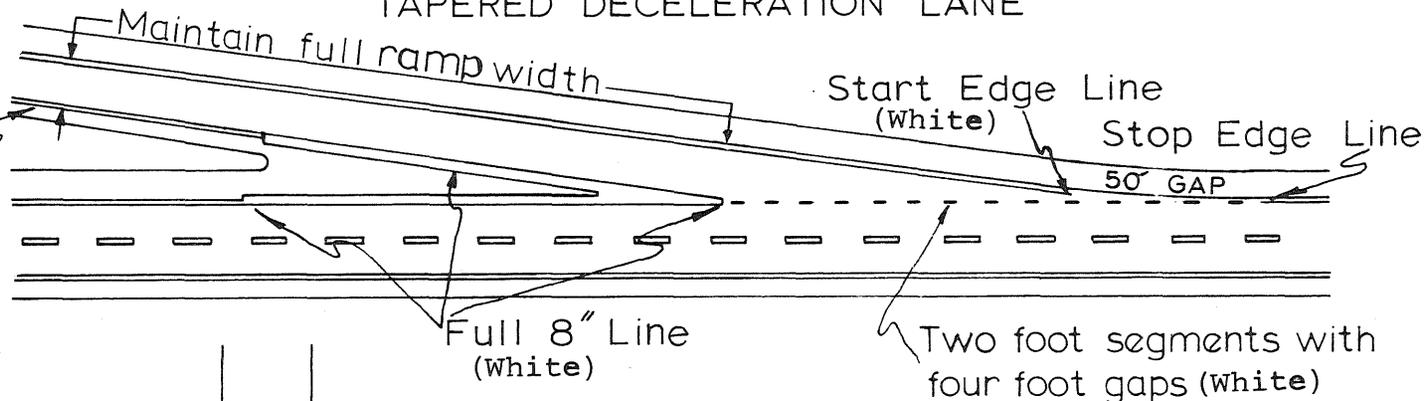
PARALLEL DECELERATION LANE

Edge Line
(Yellow)



TAPERED DECELERATION LANE

Edge Line
(Yellow)



OFF RAMP

Pavement marking arrows (OPTIONAL)

End Edge Line at Point of Tangent and Curve on the Return

41

Figure 24
Channelizing and Edge Line Markings for
Typical Exit Ramps

PARALLEL ACCELERATION LANE

Edge Line (Yellow)

Ramp Width

Edge Line (White)

Lane Width

White Curb

This section of Edge Line to be white

4 1/2" Dashed line for one-half length of full width acceleration lane with normal 10'-30' striping. (White)

Full 8" line. (White)

TAPERED ACCELERATION LANE

Edge Line (white)

Lane Width.

Maintain full ramp width

White Curb

4 1/2" Line, with normal 10 - 30' striping. (White)

Line width 8" (White)

Edge Line (Yellow)

Figure 25
Channelizing and Edge Line Markings for
Typical Entrance Ramps (With Curb)

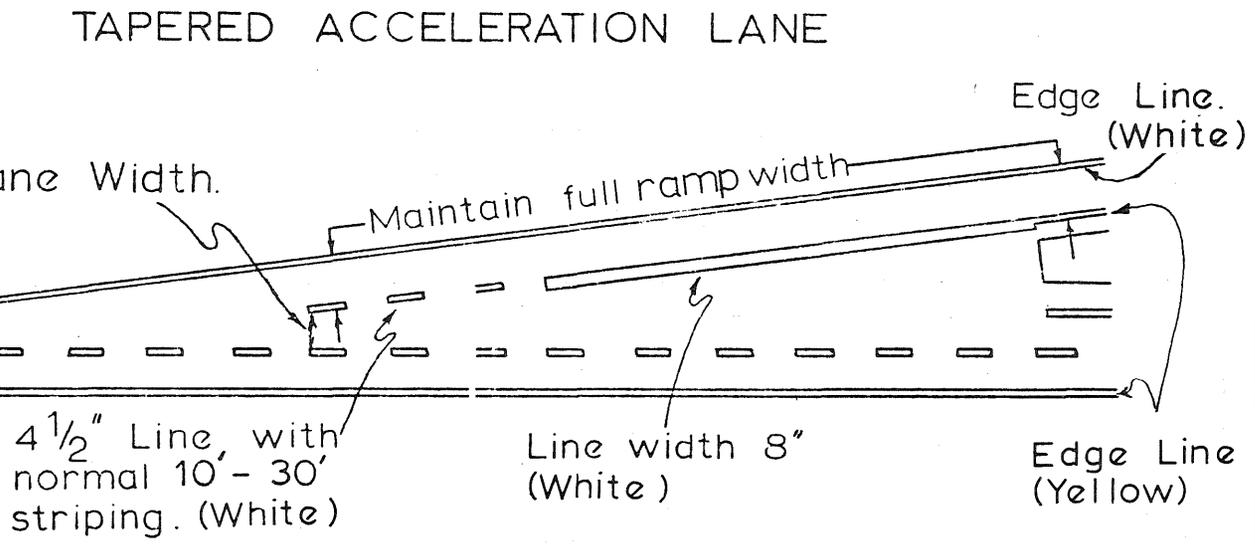
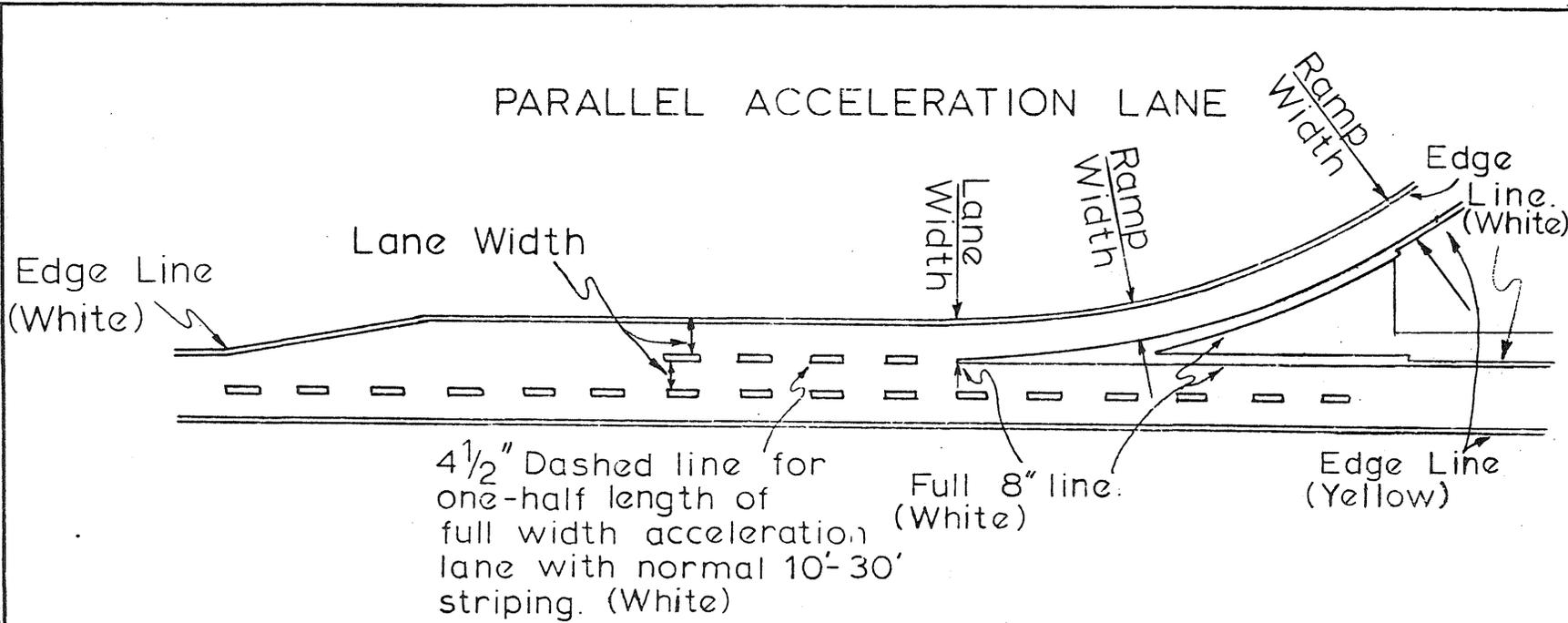


Figure 26
Channelizing and Edge Line Markings for
Typical Entrance (With no curb in gore)

**FIGURE 27
TYPICAL MARKINGS
FOR
TWO WAY LEFT TURN LANE**

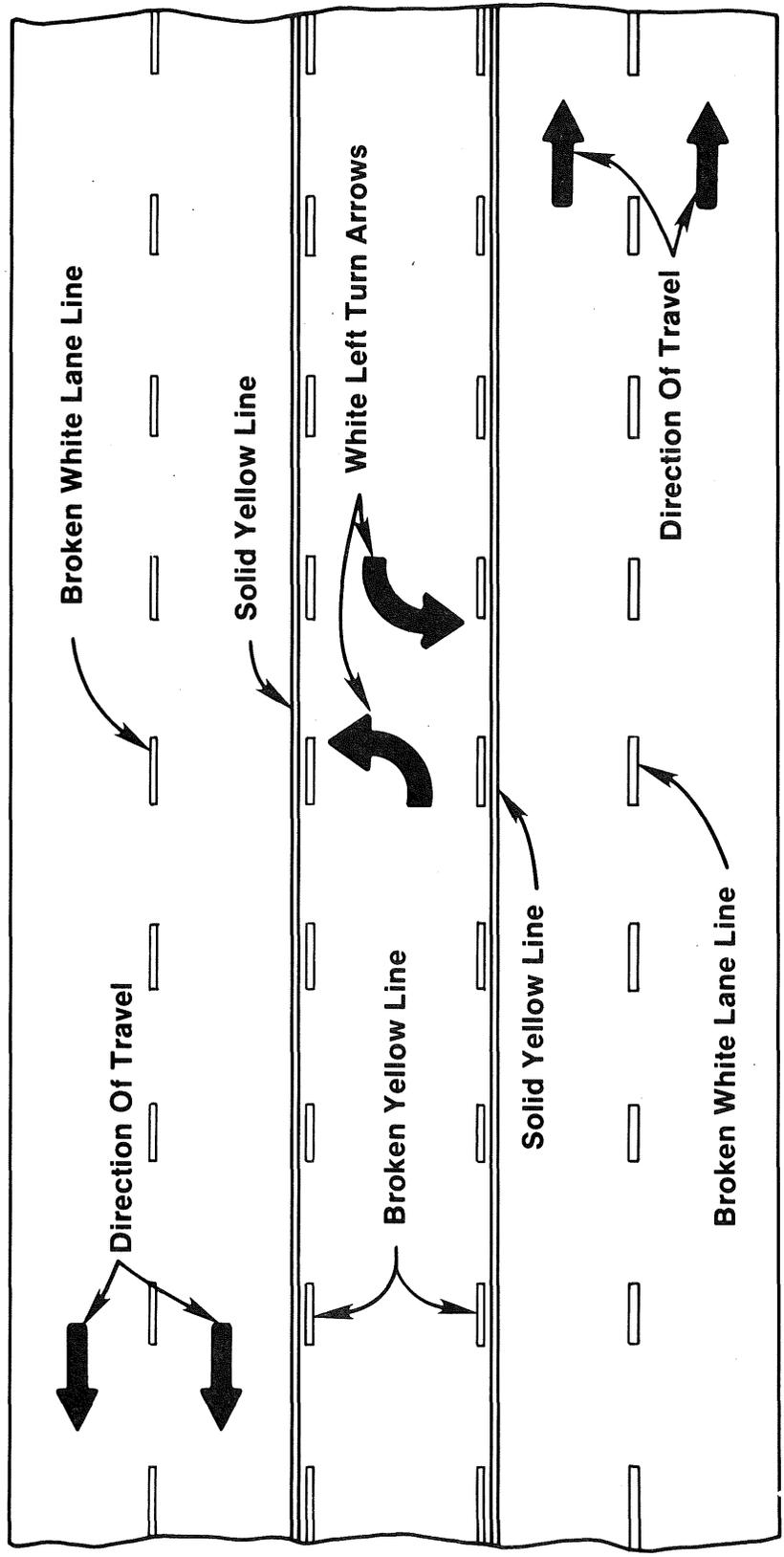
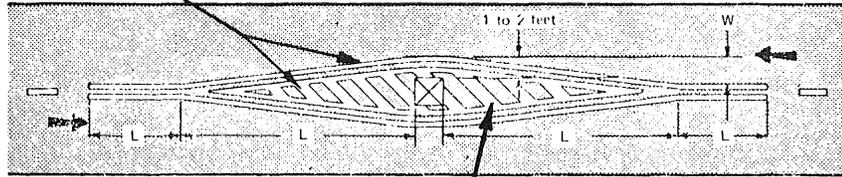


Figure 28

Standard Pavement Markings For Approach to Obstructions in the Roadway

Yellow Markings

Center of two-lane road

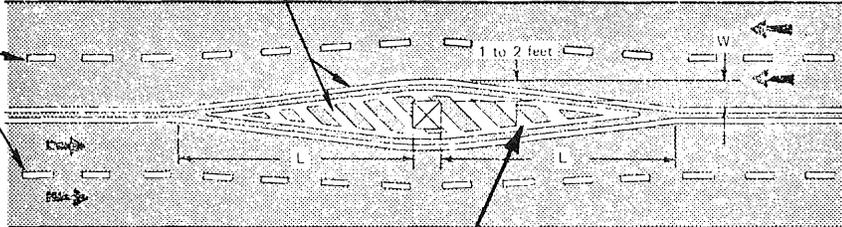


Yellow Markings

45° diagonal lines spaced at 20'

White Lane Lines

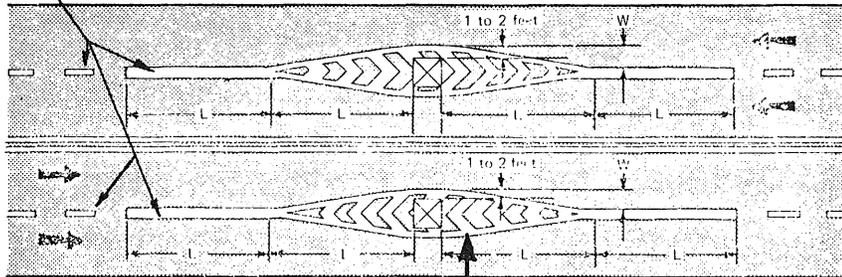
Center of four-lane road



45° diagonal lines spaced at 20'

White Markings

Traffic passing both sides of obstruction



Yellow Center Lines

45° diagonal lines spaced at 20'

S=85th percentile speed in miles per hour
W=Offset distance in feet

Minimum length of: L=100 feet in urban areas
L=200 feet in rural areas

Length "L" should be extended as required
by sight distance conditions.

See Figure 29 for Length of L.

Figure 29
Standard Pavement Markings
Taper Length (L)

W FT.	S-SPEED MPH							
	20	25	30	35	40	45	50	55
1	7	11	15	21	27	45	80	55
2	14	21	30	41	54	90	100	110
3	20	32	45	62	80	135	150	165
4	27	42	60	82	107	180	200	220
5	34	53	75	103	135	225	250	275
6	40	63	90	125	160	270	300	330
8	54	84	120	165	215	360	400	440
10	67	105	150	205	270	450	500	550
12	80	125	180	245	320	540	600	660
14	94	145	210	285	375	630	700	770
16	110	170	240	330	430	720	800	880
18	120	190	270	370	480	810	900	990
20	135	210	300	410	535	900	1000	1100

Table of Length (L) in FEET

L = Taper Length (L)

S = 85th Percentile Speed In Miles Per Hour

W = Offset Distance in Feet

For Speed 45 or More $L = S \times W$

For Speed 40 or Less $L = \frac{WS^2}{60}$

Figure 30
Standard Pavement Markings
Islands and Medians at Channelized Intersections

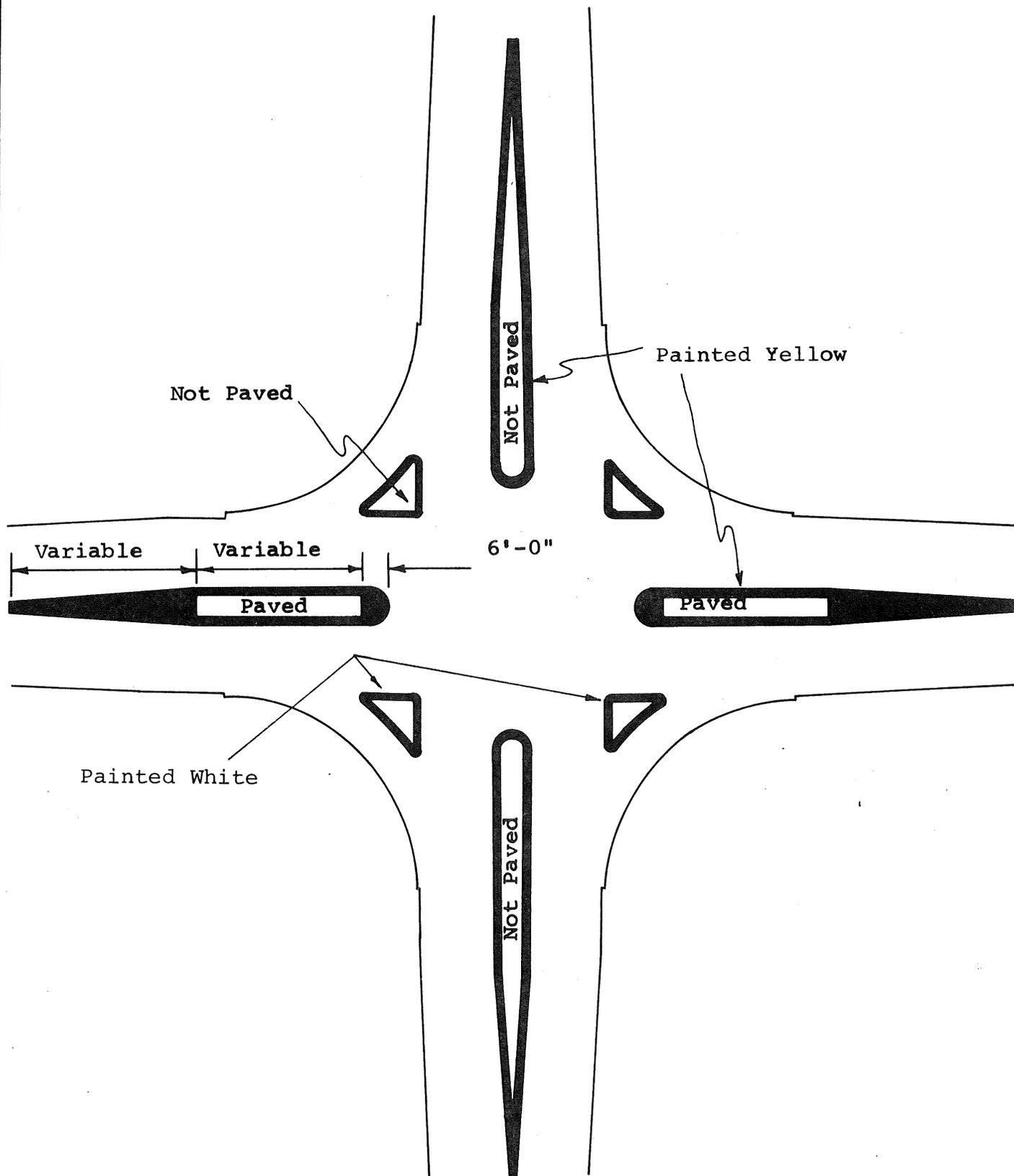


Figure 31
Pavement Markings
for Left Turn Storage Lanes

Solid White
Channelizing
Line.

Broken White
Lane Line

ONLY

Word and symbol
are optional

Figure 32

Straight and Curved Arrows

□ EACH UNIT = 3.84"

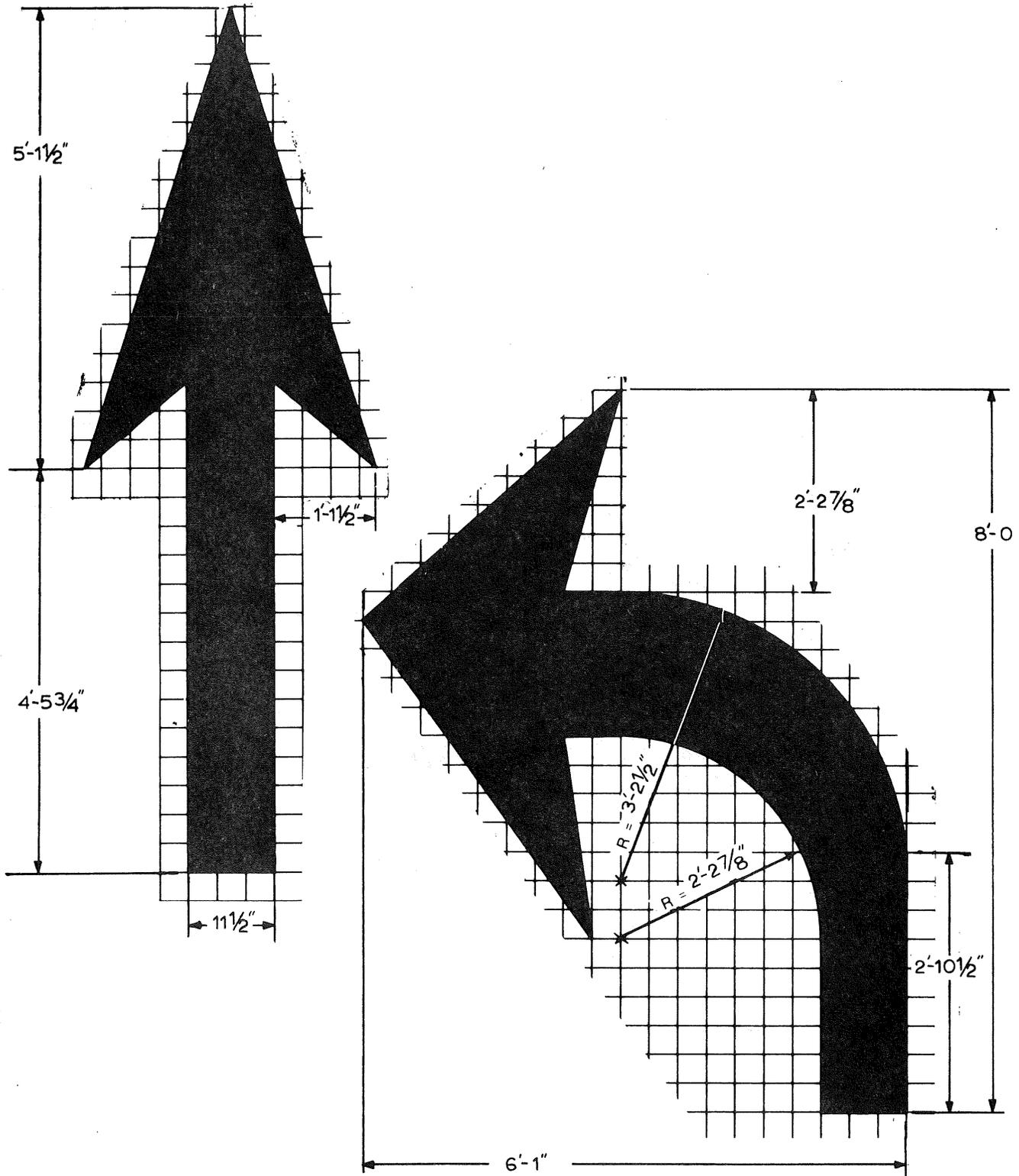


Figure 33

Combine Straight and Curved Arrows

□ EACH UNIT = 3.84"

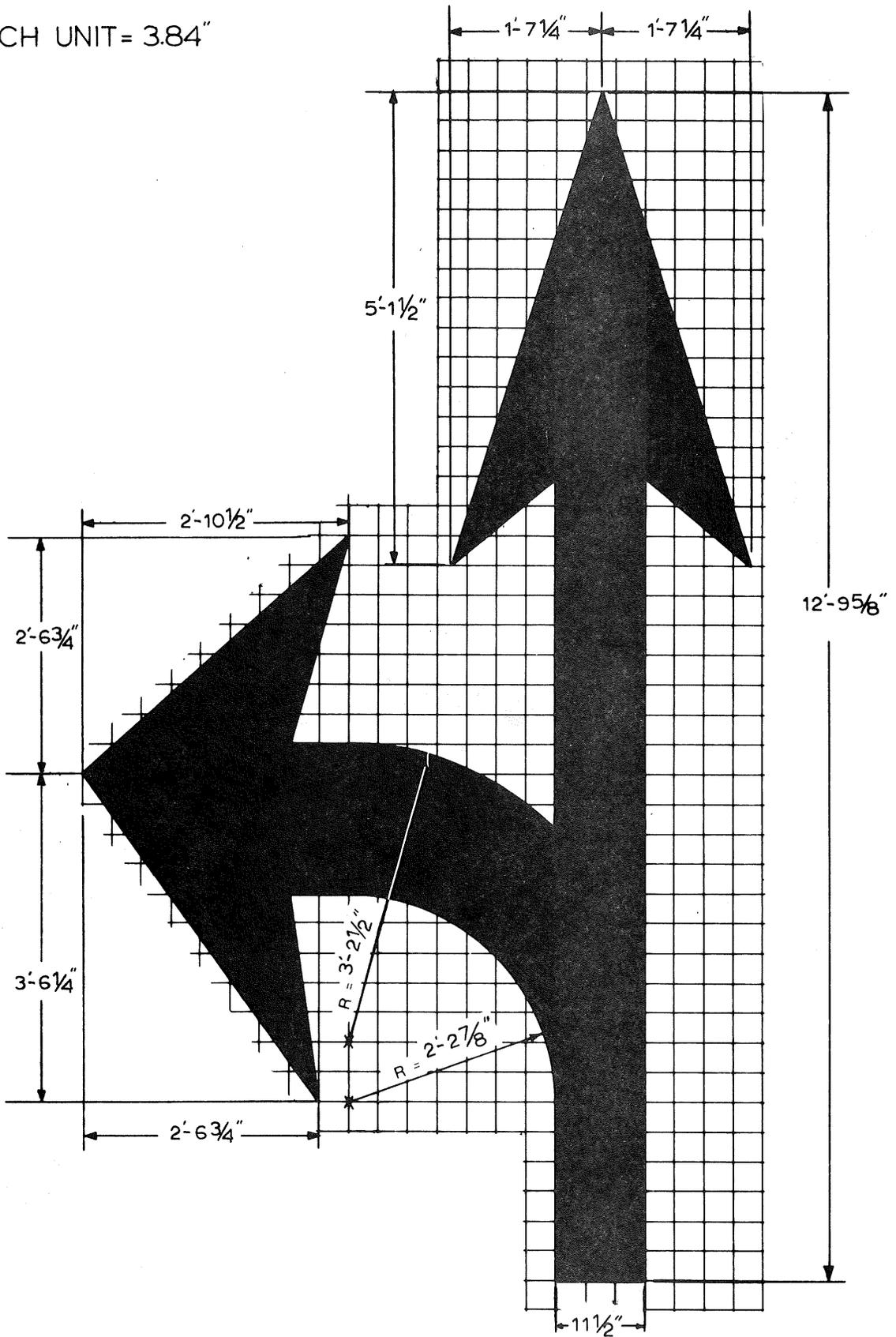


Figure 34

Freeway, Expressway and Ramp Arrows

EACH UNIT = 10"

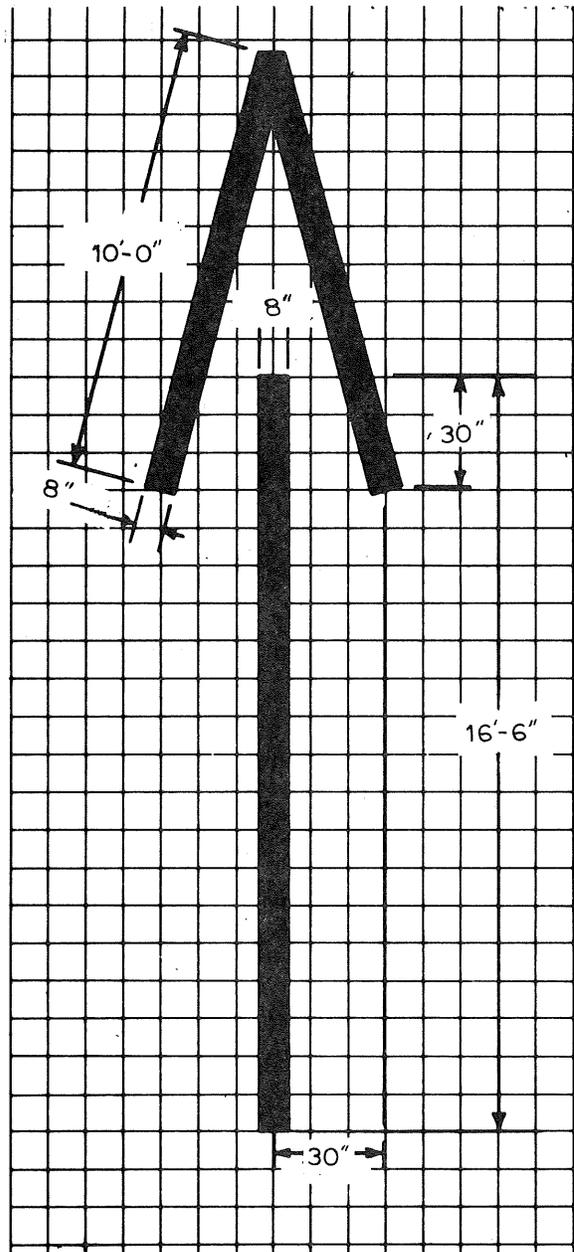
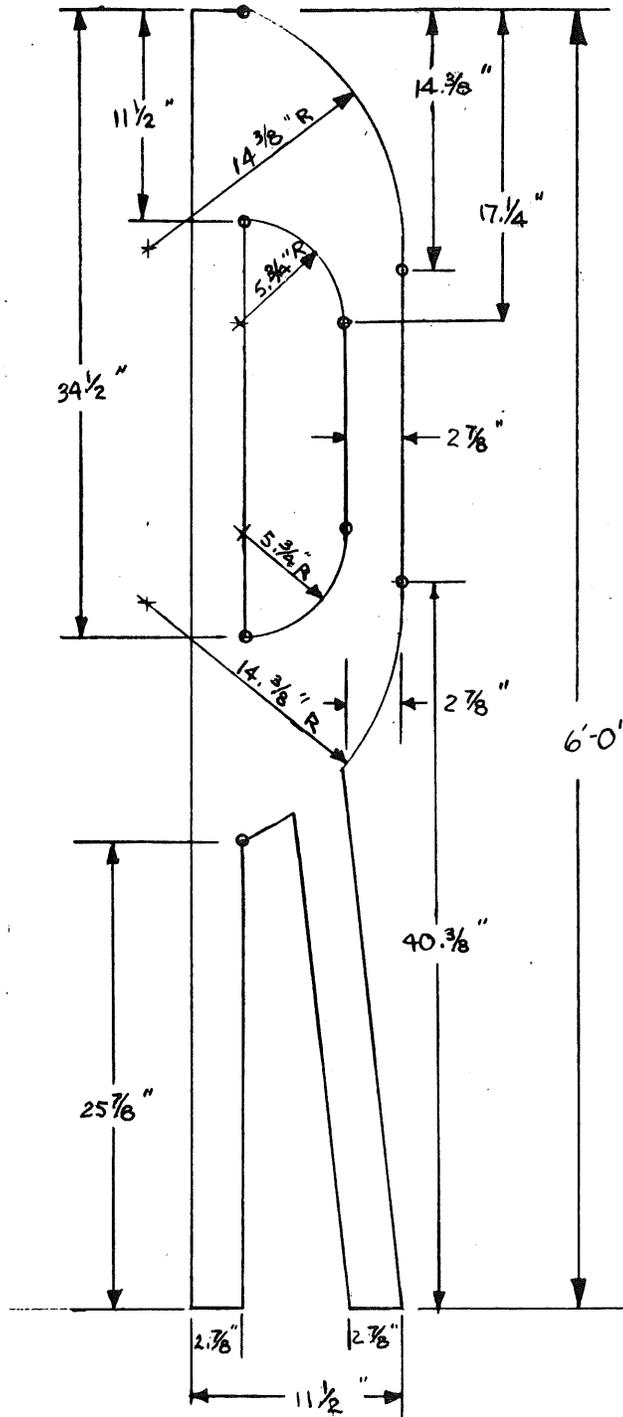
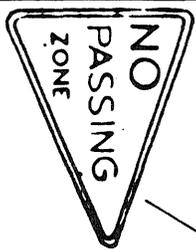
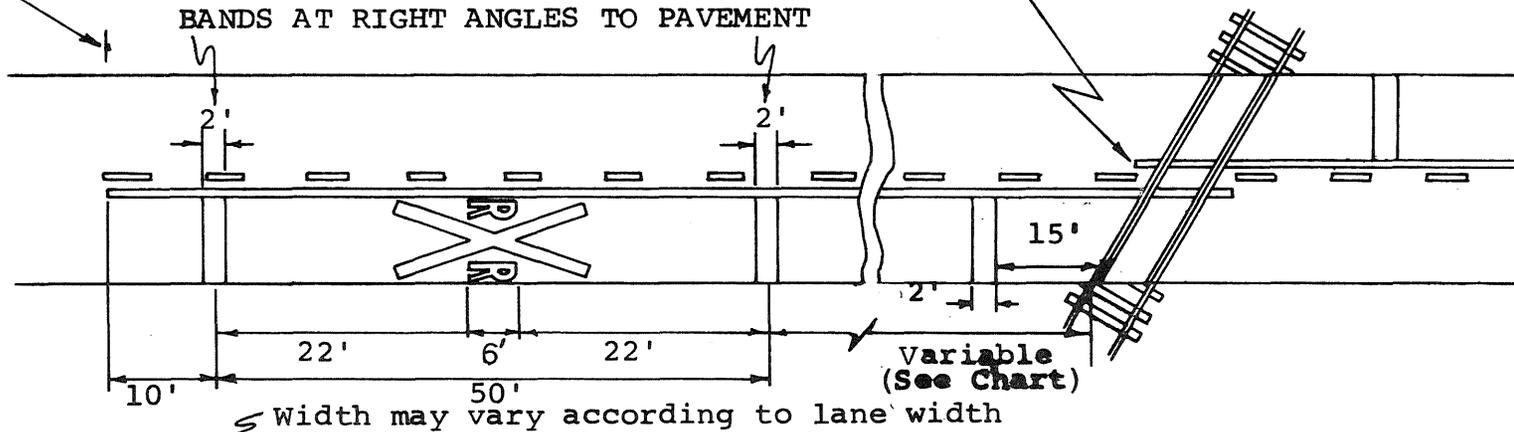


Figure 35
 Pavement Marking
 'R' for Railroad Crossings



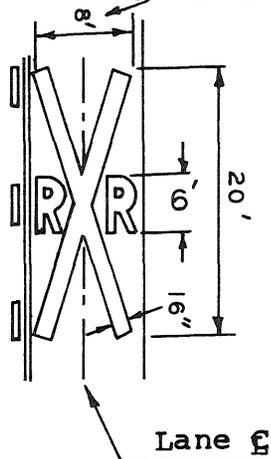


End the No Passing Line 5'+ past the last rail.



Width may vary according to lane width

On multi-lane roads the transverse bands shall extend across all approach lanes, and individual RXR symbols shall be used in each approach lane. See Figure 35 for layout 'R'.



DISTANCE FROM MARKING TO NEAREST TRACK

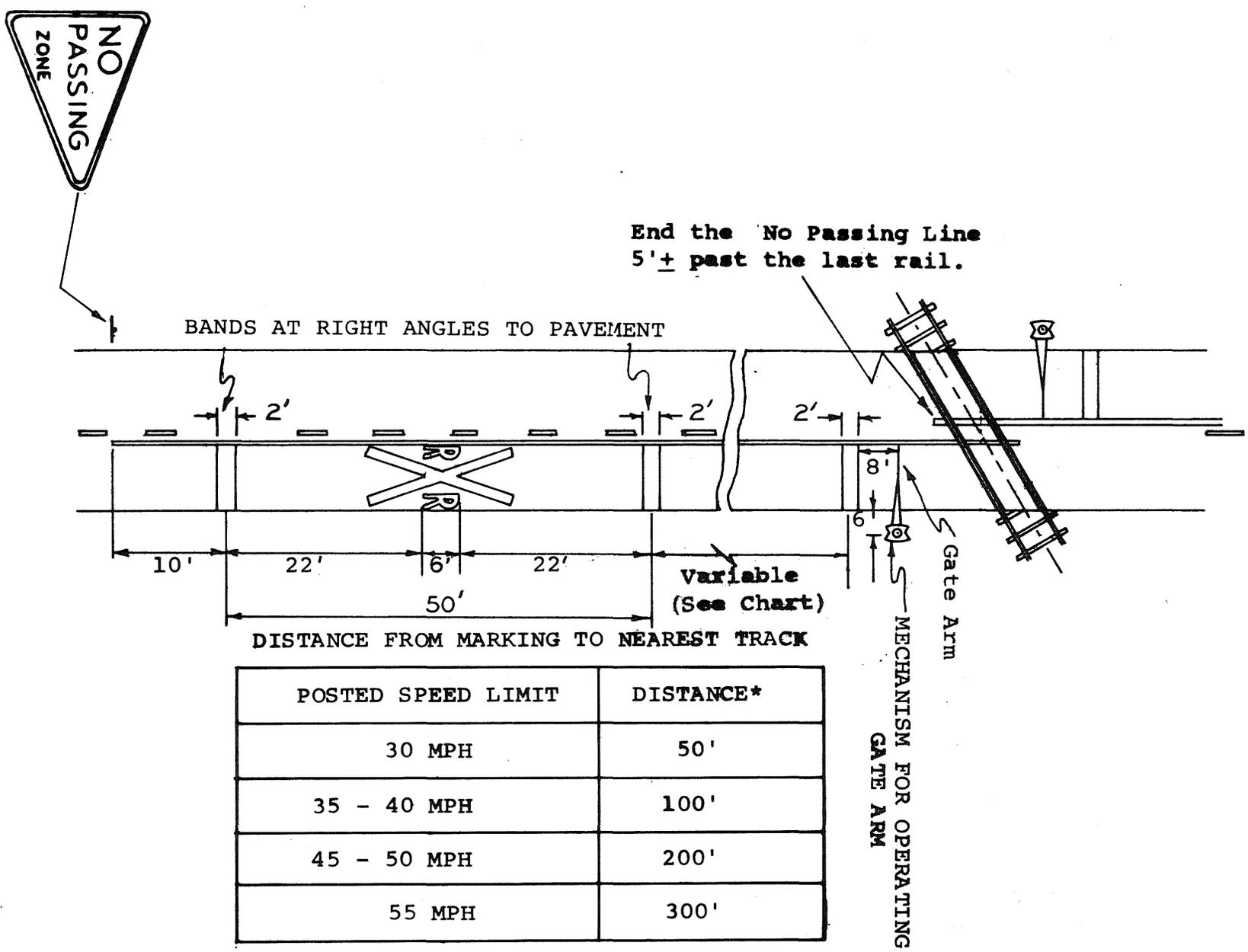
POSTED SPEED LIMIT	DISTANCE*
30 MPH	50'
35 - 40 MPH	100'
45 - 50 MPH	200'
55 MPH	300'

* Minimum Distance - May be increased to fit conditions at individual crossings.

Figure 36
Standard Pavement Markings
at Railroad Crossings Without Gates

Standard Pavement Markings
at Railroad Crossings With Gates

Figure 37



* Minimum Distance - May be increased to fit conditions at individual crossings

EDGE LINE MAP
55

DISTRICT 1

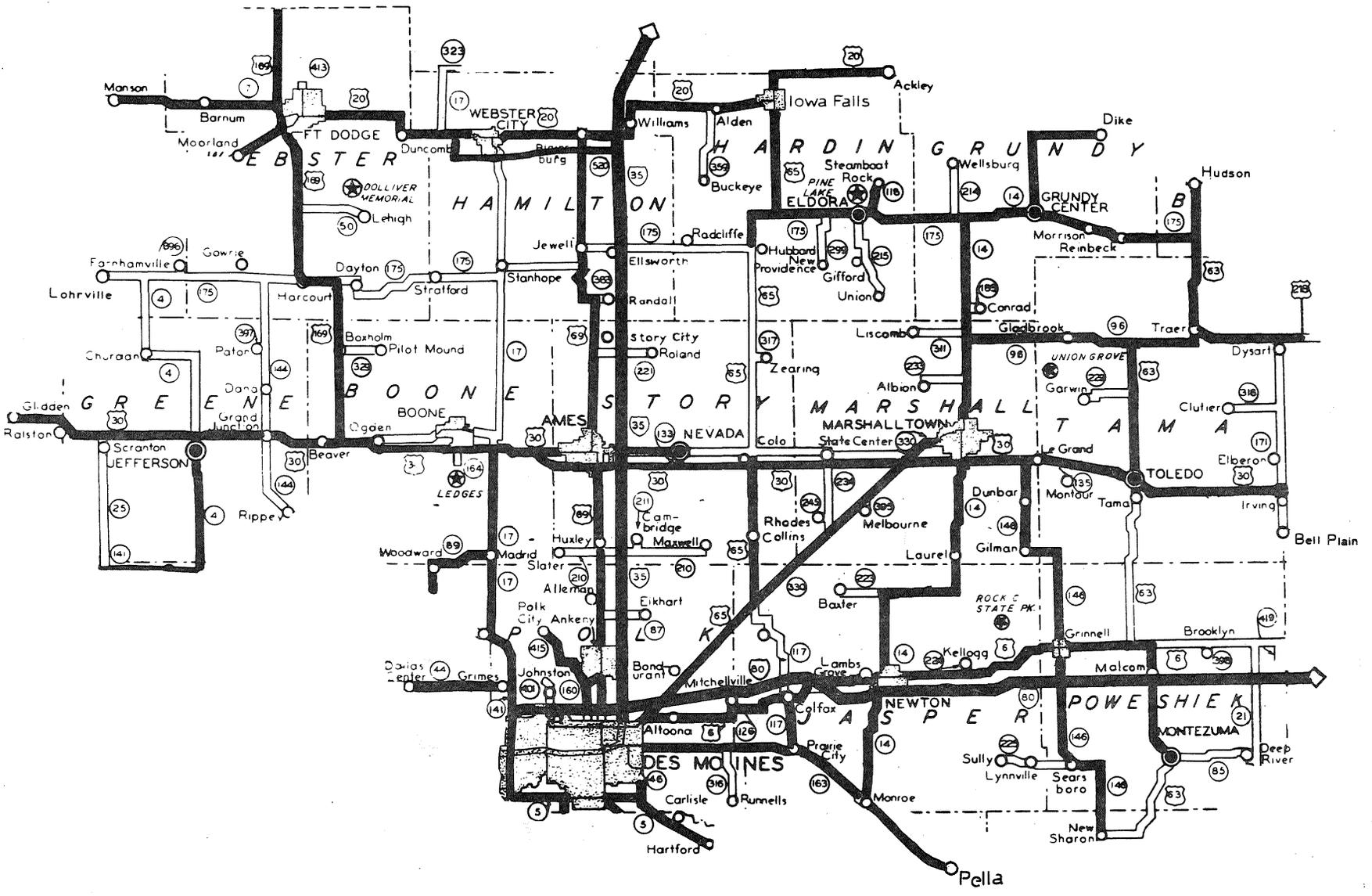
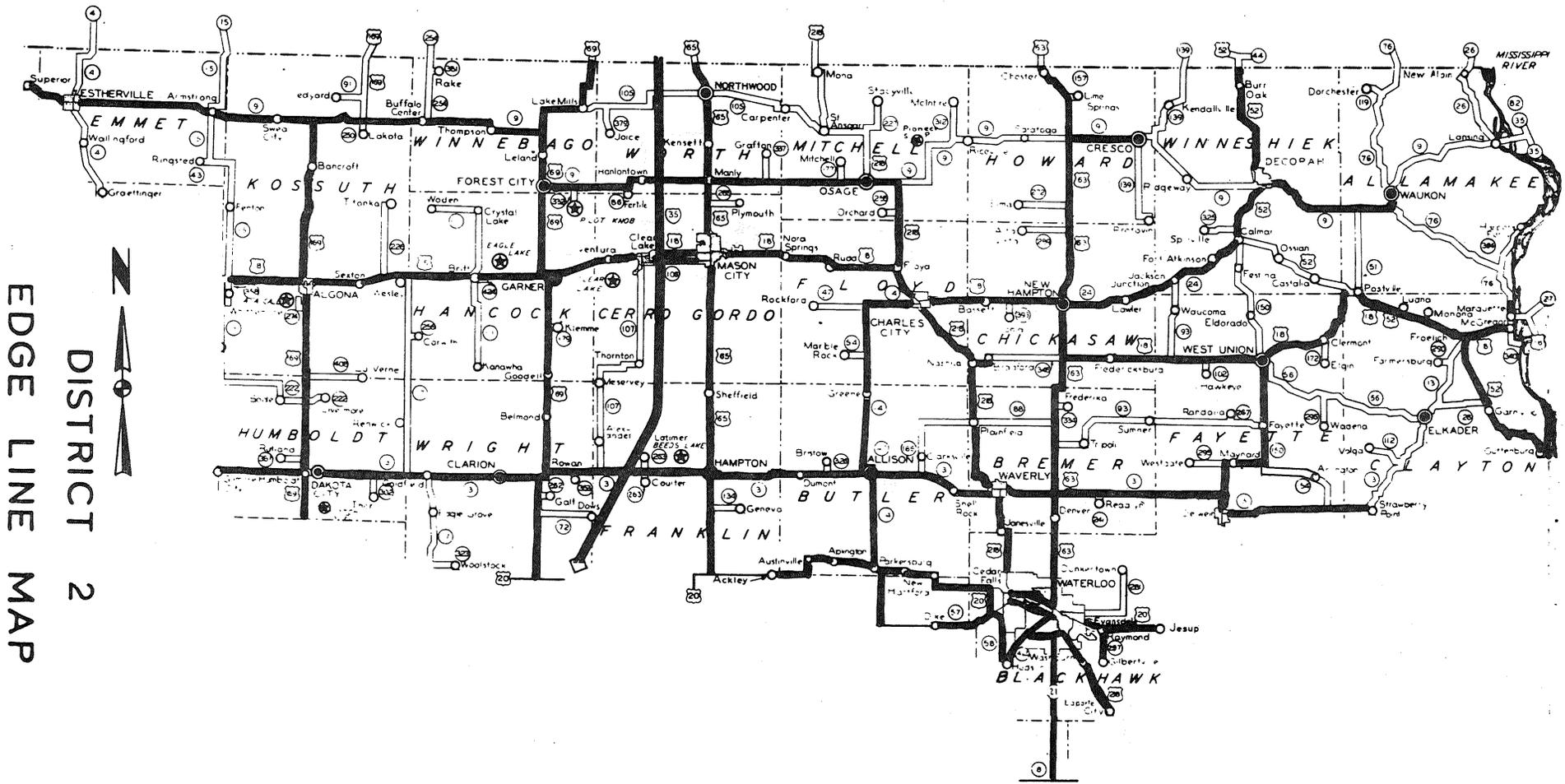


Figure 38



EDGE LINE MAP

DISTRICT 2

Figure 39

EDGE LINE MAP

DISTRICT 4

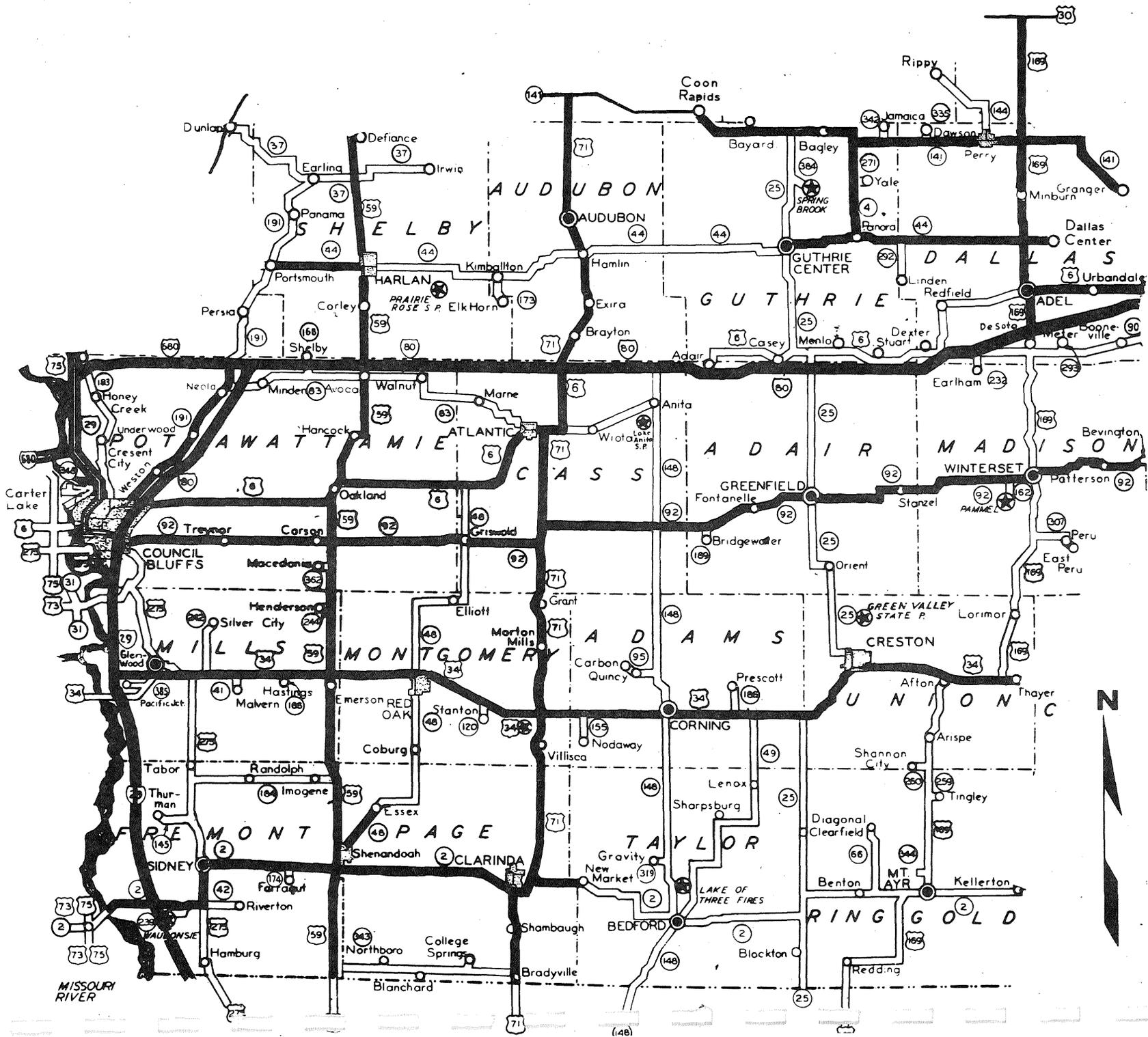


Figure 41

EDGE LINE MAP
DISTRICT 5
59

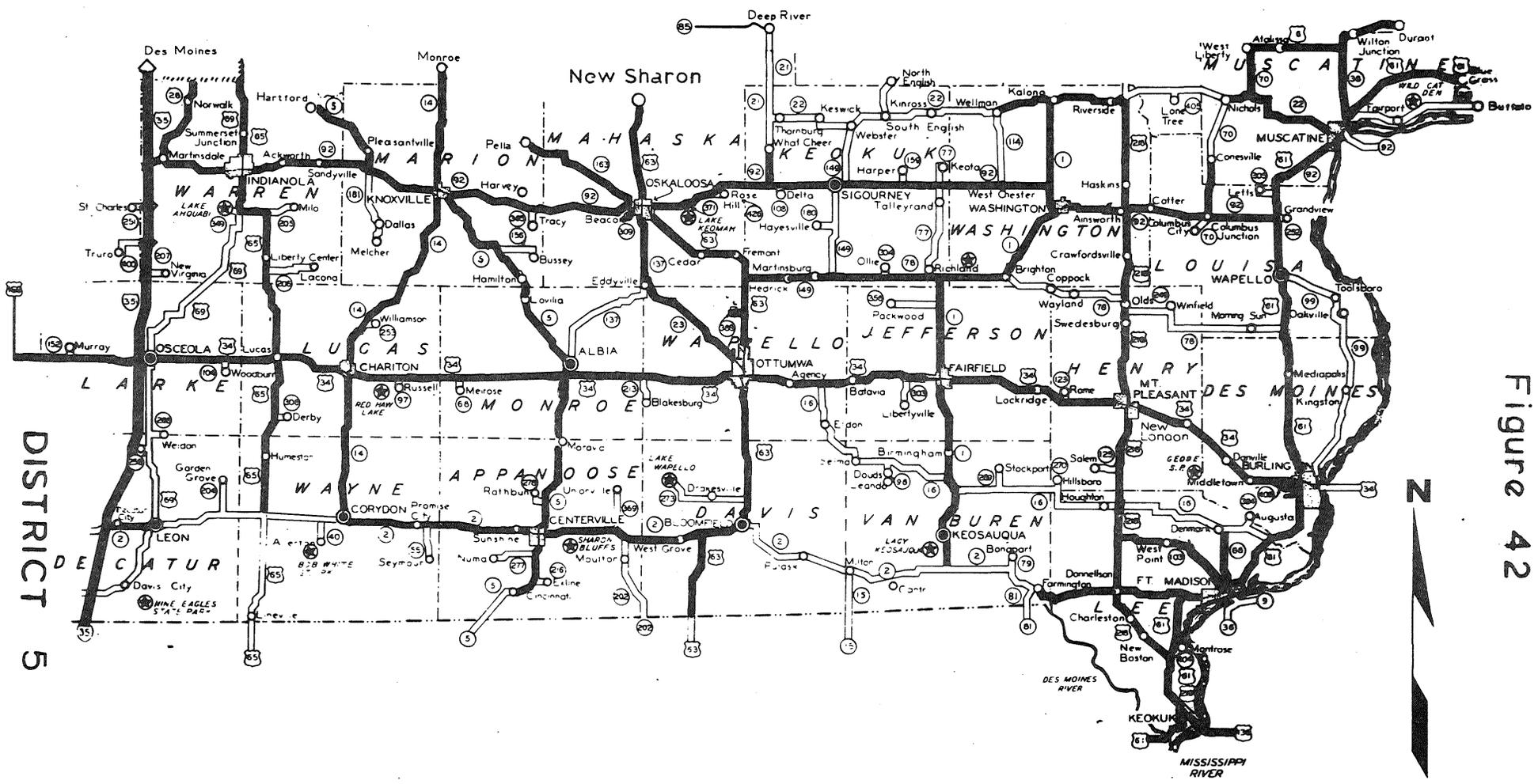


Figure 42

DISTRICT 6
EDGE LINE MAP

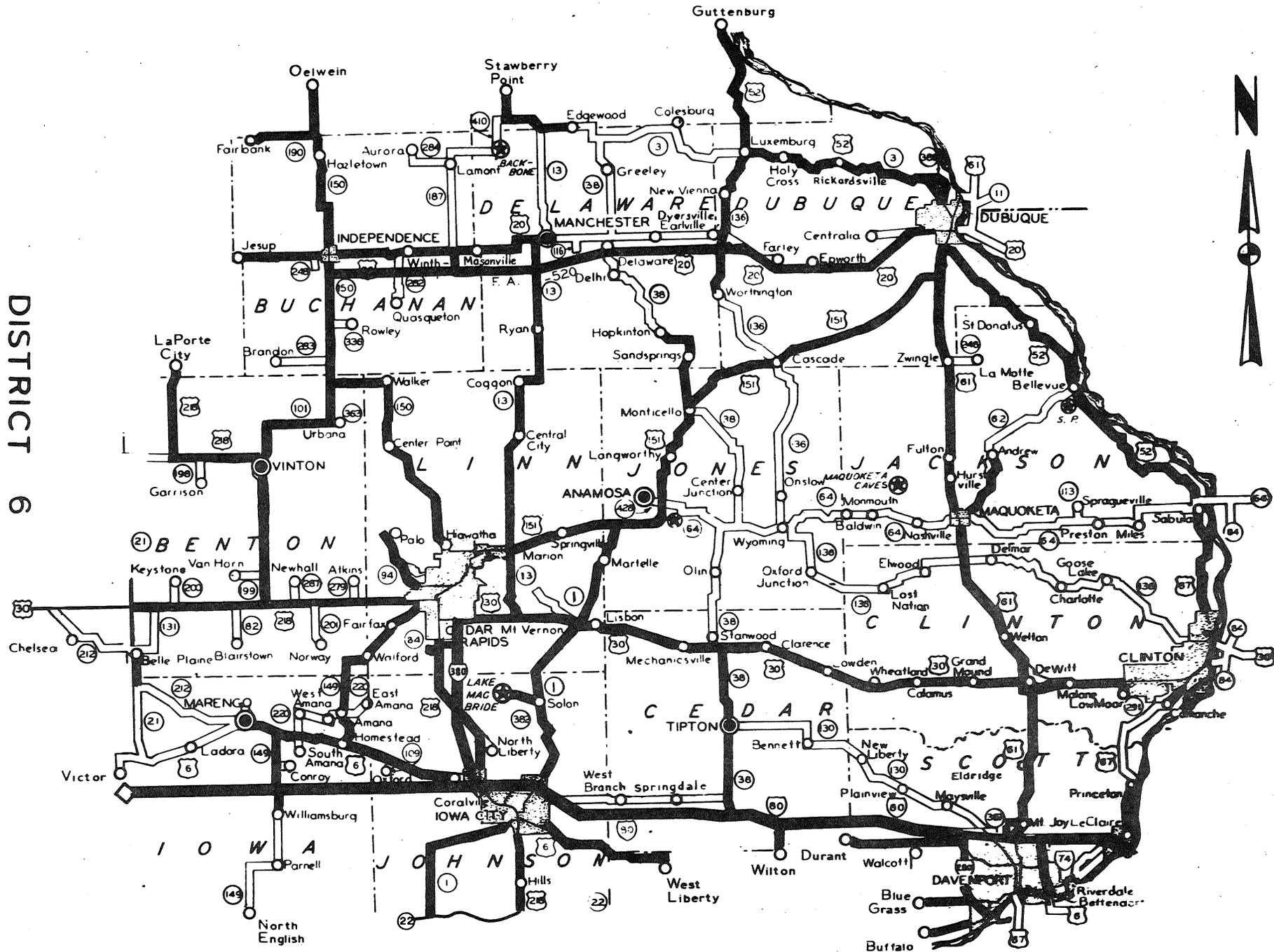


Figure 43

SECTION 4 OPERATIONS AND EQUIPMENT

General

This section is not intended as a complete instruction on the operation and maintenance of pavement marking equipment. If technical problems develop with equipment, the Paint Crew Supervisor should discuss them with the District Mechanic or refer them to the Office of Equipment Services. The District will be responsible for any training or instruction necessary for equipment operators. All markings placed shall be in accordance with requirements in Section 2, Pavement Marking Standards and illustrations in Section 3, Typical Pavement Marking Layouts.

Application Rates and Quantities

Specifications on color, line width, wet film thickness, bead application rate and paint application rates are contained in Table 3 below. Efforts should be made to meet these specifications, insofar as possible. Periodic checks should be made to assure that line width, film thickness and bead application rates are within reasonable compliance with standards. If substantial deviations are found, operations should be suspended and adjustments made to correct the problem.

Operators and Flagpersons

All equipment and manpower required for traffic control shall be available before operations begin. When authorized, temporary operators and flagpersons may be hired within budget limitations. If additional personnel are needed to staff the pavement marking operation, they shall be obtained from Area Maintenance Crews. Arrangements should be made far enough in advance to avoid delay in the marking operation or interrupting other scheduled maintenance work.

SPECIFICATIONS AND APPLICATION RATES FOR PLACING PAVEMENT MARKING LINES						
Line Description	Broken Center Line	Broken Lane Line	Double Center Line	No Passing Zone Line	Right Edge Line	Left Edge Line
Line Type- Identification Number	1	2	3	4	5	6
Color	Yellow	White	Yellow	Yellow	White	Yellow
Width	4½"	4½"	2 @ 4"	4"	4"	4"
Wet Film Thickness	13 mils	13 mils	13 mils	13 mils	12 mils	12 mils
Lbs. of Beads Per Gallon of Paint	4	4	4	4	4	4
Gallons of Paint Per Mile	4.01	4.01	28.52	14.26	13.16	13.16
Miles Per Gallon of Paint	0.25	0.25	0.04	0.07	0.08	0.08
Feet Per Gallon of Paint	1317	1317	185	370	401	401
Gallons of Paint Per Minute (1)	3.21(2)	3.21(2)	5.70(3)	2.85	2.63	2.63
(1) Based on a uniform travel rate of 12 MPH or 1,056' per minute. (2) Rate of application when 10' segments of broken line are being placed. (3) Rate of application for placing double lines simultaneously.						

Table 3

Surface Preparation and Spotting

Arrangements shall be made to remove any dirt, gravel, debris or vegetation from the pavement surface before pavement markings are placed. Normally, the broom truck will remove most of these materials. The Paint Crew Supervisor should make advance arrangements with area crews to use a rotary mower or other equipment to remove overhanging vegetation so pavement marking operations can proceed without stopping or delay.

Streets which are normally maintained by cities under contract with the Department are to be cleaned by local authorities before markings are

placed. In other cities, cleaning will be done by the District Paint Crew or Area Maintenance Crews.

Where needed, spotting of the lateral location of lines and terminal points shall be done by assigned District personnel in advance of the pavement marking operation.

Operating Speed

The operating speed of the truck applying pavement markings shall be 12 MPH or 1,056' per minute. Available controls will be used to maintain this prescribed uniform speed as accurately as possible.

Matching Existing Markings

The majority of pavement markings are renewals of previously applied markings. In most cases, the original lines are partially visible. Care must be taken to match the new marking as closely as possible with the original marking. This includes both the beginning and ending of broken or intermittent lines and the lateral position on the pavement. The Paint Crew Supervisor shall assure that responsible operators are used that have adequate training and experience to produce quality workmanship. Where serious problems develop, whether they are due to human error or mechanical malfunction of equipment, operations shall be suspended until the problem is solved. Markings are a highly visible element of the highway facility and poor workmanship cannot be tolerated.

Where pavement markings are revised, remaining portions of the original markings shall be removed or obliterated to avoid conflict with new markings or confusion for the motorist. Area Maintenance Crews should be contacted to provide assistance in removing lines by sandblasting or burning.

Operation of Equipment

Paint tanks should be kept relatively full at all times. They should not

be allowed to set overnight at 1/3 to 1/2 full. As a standard procedure, tanks should be filled to capacity after each day's operation and checked to see that they are air tight. The solvents in paint are highly volatile and evaporate quickly making it necessary to keep paint tanks and barrels sealed air tight except during transfer pumping operations. Should air tight seals be broken, solvents will rapidly evaporate making paint difficult or impossible to use.

Paint flow meters are now used on all equipment. The delivery rate should be checked frequently while operations are underway to assure conformance with application quantities prescribed in Table 3.

Paint guns and bead guns are constructed similarly and require comparable adjustments for the correct rates of application. To adjust the width of application patterns primarily requires increasing or decreasing the distance between the gun nozzles and the pavement surface. The rate of flow through the gun can be varied by the amount of travel of the valve stem and the atomizing pressure on the line delivering air to the gun. Equipment shall be adjusted as necessary to attain correct rates and patterns of application.

Maintenance of Equipment

Methylene chloride should be used as a flushing or cleaning solvent. It works well for cleaning paint tanks and lines and for removal of dried paint. Experience has shown best results by placing a quantity of methylene chloride in a paint tank and sealing it up for 48 hours. Pressure will build up in the tank due to the vapor pressure of methylene chloride. After the methylene chloride has been flushed from the tank, final cleaning should be by scraping or wiping as necessary.

Methylene chloride has the advantage of being nonflammable, but disadvantages include cost and rust problems when stored in unlined steel

containers. To avoid problems with rust particles in paint equipment, methylene chloride should be strained before using.

Used methylene chloride should be saved and where possible, reused for miscellaneous cleaning of equipment. Methylene chloride may reach toxic levels, therefore, caution should be used when working with this solvent. For more information, see the paragraph on safety which follows. Use of highly volatile flammable materials such as gasoline should be avoided or minimized on or near paint equipment.

Safety Precautions

To minimize the hazard created by a slow moving pavement marking operation, requirements contained in Section 5, Traffic Control, shall be strictly adhered to. Safety precautions regarding the operation and maintenance of equipment and the handling and transfer of paint and solvents should be followed at all times.

The solvents in fast drying paints are extremely volatile and flammable. Care should be exercised to reduce the hazard of fire near paint equipment. All open flames, sparks and glowing materials should be kept away from paint equipment and the nurse truck during loading or transfer operations. All flushing fluids and fast dry paint must be kept in closed air tight containers.

A 20 lb. dry type fire extinguisher shall be mounted on each side of both the paint truck and the nurse truck. Fire extinguishers should be located in holders so they can be quickly removed for immediate use. During loading and transfer operations, one fire extinguisher shall be removed from each truck involved and placed on the ground at a distance of 15-20' from the truck. After the loading and transfer operations are complete and all containers closed, the fire extinguishers shall be returned to their proper locations on

the trucks. Fire extinguishers shall be checked each day before painting operations begin. If for any reason a fire extinguisher is not fully ready, it shall be replaced that day.

When cleaning equipment, no person shall be allowed in a paint tank unless he has a helper who can see him at all times from outside the tank and give assistance if necessary. The tank shall be ventilated before anyone is allowed inside. Air contamination levels from methylene chloride shall be checked and the area ventilated as necessary to limit an employee's exposure in accordance with Iowa OSHA regulations as follows. Eight hour time weighted average, 500 ppm. Acceptable ceiling concentration, 1000 ppm. Acceptable maximum peak above acceptable ceiling concentration, 2000 ppm for 5 minutes in any 2 hour period.

Safety regulations from other sources which apply to this type of operation shall be enforced by responsible District personnel.

SECTION 5 TRAFFIC CONTROL

General

Pavement marking is a slow moving operation within the traveled portion of the roadway thereby constituting a source of conflict with normal traffic flow. Traffic control standards in this section are designed to give adequate advance warning to passing and oncoming traffic to assure safety for the traveling public and those operating pavement marking equipment.

Responsibilities

The District Maintenance Engineer or a designated Resident Maintenance Engineer shall check that all vehicles, equipment, signs, flashers, arrow panels, etc. are made available to the Pavement Marking Crew before authorizing them to proceed. The Paint Crew Supervisor shall have immediate charge of the operation and determine that all vehicles and equipment are in good operating condition before commencing work. The Area Supervisor shall provide vehicles and/or personnel as needed to make up a complete compliment as shown on Traffic Control Standards. If vehicles and personnel are not available in the area, they may be obtained from adjacent areas as directed by the Resident Maintenance Engineer or the District Maintenance Engineer.

Traffic Control Standards

Traffic Control Standards are shown in Figures 44 through 47. Figures 44 and 45 are for center line and edge line placement on two lane roadways while Figures 46 and 47 are for center line and edge line placement on four lane divided and undivided roadways. All equipment and signs shown on these illustrations shall be present before work begins. Any variations from these requirements shall be approved by the Resident Maintenance Engineer, the District Maintenance Engineer or the State Traffic Engineer before being

used. The distance between units should be obtained shortly after operations begin. These distances are suggested under normal conditions and may be varied for unusual circumstances. In Figure 44, the lead pickup should be in the right hand lane proceeding in the direction of the marking operation to assure that oncoming traffic will have the best opportunity to see the first sign in the convoy. Traffic overtaking the pavement marking operation shall be aided by the lead pickup moving to the shoulder to make the passing maneuver safer and to keep traffic moving. The operator of the lead pickup must use care in moving from the shoulder to the traffic lane and stay clear of traffic at all times.

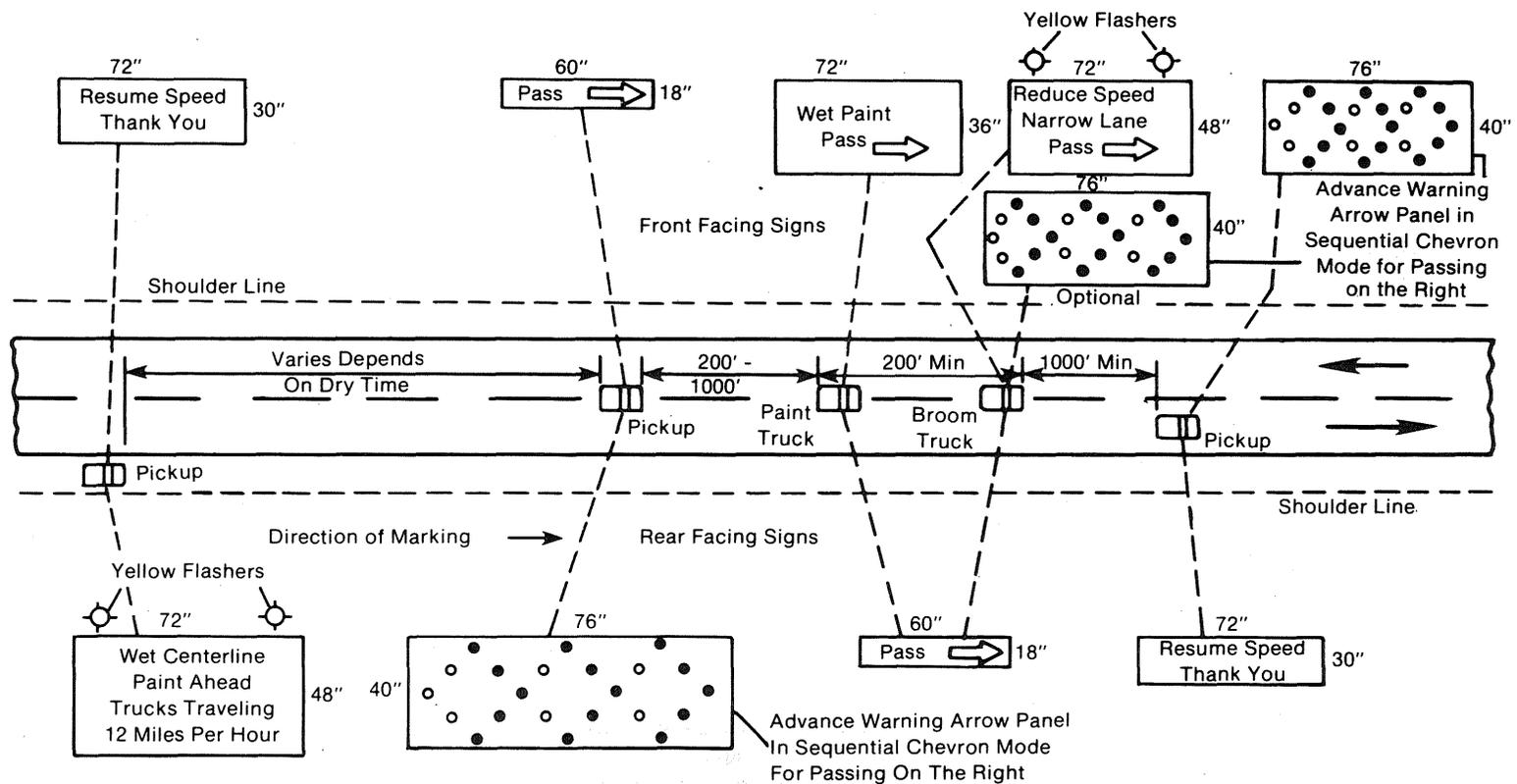
Miscellaneous Requirements

1. Except in case of an emergency, traffic will not be stopped on the roadway near the pavement marking operation. Information for the motorist will be provided by signs, flashing lights or arrow panels only. Traffic entering an Interstate or other four lane highway may be warned by signs and/or a flagperson but not stopped except in an emergency. Traffic entering the Primary Road being marked from another Primary or Secondary Road may need to be stopped and advised of the traffic marking operation nearby.
2. All signs shall be mounted on vehicles in such a manner that they can be folded down or covered when the message is not applicable.

Assistance by the Iowa State Patrol

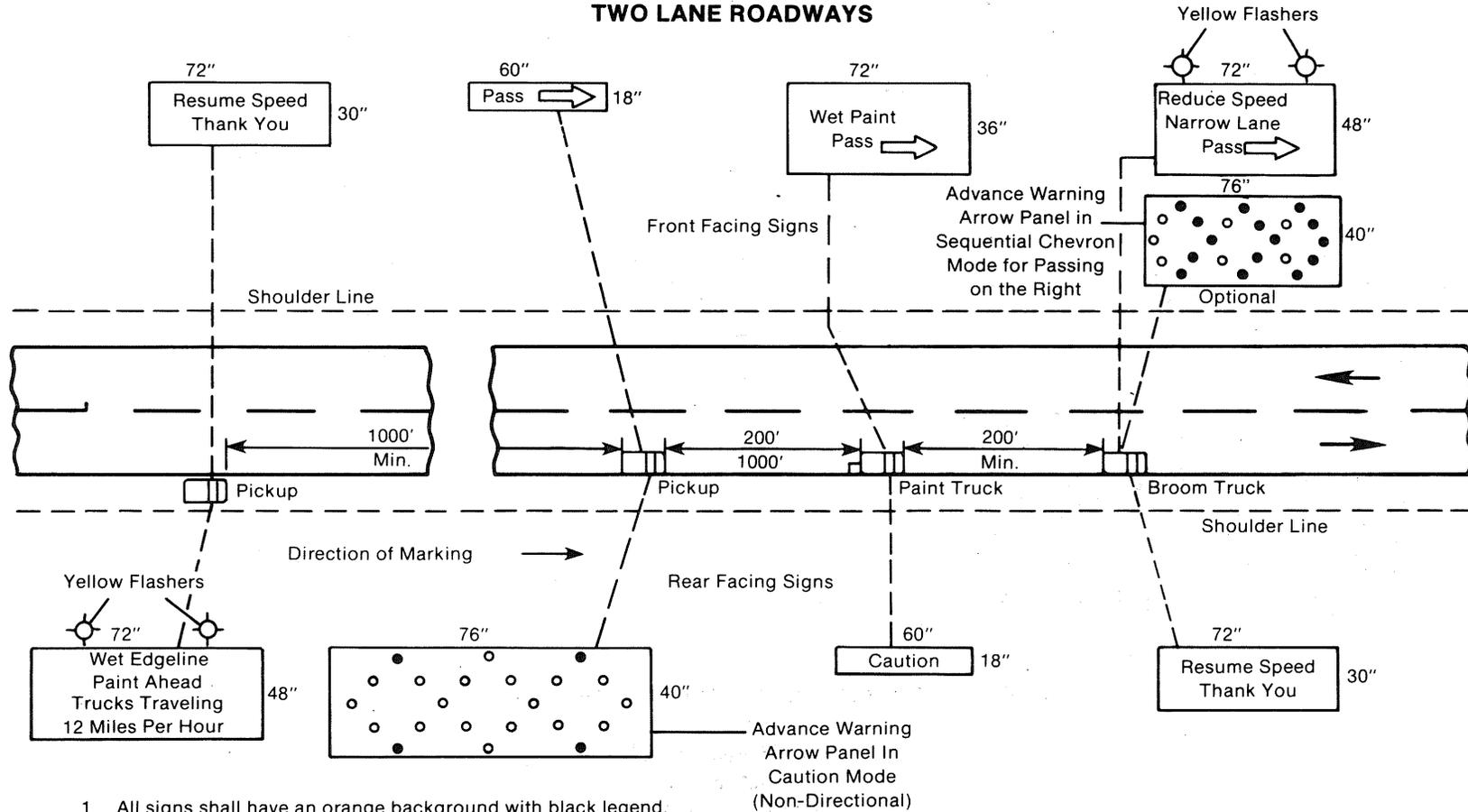
The Iowa State Patrol may be requested to have an officer present, if available, during the marking of Interstate or other multilane facilities. See Figure 46 for the location of a State Patrol vehicle when used. When markings are scheduled, the District Maintenance Engineer shall arrange with the District Office of the Patrol for this assistance, if deemed necessary.

**TRAFFIC CONTROL
FOR
CENTER LINE MARKINGS
ON
TWO LANE OR FOUR LANE UNDIVIDED ROADWAYS**



1. All signs shall have an orange background with black legend.
2. Flagpersons should be used at primary road junctions.

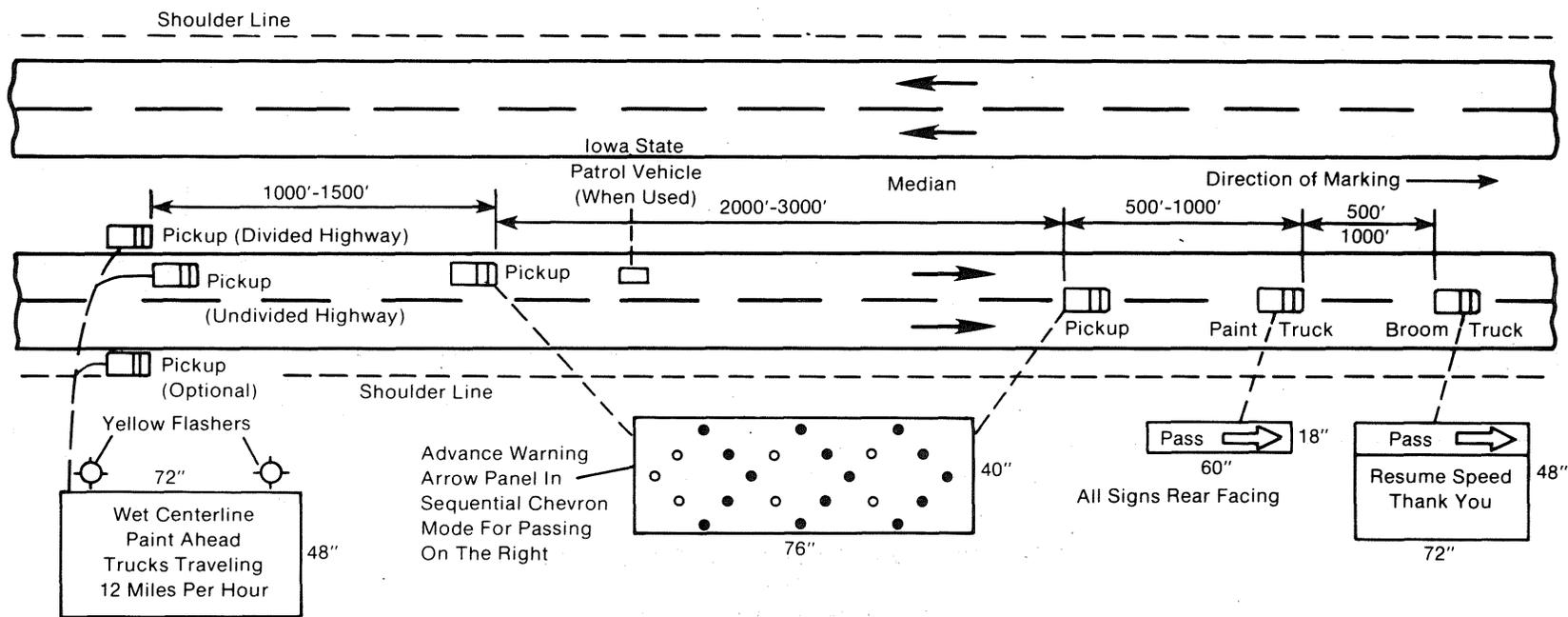
TRAFFIC CONTROL FOR EDGE LINE MARKINGS ON TWO LANE ROADWAYS



1. All signs shall have an orange background with black legend.
2. Flagpersons should be used at primary road junctions.

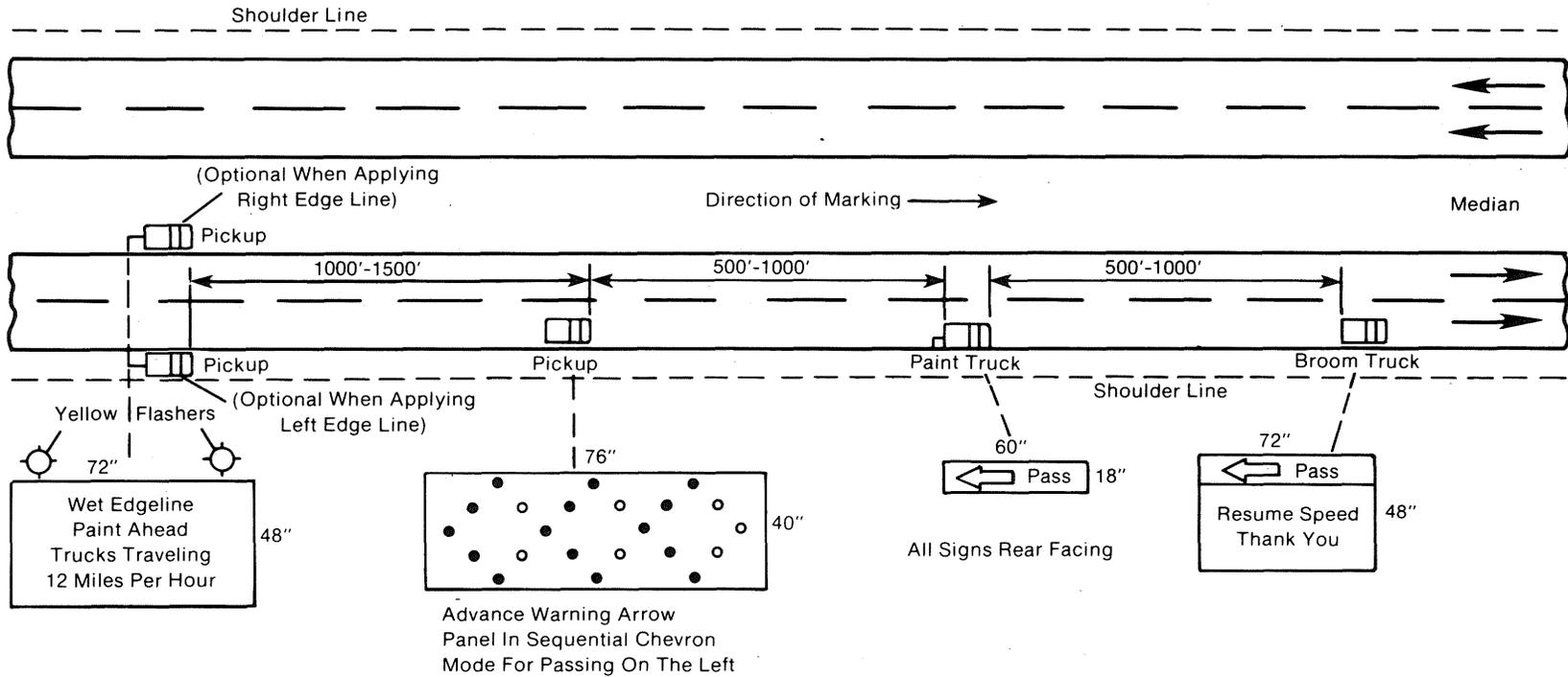
Figure 45

**TRAFFIC CONTROL
FOR
LANE LINE MARKINGS
ON
FOUR LANE DIVIDED AND UNDIVIDED ROADWAYS**



1. All signs shall have an orange background with black legend.
2. Distances between signs may vary depending on drying conditions.
3. Where traffic flow would be improved, passing on the left is permissible, but not both sides at one time.

**TRAFFIC CONTROL
FOR
EDGE LINE MARKINGS
ON
FOUR LANE DIVIDED AND UNDIVIDED ROADWAYS**



1. All signs shall have an orange background with black legend.
2. Signs are illustrated for placing the right edge line. When placing a left (median) edge line, signs shall indicate passing on the right.

SECTION 6 REPORTS AND RECORDS

General

The purpose of this section is to provide information and instructions to personnel involved with pavement marking operations on reports to be made, charging of materials and supplies and proper coding of time sheets.

Weekly Report of Accomplishments

Once pavement marking operations begin in the spring, a weekly report will be sent to the State Traffic Engineer in the Office of Maintenance by the District Paint Crew Supervisor. These reports are to be submitted each week throughout the season whether or not painting was actually done. The last report for the season should be marked "Final".

A letter size map of the District should be used for submitting the weekly report. See Figure 48 for an example. A quantity of these reporting maps will be furnished to the District Paint Crew Supervisor at the beginning of each season. Each weekly report should cover the work period beginning on Friday morning and ending on the following Thursday. Routes where center line markings were placed the previous week should be shown in red on the map. Routes where edge lines were placed should be shown in green. Miles in each of these categories shall be recorded to the nearest tenth of a mile. For instructions on how to determine reporting miles, see Figure 49.

Function Codes for Pavement Marking Operations

Function codes shown in Table 4 below are to be used for all reports and time sheets associated with pavement marking operations.

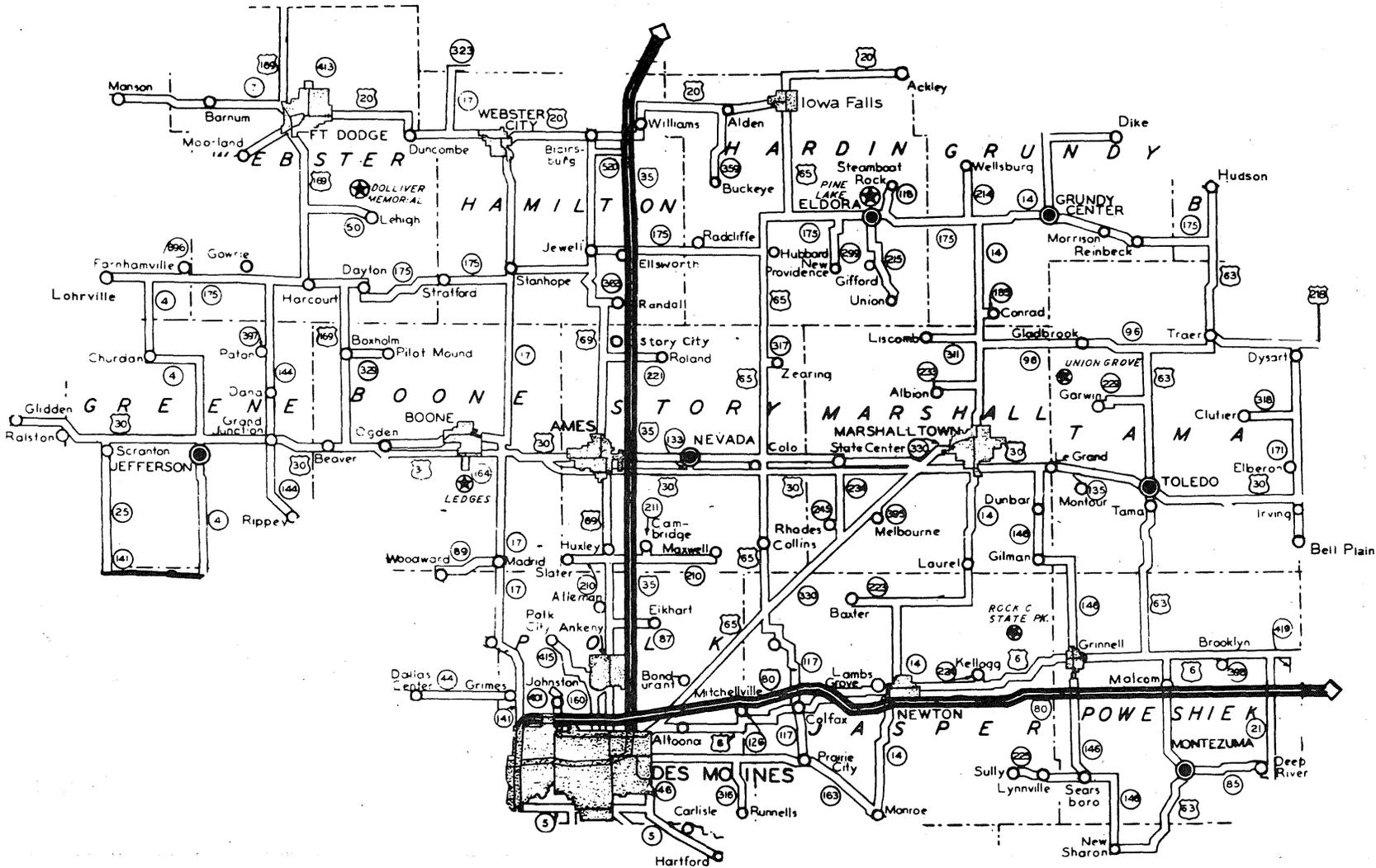


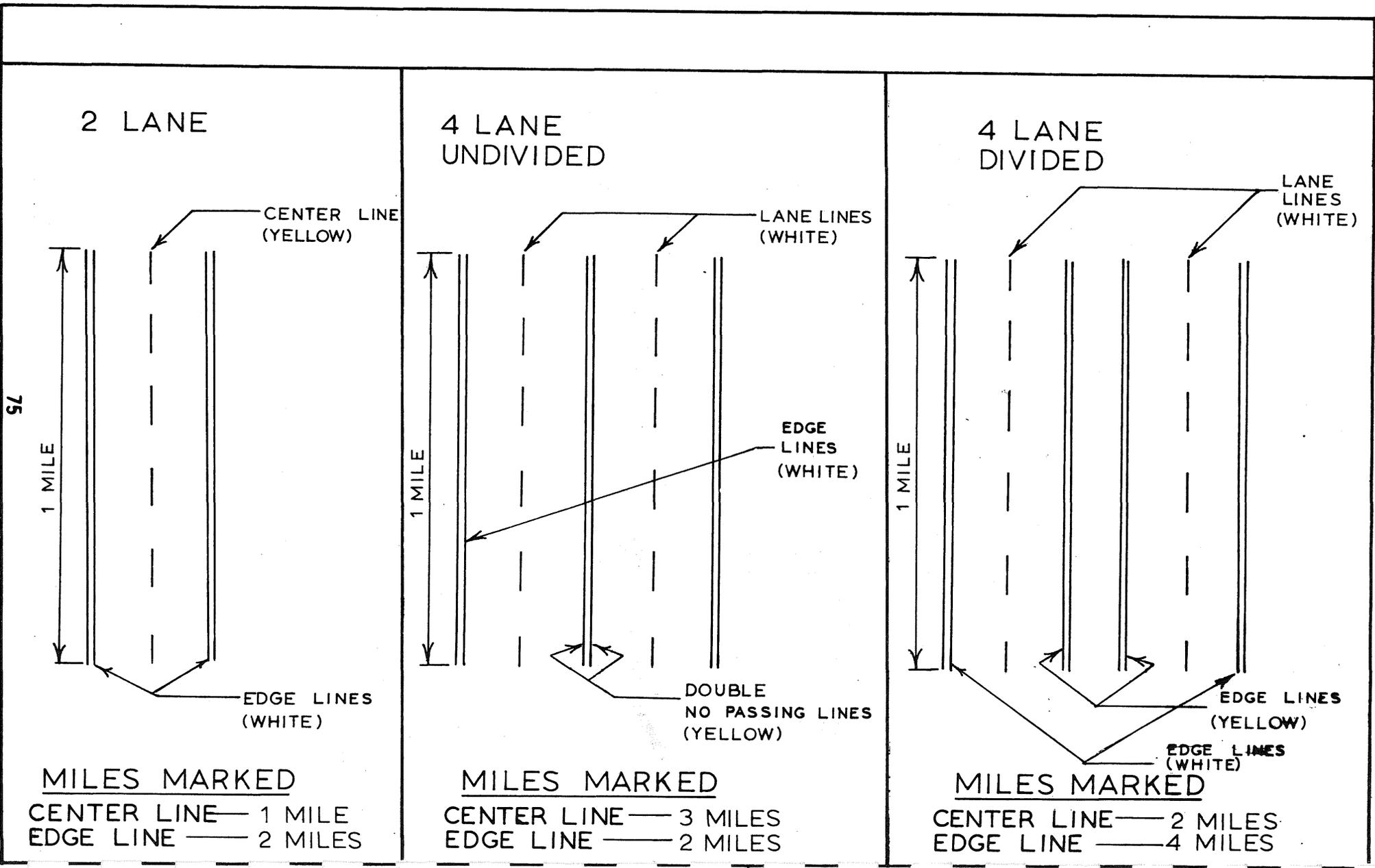
Figure 48

For Week Ending Thursday _____ 19 _____
 Centerlines Marked (Red) _____ Miles
 Edgelines Marked (Green) _____ Miles

74

Figure 49

EXAMPLES OF REPORTING MILES MARKED



Function Codes for Pavement Marking Operations	
Function Code	Description
602	District Paint Crew Supervision
605	Repair of Type "B" Equipment Including Annual Overhaul and Cleanup
663	Center Line and No Passing Line Markings
664	Edge Line Markings
665	Curb, Island and Miscellaneous Markings
673	Traffic Control for Pavement Marking Operations
674	Miscellaneous Time Associated with Traffic Marking Operations, but which cannot be charged directly to Functions 663, 664, 665 or 673.

Table 4

Charging Materials From Stock

It is necessary to keep accurate records on paint and beads used for pavement markings. Stock Issue Form 133005 is to be filled out at the end of each day charging out materials used for Functions 663, 664 and 665. See Figure 50 for an example. Materials should be charged to the Maintenance Cost Center, the county and the route number where they were used. The original or white copy of the Stock Issue should be sent to the Office of Purchasing and Inventory and the green and yellow copies should be retained by the issuing location.



STOCK ISSUE

ISSUING LOCATION

COST CENTER 5,5 LOC NO. 1,0 0,0 MO. 0,6 DAY 1,5 YR. 8,2

No. 601423

D.O.T. STOCK NUMBER	QUANTITY REQUESTED	UNIT OF ISSUE	DESCRIPTION	QUANTITY ISSUED	SYSTEM NUMBER	COUNTY NUMBER	ROUTE NUMBER OR BLDG. NUMBER	UNIT OR PAREN. NO.	A-NUMBER		RURAL 1 URBAN 2	PART 1 N.P. 2 SUSP. 3	FUNCTION CODE
									B	J			
0,1,6 0,4,7,5,5,0	550	Gal.	Paint, Yellow Traffic Fast Dry	550		8,5	0,0,3,0						6,6,3
0,0,2 0,2,7,4,0,0	3	Bag	Bead For C/L Marking	3		8,5	0,0,3,0						6,6,3
0,1,6 0,4,5,0,5,2	110	Gal.	Paint, White Traffic Fast Dry	110		8,5	0,0,3,0						6,6,4
0,0,2 0,2,7,4,0,0	2	Bag	Bead For C/L Marking	2		8,5	0,0,3,0						6,6,4
0,1,6 0,4,7,5,2,5	55	Gal.	Paint, Yellow Traffic Slow Dry	55		8,5	0,0,6,9						6,6,5
0,0,2 0,2,7,4,0,0	2	Bag	Bead For C/L Marking	2		8,5	0,0,6,9						6,6,5
			Distribution:										
			Original to Purchasing & Inventory										
			2nd & 3rd to Issuing Location										

SHIPPING DATA (Use when delivery is to be by D.O.T. Freight Service)

IF DELIVERY IS TO BE MADE TO A LOCATION OTHER THAN THE 'CHARGE TO' COST CENTER, SO INDICATE BELOW.

DELIVER TO:

GARAGE LOCATION

COMMENTS:

TO BE COMPLETED BY WAREHOUSE PERSONNEL

No.Pkgs.	Packed By	Date

TOTAL NUMBER OF PACKAGES

MATERIAL ISSUER'S SIGNATURE		DATE
CHARGE TO		
COST CENTER NAME	COST CENTER	LOC NO
Ames Maintenance	5,5,1,1	0,5
REQUESTOR'S SIGNATURE	DATE	
RECEIVER'S SIGNATURE	DATE	

Sample Stock Issue

When paint and/or beads are drawn from an inventory location outside of a Paint Crew's assigned District, a Stock Transfer shall be prepared in triplicate on Form 296. For an example, see Figure 51. The original shall be sent to the Office of Purchasing and Inventory, the second copy given to the receiver of the materials and the third copy retained by the issuing location.

Time Sheet Coding

Coding of time sheets shall be in accordance with the following instructions as illustrated on Figure 52 for permanent or part-time members of the Paint Crew and on Figure 53 for Area Maintenance Crews assisting the Paint Crew.

The Paint Crew Supervisor shall charge his time, expenses and mileage to Function 602 as illustrated on line 1 of Figure 52 unless he is actually operating equipment or assisting in the pavement marking operation. In this case, time shall be charged to other appropriate functions listed in Table 4.

Loading and transfer of materials, equipment cleanup, travel time and delays should be charged to the Function for the type of marking being placed, that is, 663, 664, or 665.

For permanent or part-time members of the Paint Crew, a Foreign Location shall always be used except for individuals who operate traffic control vehicles only. One time sheet entry shall be made to report the work accomplishment as shown on line 2 of Figure 52. This shows that center line (Function Code 663) was placed in Maintenance Area 551101 (Grundy Center Maintenance). The work was done in Grundy County (38) on Iowa 175 and the mileage was 25.7 reported under Work Identification Number. Note that the last column is for tenths of a mile. When reporting curb markings (Function Code 665), gallons to the nearest tenth should be shown under Work Identification Number.

Operators of traffic control vehicles who are permanent or part-time members of the Paint Crew should show Function Code 673, the county number and the route number. They should not enter a Foreign Location number or record miles completed. By this procedure, traffic control is then accumulated against the Paint Crew Cost Center.

Examples of time sheet coding for Area Maintenance Employees assisting the Paint Crew are shown on Figure 53. They should treat pavement markings the same as any other type of maintenance work. The first line illustrates coding for an employee involved directly in the pavement marking operation. An appropriate Function Code shall be used for the type of work being done and the county and route number shall be reported. A Foreign Location shall not be used unless the employee is outside of his assigned Maintenance Area, in which case, he should record the Cost Center for the area where the work took place under Foreign Location. The second line illustrates coding for an employee who operates a traffic control vehicle for the paint crew. The Paint Crew Cost Center should be used as a Foreign Location, regardless of where the work took place.

Expenses for all employees associated with pavement marking operations should be in accordance with DOT Policy 120.02.

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