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09_08/99

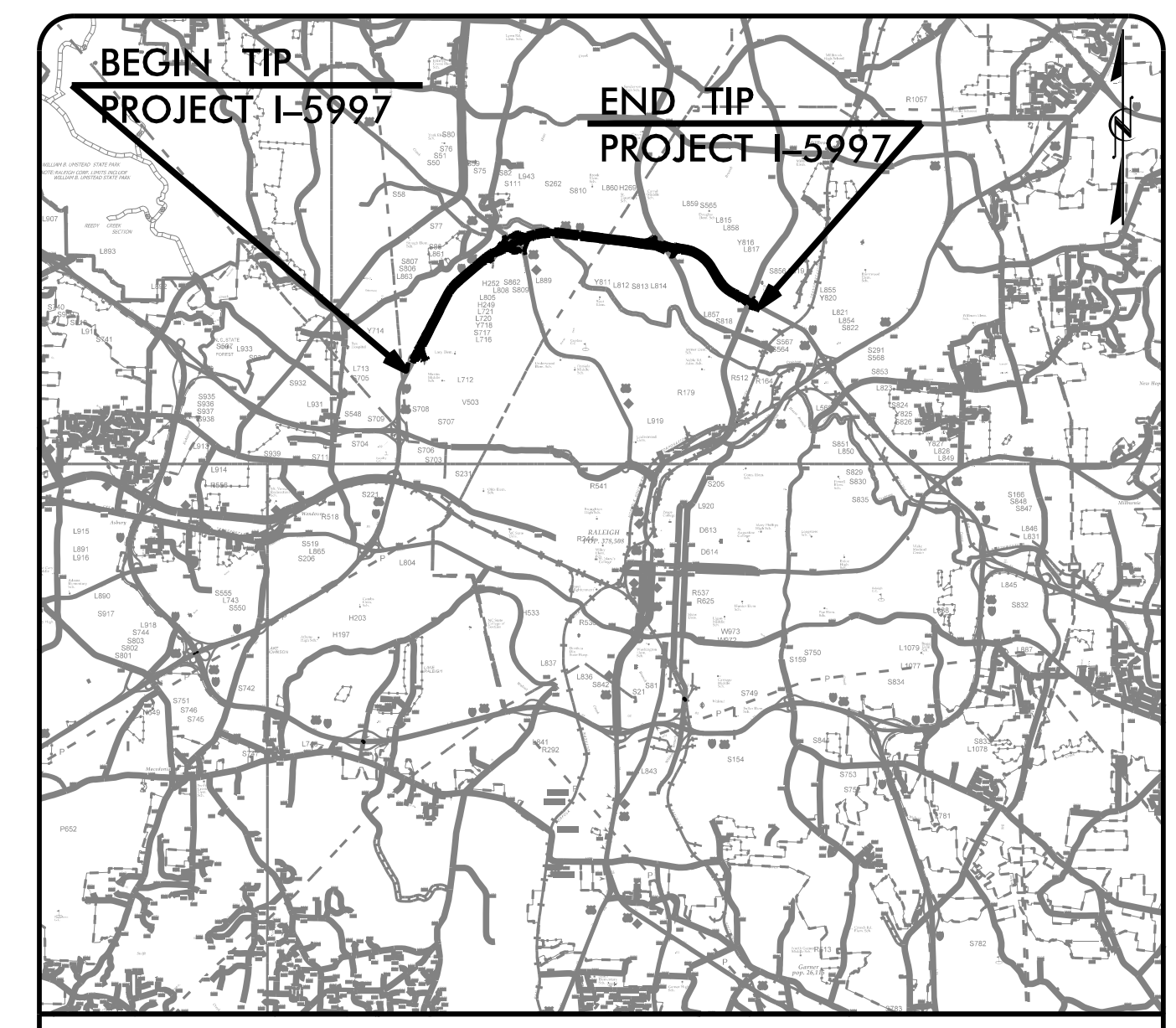
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5997	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
47952.1.1	0440024	PE	
47952.3.1	0440024	CONST.	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

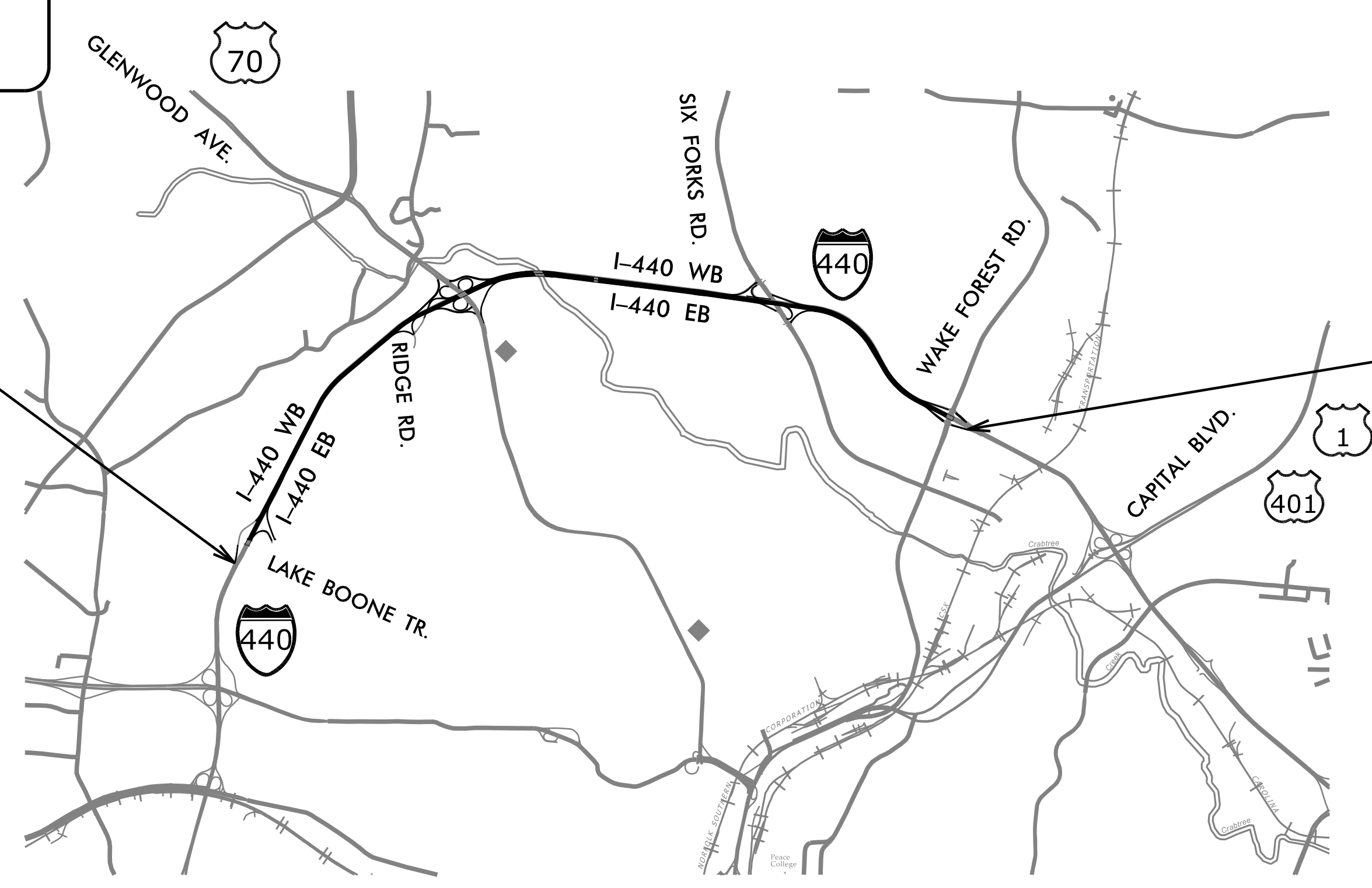
LOCATION: I-440/US-1 FROM WEST OF LAKE BOONE TRAIL TO EAST OF SR 2000 (WAKE FOREST ROAD) IN RALEIGH

TYPE OF WORK: PAVEMENT REHABILITATION, BRIDGE REPAIR, SIGNING AND ITS



VICINITY MAP

BEGIN
TIP PROJECT I-5997
BEGIN RESURFACING



END
TIP PROJECT I-5997
END RESURFACING



TIP PROJECT: I-5997

CONTRACT: C204655

NOT TO SCALE



DESIGN DATA

2019 AADT = 149,000
T = 3%
FUNC CLASS = INTERSTATE

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2 - 5	RESURFACING MAPS
6 - 7	ADA MAPS
8	DRAINAGE MAP
9 - 12	TYPICAL SECTIONS
13 - 20	DETAILS
21 - 24	SUMMARY OF QUANTITIES
25	SIGNAL LOOP DETAIL

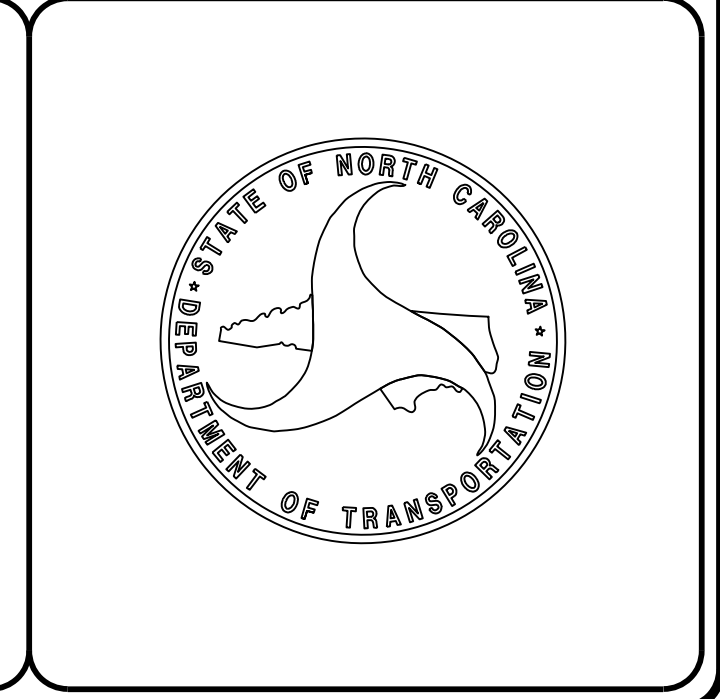
MAP 1	I-440 EB & WB	= 4.889 MILES
MAP 2	I-440 WB RAMP	= 0.100 MILES
MAP 3	I-440 EB RAMP	= 0.124 MILES
MAP 4	I-440 EB RAMP	= 0.168 MILES
MAP 5	I-440 EB RAMP	= 0.084 MILES
MAP 6	I-440 EB RAMP	= 0.080 MILES
MAP 7	I-440 WB RAMP	= 0.213 MILES
MAP 8	I-440 WB RAMP	= 0.239 MILES
MAP 9	I-440 EB RAMP	= 0.201 MILES
MAP 10	I-440 EB RAMP	= 0.218 MILES
MAP 11	I-440 WB LOOP	= 0.162 MILES
MAP 12	I-440 WB LOOP	= 0.104 MILES
MAP 13	I-440 WB RAMP	= 0.104 MILES

PROJECT LENGTH		
MAP 14	RIDGE RD RAMP	= 0.134 MILES
MAP 15	I-440 EB LOOP	= 0.142 MILES
MAP 16	I-440 EB SPUR	= 0.035 MILES
MAP 17	I-440 WB RAMP	= 0.139 MILES
MAP 18	I-440 WB RAMP	= 0.134 MILES
MAP 19	I-440 EB RAMP	= 0.081 MILES
MAP 20	I-440 EB RAMP	= 0.122 MILES
MAP 21	I-440 WB RAMP	= 0.090 MILES
MAP 22	I-440 EB LOOP	= 0.080 MILES
MAP 23	I-440 WB RAMP	= 0.087 MILES
MAP 24	I-440 WB RAMP	= 0.122 MILES
MAP 25	I-440 EB RAMP	= 0.093 MILES
MAP 26	I-440 EB RAMP	= 0.094 MILES

LENGTH OF ROADWAY TIP PROJECT I-5997 = 4.889 MILES
LENGTH OF STRUCTURE TIP PROJECT I-5997 = 0.261 MILES
TOTAL LENGTH TIP PROJECT I-5997 = 5.150 MILES

Prepared in the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2018 STANDARD SPECIFICATIONS	TRACY N. PARROTT, PE DIVISION PROJECT DELIVERY ENGINEER
RIGHT OF WAY DATE: N/A	R.K. MURPHY, JR., PE PROJECT ENGINEER
LETTING DATE: JULY 19, 2022	SCOTT L. KENNEDY PROJECT DESIGN ENGINEER

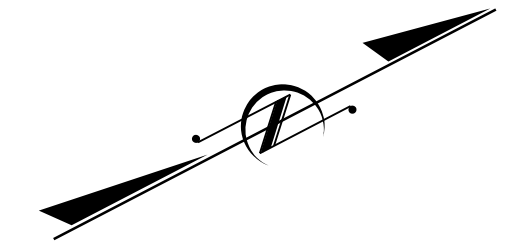


6/14/2022
I:\Proj\I-5997_Rdy_TSH_01.dgn
USERS:kennedy

**★★ EXISTING
CONCRETE PAVEMENT**

- 1. I-440 EB & WB
- 2. I-440 WB RAMP
- 3. I-440 EB RAMP
- 4. I-440 EB RAMP

REPLACE GUARDRAIL 75'
AND 1 TRAILING END UNIT



I-440
WB RAMP
LIMIT

LAKE BOONE TR.

BRIDGE
NO. 242

2

1

I-440 WB

BEGIN
RESURFACING
I-440

I-440 EB

I-440
EB RAMP
LIMIT

3

★★

4



MATCHLINE - SEE SHEET 3

I-440
EB RAMP LIMIT

REPLACE GUARDRAIL SECTIONS
TOTAL = 1000' +/-

REVISIONS

8/17/99

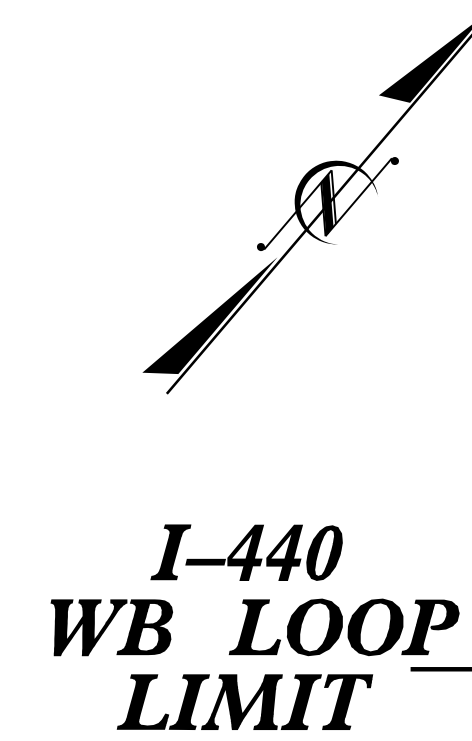
I-5997

I-440 RESURFACING

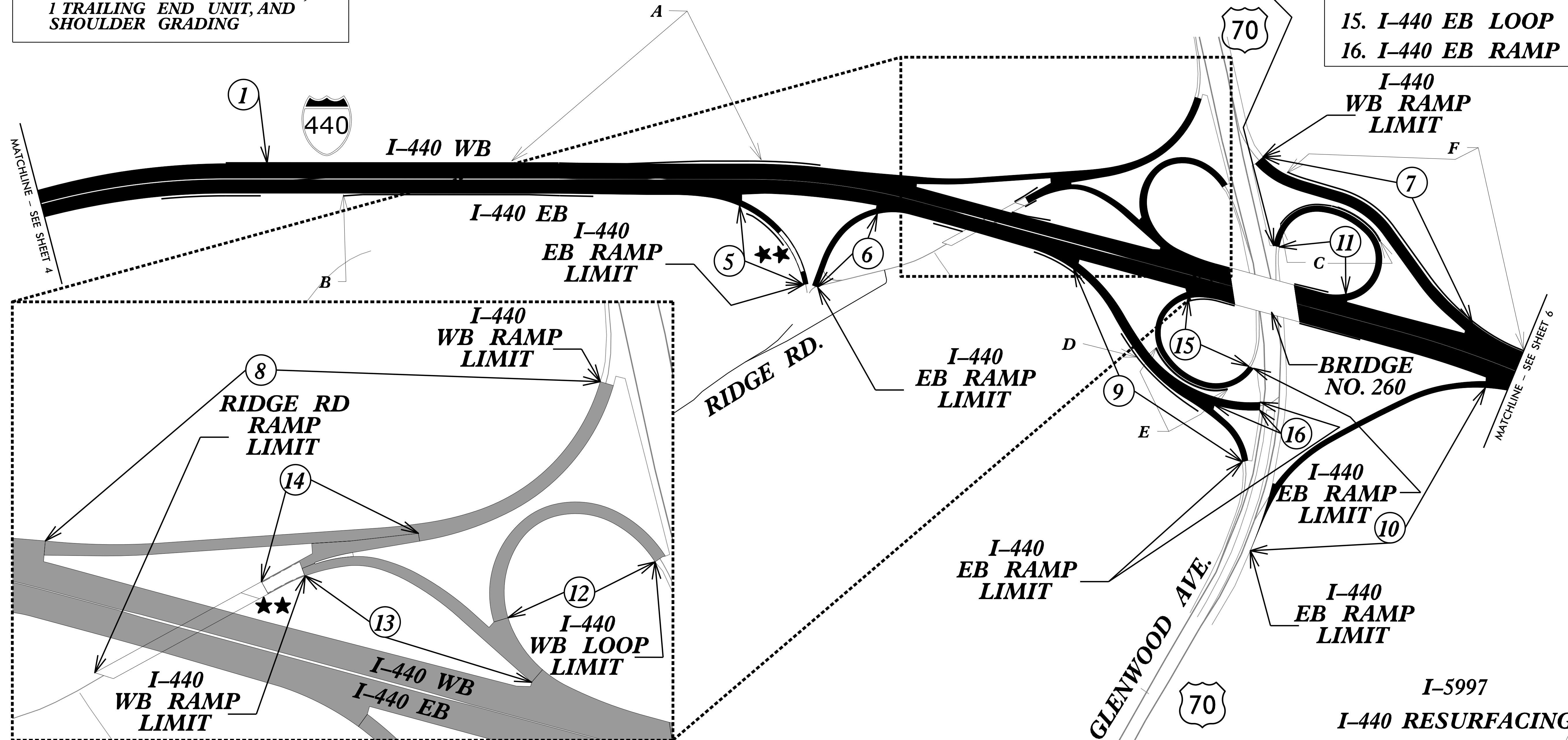
- A. REPLACE GUARDRAIL SECTIONS
TOTAL = 325' +/-
- B. REPLACE GUARDRAIL 250'
AND 1 LEADING END UNIT
- C. REPLACE GUARDRAIL
TOTAL = 500' +/-
WITH 1 LEADING END UNIT
AND 1 TRAILING END UNIT
- D. REPLACE GUARDRAIL 150'
- E. REPLACE GUARDRAIL
TOTAL = 375' +/-
WITH 1 LEADING END UNIT
AND 1 TRAILING END UNIT
- F. REPLACE GUARDRAIL SECTIONS
TOTAL = 2200' +/-
WITH 1 LEADING END UNIT,
1 TRAILING END UNIT, AND
SHOULDER GRADING

★★ EXISTING
CONCRETE PAVEMENT

- 1. I-440 EB & WB
- 5. I-440 EB RAMP
- 6. I-440 EB RAMP
- 7. I-440 WB RAMP
- 8. I-440 WB RAMP
- 9. I-440 EB RAMP
- 10. I-440 EB RAMP
- 11. I-440 WB LOOP
- 12. I-440 WB LOOP
- 13. I-440 WB RAMP
- 14. RIDGE RD RAMP
- 15. I-440 EB LOOP
- 16. I-440 EB RAMP



REVISIONS



I-5997
I-440 RESURFACING

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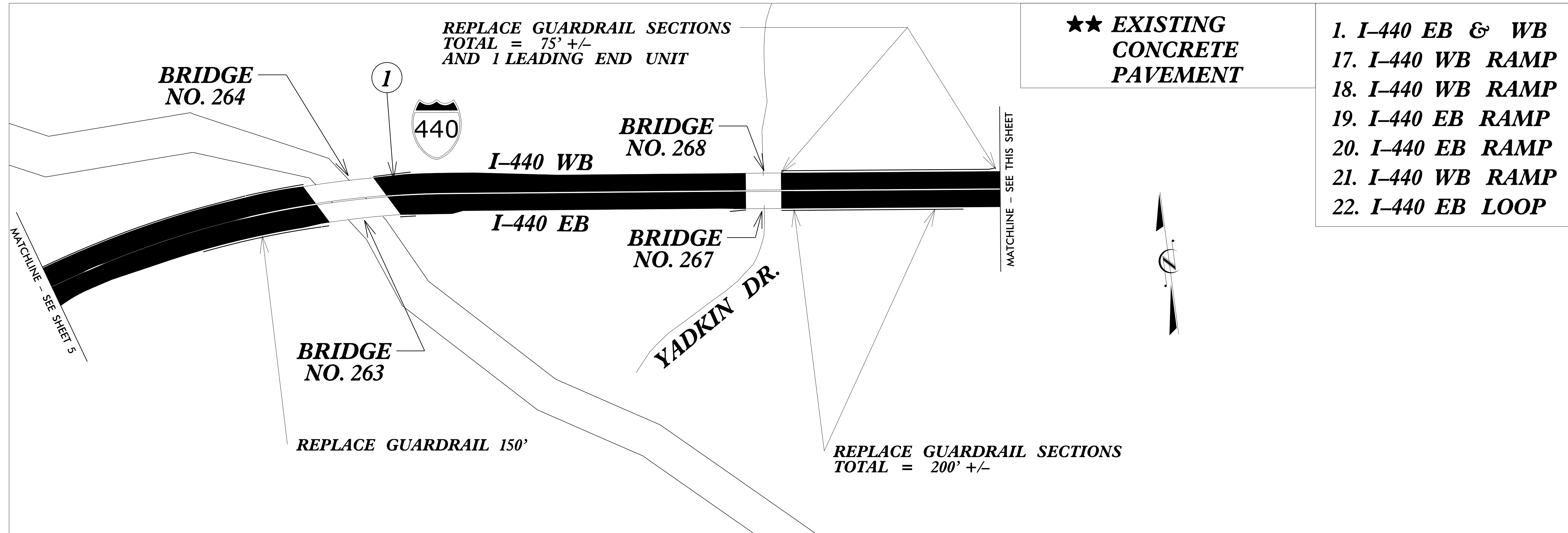
PROJECT REFERENCE NO.

I-5997

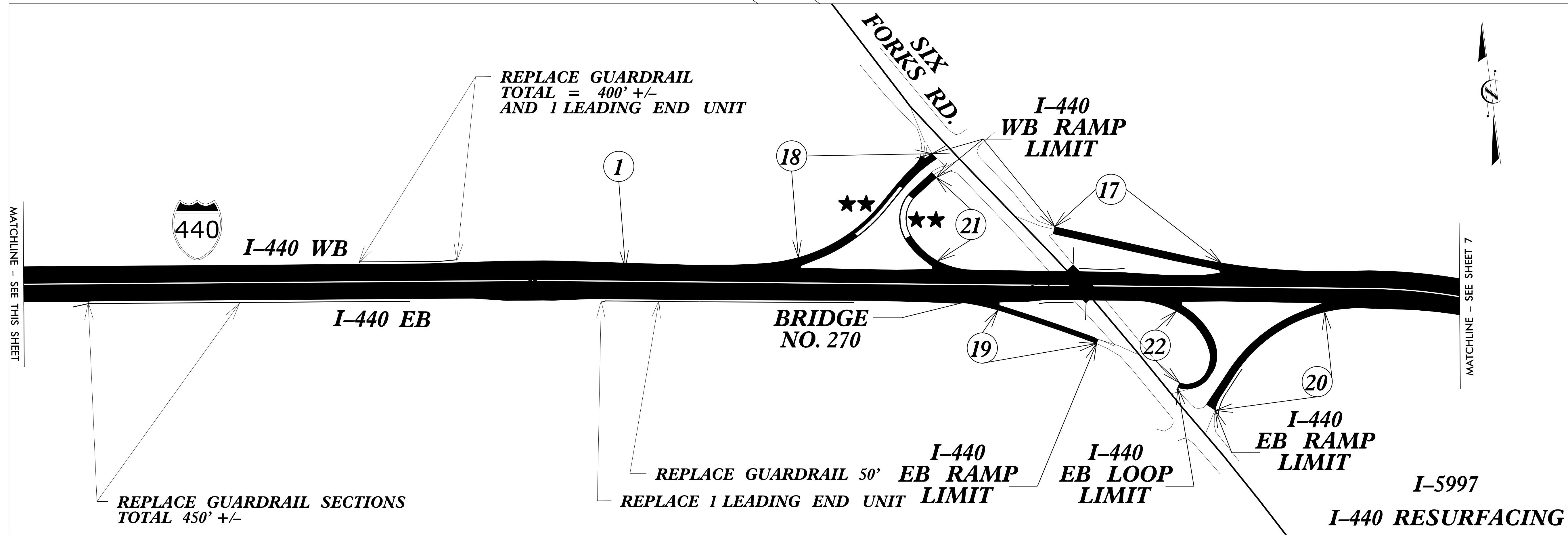
SHEET NO.

4

REVISIONS



- 1. I-440 EB & WB
- 17. I-440 WB RAMP
- 18. I-440 WB RAMP
- 19. I-440 EB RAMP
- 20. I-440 EB RAMP
- 21. I-440 WB RAMP
- 22. I-440 EB LOOP



★ **PROPOSED SHOULDER WIDENING**

- 1. I-440 EB & WB
- 23. I-440 WB RAMP
- 24. I-440 WB RAMP
- 25. I-440 EB RAMP
- 26. I-440 EB RAMP

MATCHLINE - SEE SHEET 6



REPLACE GUARDRAIL SECTIONS
TOTAL = 1400' +/-

REPLACE GUARDRAIL SECTIONS
TOTAL = 750' +/-

REPLACE GUARDRAIL SECTIONS
TOTAL = 925' +/-
AND SHOULDER GRADING

WAKE FOREST RD.

BRIDGE NO. 278

I-440 WB RAMP LIMIT

I-440 WB RAMP LIMIT

23

END RESURFACING I-440

25

I-440 EB RAMP LIMIT

I-440 EB RAMP LIMIT

26

I-5997

I-440 RESURFACING

I-440 WB

I-440 EB

1

24

REVISIONS

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REVISIONS



● **REPLACE CURB RAMPS
PER RSD 845.05 OR 845.06**

**I-5997
I-440 RESURFACING**

8/17/99

REVISIONS



● **REPLACE CURB RAMPS
PER RSD 845.05 OR 845.06** **I-5997
I-440 RESURFACING**

8/17/99

REVISIONS

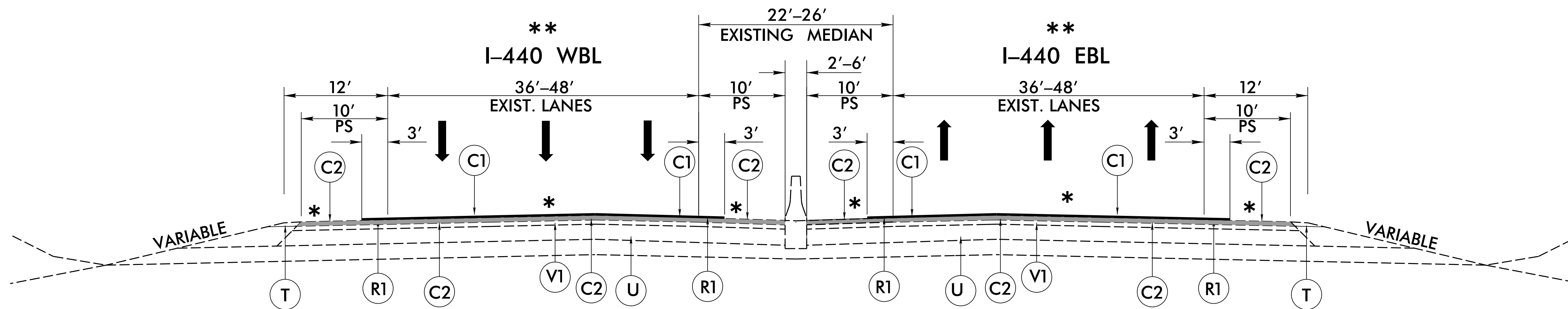


NOTE: PROPOSED PIPE EXTENSIONS AND DROP INLETS ON NORTH SIDE OF MEDIAN SHALL BE SET AT GRADES AND INVERT ELEVATIONS TO ENSURE POSITIVE FLOW TO THE EXISTING DROP INLET. INSTALLATION AT UNIFORM DEPTHS FROM THE EXISTING PAVEMENT SURFACE SHOULD PROVIDE POSITIVE FLOW. PIPE EXTENSION LAYOUT, DROP INLET LOCATIONS, AND PIPE GRADE AND INVERT ELEVATIONS SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.

PAVEMENT SCHEDULE

C1	5/8" ULTRA-THIN BONDED WEARING COURSE AT A RATE OF 70 LBS. PER SQ. YD.
C2	PROP. APPROX. 2.0" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
E1	PROP. APPROX. 4 1/2" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.
T	SHOULDER GRADING
V1	MILL 2.0" OF EXISTING ASPHALT PAVEMENT
R1	MILLED RUMBLE STRIPS
U	EXISTING PAVEMENT

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



* MATCH EXISTING CROSS SLOPES

NOTE: SHOULDER GRADING ON MAP 1 - 925' +/-

TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1

MAP 1 I-440 EBL

MAP 1 I-440 WBL

**** NOTE:**

OPEN GRADED FRICTION COURSE IS PRESENT FROM GLENWOOD AVENUE BRIDGE TO 730' WEST OF BRIDGE AT SIX FORKS ROAD. LENGTH IS +/- 8400 LF MILL MINIMUM 2 5/8" DEEP.

8/17/99

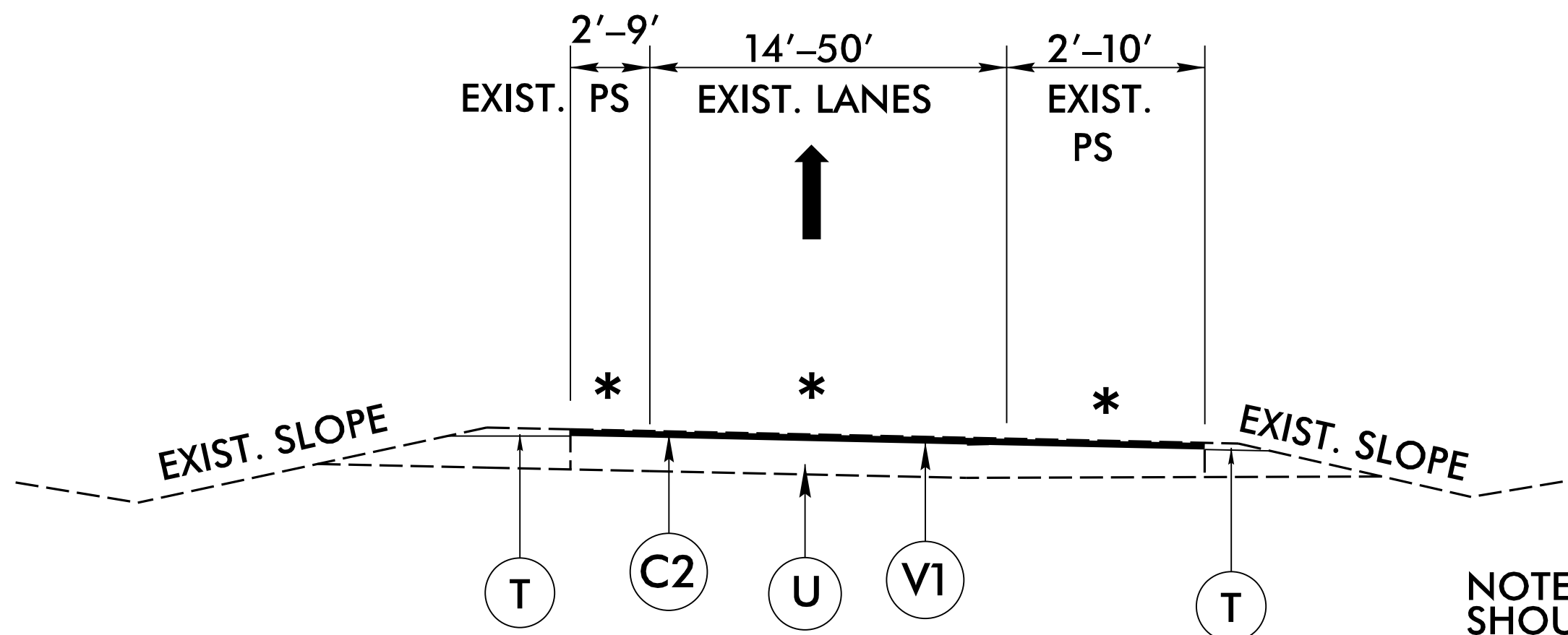
REVISIONS

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PAVEMENT SCHEDULE

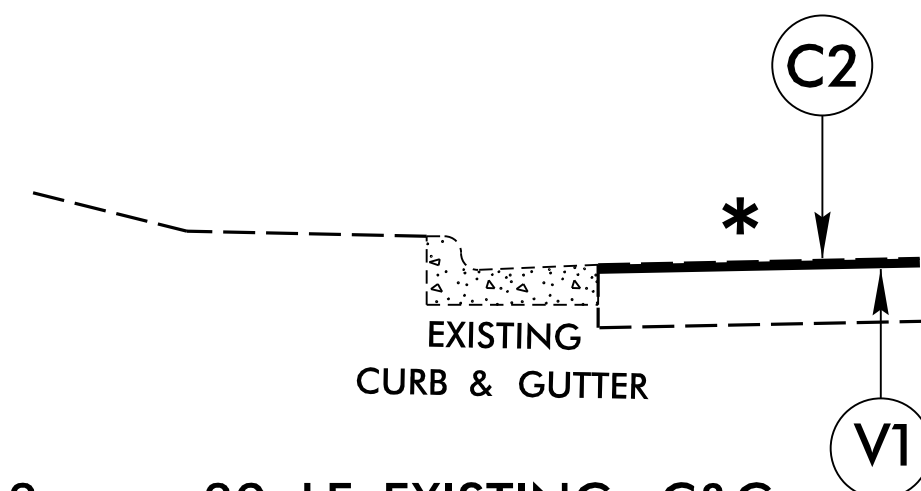
C2	PROP. APPROX. 2.0" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
T	SHOULDER GRADING
V1	MILL 2.0" OF EXISTING ASPHALT PAVEMENT
U	EXISTING PAVEMENT

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

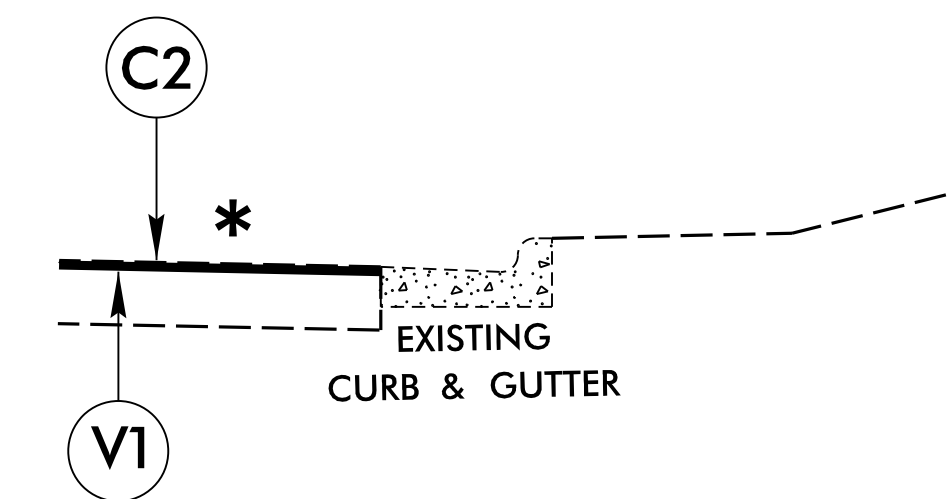


NOTE: SHOULDER GRADING ON MAP 7

* MATCH EXISTING CROSS SLOPES



- MAP 3 - 39 LF EXISTING C&G
- MAP 7 - 374 LF EXISTING C&G
- MAP 9 - 330 LF EXISTING C&G
- MAP 22 - 168 LF EXISTING C&G
- MAP 23 - 48 LF EXISTING C&G



- MAP 3 - 42 LF EXISTING C&G
- MAP 22 - 226 LF EXISTING C&G
- MAP 23 - 136 LF EXISTING C&G

USE TYPICAL SECTION NO. 2

MAP 2	I-440 WB RAMP	MAP 14	RIDGE RD. RAMP
MAP 3	I-440 EB RAMP	MAP 15	I-440 EB LOOP
MAP 6	I-440 EB RAMP	MAP 16	I-440 EB RAMP
MAP 7	I-440 WB RAMP	MAP 17	I-440 WB RAMP
MAP 8	I-440 WB RAMP	MAP 20	I-440 EB RAMP
MAP 9	I-440 EB RAMP	MAP 22	I-440 EB LOOP
MAP 10	I-440 EB RAMP	MAP 23	I-440 WB RAMP
MAP 11	I-540 WB LOOP	MAP 24	I-440 WB RAMP
MAP 12	I-440 WB LOOP	MAP 25	I-440 EB RAMP
MAP 13	I-440 WB RAMP		

8/17/99

REVISIONS

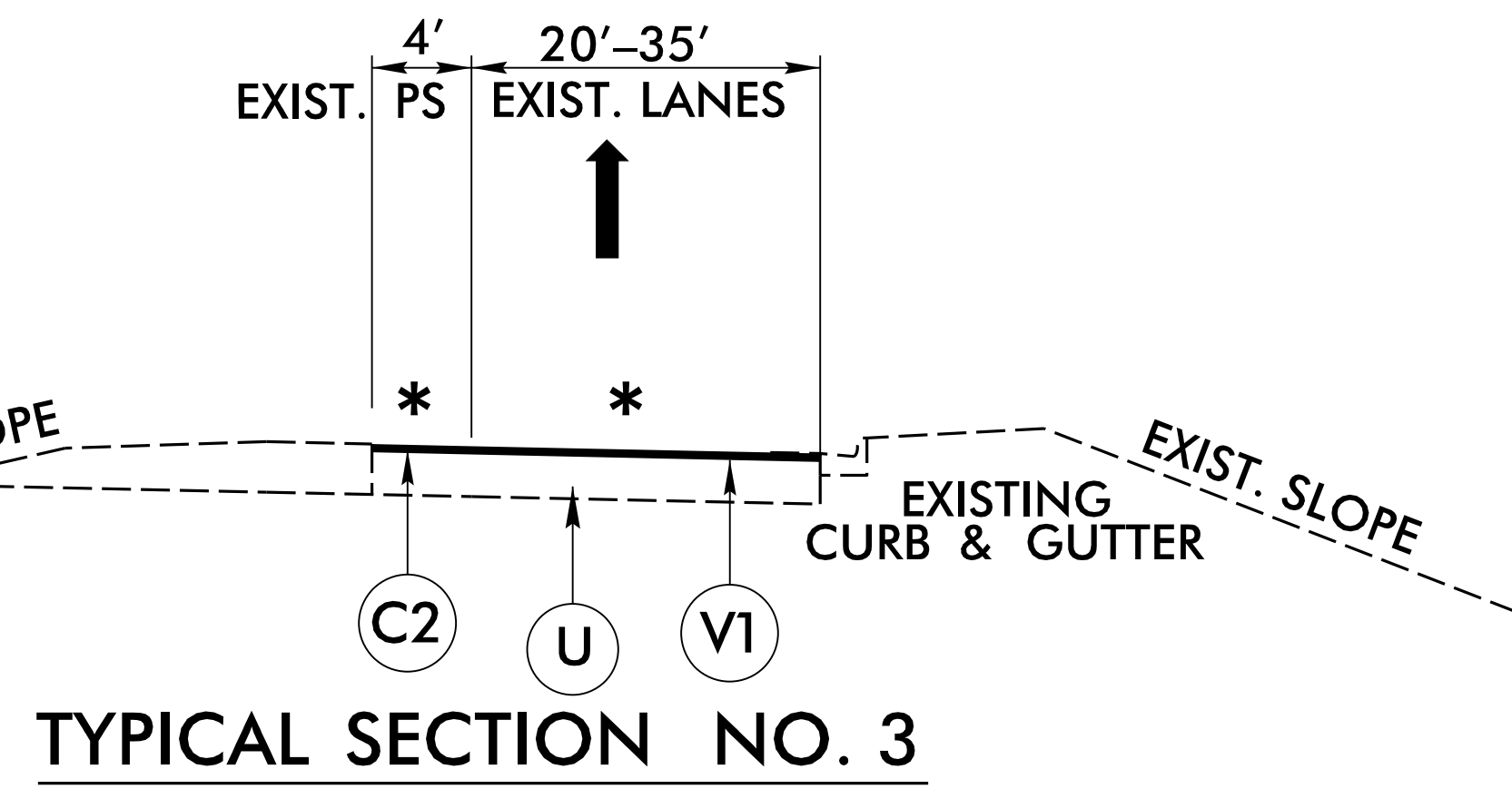
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PAVEMENT SCHEDULE

C2	PROP. APPROX. 2.0" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
V1	MILL 2.0" OF EXISTING ASPHALT PAVEMENT
U	EXISTING PAVEMENT

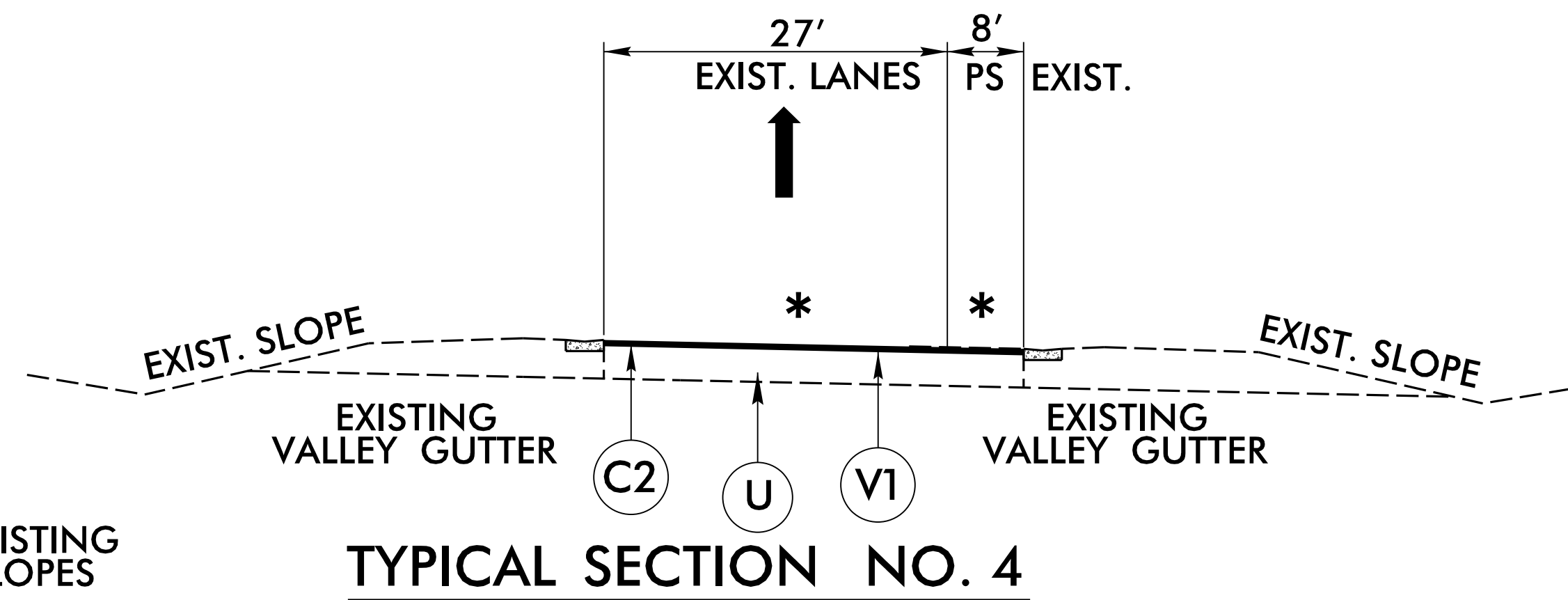
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

* MATCH EXISTING CROSS SLOPES



USE TYPICAL SECTION NO. 3
MAP 19 - I-440 EB RAMP

* MATCH EXISTING CROSS SLOPES



USE TYPICAL SECTION NO. 4
MAP 26- I-440 EB RAMP

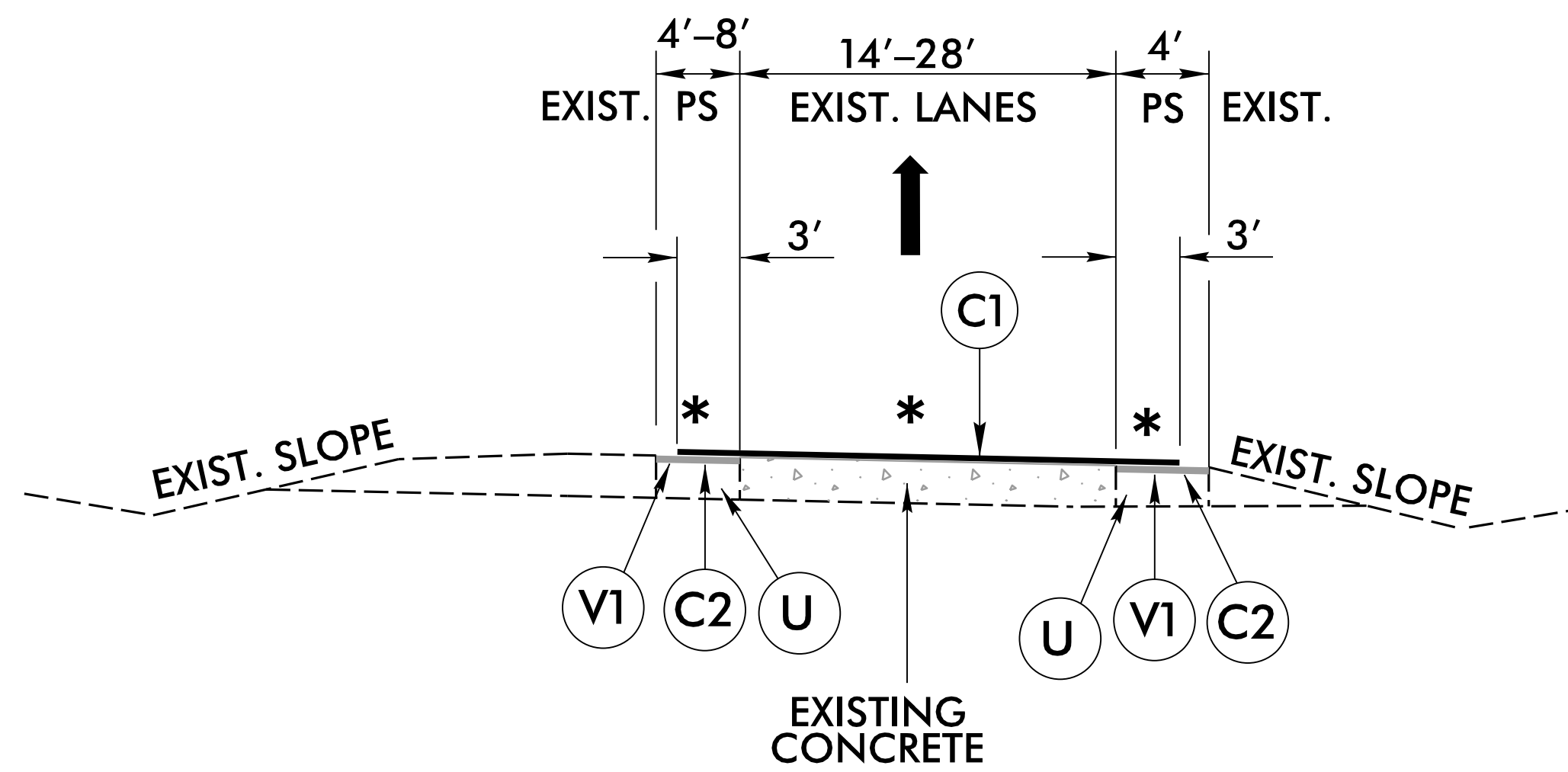
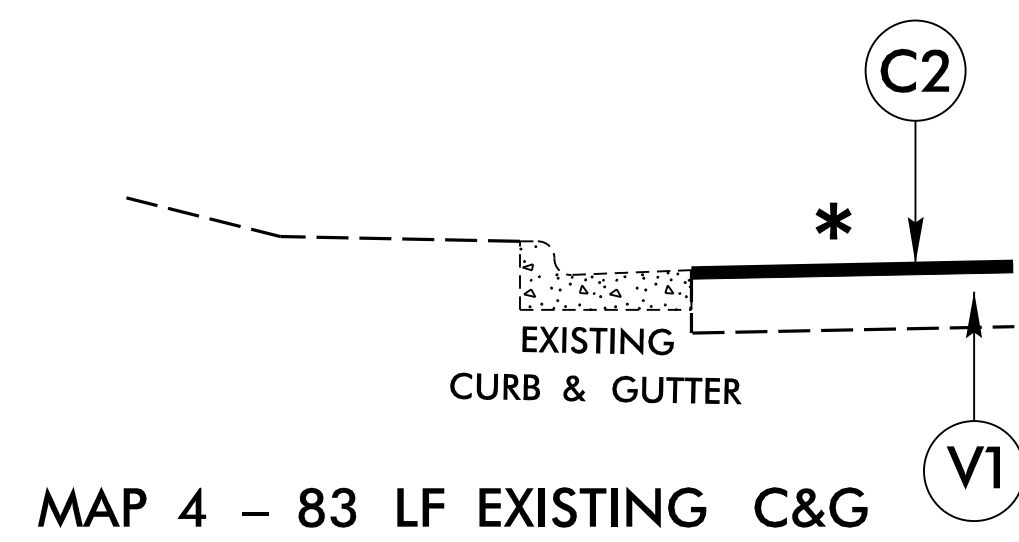
8/17/99

REVISIONS

PAVEMENT SCHEDULE

C1	5/8" ULTRA-THIN BONDED WEARING COURSE AT A RATE OF 70 LBS. PER SQ. YD.
C2	PROP. APPROX. 2.0" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
E1	PROP. APPROX. 4 1/2" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.
T	SHOULDER GRADING
V1	MILL 2.0" OF EXISTING ASPHALT PAVEMENT
U	EXISTING PAVEMENT

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

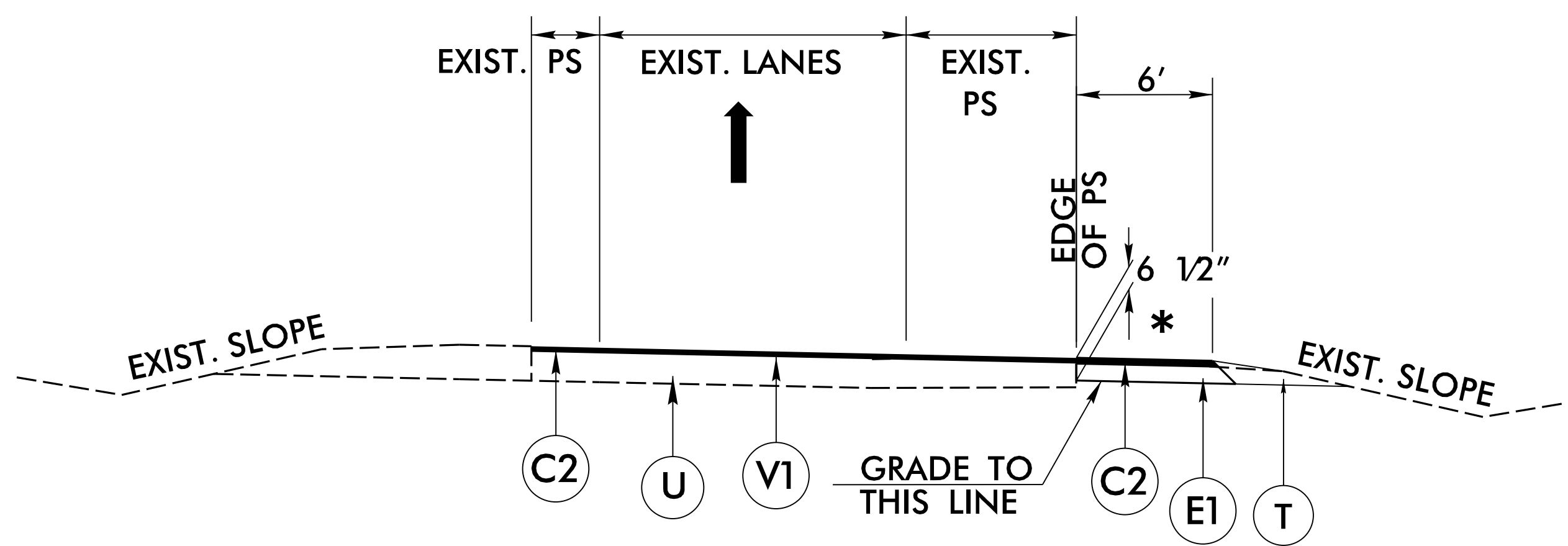
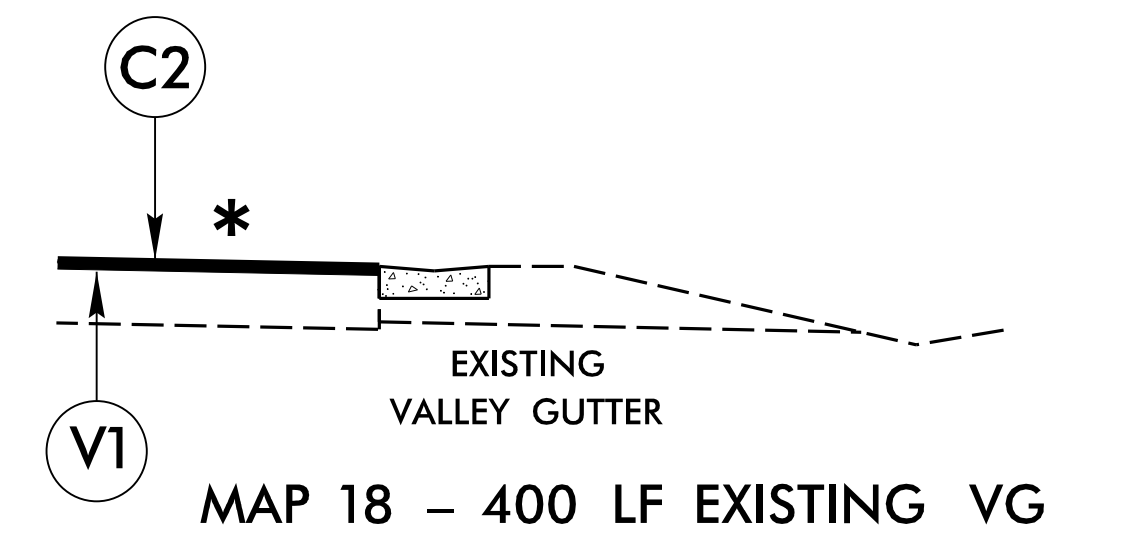
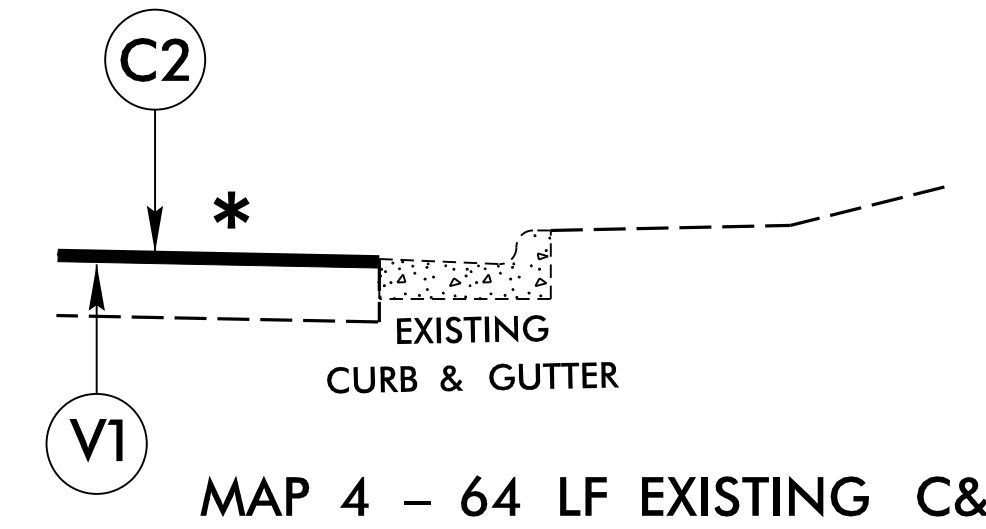


* MATCH EXISTING CROSS SLOPES

TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5

- MAP 4 I-440 EB RAMP
- MAP 5 I-440 EB RAMP
- MAP 18 I-440 WB RAMP
- MAP 21 I-440 WB RAMP



* MATCH EXISTING CROSS SLOPES

TYPICAL SECTION NO. 6

PAVED SHOULDER WIDENING

USE TYPICAL SECTION NO. 6

- MAP 24 I-440 WB RAMP 360 LF
- MAP 25 I-440 EB RAMP 240 LF

8/17/99

REVISIONS

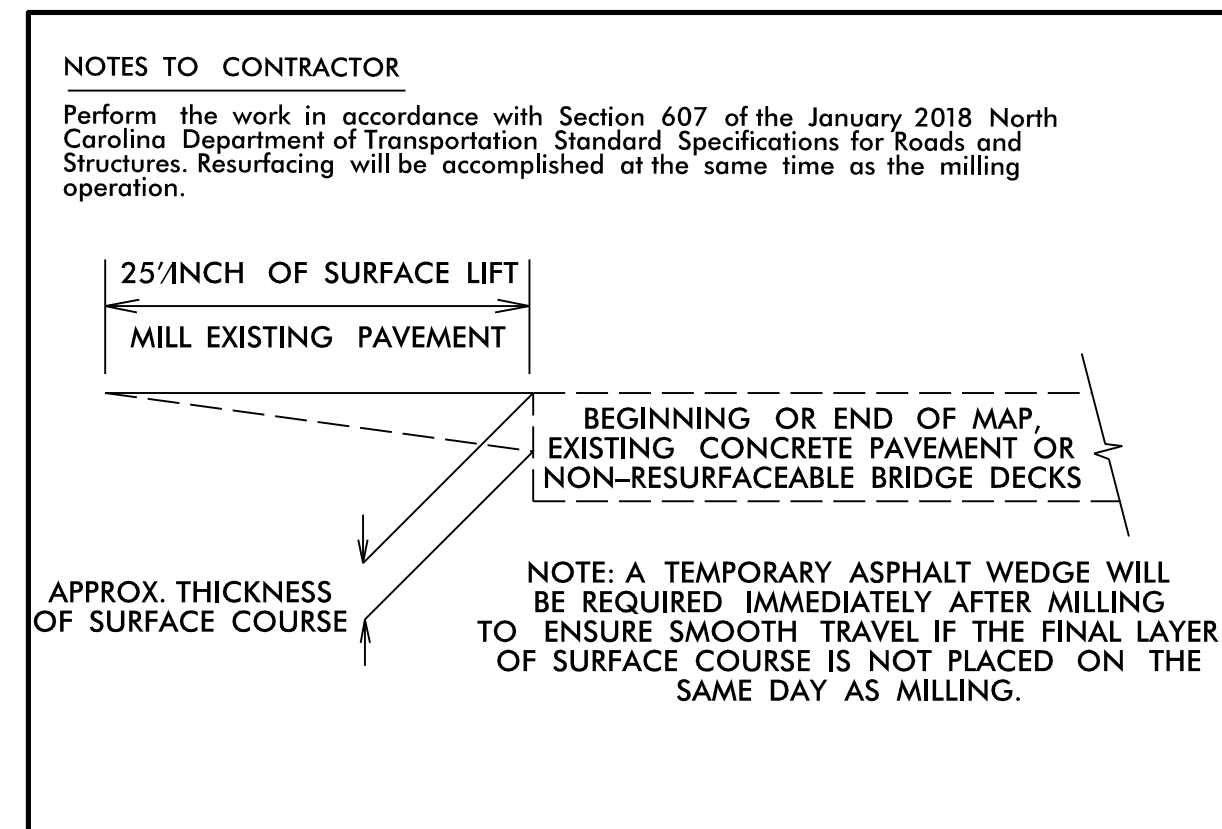
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NOTES

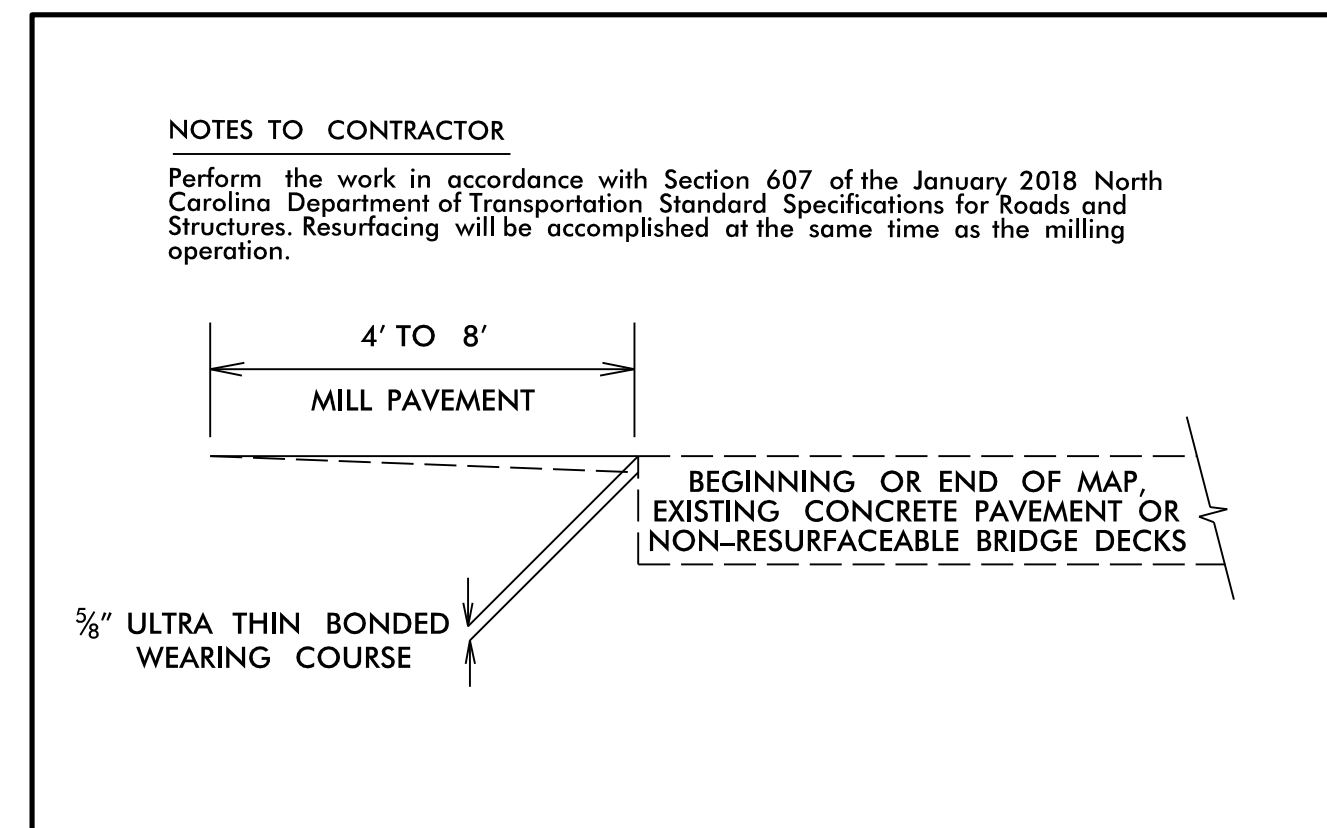
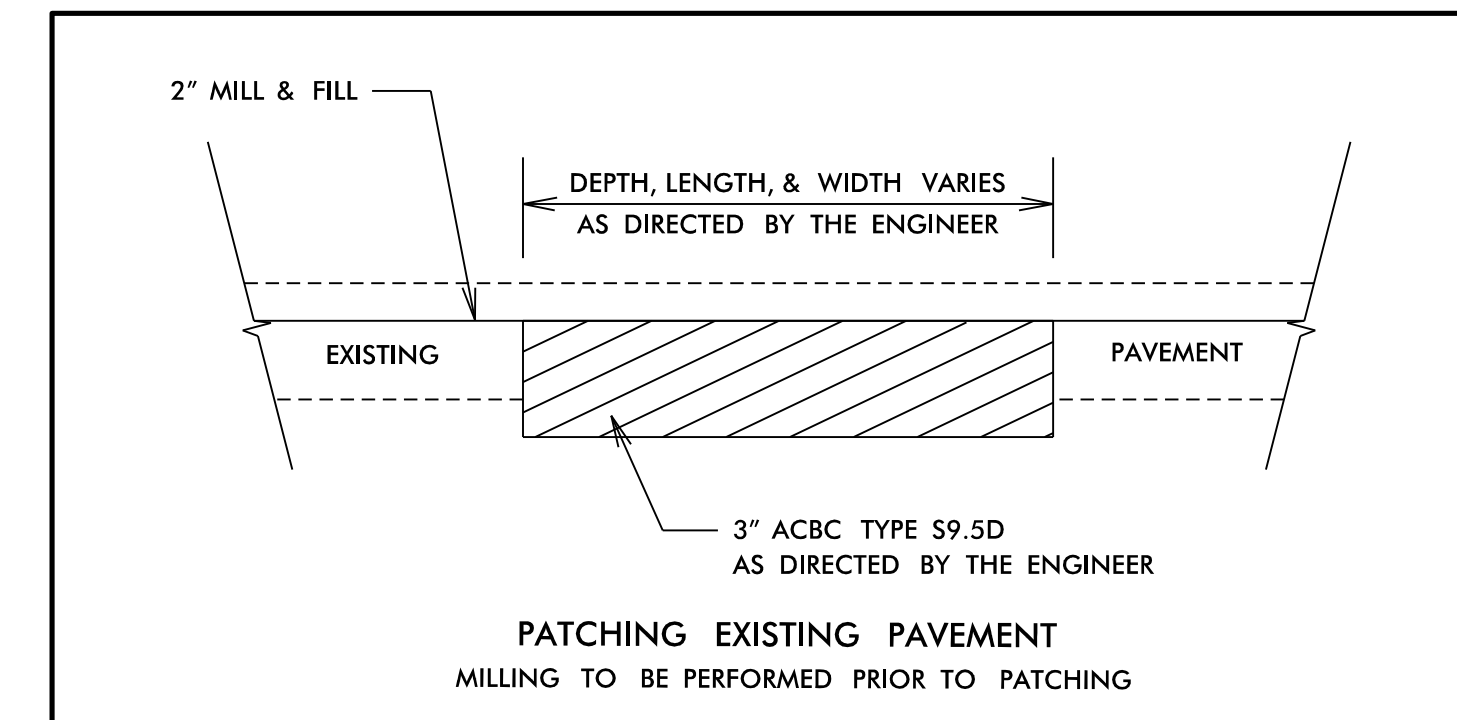
ALL PAVED RAMPS /LOOPS TO BE RESURFACED TO THE Y-LINE E.O.P.S. OR AS DIRECTED BY THE ENGINEER.

EDGES, PAVEMENT WIDENING, INTERSECTIONS AND BRIDGE FLARES ARE INCLUDED IN THE TABLE OF QUANTITIES.

REVISIONS



INCIDENTAL MILLING DETAIL

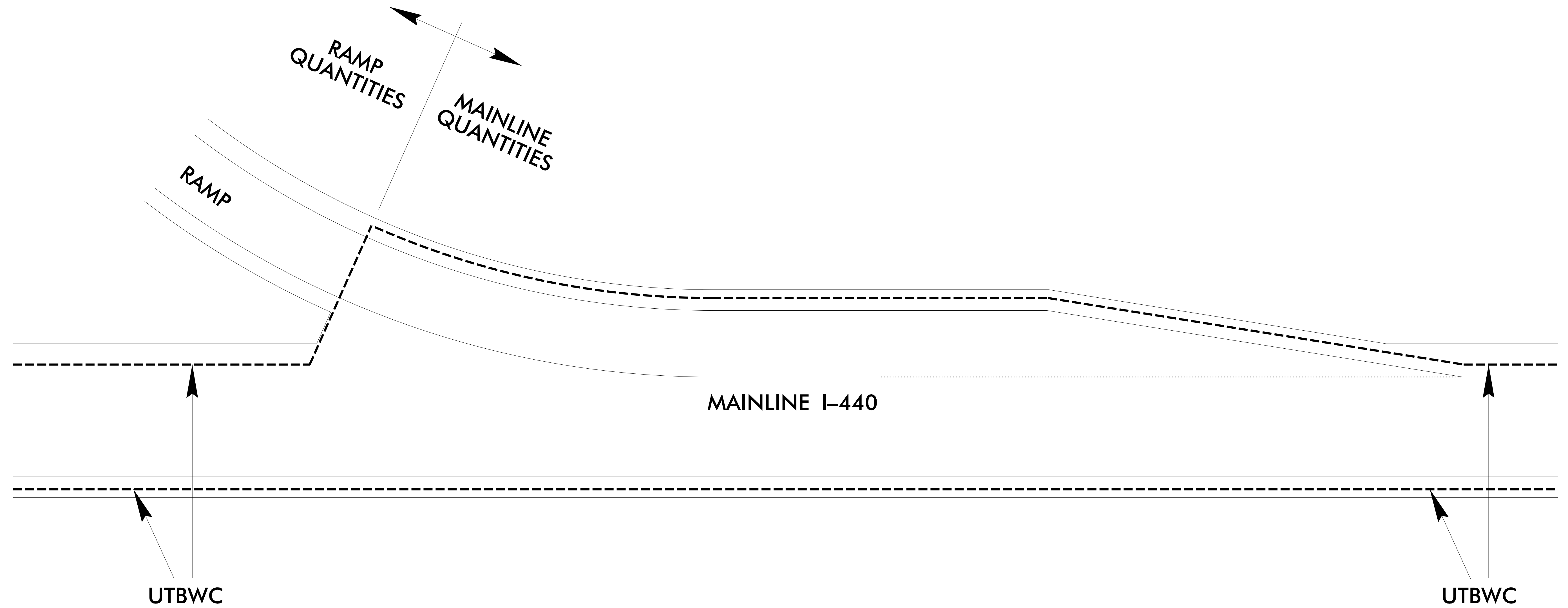


INCIDENTAL MILLING DETAIL

8/17/99

12/1/2007
11:58:00 AM
12/1/2007 Relu_psh13_Typ.dgn

PAYMENT QUANTITY SEPARATION BETWEEN MAINLINE AND RAMPS
PAVING LIMITS FOR ULTRA-THIN BONDED WEARING COURSE
AT EXIT AND ENTRANCE RAMPS & LOOPS



REVISIONS

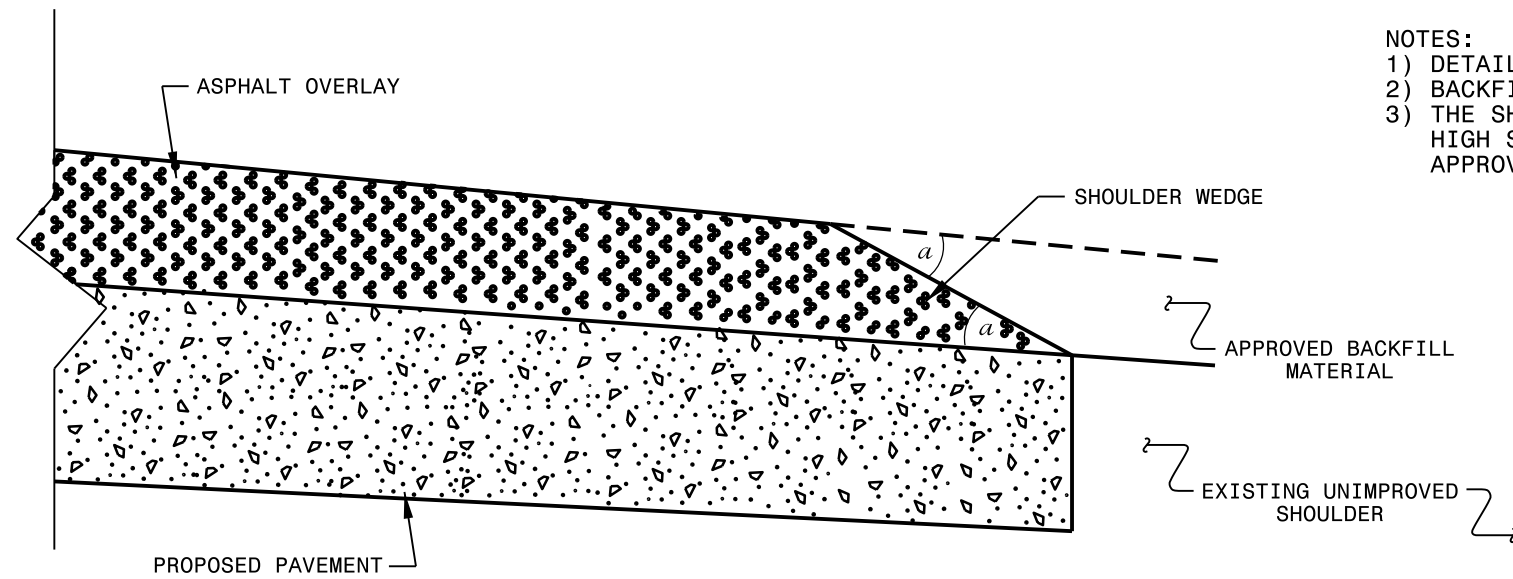
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NOT TO SCALE

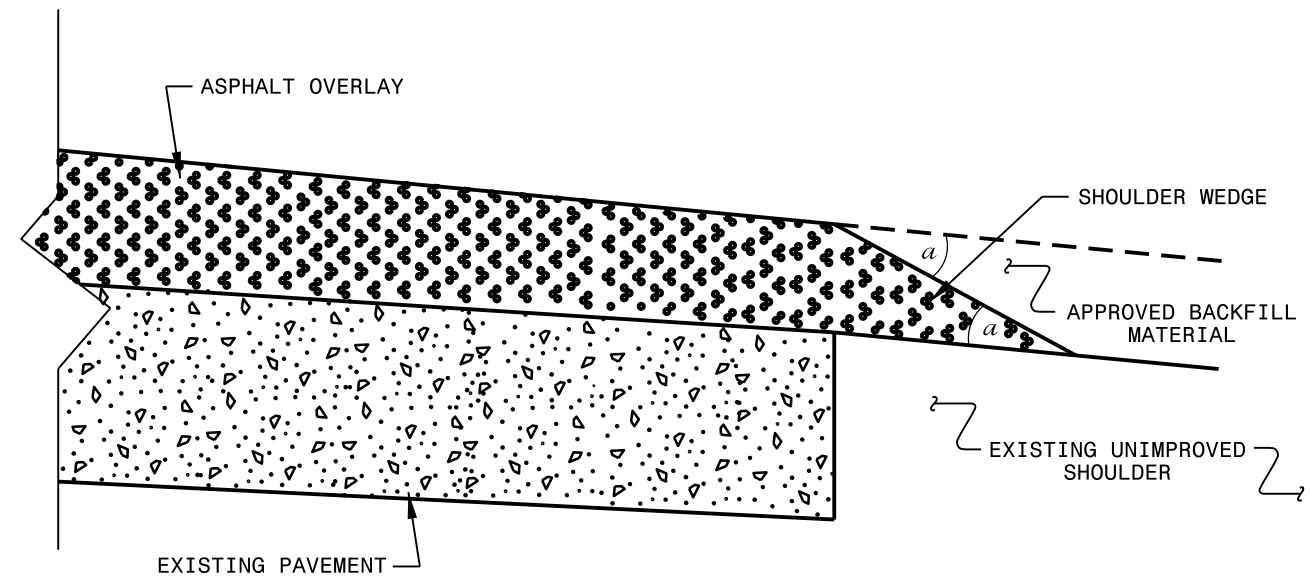
NOTES:

- 1) DETAIL DOES NOT APPLY TO OGAFB AND ULTRA-THIN BONDED WEARING COURSE.
- 2) BACKFILL SHOULDER WITH APPROVED MATERIAL.
- 3) THE SHOULDER WEDGE DEVICE MAY BE DISENGAGED AT PAVED DRIVEWAYS, SIDE STREETS, HIGH SHOULDERS, AND OTHER LOCATIONS NOT FEASIBLE TO CONSTRUCT AS APPROVED BY THE ENGINEER.



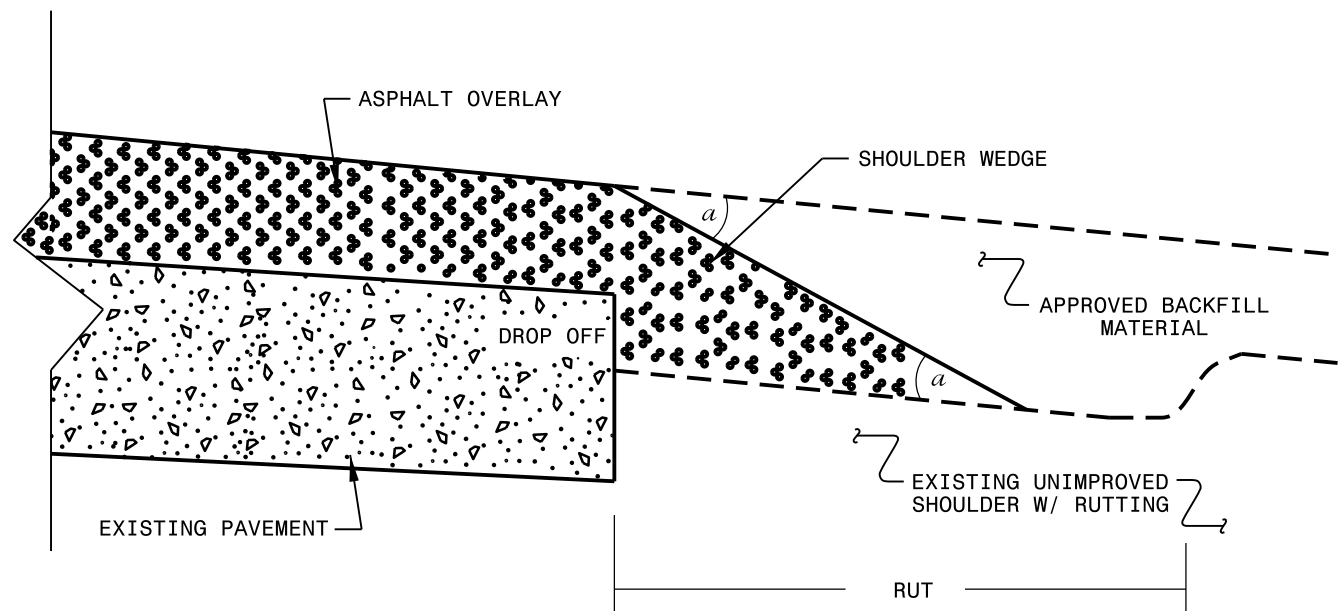
SHOULDER WEDGE DETAIL

(Resurfacing Projects w/ Widening or with Existing Paved Shoulder having no dropoffs)



SHOULDER WEDGE DETAIL

(Resurfacing Projects w/ NO Widening)

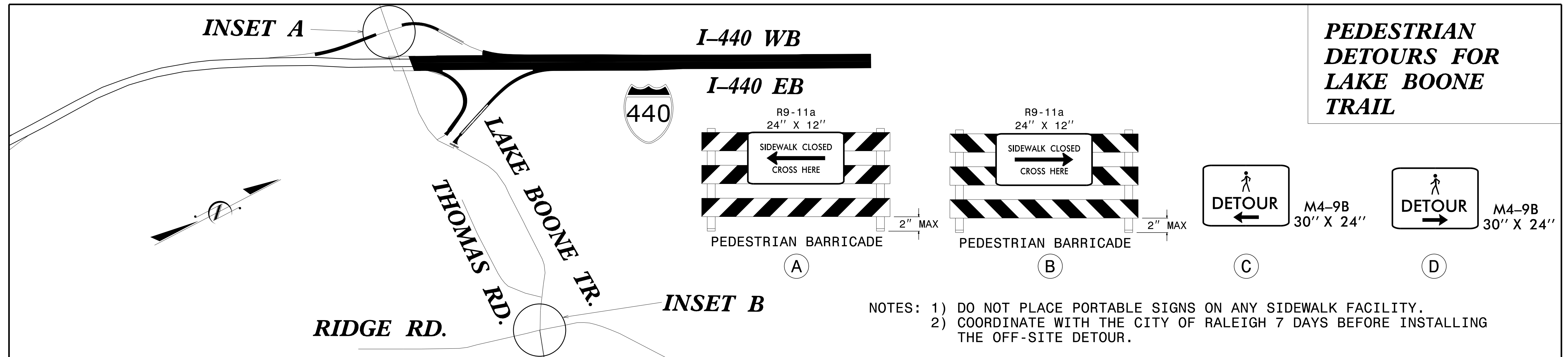


SHOULDER WEDGE DETAIL

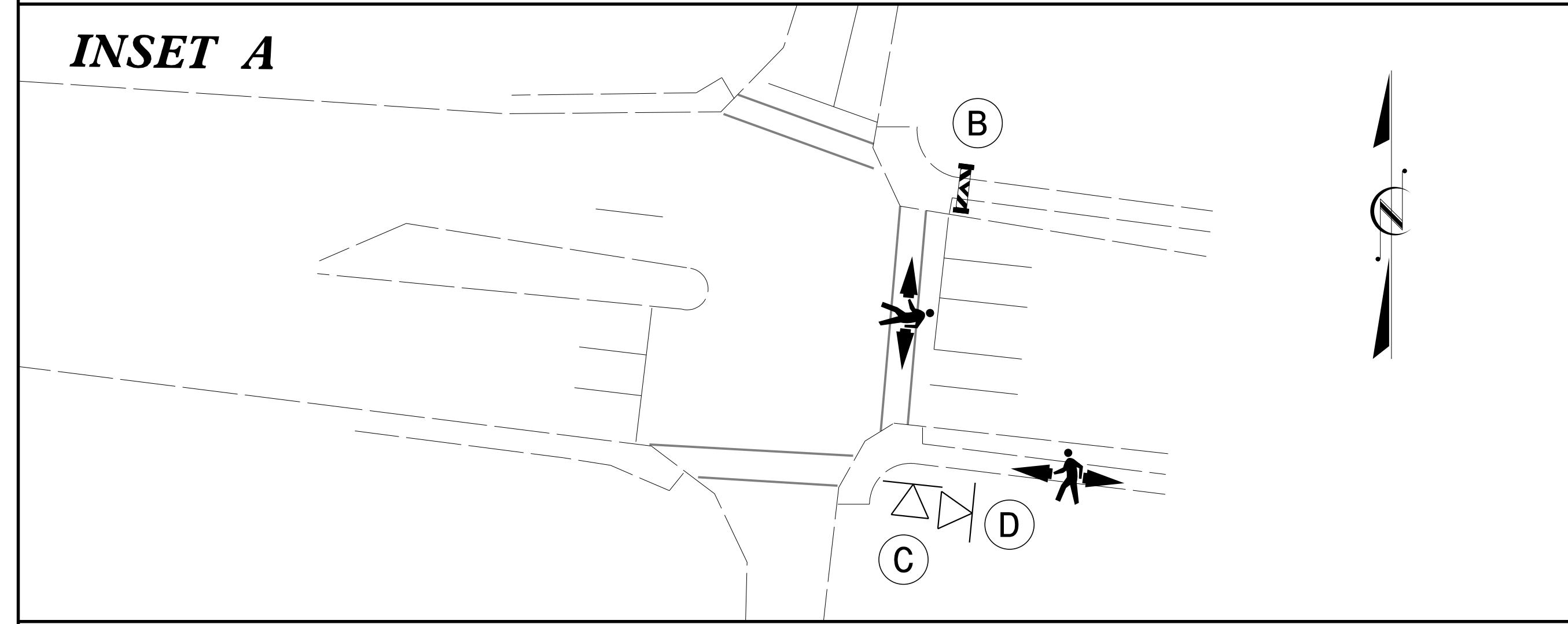
(Resurfacing Adjacent to Rutted Shoulder)

- SHOULDER WEDGE ANGLE = 30°

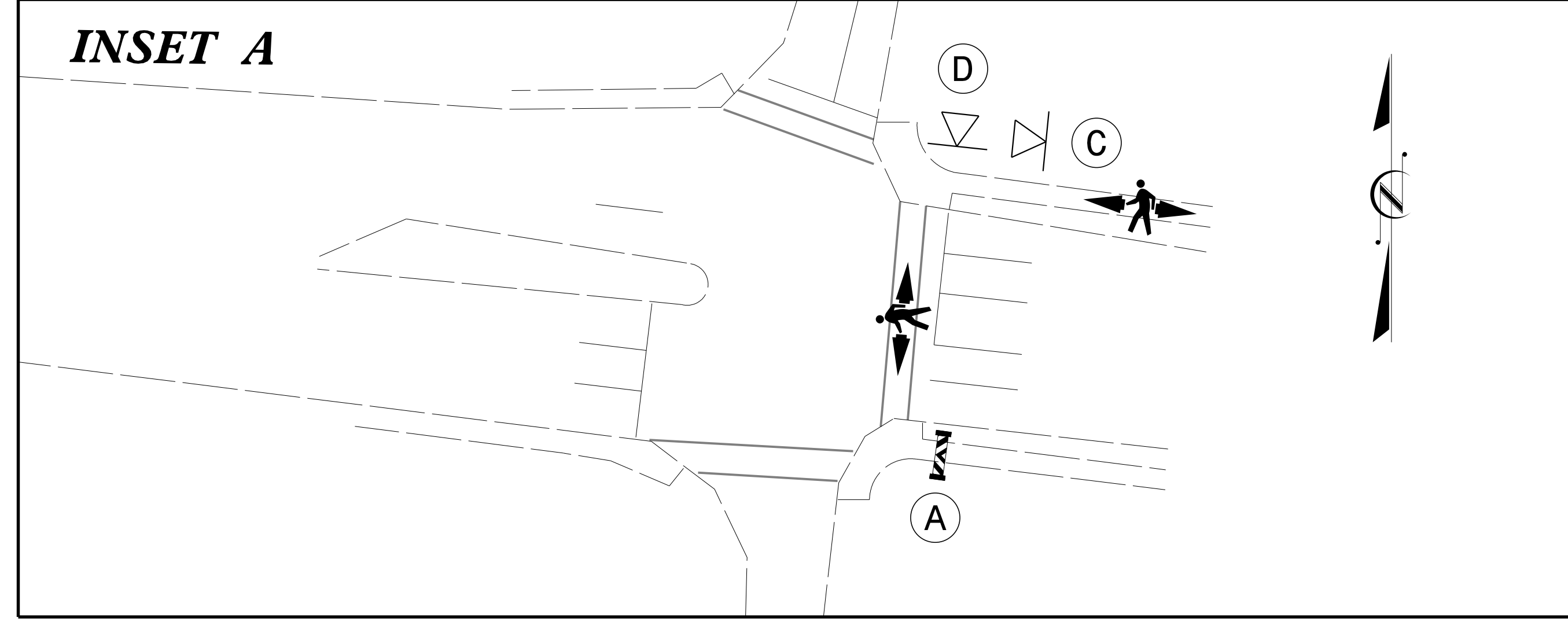
CONTRACT STANDARDS AND DEVELOPMENT UNIT	
Office 919-707-6950 FAX 919-250-4119	
SHOULDER WEDGE DETAILS	
ORIGINAL BY: T.SPELL	DATE: 7-19-11
MODIFIED BY:	DATE: 2/2/16
CHECKED BY:	DATE:
FILE SPEC.: szusr/details/stand/shoulderwedgedetail.dgn	



PEDESTRIAN DETOURS FOR WESTBOUND LANE CLOSURES



PEDESTRIAN DETOURS FOR EASTBOUND LANE CLOSURES



REVISIONS

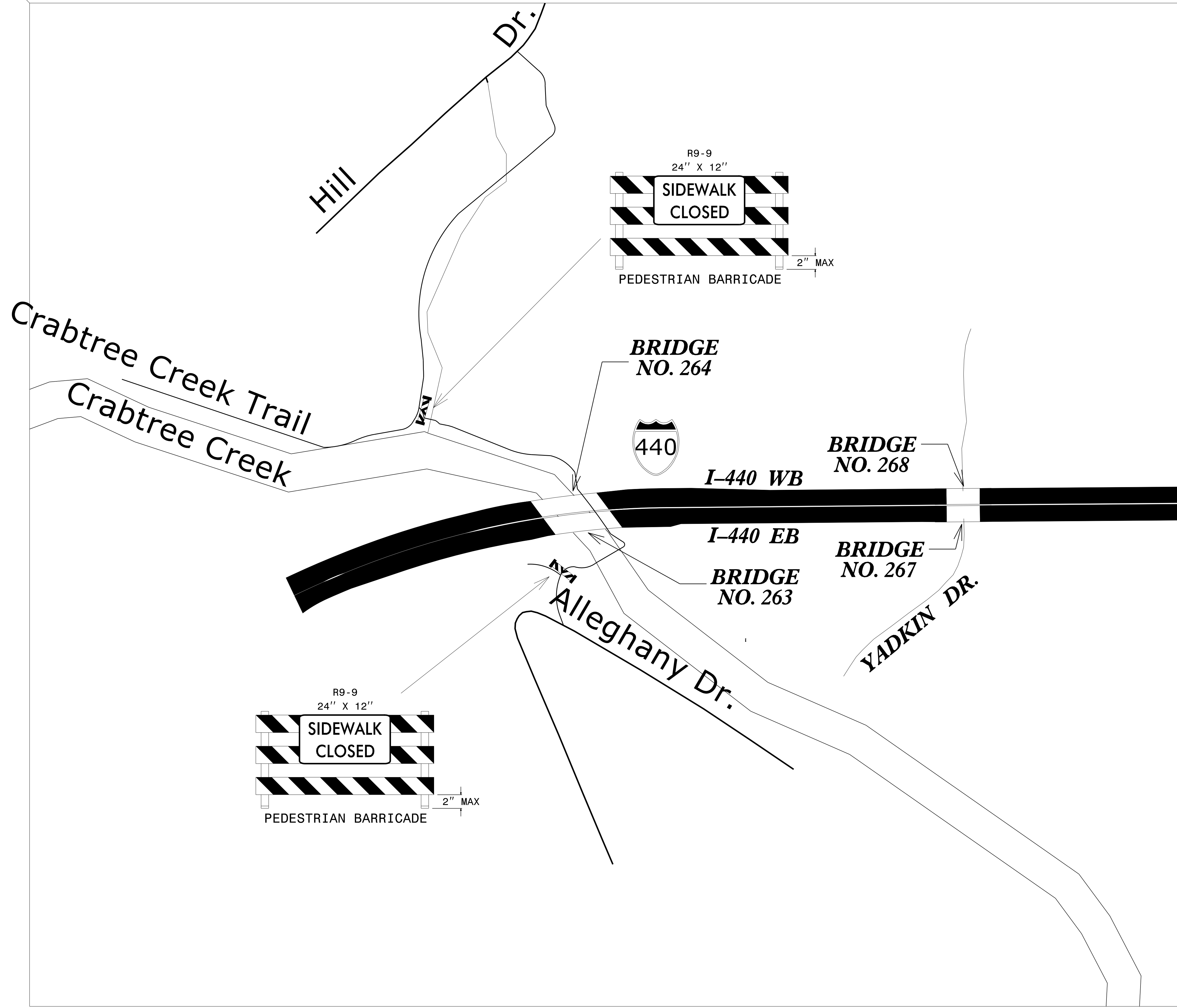
8/17/99

CRABTREE CREEK TRAIL CLOSURE

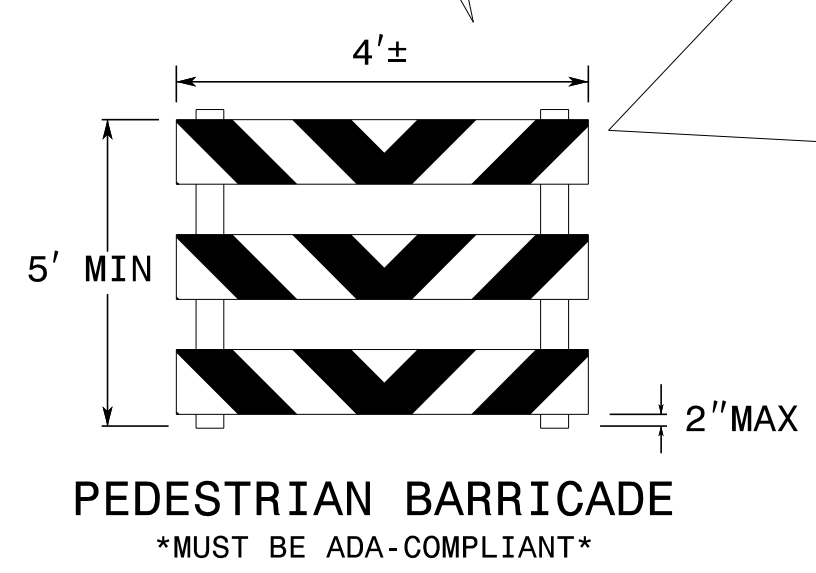
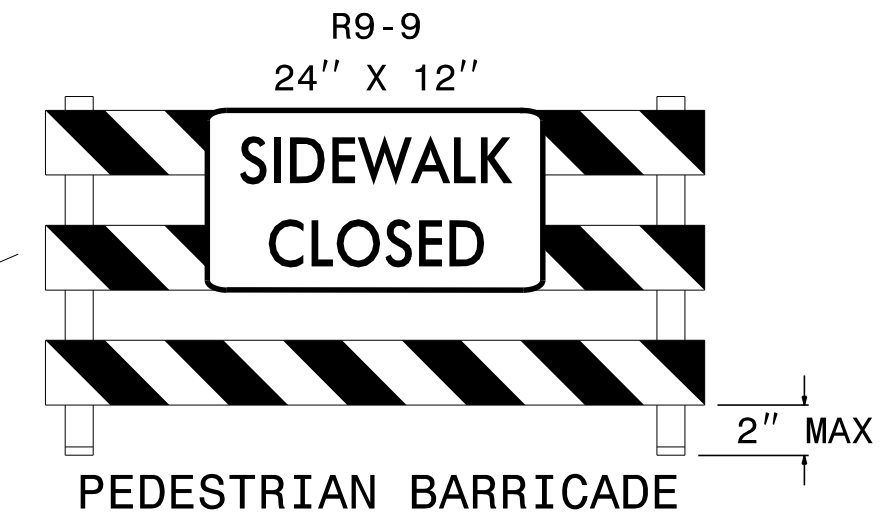
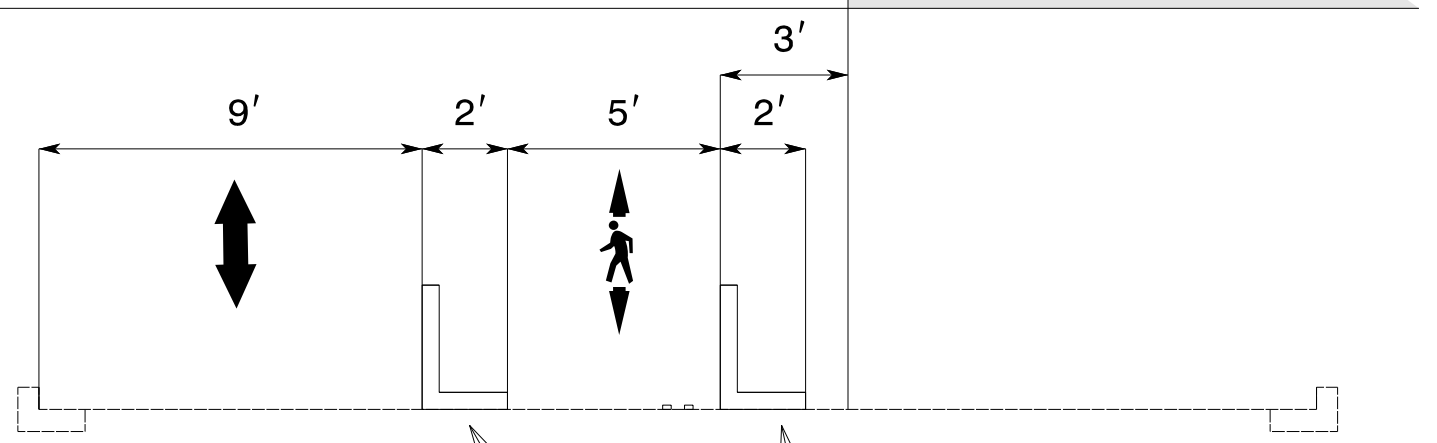
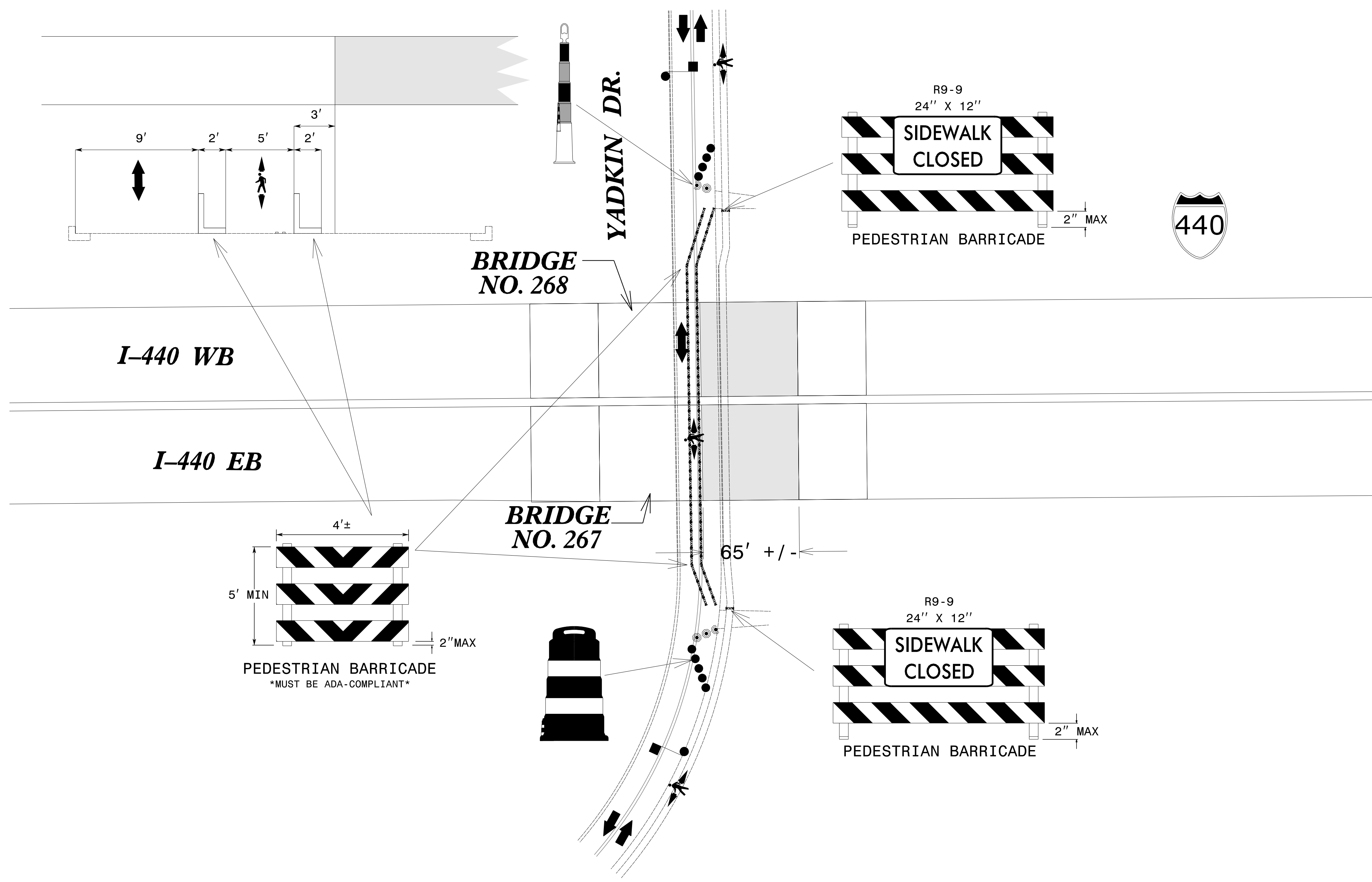


8/17/99

REVISIONS

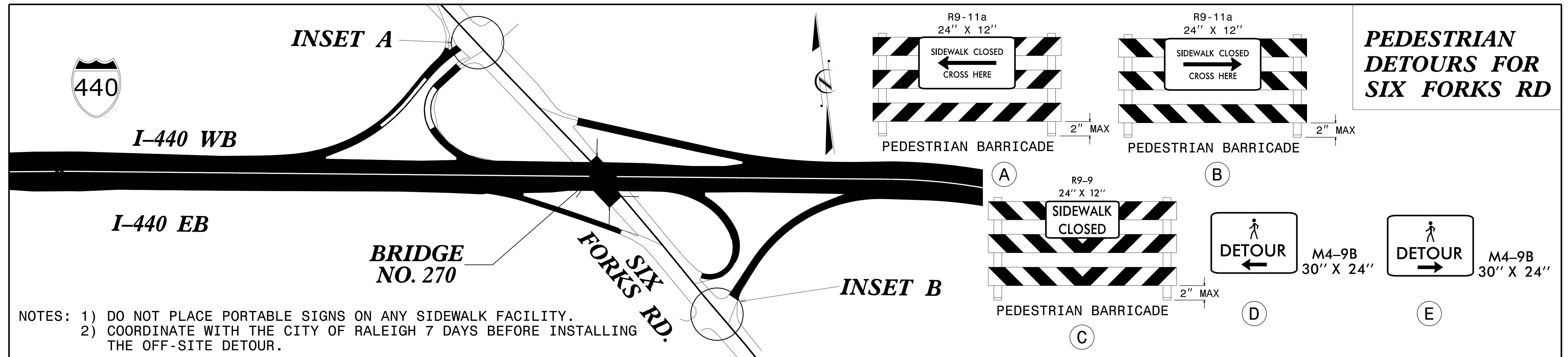


**YADKIN DRIVE
LANE CLOSURE
& PEDESTRIAN
DETOUR**

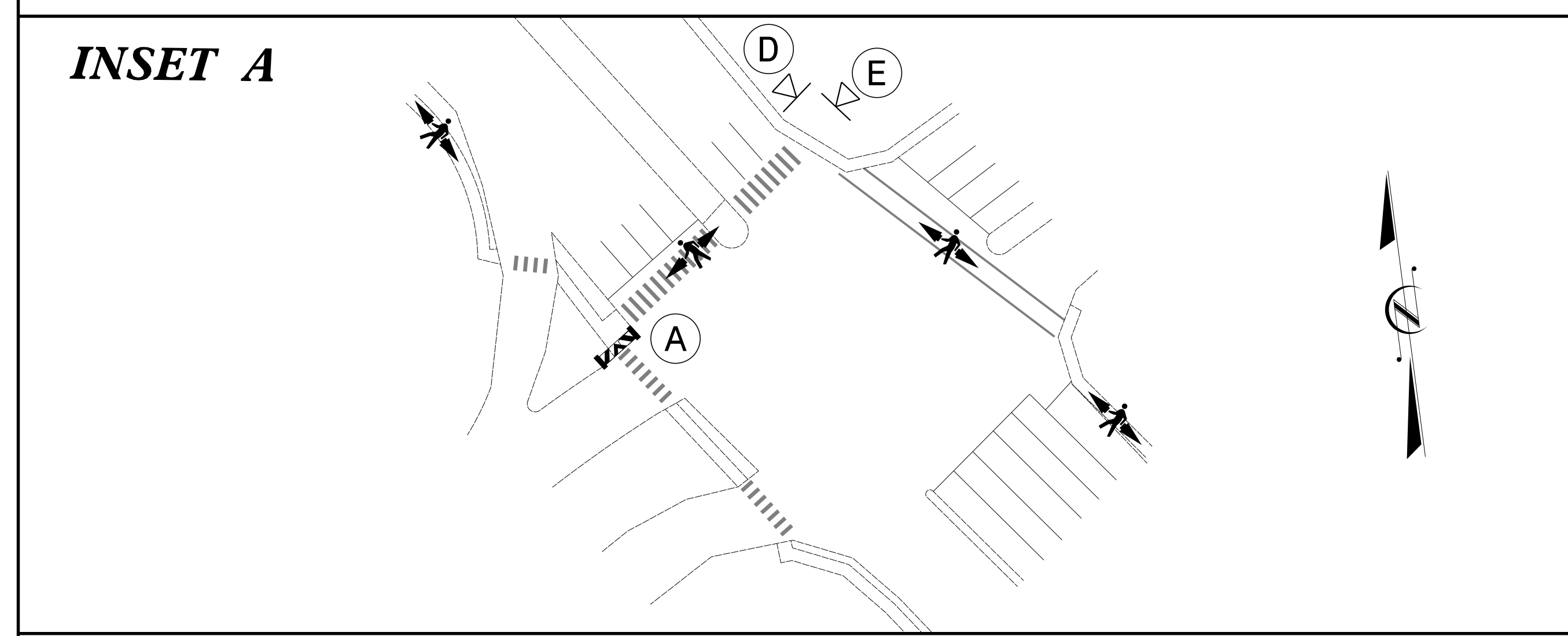


REVISIONS

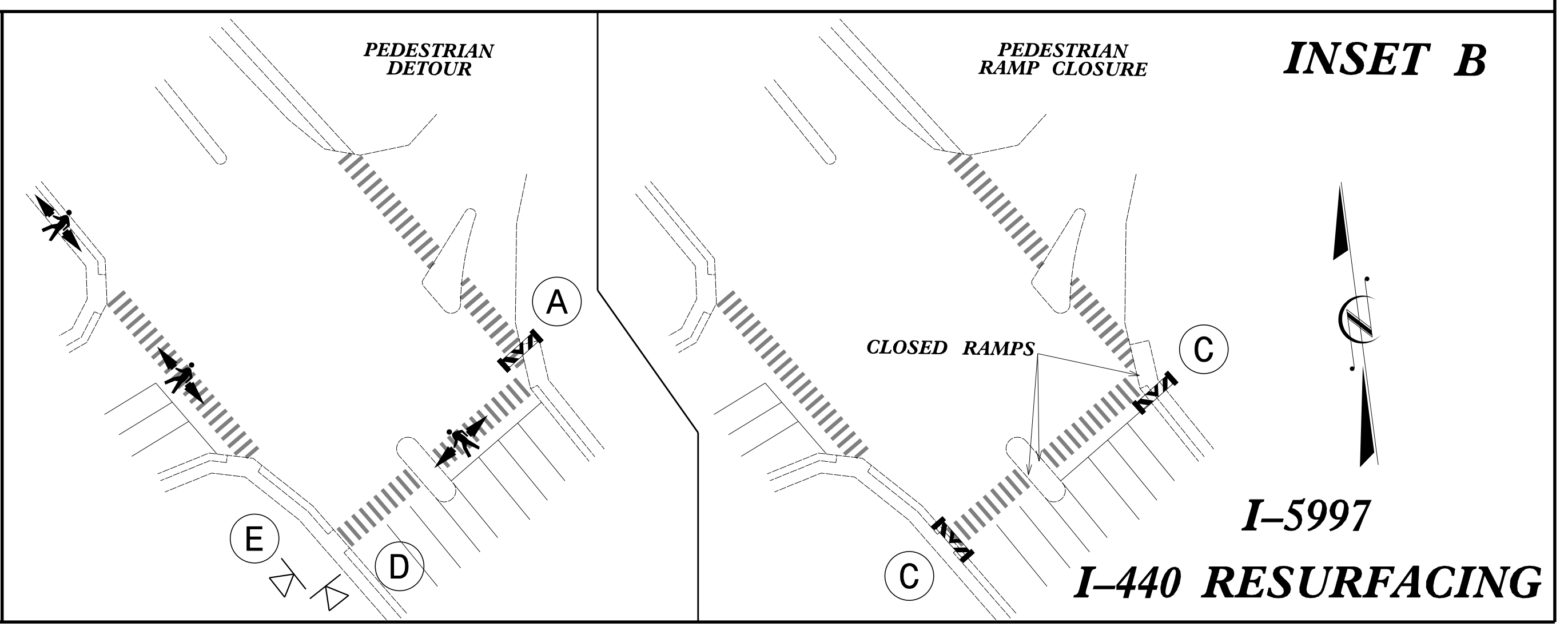
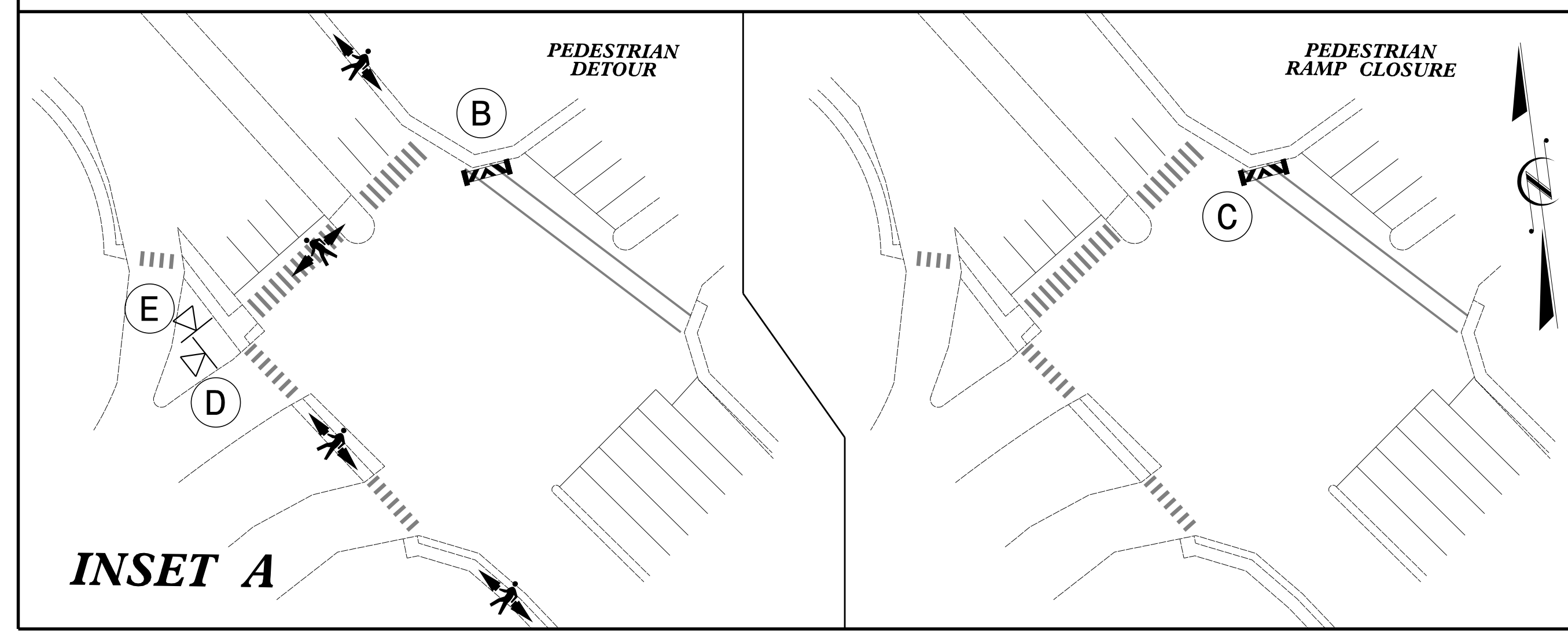
8/17/99



PEDESTRIAN DETOURS FOR SOUTHBOUND LANE CLOSURES



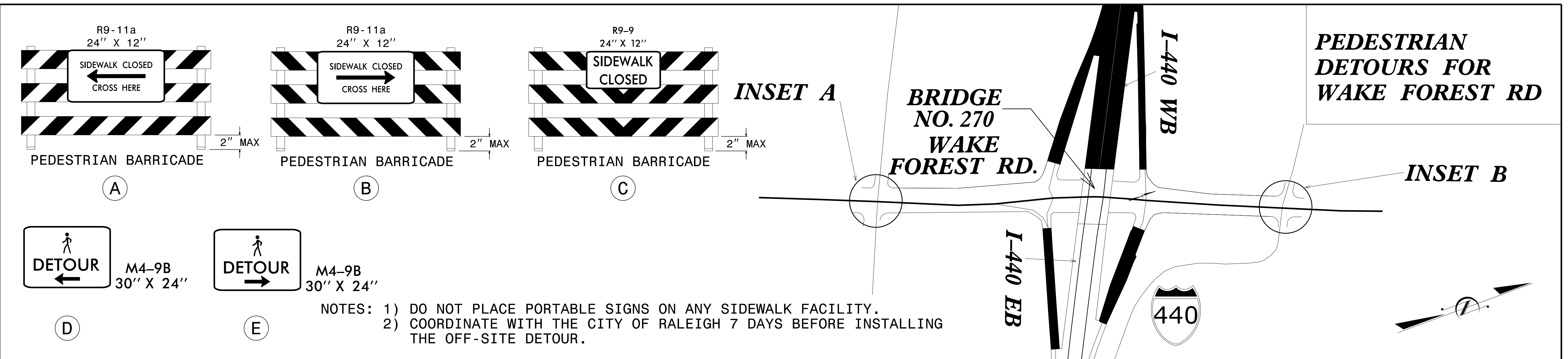
PEDESTRIAN DETOURS FOR NORTHBOUND LANE CLOSURES



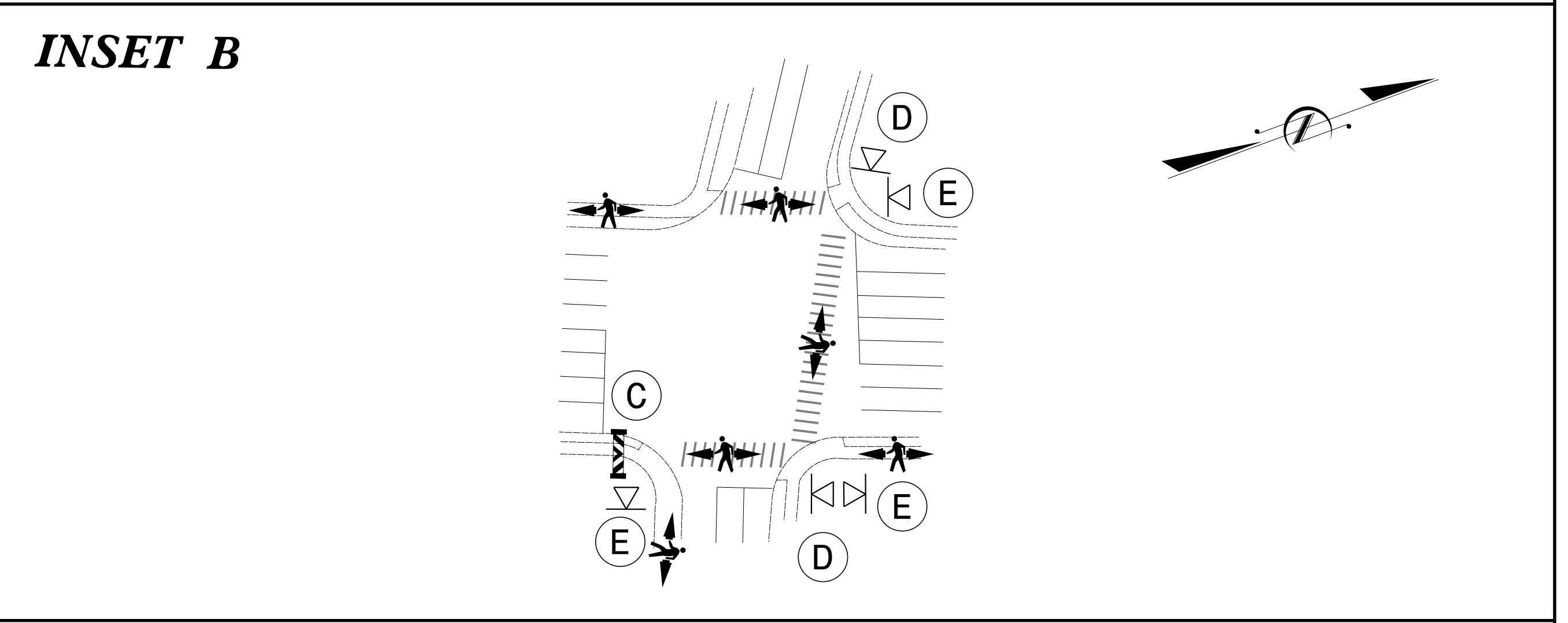
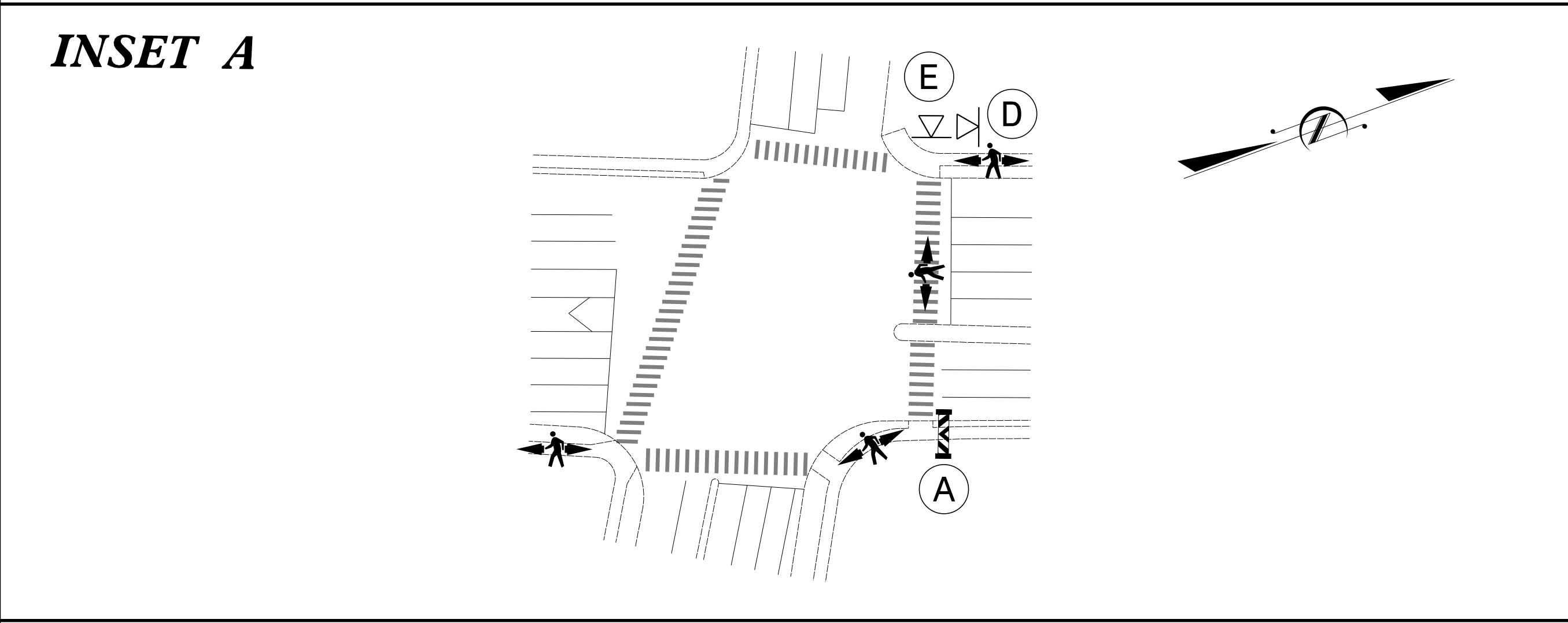
REVISIONS

8/17/99

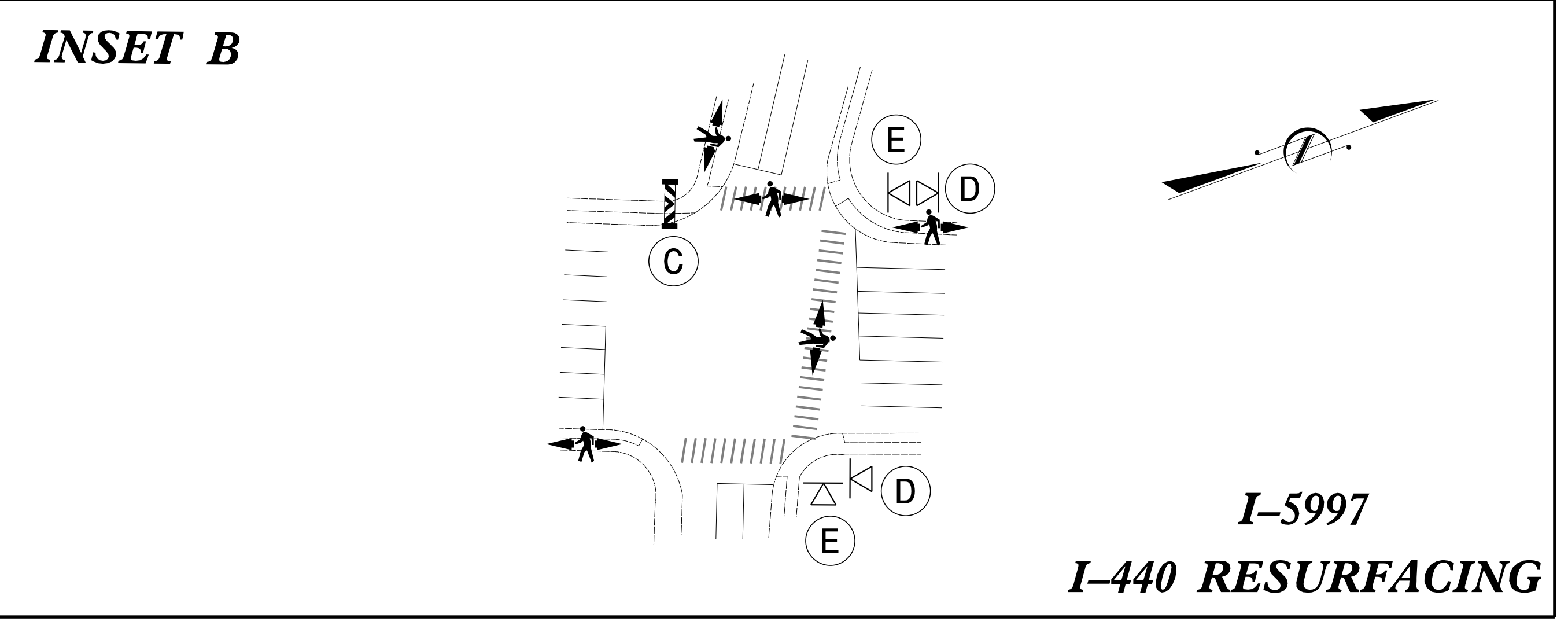
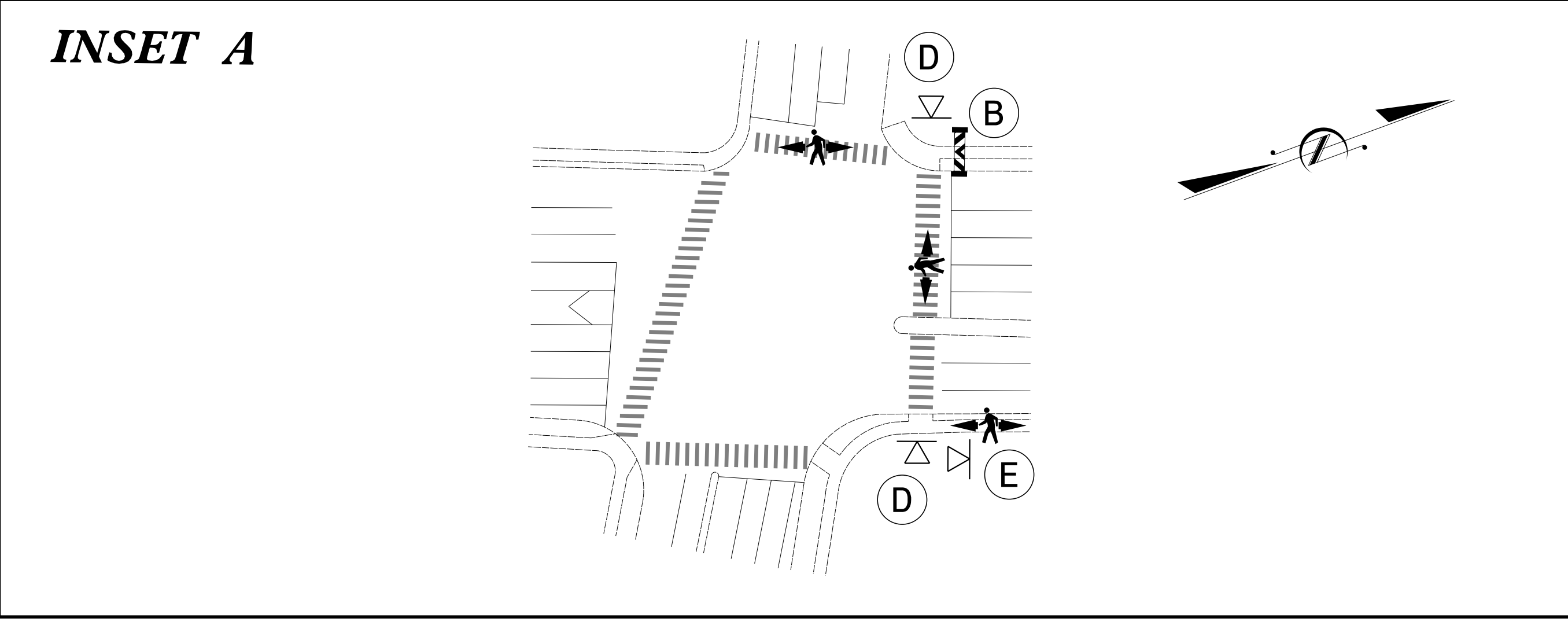
8/17/99



PEDESTRIAN DETOURS FOR NORTHBOUND LANE CLOSURES



PEDESTRIAN DETOURS FOR SOUTHBOUND LANE CLOSURES



REVISIONS

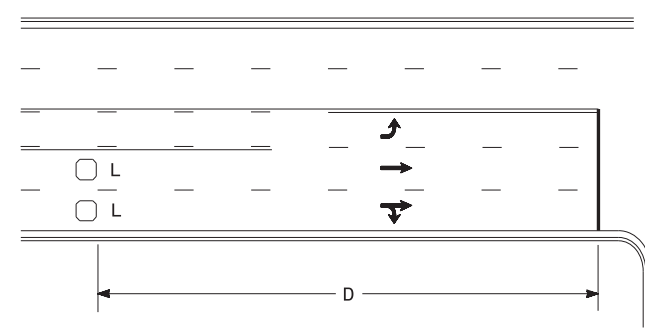
SUMMARY OF QUANTITIES

Table with 35 columns for material quantities and 26 rows of data, including 'TOTAL FOR MAP NO. 1' through 'TOTAL FOR PROJ NO. I-5997' and a 'GRAND TOTAL' row.

I-5997 I-440 RESURFACING

REVISIONS

High Speed Detection (≥40 mph)

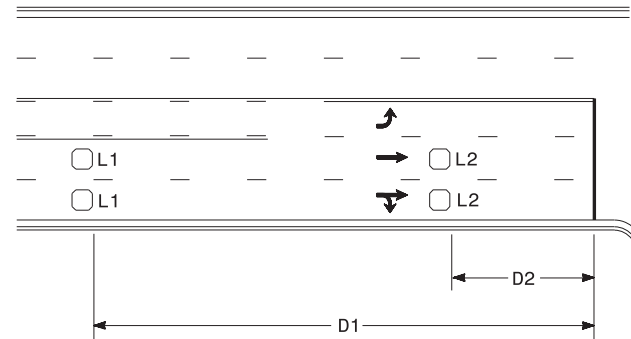


Speed Limit mph	D ft
40	250
45	300
50	355
55	420

L = 6ft X 6ft
Wired separately

Volume Density Operation

OR



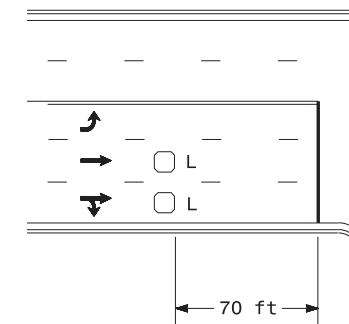
Speed Limit mph	D1 ft	D2 ft
40	250	80
45	300	90
50	355	100
55	420	110

L1 = 6ft X 6ft
Wired in series

L2 = 6ft X 6ft
Wired in series

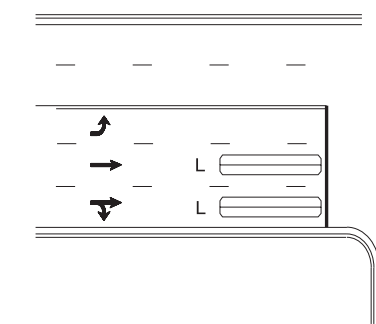
"Stretch" Operation

Low Speed Detection (≤35 mph)



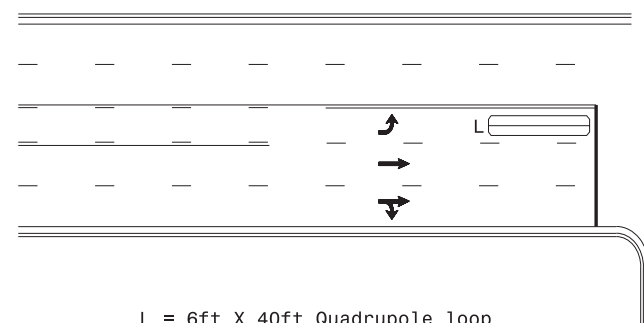
L = 6ft X 6ft
Wired in series

OR



L = 6ft X 40ft
Quadrupole loop, wired separately

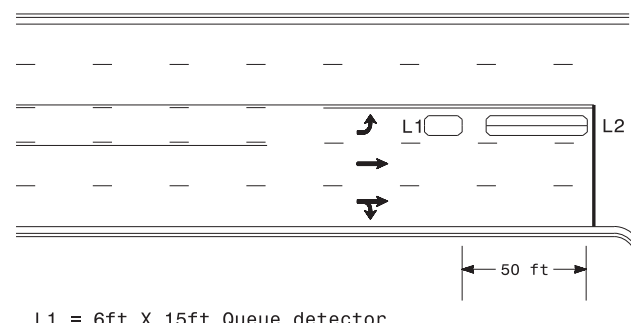
Left Turn Lane Detection



L = 6ft X 40ft Quadrupole loop

Presence Loop Detection

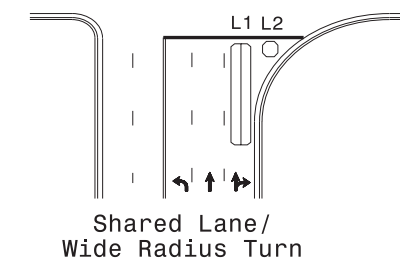
OR



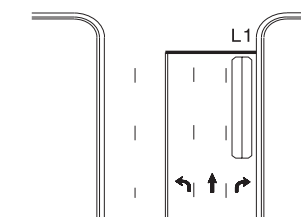
L1 = 6ft X 15ft Queue detector
L2 = 6ft X 40ft Quadrupole loop

Queue Loop Detection

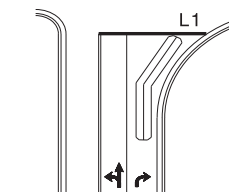
Right Turn Lane Detection



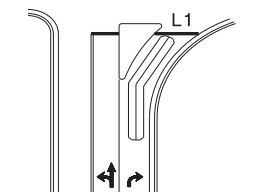
L1 = 6ft X 40ft Quadrupole loop
L2 = 6ft X 6ft [Minimum] Presence loop
Wired separately



Standard Turn

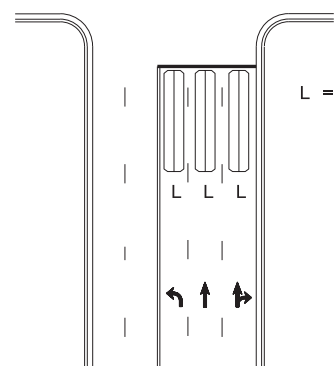


Wide Radius Turn



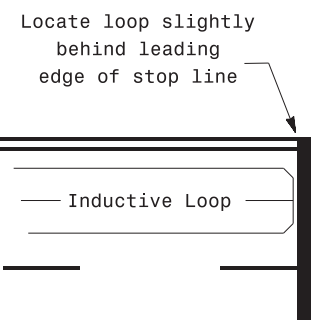
Channelized Turn

Side Street Detection



L = 6ft X 40ft
Quadrupole loop
Wired to separate
detectors/channels

Presence Loop Placement at Stop Lines



Note:
Loop may be located in advance of stop line under any of the following conditions:
1) stop line is greater than 15' from edge of intersecting roadway
2) loop detects a permissive or protected/permissive left turn
3) for an exclusive right turn lane

Recommended Number of Turns

Single 6' X 6' loop
(when wired separately):

Length of Lead-in ft	Number of Turns
< 250	3
250-375	4
375-525	5
> 525	6

Quadrupole loops: Use 2-4-2 turns

6' X 15' Loops:
Lead-in < 150', use 2 turns
Lead-in > 150', use 3 turns

750 N. Greenfield Pkwy, Garner, NC 27529

Prepared in the Offices of:

Typical Signal Loop Locations	
PLAN DATE: September 2020	REVIEWED BY: JPG
PREPARED BY: PLA	REVIEWED BY:
SCALE: N/A	REVISIONS: INIT. DATE
<p>9/8/2020</p> <p>SIG. INVENTORY NO.</p>	