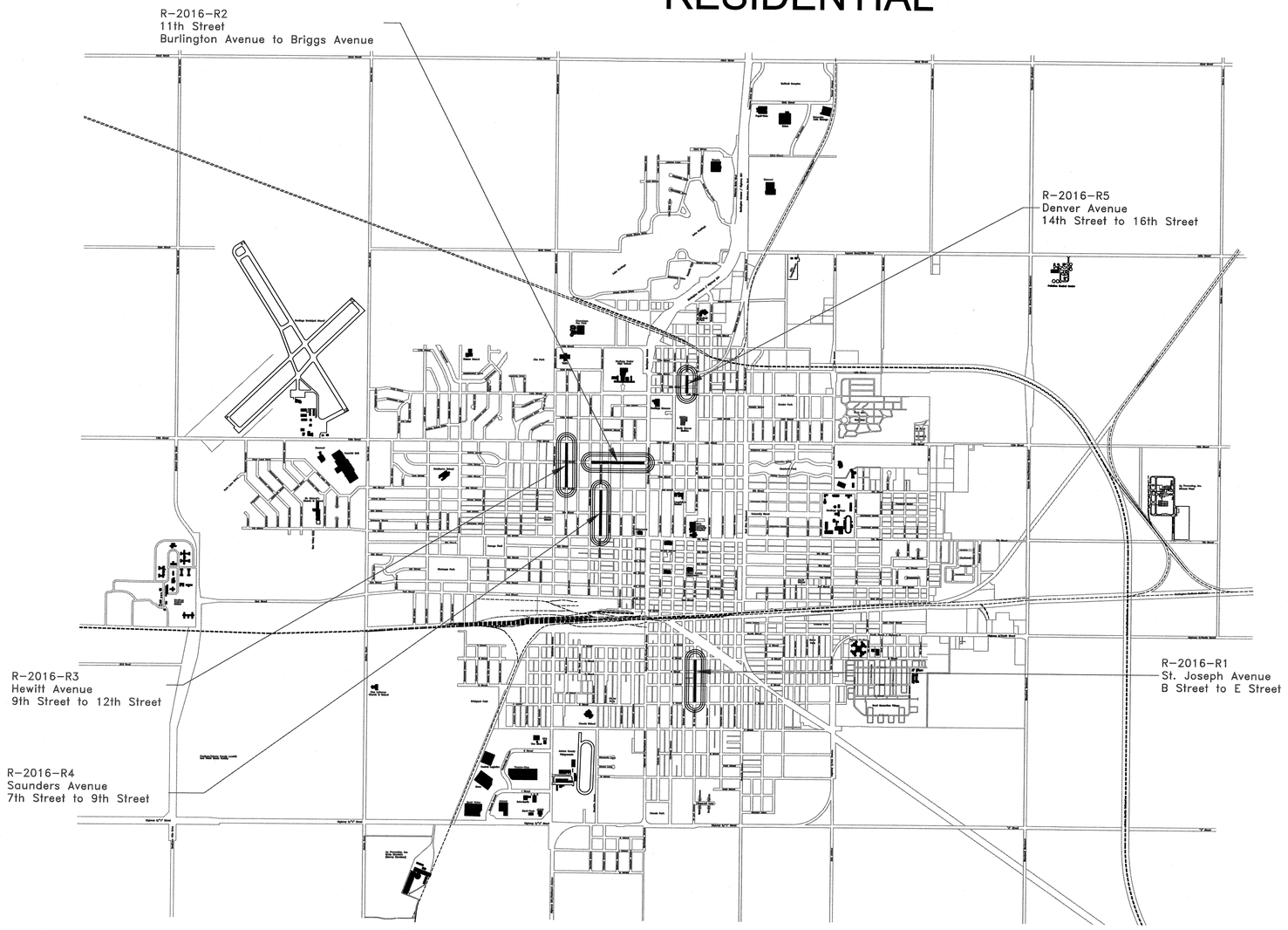
R - 2016-R RESURFACING
RESIDENTIAL



North

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3. PLAN DRAWINGS STA. 100+18.2 TO STA. 112+07

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921-R6 (2 SHEETS) TRAFFIC CONTROL, CONSTRUCTION AND MAINTENANCE
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924-R1 (3 SHEETS) TYPICAL URBAN TRAFFIC CONTROL PLAN

Hastings City Engineering
Hastings, NE

REGISTERED PROFESSIONAL ENGINEER
DAVID L WACKER
E-5090
4/27/16
STATE OF NEBRASKA

David L Wacker 4/27/2016
Hastings City Engineer Date

CITY OF HASTINGS, ENGINEERING DEPT.

Project	2016-RESIDENTIAL RESURFACING		
Proj. No.	R-2016-R		
Description	Title Page		
Design By		Date 4-2016	Contractor
Drawn By BK	Approved By DLW	Drn. No. 1 of 14	

R-2016-R RESURFACING RESIDENTIAL

ST JOSEPH AVENUE - B STREET TO E STREET

R-2016-R1

SUMMARY OF QUANTITIES

1.	Cold Milling Class 3 (approximately 2")	3,485.9	S.Y.
2.	Asphaltic Concrete Type SLX	507.4	Tons
3.	Asphaltic Cement Performance Graded Binder (64-34) with Evotherm	33.4	Tons
4.	Emulsified Asphalt (SS1H) Tack Coat	871.5	Gal
5.	Asphaltic Patching Type SPR	50.0	Tons
6.	Traffic Control, Barricades, and Maintenance thereof	1	Lump. Sum

GENERAL NOTES

MATERIALS - GENERAL REQUIREMENTS

1. Asphaltic Oil for Tack coat SS1H

   Water used to dilute emulsified asphalt shall be mixed in approximate 50-50 proportion with the oil. The rate of application of the diluted emulsified asphalt shall generally be from .10 to .20 of a gallon per square yard.

2. Asphaltic Concrete

   Type SLX and SPR asphalt according to State Specifications

CONTRACTOR'S NOTE

1. It will be the responsibility of the Contractor to dispose all pavement removal.
2. Contractor will be required to have all utilities located prior to start of work.
3. Contractor shall remove existing asphalt in driveways and shall be subsidiary to the unit price for Cold Milling Class 3.
4. Excavation, backfilling, and sawing control joints, keyway, tie bars, dowel pins, and rubberized joint sealant shall be considered subsidiary to the unit price per square yard of pavement.

NOTES:

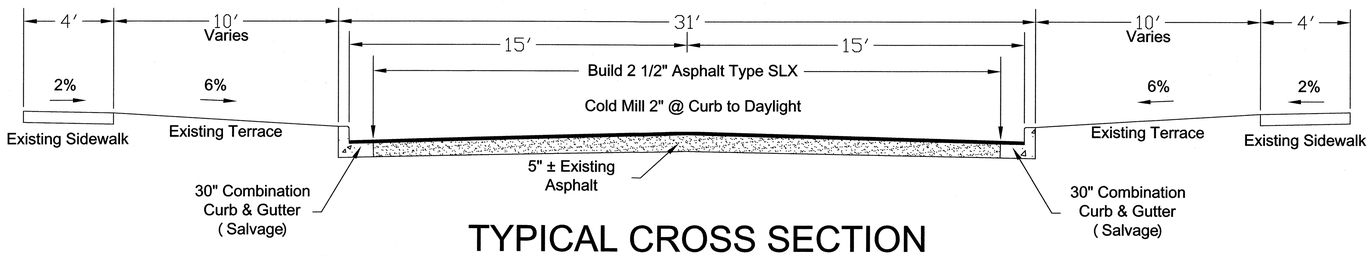
Contractor to mill outer edge to a depth of 2" and transition to daylight as indicated on project cross section plan.

Two lifts of asphalt are suggested with a 1" leveling course followed by a 1 1/2" top lift.

Sub-base may require various patching to be determined by Engineer after milling operation and street has been cleaned.

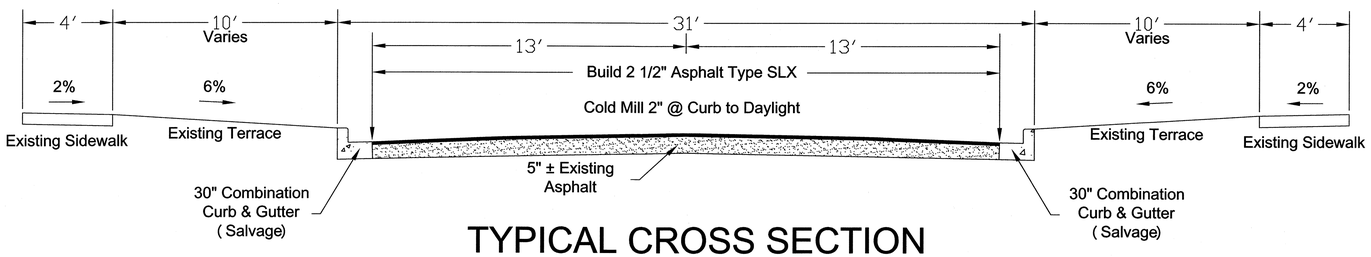
Millings are to become the property of the contractor.

Ends and returns on all roads, intersections, and driveways will be sawed prior to installation of asphalt and shall be subsidiary to the unit price of asphalt type SLX. Contractor shall use caution not to damage driveways during the removal of existing asphalt.



TYPICAL CROSS SECTION

STA. 100+18.2 TO STA. 104+82.7



TYPICAL CROSS SECTION

STA. 105+31 TO STA. 112+07

Note: Cross section 2% minimum slope maybe adjusted in field by Engineer to accommodate existing conditions.

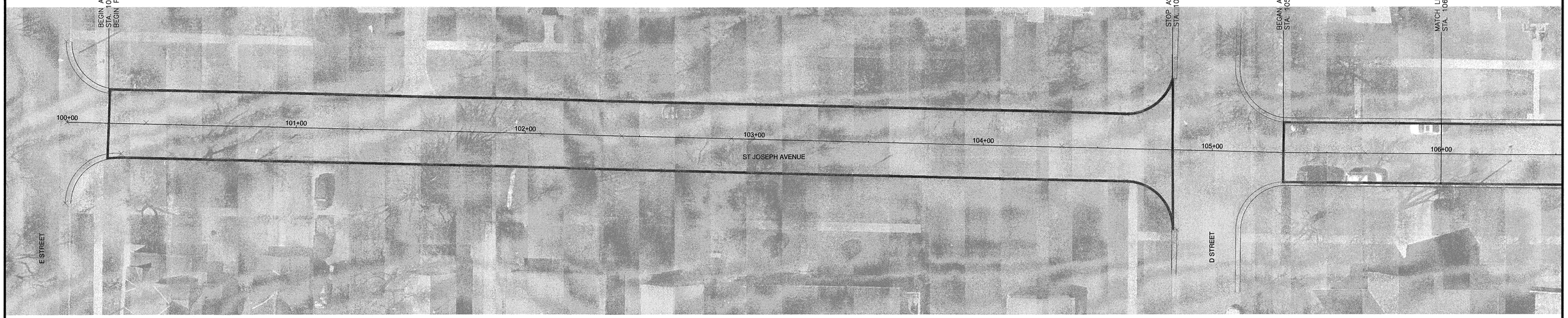
REGISTERED PROFESSIONAL ENGINEER
DAVID L. WACKER
E-5090
4/27/2017
STATE OF MINNESOTA

CITY OF HASTINGS, ENGINEERING DEPT.

Project	2016 RESURFACING		
Proj. No.	R-2016-R1		
Description	ST JOSEPH AVENUE- B STREET TO E STREET		
Design By		Date 4-2016	Contractor
Drawn By	BK	Approved By	Drn. No. 2 of 14

COLD MILLING CLASS 3 (For Info. Only)		
Station to Station	Width	Sq. Yards
100+18.2 to 104+82.7	30	1,552.4
105+31 to 106+00	26	200.2

ASPHALT TYPE SLX (For Info. Only)		
Station to Station	Width	Tons
100+18.2 to 104+82.7	30	218.0
105+31 to 106+00	26	28.1

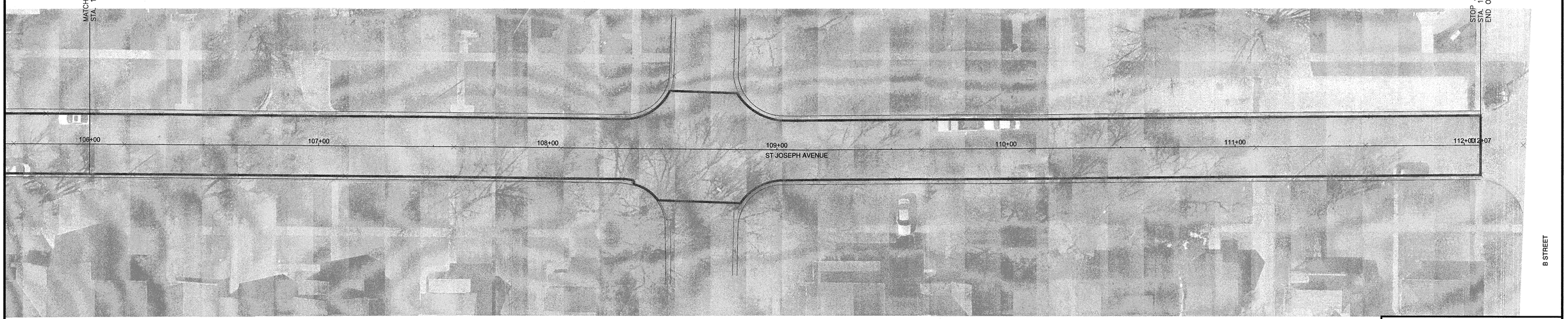


NORTH
Scale: 1"=20'

20' 0' 20' 40' 60'

COLD MILLING CLASS 3 (For Info. Only)		
Station to Station	Width	Sq. Yards
106+00 to 112+07	26	1,733.3

ASPHALT TYPE SLX (For Info. Only)		
Station to Station	Width	Tons
106+00 to 112+07	26	261.3



NORTH
Scale: 1"=20'

20' 0' 20' 40' 60'

REGISTERED PROFESSIONAL ENGINEER
DAVID L. WACKER
E-5090
4-27-2016

CITY OF HASTINGS, ENGINEERING DEPT.

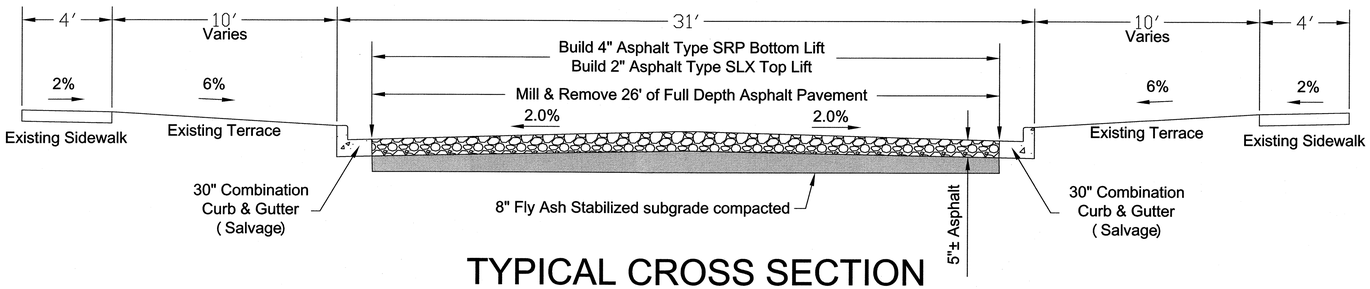
Project	2016 RESURFACING
Proj. No.	R-2016-R1
Description	ST JOSEPH AVENUE– B STREET TO E STREET
Design By	Date 4-2016 Contractor
Drawn By BK	Approved DLW Drn. No. 3 of 14

11TH STREET - BURLINGTON AVENUE TO BRIGGS AVENUE

R-2016-R2

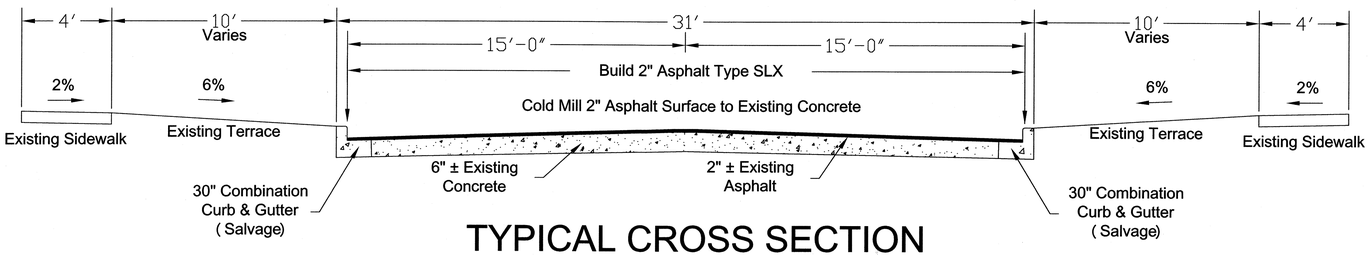
SUMMARY OF QUANTITIES

1.	Cold Milling Class 3 (approximately 2")	2,067.0	S.Y.
2.	Cold Milling Class 4 (approximately 6")	2,023.3	S.Y.
3.	Asphaltic Concrete Type SPR	455.3	Tons
4.	Asphaltic Concrete Type SLX	460.2	Tons
5.	Asphaltic Cement Performance Graded Binder (64-34) with Evotherm	54.9	Tons
6.	Emulsified Asphalt (SS1H) Tack Coat	1,022.6	Gal
7.	Subgrade Preparation	2,023.3	S.Y.
8.	8" StabilizedSubgrade, Type C Fly Ash	70.8	Tons
9.	6" Concrete Pavement Repair, Type 47B HE	50.0	S.Y.
10.	Remove 30" Combination Curb & Gutter	289.6	Lin. Ft.
11.	Full Depth Saw Cut	216.9	Lin. Ft.
12.	Remove Concrete Pavement (Intersection)	539.0	S.Y.
13.	Build 6" PCC Concrete Pavement (47B) (Intersection)	539.0	S.Y.
14.	Remove Sidewalk	104.3	S.Y.
15.	Build 5" PCC Concrete Sidewalk (47B)	104.3	S.Y.
16.	Build Curb Ramp (Detectable Warning Pad Furnished by City)	12	Each
17.	Adjust Manhole to Grade	3	Each
18.	Traffic Control, Barricades, and Maintenance thereof	1	Lump. Sum



TYPICAL CROSS SECTION

STA. 200+59.8 TO STA. 203+27
STA. 203+98.7 TO STA. 205+64.1
STA. 206+34.6 TO STA. 209+02.4



TYPICAL CROSS SECTION

STA. 209+73.9 TO STA. 215+94

Note: Cross section 2% minimum slope maybe adjusted in field by Engineer to accommodate existing conditions.

GENERAL NOTES

MATERIALS - GENERAL REQUIREMENTS

1. Asphaltic Oil for Tack coat SS1H

   Water used to dilute emulsified asphalt shall be mixed in approximate 50-50 proportion with the oil. The rate of application of the diluted emulsified asphalt shall generally be from .10 to .20 of a gallon per square yard.

2. Asphaltic Concrete

   Type SLX and SPR asphalt according to State Specifications

CONTRACTOR'S NOTE

1. It will be the responsibility of the Contractor to dispose all pavement removal.
2. Contractor will be required to have all utilities located prior to start of work.
3. Contractor shall remove existing asphalt in driveways and shall be subsidiary to the unit price for Cold Milling Class 3.
4. Excavation, backfilling, and sawing control joints, keyway, tie bars, dowel pins, and rubberized joint sealant shall be considered subsidiary to the unit price per square yard of pavement.

NOTES:

Contractor to mill full depth asphalt section from Sta. 200+59.8 to Sta. 209+02.4 as shown on project cross sections.

Contractor to mill 2" ± to existing concrete from Sta. 209+73.9 to Sta. 215+94

Subgrade shall be scarified to a depth of 8" fly ash added, watered and recompacted to complete stabilization for new area receiving full depth asphalt.

This project will be done in two or more lifts, the first lift of asphalt will consist of 4" type SPR, and the seconded or top lift of asphalt willl consist of 2" type SLX

Sub-base may require various patching to be determined by Engineer after milling operation and street has been cleaned.

Millings are to become the property of the contractor.

Ends and returns on all roads, intersections, and driveways will be sawed prior to installation of Asphalt and shall be subsidiary to the Unit Price of Asphalt Type SPR. Contractor shall use caution not to damage driveways during the removal of existing asphalt.

REGISTERED PROFESSIONAL ENGINEER
DAVID L. WACKER
E-8060
4/27/2016
STATE OF NEBRASKA

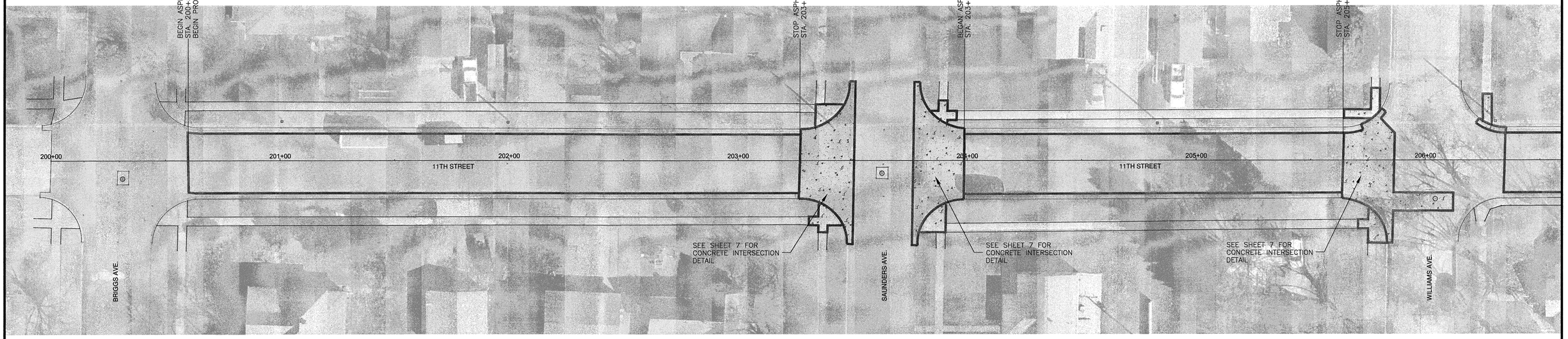
CITY OF HASTINGS, ENGINEERING DEPT.

Project	2016 RESURFACING		
Proj. No.	R-2016-R2		
Description	11TH STREET- BURLINGTON TO BRIGGS AVE.		
Design By		Date 4-2016	Contractor
Drawn By	BK	Approved By	Drn. No. 4 of 14

COLD MILLING CLASS 4 (For Info. Only)		
Station to Station	Width	Sq. Yards
200+59.8 to 203+27	26	771.9
203+98.7 to 205+64.1	26	477.8

ASPHALT TYPE SPR (For Info. Only)		
Station to Station	Width	Tons
200+59.8 to 203+27	26	173.7
203+98.7 to 205+64.1	26	107.5

ASPHALT TYPE SLX (For Info. Only)		
Station to Station	Width	Tons
200+59.8 to 203+27	26	86.8
203+98.7 to 205+64.1	26	53.8



NORTH
Scale: 1"=20'

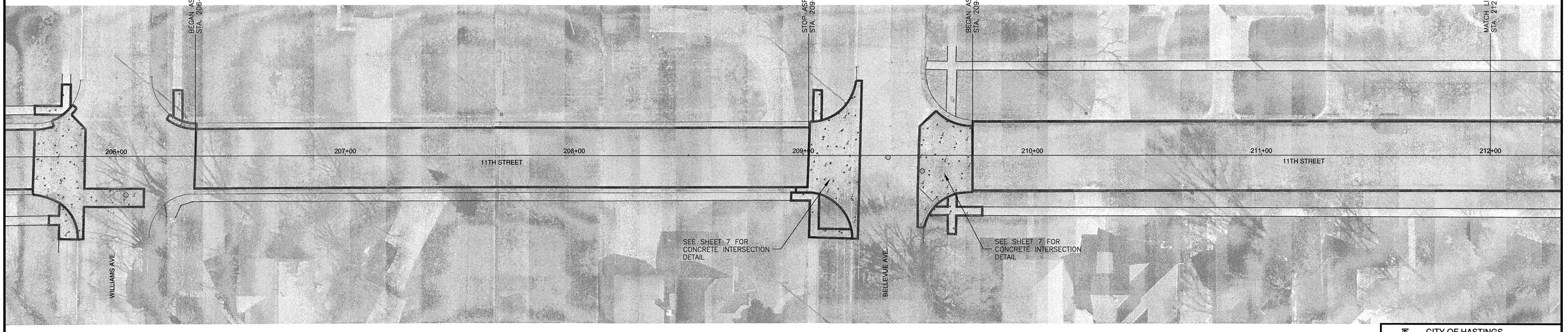
20' 0' 20' 40' 60'

COLD MILLING CLASS 4 (For Info. Only)		
Station to Station	Width	Sq. Yards
206+34.6 to 209+02.4	26	773.6

COLD MILLING CLASS 3 (For Info. Only)		
Station to Station	Width	Sq. Yards
209+73.9 to 212+00	30	753.7

ASPHALT TYPE SPR (For Info. Only)		
Station to Station	Width	Tons
206+34.6 to 209+02.4	26	174.1

ASPHALT TYPE SLX (For Info. Only)		
Station to Station	Width	Tons
206+34.6 to 209+02.4	26	87.0
209+73.9 to 212+00	30	84.8



NORTH
Scale: 1"=20'

20' 0' 20' 40' 60'

REGISTERED PROFESSIONAL ENGINEER
DAVID L. WACKER
E-5090
4-29-2016

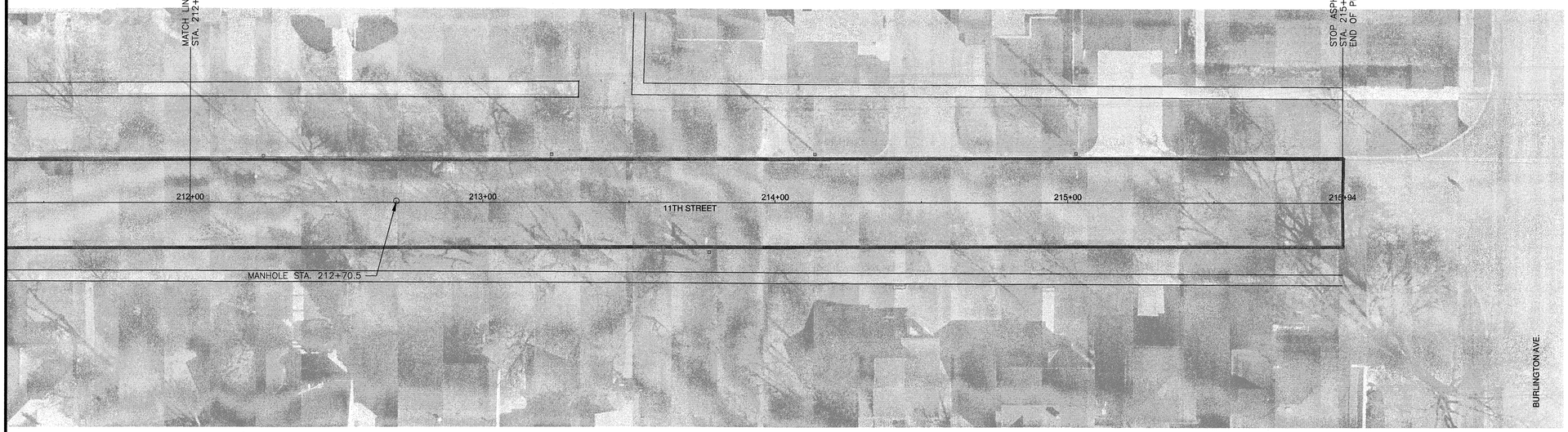
CITY OF HASTINGS, ENGINEERING DEPT.

Project	2016 RESURFACING
Proj. No.	R-2016-R2
Description	11TH STREET- BURLINGTON AVE TO BRIGGS AVE
Design By	Date 4-2016 Contractor
Drawn By BK	Approved By Dm. No.

COLD MILLING CLASS 3 (For Info. Only)		
Station to Station	Width	Sq. Yards
212+00 to 215+94	30	1,313.3

ASPHALT TYPE SLX (For Info. Only)		
Station to Station	Width	Tons
212+00 to 215+94	30	147.8

ADJUST MANHOLE TO GRADE		
Station	O.S. / Side	Each
212+70.5	CL	1



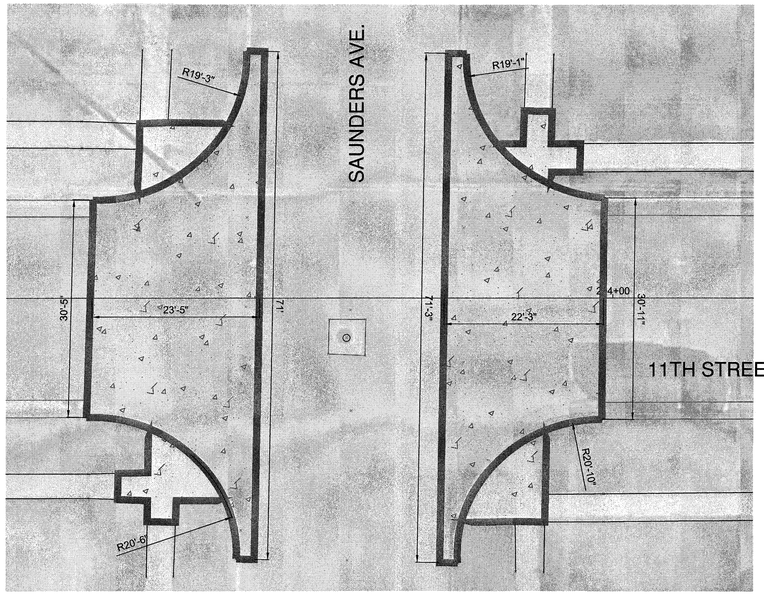
NORTH
Scale: 1"=20'

20' 0' 20' 40' 60'

REGISTERED PROFESSIONAL ENGINEER
DAVID L. WACKER
E-5090
4/27/2016
STATE OF NEBRASKA

CITY OF HASTINGS, ENGINEERING DEPT.

Project	2016 RESURFACING	
Proj. No.	R-2016-R2	
Description	11TH STREET- BURLINGTON AVE TO BRIGGS AVE	
Design By	Date 4-2016	Contractor
Drawn By BK	Approved By	Drn. No. 6 of 14



NORTH
Scale: 1"=10'

10' 0' 10' 20' 30'

SAW CUT		
Station to Station	Side	Lin. Ft.
203+50.6	LT & RT	71.0
203+76.4	LT & RT	71.2

REMOVE 30" COMBINATION CURB AND GUTTER		
Station to Station	Side	Lin. Ft.
203+27 to 203+50.6	RT	33.6
203+27 to 203+50.6	LT	34.4
203+76.4 to 203+98.7	RT	32.9
203+76.4 to 203+98.7	LT	32.5

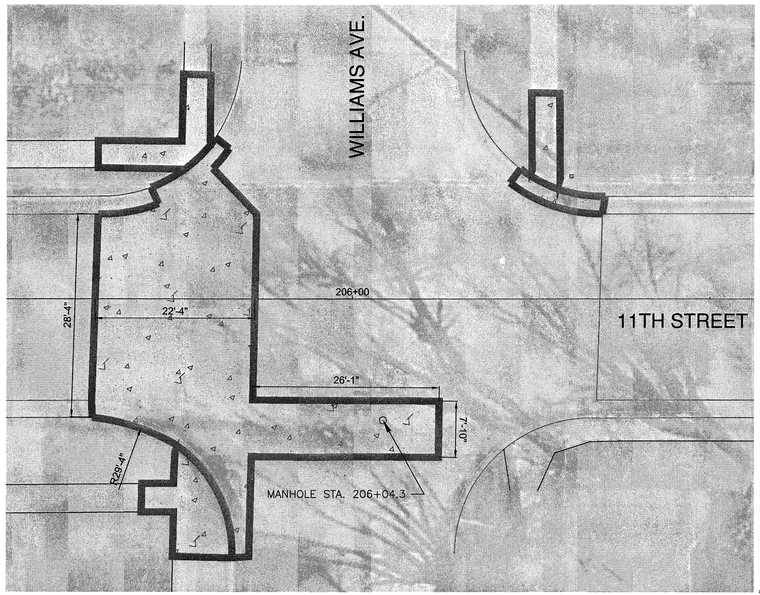
BUILD 6" P.C.C. PAVEMENT 47B		
Station to Station	Side	Sq. Yds.
203+27 to 203+50.6	LT & RT	110.2
203+76.4 to 203+98.7	LT & RT	106.0

REMOVE SIDEWALK		
Station to Station	Side	Sq. Yds.
203+30.9 to 203+45.9	RT	10.8
203+33.5 to 203+46.3	LT	8.9
203+78.8 to 203+90.7	RT	11.1
203+83.7 to 203+95.3	LT	6.6

BUILD 5" P.C.C. SIDEWALK 47B		
Station to Station	Side	Sq. Yds.
203+30.9 to 203+45.9	RT	10.8
203+33.5 to 203+46.3	LT	8.9
203+78.8 to 203+90.7	RT	11.1
203+83.7 to 203+95.3	LT	6.6

BUILD CURB RAMP WITH DETECTABLE WARNING		
Station to Station	Side	Each
203+39.9	LT	1
203+39.9	RT	1
203+84.8	LT	1
203+84.8	RT	1

*NOTE: DETECTABLE WARNING PANEL SUPPLIED BY CITY OF HASTINGS



NORTH
Scale: 1"=10'

10' 0' 10' 20' 30'

SAW CUT		
Station to Station	Side	Lin. Ft.
205+86.4	RT	14.0

REMOVE 30" COMBINATION CURB AND GUTTER		
Station to Station	Side	Lin. Ft.
205+64.1 to 205+83.2	RT	32.6
205+71.8 to 205+82.8	LT	12.1
206+22 to 206+34.6	LT	13.1

BUILD 6" P.C.C. PAVEMENT 47B		
Station to Station	Side	Sq. Yds.
205+64.1 to 206+12.2	LT & RT	117.0
206+22 to 206+34.6	LT	3.6

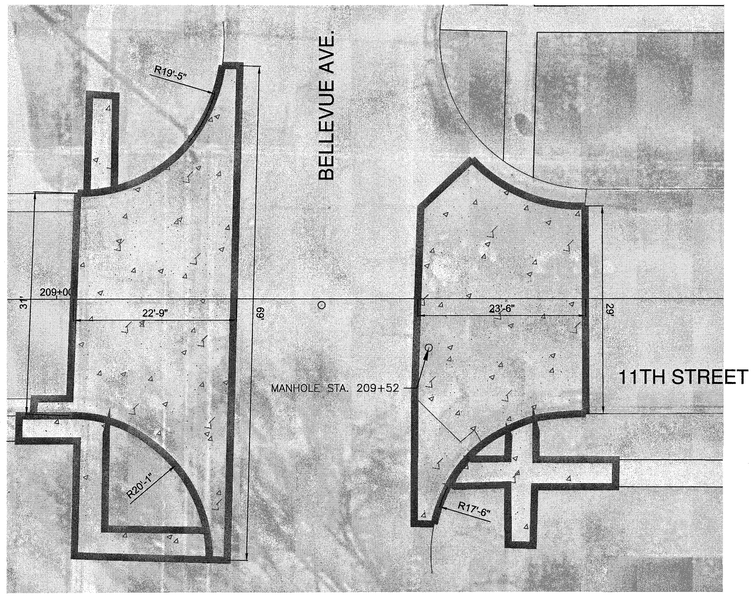
REMOVE SIDEWALK		
Station to Station	Side	Sq. Yds.
205+64.5 to 205+80.1	LT	10.2
205+70.7 to 205+83.2	RT	12.3
206+25 to 206+28	LT	5.5

BUILD 5" P.C.C. SIDEWALK 47B		
Station to Station	Side	Sq. Yds.
205+64.5 to 205+80.1	LT	10.2
205+70.7 to 205+83.2	RT	12.3
206+25 to 206+28	LT	5.5

BUILD CURB RAMP WITH DETECTABLE WARNING		
Station to Station	Side	Each
205+76.1	LT	1
205+76.1	RT	1
206+26.2	LT	1

*NOTE: DETECTABLE WARNING PANEL SUPPLIED BY CITY OF HASTINGS

ADJUST MANHOLE TO GRADE		
Station	O.S. / Side	Each
206+04.3	16.9/RT	1



NORTH
Scale: 1"=10'

10' 0' 10' 20' 30'

SAW CUT		
Station to Station	Side	Lin. Ft.
209+24.8	LT & RT	42.7
209+50.5	RT	18.0

REMOVE 30" COMBINATION CURB AND GUTTER		
Station to Station	Side	Lin. Ft.
209+02.4 to 209+24.8	RT	37.7
209+02.4 to 209+24.8	LT	30.8
209+50.5 to 209+73.9	RT	29.9

BUILD 6" P.C.C. PAVEMENT 47B		
Station to Station	Side	Sq. Yds.
209+02.4 to 209+24.8	LT & RT	107.8
209+50.5 to 209+73.9	LT & RT	94.4

REMOVE SIDEWALK		
Station to Station	Side	Sq. Yds.
208+94.8 to 209+21	RT	18.5
209+04.2 to 209+08.2	LT	5.6
209+54.7 to 209+78.2	RT	14.8

BUILD 5" P.C.C. SIDEWALK 47B		
Station to Station	Side	Sq. Yds.
208+94.8 to 209+21	RT	18.5
209+04.2 to 209+08.2	LT	5.6
209+54.7 to 209+78.2	RT	14.8

BUILD CURB RAMP WITH DETECTABLE WARNING		
Station to Station	Side	Each
209+06.2	LT	1
209+06.2	RT	1
209+21	RT	1
209+57.3	RT	1
209+65	RT	1

*NOTE: DETECTABLE WARNING PANEL SUPPLIED BY CITY OF HASTINGS

ADJUST MANHOLE TO GRADE		
Station	O.S. / Side	Each
209+52	6.8/RT	1

REGISTERED PROFESSIONAL ENGINEER
DAVID L. WACKER
E-5090
4-27-2016
STATE OF MINNESOTA

CITY OF HASTINGS, ENGINEERING DEPT.

Project	2016 RESURFACING
Proj. No.	R-2016-R2
Description	11TH STREET- BURLINGTON AVE TO BRIGGS AVE
Design By	
Date	4-2016
Contractor	
Drawn By	BK
Approved By	
Drn. No.	7 of 14

HEWITT AVENUE - 9TH STREET TO 12TH STREET

R-2016-R3

SUMMARY OF QUANTITIES

1.	Cold Milling Class 3 (approximately 2")	4,121.1	S.Y.
2.	Asphaltic Concrete Type SLX	347.7	Tons
3.	Asphaltic Cement Performance Graded Binder (64-34) with Evotherm	20.9	Tons
4.	Emulsified Asphalt (SS1H) Tack Coat	1,030.3	Gal
5.	6" Concrete Pavement Repair, Type 47B HE	50.0	S.Y.
6.	Remove 30" Combination Curb & Gutter	39.4	Lin. Ft.
7.	Build 30" Combination Curb & Gutter (47B)	39.4	Lin. Ft.
8.	Adjust Utility Valve to Grade	1	Each
9.	Adjust Manhole to Grade	2	Each
10.	Traffic Control, Barricades, and Maintenance thereof	1	Lump. Sum

MATERIALS - GENERAL REQUIREMENTS

1. Asphaltic Oil for Tack coat SS1H

   Water used to dilute emulsified asphalt shall be mixed in approximate 50-50 proportion with the oil. The rate of application of the diluted emulsified asphalt shall generally be from .10 to .20 of a gallon per square yard.

2. Asphaltic Concrete

   Type SLX asphalt according to State Specifications

GENERAL NOTES

CONTRACTOR'S NOTE

1. It will be the responsibility of the Contractor to dispose all pavement removal.

2. Contractor will be required to have all utilities located prior to start of work.

3. Contractor shall remove existing asphalt in driveways and shall be subsidiary to the unit price for Cold Milling Class 3.

4. Excavation, backfilling, and sawing control joints, keyway, tie bars, dowel pins, and rubberized joint sealant shall be considered subsidiary to the unit price per square yard of pavement.

Contractor to mill to a depth of 2 1/2" referenced on typical sections plan.

NOTES:

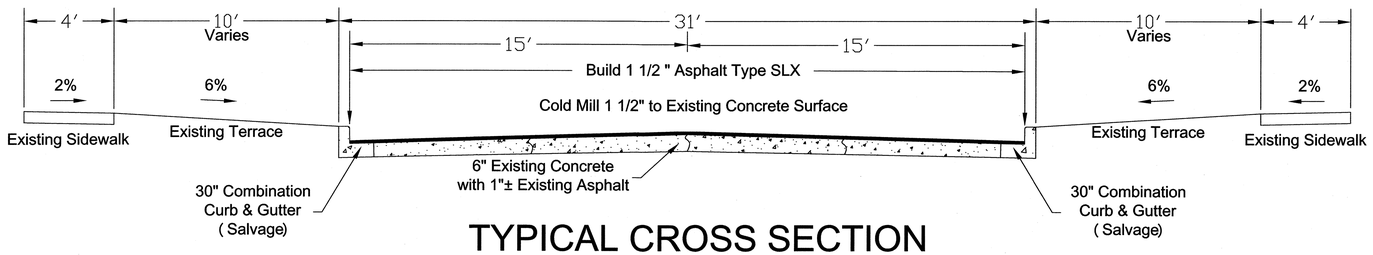
Contractor to mill a depth of 1 1/2" and referenced on typical sections plan.

One lifts of asphalt are suggested with a 1 1/2" top lift.

Sub-base may require various patching to be determined by Engineer after milling operation and street has been cleaned.

Millings are to become the property of the contractor.

Ends and returns on all roads, intersections, and driveways will be sawed prior to installation of asphalt and shall be subsidiary to the unit price of asphalt type SLX. Contractor shall use caution not to damage driveways during the removal of existing asphalt.



TYPICAL CROSS SECTION

STA. 300+00 TO STA. 311+96

Note: Cross section 2% minimum slope maybe adjusted in field by Engineer to accommodate existing conditions.

REGISTERED PROFESSIONAL ENGINEER
DAVID L. WACKER
E-5090
STATE OF MINNESOTA
4/25/2016

CITY OF HASTINGS, ENGINEERING DEPT.

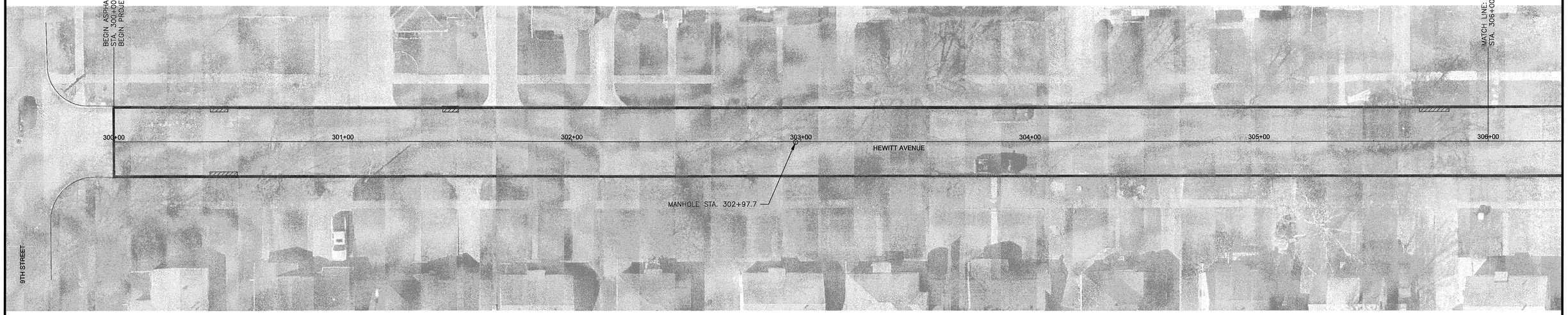
Project	2016 RESURFACING		
Proj. No.	R-2016-R3		
Description	HEWITT AVENUE – 9TH ST. TO 12TH ST.		
Design By		Date 4-2016	Contractor
Drawn By BK		Approved By	Drn. No. 8 of 14

REMOVE 30" COMBINATION CURB AND GUTTER		
Station to Station	Side	Lin. Ft.
300+42 to 300+49.6	LT	7.6
300+42 to 300+54	RT	12.0
301+43.6 to 301+50.4	LT	6.8
305+70 to 305+83	LT	13.0

COLD MILLING CLASS 3 (For Info. Only)		
Station to Station	Width	Sq. Yards
300+00 to 306+00	30	1,990.9

ASPHALT TYPE SLX (For Info. Only)		
Station to Station	Width	Tons
300+00 to 306+00	30	168.0

ADJUST MANHOLE TO GRADE		
Station	O.S. / Side	Each
302+97.7	CL	1



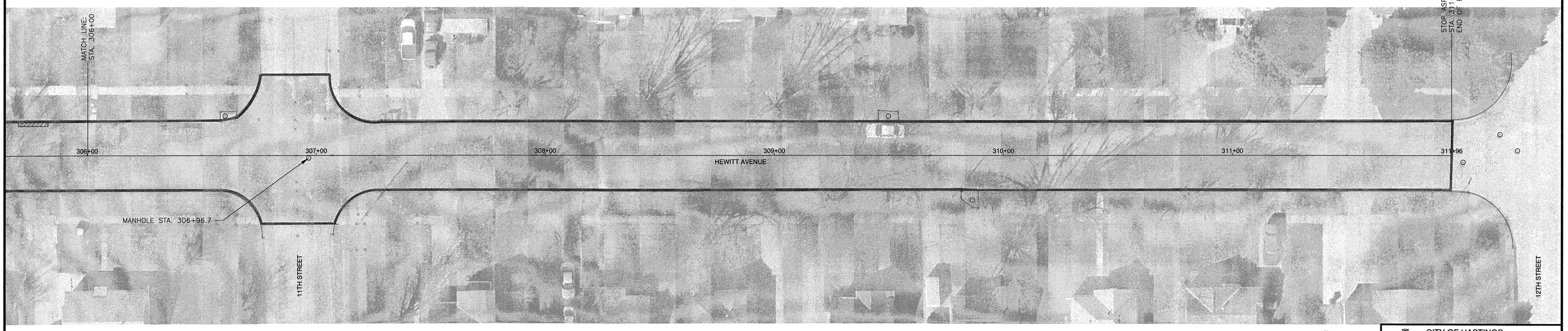
NORTH
Scale: 1"=20'

20' 0' 20' 40' 60'

COLD MILLING CLASS 3 (For Info. Only)		
Station to Station	Width	Sq. Yards
306+00 to 311+96	30	2,130.2

ASPHALT TYPE SLX (For Info. Only)		
Station to Station	Width	Tons
306+00 to 311+96	30	179.7

ADJUST MANHOLE TO GRADE		
Station	O.S. / Side	Each
306+96.7	CL	1



NORTH
Scale: 1"=20'

20' 0' 20' 40' 60'

REGISTERED PROFESSIONAL ENGINEER
DAVID L. WACKER
E-50180
4/27/2016
STATE OF MINNESOTA

CITY OF HASTINGS, ENGINEERING DEPT.

Project	2016 RESURFACING
Proj. No.	R-2016-R3
Description	HEWITT AVENUE- 9TH STREET TO 12TH STREET
Design By	
Date	4-2016
Contractor	
Drawn By	BK
Approved By	
Drn. No.	9 of 14

SAUNDERS AVENUE - 7TH STREET TO 9TH STREET

R-2016-R4

SUMMARY OF QUANTITIES

1.	Cold Milling Class 3 (approximately 2")	3,420.4	S.Y.
2.	Asphaltic Concrete Type SLX	480.2	Tons
3.	Asphaltic Cement Performance Graded Binder (64-34) with Evotherm	31.8	Tons
4.	Emulsified Asphalt (SS1H) Tack Coat	855.1	Gal
5.	Asphaltic Patching Type SPR	50.0	Tons
6.	Full Depth Saw Cut	74.4	Lin. Ft.
7.	Remove Concrete Pavement (Intersection)	310.3	S.Y.
8.	Build 6" PCC Concrete Pavement (47B) (Intersection)	310.3	S.Y.
9.	Remove 30" Combination Curb & Gutter	159.4	Lin. Ft.
10.	Build 30" Combination Curb & Gutter (47B)	159.4	Lin. Ft.
11.	Adjust Manhole to Grade	4	Each
12.	Adjust Utility Water Valve to Grade	3	Each
13.	Traffic Control, Barricades, and Maintenance thereof	1	Lump. Sum

GENERAL NOTES

MATERIALS - GENERAL REQUIREMENTS

1. Asphaltic Oil for Tack coat SS1H

   Water used to dilute emulsified asphalt shall be mixed in approximate 50-50 proportion with the oil. The rate of application of the diluted emulsified asphalt shall generally be from .10 to .20 of a gallon per square yard.

2. Asphaltic Concrete

   Type SLX and SPR asphalt according to State Specifications

CONTRACTOR'S NOTE

1. It will be the responsibility of the Contractor to dispose all pavement removal.
2. Contractor will be required to have all utilities located prior to start of work.
3. Contractor shall remove existing asphalt in driveways and shall be subsidiary to the unit price for Cold Milling Class 3.
4. Excavation, backfilling, and sawing control joints, keyway, tie bars, dowel pins, and rubberized joint sealant shall be considered subsidiary to the unit price per square yard of pavement.

NOTES:

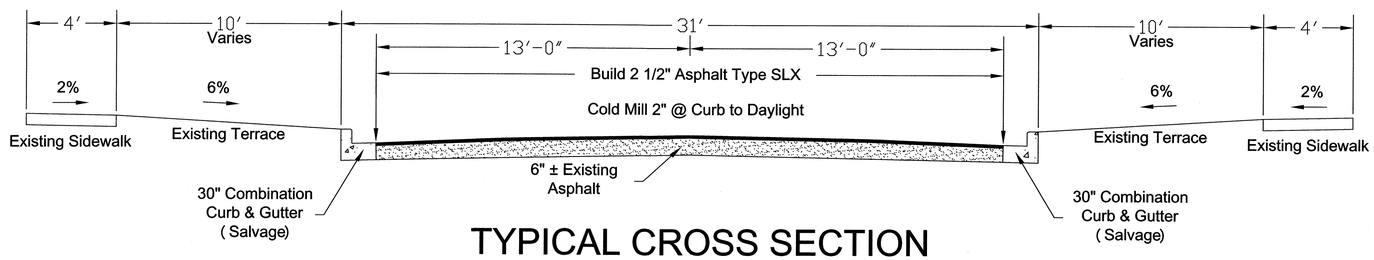
Contractor to mill outer edge to a depth of 2" and transition to daylight as indicated on project cross section plan.

Two lifts of asphalt are suggested with a 1" leveling course followed by a 1 1/2" top lift.

Sub-base may require various patching to be determined by Engineer after milling operation and street has been cleaned.

Millings are to become the property of the contractor.

Ends and returns on all roads, intersections, and driveways will be sawed prior to installation of asphalt and shall be subsidiary to the unit price of asphalt type SLX. Contractor shall use caution not to damage driveways during the removal of existing asphalt.



TYPICAL CROSS SECTION

STA. 400+16.7 TO STA. 406+25.6
STA. 406+97 TO STA. 412+84

Note: Cross section 2% minimum slope maybe adjusted in field by Engineer to accommodate existing conditions.

REGISTERED PROFESSIONAL ENGINEER
DAVID L. WACKER
E-50190
4/27/2016

CITY OF HASTINGS, ENGINEERING DEPT.

Project	2016 RESURFACING		
Proj. No.	R-2016-R4		
Description	SAUNDERS AVENUE- 7TH ST. TO 9TH ST.		
Design By		Date 4-2016	Contractor
Drawn By BK	Approved By	Drn. No.	10 of 14

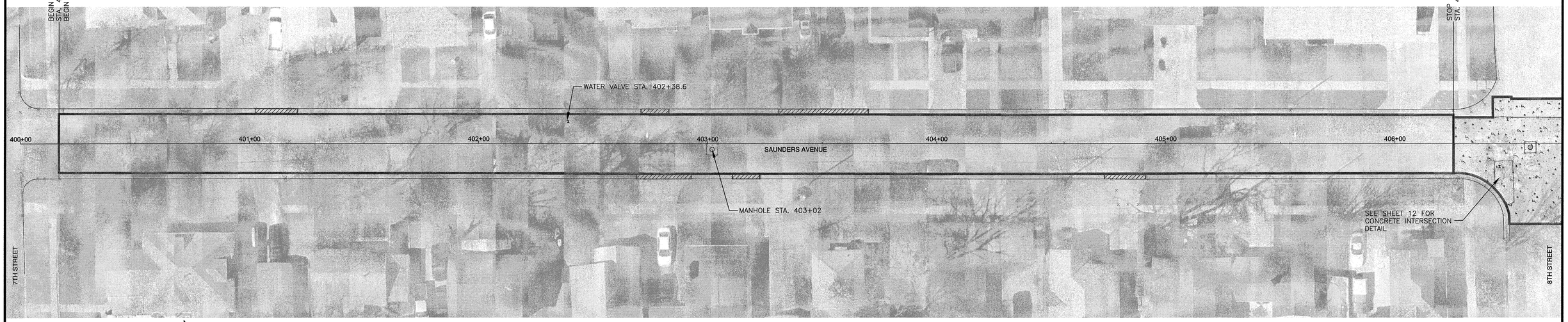
COLD MILLING CLASS 3 (For Info. Only)		
Station to Station	Width	Sq. Yards
400+16.7 to 406+25.6	26	1,745.6

ASPHALT TYPE SLX (For Info. Only)		
Station to Station	Width	Tons
400+16.7 to 406+25.6	26	245.1

ADJUST MANHOLE TO GRADE		
Station	O.S. / Side	Each
403+02	2.5/RT	1

ADJUST WATER VALVE TO GRADE		
Station	O.S. / Side	Each
402+38.6	10.0/LT	1

REMOVE 30" COMBINATION CURB AND GUTTER		
Station to Station	Side	Lin. Ft.
401+02.4 to 401+20.9	LT	18.5
402+69 to 402+92.8	RT	23.8
402+70.9 to 402+83	LT	12.1
403+10.9 to 403+22.9	RT	12.0
403+31 to 403+70	LT	39.0
404+73.3 to 404+91.3	RT	18.0



NORTH
Scale: 1"=20'

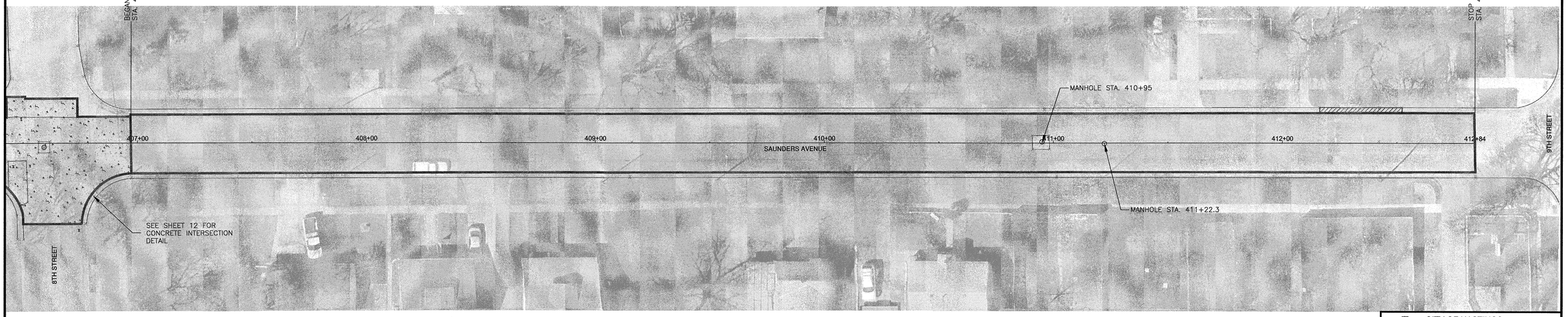
20' 0' 20' 40' 60'

COLD MILLING CLASS 3 (For Info. Only)		
Station to Station	Width	Sq. Yards
406+97 to 412+84	26	1,674.8

ASPHALT TYPE SLX (For Info. Only)		
Station to Station	Width	Tons
406+97 to 412+84	26	235.1

ADJUST MANHOLE TO GRADE		
Station	O.S. / Side	Each
410+95	CL	1
411+22.3	CL	1

REMOVE 30" COMBINATION CURB AND GUTTER		
Station to Station	Side	Lin. Ft.
412+16.2 to 412+52.2	LT	36.0



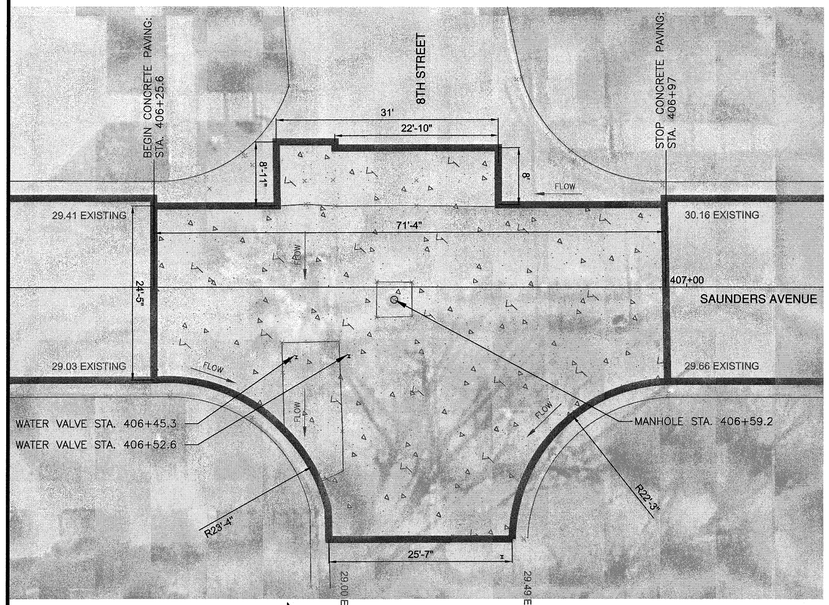
NORTH
Scale: 1"=20'

20' 0' 20' 40' 60'

REGISTERED PROFESSIONAL ENGINEER
DAVID L. WACKER
E-5080
4/27/2016
STATE OF MINNESOTA

CITY OF HASTINGS, ENGINEERING DEPT.

Project	2016 RESURFACING
Proj. No.	R-2016-R4
Description	SAUNDERS AVENUE- 7TH STREET TO 9TH STREET
Design By	
Date	4-2016
Contractor	
Drawn By	BK
Approved By	
Drn. No.	11 of 14



REMOVE CONCRETE PAVEMENT		
Station to Station	Side	Sq. Yds.
406+25.6 to 406+97	LT & RT	310.3

BUILD 6" P.C.C. PAVEMENT 47B		
Station to Station	Side	Sq. Yds.
406+25.6 to 406+97	LT & RT	310.3

SAW CUT		
Station to Station	Side	Lin. Ft.
406+25.6	LT & RT	24.4
406+50 to 406+75.6	RT	25.6
208+06.7	LT & RT	24.4

ADJUST MANHOLE TO GRADE		
Station	O.S. / Side	Each
406+59.2	1.8/RT	1

ADJUST WATER VALVE TO GRADE		
Station	O.S. / Side	Each
406+45.3	9.6/RT	1
406+52.6	9.4/RT	1

REGISTERED PROFESSIONAL ENGINEER
DAVID L. WACKER
E-5090
4/27/2016
STATE OF NEBRASKA

CITY OF HASTINGS, ENGINEERING DEPT.

Project: 2016 RESURFACING		
Proj. No.: R-2016-R4		
Description: SAUNDERS AVENUE- 7TH STREET TO 9TH STREET		
Design By	Date: 4-2016	Contractor
Drawn By: BK	Approved By	Drn. No.: 12 of 14

DENVER AVENUE - 14TH STREET TO 16TH STREET

R-2016-R5

SUMMARY OF QUANTITIES

1.	Cold Milling Class 4 (approximately 5")	1,642.8	S.Y.
2.	Asphaltic Concrete Type SPR	554.5	Tons
3.	Asphaltic Cement Performance Graded Binder (64-34)	22.2	Tons
4.	Emulsified Asphalt (SS1H) Tack Coat	410.7	Gal
5.	Subgrade Preparation	1,642.8	S.Y.
6.	8" Stabilized Subgrade, Type C Fly Ash	57.5	Tons
7.	Remove 30" Combination Curb & Gutter	42.0	Lin. Ft.
8.	Build 30" Combination Curb & Gutter (47B)	42.0	Lin. Ft.
9.	Traffic Control, Barricades, and Maintenance thereof	1	Lump. Sum

MATERIALS - GENERAL REQUIREMENTS

1. Asphaltic Oil for Tack coat SS1H

   Water used to dilute emulsified asphalt shall be mixed in approximate 50-50 proportion with the oil. The rate of application of the diluted emulsified asphalt shall generally be from .10 to .20 of a gallon per square yard.

2. Asphaltic Concrete

   Type SPR asphalt according to State Specifications

GENERAL NOTES

CONTRACTOR'S NOTE

1. It will be the responsibility of the Contractor to dispose all pavement removal.
2. Contractor will be required to have all utilities located prior to start of work.
3. Contractor shall remove existing asphalt in driveways and shall be subsidiary to the unit price for Cold Milling Class 3.
4. Excavation, backfilling, and sawing control joints, keyway, tie bars, dowel pins, and rubberized joint sealant shall be considered subsidiary to the unit price per square yard of pavement.

NOTES:

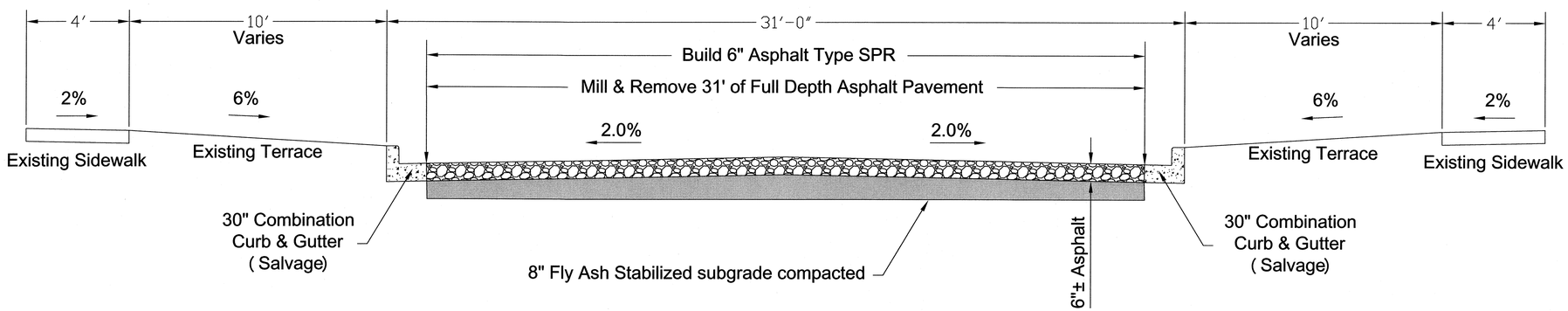
Contractor to mill full depth asphalt section.

Subgrade shall be scarified to a depth of 8" fly ash added, watered and recompacted to complete stabilization for new area receiving full depth asphalt.

This project will be done in two lifts, the first lift of asphalt will consist of 4" type SPR, and the seconded lift of asphalt willl consist of 2" type SPR

Sub-base may require various patching to be determined by Engineer after milling operation and street has been cleaned.

Ends and returns on all roads, intersections, and driveways will be sawed prior to installation of Asphalt and shall be subsidiary to the Unit Price of Asphalt Type SPR. Contractor shall use caution not to damage driveways during the removal of existing asphalt.



TYPICAL CROSS SECTION

STA. 500+00 TO STA. 505+38.6

Note: Cross section slope maybe adjusted in field by Engineer to accommodate existing conditions.

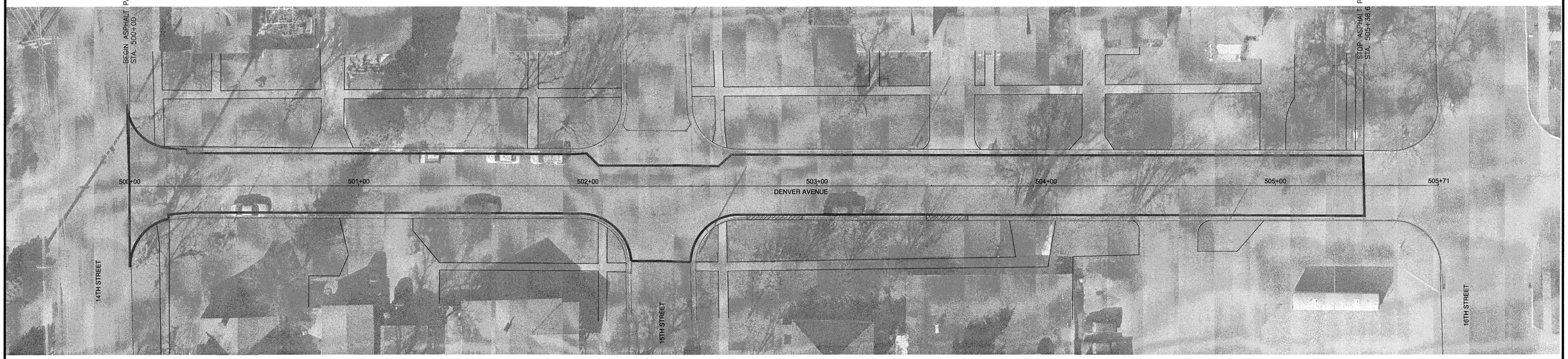
REGISTERED PROFESSIONAL ENGINEER
DAVID L. WACKER
E-5080
STATE OF NEBRASKA

CITY OF HASTINGS, ENGINEERING DEPT.		
Project: 2016 RESURFACING		
Proj. No.: R-2016-R5		
Description: DENVER AVENUE- 14TH ST. TO 16TH ST.		
Design By:	Date: 4-2016	Contractor:
Drawn By: BK	Approved By:	Drn. No.: 13 of 14

COLD MILLING CLASS 4 (For Info. Only)		
Station to Station	Width	Sq. Yards
500+00 to 505+38.6	26	1,642.8

ASPHALT TYPE SPR (For Info. Only)		
Station to Station	Width	Tons
500+00 to 505+38.6	26	554.5

REMOVE 30" COMBINATION CURB AND GUTTER		
Station to Station	Side	Lin. Ft.
502+69.5 to 502+93.5	RT	24.0
503+47.8 to 503+65.8	RT	18.0



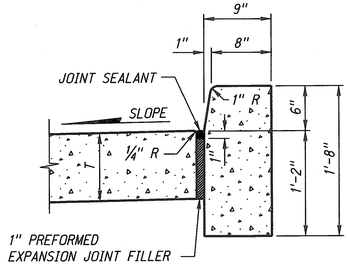
NORTH
Scale: 1"=20'

20' 0' 20' 40' 60'

REGISTERED PROFESSIONAL ENGINEER
DAVID L WACKER
E-5090
4/28/2016
STATE OF NEBRASKA

CITY OF HASTINGS, ENGINEERING DEPT.

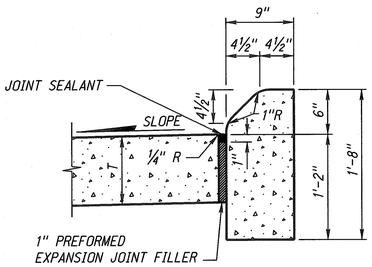
Project: 2016 RESURFACING		
Proj. No. R-2016-R5		
Description: DENVER AVENUE- 14TH STREET TO 16TH STREET		
Design By	Date 4-2016	Contractor
Drawn By BK	Approved By	Drn. No. 14 of 14



CONCRETE BARRIER CURB *

QUANTITIES

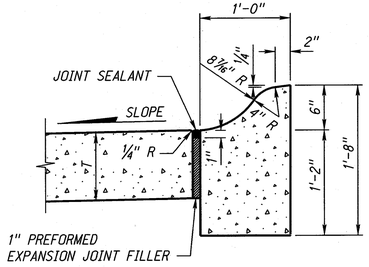
CONCRETE	4.55 CU. YDS./STA.
AREA	1.228 SQ. FT.



CONCRETE MEDIAN CURB *

QUANTITIES

CONCRETE	4.42 CU. YDS./STA.
AREA	1.192 SQ. FT.

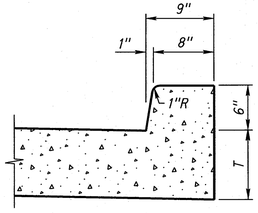


CONCRETE CURB, * TYPE I

QUANTITIES

CONCRETE	5.22 CU. YDS./STA.
AREA	1.408 SQ. FT.

NOTE: * ONE INCH PREFORMED EXPANSION JOINT FILLER SHALL BE PLACED AT INTERVALS OF NOT MORE THAN 100 FT. THRU CONCRETE BARRIER CURB, CONCRETE MEDIAN CURB, AND CONCRETE CURB, TYPE I.

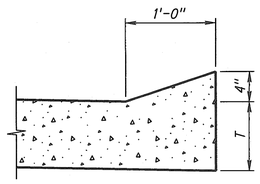


NOTE: MAY BE USED WHEN T IS LESS THAN 12"

INTEGRAL CONCRETE BARRIER CURB

QUANTITIES

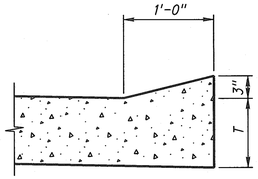
CONCRETE	1.33 CU. YDS./STA.
AREA	0.359 SQ. FT.



INTEGRAL CONCRETE SLOPING CURB

QUANTITIES

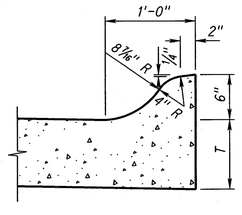
CONCRETE	0.62 CU. YDS./STA.
AREA	0.167 SQ. FT.



INTEGRAL CONCRETE SLOPING CURB

QUANTITIES

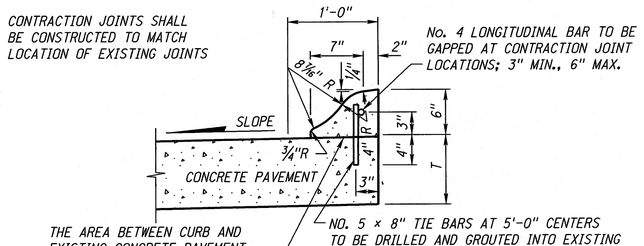
CONCRETE	0.46 CU. YDS./STA.
AREA	0.123 SQ. FT.



INTEGRAL CONCRETE CURB

QUANTITIES

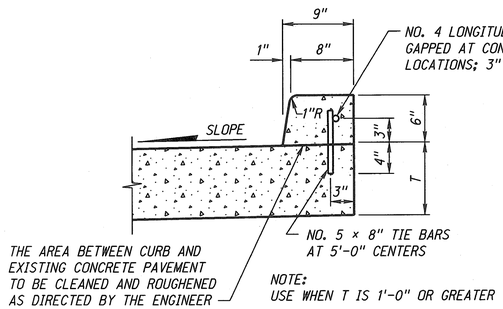
CONCRETE	0.89 CU. YDS./STA.
AREA	0.239 SQ. FT.



CONCRETE CURB, TYPE II

QUANTITIES

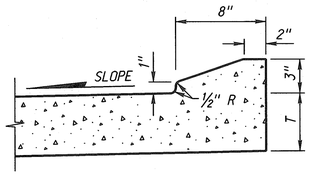
CONCRETE	0.87 CU. YDS./STA.
AREA	0.234 SQ. FT.



CONCRETE BARRIER CURB ALTERNATE

QUANTITIES

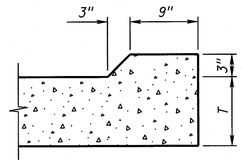
CONCRETE	1.33 CU. YDS./STA.
AREA	0.359 SQ. FT.



INTEGRAL CONCRETE TRUCK APRON CURB

QUANTITIES

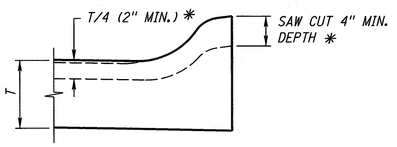
CONCRETE	0.47 CU. YDS./STA.
AREA	0.127 SQ. FT.



EROSION CONTROL CURB

QUANTITIES

CONCRETE	0.81 CU. YDS./STA.
AREA	0.219 SQ. FT.



CONTRACTION JOINT THRU CURB

* FOR NON-INTEGRAL CURB THE CONTRACTION JOINTS MAY BE MADE WITH A DOUBLE EDGER WHILE THE CONCRETE IS STILL PLASTIC.

REV. NO.	DATE	DESCRIPTION OF REVISION
R11	JUL 15	ADDED TRUCK APRON CURB
R10	FEB 09	MULTIPLE REVISIONS
R9	MAR 05	MULTIPLE REVISIONS

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 301-R11

PAVEMENT DETAILS

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL ENGINEER JAMES J. KNOTT E-6035 STATE OF NEBRASKA

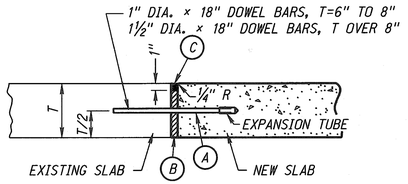
4/6/15
DATE

ORIGINAL:
JANUARY 31, 1974
DATE

1/3

ROADWAY DESIGN DIVISION

Computer: DRDESIGN147 User: dor13017 Date: 06-MAR-2015 14:29 File: 30100e11.dgn Scale: 1:100 SHEET 1 OF 3



(A) GREASE DOWEL BAR ON EXPANSION TUB SIDE

(B) 1" PREFORMED EXPANSION JOINT FILLER

(C) JOINT SEALANT

NOTES:

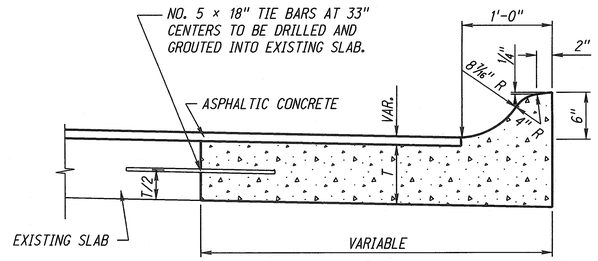
DOWEL BARS SHALL BE DRILLED TO A DEPTH OF 8" INTO EXISTING SLAB AND GROUTED.

DOWEL BARS SHALL BE PLACED AT 1'-0" CENTERS. THE OUTSIDE DOWEL BAR SHALL BE PLACED 6" FROM THE EDGE OF THE SLAB.

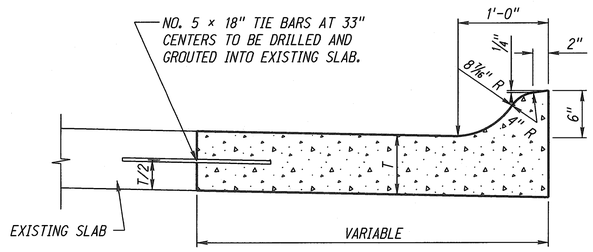
THIS JOINT SHALL BE CONSTRUCTED TRANSVERSE TO THE ROADWAY WHERE THE NEW CONCRETE ABUTS THE EXISTING CONCRETE.

DOWEL BARS SHALL BE PLACED PARALLEL TO THE ROADWAY ℄ AND TO THE ROADBED.

EXPANSION JOINT (SUBSIDIARY)

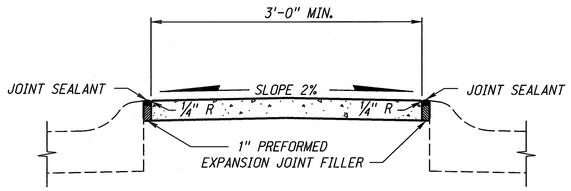


CONCRETE BASE COURSE W/INTEGRAL CURB



THE FOLLOWING NOTE IS TYPICAL FOR CONCRETE BASE COURSE W/INTEGRAL CURB AND CONCRETE PAVEMENT WIDENING: CONTRACTION AND EXPANSION JOINTS SHALL BE CONSTRUCTED TO MATCH LOCATIONS OF EXISTING JOINTS.

CONCRETE PAVEMENT WIDENING



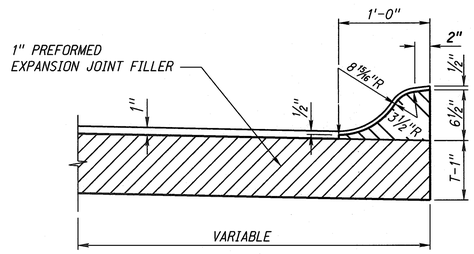
CONCRETE MEDIAN SURFACING

ONE INCH PREFORMED EXPANSION JOINT FILLER SHALL BE PLACED ACROSS THE FULL WIDTH OF THE MEDIAN SURFACING AT INTERVALS OF NOT MORE THAN 49'-0".

LONGITUDINAL JOINTS ONE INCH DEEP SHALL BE MADE IN ALL MEDIANS WHEN SURFACING WIDTH IS 16'-0" OR GREATER.

TRANSVERSE JOINTS ONE INCH DEEP SHALL BE MADE IN ALL MEDIANS AT INTERVALS OF NOT MORE THAN 8'-0".

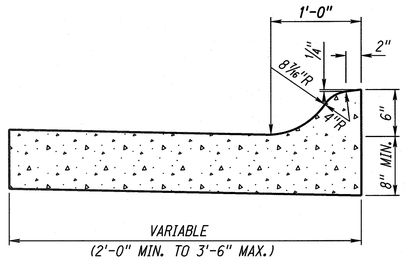
TRANSVERSE AND LONGITUDINAL JOINTS SHALL NOT BE FILLED.



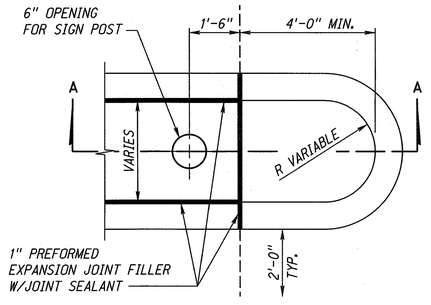
ONE INCH PREFORMED EXPANSION JOINT FILLER SHALL BE PLACED AT INTERSECTION RETURNS AND WHERE SHOWN ON THE PLANS. TRANSVERSE JOINTS SHALL BE PROVIDED EVERY 8'-0" OR WHERE SHOWN ON THE PLANS.

NOTE: RECESS THE EXPANSION JOINT FILLER ½" FROM THE TOP SURFACE OF THE CURB TYPE UNDER CONSTRUCTION

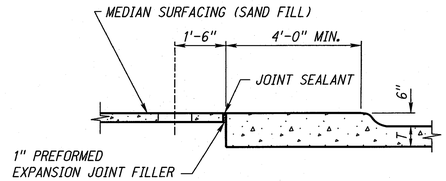
DETAIL FOR CUTTING EXPANSION JOINT FILLER



COMBINATION CONCRETE CURB & GUTTER

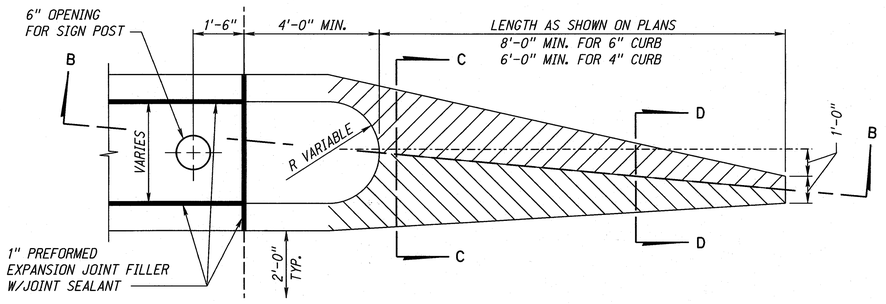


PLAN

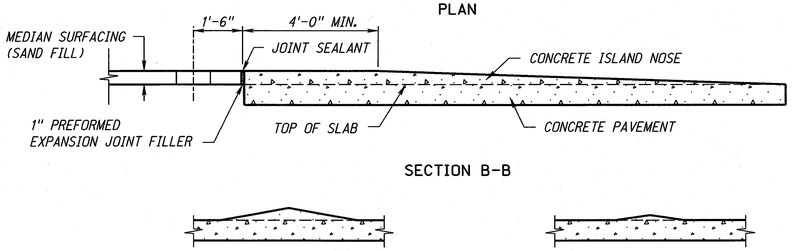


SECTION A-A

END OF MEDIAN ISLAND



PLAN



SECTION B-B

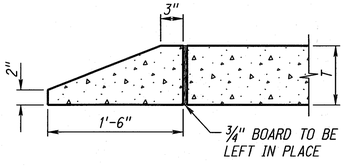
SECTION C-C

SECTION D-D

CONCRETE ISLAND NOSE

NOTE:
EXISTING CONCRETE PAVEMENT IS TO BE REMOVED TO BUILD CONCRETE ISLAND NOSE.

NOTE: T = PAVEMENT THICKNESS



CONCRETE HEADER

REV. NO.	DATE	DESCRIPTION OF REVISION
R11	JUL 15	ADDED TRUCK APRON CURB
R10	FEB 09	MULTIPLE REVISIONS
R9	MAR 05	MULTIPLE REVISIONS

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 301-R11

PAVEMENT DETAILS

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

JAMES J. KNOTT E-6035 PROFESSIONAL ENGINEER STATE OF NEBRASKA 3/19/15

Howard A. Schwartz

4/6/15
DATE

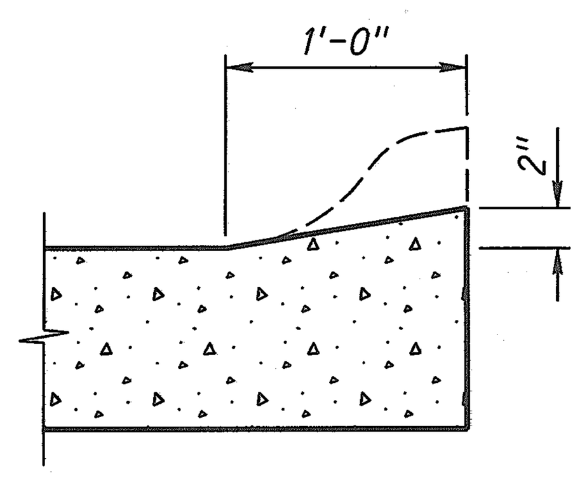
ORIGINAL:
JANUARY 31, 1974
DATE

2
3

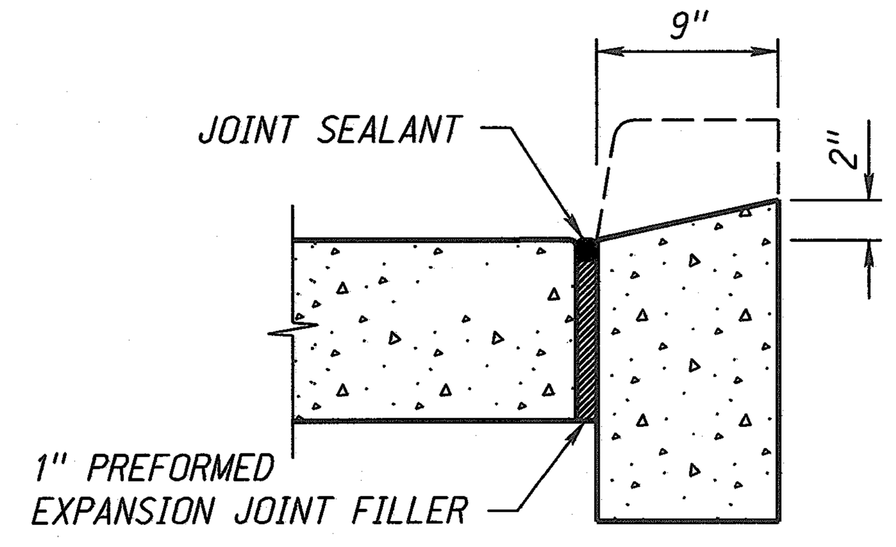
ROADWAY DESIGN DIVISION

Computer: DRDESIGN147 User: dor13017 Date: 06-MAR-2015 14:19

File: 30100e11.dgn Scale: 1:100 SHEET 3 OF 3

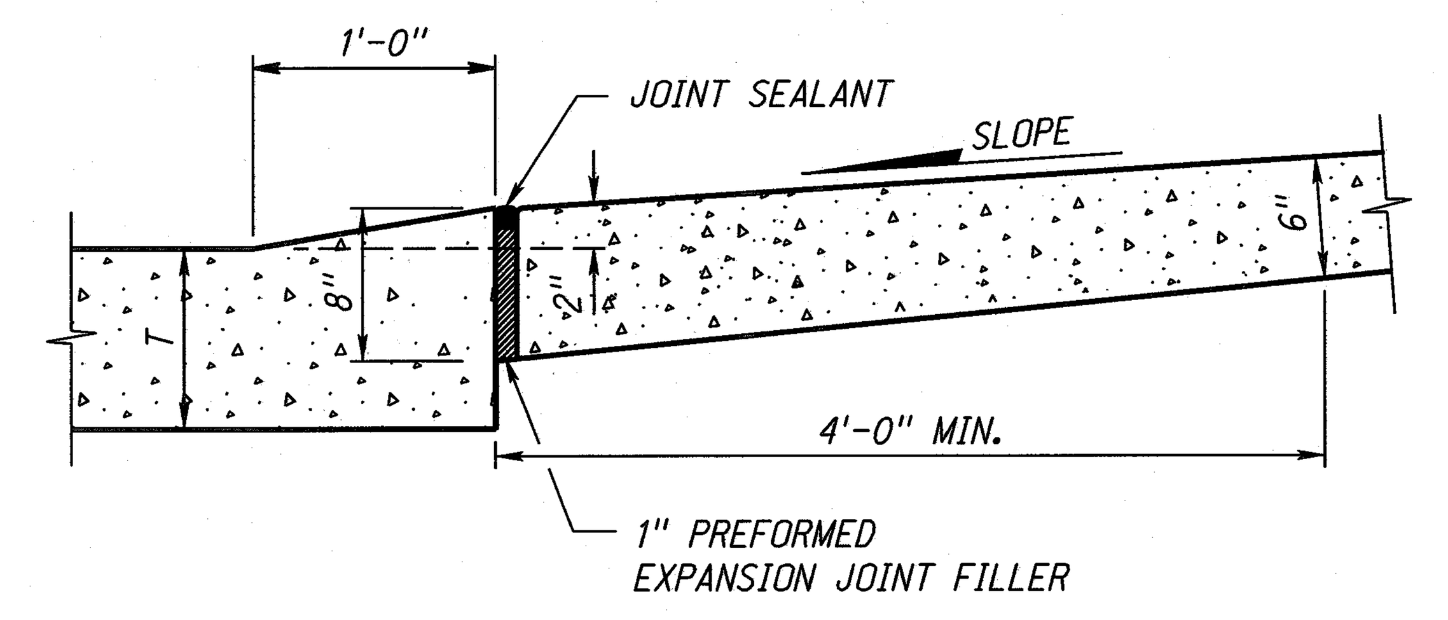


INTEGRAL CURB

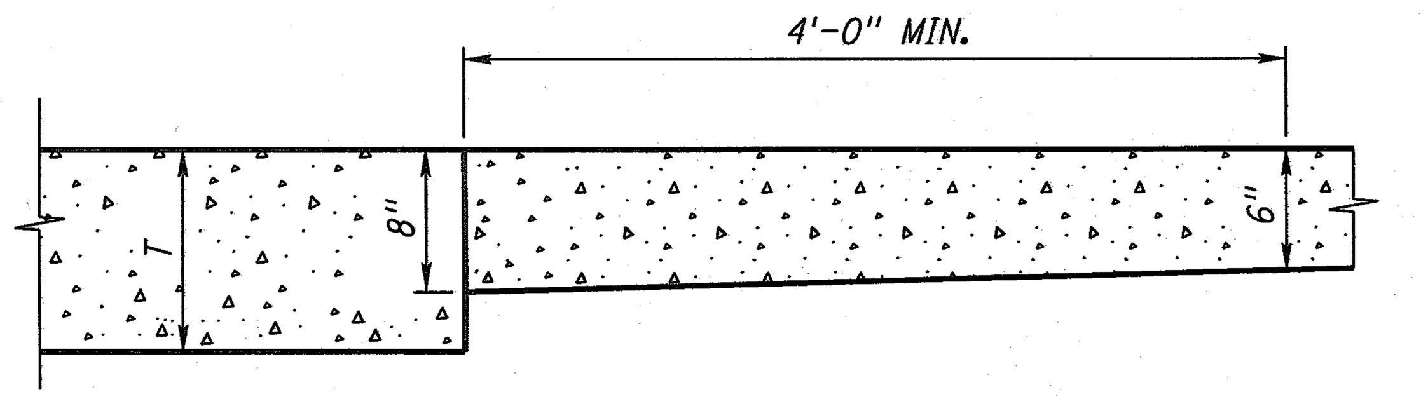


BARRIER CURB

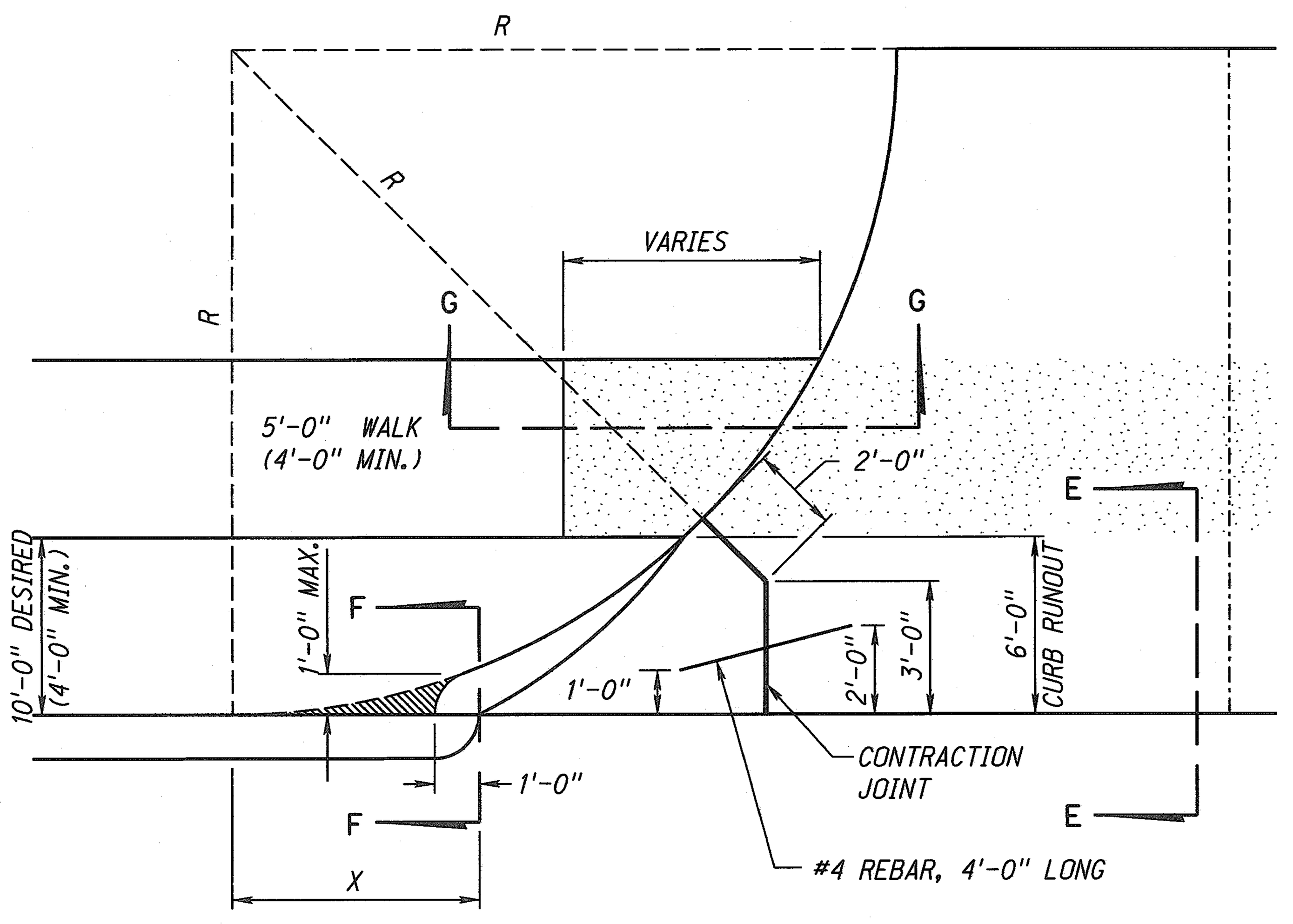
DETAILS OF CURB DROPS



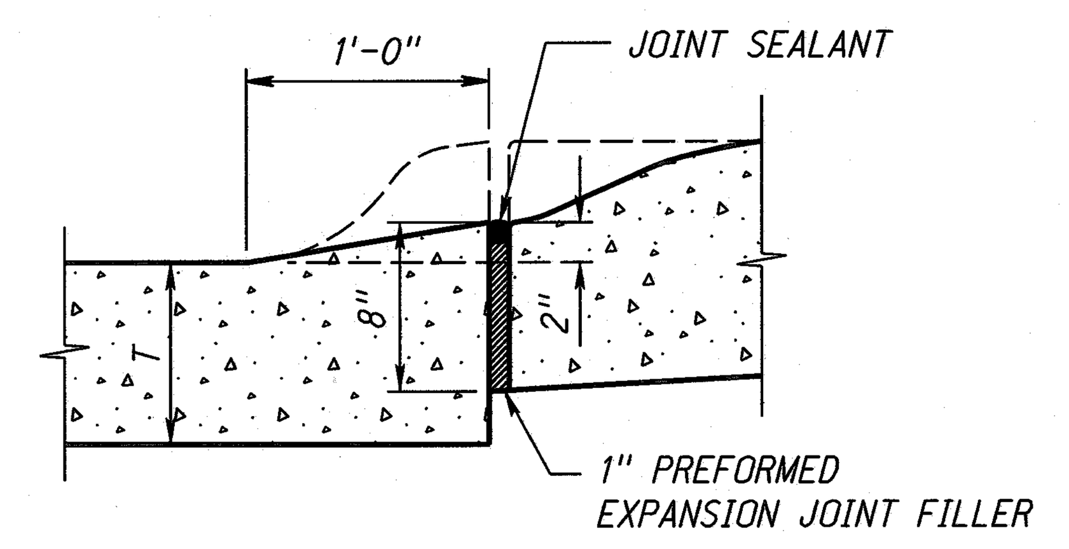
SECTION E-E



(RURAL DRIVEWAY)



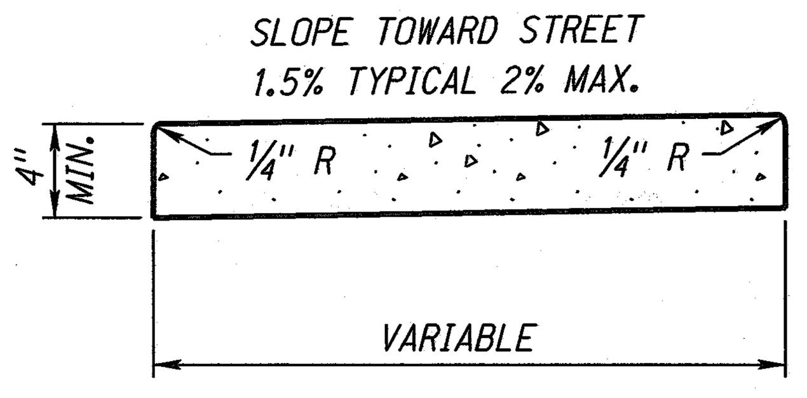
URBAN DRIVEWAY PLAN



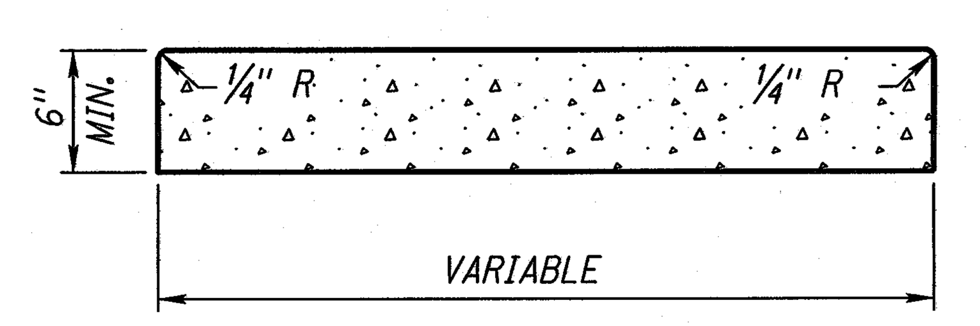
SECTION F-F

R	X
5'-0"	3.00'
10'-0"	4.36'
15'-0"	5.38'
20'-0"	6.24'
25'-0"	7.00'
30'-0"	7.68'
35'-0"	8.31'
40'-0"	8.89'

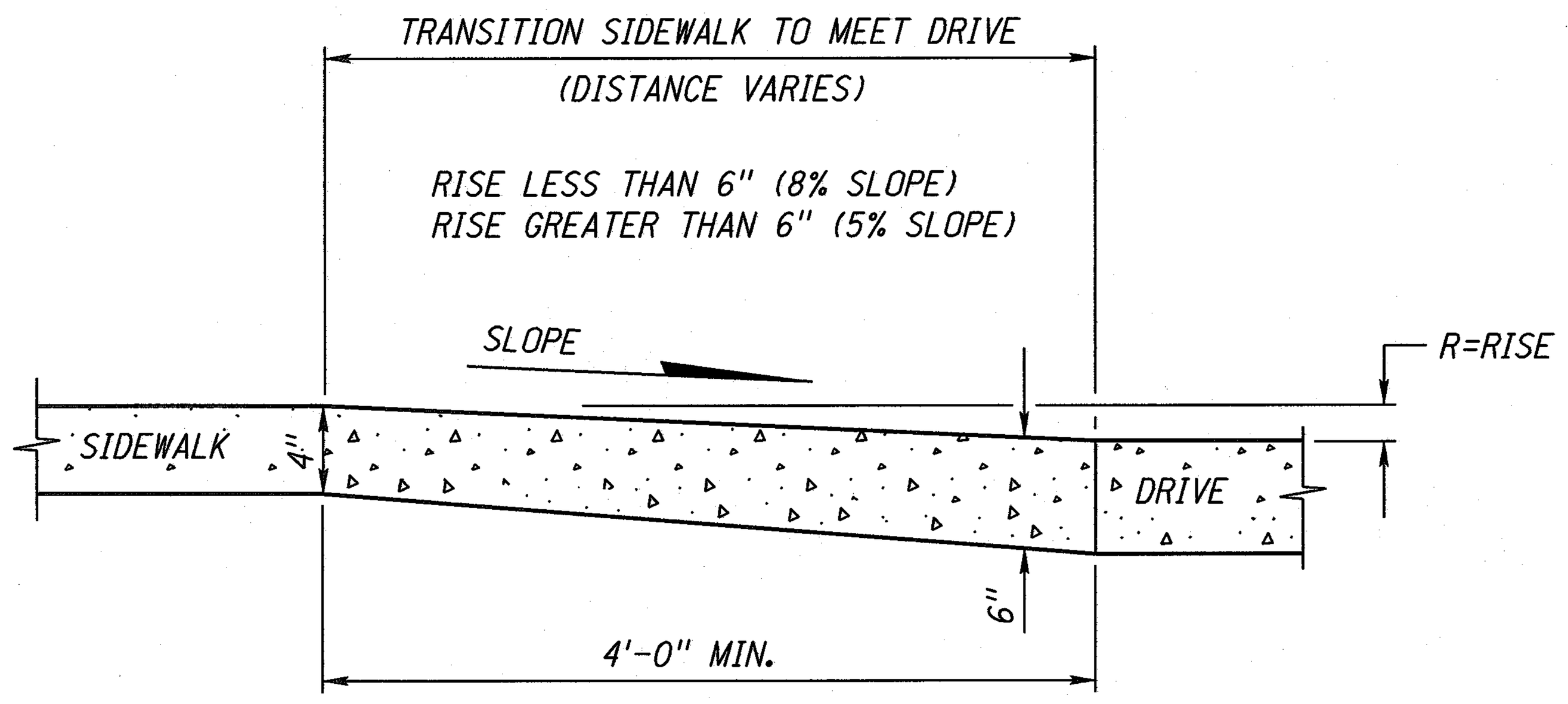
R = RADIUS
$X = \sqrt{(2R-1)}$
(X & R IN FEET)



SIDEWALK



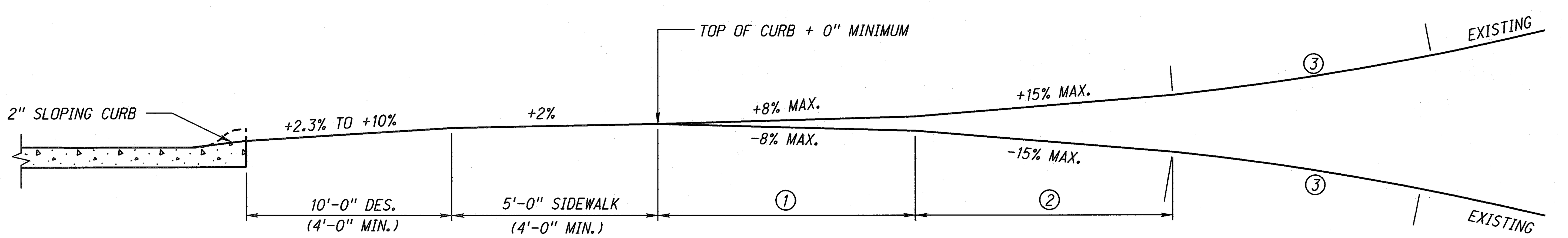
SIDEWALK AT DRIVEWAY



SECTION G-G

NOTE:

1" PREFORMED EXPANSION JOINT FILLER SHALL BE PLACED IN ALL SIDEWALKS OR CROSSWALKS AT INTERVALS OF NOT MORE THAN 50'-0", AND AT ALL POINTS WHERE SIDEWALKS OR CROSSWALKS ARE ADJACENT TO CURB. IF SIDEWALK OR CROSSWALK TO BE CONSTRUCTED IS LESS THAN 50'-0" IN LENGTH, ONE SUCH EXPANSION JOINT SHALL BE PLACED AS DIRECTED BY THE ENGINEER.



PROFILE URBAN DRIVEWAY WITH SIDEWALK
(MAXIMUM PERCENT OF GRADE)

① 10'-0" MINIMUM IS REQUIRED WHEN THE EXISTING GRADE IS GREATER THAN ±8%
② 10'-0" MINIMUM IS REQUIRED WHEN THE EXISTING GRADE IS GREATER THAN ±15%
③ 10'-0" MINIMUM ROUNDING IS REQUIRED WHEN THE EXISTING GRADE IS GREATER THAN ±22%

NOTE: T = PAVEMENT THICKNESS

REV. NO.	DATE	DESCRIPTION OF REVISION
R11	JUL 15	ADDED TRUCK APRON CURB
R10	FEB 09	MULTIPLE REVISIONS
R9	MAR 05	MULTIPLE REVISIONS

NEBRASKA DEPARTMENT OF ROADS
STANDARD PLAN NO. 301-R11

PAVEMENT DETAILS

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM: Howard A. Schwartz
4/6/15
DATE

PROFESSIONAL CIVIL ENGINEER JAMES J. KNOTT E-6035 STATE OF NEBRASKA 3-13-15

ORIGINAL:
JANUARY 31, 1974
DATE

3 / 3

ROADWAY DESIGN DIVISION
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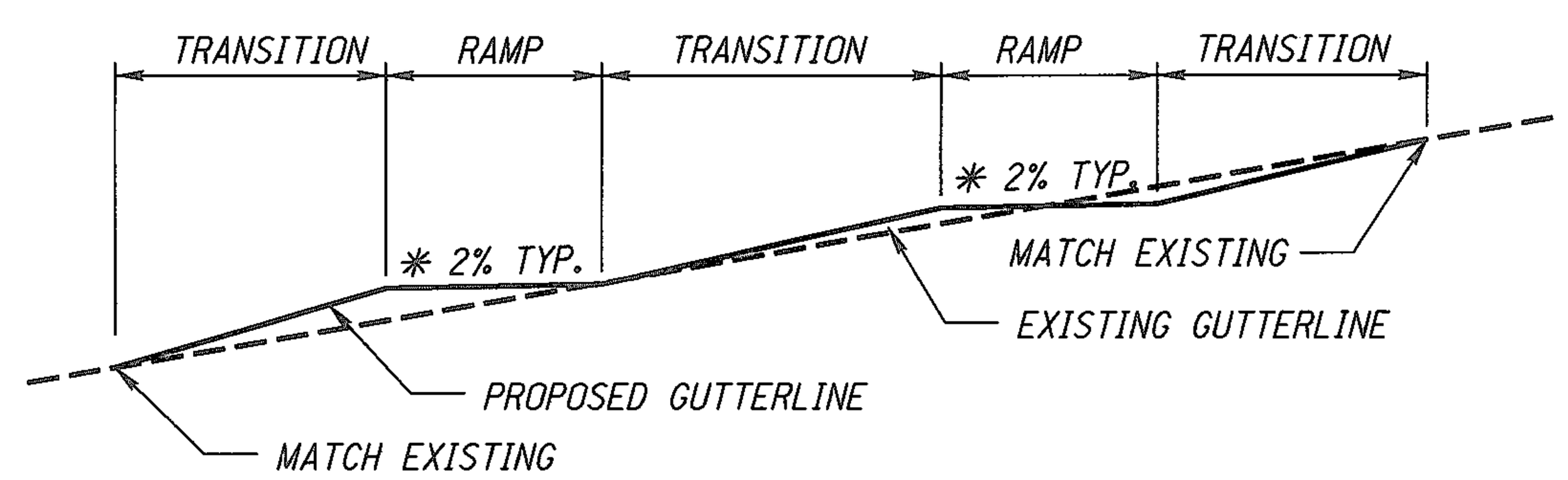
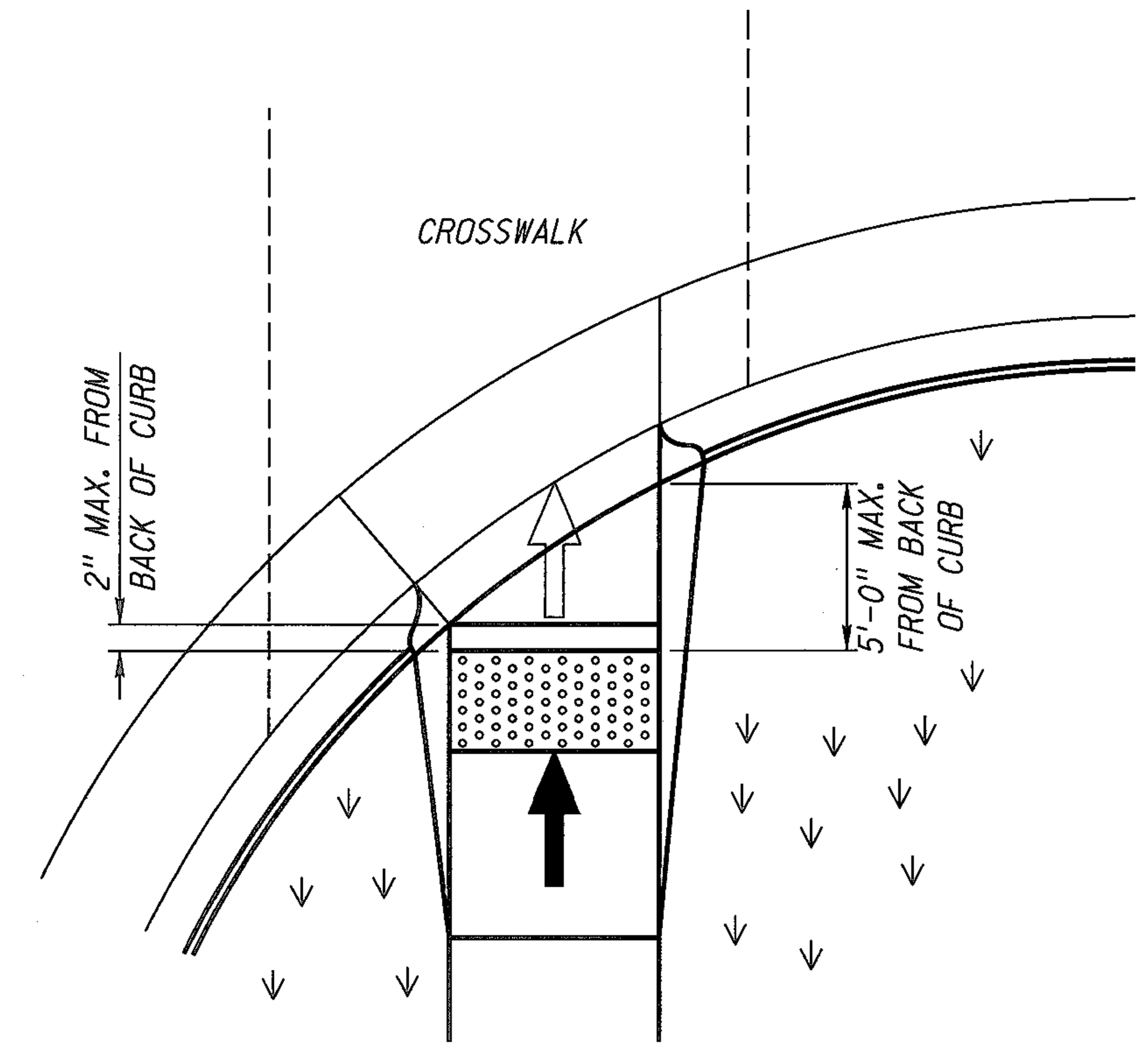
SHEET 1 OF 4

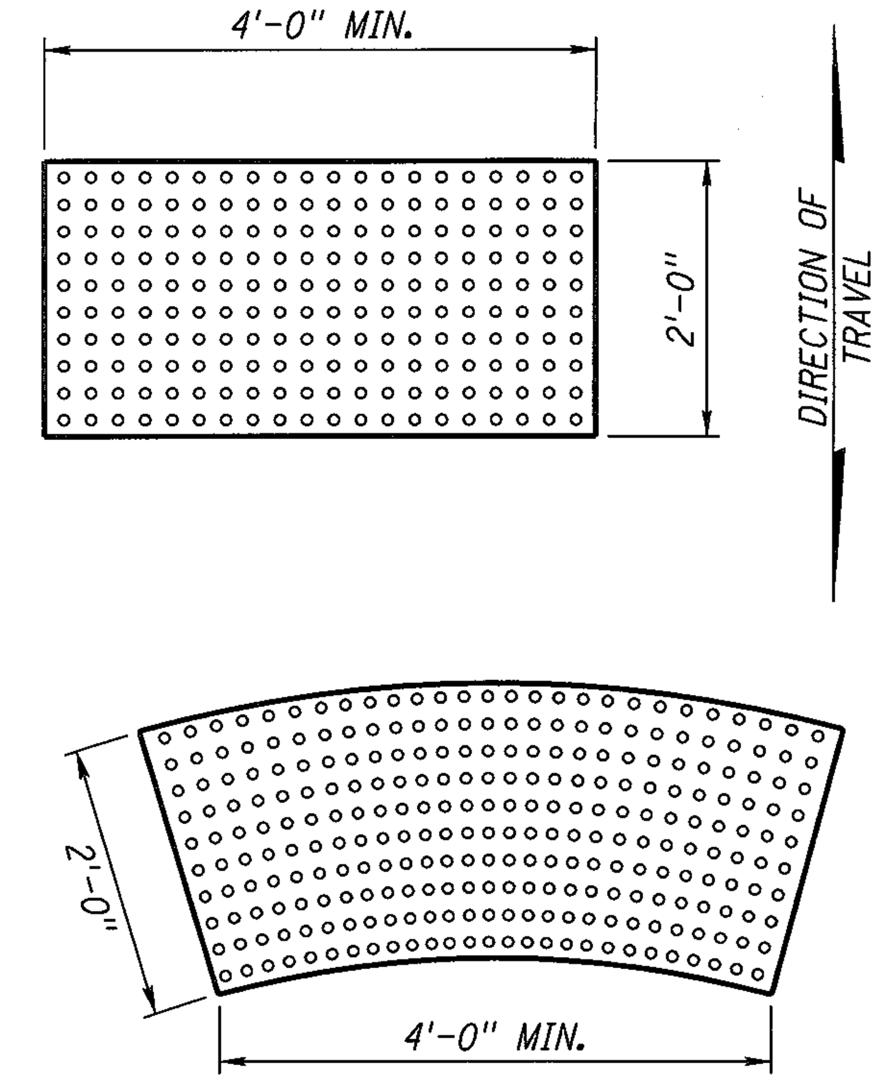


* 2% PREFERRED WHERE TRAFFIC STOPS, UP TO 5% ALLOWED WHERE TRAFFIC CONTINUES THROUGH THE CROSSWALK WITHOUT STOPPING (INCLUDING TRAFFIC SIGNALS).

GUTTER PROFILE DETAIL



DETECTABLE WARNING PANEL PLACEMENT DETAIL



DETECTABLE WARNING PANELS

NOTES:

1. THE SURFACE OF ALL CURB RAMPS SHALL BE BROOMED PERPENDICULAR TO THE SLOPE OF THE CURB RAMP.

2. CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE CURB RAMP, FREE OF SAGS AND SHORT GRADE CHANGES.

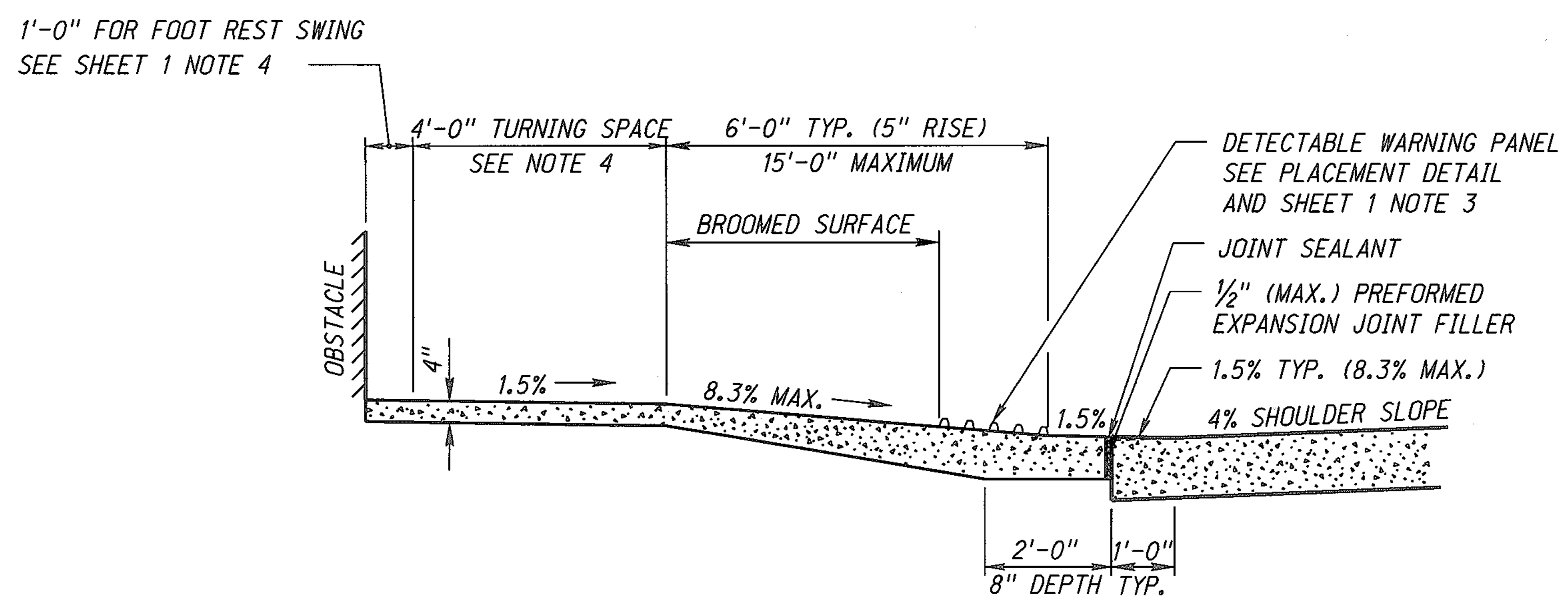
3. ALL CURB RAMPS SHALL BE CONSTRUCTED WITH A DETECTABLE WARNING PANEL (DWP), 2 FT. × 4 FT. MINIMUM. PLACED WITHIN 2" OF THE BACK OF CURB.

   DETECTABLE WARNING PANEL:
   - SHALL BE PAID FOR BY THE SQ. FT.
   - SHALL BE FROM THE APPROVED PRODUCT LIST
   - SHALL BE A CONTRASTING COLOR TO THE SURROUNDING SURFACING.
   - SHALL EXTEND THE FULL WIDTH OF THE CURB RAMP.

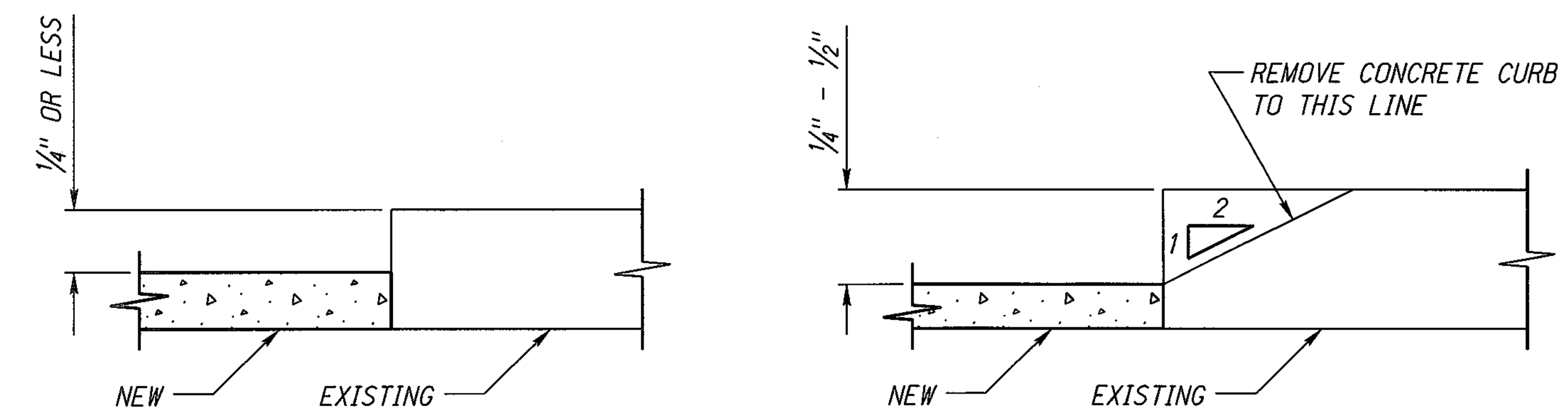
   NEW CURB RAMPS SHALL HAVE CAST IN CONCRETE DETECTABLE WARNING PANELS.

4. TURNING SPACE SHALL HAVE MINIMUM DIMENSIONS OF 4 FT. × 4 FT. AND SHALL BE A MINIMUM OF 1 FT. FROM ANY OBSTACLE SUCH AS A CURB OR RETAINING WALL FOR SWING OF WHEELCHAIR FOOT REST. THE SLOPE SHALL BE 2% MAXIMUM IN ANY DIRECTION.

5. THE WORK OF CONSTRUCTING CURB RAMPS SHALL BE INCLUDED IN THE QUANTITIES FOR "CONCRETE SIDEWALKS", "CONCRETE MEDIAN SURFACING" OR "CONCRETE BIKEWAY". THE WORK OF MODIFICATION OF NEW OR EXISTING CURB WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE CONSIDERED SUBSIDIARY TO OTHER ITEMS OF WORK FOR WHICH DIRECT PAYMENT IS MADE.



TYPICAL RAMP PROFILE



NO BEVELING

BEVEL AS REQUIRED

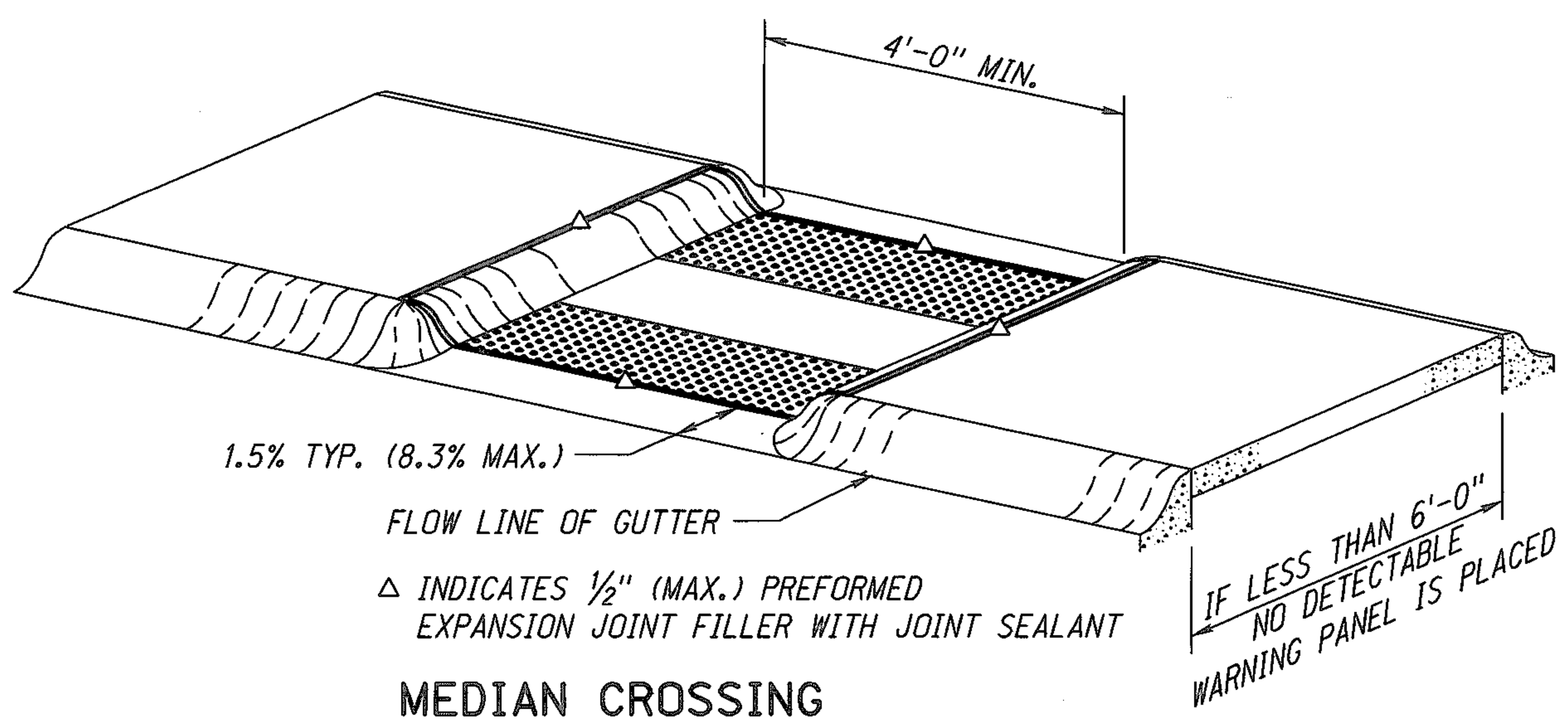
WHEN EXISTING SIDEWALK DOES NOT MEET THE 2% CROSS SLOPE, BEVELING TO MEET PROWAG IS REQUIRED.

THE SIDEWALK PANEL ABUTTING THE EXISTING SIDEWALK (WHICH MAY NOT BE 2% SLOPE): BUILD FULL WIDTH OF THE NEW SIDEWALK, ON 2% MAXIMUM CROSS SLOPE AND BEVEL THE EXISTING SIDEWALK EDGE WHERE IT DOES NOT MEET THE NEW WITHIN ¼", THIS WORK IS SUBSIDIARY.

BEVELING DETAIL

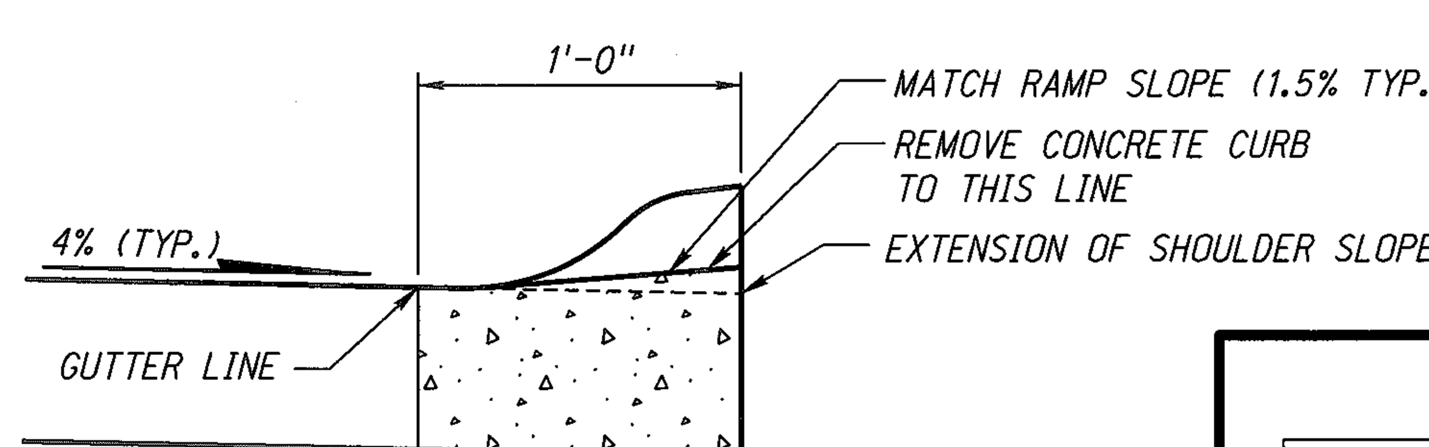
LEGEND

- DETECTABLE WARNING PANEL (DWP)
- BROOMED CURB RAMP WHEN 5% TO 8.3%
- RAMP FLARE
- GRASS OR NON WALKING SURFACE
- CURB TRANSITION
- CURB FACE SLOPE 1 VERT. : 2 HORZ.



△ INDICATES ½" (MAX.) PREFORMED EXPANSION JOINT FILLER WITH JOINT SEALANT

MEDIAN CROSSING



NOTE:
COMBINATION CONCRETE CURB AND GUTTER MAY BE REMOVED AND REPLACED IN LIEU OF MILLING.

CURB DETAIL

SLOPE LEGEND

(open arrow)	SIDEWALK/TURNING SPACE AND RAMP CROSS SLOPE 1.5% TYPICAL, 2.0% MAX. SLOPE
(solid arrow)	RAMP RUNNING SLOPE 8.0% TYPICAL, 8.3% MAX. SLOPE
(flare arrow)	FLARE 90° TO RAMP 9.0% TYPICAL, 10.0% MAX. SLOPE

THE CONTRACTOR SHOULD ACCOUNT FOR CONSTRUCTION TOLERANCES TO PREVENT EXCEEDING THE MAXIMUM SLOPES. ANY SLOPES EXCEEDING THE MAXIMUMS SHALL NOT BE ACCEPTED WITHOUT PRIOR APPROVAL FROM THE ROADWAY DESIGN ENGINEER. AN EXCEPTION TO THIS IS THE TRANSITIONAL SEGMENT TO EXISTING SIDEWALK MUST CONNECT TO THE EXISTING SIDEWALK PANEL; THIS DOES NOT REQUIRE A STATEMENT OF TECHNICAL INFEASIBILITY. (REF. PROWAG CHAPTER R3 TECHNICAL REQUIREMENTS)

REV. NO.	DATE	DESCRIPTION OF REVISION
R2	OCT 14	CHANGE PM TO ROADWAY DESIGN ENGINEER
R1	FEB 13	ALL OF PLAN REWORKED (PROWAG)

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 303-R2

CURB RAMPS

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

6/12/14

OCT 2014
DATE

PROFESSIONAL CIVIL ENGINEER JAMES J. KNOTT E-6035 STATE OF NEBRASKA 5.5.14

ORIGINAL:
MARCH 22, 2010
DATE

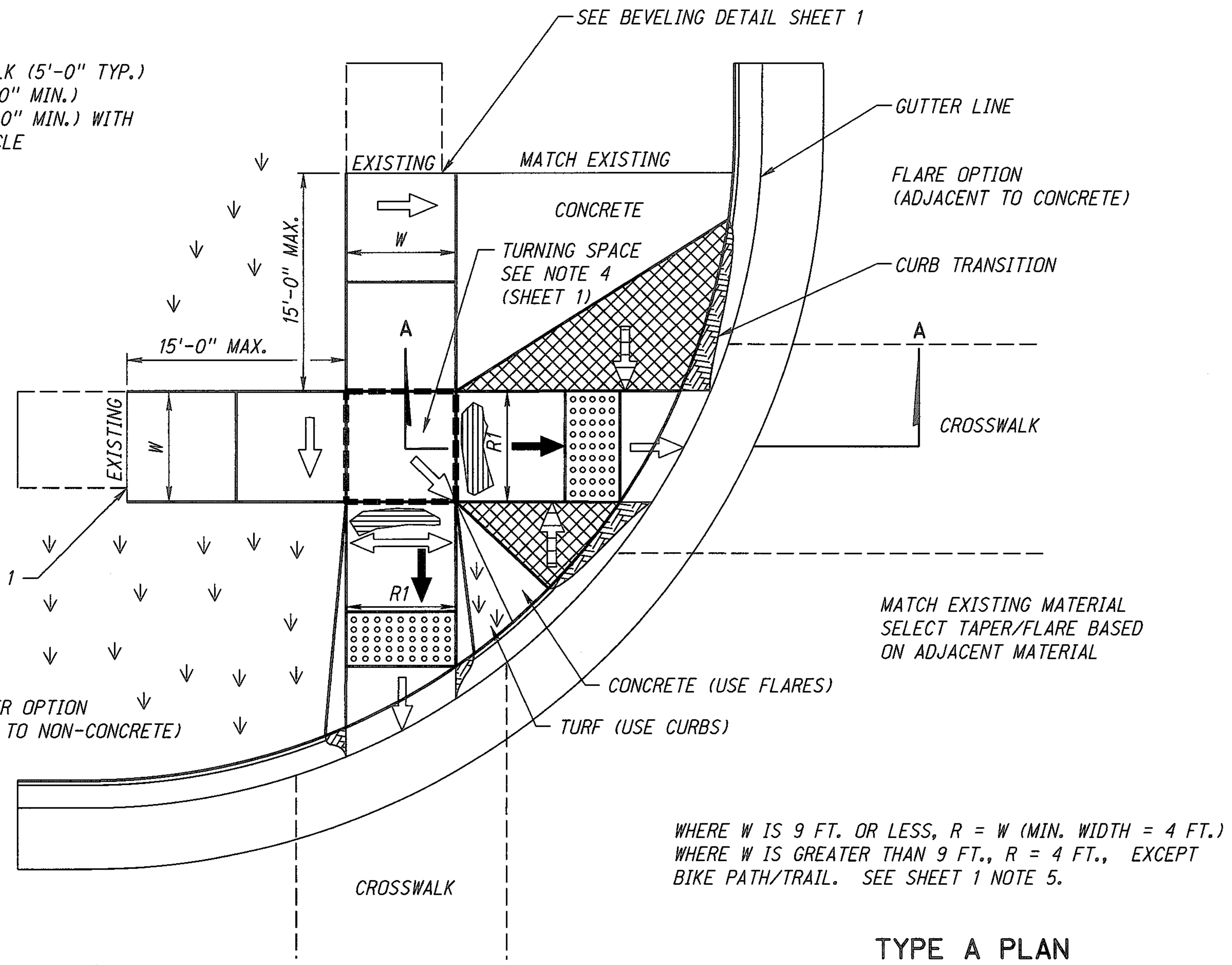
1 / 4

ROADWAY DESIGN DIVISION

Computer: DRDESIGN55 User: dor13017 Date: 02-MAY-2014 11:16

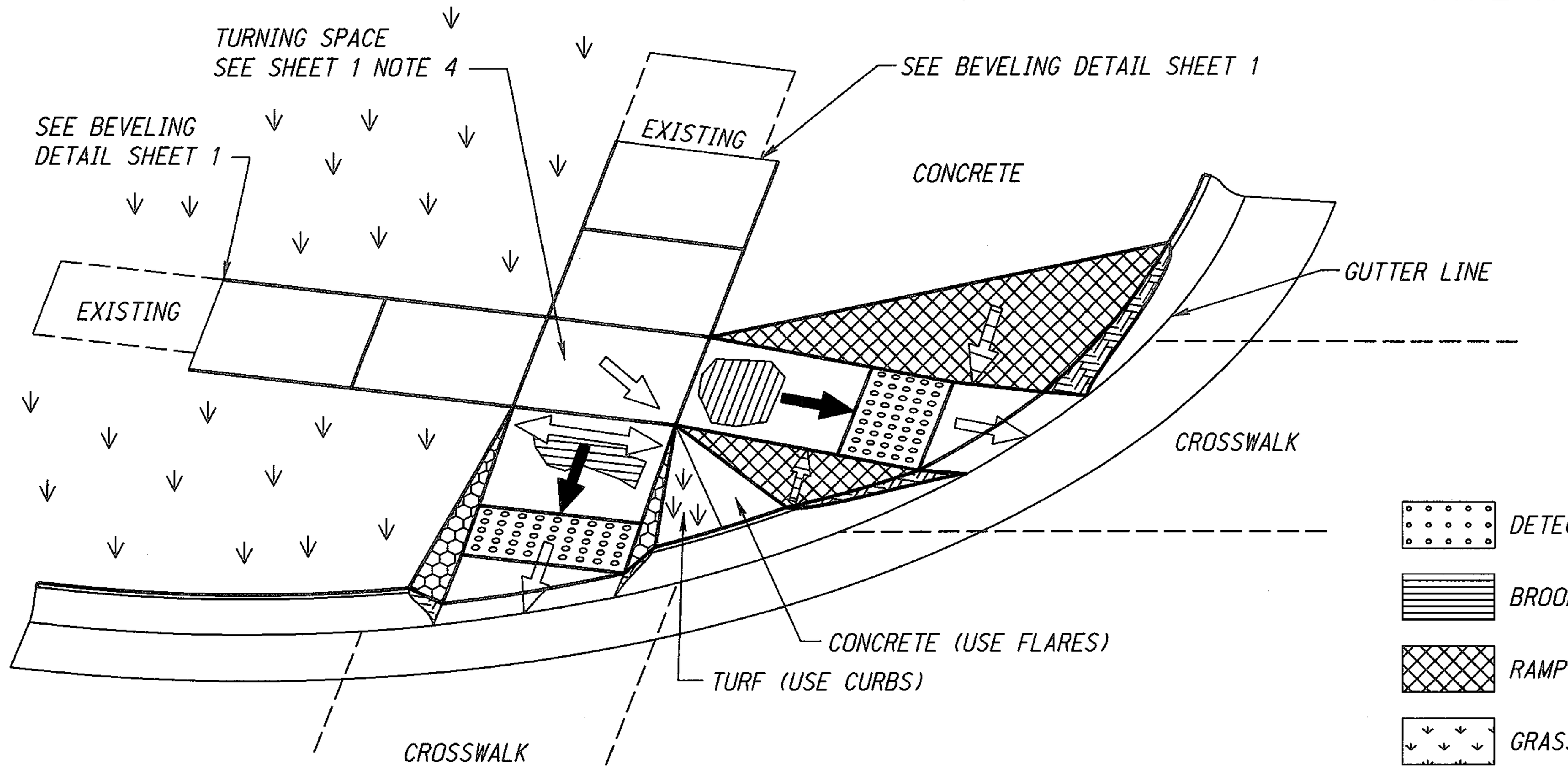
File: 30300e02.dgn Scale: 1:100 SHEET 2 OF 4 3030-0-E-02

W = WIDTH OF SIDEWALK (5'-0" TYP.)
R1 = RAMP WIDTH (4'-0" MIN.)
R2 = RAMP WIDTH (5'-0" MIN.) WITH VERTICAL OBSTACLE

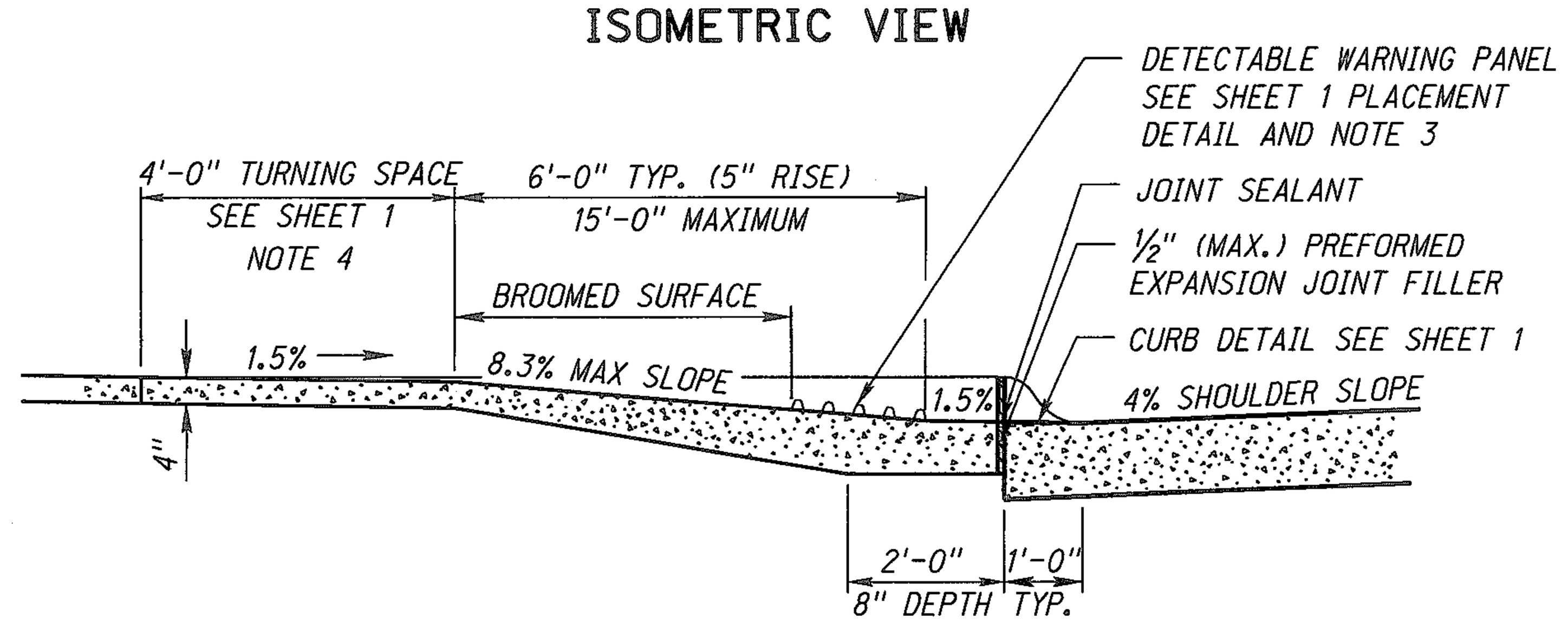


WHERE W IS 9 FT. OR LESS, R = W (MIN. WIDTH = 4 FT.)
WHERE W IS GREATER THAN 9 FT., R = 4 FT., EXCEPT BIKE PATH/TRAIL. SEE SHEET 1 NOTE 5.

TYPE A PLAN



ISOMETRIC VIEW



TYPE A CROSS SECTION

SECTION A-A

LEGEND

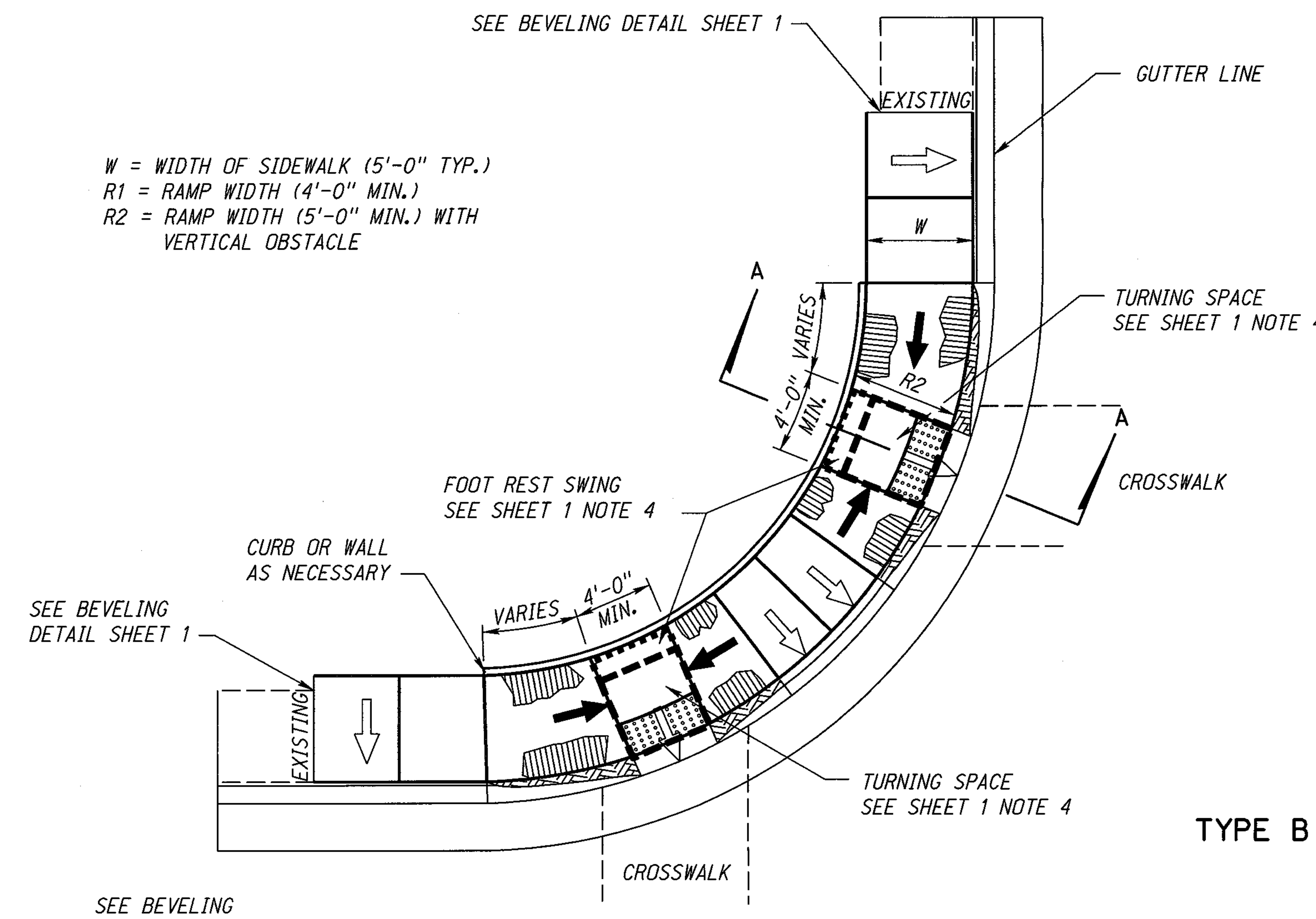
- DETECTABLE WARNING PANEL (DWP)
- BROOMED CURB RAMP WHEN 5% TO 8.3%
- RAMP FLARE
- GRASS OR NON WALKING SURFACE
- CURB TRANSITION
- CURB FACE SLOPE 1 VERT. : 2 HORZ.

SLOPE LEGEND

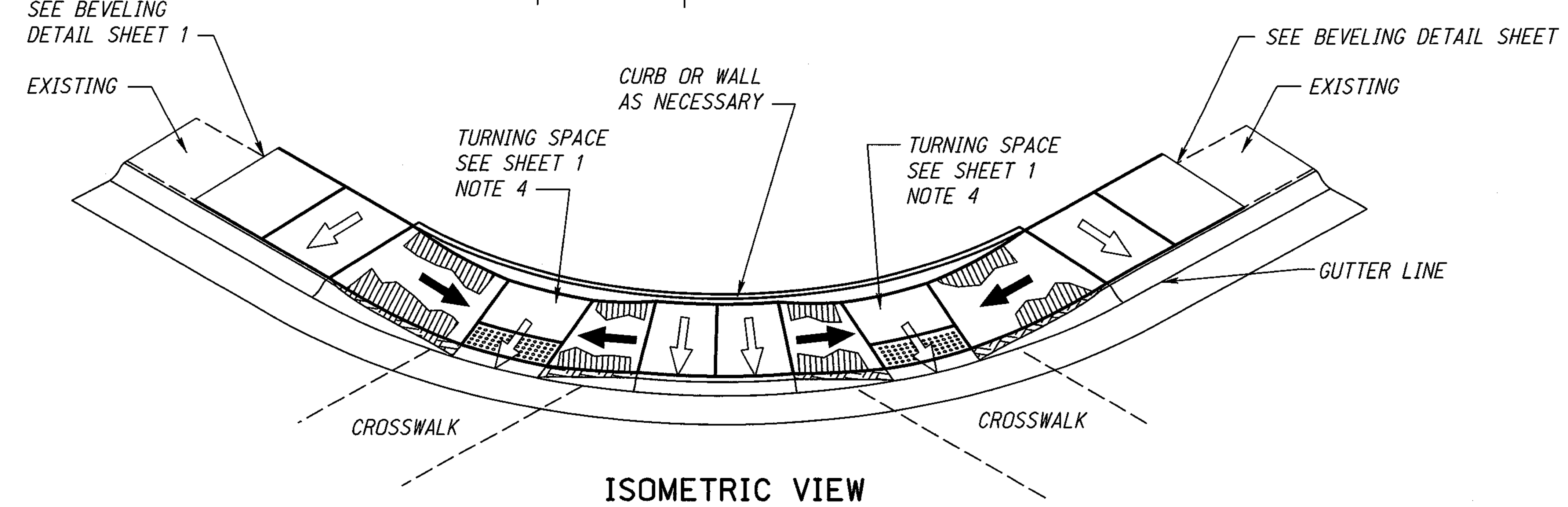
	SIDEWALK/TURNING SPACE AND RAMP CROSS SLOPE 1.5% TYPICAL, 2.0% MAX. SLOPE
	RAMP RUNNING SLOPE 8.0% TYPICAL, 8.3% MAX. SLOPE
	FLARE 90° TO RAMP 9.0% TYPICAL, 10.0% MAX. SLOPE

THE CONTRACTOR SHOULD ACCOUNT FOR CONSTRUCTION TOLERANCES TO PREVENT EXCEEDING THE MAXIMUM SLOPES. ANY SLOPES EXCEEDING THE MAXIMUMS SHALL NOT BE ACCEPTED WITHOUT PRIOR APPROVAL FROM THE ROADWAY DESIGN ENGINEER. AN EXCEPTION TO THIS IS THE TRANSITIONAL SEGMENT TO EXISTING SIDEWALK MUST CONNECT TO THE EXISTING SIDEWALK PANEL; THIS DOES NOT REQUIRE A STATEMENT OF TECHNICAL INFEASIBILITY. (REF. PROWAG CHAPTER R3 TECHNICAL REQUIREMENTS)

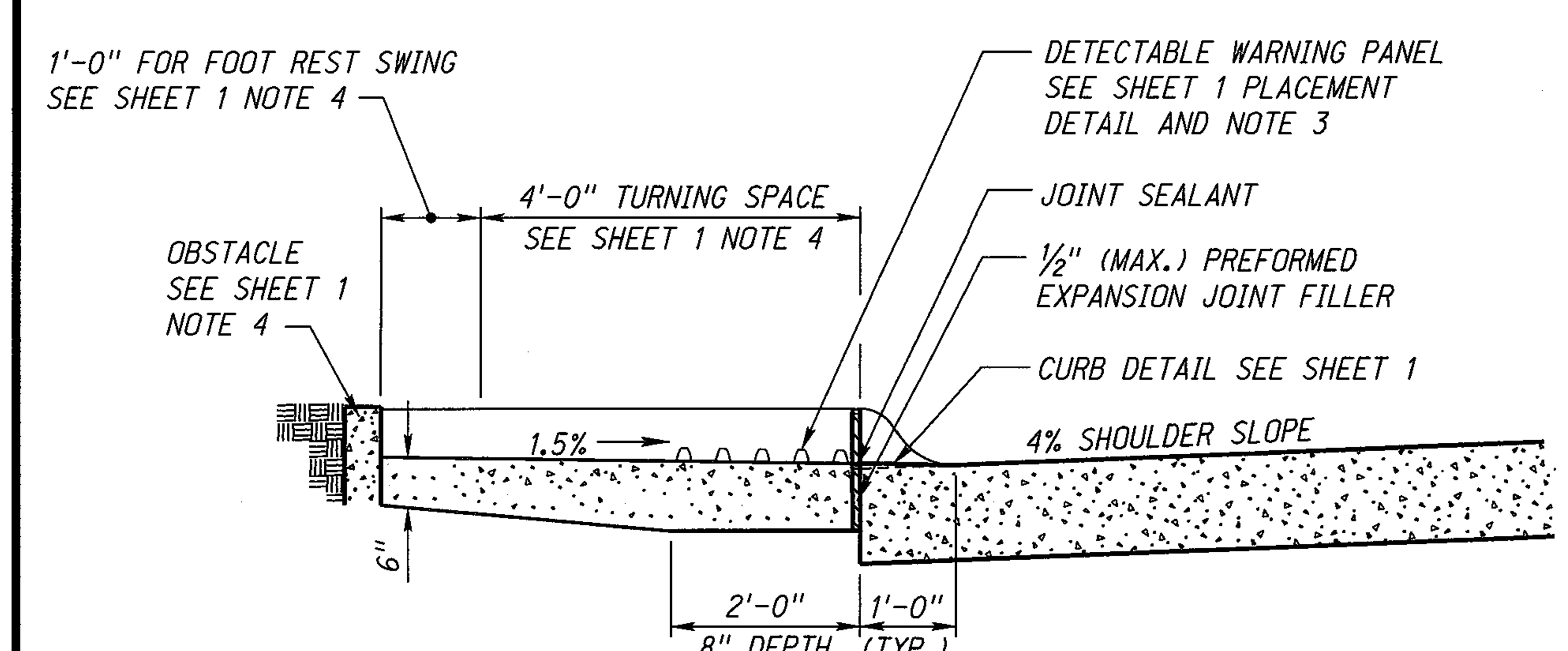
W = WIDTH OF SIDEWALK (5'-0" TYP.)
R1 = RAMP WIDTH (4'-0" MIN.)
R2 = RAMP WIDTH (5'-0" MIN.) WITH VERTICAL OBSTACLE



TYPE B PLAN



ISOMETRIC VIEW



TYPE B CROSS SECTION

SECTION A-A

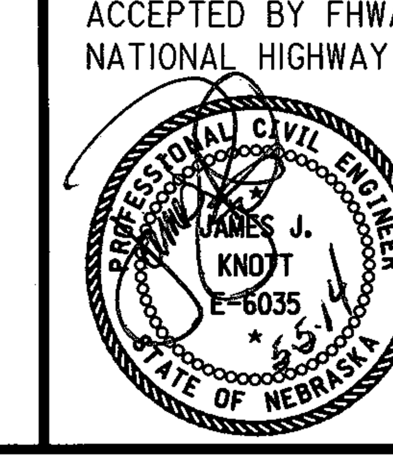
REV. NO.	DATE	DESCRIPTION OF REVISION
R2	OCT 14	CHANGE PM TO ROADWAY DESIGN ENGINEER
R1	FEB 13	ALL OF PLAN REWORKED (PROWAG)

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 303-R2

CURB RAMPS

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM: 6/12/14



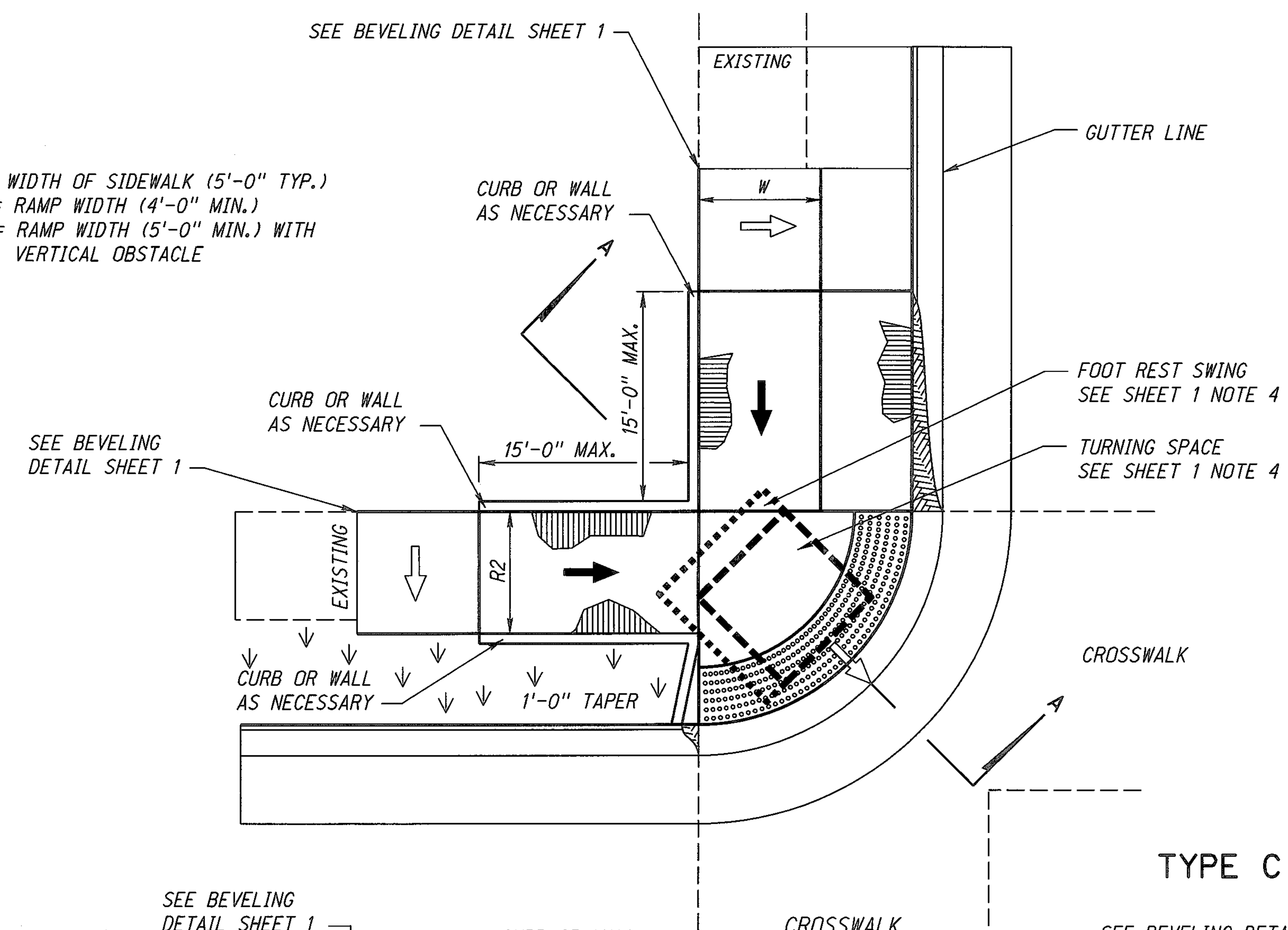
OCT 2014
DATE

ORIGINAL:
MARCH 22, 2010
DATE

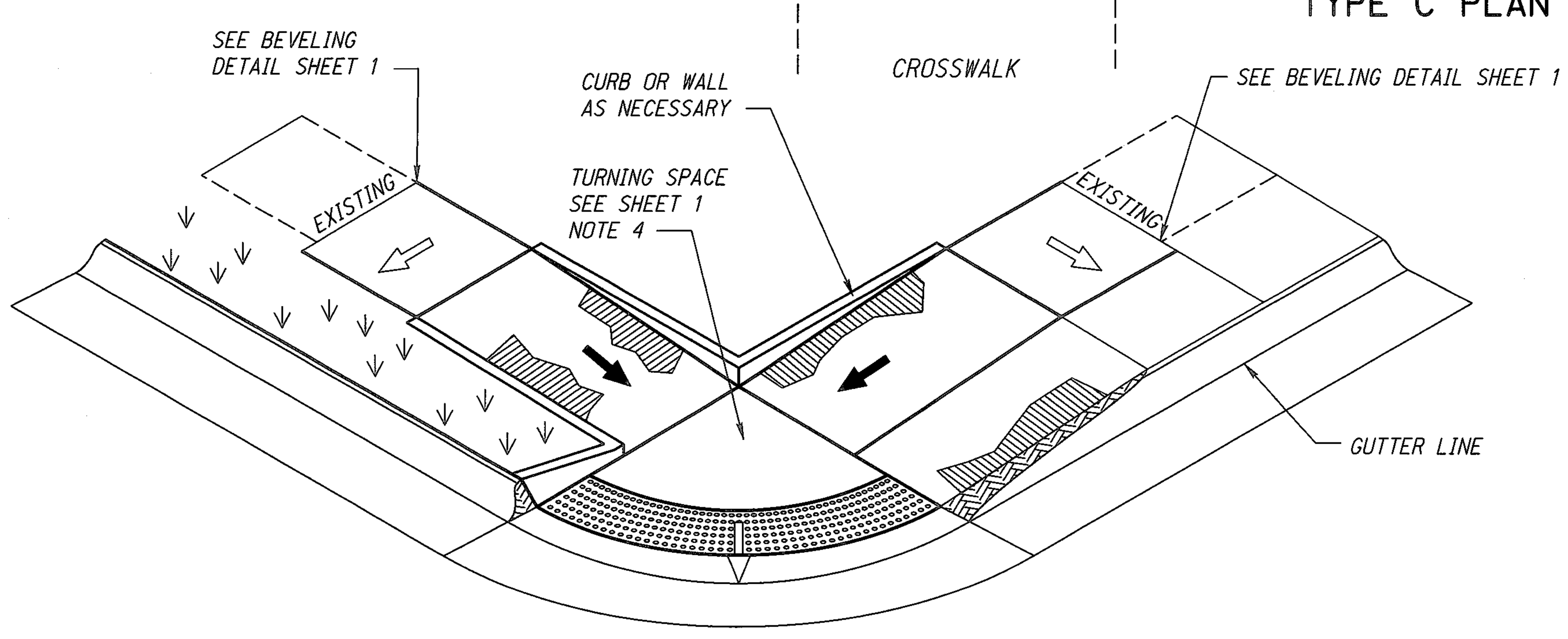
2
4

ROADWAY DESIGN DIVISION

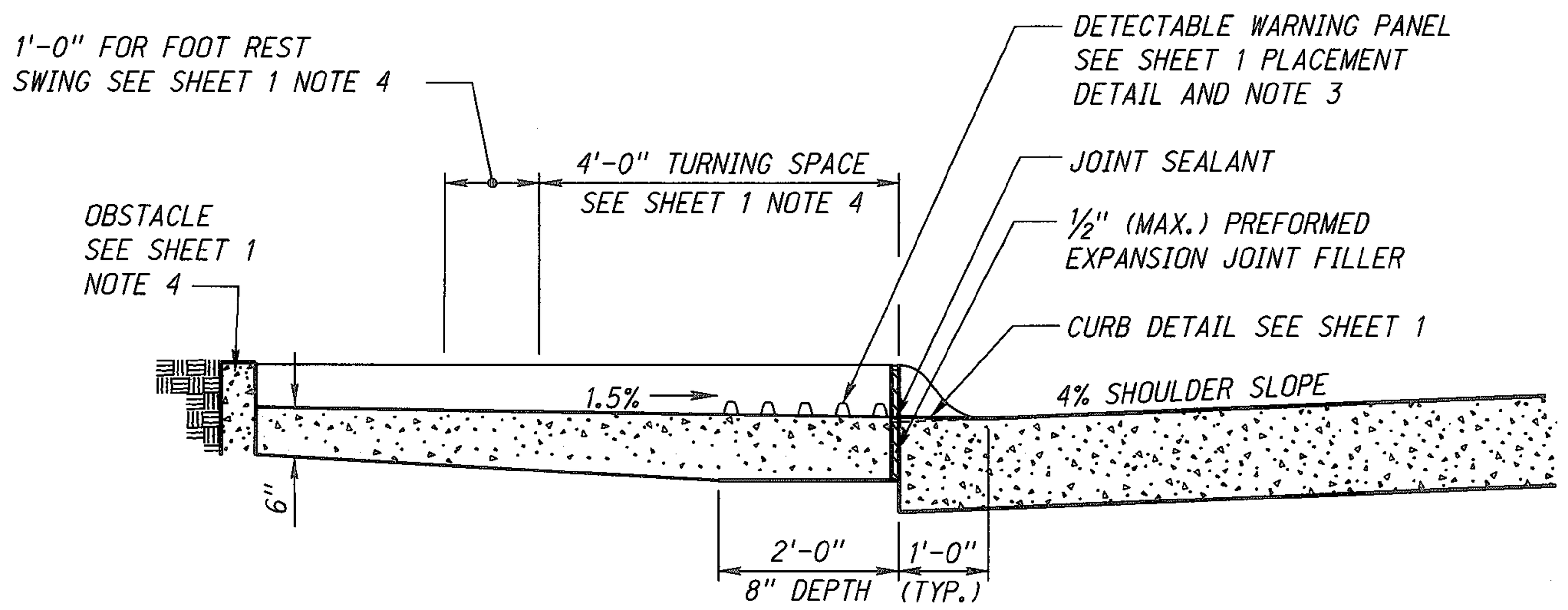
W = WIDTH OF SIDEWALK (5'-0" TYP.)
R1 = RAMP WIDTH (4'-0" MIN.)
R2 = RAMP WIDTH (5'-0" MIN.) WITH VERTICAL OBSTACLE



TYPE C PLAN

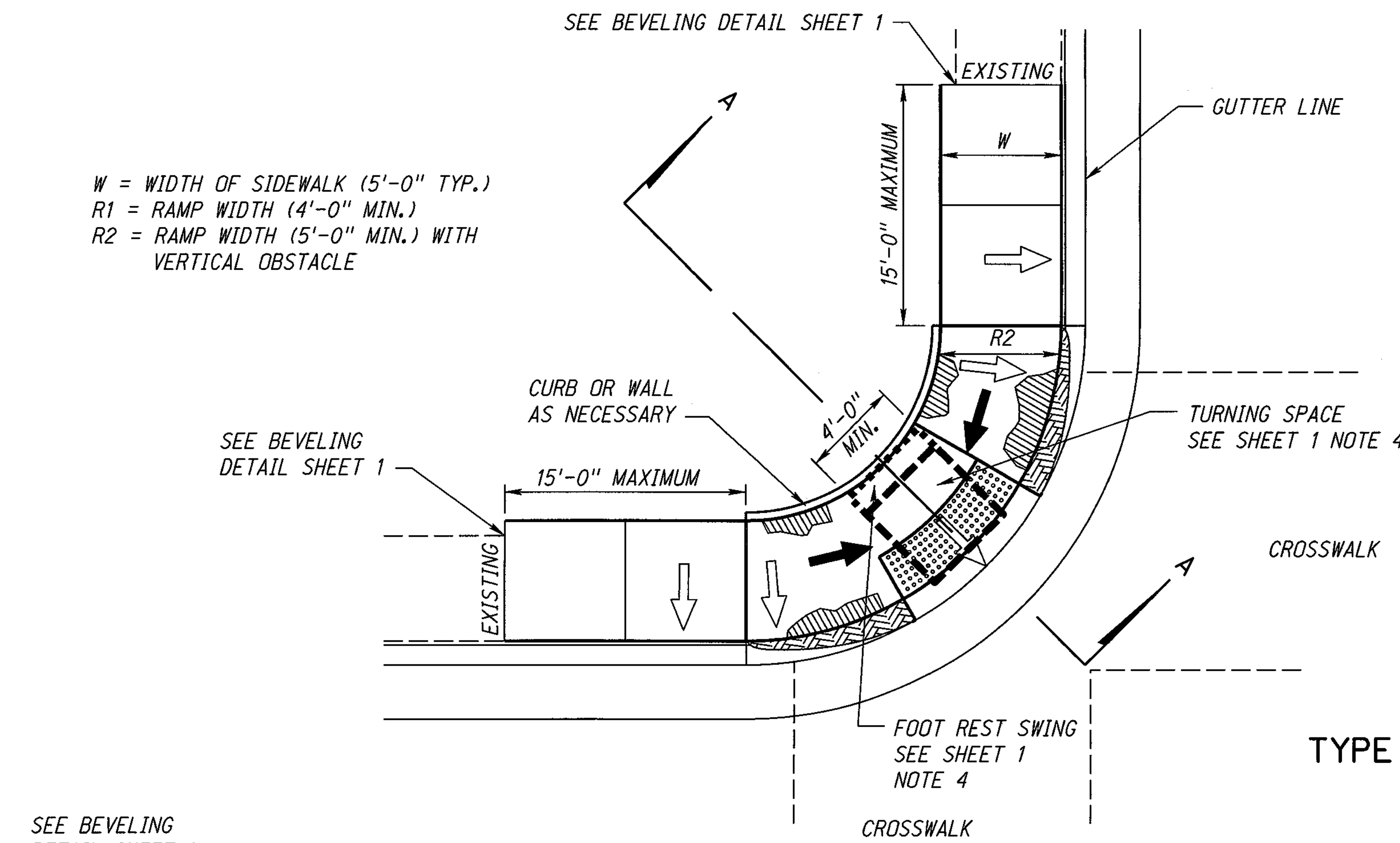


ISOMETRIC VIEW

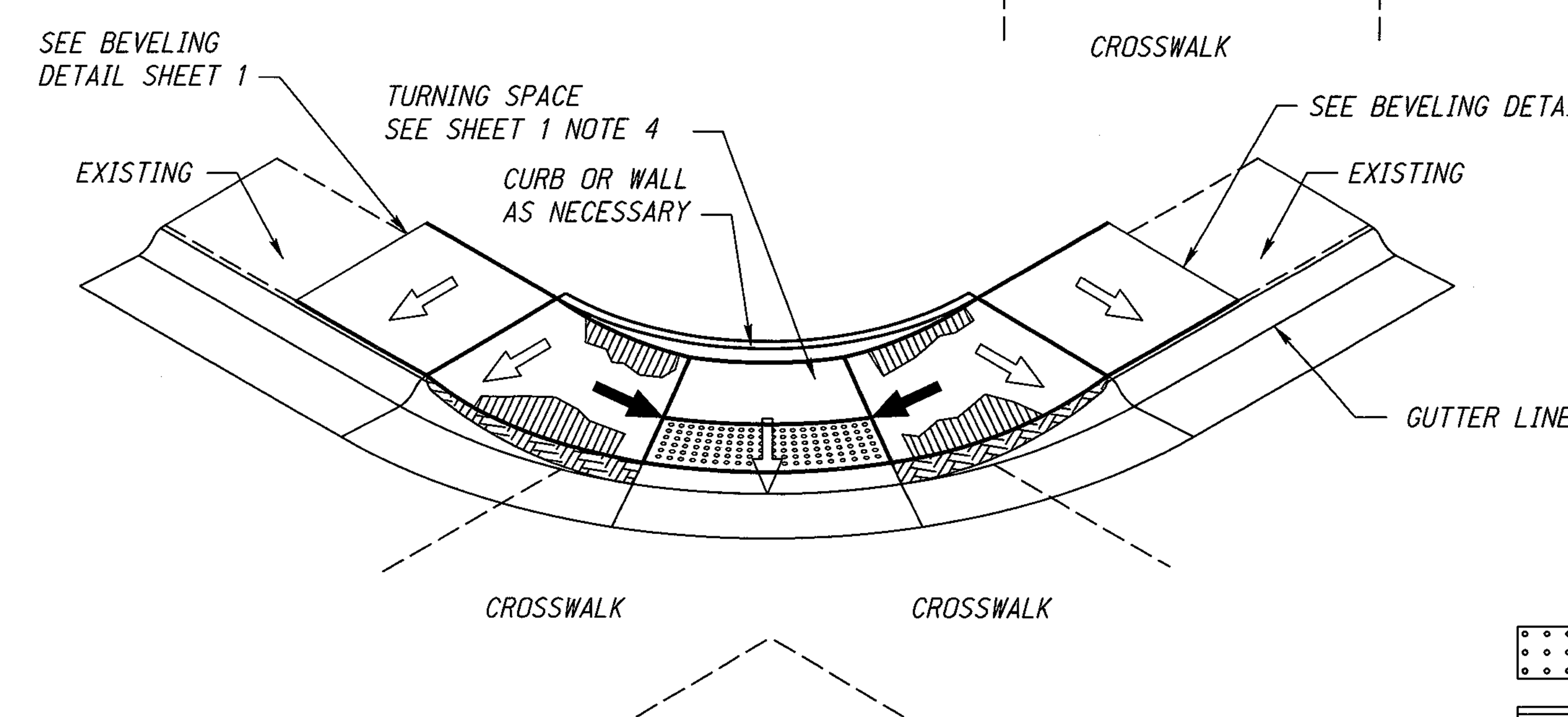


TYPE C CROSS SECTION
SECTION A-A

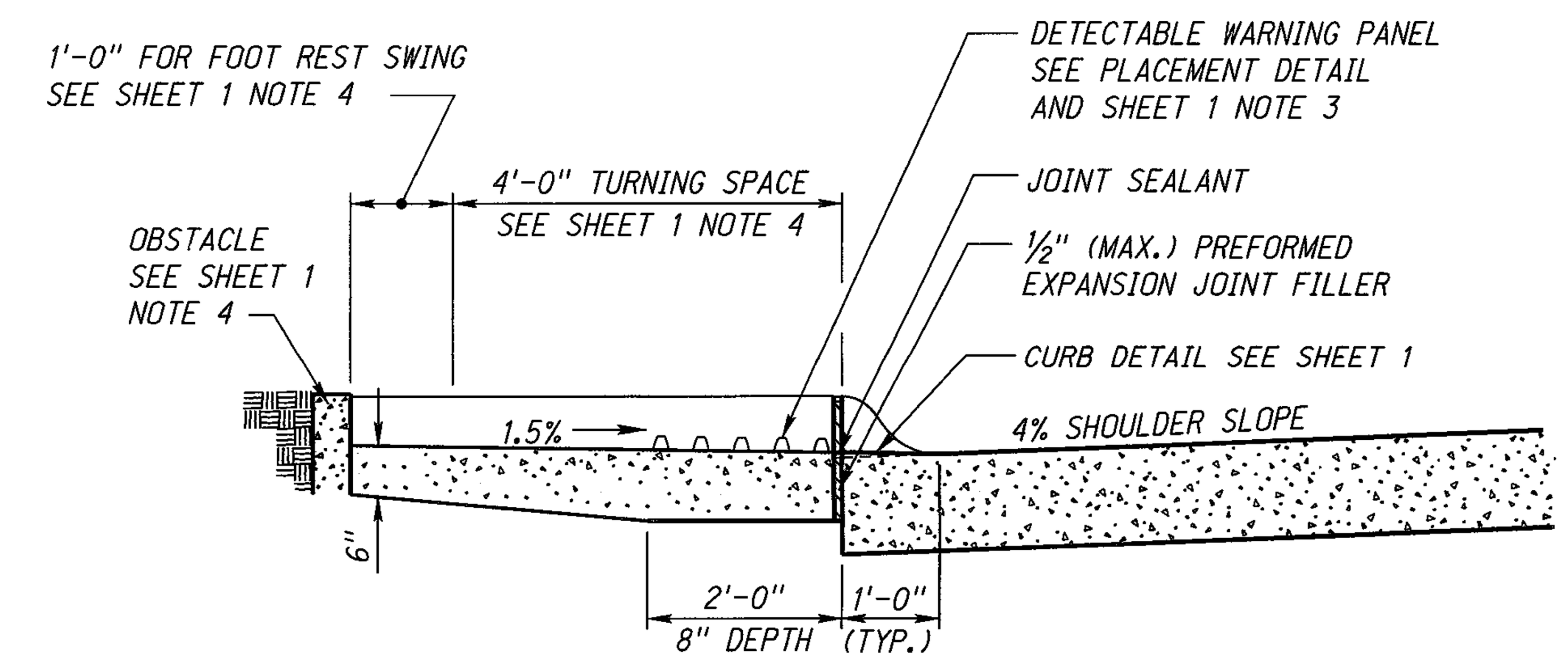
W = WIDTH OF SIDEWALK (5'-0" TYP.)
R1 = RAMP WIDTH (4'-0" MIN.)
R2 = RAMP WIDTH (5'-0" MIN.) WITH VERTICAL OBSTACLE



TYPE D PLAN



ISOMETRIC VIEW



TYPE D CROSS SECTION
SECTION A-A

LEGEND

- DETECTABLE WARNING PANEL (DWP)
- BROOMED CURB RAMP WHEN 5% TO 8.3%
- RAMP FLARE
- GRASS OR NON WALKING SURFACE
- CURB TRANSITION
- CURB FACE SLOPE 1 VERT. : 2 HORZ.

SLOPE LEGEND

	SIDEWALK/TURNING SPACE AND RAMP CROSS SLOPE 1.5% TYPICAL, 2.0% MAX. SLOPE
	RAMP RUNNING SLOPE 8.0% TYPICAL, 8.3% MAX. SLOPE
	FLARE 90° TO RAMP 9.0% TYPICAL, 10.0% MAX. SLOPE

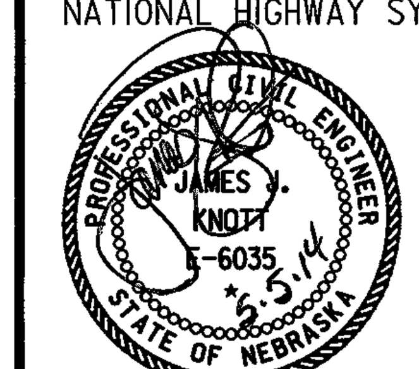
THE CONTRACTOR SHOULD ACCOUNT FOR CONSTRUCTION TOLERANCES TO PREVENT EXCEEDING THE MAXIMUM SLOPES. ANY SLOPES EXCEEDING THE MAXIMUMS SHALL NOT BE ACCEPTED WITHOUT PRIOR APPROVAL FROM THE ROADWAY DESIGN ENGINEER. AN EXCEPTION TO THIS IS THE TRANSITIONAL SEGMENT TO EXISTING SIDEWALK MUST CONNECT TO THE EXISTING SIDEWALK PANEL; THIS DOES NOT REQUIRE A STATEMENT OF TECHNICAL INFEASIBILITY. (REF. PROWAG CHAPTER R3 TECHNICAL REQUIREMENTS)

REV. NO.	DATE	DESCRIPTION OF REVISION
R2	OCT 14	CHANGE PM TO ROADWAY DESIGN ENGINEER
R1	FEB 13	ALL OF PLAN REWORKED (PROWAG)

NEBRASKA DEPARTMENT OF ROADS
STANDARD PLAN NO. 303-R2

CURB RAMPS

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:



Howard A. Schwart 6/12/14

OCT 2014
DATE

ORIGINAL:
MARCH 22, 2010
DATE

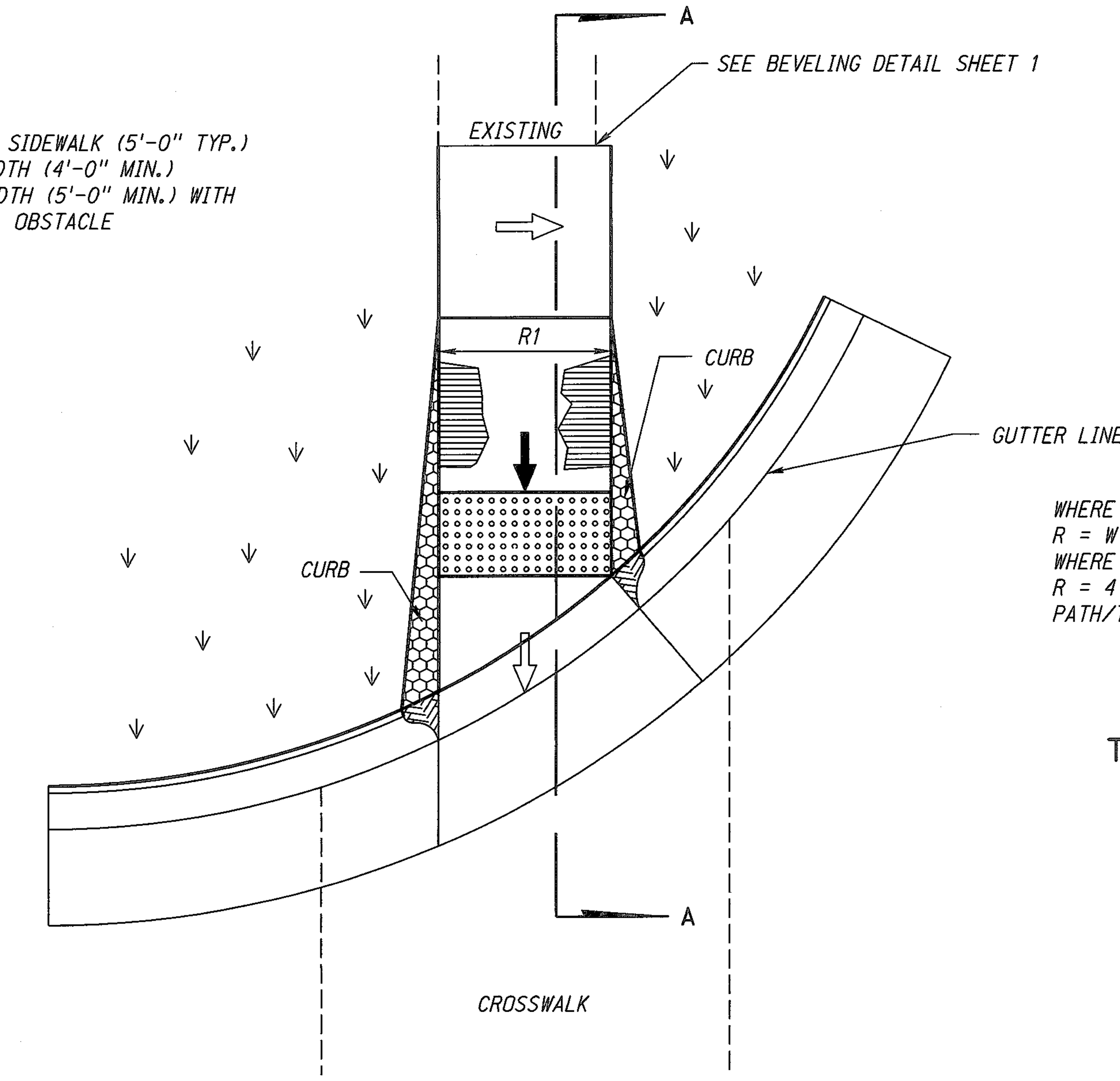
3 / 4

Computer: DRDESIGN55 User: dor13017 Date: 02-MAY-2014 11:16 3030-0-E-02
File: 30300e02.dgn
Scale: 1:100
SHEET 3 OF 4

ROADWAY DESIGN DIVISION

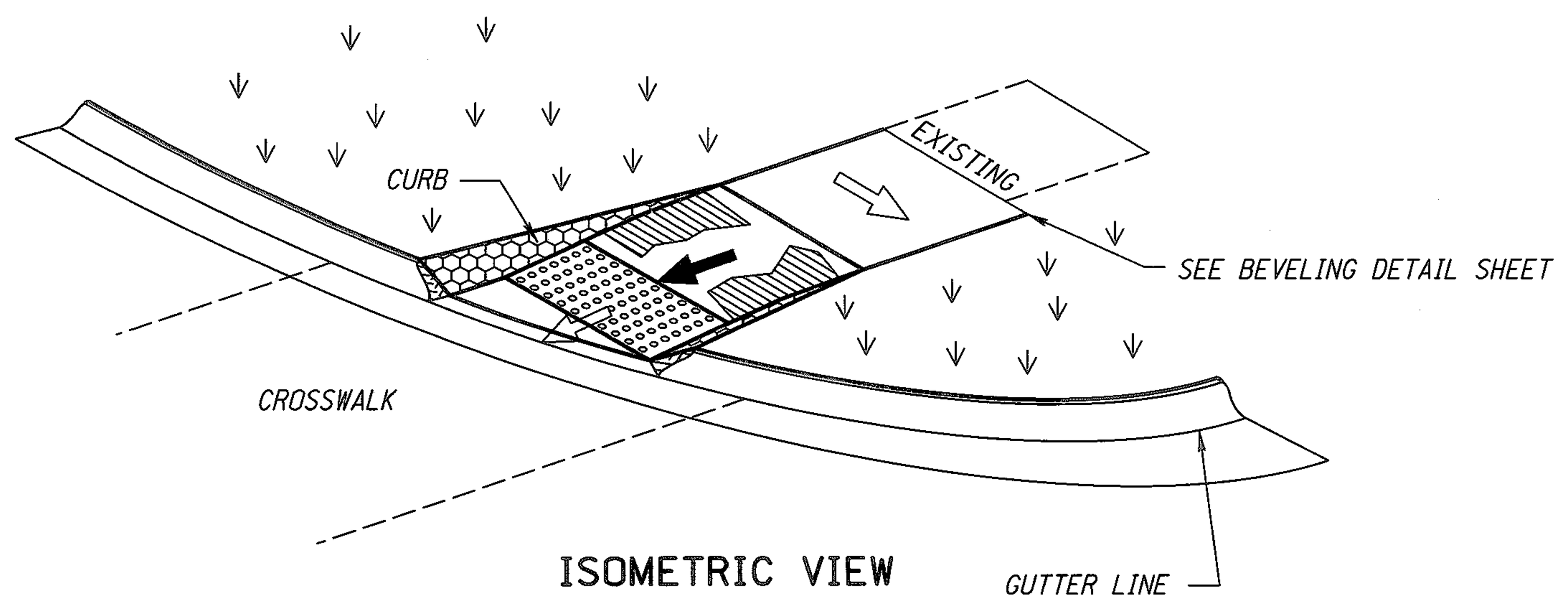
File: 30300e02.dgn Scale: 1:100 SHEET 4 OF 4 3030-0-E-02 Date: 02-MAY-2014 11:16 User: dor13017 Computer: DRDESIGN55

W = WIDTH OF SIDEWALK (5'-0" TYP.)
R1 = RAMP WIDTH (4'-0" MIN.)
R2 = RAMP WIDTH (5'-0" MIN.) WITH VERTICAL OBSTACLE

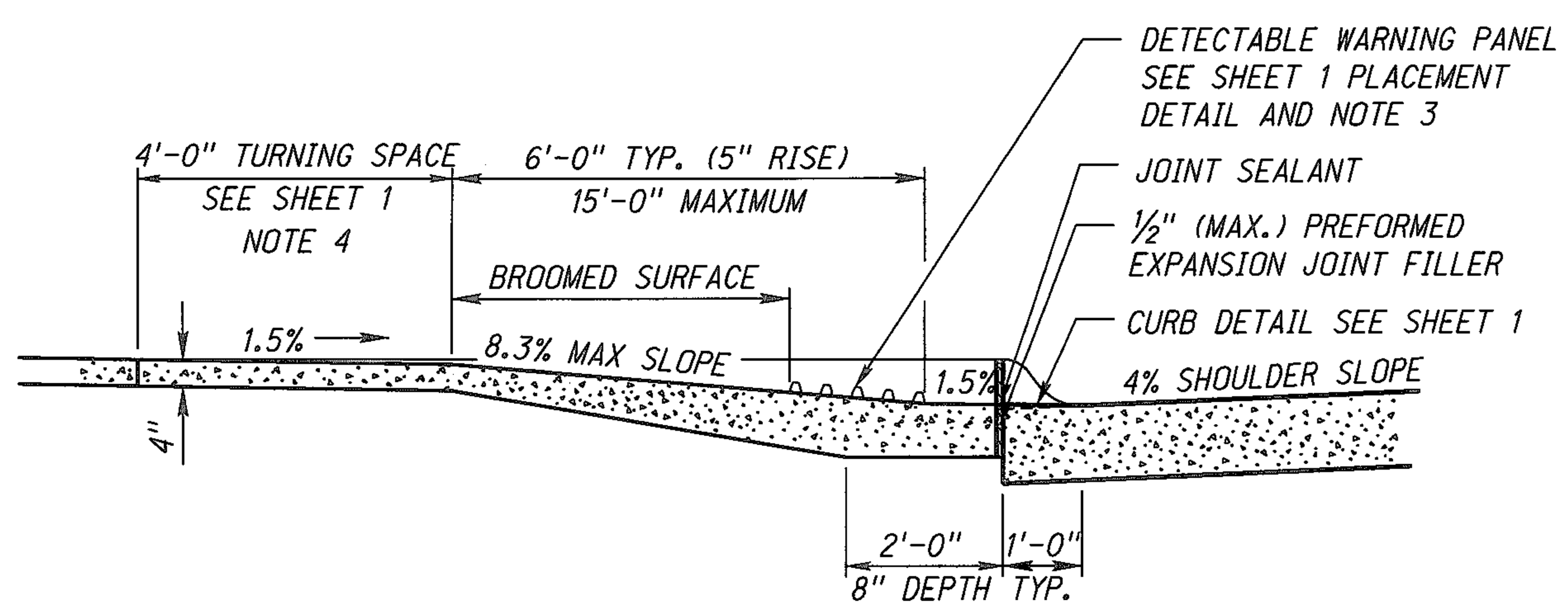


WHERE W IS 9 FT. OR LESS,
R = W (MIN. WIDTH = 4 FT.)
WHERE W IS GREATER THAN 9 FT.,
R = 4 FT., EXCEPT BIKE PATH/TRAIL. SEE NOTE 5 (SHEET 1)

TYPE E PLAN



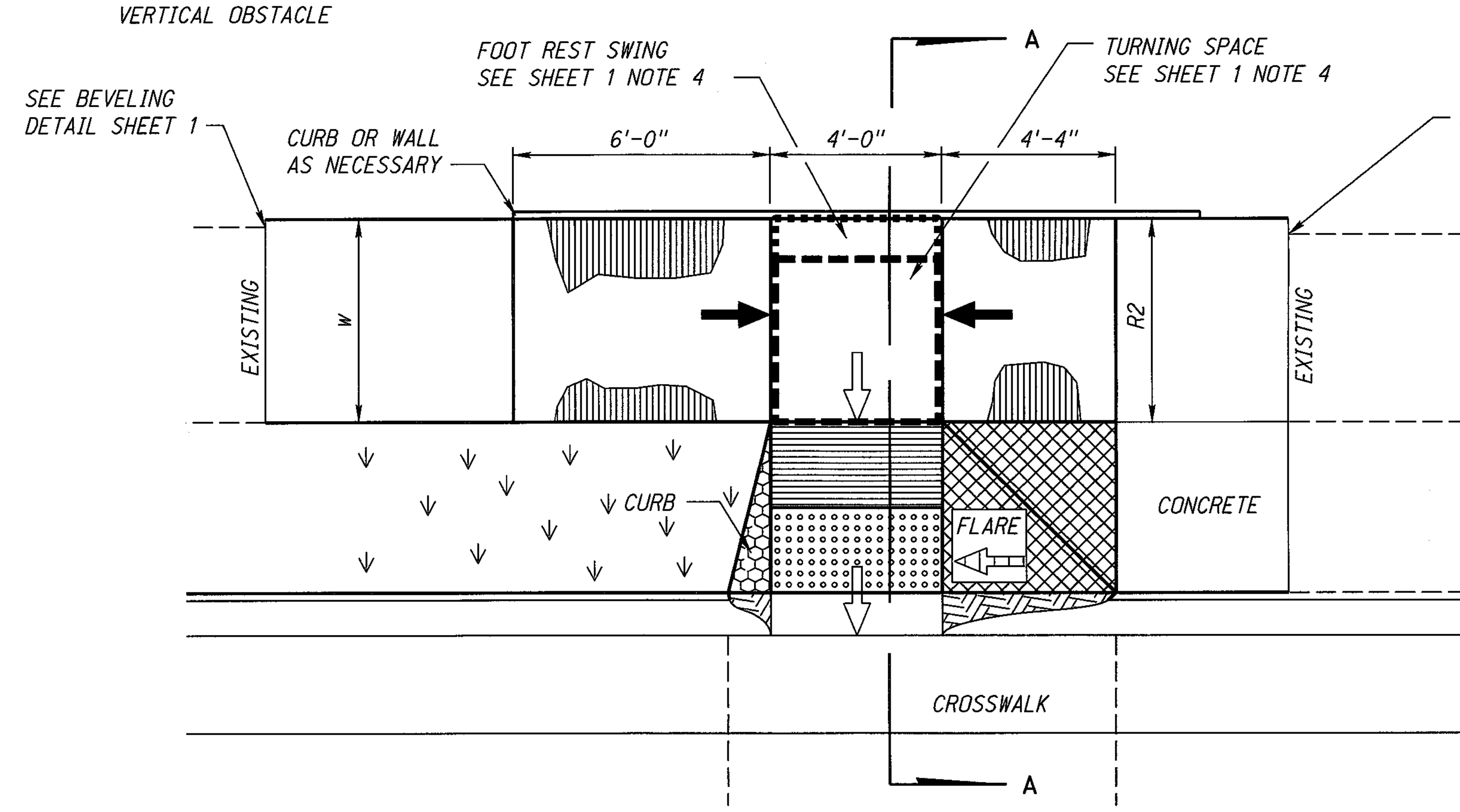
ISOMETRIC VIEW



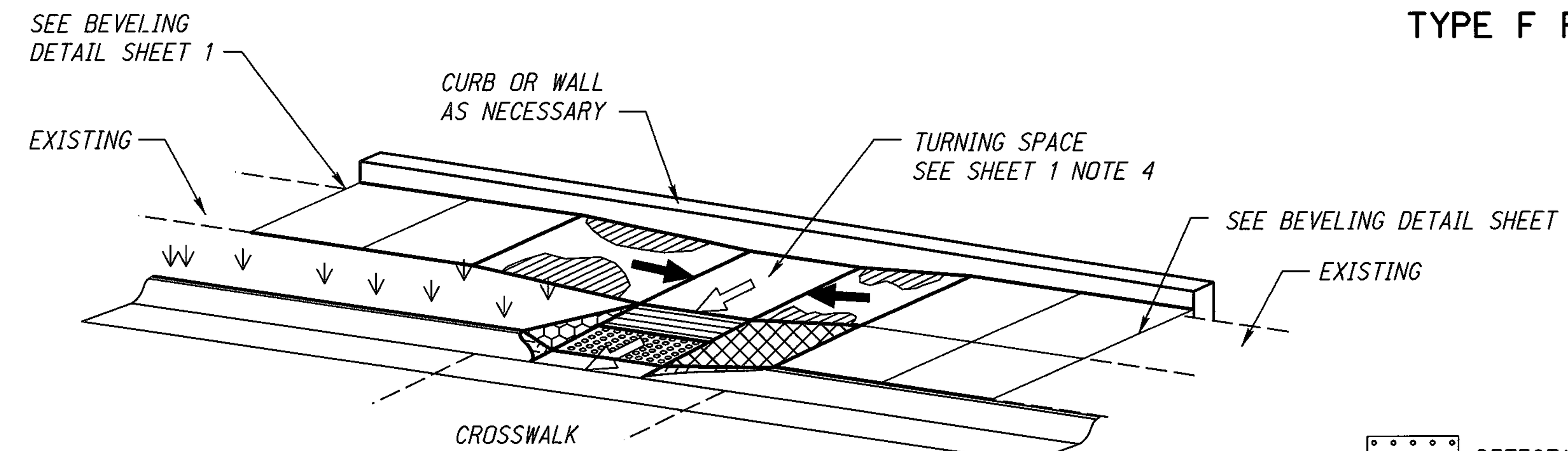
TYPE E CROSS SECTION

SECTION A-A

W = WIDTH OF SIDEWALK (5'-0" TYP.)
R1 = RAMP WIDTH (4'-0" MIN.)
R2 = RAMP WIDTH (5'-0" MIN.) WITH VERTICAL OBSTACLE



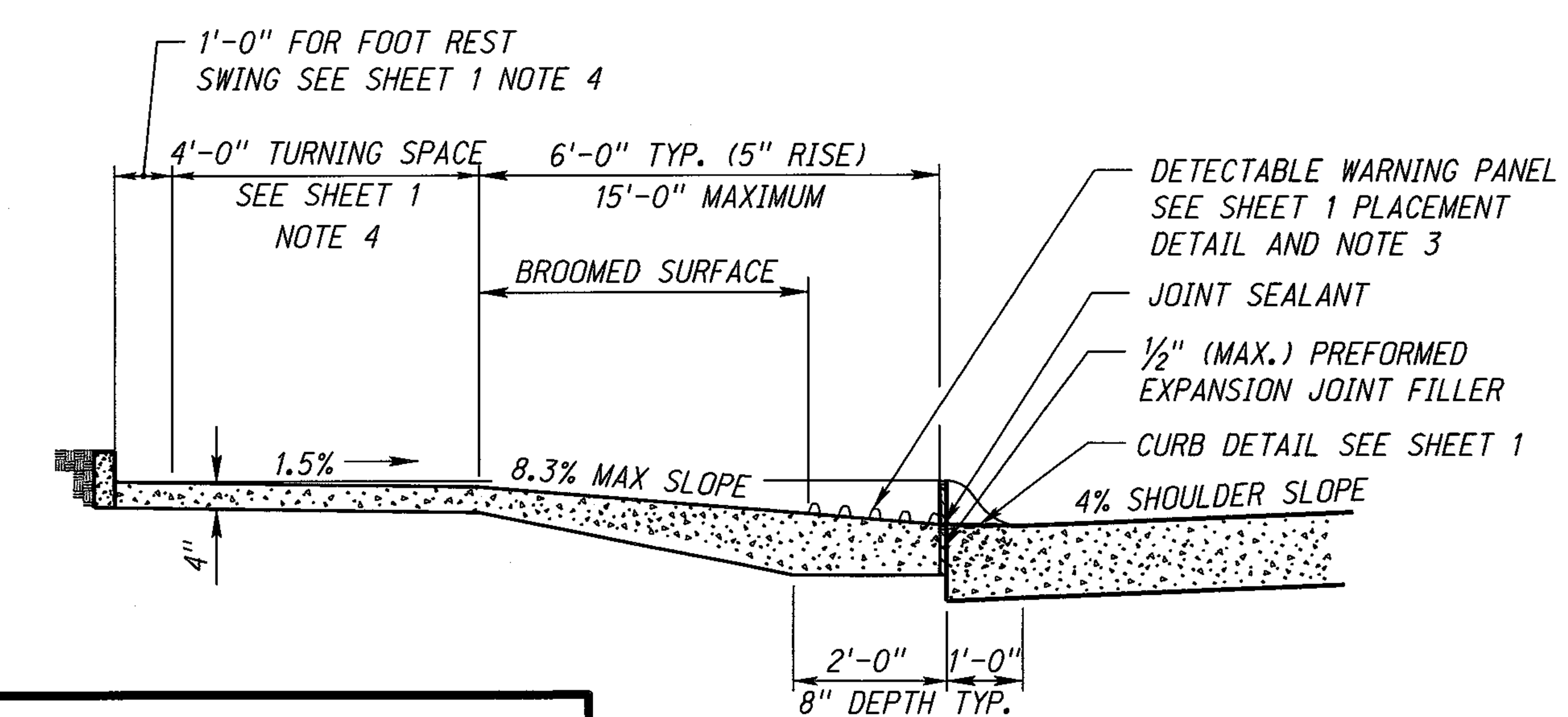
TYPE F PLAN



ISOMETRIC VIEW

LEGEND

DWP pattern	DETECTABLE WARNING PANEL (DWP)
Horizontal lines	BROOMED CURB RAMP WHEN 5% TO 8.3%
Crosshatch	RAMP FLARE
Grass symbols	GRASS OR NON WALKING SURFACE
Diagonal pattern	CURB TRANSITION
Hexagon pattern	CURB FACE SLOPE 1 VERT. : 2 HORZ.



TYPE F CROSS SECTION

SECTION A-A

SLOPE LEGEND

	SIDEWALK/TURNING SPACE AND RAMP CROSS SLOPE 1.5% TYPICAL, 2.0% MAX. SLOPE
	RAMP RUNNING SLOPE 8.0% TYPICAL, 8.3% MAX. SLOPE
	FLARE 90° TO RAMP 9.0% TYPICAL, 10.0% MAX. SLOPE

THE CONTRACTOR SHOULD ACCOUNT FOR CONSTRUCTION TOLERANCES TO PREVENT EXCEEDING THE MAXIMUM SLOPES. ANY SLOPES EXCEEDING THE MAXIMUMS SHALL NOT BE ACCEPTED WITHOUT PRIOR APPROVAL FROM THE ROADWAY DESIGN ENGINEER. AN EXCEPTION TO THIS IS THE TRANSITIONAL SEGMENT TO EXISTING SIDEWALK MUST CONNECT TO THE EXISTING SIDEWALK PANEL; THIS DOES NOT REQUIRE A STATEMENT OF TECHNICAL INFEASIBILITY. (REF. PROWAG CHAPTER R3 TECHNICAL REQUIREMENTS)

REV. NO.	DATE	DESCRIPTION OF REVISION
R2	OCT 14	CHANGE PM TO ROADWAY DESIGN ENGINEER
R1	FEB 13	ALL OF PLAN REWORKED (PROWAG)

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 303-R2

CURB RAMPS

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

6/2/14

OCT 2014
DATE

PROFESSIONAL CIVIL ENGINEER JAMES J. KNOTT E-6035 STATE OF NEBRASKA 5.5.14

ORIGINAL:
MARCH 22, 2010
DATE

ROADWAY DESIGN DIVISION

Computer: DRDESIGN55 User: dor13017 Date: 27-FEB-2014 07:45

File: 92000e06.dgn
Scale: 1:100
SHEET 1 OF 3

CHANNELIZATION DEVICES

THE FUNCTION OF CHANNELIZATION DEVICES IS TO WARN ROAD USERS OF CONDITIONS CREATED BY WORK ACTIVITIES IN OR NEAR THE TRAVELED WAY, TO PROTECT WORKERS IN THE TEMPORARY TRAFFIC CONTROL ZONE, AND TO GUIDE DRIVERS AND PEDESTRIANS SAFELY. CHANNELIZING DEVICES INCLUDE BUT ARE NOT LIMITED TO CONES, TUBULAR POSTS, VERTICAL PANELS, DRUMS, BARRICADES, TRAFFIC LANE DIVIDERS, TEMPORARY RAISED ISLANDS, AND BARRIERS.

DEVICES USED FOR CHANNELIZATION SHOULD PROVIDE FOR SMOOTH AND GRADUAL TRAFFIC MOVEMENT FROM ONE LANE TO ANOTHER, ONTO A BYPASS OR DETOUR, OR TO REDUCE THE WIDTH OF THE TRAVELED WAY. THEY MAY ALSO BE USED TO SEPARATE TRAFFIC FROM THE WORK SPACE, PAVEMENT DROP-OFFS, PEDESTRIAN PATHS, OR OPPOSING DIRECTIONS OF TRAFFIC.

CHANNELIZING DEVICES SHALL MEET THE CRASHWORTHY PERFORMANCE CRITERIA CONTAINED IN THE NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP) REPORT 350 OR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH). THEY SHOULD BE CONSTRUCTED AND BALLASTED TO PERFORM IN A PREDICTABLE MANNER WHEN INADVERTENTLY STRUCK BY A VEHICLE. IF STRUCK, THE DEVICE SHOULD YIELD OR BREAK AWAY, FRAGMENTS OR OTHER DEBRIS FROM THE DEVICE SHOULD NOT PENETRATE THE PASSENGER COMPARTMENT OF THE VEHICLE OR BE A POTENTIAL HAZARD TO WORKERS OR PEDESTRIANS IN THE IMMEDIATE AREA.

SPACING OF CHANNELIZING DEVICES SHOULD NOT EXCEED A DISTANCE IN FEET EQUAL TO THE SPEED WHEN USED FOR THE TAPER CHANNELIZATION, AND A DISTANCE IN FEET OF TWICE THE SPEED WHEN USED FOR TANGENT CHANNELIZATION.

SPACING OF CHANNELIZATION DEVICES		
SPEED (MPH)	SPACING OF DEVICES (FEET)	
S	TAPER	TANGENT
25	25	50
35	35	70
45	45	90
55	55	110
60	60	120
65	65	130
75	75	150

WARNING LIGHTS MAY BE ADDED TO CHANNELIZING DEVICES IN AREAS WITH FREQUENT FOG, SNOW, OR SEVERE ROADWAY CURVATURE, OR WHERE VISUAL DISTRACTIONS ARE PRESENT, EXCEPT FOR THE SEQUENTIAL FLASHING WARNING LIGHTS, WARNING LIGHTS PLACED ON CHANNELIZING DEVICES USED IN A SERIES TO CHANNELIZE ROAD USERS SHALL BE STEADY-BURN.

THE RETROREFLECTIVE MATERIAL USED ON CHANNELIZING DEVICES SHALL HAVE A SMOOTH, SEALED OUTER SURFACE, MEETING THE REQUIREMENTS OF THE ASTM SPECIFICATION D4956, FOR TYPE IV SHEETING OR TYPE V REBOUNDABLE SHEETING (OR GREATER).

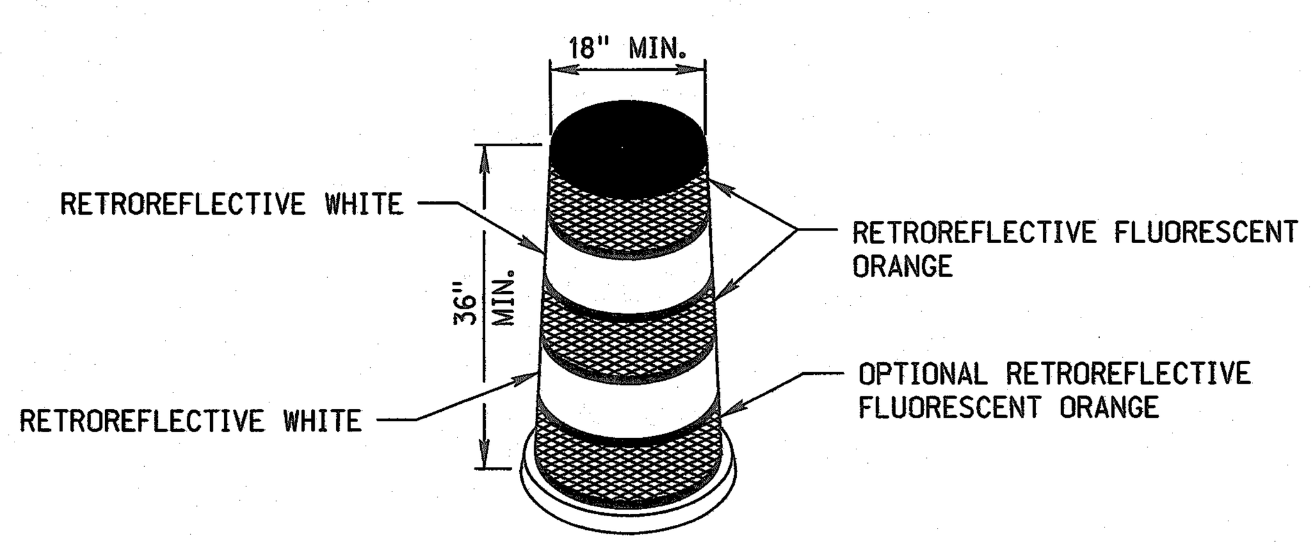
COEFFICIENT OF RETROREFLECTION (CD/LUX/M^2)			
WHITE	ORANGE	RED	YELLOW
250	100	45	170

THE AMERICAN TRAFFIC SAFETY SERVICES ASSOCIATION (ATSSA) "QUALITY GUIDELINES FOR WORK ZONE TRAFFIC CONTROL DEVICES" SHALL BE USED AS A VISUAL GUIDE FOR DETERMINING IF A TRAFFIC CONTROL DEVICE/OR SIGN IS ACCEPTABLE, MARGINAL OR UNACCEPTABLE.

THE NAME AND TELEPHONE NUMBER OF THE AGENCY, CONTRACTOR, OR SUPPLIER MAY BE SHOWN ON THE CHANNELIZING DEVICE BACK OR SUPPORT, BUT NOT ON THE DEVICE FACE. THE LETTERS AND NUMBERS SHALL BE A NON-REFLECTIVE COLOR AND NOT OVER 15 SQUARE INCHES IN TOTAL AREA.

PARTICULAR ATTENTION SHOULD BE GIVEN TO MAINTAINING THE CHANNELIZING DEVICES TO KEEP THEM CLEAN, VISIBLE, AND PROPERLY POSITIONED. DEVICES SHALL BE REPLACED THAT ARE DAMAGED AND/OR HAVE LOST A SIGNIFICANT AMOUNT OF THEIR RETROREFLECTIVITY AND EFFECTIVENESS.

REFLECTORIZED PLASTIC DRUMS



DESIGN

REFLECTORIZED PLASTIC DRUMS USED FOR TRAFFIC WARNING OR CHANNELIZATION SHALL BE CONSTRUCTED OF LIGHTWEIGHT, FLEXIBLE, AND DEFORMABLE MATERIALS AND BE A MINIMUM OF 36 INCHES IN HEIGHT AND HAVE A MINIMUM WIDTH OF AT LEAST A 18 INCHES, REGARDLESS OF ORIENTATION. THE PREDOMINANT COLOR OF THE DRUM SHALL BE ORANGE. METAL DRUMS SHALL NOT BE USED. THE MARKINGS ON DRUMS SHALL BE HORIZONTAL, SHALL BE CIRCUMFERENTIAL, AND SHALL DISPLAY FOUR 6 INCH WIDE BANDS OF RETROREFLECTIVE SHEETING, ALTERNATING FLUORESCENT ORANGE-WHITE-FLUORESCENT ORANGE-WHITE, DRUMS SHALL HAVE CLOSED TOPS THAT WILL NOT ALLOW COLLECTION OF CONSTRUCTION OR OTHER DEBRIS.

APPLICATION

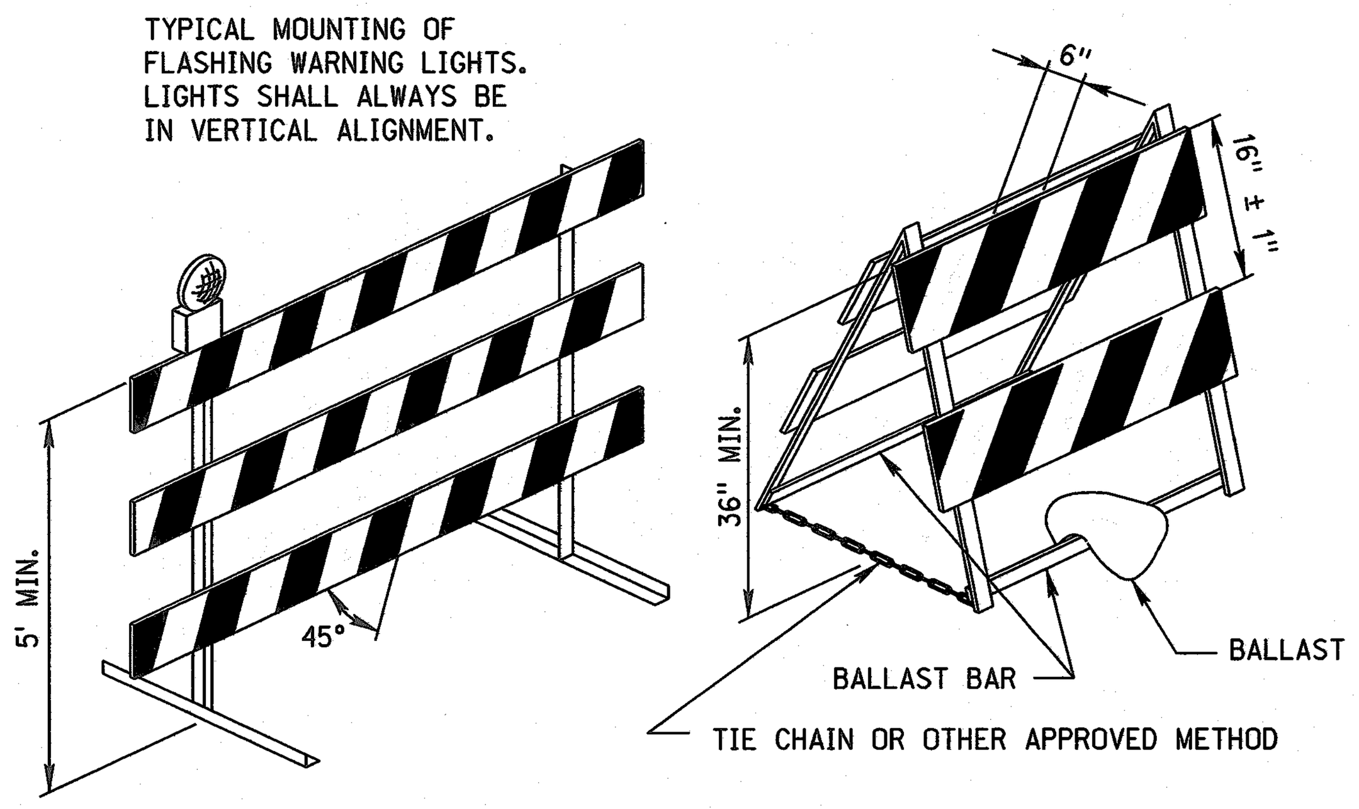
DRUMS ARE MOST COMMONLY USED TO CHANNELIZE OR DELINEATE TRAFFIC FLOW BUT MAY ALSO BE USED INDIVIDUALLY OR IN GROUPS TO MARK SPECIFIC LOCATIONS. DRUMS ARE HIGHLY VISIBLE AND HAVE GOOD TARGET VALUE; THEY GIVE THE APPEARANCE OF BEING FORMIDABLE OBSTACLES AND, THEREFORE, COMMAND THE RESPECT OF ROAD USERS.

BALLAST SHALL NOT BE PLACED ON TOP OF THE DRUM. DRUMS SHOULD NOT BE WEIGHTED WITH SAND, WATER, OR ANY MATERIAL.

BARRICADES

BARRICADE TYPE	TYPE II	TYPE III
WIDTH OF RAIL ✻	8 INCHES MIN. - 12 INCHES MAX.	8 INCHES MIN. - 12 INCHES MAX.
LENGTH OF RAIL	36 INCHES	8 FEET ✻✻
WIDTH OF STRIPES	6 INCHES	6 INCHES
HEIGHT	36 INCHES	5 FEET
REFLECTIVE SHEETING	TYPE IV	TYPE IV
NUMBER OF REFLECTORIZED RAIL FACES	4 (TWO EACH DIRECTION)	6 (THREE EACH DIRECTION)

✻NOMINAL DIMENSIONS ARE PERMISSIBLE WHEN CONSTRUCTED FROM LUMBER.
✻✻WHEN LATERAL SPACE IS LIMITED, SOME TYPE III BARRICADES WITH A 4 FOOT LENGTH OF RAIL, MAY BE ALLOWED WHEN APPROVED BY THE ENGINEER.



BALLAST SHALL NOT BE PLACED OVER ANY REFLECTIVE DEVICE

DESIGN

A BARRICADE IS A PORTABLE OR FIXED DEVICE HAVING TWO OR THREE RAILS WITH APPROPRIATE MARKINGS. IT IS USED TO CONTROL ROAD USERS BY CLOSING, RESTRICTING, OR DELINEATING ALL OR A PORTION OF THE RIGHT-OF-WAY.

BARRICADES SHALL BE ONE OF TWO TYPES; TYPE II OR TYPE III.

STRIPES ON BARRICADE RAILS SHALL BE ALTERNATING ORANGE AND WHITE RETROREFLECTIVE STRIPES SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES IN THE DIRECTION ROAD USERS ARE TO PASS. THE STRIPES SHALL BE 6 INCHES WIDE. THE MINIMUM RAIL LENGTH FOR A TYPE II BARRICADE IS 36 INCHES.

WHERE BARRICADES EXTEND ENTIRELY ACROSS A ROADWAY, THE STRIPES SHOULD SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH ROAD USERS MUST TURN. WHERE BOTH RIGHT AND LEFT TURNS ARE PROVIDED, THE STRIPES MAY SLOPE DOWNWARD IN BOTH DIRECTIONS FROM THE CENTER OF THE BARRICADE OR BARRICADES. WHERE NO TURNS ARE INTENDED, THE STRIPES SHOULD SLOPE DOWNWARD TOWARD THE CENTER OF THE BARRICADE OR BARRICADES.

BARRICADE RAILS SHOULD BE SUPPORTED IN A MANNER THAT WILL ALLOW THEM TO BE SEEN BY THE ROAD USER, AND IN A MANNER THAT PROVIDES A STABLE SUPPORT THAT IS NOT EASILY BLOWN OVER OR DISPLACED.

ON HIGH-SPEED ROADWAYS OR IN OTHER SITUATIONS WHERE BARRICADES MAY BE SUSCEPTIBLE TO OVERTURNING IN THE WIND, SANDBAGS SHOULD BE USED FOR BALLASTING. SANDBAGS MAY BE PLACED ON LOWER PARTS OF THE FRAME OR STAYS TO PROVIDE THE REQUIRED BALLAST BUT SHALL NOT BE PLACED ON TOP OF ANY STRIPED RAIL. BARRICADES SHALL NOT BE BALLASTED BY HEAVY OBJECTS SUCH AS ROCKS OR CHUNKS OF CONCRETE.

THE BARRICADE OWNERS NAME, NOT TO EXCEED 15 SQUARE INCHES SHALL BE SHOWN ON THE BARRICADE BACK OR SUPPORT BUT NOT ON ITS FACE.

✻✻ WHEN LATERAL SPACE IS LIMITED, SOME TYPE III BARRICADES WITH A 4 FOOT LENGTH OF RAIL, MAY BE ALLOWED WHEN APPROVED BY THE ENGINEER.

APPLICATION

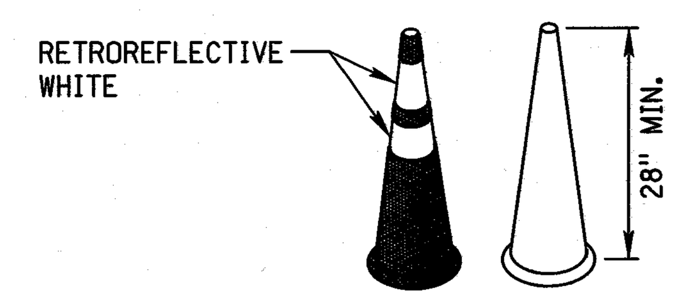
TYPE II BARRICADES ARE INTENDED FOR USE IN SITUATIONS WHERE TRAFFIC IS MAINTAINED THROUGH THE TEMPORARY TRAFFIC CONTROL ZONE. THEY MAY BE USED INDIVIDUALLY OR IN GROUPS TO MARK A SPECIFIC CONDITION, OR THEY MAY BE USED IN A SERIES FOR CHANNELIZING TRAFFIC. ON THE INTERSTATE, FREEWAY AND EXPRESSWAY SYSTEM, TYPE II BARRICADES SHALL NOT BE USED FOR CHANNELIZATION.

TYPE III BARRICADES USED AT A ROAD CLOSURE MAY EXTEND COMPLETELY ACROSS A ROADWAY FROM CURB TO CURB. WHERE PROVISION IS MADE FOR ACCESS OF AUTHORIZED EQUIPMENT AND VEHICLES, THE RESPONSIBILITY FOR THE TYPE III BARRICADES SHOULD BE ASSIGNED TO A PERSON WHO SHALL PROVIDE PROPER CLOSURE AT THE END OF EACH WORK DAY.

WHEN A HIGHWAY IS LEGALLY CLOSED BUT ACCESS MUST STILL BE ALLOWED FOR LOCAL TRAFFIC, THE TYPE III BARRICADES MAY NOT BE EXTENDED COMPLETELY ACROSS A ROADWAY. A SIGN WITH THE APPROPRIATE LEGEND CONCERNING PERMISSIBLE USE BY LOCAL TRAFFIC SHALL BE MOUNTED.

NORMALLY PERMANENT SIGNS MOUNTED ON BARRICADES SHALL BE ERECTED ABOVE THE BARRICADE. THE SIGNS "ROAD CLOSED", OR "ROAD WORK AHEAD", FOR EXAMPLE CAN EFFECTIVELY BE MOUNTED ABOVE THE BARRICADE THAT CLOSES THE ROADWAY. TYPE III BARRICADES SHALL BE SUPPLEMENTED WITH A LIGHTING DEVICE UNLESS SPECIFICALLY OMITTED BY THE ENGINEER. DETOUR ARROW AND LARGE WARNING ARROW SIGNS SHOULD BE PLACED ON THE FACE OF BARRICADE.

CONES



DESIGN

CONES SHALL BE PREDOMINANTLY ORANGE, FLOURESCENT RED-ORANGE, OR FLOURESCENT YELLOW/ORANGE, NOT LESS THAN 28 INCHES IN HEIGHT, AND SHALL BE MADE OF A MATERIAL THAT CAN BE STRUCK WITHOUT DAMAGING VEHICLES ON IMPACT. CONES WHEN ALLOWED ON THE INTERSTATE, FREEWAY OR EXPRESSWAY SYSTEM SHALL BE A MINIMUM OF 36 INCHES IN HEIGHT.

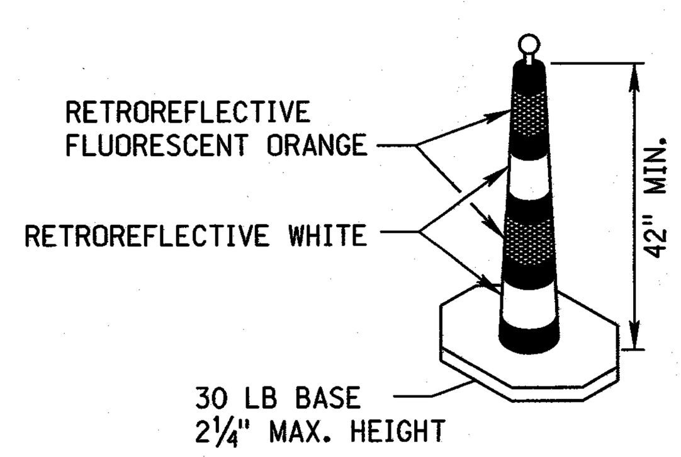
FOR NIGHTTIME USE, CONES SHALL BE RETROREFLECTIVE OR EQUIPPED WITH LIGHTING DEVICES FOR MAXIMUM VISIBILITY. RETROREFLECTION OF 28 INCH OR 36 INCH CONES SHALL BE PROVIDED BY A WHITE BAND 6 INCHES WIDE, NO MORE THAN 4 INCHES FROM THE TOP OF THE CONE, AND AN ADDITIONAL 4 INCH WIDE WHITE BAND A MINIMUM OF 2 INCHES BELOW THE 6 INCH BAND.

APPLICATION

TRAFFIC CONES ARE USED TO CHANNELIZE TRAFFIC, DIVIDE OPPOSING TRAFFIC LANES, DIVIDE TRAFFIC LANES WHEN TWO OR MORE LANES ARE KEPT OPEN IN THE SAME DIRECTION, AND DELINEATE SHORT-DURATION MAINTENANCE AND UTILITY WORK. CONES SHALL NOT BE USED FOR LANE CLOSURE TAPERS OR SHIFTS, CONES SMALLER THAN 42 INCHES SHALL NOT BE USED AT NIGHT ON RURAL HIGHWAYS, UNLESS SHOWN ON THE PLANS OR AS APPROVED OR DIRECTED BY THE ENGINEER.

STEPS SHOULD BE TAKEN TO ENSURE THAT CONES WILL NOT BE BLOWN OVER OR DISPLACED BY WIND OR MOVING TRAFFIC. CONES CAN BE DOUBLED UP TO INCREASE THEIR WEIGHT. SOME CONES ARE CONSTRUCTED WITH BASES THAT CAN BE FILLED WITH BALLAST. OTHERS HAVE SPECIAL WEIGHTED BASES, OR WEIGHTS SUCH AS SANDBAG RINGS THAT CAN BE DROPPED OVER THE CONES AND ONTO THE BASE TO PROVIDE ADDED STABILITY. BALLAST, HOWEVER, SHOULD NOT PRESENT A HAZARD IF THE CONES ARE INADVERTENTLY STRUCK.

42 INCH CONES



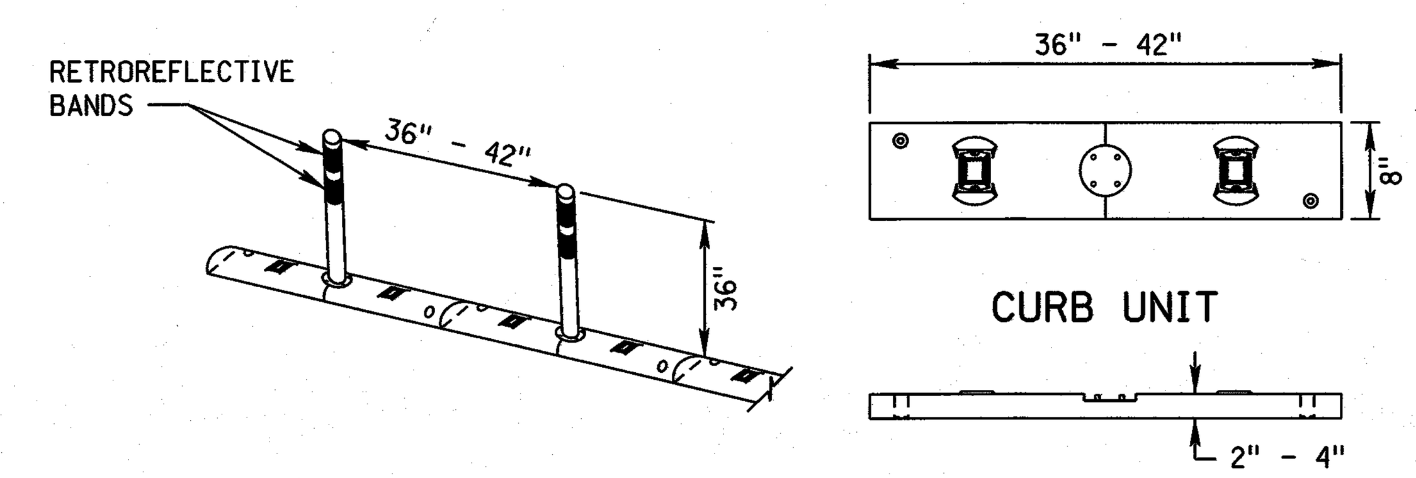
DESIGN

42 INCH CONES SHALL INCLUDE A 30 POUND RUBBER BASE AND DISPLAY FOUR 6 INCH WIDE BANDS OF RETROFEFLECTIVE SHEETING, ALTERNATING FLUORESCENT ORANGE-WHITE-FLOURESCENT ORANGE-WHITE.

APPLICATION

WHEN APPROVED BY THE ENGINEER OR SHOWN IN THE PLANS, 42 INCH REFLECTIVE CONES MAY BE USED IN LIEU OF TYPE II BARRICADES OR REFLECTORIZED DRUMS. 42 INCH CONES SHALL NOT BE USED FOR LANE-CLOSURE TAPERS OR SHIFTS. IF A RECTANGULAR BASE IS USED, THE LONG SIDE OF THE BASE SHOULD BE ORIENTED PARALLEL TO THE DIRECTION OF TRAFFIC.

TUBULAR POST AND CURB SYSTEM



DESIGN

TUBULAR POSTS USED IN THE SYSTEM SHALL BE 36 INCHES HIGH AND A MINIMUM OF 2 INCHES WIDE WHEN FACING TRAFFIC. THE TUBULAR POST AND CURB SYSTEM SHALL BE MADE OF A MATERIAL THAT CAN BE STRUCK WITHOUT DAMAGING IMPACTING VEHICLES. THE COLOR SHALL BE AS SHOWN IN THE PLANS.

THE TUBULAR POSTS SHALL BE RETROREFLECTIVE. RETROREFLECTION OF TUBULAR POSTS SHALL BE PROVIDED BY TWO 3-INCH WIDE RETROREFLECTIVE BANDS PLACED A MAXIMUM OF 2 INCHES FROM THE TOP WITH A MAXIMUM OF 6 INCHES BETWEEN THE BANDS. EACH CURB SECTION SHALL CONTAIN ONE RETROREFLECTIVE MARKER FACING EACH DIRECTION OF TRAFFIC. THE COLOR OF THE RETROREFLECTIVE BANDS AND MARKERS SHALL MATCH THE POST/CURB COLOR.

THE CURB SECTIONS SHALL BE CONFIGURED TO ALLOW FOR DRAINAGE FROM THE PAVEMENT SURFACE.

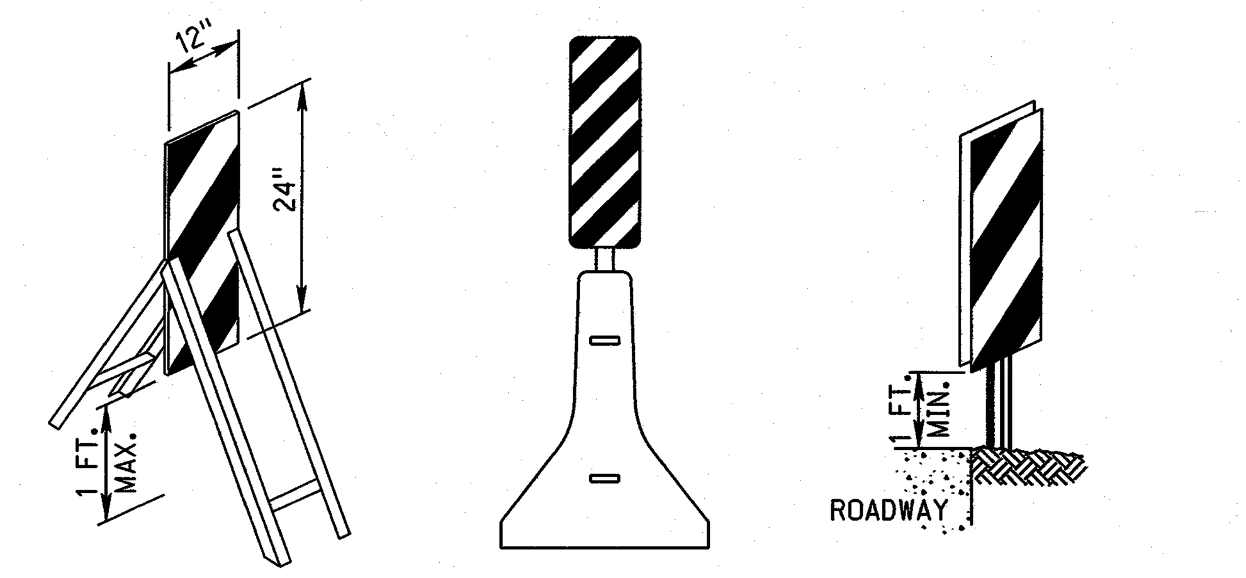
APPLICATION

TUBULAR POST AND CURB SYSTEMS MAY BE USED TO DIVIDE OPPOSING LANES OF TRAFFIC OR TO DIVIDE TRAFFIC LANES WHEN TWO OR MORE LANES ARE KEPT OPEN IN THE SAME DIRECTION.

FASTENING THE CURBS TO THE PAVEMENT WITH ANCHOR BOLTS OR OTHER SUITABLE METHODS AS DIRECTED BY THE MANUFACTURER IS REQUIRED TO MINIMIZE THE CHANCE OF BEING MOVED BY TRAFFIC.

TUBULAR POST AND CURB SYSTEMS SHALL BE INSTALLED IN THE LOCATIONS SHOWN IN THE PLANS OR DIRECTED BY THE ENGINEER.

VERTICAL PANELS



DESIGN

RETROREFLECTIVE MATERIAL ON VERTICAL PANELS SHALL BE 12 INCHES WIDE AND AT LEAST 24 INCHES HIGH. THEY SHALL HAVE ALTERNATING ORANGE AND WHITE STRIPES, WHERE THE HEIGHT OF THE RETROREFLECTIVE MATERIAL ON THE VERTICAL PANEL IS MORE THAN 36 INCHES, A PANEL STRIPE WIDTH OF 6 INCHES SHALL BE USED. WHERE THE HEIGHT OF THE RETROREFLECTIVE MATERIAL ON THE VERTICAL PANEL IS 36 INCHES OR LESS, A PANEL STRIPE WIDTH OF 4 INCHES SHALL BE USED. IF USED FOR TWO-WAY TRAFFIC, BACK-TO-BACK PANELS SHALL BE USED.

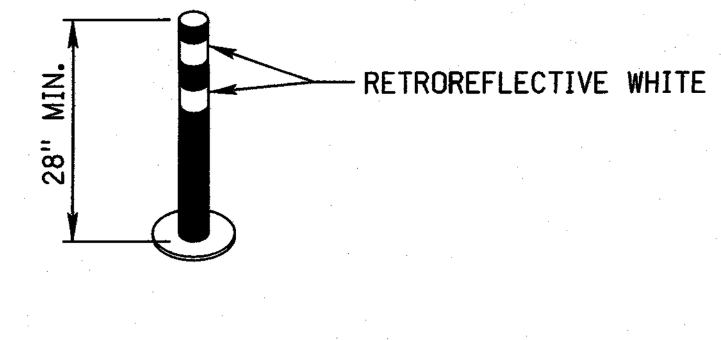
MARKINGS FOR VERTICAL PANELS SHALL BE ALTERNATING ORANGE AND WHITE RETROREFLECTORIZED STRIPES SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES IN THE DIRECTION TRAFFIC IS TO PASS.

POST MOUNTED VERTICAL PANELS SHALL BE MOUNTED WITH THE BOTTOM A MINIMUM OF 1 FOOT ABOVE THE ROADWAY. VERTICAL PANELS ON A TEMPORARY STAND SHALL BE MOUNTED WITH THE BOTTOM A MAXIMUM OF 1 FOOT ABOVE THE ROADWAY.

APPLICATION

WHERE SPACE IS LIMITED VERTICAL PANELS MAY BE USED TO CHANNEL TRAFFIC, DIVIDE OPPOSING LANES OF TRAFFIC, DIVIDE TRAFFIC LANES OR REPLACE BARRICADES. WHEN APPROVED BY THE ENGINEER, VERTICAL PANELS MAY BE POST-MOUNTED ALONG THE SIDE OF THE ROADWAY.

TUBULAR POSTS



DESIGN

TUBULAR POSTS SHALL BE PREDOMINANTLY ORANGE, NOT LESS THAN 28 INCHES HIGH, BE A MINIMUM OF 2 INCHES WIDE WHEN FACING TRAFFIC, AND MADE OF A MATERIAL THAT CAN BE STRUCK WITHOUT DAMAGING IMPACTING VEHICLES.

TUBULAR POSTS SHALL BE RETROREFLECTIVE. RETROREFLECTION OF TUBULAR POSTS SHALL BE PROVIDED BY TWO 3 INCHES WIDE WHITE BANDS PLACED A MAXIMUM OF 2 INCHES FROM THE TOP, WITH A MAXIMUM OF 6 INCHES BETWEEN THE BANDS. THE BASE SHALL NOT BE WIDER THAN 12 INCHES OR HIGHER THAN 2 INCHES.

APPLICATION

TUBULAR POSTS HAVE LESS VISIBLE AREA THAN OTHER DEVICES AND SHOULD BE USED ONLY WHERE SPACE RESTRICTIONS DO NOT ALLOW FOR THE USE OF OTHER MORE VISIBLE DEVICES. THEY MAY BE USED EFFECTIVELY TO DIVIDE OPPOSING LANES OF TRAFFIC OR TO DIVIDE TRAFFIC LANES WHEN TWO OR MORE LANES ARE KEPT OPEN IN THE SAME DIRECTION.

STEPS SHOULD BE TAKEN TO ASSURE THAT TUBULAR POSTS WILL NOT BE BLOWN OVER OR DISPLACED BY TRAFFIC BY EITHER AFFIXING THEM TO THE PAVEMENT WITH ANCHOR BOLTS OR ADHESIVE, IF A NONCYLINDRICAL DEVICE IS USED, IT SHALL BE ATTACHED TO THE PAVEMENT TO ENSURE THAT THE WIDTH FACING TRAFFIC MEETS THE MINIMUM REQUIREMENTS.

TUBULAR POSTS SHOULD NOT BE USED FOR PEDESTRIAN CHANNELIZATION OR A PEDESTRIAN BARRIERS IN TEMPORARY TRAFFIC CONTROL ZONES ON OR ALONG SIDEWALKS.

REV. NO.	DATE	DESCRIPTION OF REVISION
R6	JUN 14	2009 MUTCD UPDATE
R5	OCT 98	REVISE CHANNELIZATION DEVICES, TAPER
R4	JAN 95	REWRITE

NEBRASKA DEPARTMENT OF ROADS
STANDARD PLAN NO. 920-R6

TRAFFIC CONTROL CONSTRUCTION AND MAINTENANCE

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL CIVIL ENGINEER DANIEL J. WADDLE E-6289 STATE OF NEBRASKA

JUNE 2014
DATE

ORIGINAL:
OCTOBER 1998
DATE

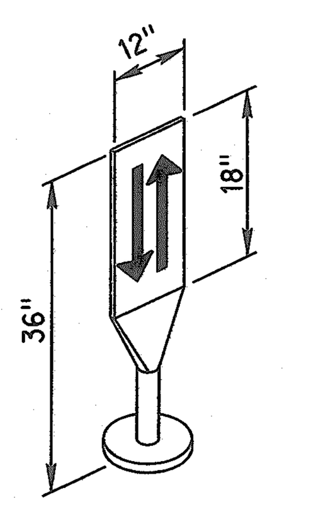
1 / 3

ROADWAY DESIGN DIVISION

Computer: DRDESIGN55 User: dor13017 Date: 26-FEB-2014 13:21

File: 92000e06.dgn Scale: 1:100 SHEET 2 OF 3

OPPOSING TRAFFIC LANE DIVIDERS



DESIGN

OPPOSING TRAFFIC LANE DIVIDERS SHALL BE A TWO SIDED UPRIGHT RETROREFLECTORIZED ORANGE PANEL, WITH A WIDTH OF 12 INCHES AND A HEIGHT OF 18 INCHES. THE TOP OF THE PANEL SHALL BE 36 INCHES ABOVE THE PAVEMENT. THE SYMBOL ON EACH SIDE SHALL BE TWO OPPOSING BLACK ARROWS. THE LANE DIVIDER SHALL BE MADE OF LIGHTWEIGHT MATERIAL THAT WILL YIELD UPON IMPACT BY A VEHICLE. THE LANE DIVIDER BASE SHALL NOT BE WIDER THAN 12 INCHES OR HIGHER THAN 4 INCHES. THE BASE SHALL BE ATTACHED TO THE EXISTING SURFACE BY EPOXY OR OTHER SUITABLE ADHESIVE, TO ENSURE THAT THE PANEL REMAINS FACING TRAFFIC.

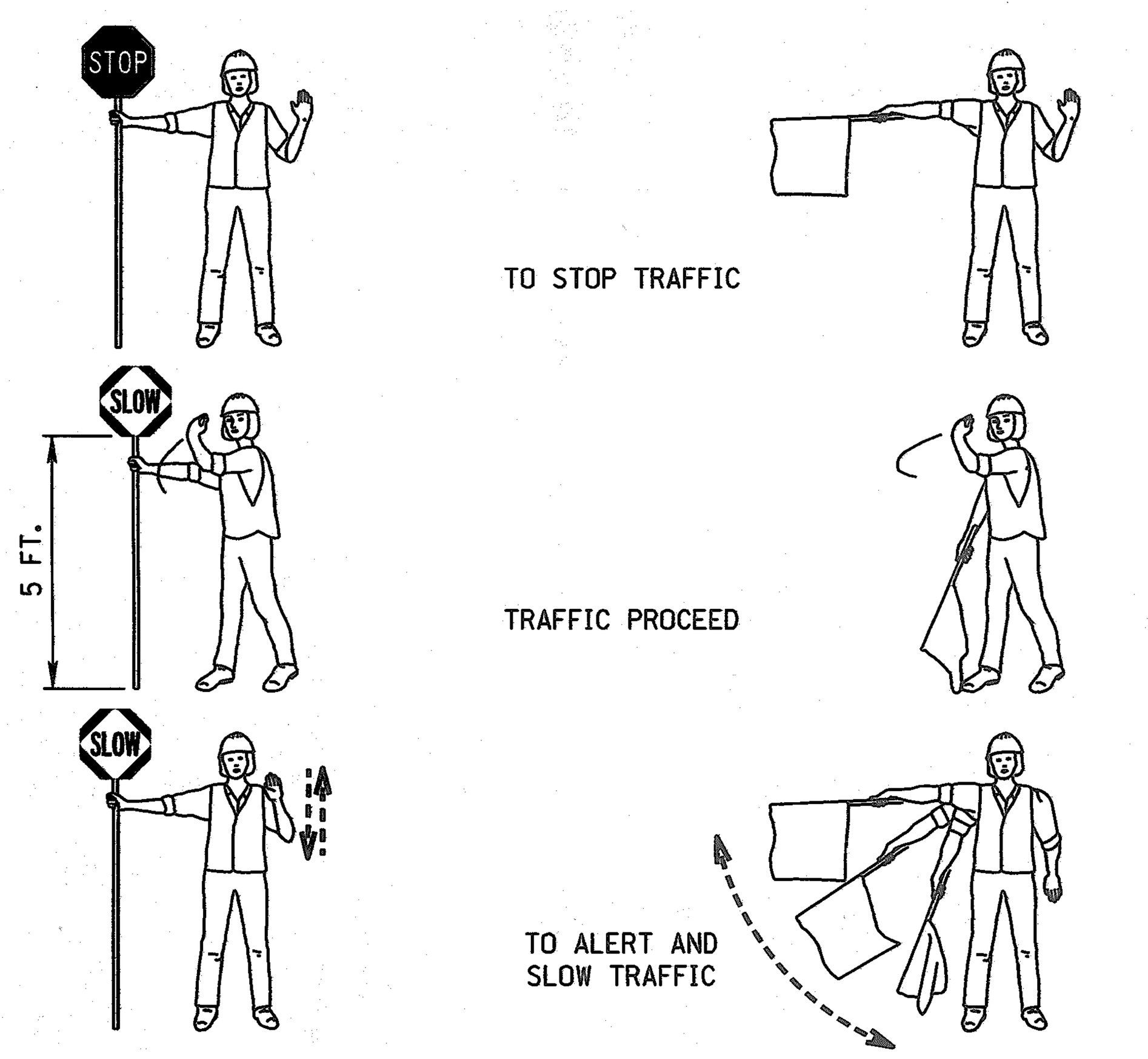
APPLICATION

OPPOSING TRAFFIC LANE DIVIDERS ARE DELINEATION DEVICES USED AS CENTER LANE DIVIDERS TO SEPARATE OPPOSING TRAFFIC ON A TWO-LANE, TWO-WAY OPERATION.

FLAGGERS

REQUIRED METHOD

EMERGENCY USE ONLY



FLAGGER PADDLE

THE STOP/SLOW PADDLE SHALL HAVE AN OCTAGONAL SHAPE ON A RIGID HANDLE. STOP/SLOW PADDLES SHALL BE AT LEAST 18 INCHES WIDE WITH LETTERS AT LEAST 6 INCHES HIGH. IF THE STOP/SLOW PADDLE IS PLACED ON A RIGID STAFF, THE MINIMUM LENGTH OF THE STAFF, MEASURED FROM THE BOTTOM OF THE SIGN TO THE END OF THIS STAFF THAT RESTS ON THE GROUND, SHOULD BE 5 FEET. THE STOP/SLOW PADDLE SHOULD BE THE PRIMARY AND PREFERRED HAND-SIGNALING DEVICE BECAUSE THE STOP/SLOW PADDLE GIVES ROAD USERS MORE POSITIVE GUIDANCE THAN RED FLAGS. USE OF FLAGS SHOULD BE LIMITED TO EMERGENCY SITUATIONS.

FLAGGERS

A FLAGGER MUST BE DRESSED FOR SAFETY. IN ADDITION TO THE REQUIREMENTS OF THE "WORKER VISIBILITY" SECTION LISTED BELOW, FLAGGERS SHALL WEAR:

1. AN ORANGE OR YELLOW/GREEN CAP OR HARD HAT.
2. A SHIRT WITH SLEEVES, PANTS AND SHOES (TANK TOPS, SHORTS OR SANDALS SHALL NOT BE WORN).

FLAGGERS SHALL BE INSTRUCTED IN THE PROPER LOCATION, DUTIES AND PROCEDURES FOR FLAGGING AS OUTLINED IN THE CURRENT MUTCD AND THE DEPARTMENT OF ROADS FLAGGER'S HANDBOOK. AS REQUIRED BY THE DEPARTMENT OF ROADS, THE FLAGGER SHALL BE CERTIFIED, AND HAVE IN THEIR POSSESSION, A VALID FLAGGER CERTIFICATION CARD.

WORKER VISIBILITY

ALL WORKERS WITHIN THE RIGHT-OF-WAY WHO ARE EXPOSED EITHER TO TRAFFIC (VEHICLES USING THE HIGHWAY FOR PURPOSES OF TRAVEL) OR TO CONSTRUCTION EQUIPMENT WITHIN THE WORK AREA SHALL WEAR HIGH-VISIBILITY SAFETY APPAREL. HIGH-VISIBILITY SAFETY APPAREL IS DEFINED TO MEAN PERSONAL PROTECTIVE SAFETY CLOTHING THAT;

1. IS INTENDED TO PROVIDE CONSPICUITY DURING BOTH DAYTIME AND NIGHTTIME USAGE, AND
2. MEETS THE PERFORMANCE CLASS 2 OR CLASS 3 REQUIREMENTS OF THE ANSI/ISEA 107-2004 PUBLICATION ENTITLED "AMERICAN NATIONAL STANDARDS FOR HIGH-VISIBILITY SAFETY APPAREL AND HEADWEAR"

LIGHTING DEVICES

FUNCTION

CONSTRUCTION AND MAINTENANCE ACTIVITIES OFTEN CREATE CONDITIONS ON OR NEAR THE TRAVELED WAY THAT ARE PARTICULARLY HAZARDOUS AT NIGHT. IT IS OFTEN DESIRABLE AND NECESSARY TO SUPPLEMENT THE REFLECTORIZED SIGNS, BARRIERS, AND CHANNELIZING DEVICES WITH LIGHTING DEVICES. STROBE TYPE LIGHTS ARE NOT PERMITTED.

BARRICADE WARNING LIGHTS DESIGN (BATTERY OPERATED)

TYPE "A" LOW INTENSITY FLASHING WARNING LIGHTS ARE MOST COMMONLY MOUNTED ON BARRICADES, OR WITH SIGNS AND ARE INTENDED TO WARN THE DRIVER THAT THEY ARE PROCEEDING IN A HAZARDOUS AREA. THESE LIGHTS SHALL NOT BE USED FOR DELINEATION, AS A SERIES OF FLASHING LIGHTS IN A ROW WOULD TEND TO OBSCURE THE DESIRED PATH.

TYPE "A" HIGH INTENSITY FLASHING WARNING LIGHTS ARE NORMALLY MOUNTED ON THE TYPE III BARRICADE THAT ACCOMPANIES THE ADVANCE WARNING SIGNS.

TYPE "C" STEADY BURN LIGHTS AS USED HEREIN, SHALL MEAN A SERIES OF LOW WATTAGE YELLOW ELECTRIC LIGHTS. WHERE LIGHTS ARE NEEDED TO DELINEATE OR MARK THE TRAVELED WAY THROUGH AND AROUND OBSTRUCTIONS IN A CONSTRUCTION MAINTENANCE AREA, THE DELINEATION SHALL BE ACCOMPLISHED BY USE OF STEADY BURNING LIGHTS. WHEN USED TO SUPPLEMENT CHANNELIZATION, THE MAXIMUM SPACING FOR WARNING LIGHTS SHOULD BE IDENTICAL TO THE CHANNELIZING DEVICE SPACING REQUIREMENTS. WHEN USED TO DELINEATE A CURVE, TYPE "C" WARNING LIGHTS SHOULD ONLY BE USED ON DEVICES ON THE OUTSIDE OF THE CURVE, AND NOT ON THE INSIDE OF THE CURVE.

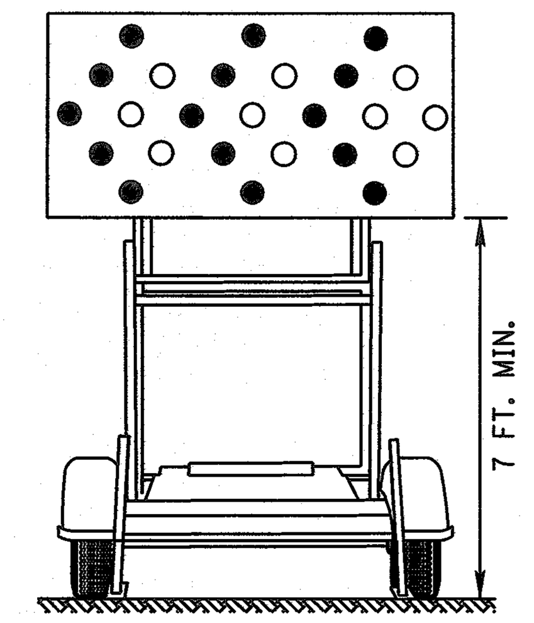
FLASHING ARROW PANEL (DISPLAY)

AN ARROW PANEL IS A SIGN WITH A MATRIX OF ELEMENTS, CAPABLE OF EITHER FLASHING OR SEQUENTIAL DISPLAYS. THIS SIGN SHALL PROVIDE ADDITIONAL WARNING AND DIRECTIONAL INFORMATION TO ASSIST IN MERGING AND CONTROLLING ROAD USERS THROUGH OR AROUND A TEMPORARY TRAFFIC CONTROL ZONE. AN ARROW PANEL SHOULD BE USED IN COMBINATION WITH APPROPRIATE SIGNS, CHANNELIZING DEVICES OR OTHER TRAFFIC CONTROL DEVICES.

DESIGN

ARROW PANELS SHALL MEET THE SIZE AND SPECIFICATIONS OF THE MUTCD FOR TYPE "C" ARROW DISPLAYS.

FLASHING ARROW PANEL SHALL BE RECTANGULAR, OF SOLID APPEARANCE AND FINISHED IN NON-REFLECTIVE BLACK. THE PANEL SHALL BE MOUNTED ON A VEHICLE, TRAILER OR OTHER SUITABLE SUPPORT. MINIMUM MOUNTING HEIGHT MEASURED VERTICALLY FROM THE BOTTOM OF THE PANEL TO THE ROADWAY BELOW IT OR TO THE ELEVATION OF THE NEAR EDGE OF THE ROADWAY. SHALL BE 7 FEET EXCEPT ON VEHICLE-MOUNTED PANELS, WHICH SHOULD BE AS HIGH AS PRACTICAL.



THE FOLLOWING SELECTIONS SHALL BE PROVIDED ON THE ARROW PANEL	
OPERATING MODE	PANEL DISPLAY
FLASHING ARROW	RIGHT SHOWN; LEFT OPPOSITE
SEQUENTIAL ARROW	RIGHT SHOWN; LEFT OPPOSITE
SEQUENTIAL CHEVRON	RIGHT SHOWN; LEFT OPPOSITE
FLASHING DOUBLE ARROW	
FLASHING OR ALTERNATING CAUTION	OR / OR FLASHING LINE / FLASHING CORNERS ALTERNATING DIAMOND CAUTION

THE ARROW PANEL SHALL HAVE A MINIMUM SIZE OF 96 INCHES WIDE AND 48 INCHES HIGH. THE MINIMUM LEGIBILITY DISTANCE SHALL BE 1 MILE. THE PANEL SHALL CONTAIN 25 LAMP ELEMENTS. ARROW PANEL ELEMENTS SHALL BE CAPABLE OF A MINIMUM 50 PERCENT DIMMING, AUTOMATICALLY WHEN AMBIENT LIGHT FALLS BELOW 50 LUX.

THE MINIMUM ELEMENT "ON TIME" SHALL BE 50 PERCENT FOR THE FLASHING MODE AND EQUAL INTERVALS OF 25 PERCENT FOR EACH SEQUENTIAL CHEVRON PHASE. THE FLASHING RATE SHALL BE NO FEWER THAN 25 NOR MORE THAN 40 FLASHES PER MINUTE.

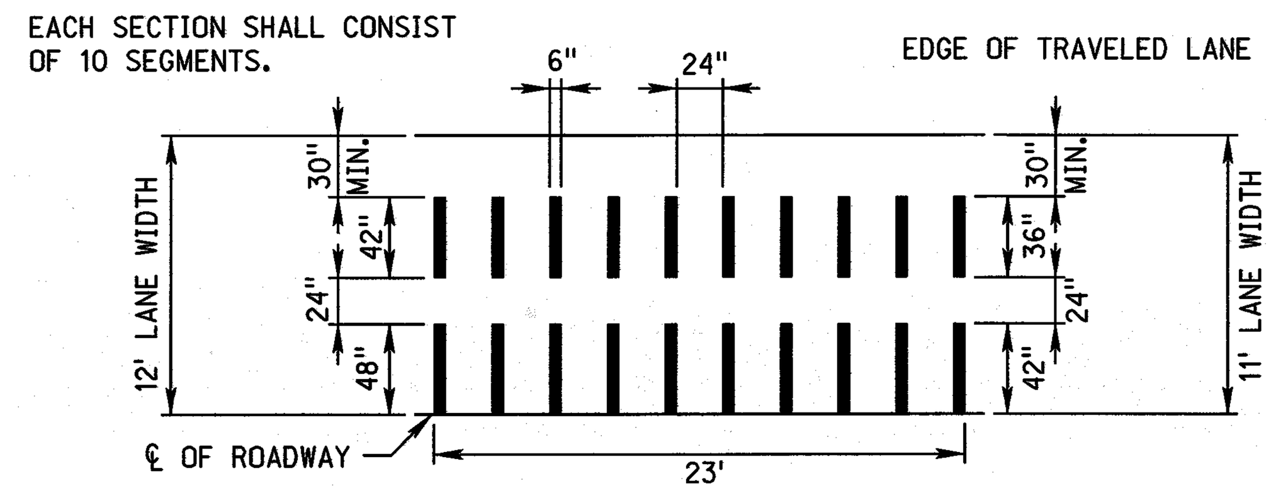
APPLICATION

A FLASHING ARROW OR SEQUENTIAL CHEVRON MODE SHALL ONLY BE USED FOR STATIONARY OR MOVING LANE CLOSURES.

FOR SHOULDER WORK BLOCKING THE SHOULDER, FOR ROADSIDE WORK NEAR THE SHOULDER, OR FOR TEMPORARILY CLOSING ONE LANE ON A TWO-LANE, TWO-WAY ROADWAY, AN ARROW PANEL SHALL BE USED ONLY IN THE CAUTION MODE.

AN ARROW DISPLAY MODE SHALL NOT BE USED ON A TWO-LANE TWO-WAY ROADWAY FOR TEMPORARY ONE-LANE OPERATION OR LANE SHIFTS. AN ARROW DISPLAY SHALL NOT BE USED TO LATERALLY SHIFT TRAFFIC.

TEMPORARY RUMBLE STRIPS



DESIGN

TEMPORARY RUMBLE STRIPS MAY BE MADE OF ASPHALT PAVING MATERIAL, EPOXY AND AGGREGATE OR OTHER SUITABLE MATERIAL WHICH WILL MAINTAIN A DESIRABLE RUMBLE EFFECT. THE TEMPORARY RUMBLE STRIP SHOULD HAVE AN INSTALLED HEIGHT OF ⅝". PREFORMED RUMBLE STRIPS MAY BE USED PROVIDED THEY HAVE A MINIMUM ½" HEIGHT.

TRAFFIC SIGNALS

TRAFFIC SIGNALS MAY BE ALLOWED AT CERTAIN EQUIPMENT CROSSINGS WHERE THE VOLUME OF FILL MATERIAL AND THE NUMBER OF EQUIPMENT CROSSINGS PER HOUR IS HIGH. TRAFFIC SIGNALS MAY BE ALLOWED AT CERTAIN BRIDGE CONSTRUCTION SITES WHERE A COMBINATION OF ONE-WAY TRAFFIC AND HIGH TRAFFIC VOLUMES WOULD BE BEST SERVED WITH THIS TYPE OF TRAFFIC CONTROL.

ALL TRAFFIC SIGNAL REQUESTS AND METHOD OF INSTALLATION ON THE STATE HIGHWAY SYSTEM SHALL BE IN COMPLIANCE WITH THE MUTCD AND MUST BE APPROVED BY THE STATE TRAFFIC ENGINEER.

IF, AFTER THE SIGNAL ASSEMBLIES ARE ERECTED AND THE ROAD IS OPEN TO PUBLIC TRAVEL, THE SIGNAL SYSTEM IS NOT PUT IMMEDIATELY INTO OPERATION, THE SIGNAL FACES SHALL BE COVERED WITH BURLAP OR OTHER OPAQUE MATERIAL SUBJECT TO THE APPROVAL OF THE ENGINEER, INOPERATIVE SIGNALS ON ROADS OPEN TO THE PUBLIC SHALL ALWAYS BE COVERED. TILTING THE SIGNALS UPWARD IS NOT AN ACCEPTABLE ALTERNATIVE TO COVERING THE HEADS.

FLOODLIGHTS

WHEN NIGHTTIME WORK IS REQUIRED, FLOODLIGHTS SHALL BE USED TO ILLUMINATE FLAGGER STATIONS. FLOODLIGHTS SHOULD BE USED TO ILLUMINATE EQUIPMENT CROSSINGS, AND OTHER AREAS WHERE EXISTING LIGHT IS NOT ADEQUATE FOR THE WORK TO BE PERFORMED SAFELY.

IN NO CASE SHALL FLOODLIGHTING BE PERMITTED TO CREATE A DISABLING GLARE FOR DRIVERS. THE ADEQUACY OF THE FLOODLIGHT PLACEMENT AND ELIMINATION OF POTENTIAL GLARE SHOULD BE CHECKED BY DRIVING THROUGH THE PROJECT.

PAVEMENT MARKING

IT IS INTENDED TO THE EXTENT POSSIBLE, THAT MOTORISTS BE PROVIDED MARKINGS WITHIN A WORK AREA COMPARABLE TO THE MARKINGS NORMALLY MAINTAINED ALONG ADJACENT ROADWAYS, PARTICULARLY AT EITHER END OF THE WORK AREA.

ALL MARKINGS AND DEVICES USED TO DELINEATE VEHICLE AND PEDESTRIAN PATHS SHALL BE CAREFULLY REVIEWED DURING DAYTIME AND NIGHTTIME PERIODS TO AVOID INADVERTENTLY LEADING DRIVERS OR PEDESTRIANS FROM THE INTENDED PATH.

PAVEMENT MARKINGS NO LONGER APPLICABLE SHALL BE REMOVED UNLESS OTHERWISE APPROVED BY THE ENGINEER.

TAPERS

TAPERS ARE CREATED USING A SERIES OF CHANNELIZING DEVICES OR PAVEMENT MARKINGS TO MOVE TRAFFIC OUT OF OR INTO ITS NORMAL PATH.

MERGING TAPER

A MERGING TAPER REQUIRES THE LONGEST DISTANCE BECAUSE DRIVERS ARE REQUIRED TO MERGE INTO COMMON ROAD SPACE. THE TAPER SHOULD BE LONG ENOUGH TO ENABLE MERGING DRIVERS TO HAVE ADEQUATE ADVANCE WARNING AND SUFFICIENT LENGTH TO ADJUST THEIR SPEEDS AND MERGE INTO A SINGLE LANE BEFORE THE DOWNSTREAM END OF THE TRANSITION.

SHIFTING TAPER

A SHIFTING TAPER IS USED WHEN MERGING IS NOT REQUIRED, BUT A LATERAL SHIFT IS NEEDED. APPROXIMATELY ONE-HALF "L" HAS BEEN FOUND TO BE ADEQUATE. WHERE MORE SPACE IS AVAILABLE, IT MAY BE BENEFICIAL TO USE LONGER TAPERS. GUIDANCE FOR CHANGES IN ALIGNMENT MAY ALSO BE ACCOMPLISHED BY USING HORIZONTAL CURVES DESIGNED FOR NORMAL HIGHWAY SPEEDS.

SHOULDER TAPERS

A SHOULDER TAPER MAY BE BENEFICIAL ON HIGH-SPEED ROADWAYS WHERE SHOULDERS ARE PART OF THE ACTIVITY AREA AND ARE CLOSED, OR WHEN IMPROVED SHOULDERS MIGHT BE MISTAKEN AS A DRIVING LANE IN THESE INSTANCES, THE SAME TYPE, BUT ABBREVIATED, CLOSURE PROCEDURES USED ON A NORMAL PORTION OF THE ROADWAY CAN BE USED. IF USED, SHOULDER TAPERS APPROACHING THE ACTIVITY AREA SHOULD HAVE A LENGTH OF ABOUT ONE-THIRD "L".

DOWNSTREAM TAPERS

THE DOWNSTREAM TAPER MAY BE USEFUL IN TERMINATION AREAS TO PROVIDE A VISUAL CUE TO THE DRIVER THAT ACCESS IS AVAILABLE TO THE ORIGINAL LANE OR PATH THAT WAS CLOSED. WHEN USED, IT SHOULD HAVE A MINIMUM LENGTH OF ABOUT 100 FEET PER LANE, WITH DEVICES SPACED ABOUT 20 FEET APART.

ONE LANE, TWO WAY TAPER

THE ONE-LANE, TWO-WAY TAPER IS USED IN ADVANCE OF AN ACTIVITY AREA THAT OCCUPIES PART OF A TWO-WAY ROADWAY IN SUCH A WAY THAT A PORTION OF THE ROAD IS USED ALTERNATELY BY TRAFFIC IN EACH DIRECTION. A SHORT TAPER HAVING A MINIMUM LENGTH OF 50 FEET AND A MAXIMUM LENGTH OF 100 FEET WITH CHANNELZING DEVICES AT APPROXIMATELY 20 FOOT SPACINGS SHOULD BE USED TO GUIDE TRAFFIC INTO THE ONE-LANE-SECTION AND A DOWNSTREAM TAPER WITH A LENGTH OF APPROXIMATELY 100 FEET SHOULD BE USED TO GUIDE TRAFFIC BACK INTO THEIR ORIGINAL LANE.

TAPER LENGTH CRITERIA FOR TEMPORARY TRAFFIC CONTROL ZONES	
TYPE OF TAPER	TAPER LENGTH (FEET)
MERGING TAPER	L MINIMUM
SHIFTING TAPER	1/2 L MINIMUM
SHOULDER TAPER	1/3 L MINIMUM
TWO-WAY TAPER	100 FEET MAXIMUM

FORMULAS FOR L	
SPEED	FORMULA
40 MPH OR LESS	$L = \frac{WS^2}{60}$
45 MPH OR GREATER	$L = WS$

L = TAPER LENGTH IN FEET
W = WIDTH OF OFFSET IN FEET
S = POSTED SPEED LIMIT PRIOR TO WORK IN MPH

TAPER LENGTH L (FEET)			
SPEED (MPH)	LANE WIDTH		
S	10 FT.	11 FT.	12 FT.
25	105	115	125
30	150	165	180
35	205	225	245
40	270	295	320
45	450	495	540
50	500	550	600
55	550	605	660
60	600	660	720
65	650	715	780
75	750	825	900

REV. NO.	DATE	DESCRIPTION OF REVISION
R6	JUN 14	2009 MUTCD UPDATE
R5	OCT 98	REVISE CHANNELIZATION DEVICES, TAPER
R4	JAN 95	REWRITE

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 920-R6

TRAFFIC CONTROL CONSTRUCTION AND MAINTENANCE

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL CIVIL ENGINEER DANIEL J. WADDLE E-6289 STATE OF NEBRASKA

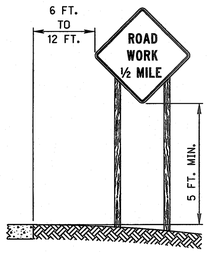
JUNE 2014
DATE

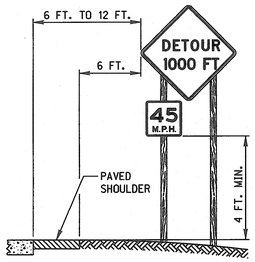
ORIGINAL:
OCTOBER 1998
DATE

2 / 3

ROADSIDE SIGNS

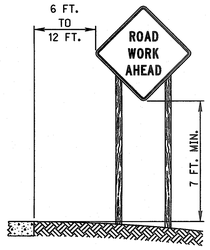
HEIGHT AND LATERAL LOCATION OF SIGNS
RURAL AREA

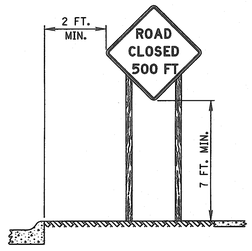




WITH SPEED ADVISORY PLATE

URBAN AREA





TYPICAL FIRST SIGN AT CONSTRUCTION SITE

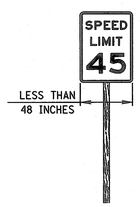
WITH TYPE "A" FLASHING WARNING LIGHT MOUNTED ABOVE TYPE III BARRICADE

PORTABLE AND TEMPORARY MOUNTING

TYPICAL SIGN MOUNTINGS

POST MOUNTED

SIGNS 48 INCHES OR WIDER REQUIRE TWO POSTS



SIGN WIDTHS LESS THAN 48 INCHES MAY BE MOUNTED WITH ONE POST

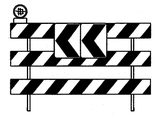
TYPICAL SIGN MOUNTINGS

OTHER THAN POST MOUNTED

TYPE III BARRICADE WITH SIGN

PORTABLE AND TEMPORARY MOUNTING

TYPE III BARRICADE WITH SIGN AND DETOUR ARROW



TYPE III BARRICADE WITH CHEVRONS

TYPE II BARRICADE WITH DETOUR ARROW OR SIGN

PLASTIC DRUM WITH CHEVRON OR SIGN

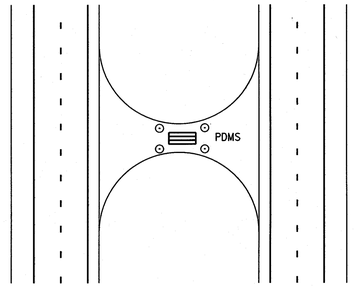
TEMPORARY SIGN SUPPORTS

ALL "TEMPORARY SIGN" SUPPORTS (BASES) SHALL BE NCHRP 350 OR MASH (TL-3) APPROVED.

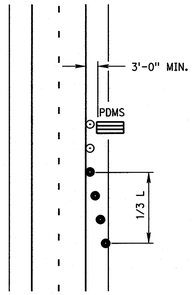
"TEMPORARY SIGNS" ARE ALL TEMPORARILY MOUNTED WORK ZONE SIGNS THAT ARE NOT POST MOUNTED IN THE GROUND AT THE TYPICAL 5 FOOT MOUNTING HEIGHT. TEMPORARY SIGNS ARE CONSIDERED NCHRP 350 OR MASH CATEGORY 2 DEVICES AND ARE MOUNTED ON TEMPORARY SIGN STANDS. TEMPORARY SIGNS SHALL BE MOUNTED A MINIMUM OF 1 FOOT ABOVE THE GROUND, UNLESS OTHERWISE REQUIRED TO BE MOUNTED AT A HIGHER HEIGHT.

TEMPORARY SIGNS AND THEIR SUPPORTS SHALL NOT BE IN PLACE LONGER THAN 3 DAYS. ANY SIGN THAT IS TO BE IN PLACE LONGER THAN 3 DAYS SHALL BE POST MOUNTED OR MOUNTED TO A DRUM, BARRICADE, OR BARRIER, AS REQUIRED BY THE PLANS OR SPECIFICATIONS.

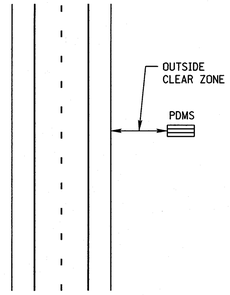
PORTABLE DYNAMIC MESSAGE SIGN DELINEATION



IN MEDIAN



ON SHOULDER



OFF SHOULDER

PORTABLE DYNAMIC MESSAGE SIGNS (PDMS)

THE PLACEMENT OF PDMS SHOULD BE IN THE FOLLOWING ORDER:

WHENEVER POSSIBLE, PDMS SHOULD BE PLACED OFF OF ANY USABLE PORTION OF THE ROADWAY ON THE RIGHT SIDE OF THE ROADWAY. WHEN PLACED OUTSIDE THE CLEAR ZONE OR BEHIND GUARDRAIL OR CONCRETE PROTECTION BARRIERS, DELINEATION IS NOT REQUIRED.

WHERE FIELD CONDITIONS DO NOT ALLOW FOR THIS PLACEMENT, THE SIGNS MAY BE LOCATED ON THE OUTSIDE SHOULDER OF THE ROADWAY OR WITHIN THE MEDIAN.

A. A MINIMUM CLEARANCE OF 3 FEET MEASURED HORIZONTALLY FROM THE EDGE OF THE SIGN TO THE EDGE OF THE TRAVELED WAY IS RECOMMENDED.
B. THE PDMS SHOULD HAVE A MINIMUM MOUNTED HEIGHT OF 7 FEET ON FREEWAYS, EXPRESSWAYS AND IN URBAN AREAS.
C. ALL OTHER RURAL APPLICATIONS SHOULD HAVE A MINIMUM HEIGHT OF 5 FEET.

THESE HEIGHTS ARE MEASURED VERTICALLY FROM THE BOTTOM OF THE SIGN TO THE ELEVATION OF THE NEAR EDGE OF THE PAVEMENT.

REFLECTORIZED PLASTIC DRUMS SHOULD BE USED TO DELINEATE EACH SIGN USING A 1/3 L TAPER. THESE DRUMS SHOULD BE POSITIONED ON THE UPSTREAM END OF THE SIGN TO FORM A TAPER LEADING UP TO THE TRAFFIC SIDE OF THE SIGN. FOR A SIGN LOCATED IN THE MEDIAN, THE SIGN SHOULD BE DELINEATED WITH A 42 INCH CONE ON ALL FOUR CORNERS.

WHEN DEPLOYED, THE SIGN SHALL BE SIGHTED AND ALIGNED WITH APPROACHING TRAFFIC TO ENSURE VISIBILITY OF THE MESSAGE. IF MULTIPLE SIGNS ARE USED, THE SIGNS SHOULD BE LOCATED ON THE SAME SIDE OF THE ROAD AND SEPARATED ACCORDING TO PROPER SIGN SPACING.

WHEN PRACTICAL, PDMS SHOULD NOT BE USED TO REPLACE STATIC SIGNS FOR LONG TERM USAGE (OVER 10 DAYS).

WHEN PDMS ARE TO BE DEPLOYED FOR LONG PERIODS, SUCH AS INCIDENT MANAGEMENT ROLES, CONCRETE PADS WITH APPROPRIATE TIE DOWNS SHOULD BE CONSTRUCTED FOR THEIR PLACEMENT.

PDMS NOT ACTIVELY BEING USED IN A CONSTRUCTION OR INCIDENT MANAGEMENT ROLE SHOULD BE REMOVED.

REFER TO NDOR "DMS GUIDELINES" FOR PROPER PDMS MESSAGE INFORMATION.

NOTES

1. ALL TRAFFIC CONTROL DEVICES SHALL MEET THE APPLICABLE STANDARDS AND SPECIFICATIONS PRESCRIBED IN PART 6 OF THE LATEST ADOPTED EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, (MUTCD)" AND THE STATE OF NEBRASKA SUPPLEMENT TO THE MUTCD. ALL TRAFFIC CONTROL DEVICES SHALL BE CRASHWORTHY AND QUALIFY AS SUCH ACCORDING TO THE TESTING AND ACCEPTANCE GUIDELINES OF THE NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP) REPORT 350 OR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH).
2. TRAFFIC CONTROL PLANS AND DEVICES SHOULD FOLLOW THE PRINCIPLES SET FORTH, BUT MAY DEVIATE FROM THE TYPICAL DRAWINGS TO ALLOW FOR CONDITIONS AND REQUIREMENTS OF THE PROJECT.
3. TRAFFIC CONTROL DEVICES SHALL BE INSTALLED SO AS NOT TO OBSTRUCT THE VIEW OF OTHER TRAFFIC CONTROL DEVICES.
4. THE ENGINEER SHALL HAVE THE AUTHORITY TO REQUIRE THE USE, AND APPROVE THE LOCATION OF ANY OF THE DEVICES SHOWN IN THESE PLANS.

WORK ZONE SPEED LIMIT NOTES

A. WORK ZONE SPEED LIMITS SHALL NOT BE INSTALLED WITHOUT A SPEED ZONE AUTHORIZATION COMPLETED BY THE DEPARTMENT.

B. REDUCED SPEED LIMITS SHOULD BE USED ONLY IN THE SPECIFIC PORTION OF THE WORK ZONE WHERE CONDITIONS OR RESTRICTIVE FEATURES ARE PRESENT. HOWEVER, FREQUENT CHANGES IN THE SPEED LIMIT SHOULD BE AVOIDED. THE REDUCTION OF SPEED SHOULD BE DESIGNED SO VEHICLES CAN SAFELY TRAVEL THROUGH THE WORK ZONE WITH A SPEED LIMIT REDUCTION OF NO MORE THAN 10 MPH UNLESS OTHERWISE NOTED IN THE PLANS.

C. WORK ZONE SPEED LIMITS SHOWN ARE TYPICAL APPLICATIONS ONLY AND ARE NOT TO BE ASSUMED AS THE SPEED LIMITS REQUIRED FOR THE WORK.

D. EXISTING SPEED LIMIT SIGNS SHALL BE REMOVED OR COVERED WHEN A REDUCED WORK ZONE SPEED LIMIT IS IN EFFECT IN THE SAME AREA.

E. WORK ZONE SPEED LIMIT SIGNS SHALL BE INSTALLED EVERY MILE THROUGH THE WORK AREA WHEN SPEED ZONE IS REDUCED.

F. A SPEED LIMIT SIGN ENDING THE REDUCED SPEED ZONE SHALL BE INSTALLED AT THE END OF EACH ZONE.

G. DOUBLE FINES AND REDUCED SPEED ZONE SIGNING ARE NOT REQUIRED FOR SHORT-DURATION WORK LESS THAN 12 HOURS.

TAPER FORMULA

L = S x W FOR SPEEDS OF 45 MPH OR MORE.

$L = \frac{WS^2}{60}$ FOR SPEEDS OF 40 MPH OR LESS.

WHERE:

L = MINIMUM LENGTH OF TAPER.

S = NUMERICAL VALUE OF POSTED SPEED LIMIT PRIOR TO WORK.

W = WIDTH OF OFFSET (LANE WIDTH).

LEGEND

- TYPE III BARRICADE
- REFLECTORIZED PLASTIC DRUM
- REFLECTORIZED PLASTIC DRUM OR 42" CONE
- PORTABLE DYNAMIC MESSAGE SIGN

REV. NO.	DATE	DESCRIPTION OF REVISION
R6	JUN 14	2009 MUTCD UPDATE
R5	OCT 98	REVISE CHANNELIZATION DEVICES, TAPER
R4	JAN 95	REWRITE

NEBRASKA DEPARTMENT OF ROADS

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TRAFFIC CONTROL CONSTRUCTION AND MAINTENANCE

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL CIVIL ENGINEER
DANIEL J. WADDLE
E-6289
STATE OF NEBRASKA

JUNE 2014
DATE

ORIGINAL:
OCTOBER 1998
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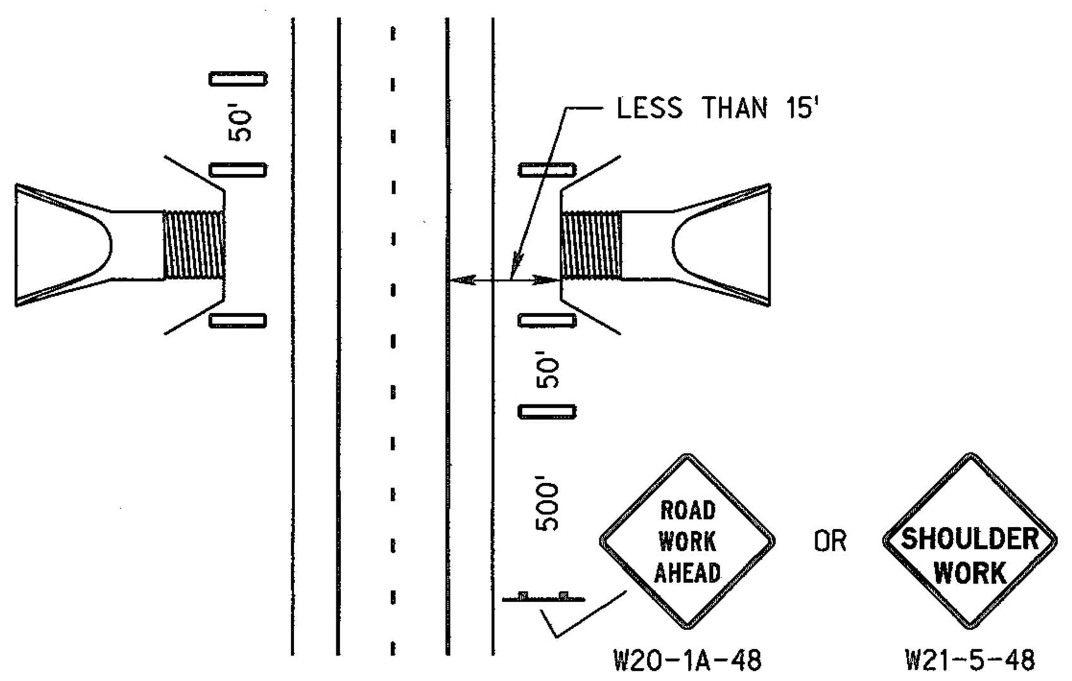
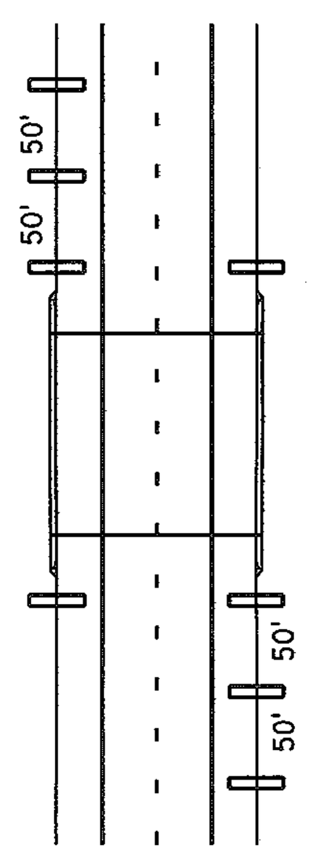
3



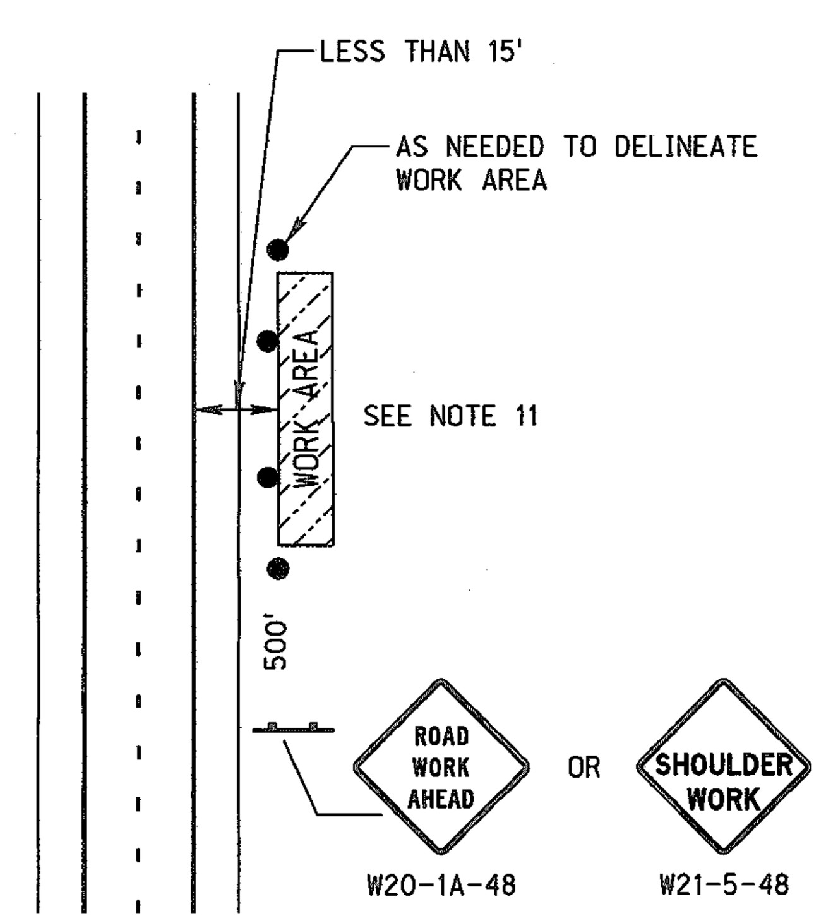
CULVERT DELINEATION

WHEN GUARDRAIL IS REMOVED AND/OR EXCAVATION IS LESS THAN 15 FEET FROM EDGE OF TRAVELED WAY



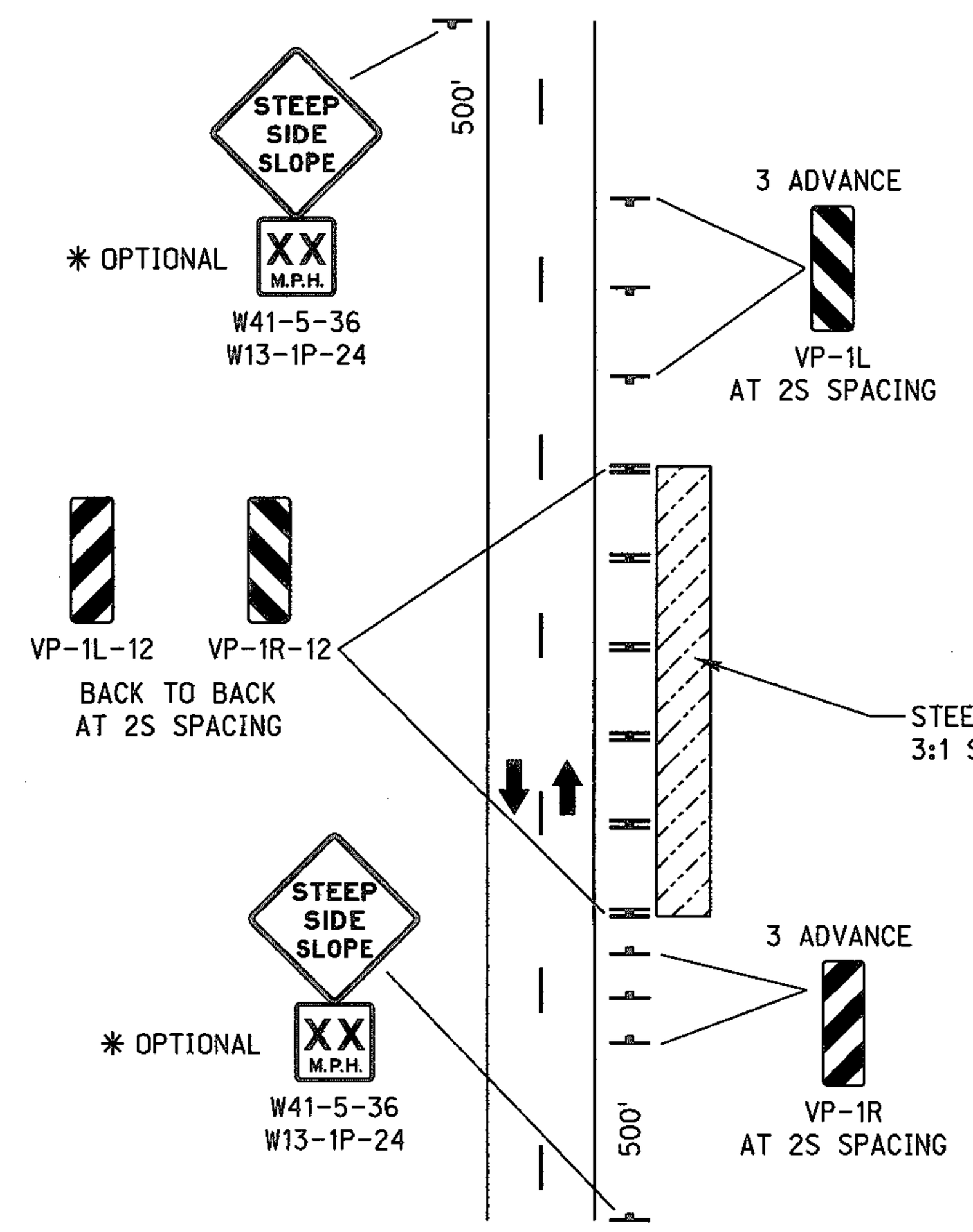
BRIDGE RAIL END DELINEATION

WHEN GUARDRAIL IS REMOVED

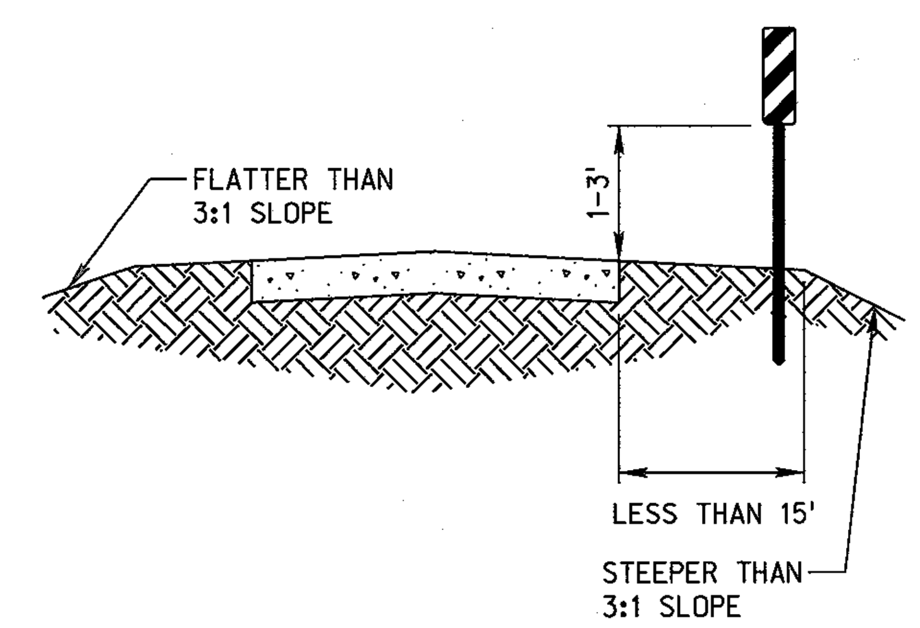


WORK BEYOND THE SHOULDER

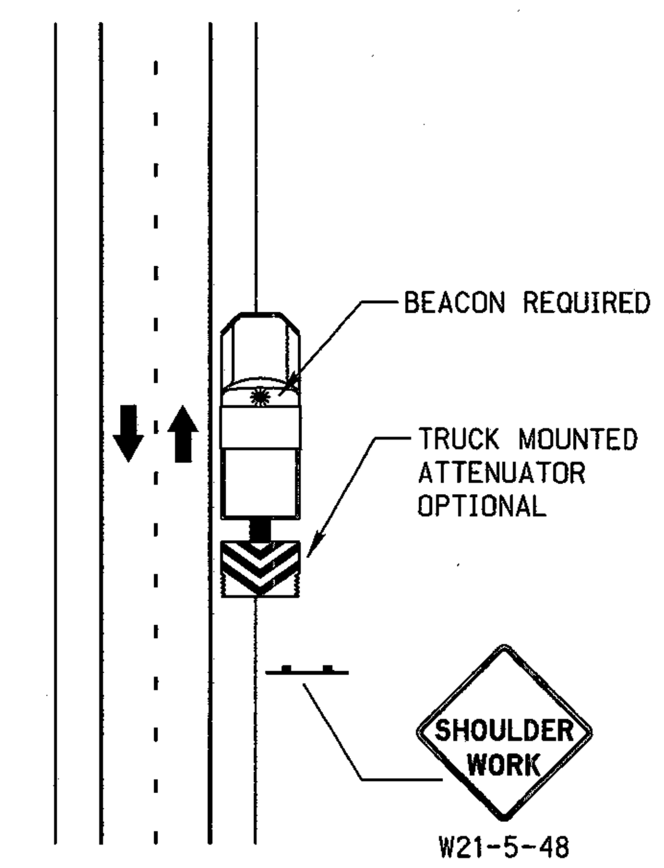
TA-1



VERTICAL PANELS SHOULD BE USED FOR AREAS WHERE GUARDRAIL IS REMOVED, OR PROJECT GRADING HAS CREATED A FORESLOPE STEEPER THAN 3:1, AND WITHIN 15 FEET OF THE TRAVELED WAY. NOT USED FOR CULVERT OR BRIDGE END DELINEATION. VERTICAL PANEL SPACING MAY BE REDUCED FOR HORIZONTAL CURVES.

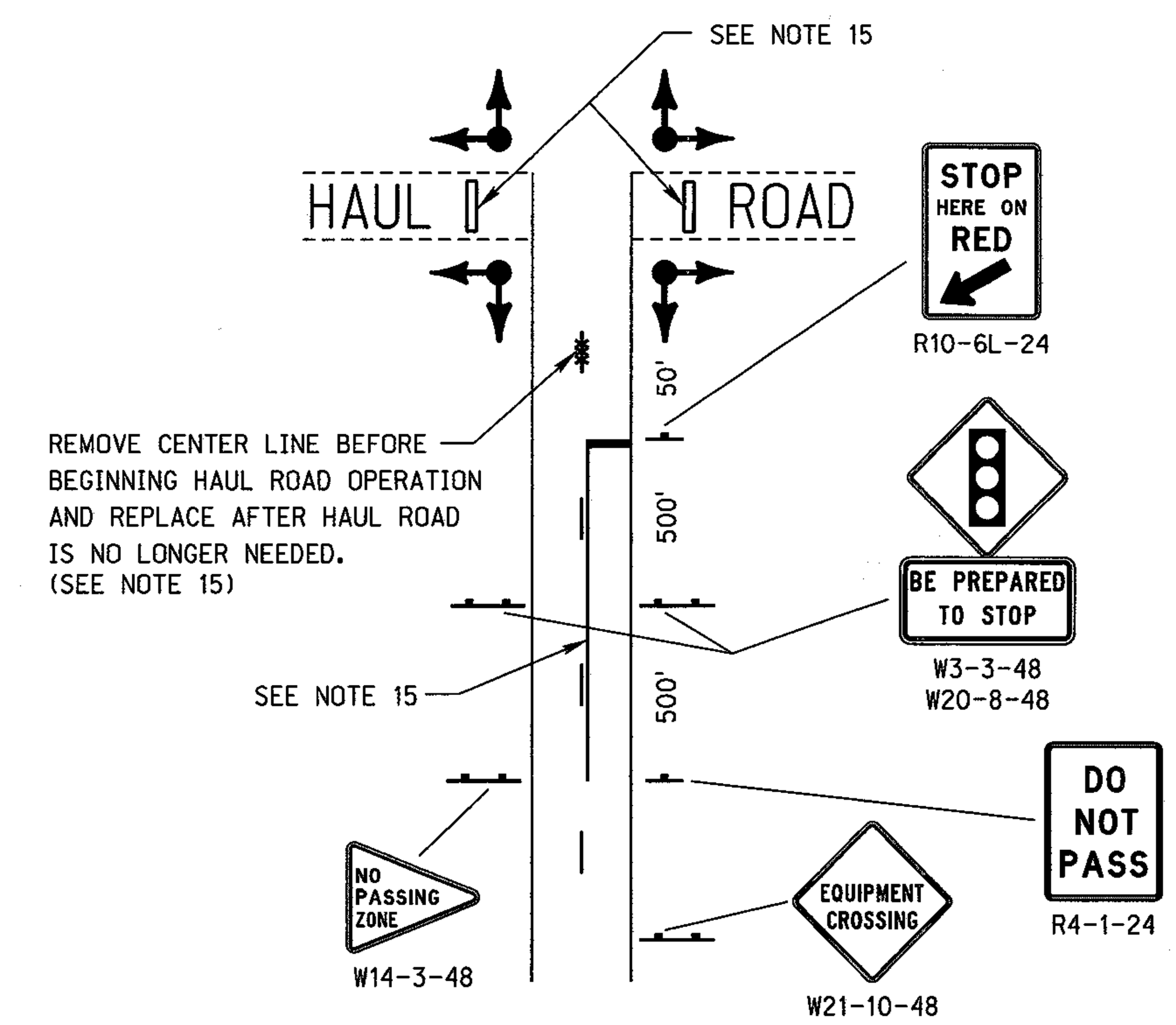


STEEP SLOPE DELINEATION



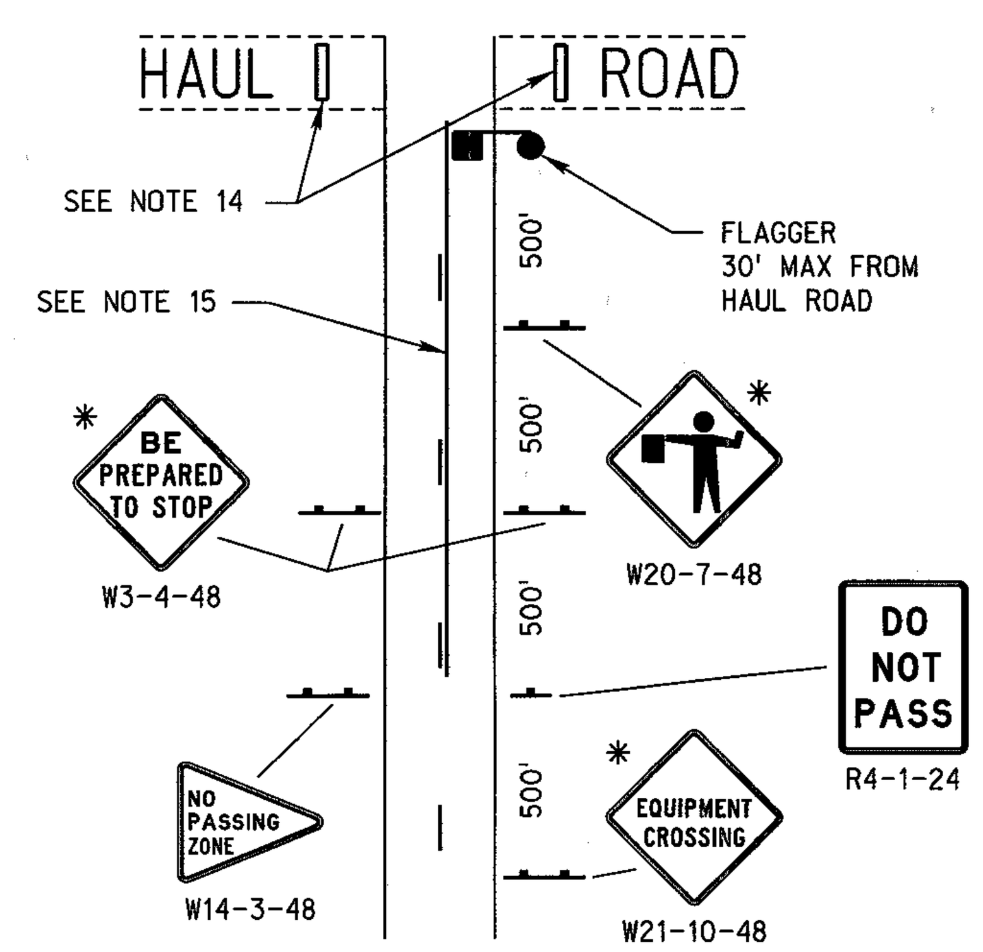
MOBILE OPERATION ON SHOULDER

NO ENCROACHMENT ON TRAVEL LANE
TA-4



HAUL ROAD CROSSING IN CONSTRUCTION AREA USING TEMPORARY TRAFFIC SIGNAL

TA-14



HAUL ROAD CROSSING IN CONSTRUCTION AREA USING FLAGGERS

TA-14
✱ SIGNS ARE SUBSIDIARY TO THE FLAGGING OPERATION.

TAPER FORMULA

L = S x W FOR SPEEDS OF 45 MPH OR MORE.

$L = \frac{WS^2}{60}$ FOR SPEEDS OF 40 MPH OR LESS.

WHERE:

L = MINIMUM LENGTH OF TAPER.

S = NUMERICAL VALUE OF POSTED SPEED LIMIT PRIOR TO WORK.

W = WIDTH OF OFFSET (LANE WIDTH).

LEGEND

- TYPE III BARRICADE
- REFLECTORIZED PLASTIC DRUM
- SINGLE POSTED SIGN
- DOUBLE POSTED SIGN
- FLAGGER
- REFLECTORIZED PLASTIC DRUM OR 42" CONE
- TRAFFIC SIGNAL

NOTES

1. SIGNS SHOWN ARE USUALLY FOR ONE DIRECTION OF TRAVEL ONLY.
2. DESIGNATION OF SPEED SHOWN ON ADVISORY SPEED SIGNS (W13-1P) SHALL BE DETERMINED BY THE ENGINEER IN ACCORDANCE WITH MUTCD. THE SPEED DESIGNATION SHALL BE AS HIGH AS PRACTICAL AND FEASIBLE.
3. "FLAGGER AHEAD SYMBOL" SIGN (W20-7) SHALL BE USED WHEN A FLAGGER IS PRESENT, AND REMOVED WHEN NOT APPLICABLE.
4. THE CONTRACTOR SHALL INSTALL, MAINTAIN, AND REMOVE ALL SIGNS IN ACCORDANCE WITH THE DETAILS OF AND AT THE LOCATIONS SHOWN IN THE PLANS. SIGNS INSTALLED BY THE DEPARTMENT OF ROADS OR OTHER GOVERNMENT AGENCY SHALL BE MAINTAINED AND REMOVED BY THEIR FORCES.
5. G20-1 "ROAD WORK NEXT X MILES" SHALL BE USED ON ANY CONSTRUCTION OR MAINTENANCE PROJECT LONGER THAN 2 MILES.
6. WHEN MESSAGE IS NOT PERTINENT, SIGNS SHALL BE TAKEN DOWN, COVERED OR FOLDED. TAPE IS NOT PERMITTED ON THE FACE OF THE SIGN.
7. VEHICLES OR EQUIPMENT SHALL NOT BE PARKED SO AS TO OBSCURE OR DISTRACT FROM TRAFFIC CONTROL DEVICES.
8. ORANGE FLAGS MAY BE USED TO CALL ATTENTION TO WARNING SIGNS.
9. CULVERT, BRIDGE AND STEEP SLOPE DELINEATION. EXISTING GUARDRAIL SHOULD REMAIN IN PLACE AS LONG AS PRACTICAL FOR THE PROTECTION IT PROVIDES, AND REINSTALLED AS SOON AS PRACTICAL.
10. TA-1 AND TA-3
FOR SHORT-DURATION OPERATIONS 60 MINUTES OR LESS, ALL SIGNS AND CHANNELIZING DEVICES MAY BE ELIMINATED IF A VEHICLE WITH AN ACTIVATED HIGH-INTENSITY ROTATING, FLASHING, OSCILLATING OR AMBER STROBE LIGHTS ARE USED, AND THE WORK DOES NOT ENCROACH INTO THE OPEN TRAVEL LANE.
11. TA-1 AND TA-3
WHEN PAVED SHOULDERS HAVING A WIDTH OF 8 FEET OR MORE ARE CLOSED, AT LEAST ONE ADVANCE WARNING SIGN SHALL BE USED. IN ADDITION, CHANNELIZING DEVICES SHALL BE USED TO CLOSE THE SHOULDER IN ADVANCE TO DELINEATE THE BEGINNING OF THE WORK SPACE AND DIRECT VEHICULAR TRAFFIC TO REMAIN WITHIN THE TRAVELED WAY.
12. TA-4
VEHICLE HAZARD WARNING SIGNALS SHALL NOT BE USED INSTEAD OF THE VEHICLE'S HIGH-INTENSITY ROTATING, FLASHING OR AMBER STROBE LIGHTS.
13. TA-10
IF THE QUEUING OF VEHICLES ACROSS ACTIVE RAILROAD TRACKS CANNOT BE AVOIDED, A FLAGGER SHALL BE PROVIDED AT THE RAILROAD CROSSING TO PREVENT VEHICLES FROM STOPPING WITHIN THE RAILROAD CROSSING EVEN IF AUTOMATIC WARNING DEVICES ARE IN PLACE.
14. TA-14
WHEN THE HAUL ROAD IS NOT IN USE, TYPE III BARRICADES SHALL BE IN PLACE. THE "FLAGGER", "SIGNAL AHEAD", AND "BE PREPARED TO STOP" SIGNS SHALL BE COVERED OR REMOVED, AND THE TRAFFIC SIGNAL SHALL BE PUT INTO FLASH YELLOW ON THE HIGHWAY, RED ON THE HAUL ROAD.
15. TA-14
THE "NO PASSING" SIGNS (R4-1-24 AND W14-3-48) AND PAVEMENT MARKINGS ARE NOT REQUIRED IF HAULING OPERATION IS IN EFFECT ONLY DURING DAYLIGHT HOURS.
16. APPLICATIONS SHOWN ARE FOR LOCAL SITUATIONS IN PROPERLY MARKED CONSTRUCTION ZONES AND DO NOT INCLUDE LEAD SIGNS WHICH ARE INSTALLED AT THE BEGINNING OF THE PROJECT.
17. THE LEAD SIGNS ARE NOT NEEDED IF TWO PROJECTS ARE LESS THAN 1 MILE APART. THE "END CONSTRUCTION" SIGN (G20-2B-48) SHOULD NOT BE INSTALLED BETWEEN THE PROJECTS.
18. REFER TO STANDARD PLAN 920 FOR GENERAL INFORMATION NOT SHOWN.

REV. NO.	DATE	DESCRIPTION OF REVISION
R6	JUN 14	2009 MUTCD UPDATE
R5	DEC 05	2003 MUTCD UPDATE
R4	AUG 98	SIGN CHANGES, ADDITIONS

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 921-R6

TRAFFIC CONTROL, CONSTRUCTION AND MAINTENANCE

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM: 4/17/14

PROFESSIONAL CIVIL ENGINEER DANIEL J. WADDLE E-6289 STATE OF NEBRASKA

JUNE 2014
DATE

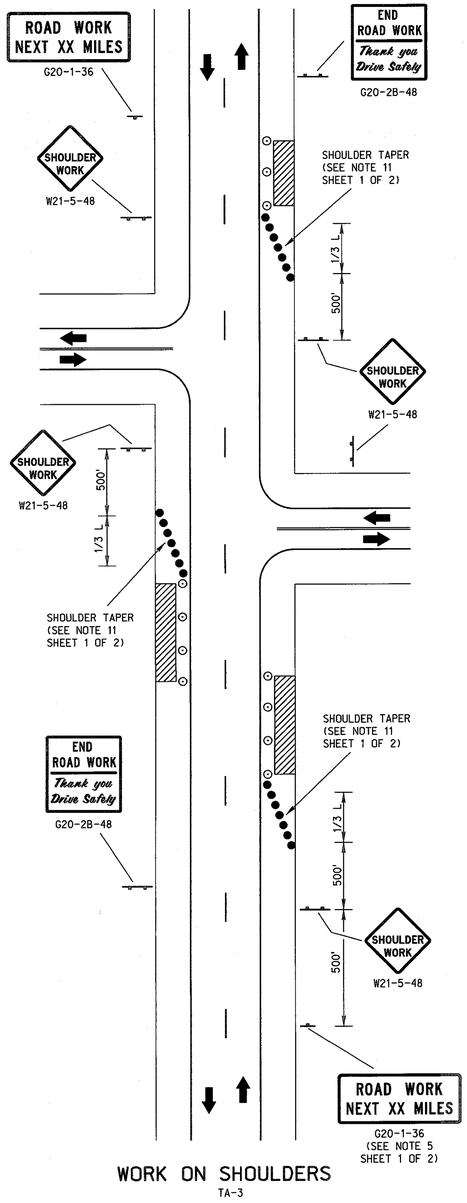
ORIGINAL:
JUNE 3, 1980
DATE

1 / 2

ROADWAY DESIGN DIVISION

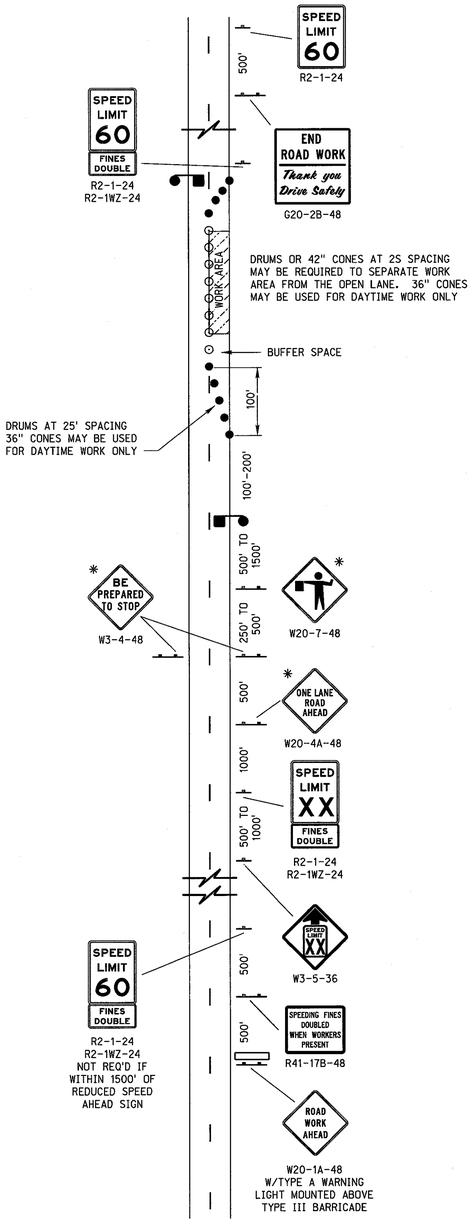
Computer: DRDESIGN55 User: dor13017 Date: 28-MAR-2014 13:35

File: 92100e06.dgn Scale: 1:100 SHEET 1 OF 2



WORK ON SHOULDERS

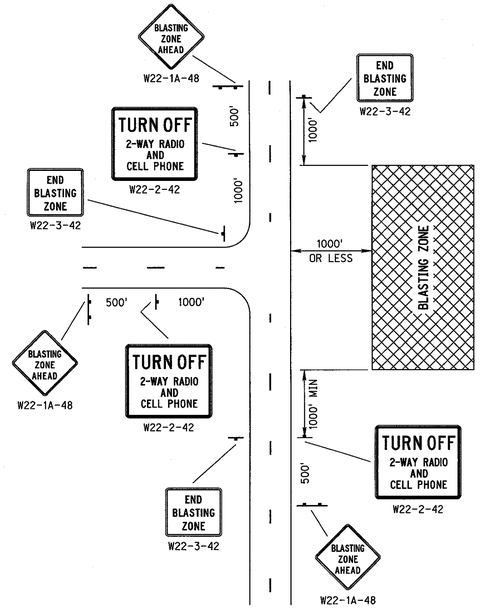
TA-3



LANE CLOSURE

TA-10

✳ SIGNS ARE SUBSIDIARY TO THE FLAGGING OPERATION.



BLASTING ZONE

TA-2

TAPER FORMULA

L = S x W FOR SPEEDS OF 45 MPH OR MORE.

$L = \frac{WS^2}{60}$ FOR SPEEDS OF 40 MPH OR LESS.

WHERE:

L = MINIMUM LENGTH OF TAPER.

S = NUMERICAL VALUE OF POSTED SPEED LIMIT PRIOR TO WORK.

W = WIDTH OF OFFSET (LANE WIDTH).

LEGEND

- TYPE III BARRICADE
- REFLECTORIZED PLASTIC DRUM
- SINGLE POSTED SIGN
- DOUBLE POSTED SIGN
- FLAGGER
- REFLECTORIZED PLASTIC DRUM OR 42" CONE
- TRAFFIC SIGNAL

REV. NO.	DATE	DESCRIPTION OF REVISION
R6	JUN 14	2009 MUTCD UPDATE
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NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 921-R6

TRAFFIC CONTROL, CONSTRUCTION AND MAINTENANCE

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM: 4/17/14

PROFESSIONAL CIVIL ENGINEER ★ DANIEL J. WADDLE E-6289 ★ STATE OF NEBRASKA

JUNE 2014
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ORIGINAL:
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DATE

2/2

ROADWAY DESIGN DIVISION

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Date: 28-MAR-2014 13:35
File: 92100e06.dgn
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SHEET 2 OF 2

ROADWAY DESIGN DIVISION
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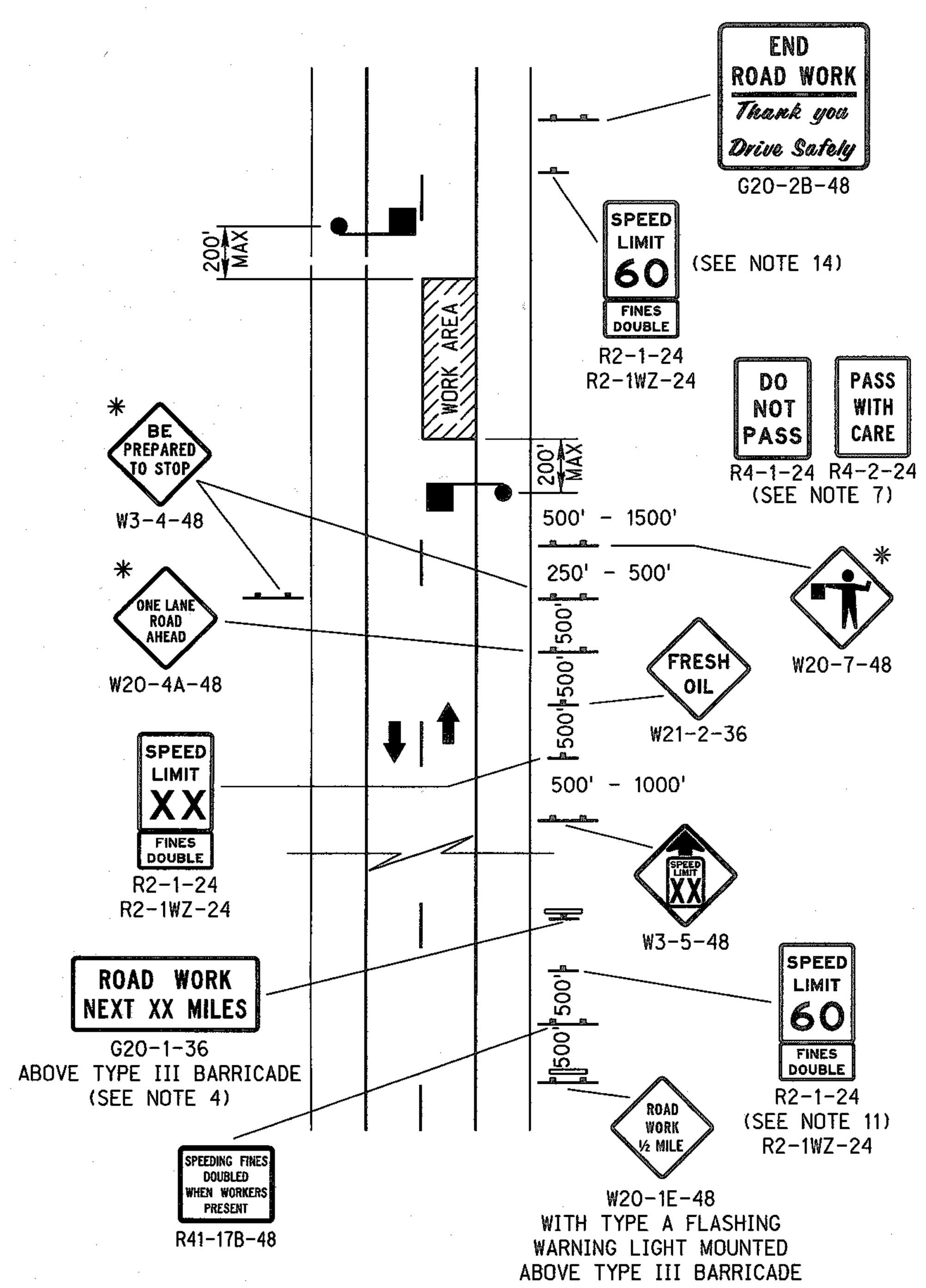
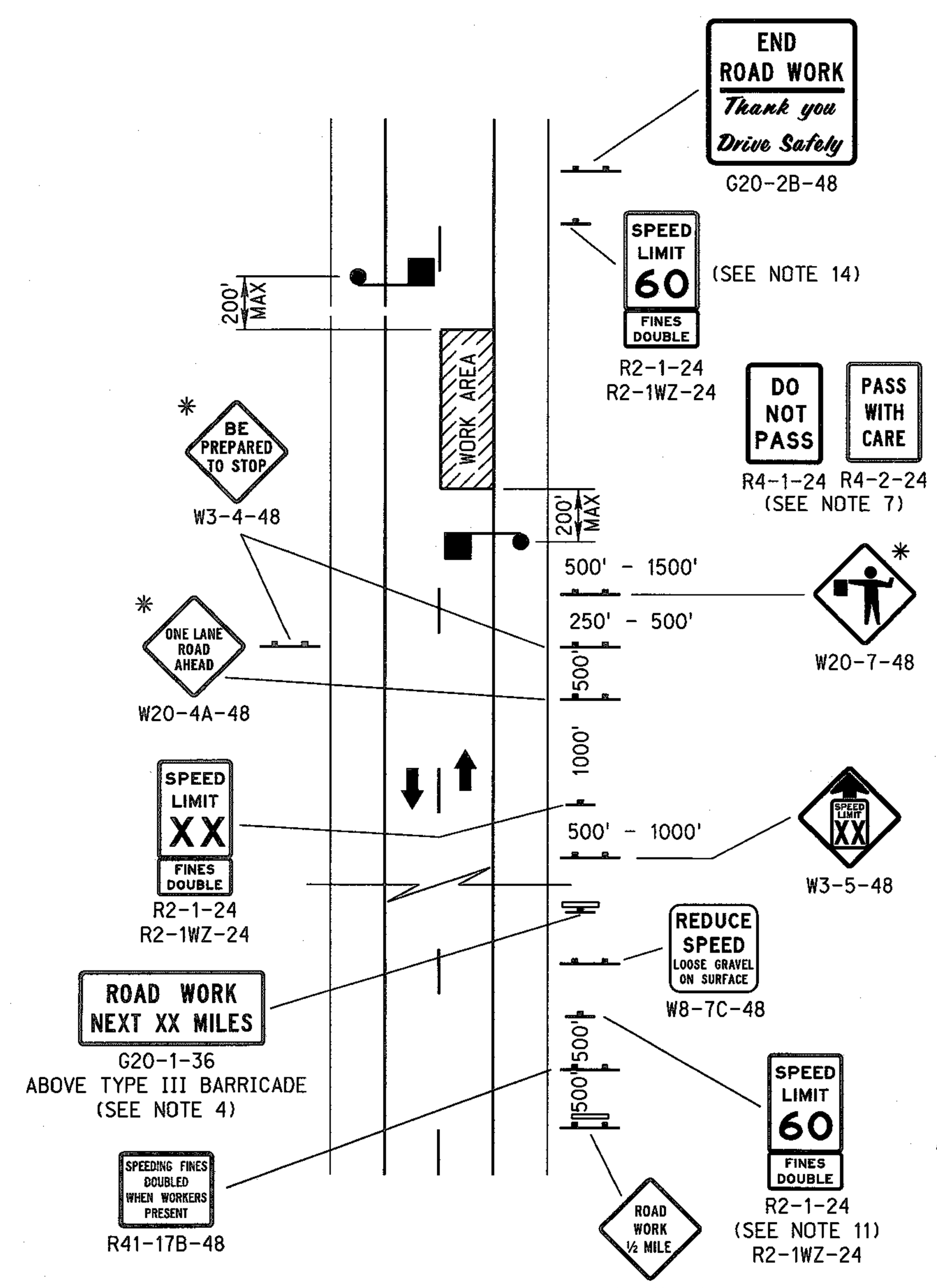
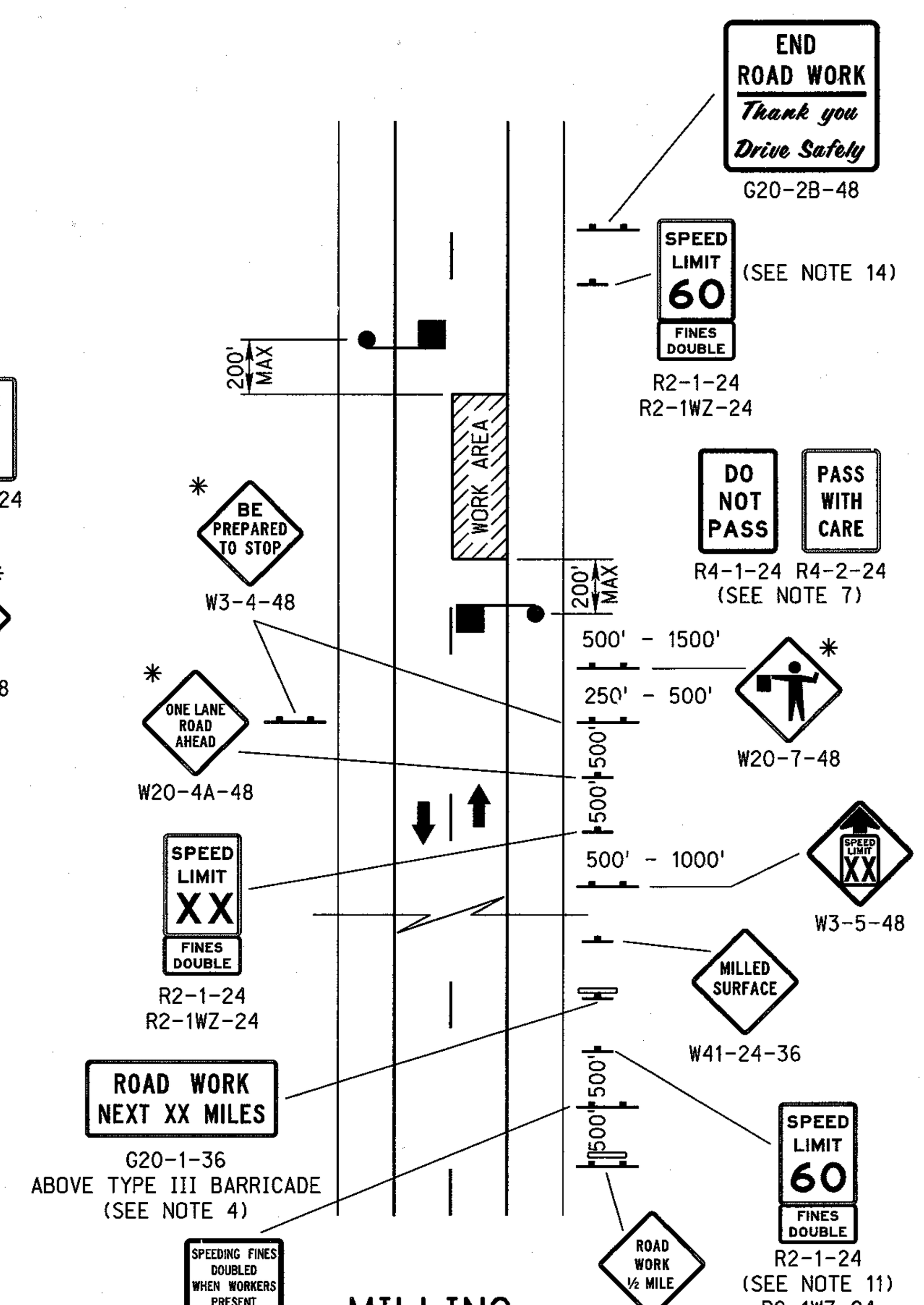
SHEET 1 OF 2



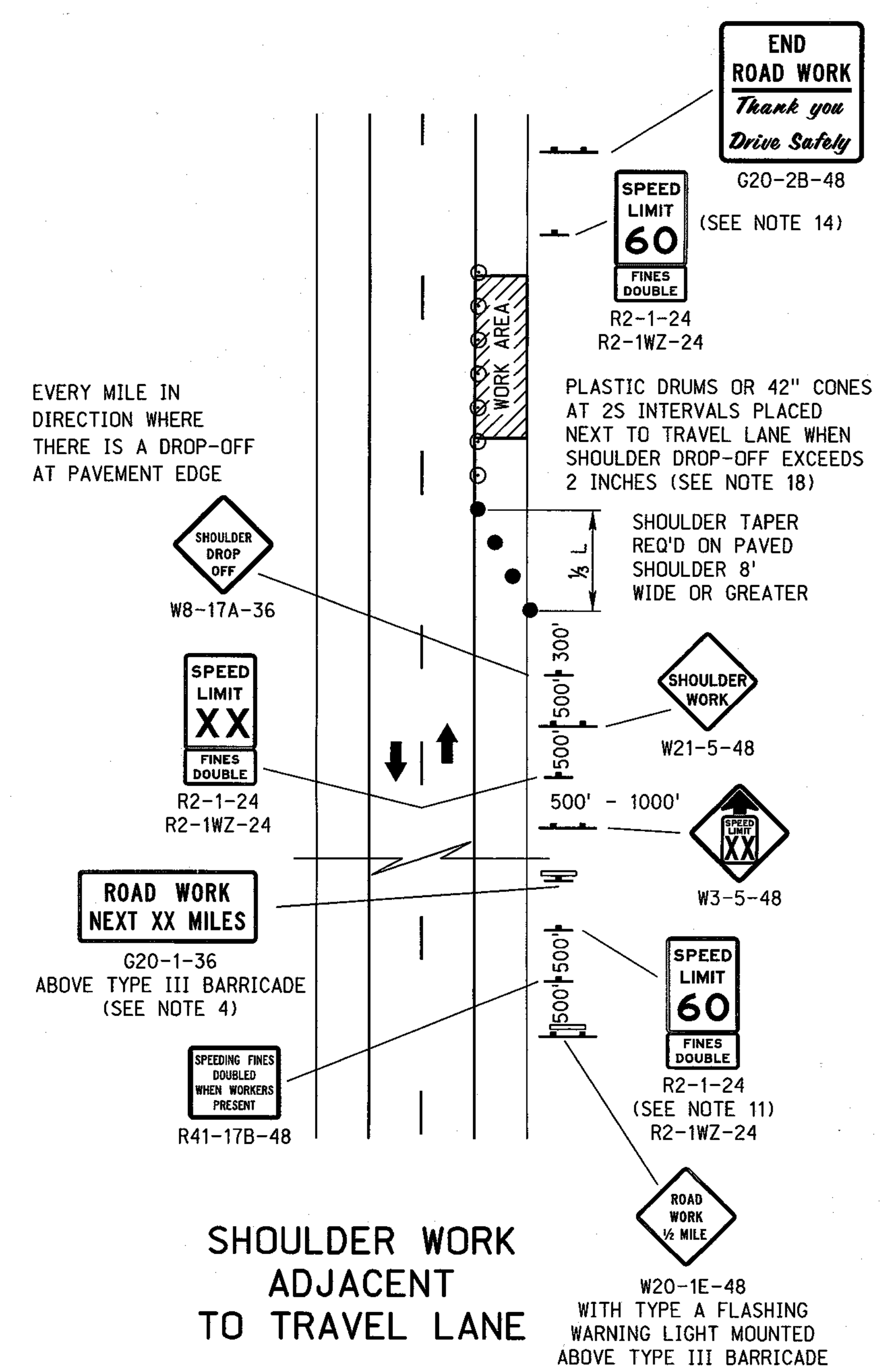
ASPHALT SURFACING OR FOG SEAL



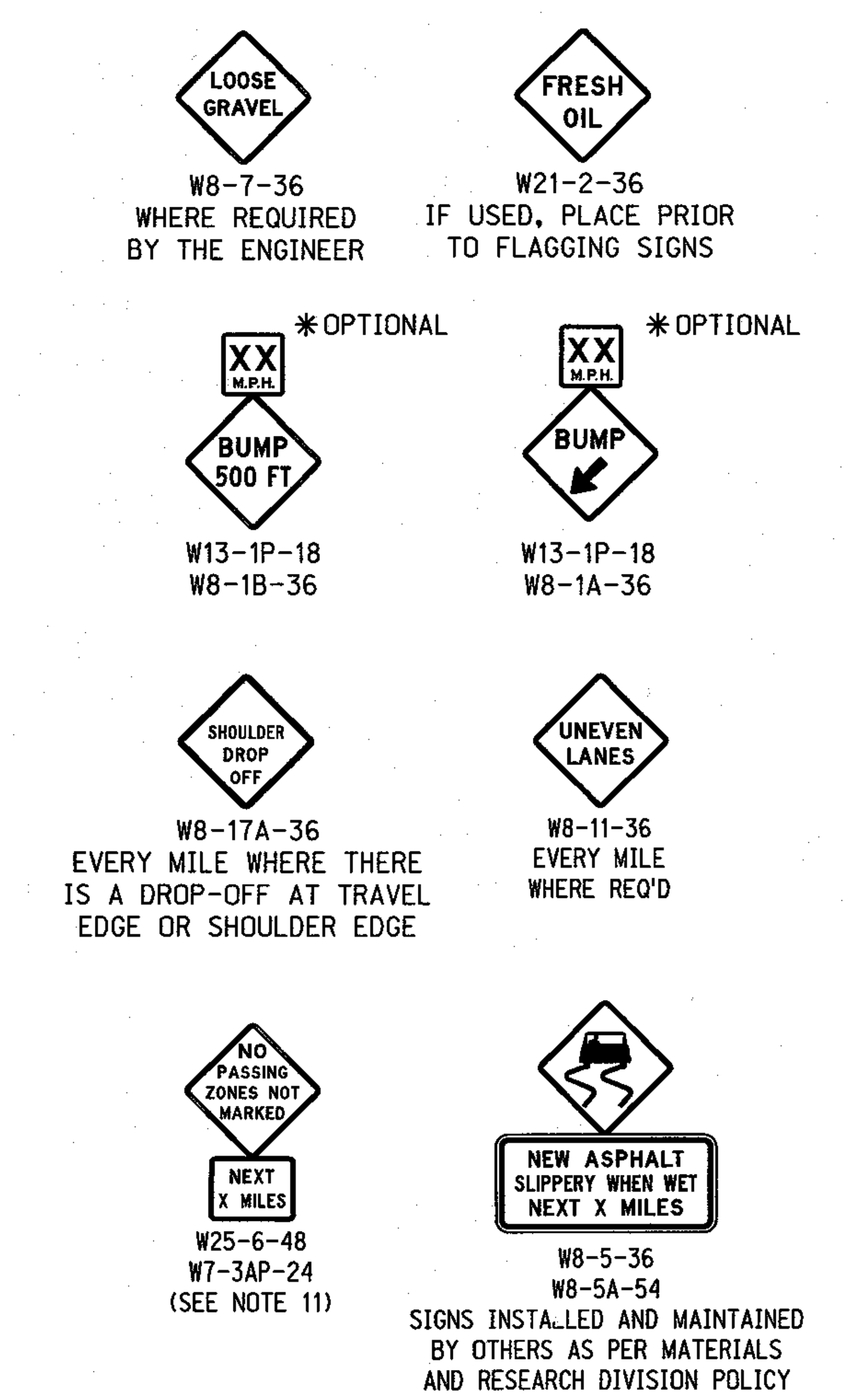
ARMOR COAT SURFACING



MILLING



SHOULDER WORK ADJACENT TO TRAVEL LANE



ADDITIONAL SIGNS USE WHERE APPLICABLE

*SIGNS ARE SUBSIDIARY TO THE FLAGGING OPERATION.

GENERAL NOTES

1. SIGNS SHOWN ARE USUALLY FOR ONE DIRECTION OF TRAVEL ONLY.
2. WORK ZONE SPEED LIMITS SHOWN ARE TYPICAL APPLICATIONS ONLY, AND SHOULD ONLY BE USED WHERE CONDITIONS OR RESTRICTIVE FEATURES ARE PRESENT.
3. "FLAGGERS AHEAD SYMBOL" SIGN (W20-7-48) SHALL BE USED WHEN A FLAGGER IS PRESENT, AND REMOVED WHEN NOT APPLICABLE.
4. G20-1 "ROAD WORK NEXT XX MILES" SHALL BE USED ON ANY CONSTRUCTION OR MAINTENANCE PROJECT LONGER THAN 2 MILES.
5. WHEN MESSAGE IS NOT PERTINENT, SIGNS SHALL BE TAKEN DOWN, COVERED OR FOLDED. TAPE WILL NOT BE PERMITTED ON THE FACE OF THE SIGN.
6. ORANGE FLAGS MAY BE USED TO CALL ATTENTION TO THE ADVANCE WARNING SIGNS.
7. "DO NOT PASS" AND "PASS WITH CARE" SIGNS WILL BE INSTALLED AT THE BEGINNING AND ENDING OF EACH "NO PASSING" ZONE WHERE PAVEMENT HAS NOT BEEN MARKED. FOR ROADWAYS WITH ADTs OF 2,000 VEHICLES PER DAY OR LESS, THE TIME PERIOD BETWEEN COMPLETION OF THE WORK AND PLACEMENT OF THE PAVEMENT MARKINGS SHALL NOT EXCEED TWO WEEKS. FOR ROADWAYS WITH ADTs GREATER THAN 2,000 VEHICLES PER DAY, THE TIME PERIOD SHALL NOT EXCEED THREE CALENDAR DAYS, CONDITIONS PERMITTING.
8. WHERE TRAFFIC QUEUES ARE LONG AND FLAGGER VISIBILITY IS LIMITED, THE ENGINEER MAY REQUIRE AN ADDITIONAL FLAGGER.
9. "MILLED SURFACE" SIGN (W41-24) IS NOT REQUIRED FOR MILLED SURFACES LESS THAN 1000 FEET IN LENGTH OR FOR MILLED SURFACES THAT ARE NOT BEING OVERLAID WITH THE PROJECT.
10. "NO PASSING ZONES NOT MARKED" SIGN (W25-6-48) SHOULD BE INSTALLED AT EACH END OF THE PROJECT WHENEVER THE EXISTING NO PASSING ZONE PAVEMENT MARKINGS HAVE BEEN REMOVED OR COVERED AND NO PASSING ZONE PAVEMENT MARKINGS ARE NOT INCLUDED IN THE PROJECT.
11. SPEED LIMIT SIGN IS NOT REQUIRED IF WITHIN 1500 FT OF A REDUCED SPEED AHEAD SIGN.
12. WHENEVER FEASIBLE, WORK ZONE TRAFFIC CONTROL PLANS SHOULD BE DEVELOPED TO ACCOMMODATE SPEED LIMIT REDUCTIONS NO GREATER THAN 10 MPH BELOW NORMAL CONDITIONS. W3-5 SIGN IS NOT NEEDED IF SPEED LIMIT IS NOT REDUCED.
13. WORK ZONE SPEED LIMITS SHALL NOT BE INSTALLED WITHOUT A SPEED ZONE AUTHORIZATION COMPLETED BY THE DEPARTMENT. SEE WORK ZONE SPEED LIMIT NOTES ON STANDARD PLAN 920.
14. A SPEED LIMIT SIGN ENDING THE REDUCED SPEED ZONE SHALL BE INSTALLED AT THE END OF EACH ZONE.
15. IF THE QUEUING OF VEHICLES ACROSS ACTIVE RAILROAD TRACKS CANNOT BE AVOIDED, A FLAGGER SHALL BE PROVIDED AT THE RAILROAD CROSSING TO PREVENT VEHICLES FROM STOPPING WITHIN THE RAILROAD CROSSING EVEN IF AUTOMATIC WARNING DEVICES ARE IN PLACE. AT NO TIME, WILL THE QUEUE FROM A FLAGGING OPERATION EXTEND ACROSS A RAILROAD CROSSING.
16. EARLY COORDINATION WITH THE RAILROAD COMPANY SHOULD OCCUR BEFORE WORK STARTS.
17. THE "DO NOT STOP ON TRACKS" SIGN SHOULD BE USED ON ALL APPROACHES TO A HIGHWAY-RAIL GRADE CROSSING WITHIN THE LIMITS OF A TEMPORARY TRAFFIC CONTROL ZONE.
18. PLACE TYPE II BARRICADES, REFLECTORIZED PLASTIC DRUMS, OR 42" CONES ON THE TRAFFIC SIDE OF THE DROP-OFF WHERE SUFFICIENT LATERAL DISTANCE EXISTS BETWEEN THE TRAVEL LANE AND THE DROP-OFF (DROP-OFF DETAIL ON SHEET 2).
19. THE LEAD SIGNS ARE NOT NEEDED IF TWO PROJECTS ARE LESS THAN 1 MILE APART. THE "END CONSTRUCTION" SIGN (G20-2B-48) SHOULD NOT BE INSTALLED BETWEEN THE PROJECTS.
20. ON ARMOR COAT SURFACING, A "LOOSE GRAVEL" SIGN (W8-7-36) IS REQUIRED AT THE BEGINNING OF THE DAYS WORK AND SHALL REMAIN IN PLACE UNTIL THE LOOSE GRAVEL HAS BEEN SWEPT OFF.
21. SIGN SIZES SHOWN ARE FOR TYPICAL SITUATIONS- REFER TO NEBRASKA SUPPLEMENT TO THE MUTCD FOR FURTHER SIZE INFORMATION.
22. REFER TO STANDARD PLAN 920 FOR GENERAL INFORMATION NOT SHOWN.

LEGEND

- FLAGGER
- REFLECTORIZED PLASTIC DRUM
- REFLECTORIZED PLASTIC DRUM OR 42" CONE
- TYPE III BARRICADE
- SINGLE POSTED SIGN
- DOUBLE POSTED SIGN

TAPER FORMULA

$L = S \times W$ FOR SPEEDS OF 45 MPH OR MORE.

$L = \frac{WS^2}{60}$ FOR SPEEDS OF 40 MPH OR LESS.

WHERE:

L = MINIMUM LENGTH OF TAPER.

S = NUMERICAL VALUE OF POSTED SPEED LIMIT PRIOR TO WORK.

W = WIDTH OF OFFSET (LANE WIDTH).

REV. NO.	DATE	DESCRIPTION OF REVISION
R9	JUN 14	2009 MUTCD UPDATES
R8	JAN 10	PILOT CAR SIGN, FINE SIGNS & NOTES 19, 20, 22 & 25

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 922-R9

TRAFFIC CONTROL FOR ASPHALT SURFACING

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

JUNE 2014
DATE

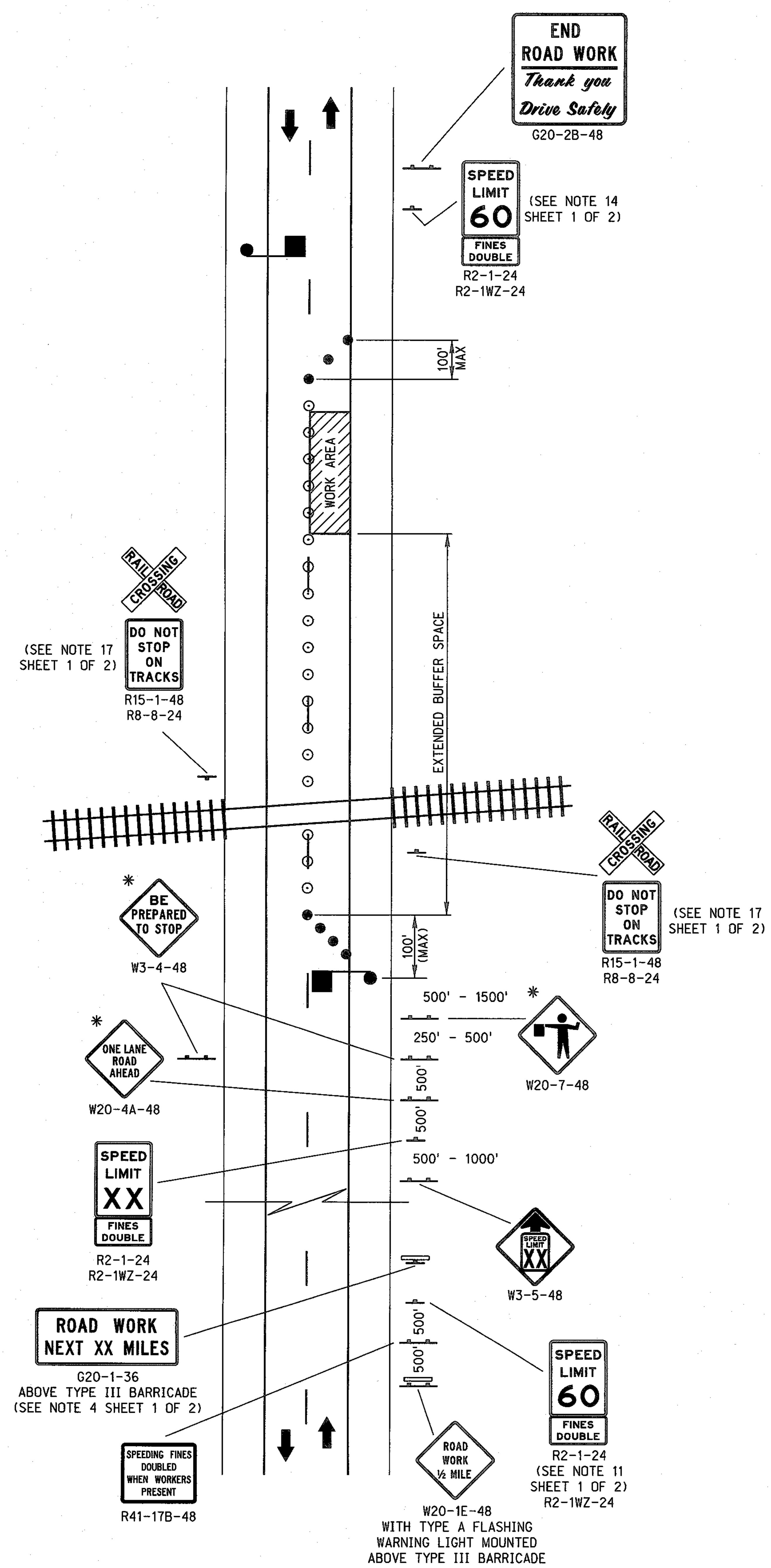
PROFESSIONAL CIVIL ENGINEER ★ DANIEL J. WADDLE E-6289 ★ STATE OF NEBRASKA

ORIGINAL:
JUNE 3, 1980
DATE

1/2

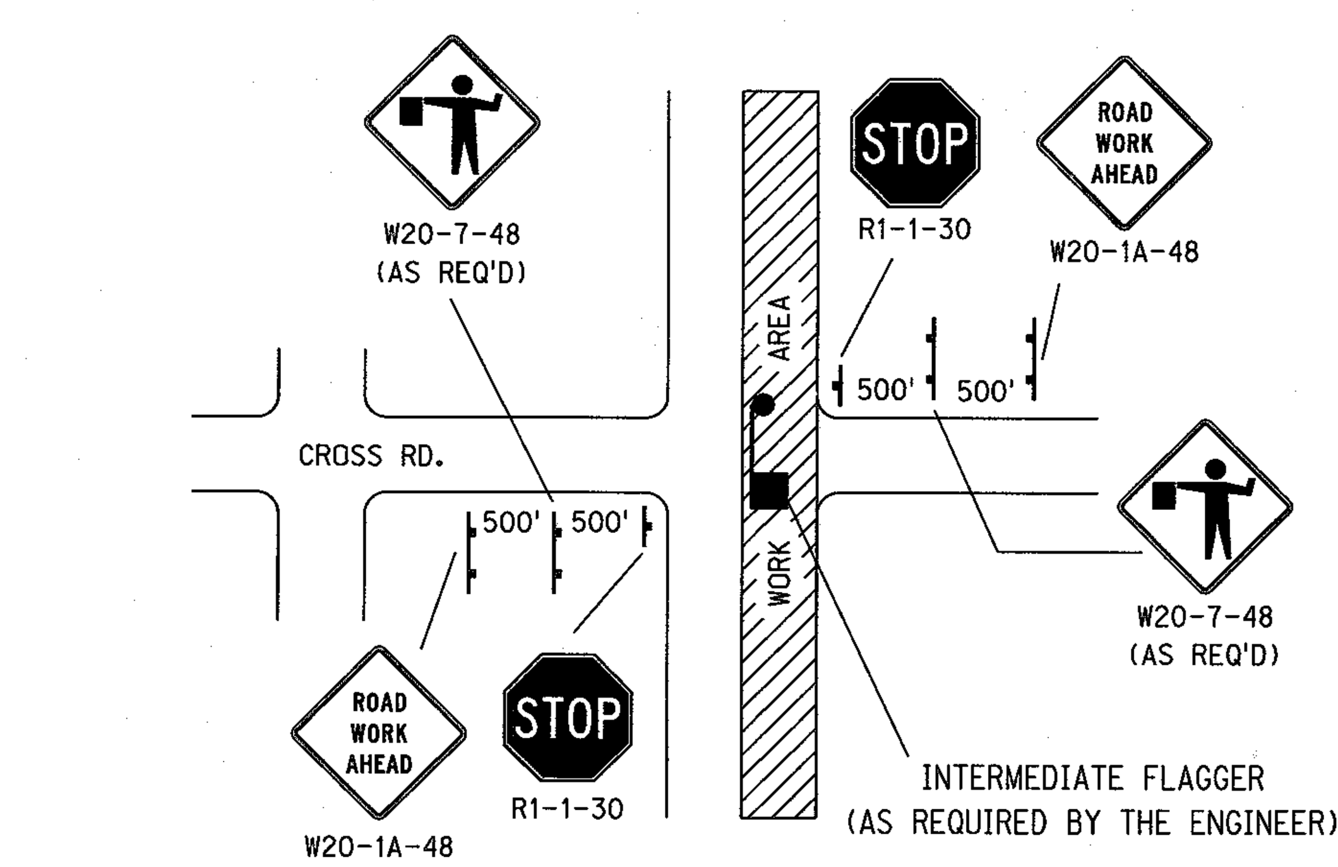
ROADWAY DESIGN DIVISION

Computer: DRDESIGN188 User: dor13161 Date: 15-APR-2014 14:17

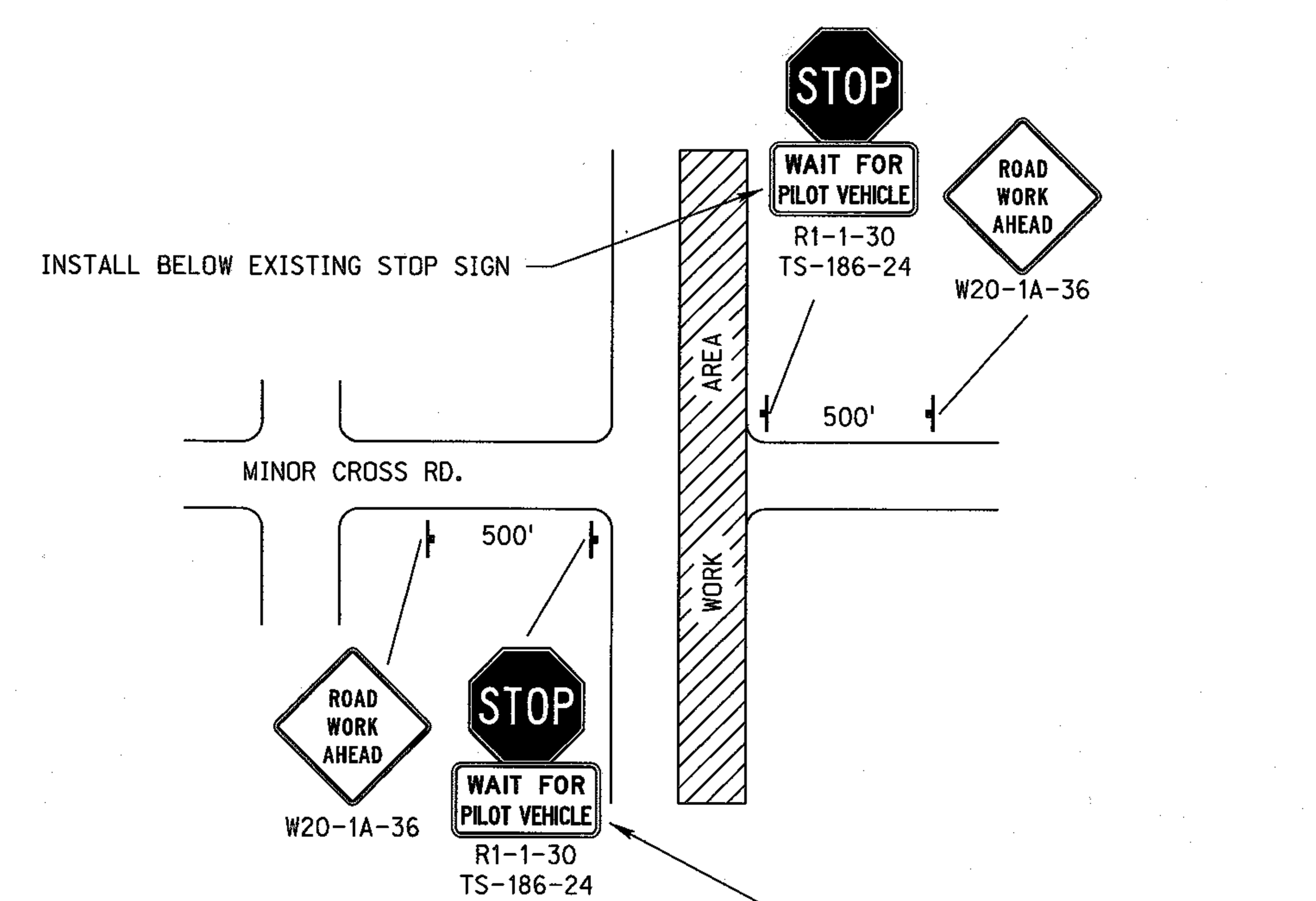


WORK IN VICINITY OF RAILROAD CROSSING

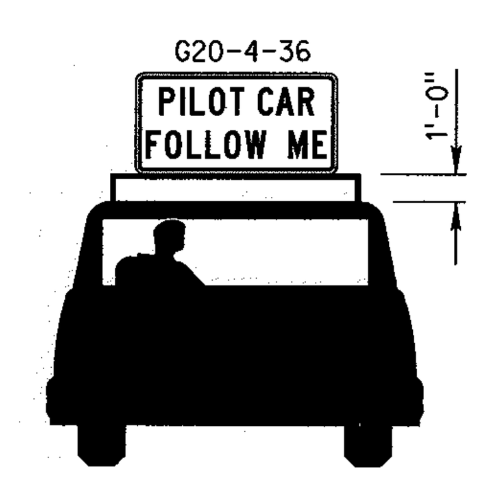
* SIGNS ARE SUBSIDIARY TO THE FLAGGING OPERATION.



MINOR OR MAJOR CROSS ROAD WITH FLAGGER

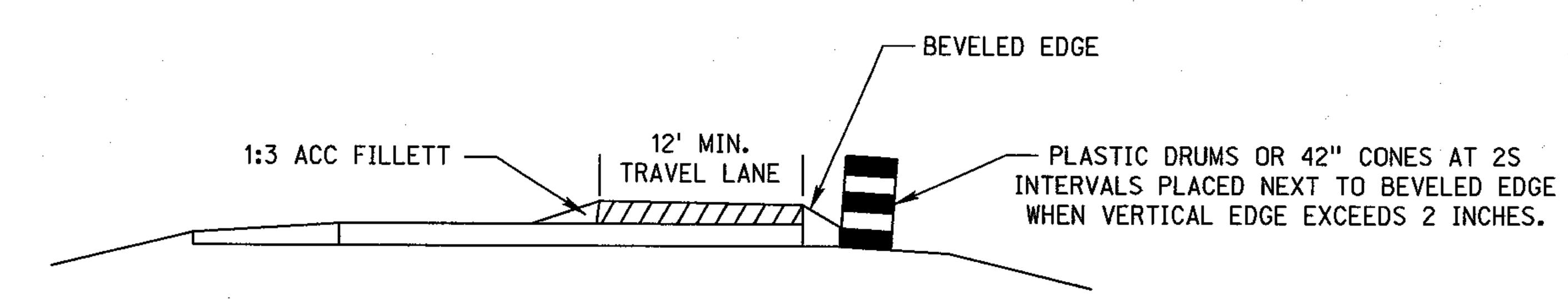


MINOR CROSS ROAD NO FLAGGER WITH PILOT CAR OPERATION

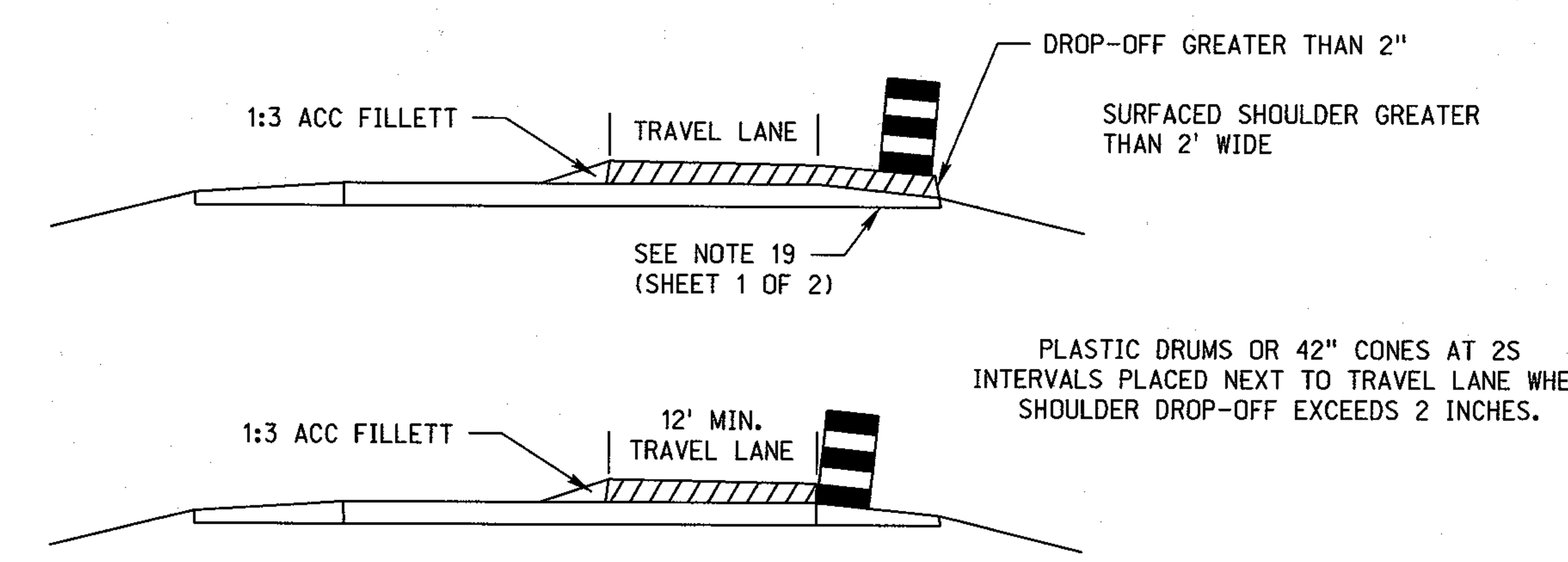


THE BOTTOM OF THE SIGN SHALL BE MOUNTED A MINIMUM OF 1 FOOT ABOVE THE VEHICLE'S ROOF. THE SIGN SHALL BE SECURELY COVERED OR REMOVED WHEN NOT IN USE.

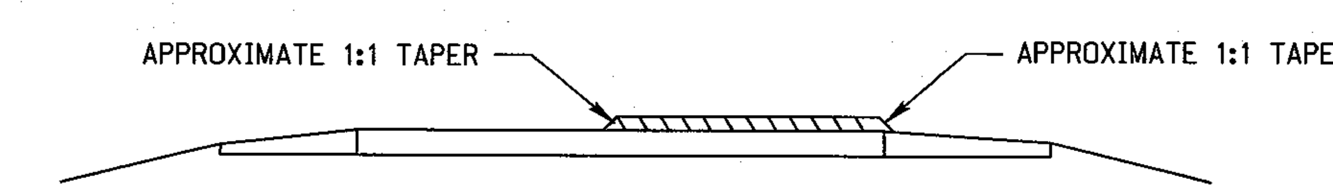
PILOT CAR SIGN



BEVELED EDGE



DROP-OFF GREATER THAN 2 INCHES



DROP-OFF 2 INCHES AND LESS

TAPER FORMULA

L = S x W FOR SPEEDS OF 45 MPH OR MORE.

$L = \frac{WS^2}{60}$ FOR SPEEDS OF 40 MPH OR LESS.

WHERE:

L = MINIMUM LENGTH OF TAPER.

S = NUMERICAL VALUE OF POSTED SPEED LIMIT PRIOR TO WORK.

W = WIDTH OF OFFSET (LANE WIDTH).

LEGEND

- FLAGGER
- REFLECTORIZED PLASTIC DRUM
- REFLECTORIZED PLASTIC DRUM OR 42" CONE
- TYPE III BARRICADE
- SINGLE POSTED SIGN
- DOUBLE POSTED SIGN

REV. NO.	DATE	DESCRIPTION OF REVISION
R9	JUN 14	2009 MUTCD UPDATES
R8	JAN 10	PILOT CAR SIGN, FINE SIGNS & NOTES 19, 20, 22 & 25

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 922-R9

TRAFFIC CONTROL FOR ASPHALT SURFACING

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL CIVIL ENGINEER DANIEL J. WADDLE E-6289 STATE OF NEBRASKA

JUNE 2014
DATE

ORIGINAL:
JUNE 3, 1980
DATE

2 / 2

File: 92200e09.dgn
Scale: 1:100
SHEET 2 OF 2

ROADWAY DESIGN DIVISION
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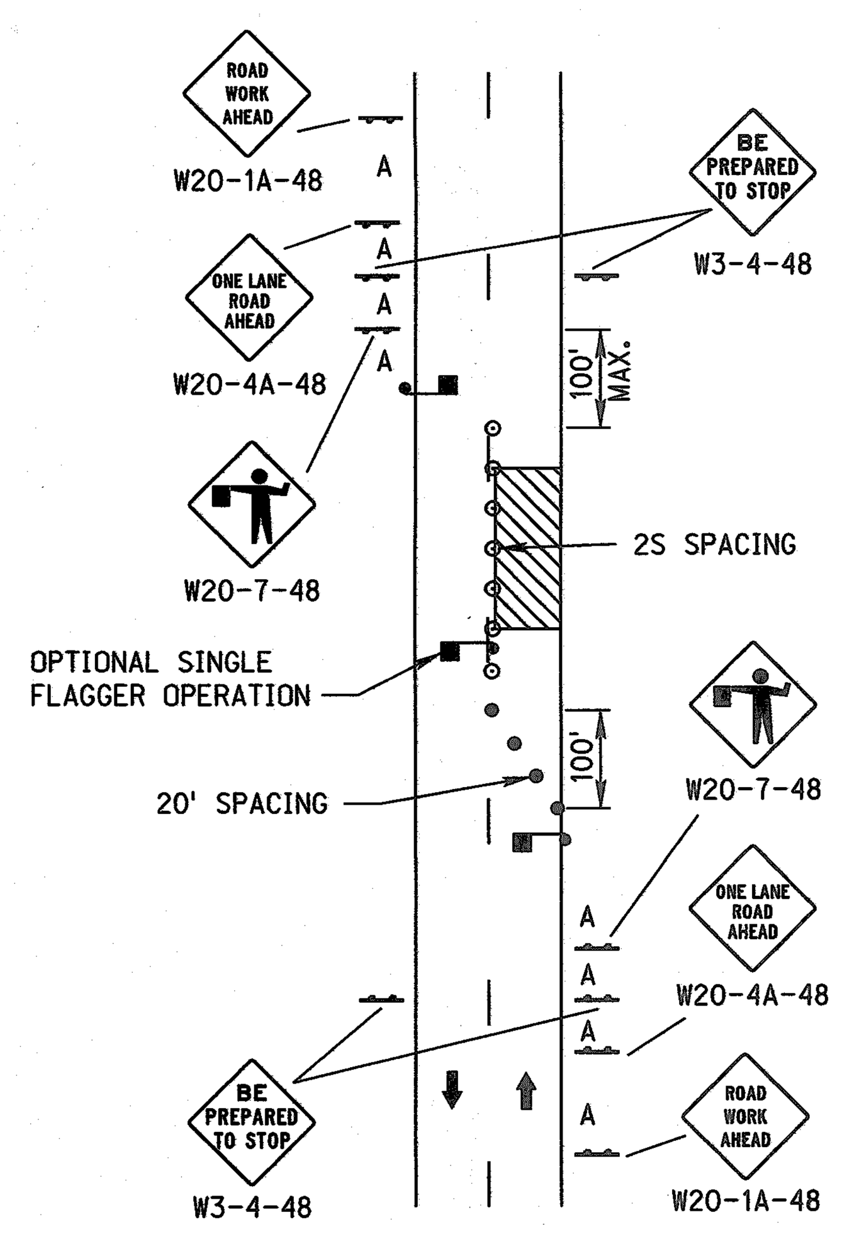
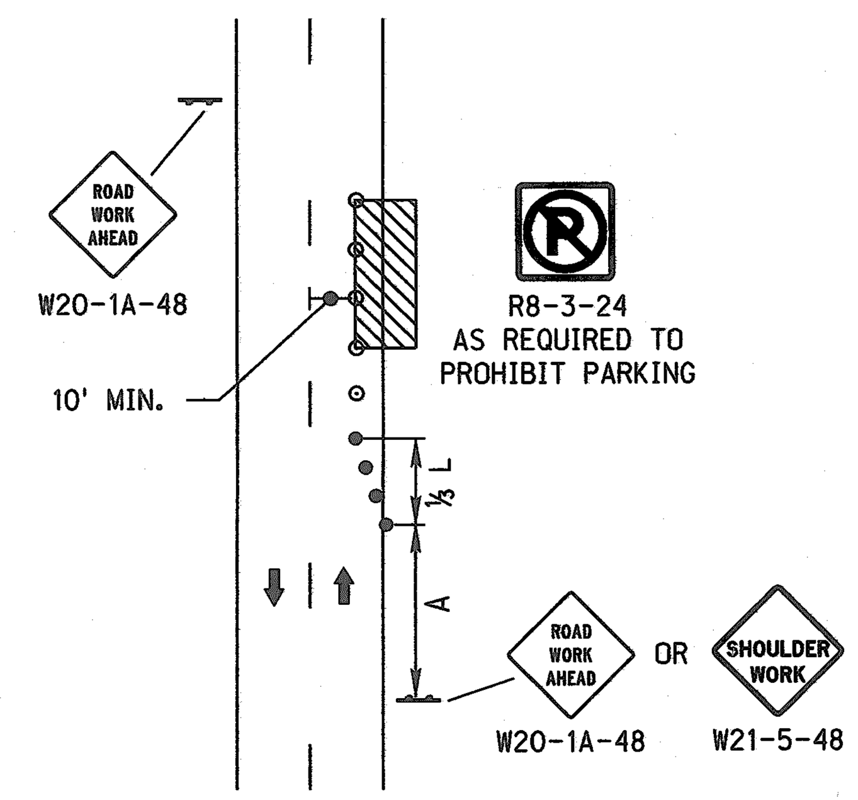
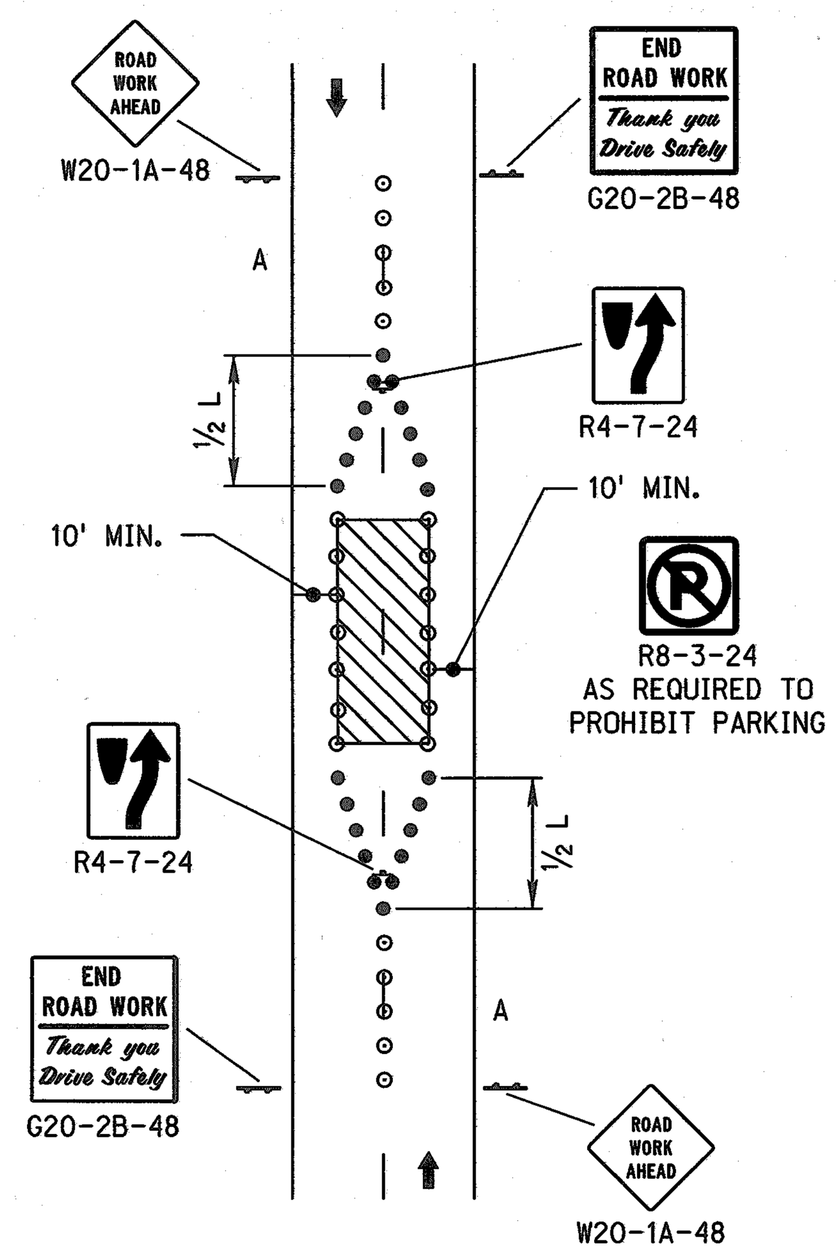


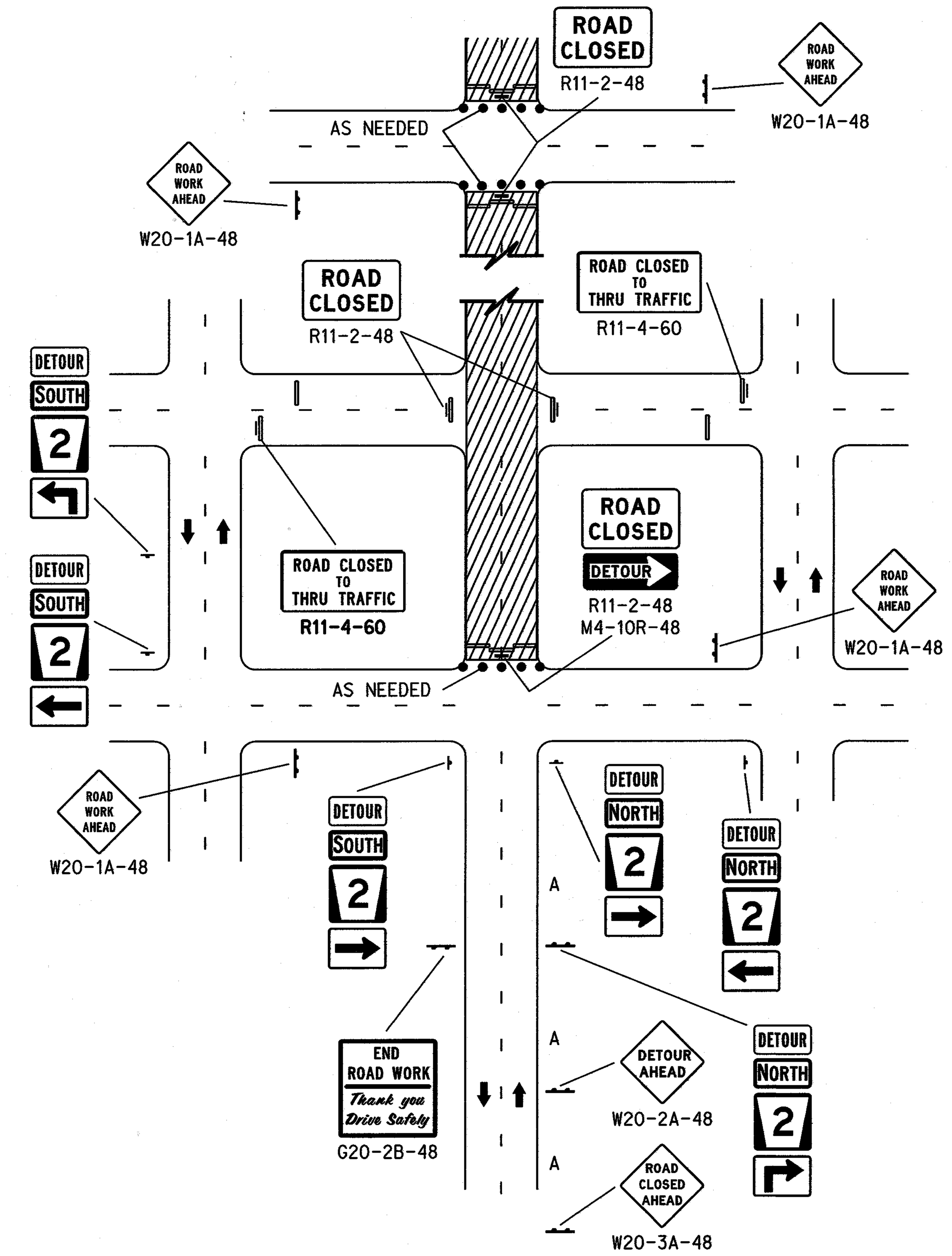
ONE LANE CLOSED WITH FLAGGER



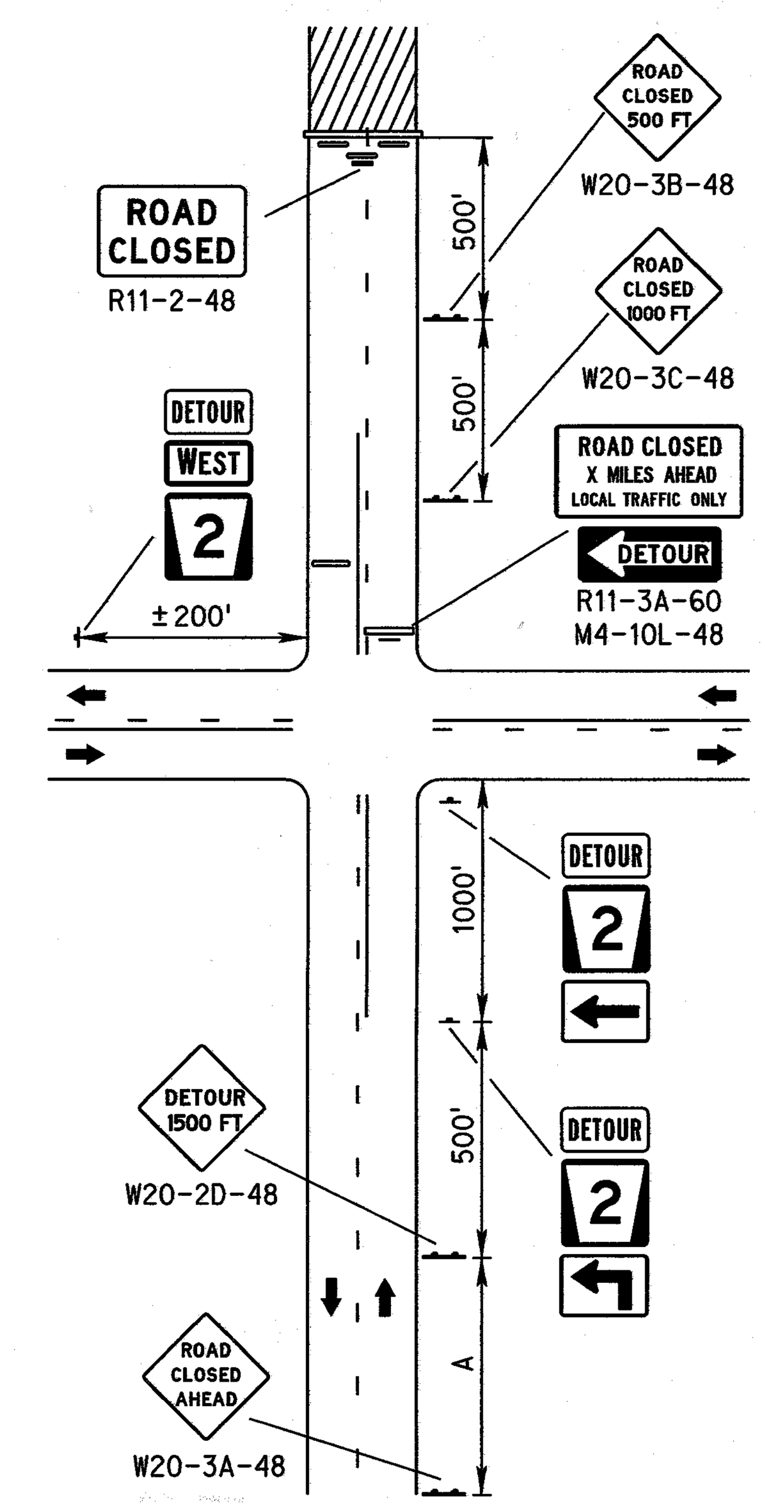
SHOULDER OR PARKING LANE CLOSED



WORK IN CENTER OF ROAD WITH LOW TRAFFIC VOLUMES



ROAD CLOSED AT DETOUR



ROAD CLOSED BEYOND DETOUR

LEGEND

- FLASHING ARROW PANEL
- TYPE III BARRICADE
- REFLECTORIZED PLASTIC DRUM
- TUBULAR POST
- REFLECTORIZED PLASTIC DRUM OR 42" CONE
- SINGLE POSTED SIGN
- DOUBLE POSTED SIGN
- FLAGGER
- xxxx PAVEMENT MARKING REMOVAL

TAPER FORMULA

$L = S \times W$ FOR SPEEDS OF 45 MPH OR MORE.

$L = \frac{WS^2}{60}$ FOR SPEEDS OF 40 MPH OR LESS.

WHERE:

L = MINIMUM LENGTH OF TAPER.

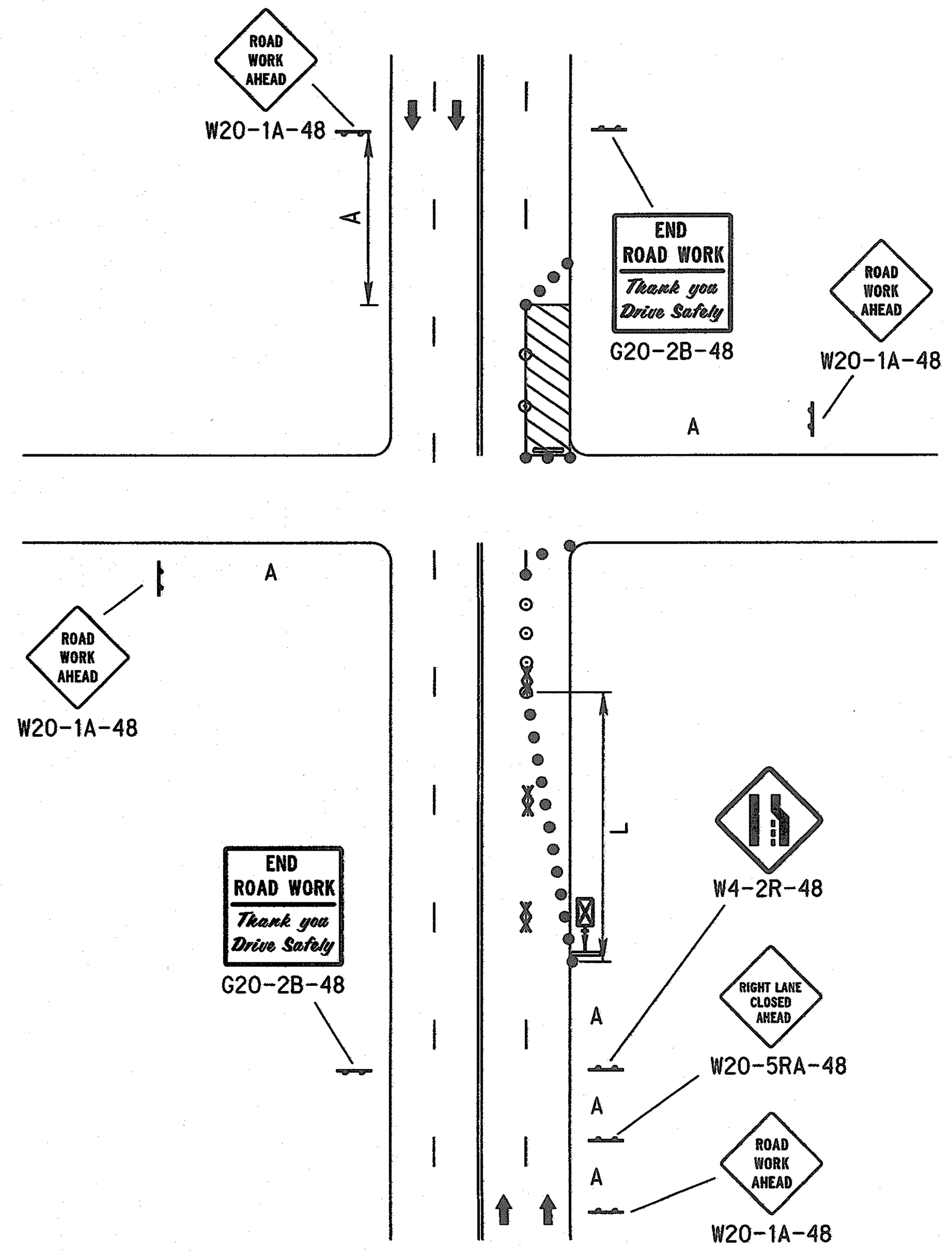
S = NUMERICAL VALUE OF POSTED SPEED LIMIT PRIOR TO WORK.

W = WIDTH OF OFFSET (LANE WIDTH).

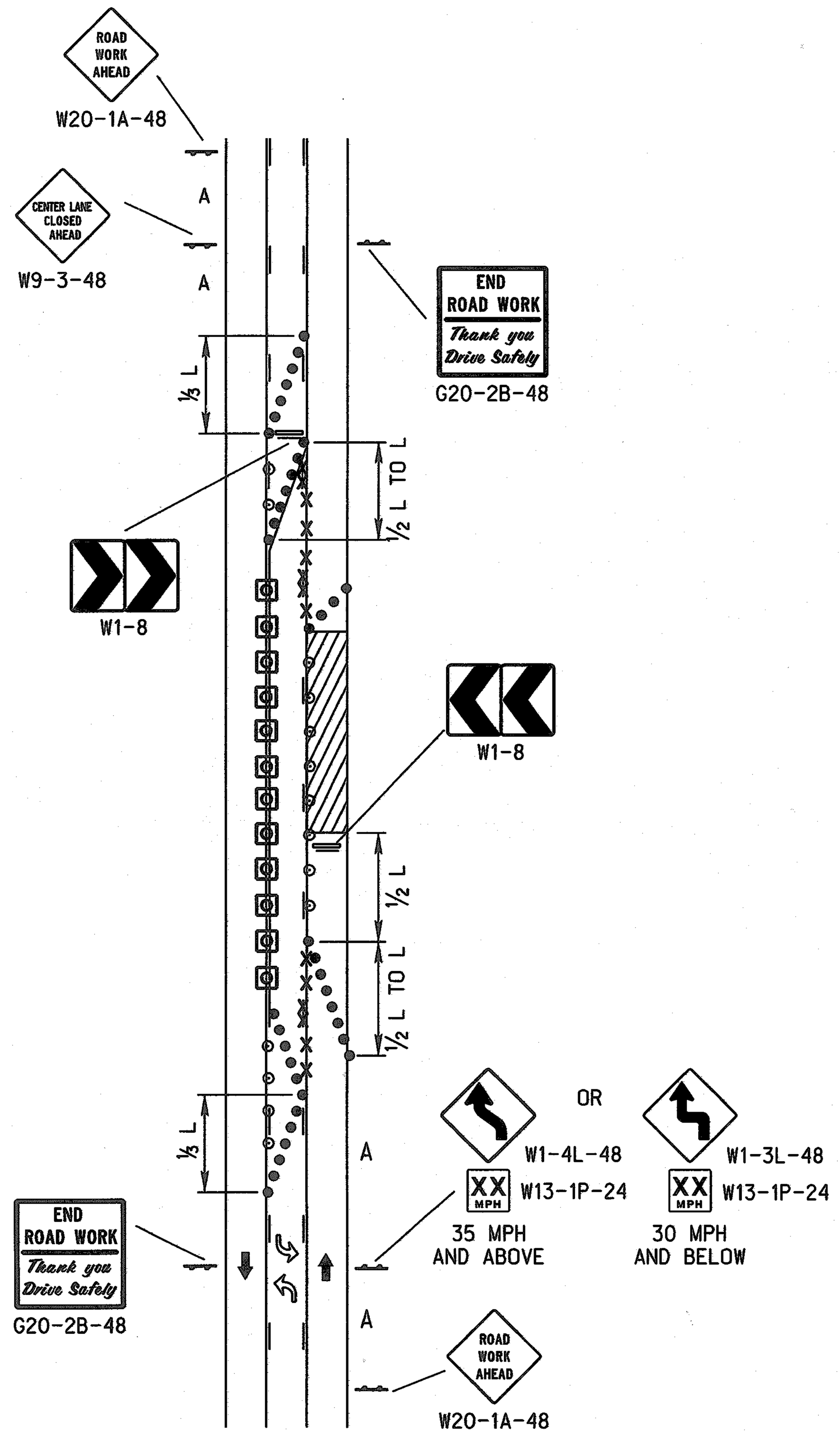
NOTES

1. ALL BARRICADE AND SIGN LOCATIONS ON THIS PLAN ARE APPROXIMATE, AND MAY BE ADJUSTED TO FIT FIELD CONDITIONS. THE SIGNS SHALL BE INSTALLED SO AS NOT TO OBSCURE THE VIEW OF OTHER TRAFFIC CONTROL DEVICES.
2. MINIMUM WIDTH OF TRAVELLED LANE SHALL BE AS REQUIRED BY THE ENGINEER.
3. FLASHING ARROW PANEL REQUIRED ON ALL ROADWAYS WITH POSTED SPEED LIMIT 45 MPH OR HIGHER. THE USE OF A FLASHING ARROW PANEL IS OPTIONAL ON ROADWAYS WITH A POSTED SPEED OF 40 MPH OR LOWER.
4. LONG-TERM FLASHING ARROW PANELS IN URBAN RESIDENTIAL AREAS WHERE DIESEL ENGINE NOISE WILL BE DISRUPTIVE TO RESIDENTS, MAY BE REQUIRED TO OPERATE BY 120 VAC, OR IF SIGHT DISTANCE ALLOWS, A SOLAR POWERED ARROW PANEL MAY BE USED.
5. FOR SHORT-TERM WORK (LESS THAN 24 HOURS) SIGN G20-2B-48 (END ROAD WORK, THANK YOU, DRIVE SAFELY) MAY BE OMITTED.
6. THE MAXIMUM SPACING BETWEEN CHANNELIZING DEVICES IN A TAPER SHOULD BE APPROXIMATELY EQUAL IN FEET TO THE SPEED LIMIT (S). WHERE CHANNELIZING DEVICES ARE USED ALONG THE WORK AREA, THE SPACING MAY BE INCREASED TO THE DISTANCE IN FEET EQUAL TO THE SPEED LIMIT, DOUBLED (2 × S). SEE "TAPER FORMULA" TABLE FOR MORE INFORMATION.
7. FOR LANE CLOSURES OVER 72 HOURS, ALL CONFLICTING PAVEMENT MARKINGS SHALL BE REMOVED. ON ASPHALT SURFACES, DURABLE PAVEMENT MARKINGS MAY BE COVERED WITH APPROVED BLACK TEMPORARY PAVEMENT MARKING TAPE.
8. DESIGNATION OF SPEED SHOWN ON ADVISORY SPEED SIGNS W13-1P SHALL BE DETERMINED BY THE ENGINEER IN ACCORDANCE WITH MUTCD. THE SPEED DESIGNATION SHALL BE AS HIGH AS PRACTICAL AND FEASIBLE.

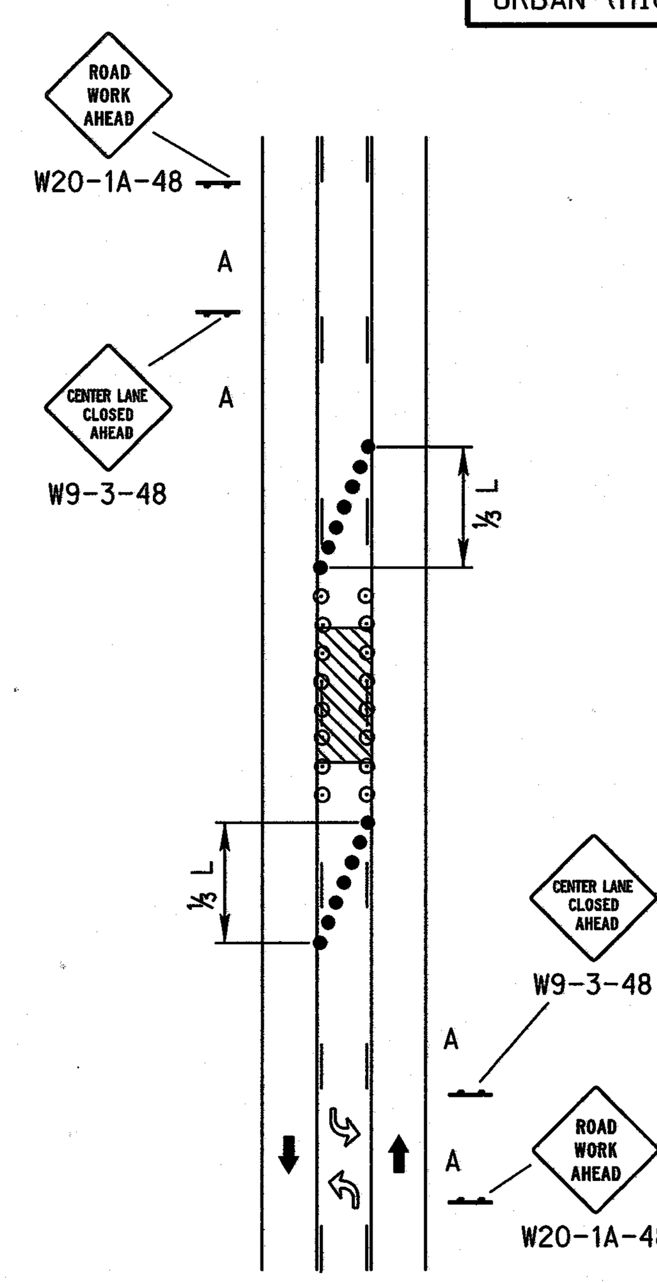
ROAD TYPE	MINIMUM DISTANCE BETWEEN SIGNS A
URBAN (LOW SPEED - 25 MPH TO 40 MPH)	100'
URBAN (HIGH SPEED - 45 MPH OR HIGHER)	350'



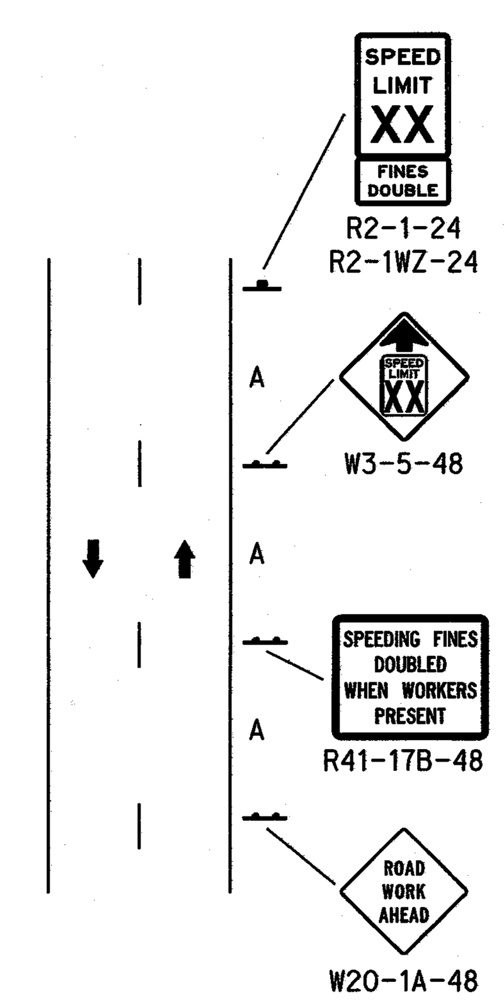
LANE CLOSED NEAR INTERSECTION (RIGHT LANE CLOSED)



3-LANE ROADWAY ONE LANE CLOSED



TWO-WAY LEFT TURN LANE CLOSED



TYPICAL ADVANCED SIGNING

REV. NO.	DATE	DESCRIPTION OF REVISION
R1	JUN 14	2009 MUTCD UPDATES

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 924-R1

URBAN TRAFFIC CONTROL PLAN

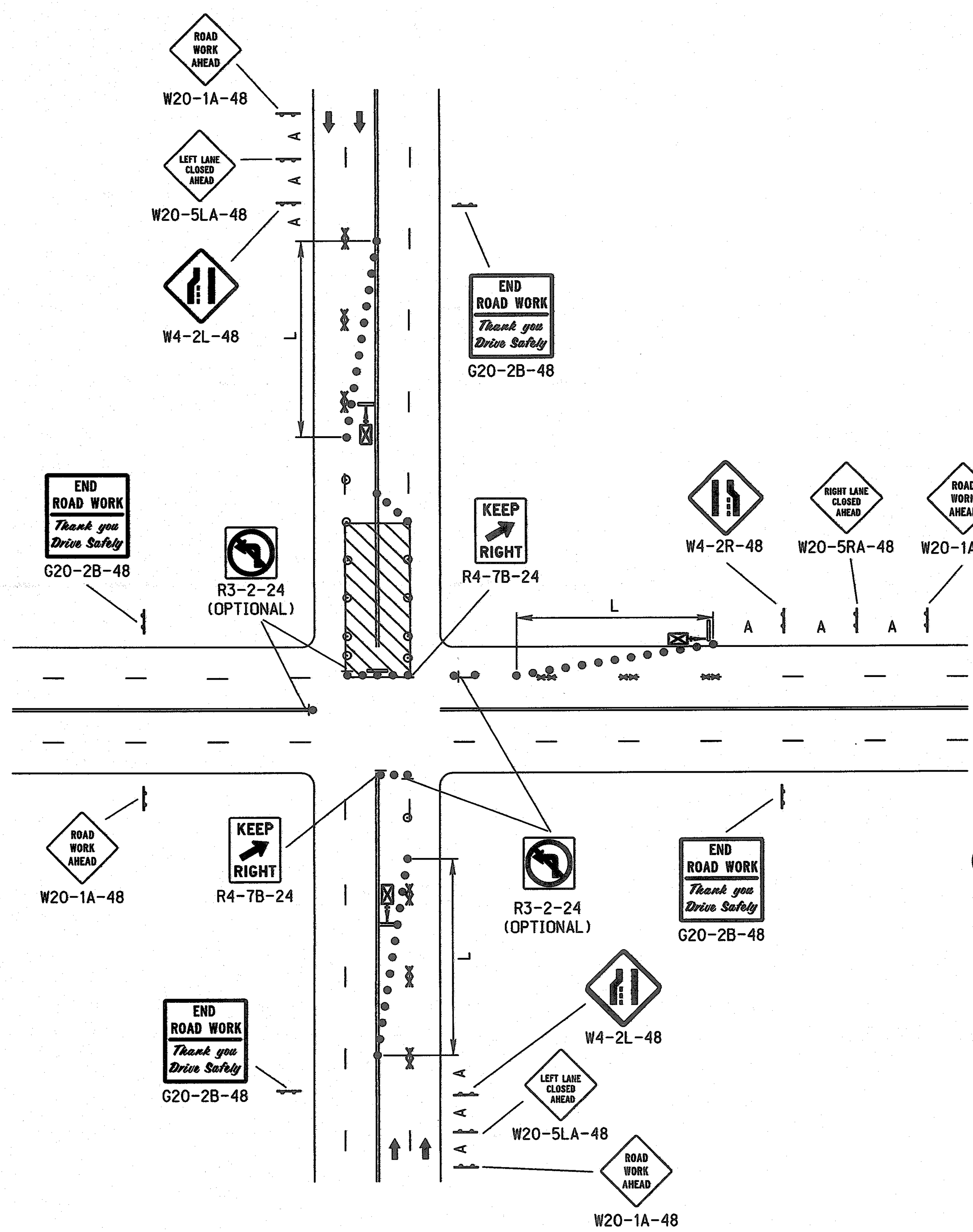
ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL CIVIL ENGINEER DANIEL J. WADDLE E-6289 STATE OF NEBRASKA

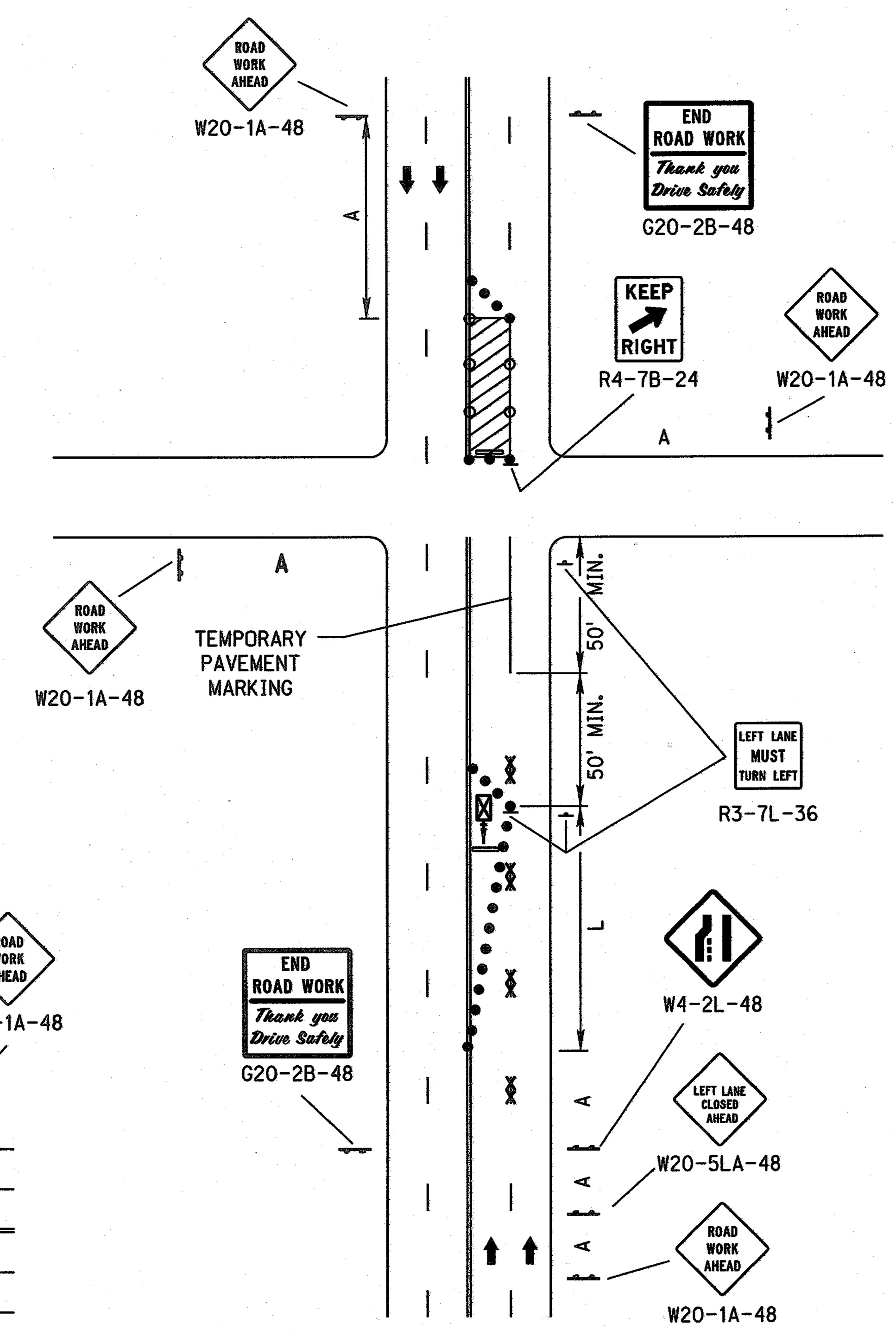
JUNE 2014
DATE

ORIGINAL:
FEBRUARY 1, 2010
DATE

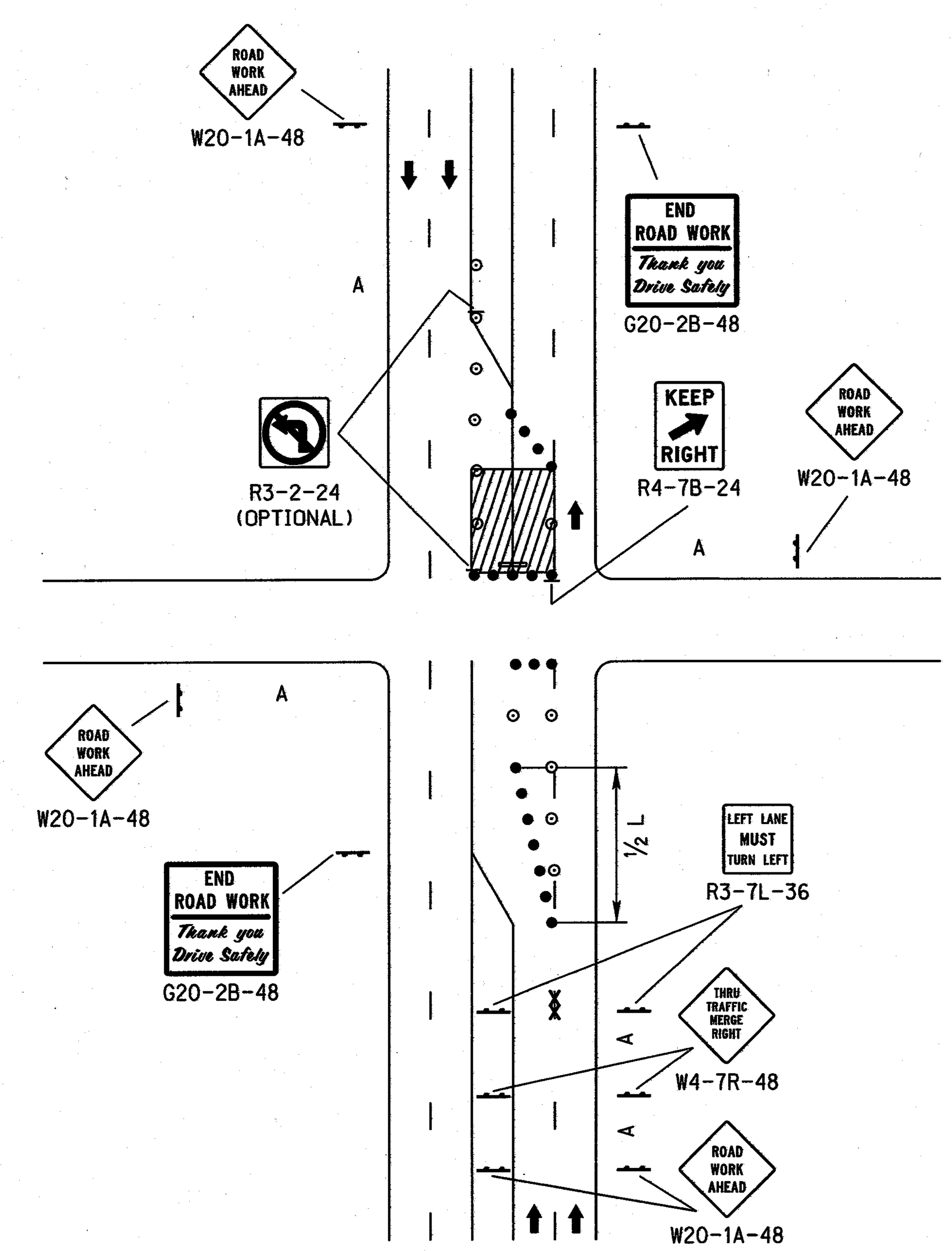
ROADWAY DESIGN DIVISION



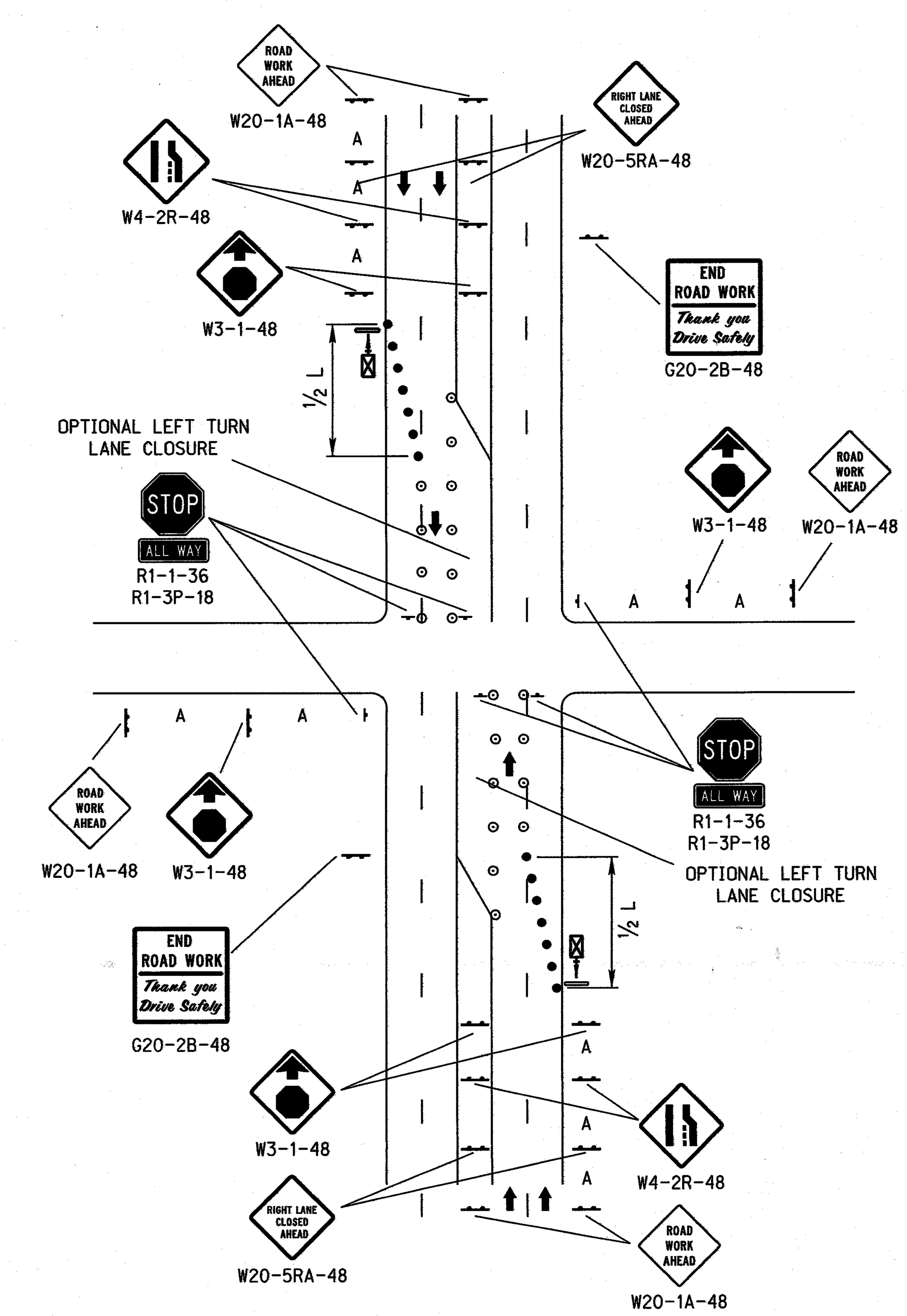
4 LANE UNDIVIDED ROADWAY CENTER LANES CLOSED NEAR INTERSECTION



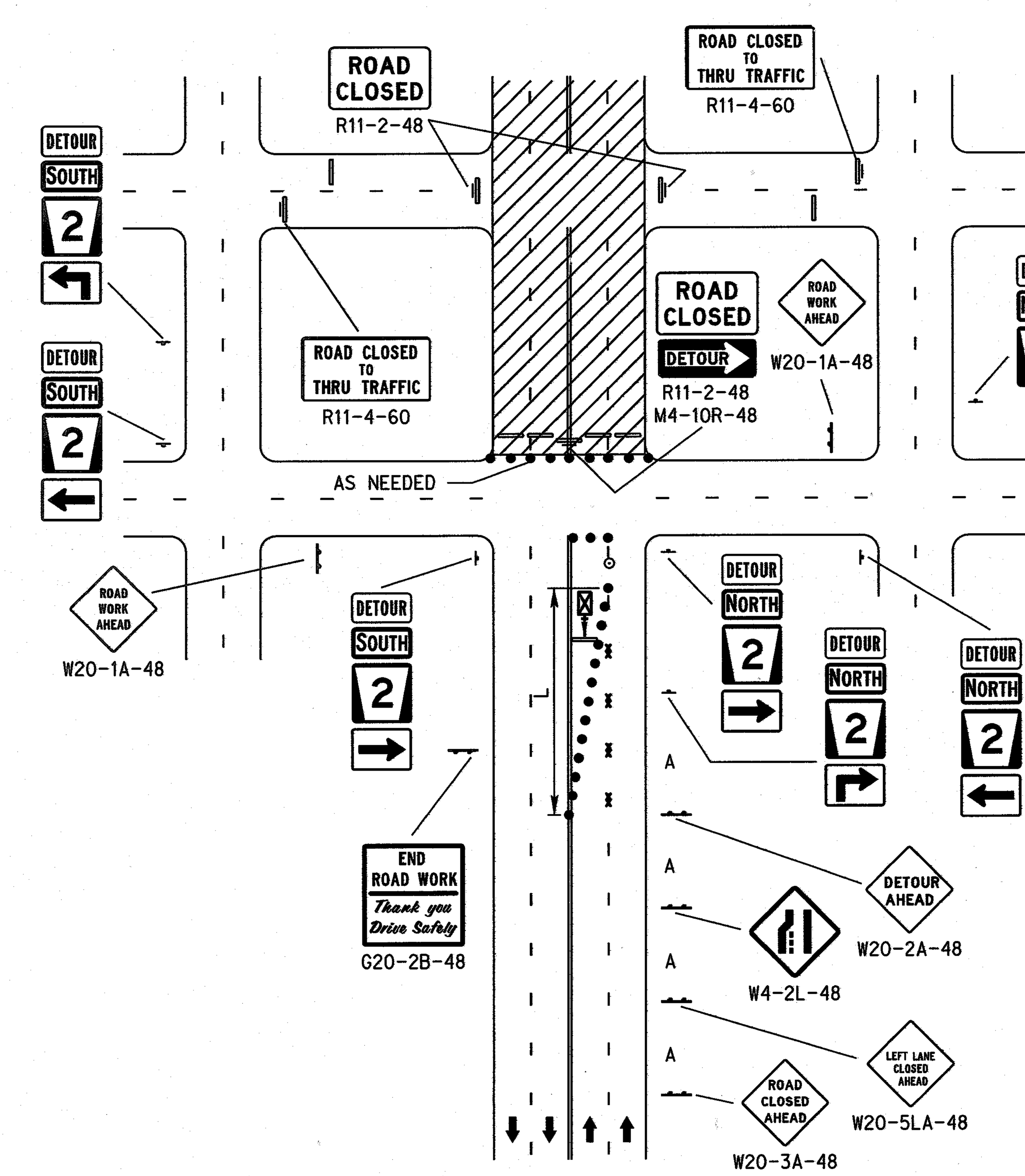
LANE CLOSED NEAR INTERSECTION (LEFT LANE CLOSURE FORMING A TURNBAY)



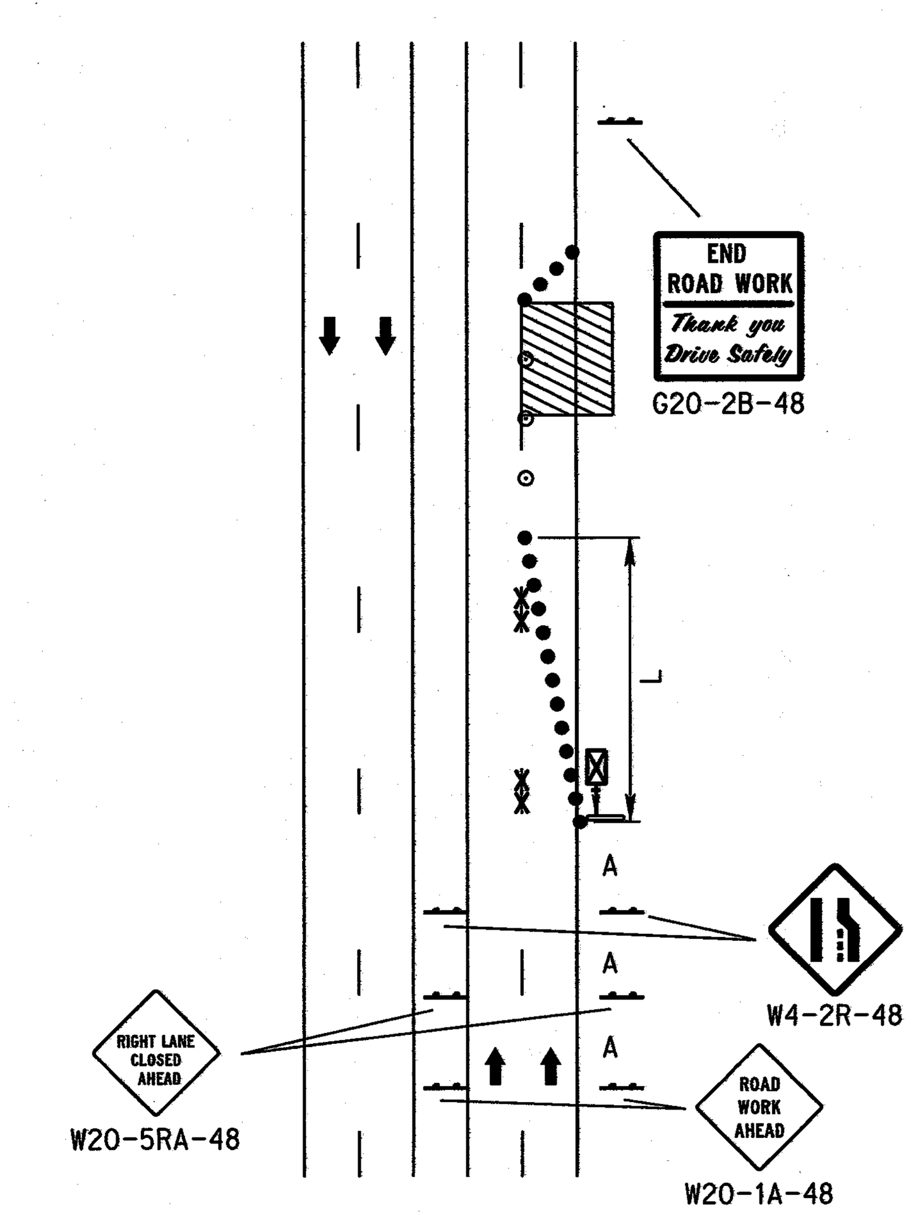
4 LANE DIVIDED ROADWAY CENTER LANES CLOSED NEAR INTERSECTION



TEMPORARY ALL-WAY STOP FOR SIGNAL WORK



ROAD CLOSED AT DETOUR (OPTIONAL LANE CLOSURE)



DIVIDED ROADWAY ONE LANE CLOSED

ROAD TYPE	MINIMUM DISTANCE BETWEEN SIGNS
	A
URBAN (LOW SPEED - 25 MPH TO 40 MPH)	100'
URBAN (HIGH SPEED - 45 MPH OR HIGHER)	350'

LEGEND

- FLASHING ARROW PANEL
- TYPE III BARRICADE
- REFLECTORIZED PLASTIC DRUM
- TUBULAR POST
- REFLECTORIZED PLASTIC DRUM OR 42" CONE
- SINGLE POSTED SIGN
- DOUBLE POSTED SIGN
- FLAGGER
- XXXX PAVEMENT MARKING REMOVAL

TAPER FORMULA

L = S x W FOR SPEEDS OF 45 MPH OR MORE.

$L = \frac{WS^2}{60}$ FOR SPEEDS OF 40 MPH OR LESS.

WHERE:

L = MINIMUM LENGTH OF TAPER.

S = NUMERICAL VALUE OF POSTED SPEED LIMIT PRIOR TO WORK.

W = WIDTH OF OFFSET (LANE WIDTH).

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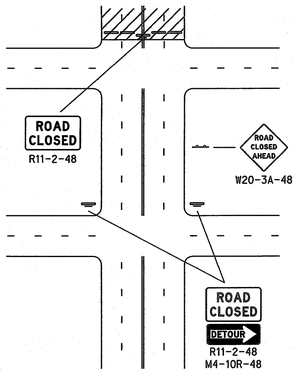
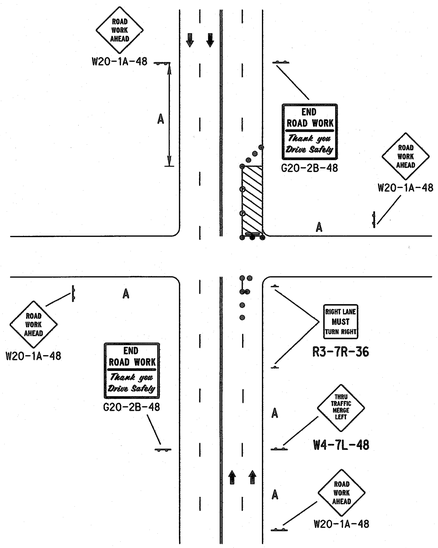
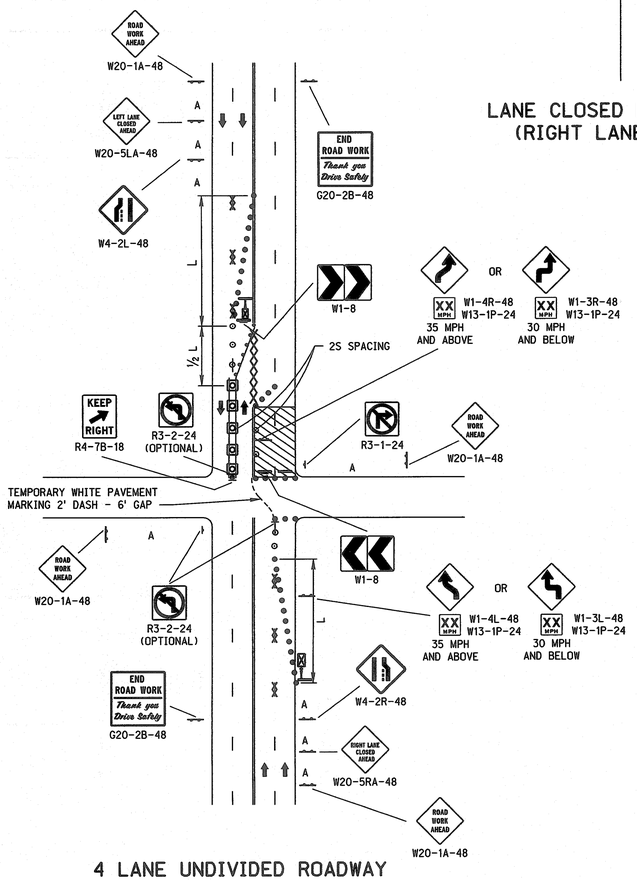


ROAD CLOSED
BEYOND DETOUR



LANE CLOSED NEAR INTERSECTION
(RIGHT LANE REMAINS OPEN)



4 LANE UNDIVIDED ROADWAY
TWO LANES CLOSED NEAR INTERSECTION

LEGEND

- FLASHING ARROW PANEL
- TYPE III BARRICADE
- REFLECTORIZED PLASTIC DRUM
- TUBULAR POST
- REFLECTORIZED PLASTIC DRUM OR 42" CONE
- SINGLE POSTED SIGN
- DOUBLE POSTED SIGN
- FLAGGER
- xxxx PAVEMENT MARKING REMOVAL

TAPER FORMULA

L = S x W FOR SPEEDS OF 45 MPH OR MORE.

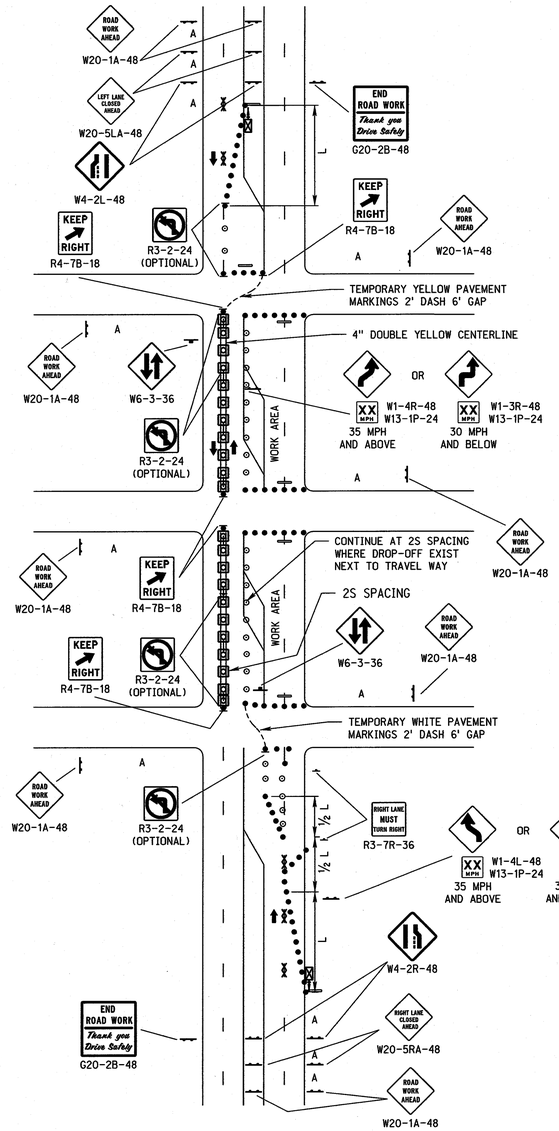
$L = \frac{WS^2}{60}$ FOR SPEEDS OF 40 MPH OR LESS.

WHERE:

L = MINIMUM LENGTH OF TAPER.

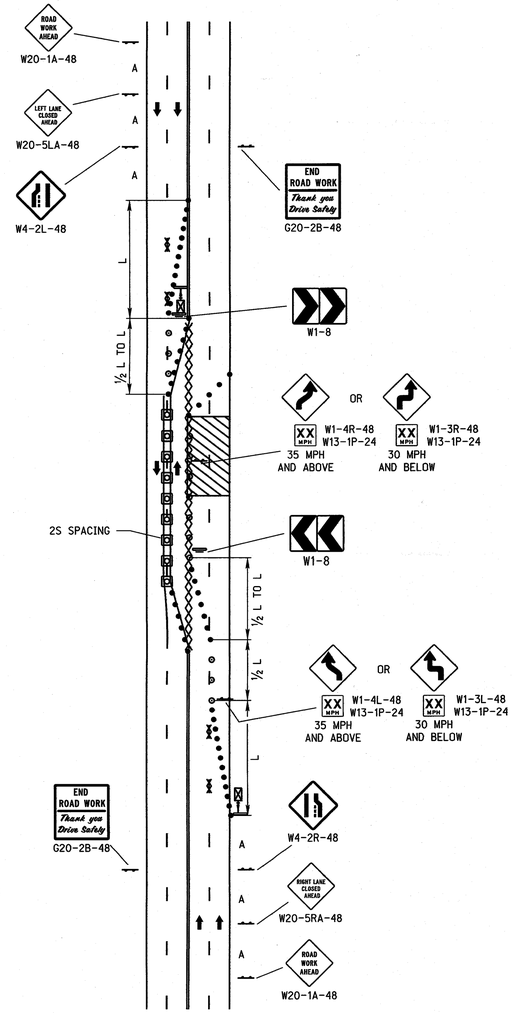
S = NUMERICAL VALUE OF POSTED SPEED LIMIT PRIOR TO WORK.

W = WIDTH OF OFFSET (LANE WIDTH).



4-LANE DIVIDED
HALF CLOSED

ROAD TYPE	MINIMUM DISTANCE BETWEEN SIGNS
	A
URBAN (LOW SPEED - 25 MPH TO 40 MPH)	100'
URBAN (HIGH SPEED - 45 MPH OR HIGHER)	350'



4-LANE UNDIVIDED
2 LANES CLOSED

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