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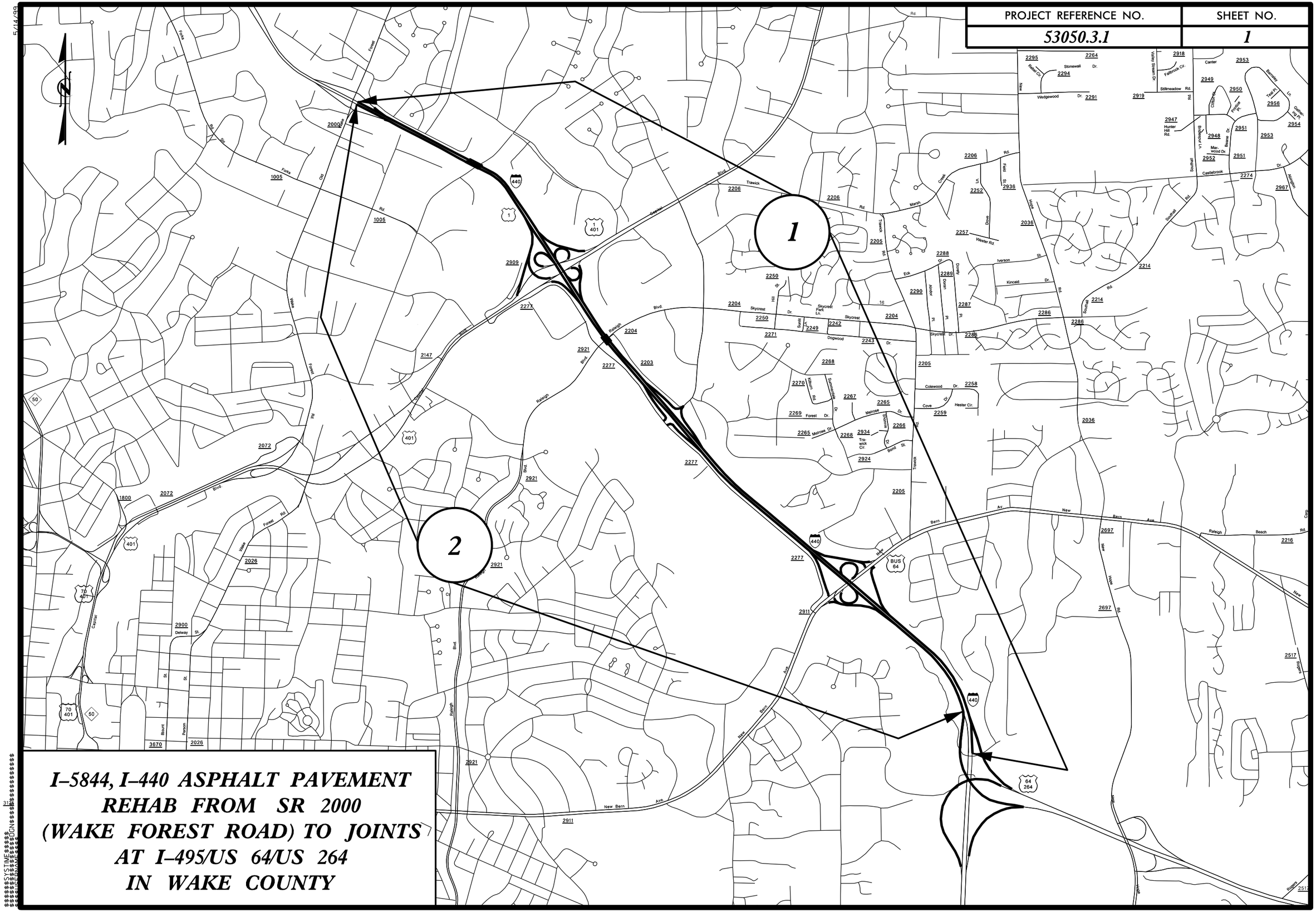
PROJECT REFERENCE NO.	SHEET NO.
53050.3.1	1



I–5844, I–440 ASPHALT PAVEMENT REHAB FROM SR 2000 (WAKE FOREST ROAD) TO JOINTS AT I–495/US 64/US 264 IN WAKE COUNTY

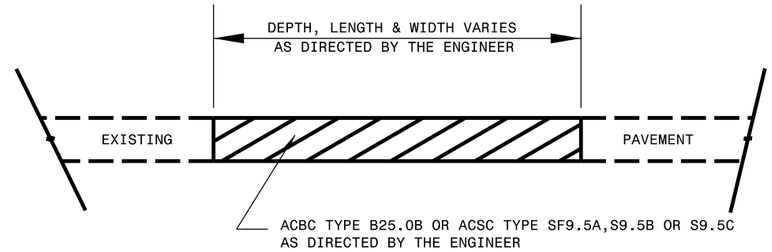
5/14/99

SYSTIME$$DATE$$DGN$$

PROJECT REFERENCE NO.	SHEET NO.
53050.3.1	2

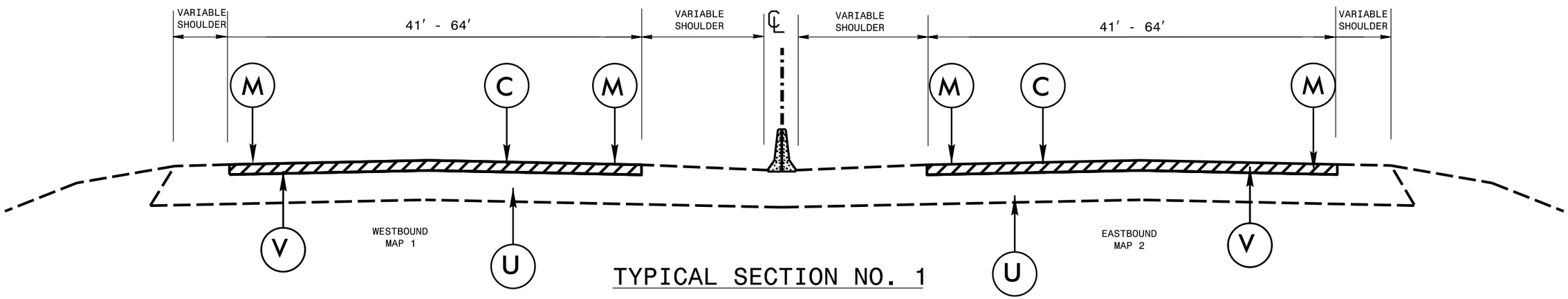
PAVEMENT SCHEDULE

C	2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
D	3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
J	PROP. 6" AGGREGATE BASE COURSE, AS DIRECTED BY THE ENGINEER
M	PROP. CONTINUOUS MILLED RUMBLE STRIP, AS DIRECTED BY THE ENGINEER
S	PROP. SHOULDER GRADING WITH AGGREGATE SHOULDER BORROW, AS DIRECTED BY THE ENGINEER
U	EXISTING PAVEMENT
V1	2" MILLING
V2	5" MILLING



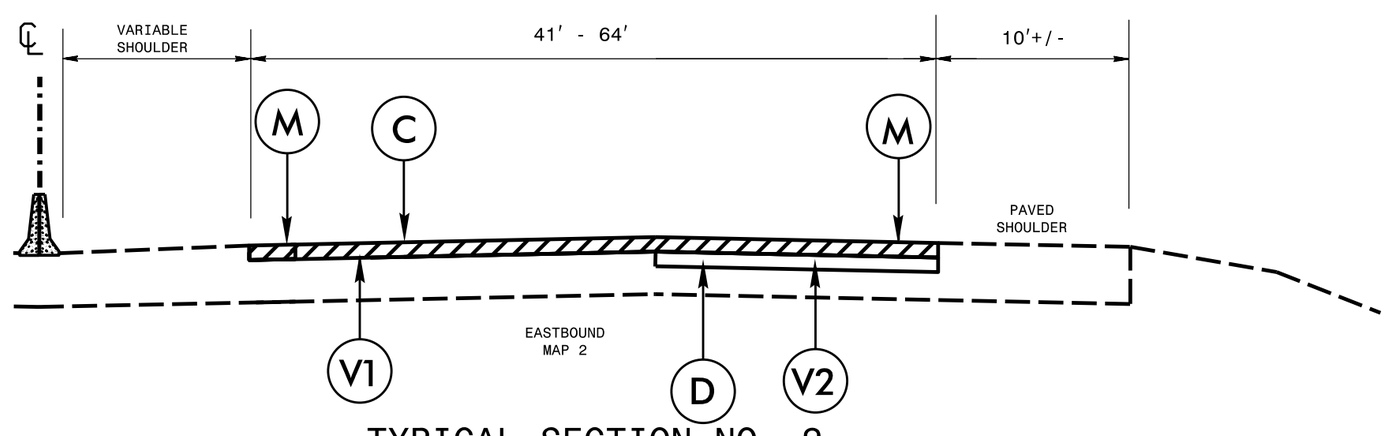
PATCHING EXISTING PAVEMENT

MILLING TO BE PERFORMED PRIOR PATCHING



TYPICAL SECTION NO. 1

* MILL TO THE PAVEMENT JOINT OUTSIDE OF MILLED RUMBLE STRIPS



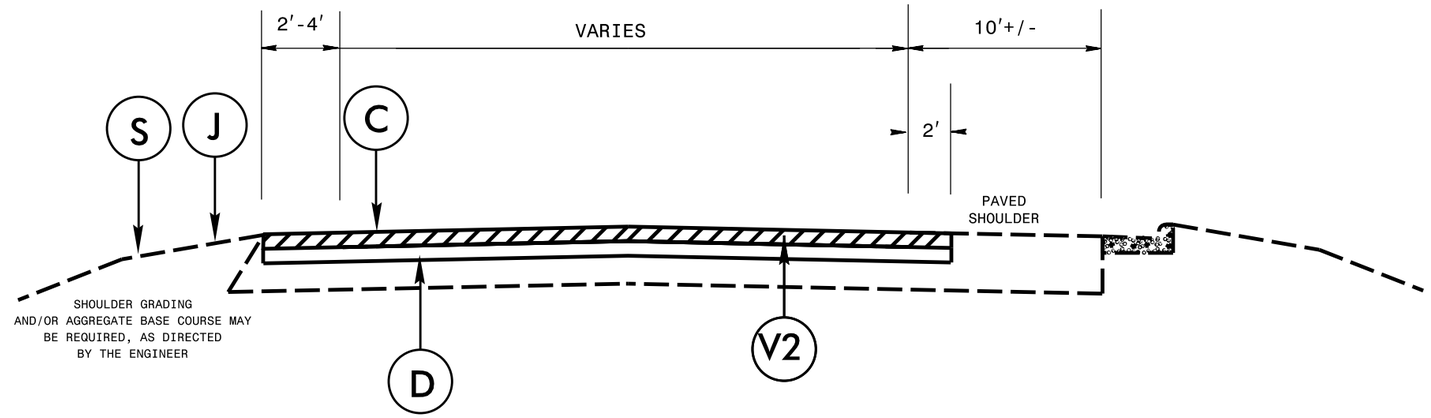
TYPICAL SECTION NO. 2

* USE ON I-440 EASTBOUND RIGHT TWO LANES FROM THE THEORETICAL GORE AT NEW BERN AVENUE ON RAMP TO I-495 EASTBOUND ON RAMP AS DIRECTED BY THE ENGINEER.

PROJECT REFERENCE NO.	SHEET NO.
53050.3.1	3

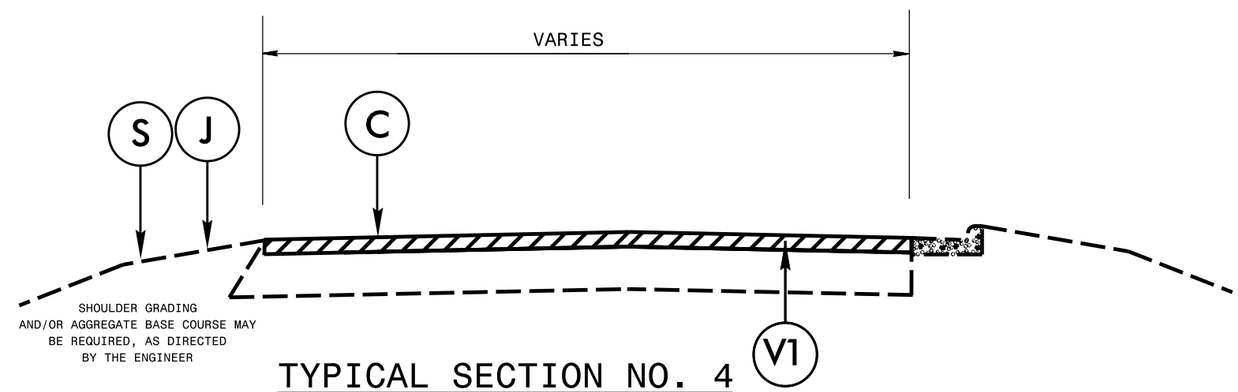
PAVEMENT SCHEDULE

C	2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
D	3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
J	PROP. 6" AGGREGATE BASE COURSE, AS DIRECTED BY THE ENGINEER
M	PROP. CONTINUOUS MILLED RUMBLE STRIP, AS DIRECTED BY THE ENGINEER
S	PROP. SHOULDER GRADING WITH AGGREGATE SHOULDER BORROW, AS DIRECTED BY THE ENGINEER
U	EXISTING PAVEMENT
V1	2" MILLING
V2	5" MILLING



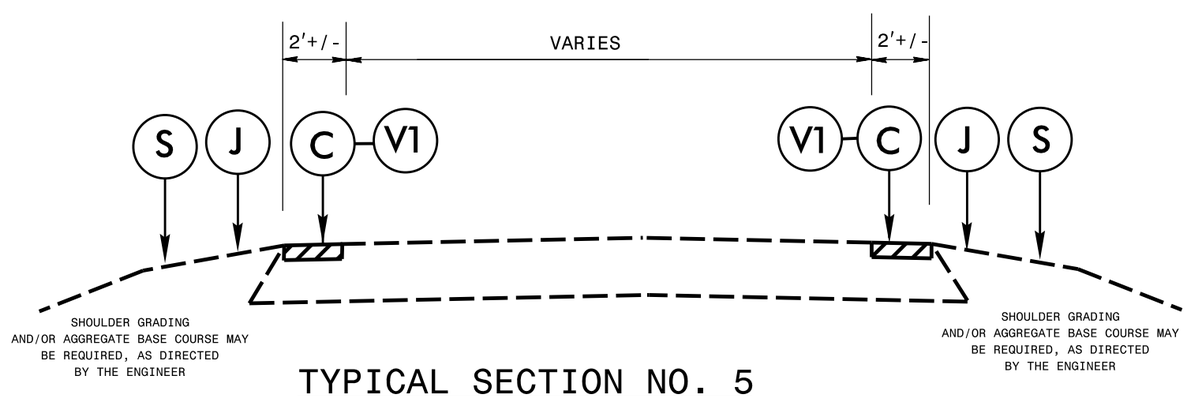
TYPICAL SECTION NO. 3

* USE ON I-495 WEST RAMP TO I-440 WEST FROM THE BRIDGE TO THE END OF THE THEORETICAL GORE.
* USE ON I-440 EASTBOUND EXIT RAMP TO I-495 EAST TO THE BRIDGE JOINT ON THE EXIT.



TYPICAL SECTION NO. 4

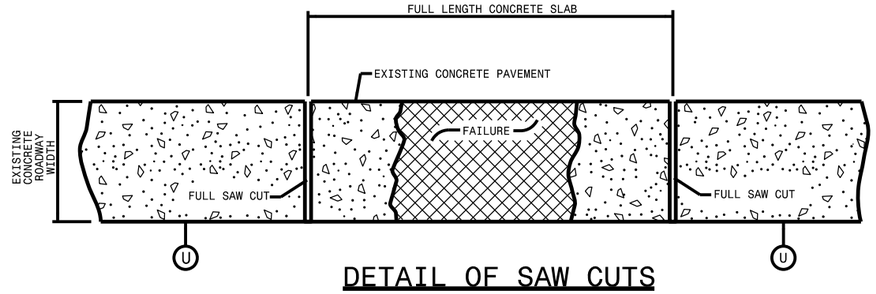
* USE THIS TYPICAL ON ASPHALT RAMPS



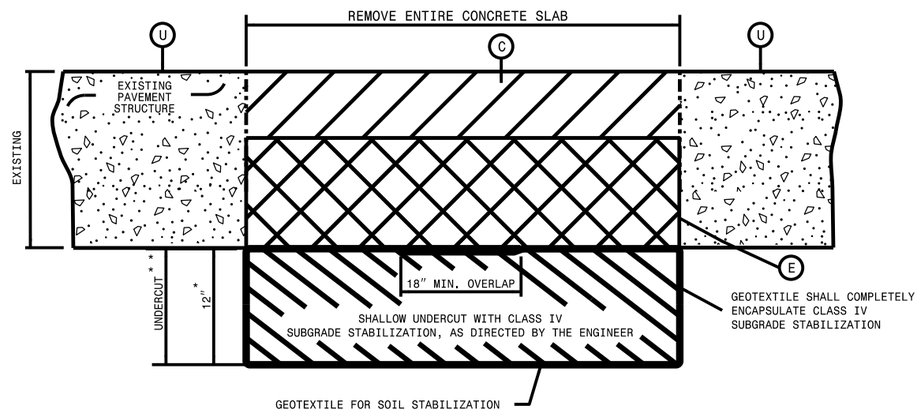
TYPICAL SECTION NO. 5

* USE THIS TYPICAL ON CONCRETE RAMPS WITH ASPHALT SHOULDERS
* PERFORM JOINT SEALING, CRACK SEALING, SPALL REPAIR AND SLAB REPLACEMENT AND PAVEMENT MARKING/MARKER REPLACEMENT, AS DIRECTED BY THE ENGINEER

PROJECT REFERENCE NO.	SHEET NO.
53050.3.1	4



DETAIL OF SAW CUTS



DETAIL OF CONCRETE PAVEMENT REPAIR

* DIMENSIONS ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED

** UNDERCUT REQUIRED ONLY IN AREAS AS DIRECTED BY THE ENGINEER

PAVEMENT SCHEDULE	
C	2" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5C
E	VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AS DIRECTED BY THE ENGINEER
U	EXISTING PAVEMENT STRUCTURE

DETAIL TO BE USED FOR 2 SLABS AT
I-440 EB TO CAPITAL BLVD NORTH RAMP

DETAIL FOR REPLACEMENT OF CONCRETE SLABS

PROJECT NO.	SHEET NO.	TOTAL NO.
53050.3.1		

SUMMARY OF QUANTITIES

PROJECT	COUNTY	MAP	ROUTE	DESCRIPTION	TYP	LANES	LANE TYPE	FINAL SURFACE TESTING REQUIRED	WARM MIX ASPHALT REQUIRED	LENGTH	WIDTH	REMOVAL OF EXISTING CONCRETE PAVEMENT SLABS	GEOTEXTILE FOR SOIL STABILIZATION	AGGREGATE SHOULDER BORROW (ASB)	SHOULDER GRADING	SHALLOW UNDERCUT	CLASS IV SUBGRADE STABILIZA-TION	AGGREGATE BASE COURSE	2" MILLING	5" MILLING	BASE COURSE, B25.0B	INTER MEDIATE COURSE, I19.0C	SURFACE COURSE, S9.5C	ASPHALT BINDER FOR PLANT MIX	PATCHING EXISTING PAVEMENT	PATCHING CONCRETE PAVEMENT SPALLS	MILLED RUMBLE STRIPS (ASPHALT CEMENT CONCRETE)	SEALING EXISTING CONCRETE PAVEMENT JOINTS	SEALING EXISTING PAVEMENT CRACKS & SPALLS, POLYMER PATCH	INDUCTIVE LOOP
NO		NO			NO					MI	FT	SY	SY	TON	SMI	CY	TON	TONS	SY	SY	TONS	TONS	TONS	TON	TONS	SF	LF	LF	LB	LF
53050.3.1	Wake	1	I-440 WB	PAVEMENT JOINT AT I-495/US 64/US264 TO SR 2000 - WAKE FOREST RD	1	2		NO	NO	3.96	41			16	0.31			515	149,705	2,707		463	17,679	1,065	250	60	41,818	9,330	1,680	
TOTAL FOR MAP NO. 1										**3.96**				**16**	**0.31**			**515**	**149,705**	**2,707**		**463**	**17,679**	**1,065**	**250**	**60**	**41,818**	**9,330**	**1,680**	
53050.3.1	Wake	2	I-440 EB	SR 2000 - WAKE FOREST RD TO PAVEMENT JOINT AT I-495/US64/US 264	1	2		NO	NO	3.84	41	67	17	16	0.32	6	12	240	129,922	13,444	23	2,299	16,599	1,091	250	250	40,550	9,070	11,652	410
TOTAL FOR MAP NO. 2										**3.84**		**67**	**17**	**16**	**0.32**	**6**	**12**	**240**	**129,922**	**13,444**	**23**	**2,299**	**16,599**	**1,091**	**250**	**250**	**40,550**	**9,070**	**11,652**	**410**
TOTAL FOR PROJ NO. 53050.3.1										**7.8**		**67**	**17**	**32**	**0.63**	**6**	**12**	**755**	**279,627**	**16,151**	**23**	**2,762**	**34,278**	**2,156**	**500**	**310**	**82,368**	**18,400**	**13,332**	**410**
GRAND TOTAL										**7.8**		**67**	**17**	**32**	**0.63**	**6**	**12**	**755**	**279,627**	**16,151**	**23**	**2,762**	**34,278**	**2,156**	**500**	**310**	**82,368**	**18,400**	**13,332**	**410**

PROJECT NO.	SHEET NO.	TOTAL NO.
53050.3.1		

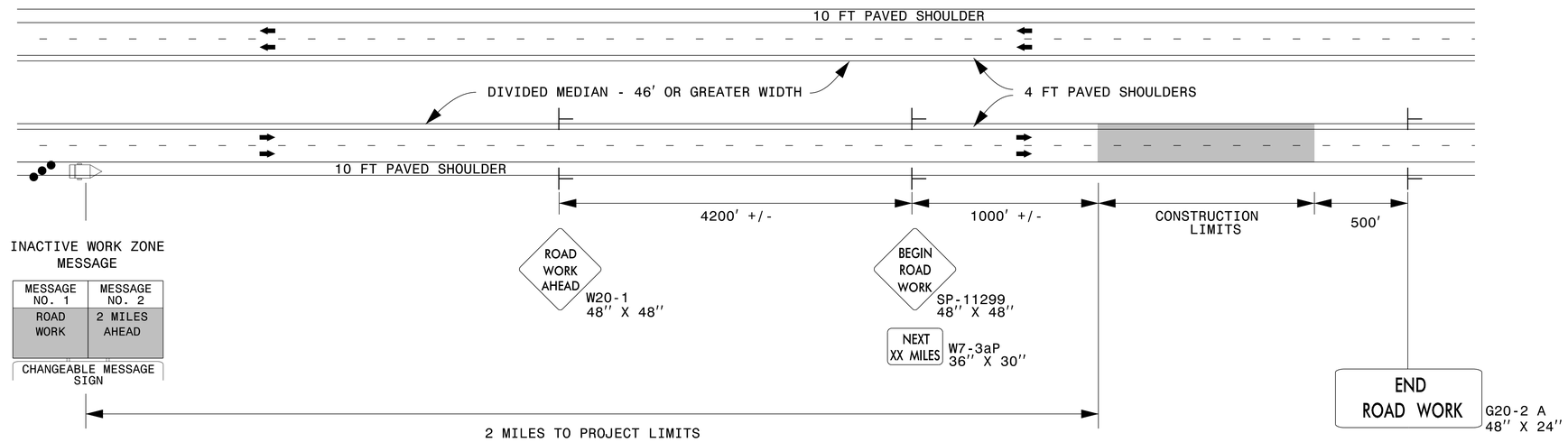
THERMOPLASTIC AND PAINT QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP NO	LANES	LANE TYPE	LENGTH	WIDTH	4400000000-E STATIONARY WORK ZONE SIGN SF	4405000000-E PORTABLE WORK ZONE SIGN SF	4410000000-E BARRICADE MOUNTED WORK ZONE SIGN SF	4415000000-N FLASHING ARROW BOARD EA	4420000000-N CHANGABLE MESSAGE SIGNS EA	4422000000-N CHANGEABLE MESSAGE SIGNS (SHORT TERM) DAY	4430000000-N DRUMS EA	4445000000-E TYPE III BARICADE LF	4480000000-N TMA EA	4510000000-N LAW ENFORCEMENT HR	4600000000-N GENERIC TRAFFIC CONTROL ITEM, WORK ZONE DIGITAL SPEED LIMIT SIGNS EA	4600000000-N GENERIC TRAFFIC CONTROL ITEM, PRESENCE LIGHTING EA	4600000000-N GENERIC TRAFFIC CONTROL ITEM, SEQUENTIAL FLASHING WARNING LIGHTS EA	4688000000-E 6" X 90 M WHITE THERMO LF	4688000000-E 6" X 90 M YELLOW THERMO LF	4690000000-E 6" X 120 M WHITE THERMO LF	4700000000-E 12" X 90 M WHITE THERMO LF	4702000000-E 12" X 120 M WHITE THERMO LF	4710000000-E 24" X 120 M WHITE THERMO LF	4721000000-E THERMO MSG ONLY 120 M EA	4725000000-E THERMO MERGE ARROW 90 M EA	4725000000-E THERMO RT ARROW 90 M EA
53050.3.1	Wake	1	I-440 WB	PAVEMENT JOINT AT I-495/US 64/US264 TO SR 2000 - WAKE FOREST RD	1	2		3.96	41	262	180	10	1	2.00	22	100	16	1	90	1	6	16	26,750	26,660	16,032	6,892	270			14	12
TOTAL FOR MAP NO. 1								**3.96**		**262**	**180**	**10**	**1**	**2.00**	**22**	**100**	**16**	**1**	**90**	**1**	**6**	**16**	**26,750**	**26,660**	**16,032**	**6,892**	**270**			**14**	**12**
53050.3.1	Wake	2	I-440 EB	SR 2000 - WAKE FOREST RD TO PAVEMENT JOINT AT I-495/US64/US 264	1	2		3.84	41	262	180	10	1	2.00	22	100	16	1	170	1	6	16	24,040	24,257	15,265	6,520	235	30	32		24
TOTAL FOR MAP NO. 2								**3.84**		**262**	**180**	**10**	**1**	**2**	**22**	**100**	**16**	**1**	**170**	**1**	**6**	**16**	**24,040**	**24,257**	**15,265**	**6,520**	**235**	**30**	**32**		**24**
TOTAL FOR PROJ NO. 53050.3.1								**7.8**		**524**	**360**	**20**	**2**	**4**	**44**	**200**	**32**	**2**	**260**	**2**	**12**	**32**	**50,790**	**50,917**	**31,297**	**13,412**	**505**	**30**	**32**	**14**	**36**
																					46		**101,707**							**50**	
GRAND TOTAL								**7.8**		**524**	**360**	**20**	**2**	**4**	**44**	**200**	**32**	**2**	**260**	**2**	**12**	**32**	**50,790**	**50,917**	**31,297**	**13,412**	**505**	**30**	**32**	**14**	**36**
																					46		**101,707**							**50**	

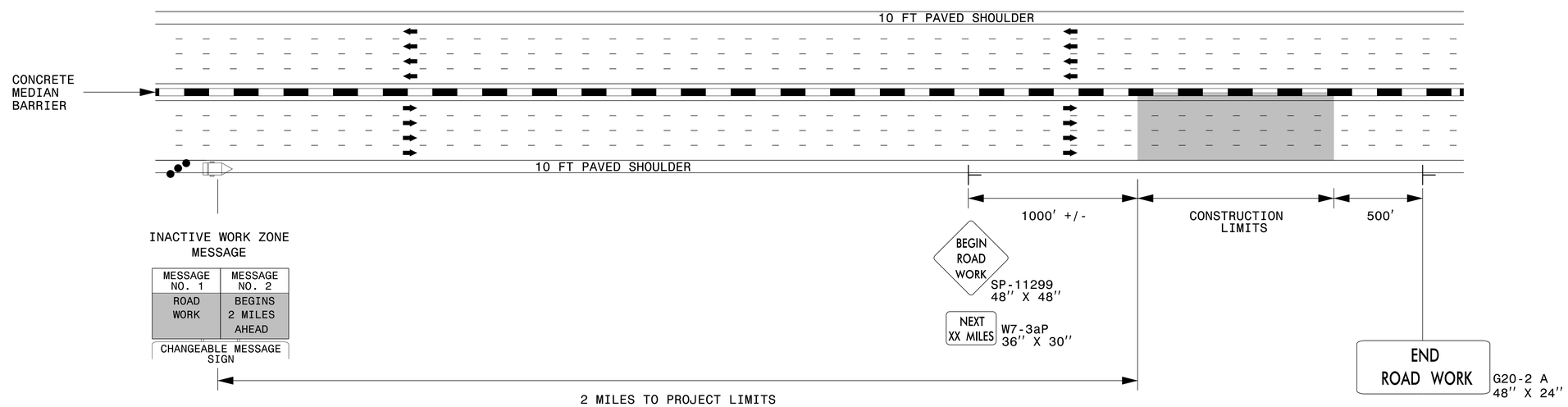
PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP NO	LANES	LANE TYPE	LENGTH	WIDTH	4800000000-N COLD APPLIED MSG ONLY, TYPE II EA	4800000000-N COLD APPLIED MSG LANE, TYPE II EA	4800000000-N COLD APPLIED MSG ENDS, TYPE II EA	4800000000-N COLD APPLIED MSG 1500 FT, TYPE II EA	4805000000-N COLD APPLIED PLASTIC RT ARROW, TYPE II EA	4847100000-E 6" WHITE POLYUREA (HIGHLY REFLECTIVE ELEMENTS) LF	4847100000-E 6" YELLOW POLYUREA (HIGHLY REFLECTIVE ELEMENTS) LF	4847110000-E 8" WHITE POLYUREA (HIGHLY REFLECTIVE ELEMENTS) LF	4855000000-E 6" LINE REMOVAL LF	4860000000-E 8" LINE REMOVAL LF	4875000000-N REML OF PVMT MRKG SYMBOLS & CHARACTERS EA	4900000000-N CRYSTAL & RED MARKERS EA	4905000000-N SNOW PLOWABLE MARKERS EA
53050.3.1	Wake	1	I-440 WB	PAVEMENT JOINT AT I-495/US 64/US264 TO SR 2000 - WAKE FOREST RD	1	2		3.96	41	4	4	4	6	1	5,268	3,332		8,600		17	50	1,200
TOTAL FOR MAP NO. 1								**3.96**		**4**	**4**	**4**	**6**	**1**	**5,268**	**3,332**		**8,600**		**17**	**50**	**1,200**
53050.3.1	Wake	2	I-440 EB	SR 2000 - WAKE FOREST RD TO PAVEMENT JOINT AT I-495/US64/US 264	1	2		3.84	41						9,633	8,692	610	18,325	610		140	1,178
TOTAL FOR MAP NO. 2								**3.84**							**9,633**	**8,692**	**610**	**18,325**	**610**		**140**	**1,178**
TOTAL FOR PROJ NO. 53050.3.1								**7.8**		**4**	**4**	**4**	**6**	**1**	**14,901**	**12,024**	**610**	**26,925**	**610**	**17**	**190**	**2,378**
										18					**26,925**							
GRAND TOTAL								**7.8**		**4**	**4**	**4**	**6**	**1**	**14,901**	**12,024**	**610**	**26,925**	**610**	**17**	**190**	**2,378**
										18					**26,925**							

PROJ. REFERENCE NO.	SHEET NO.
I-5844	DETAIL 1

DIVIDED MEDIANS WITH WIDTHS 46′ OR GREATER



DIVIDED MEDIANS WITH WIDTHS LESS THAN 46′ OR WITH PERMANENT MEDIAN BARRIER



NOTES:

1) LATERAL CLEARANCE AT ALL SIGN LOCATIONS SHALL BE 6′ AS MEASURED FROM THE EDGE OF PAVEMENT.
2) MOUNT SIGNS THAT ARE LARGER THAN 10 SQUARE FEET IN AREA ON TWO OR MORE WOOD OR U-CHANNEL SUPPORTS. PERFORATED SQUARE TUBING SUPPORT SYSTEMS MAY SUPPORT LARGER AREAS ON A SINGLE SUPPORT. FOLLOW MANUFACTURER'S RECOMMENDATIONS. THESE SYSTEMS SHALL BE NCHRP 350 COMPLIANT AND NCDOT APPROVED.
3) FOR MEDIAN WIDTHS LESS THAN 46′ (MEASURED EDGELINE TO EDGELINE) USE THE BOTTOM DRAWING.
4) IF STATIONARY GENERAL WARNING SIGNS ARE USED, THEY WILL BE PAID FOR PER SECTION 104 OF THE NCDOT STANDARD SPECIFICATIONS AS EXTRA WORK.
5) INSTALL "ROAD WORK AHEAD"(W20-1) ALONG ENTRANCE RAMPS 500′ PRIOR TO RAMP TERMINAL, AND "END ROAD WORK" (G20-2a) AT THE END OF EXIT RAMPS WITHIN THE WORK ZONE.

LEGEND

- CHANGEABLE MESSAGE SIGN (CMS)
- STATIONARY SIGN
- DIRECTION OF TRAFFIC FLOW
- TRAFFIC DRUM

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

RESURFACING ADVANCE WARNING SIGNS FOR HIGH SPEED FACILITIES ≥ 60 MPH

8/9/2016
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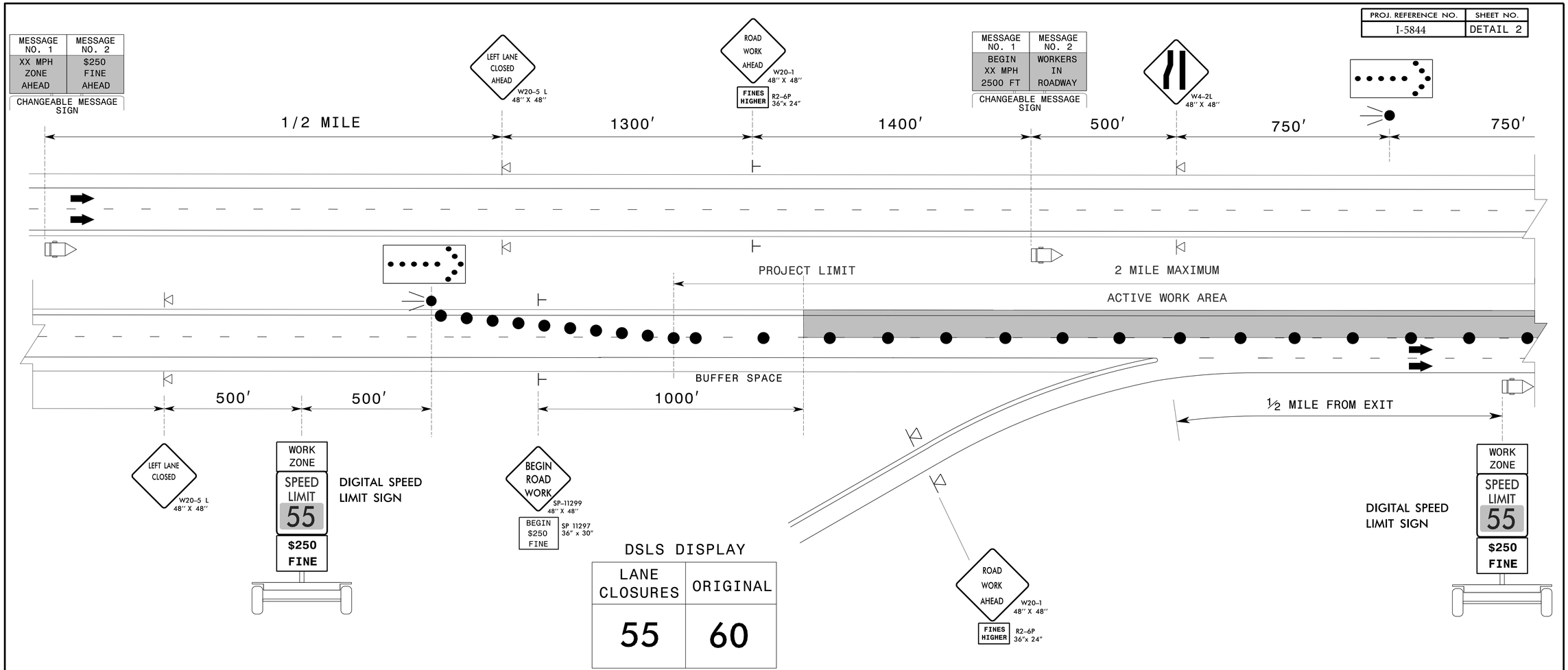
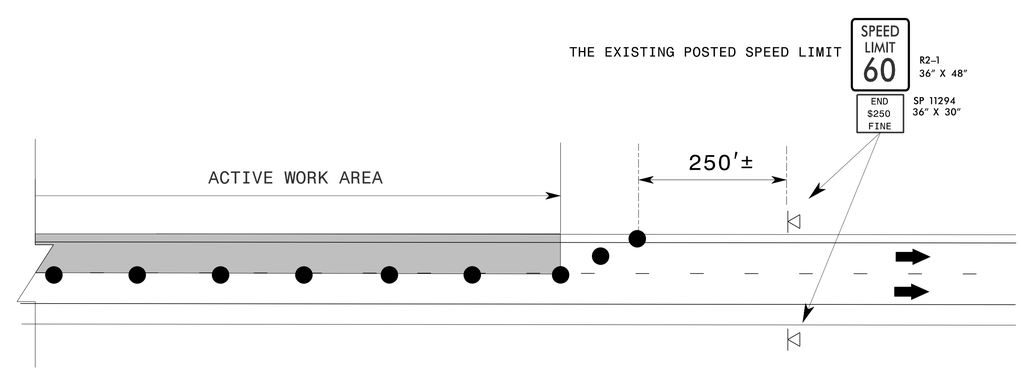
PROJ. REFERENCE NO.	SHEET NO.
I-5844	DETAIL 2



DSLS DISPLAY

LANE CLOSURES	ORIGINAL
55	60

DSLS TO BE SPACED 1.5 MILES THROUGHOUT ACTIVE WORK ZONE



GUIDELINES

1. NCDOT HAS SOLE AUTHORITY OF THE SPEED LIMITS DISPLAYED ON THE DIGITAL SPEED LIMIT SIGNS.
2. THE WORK ZONE VARIABLE SPEED LIMIT REDUCTION ("WZVSLR") IS FOR USE ONLY AFTER AN ENGINEERING INVESTIGATION HAS BEEN PERFORMED BY THE REGIONAL TRAFFIC ENGINEER, THE DIVISION AND THE WORK ZONE TRAFFIC CONTROL SECTION.
3. THE "WZVSLR" IS INTENDED FOR USE ON FREEWAYS WITH ORIGINAL SPEED LIMITS 60 MPH OR GREATER. THE POSTED SPEED LIMITS DISPLAYED WITHIN THE ACTIVE WORK ZONE MAY VARY BETWEEN 55 MPH TO 70 MPH, DEPENDENT UPON ROAD WORK CONDITIONS AND THE ORIGINAL SPEED LIMIT OF THE FACILITY.
4. THIS APPLICATION IS FOR SHORT-TERM ACTIVITIES (i.e. LANE CLOSURES AND ROAD CLOSURES). THE MAXIMUM LANE CLOSURE LENGTH IS 2 MILES UNLESS OTHERWISE SHOWN IN THE PLANS. THE "WZVSLR" SHALL NOT BE IN OPERATION CONTINUOUSLY (24/7) FOR A PERIOD EXCEEDING 30 CALENDAR DAYS.
5. ALL ORIGINAL SPEED LIMIT SIGNS SHALL BE COVERED OR REMOVED. THE DIGITAL SPEED LIMIT SIGNS WILL TAKE THE PLACE OF ALL ORIGINAL STATIONARY SPEED LIMIT SIGNS. THE DIGITAL SPEED LIMIT SIGNS MAY BE TRAILER MOUNTED OR STATIONARY MOUNTED.
6. THE STATE TRAFFIC ENGINEER HAS TO ORDINANCE THE "WZVSLR" IN ORDER FOR THE REDUCTION AND/OR $250 SPEEDING FINE TO BE VALID AND ENFORCEABLE. NO SPEED LIMIT MESSAGES/SIGNS SHALL BE INSTALLED PRIOR TO RECEIVING A SIGNED ORDINANCE. IN ADDITION, THE $250 SPEEEDING FINE ALSO REQUIRES A SEPARATE SIGNED ORDINANCE BY THE STATE TRAFFIC ENGINEER.
6. EACH DIRECTION OF THE PROJECT IS TO BE EVALUATED FOR THE "WZVSLR". THIS DRAWING INTENTIONALLY HAS 1 DIRECTION SIGNED AS A REMINDER TO CAREFULLY CONSIDER WHETHER BOTH DIRECTIONS OF THE PROJECT NEED TO HAVE THE SPEED LIMIT REDUCED.

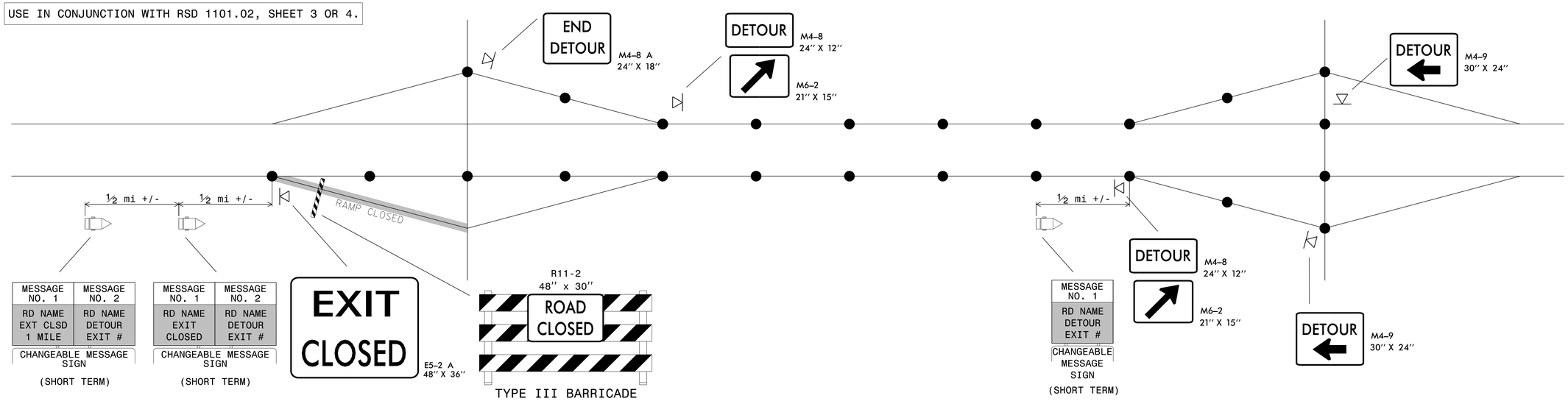
DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

WORK ZONE "VARIABLE" SPEED LIMIT REDUCTION USING DIGITAL SPEED LIMIT SIGNS

PROJ. REFERENCE NO.	SHEET NO.
I-5844	DETAIL 4

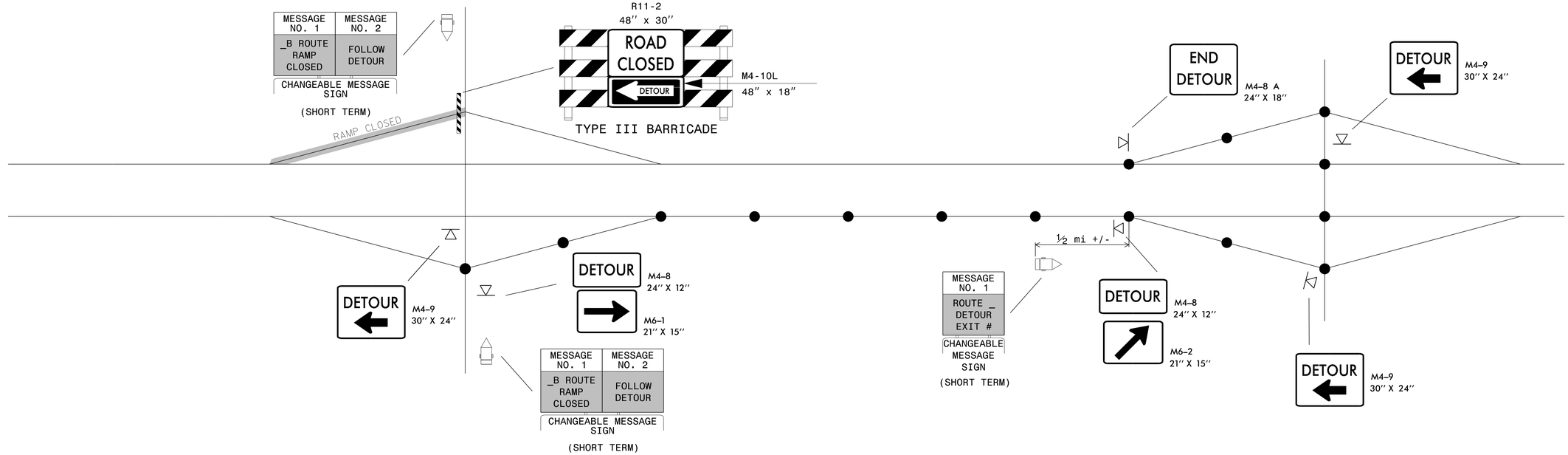
SHORT TERM CLOSURE AND DETOUR OF OFF-RAMP TO ADJACENT INTERCHANGE

USE IN CONJUNCTION WITH RSD 1101.02, SHEET 3 OR 4.



SHORT TERM CLOSURE AND DETOUR OF ON-RAMP TO ADJACENT INTERCHANGE

USE IN CONJUNCTION WITH RSD 1101.02, SHEET 3 OR 4.



GENERAL NOTES:
1. THIS DRAWING IS INTENDED FOR USE DURING SHORT TERM CLOSURES OF INTERSTATE AND FREEWAY RAMPS.
2. RAMP CLOSURES SHALL BE APPROVED BY THE ENGINEER.
3. IF RAMP CLOSURE RESTRICTIONS APPLY, SEE SPECIAL PROVISION, "INTERMEDIATE CONTRACT TIMES AND LIQUIDATED DAMAGES".
4. ADDITIONAL CHANGEABLE MESSAGE SIGNS AND POSSIBLE DETOUR SIGNS MAY BE NECESSARY FOR MORE COMPLEX CLOSURES/DETOURS. COMPENSATION FOR ADDITIONAL DEVICES SHALL BE MADE BASED ON THE UNIT BID PRICE FOR THE RESPECTIVE DEVICE.

LEGEND

PORTABLE SIGN

CHANGEABLE MESSAGE SIGN

DETOUR ROUTE

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

SHORT TERM CLOSURE AND DETOUR OF INTERSTATE/FREEWAY RAMPS

8/9/2016
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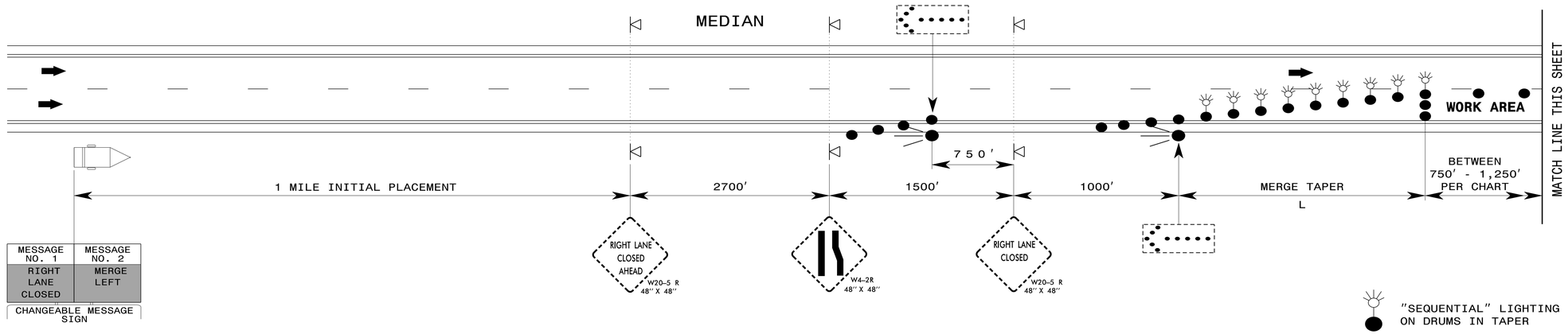
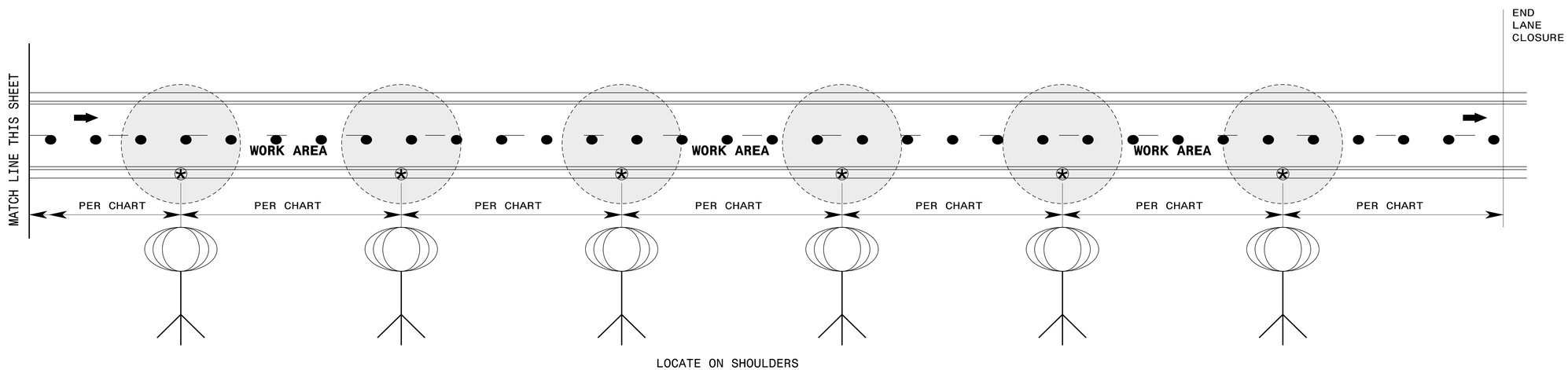
User:kedais

PROJ. REFERENCE NO.	SHEET NO.

ADVANCE WARNING AREA



WORK ZONE AREA



SPACING CHART

LIGHT OUTPUT (LUMENS)	MINIMUM LIGHTED FIXTURE AREA (SQUARE FEET)	MAXIMUM SPACING (FEET)	LIGHT UNITS (PER MILE)
50,000 TO 65,000	5.5	750'	6
66,000 TO 80,000	5.5	1,000'	5
81,000 TO 100,000	36	1,250'	4

NOTES

1) SPACE LIGHT UNITS ACCORDING TO THE CHART.

2) EACH LIGHT UNIT SHALL BE CAPABLE OF ELEVATING TO A MINIMUM HEIGHT OF 14' ABOVE THE PAVEMENT.

3) PLACE ON PAVED SHOULDER IF POSSIBLE.

APPROVED:_____ DATE:_____

SEAL D R A F T

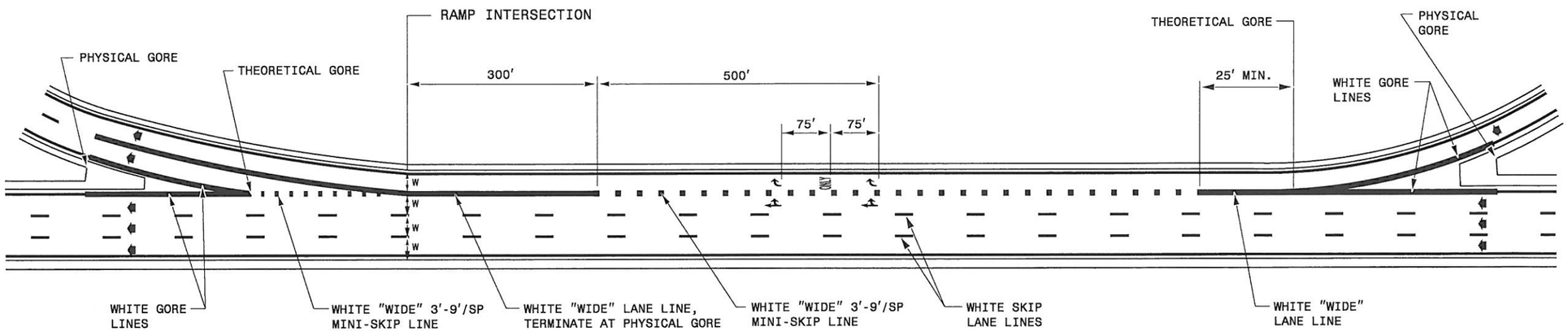
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WORK ZONE TRAFFIC CONTROL

WORK ZONE "PRESENCE" LIGHTING

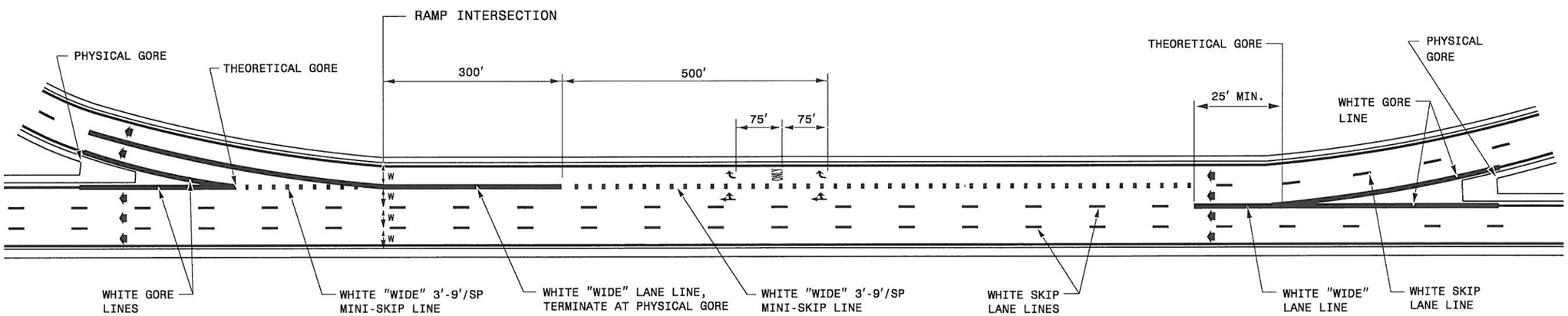
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-16

AUXILIARY LANE WITH MULTI-LANE EXIT RAMP, 2 MILES OR LESS BETWEEN RAMPS



AUXILIARY LANE WITH MULTI-LANE ENTRANCE RAMP AND EXIT RAMP, 2 MILES OR LESS BETWEEN RAMPS



GENERAL NOTES:

1- USE THE GUIDANCE SHOWN ON THE FOLLOWING DETAILS IN CONJUNCTION WITH THE EXIT RAMP GUIDANCE SHOWN ON ROADWAY STANDARD DRAWING 1205.03.

2- LANE LINES INDICATED AS "WIDE" SHALL BE AT LEAST TWICE THE WIDTH OF THE NORMAL LINE.

3- GORE LINES SHALL BE TWICE THE WIDTH OF THE NORMAL LINE.

LEGEND

W = WIDTH OF TRAVEL LANE

DIRECTION OF TRAFFIC FLOW

ONLY — PAVEMENT MARKING SYMBOLS & CHARACTERS

ENGLISH DETAIL DRAWING FOR
PAVEMENT MARKINGS
LANE DROPS
MISCELLANEOUS TYPICAL

SHEET 1 OF 2

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-16

ENGLISH DETAIL DRAWING FOR
PAVEMENT MARKINGS
LANE DROPS
MISCELLANEOUS TYPICAL

SHEET 1 OF 2

STATE OF
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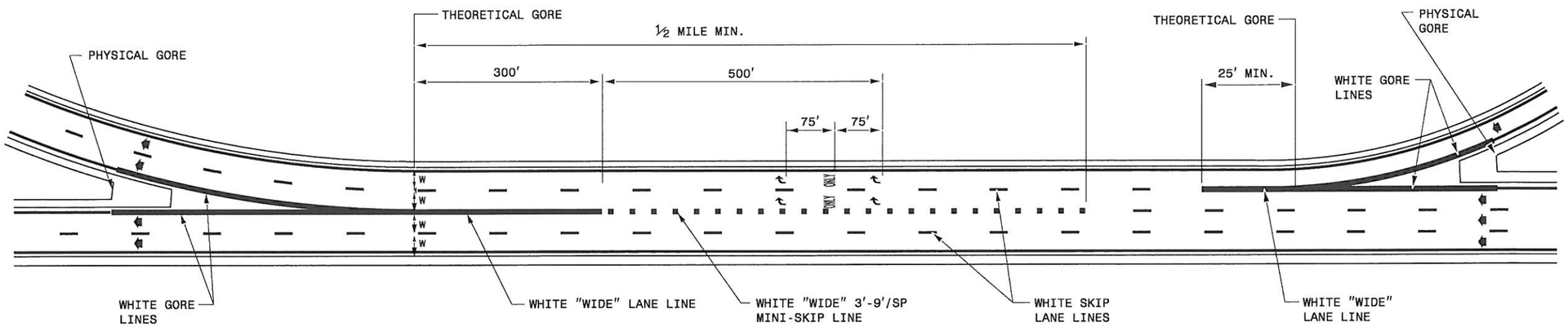
7-16

ENGLISH DETAIL DRAWING FOR
PAVEMENT MARKINGS
LANE DROPS
MISCELLANEOUS TYPICAL

SHEET 2 OF 2

LANE DROP ADJACENT TO AUXILIARY LANE



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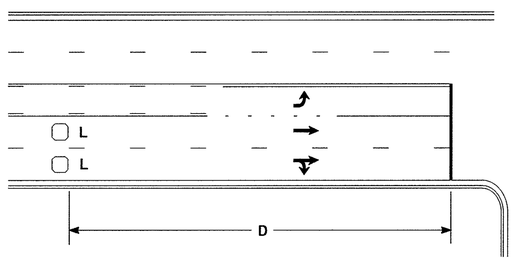
ENGLISH DETAIL DRAWING FOR
PAVEMENT MARKINGS
LANE DROPS
MISCELLANEOUS TYPICAL

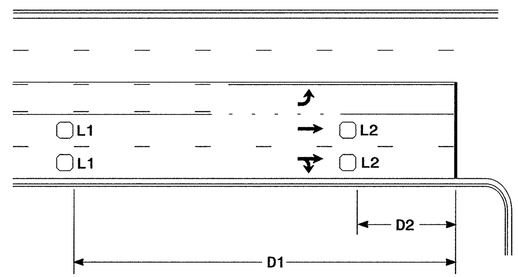
SHEET 2 OF 2

PROJECT REFERENCE NO.	SHEET NO.
I-5844	SIG 1

High Speed Detection
[≥40 mph (64 km/hr)]



OR



Speed Limit mph (km/hr)		D ft	(m)
40	(64)	250	(75)
45	(72)	300	(90)
50	(80)	355	(110)
55	(88)	420	(130)

L = 6ft X 6ft (1.8m X 1.8m)
Wired in series for TS1 Controllers
Wired separately for TS2, 170, and 2070L Controllers

Volume Density Operation

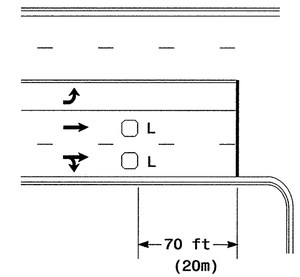
Speed Limit mph (km/hr)		D1 ft	(m)	D2 ft	(m)
40	(64)	250	(75)	80	(25)
45	(72)	300	(90)	90	(27)
50	(80)	355	(110)	100	(30)
55	(88)	420	(130)	110	(35)

L1 = 6ft X 6ft (1.8m X 1.8m) Wired in series

L2 = 6ft X 6ft (1.8m X 1.8m) Wired in series

"Stretch" Operation

Low Speed Detection
[≤35 mph (56 km/hr)]



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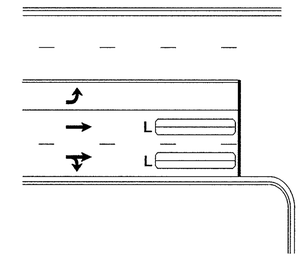
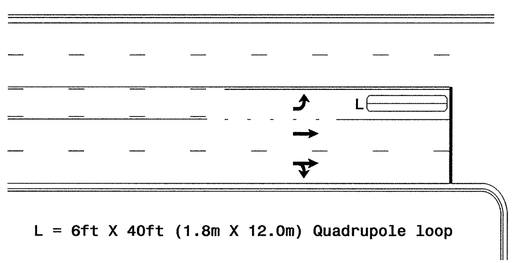


L = 6ft X 6ft (1.8m X 1.8m)
Wired in series

L = 6ft X 40ft (1.8m X 12.0m)
Quadrupole loop, wired separately

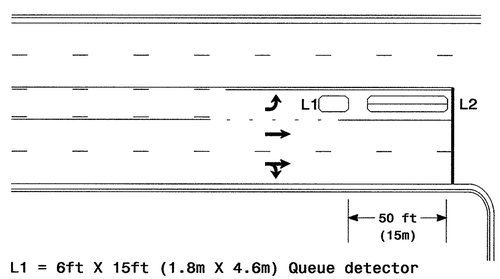
Left Turn Lane Detection



L = 6ft X 40ft (1.8m X 12.0m) Quadrupole loop

Presence Loop Detection

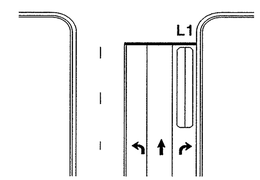
OR



L1 = 6ft X 15ft (1.8m X 4.6m) Queue detector
L2 = 6ft X 40ft (1.8m X 12.0m) Quadrupole loop

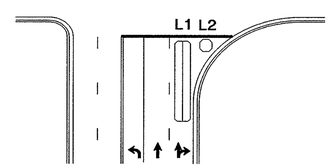
Queue Loop Detection

Right Turn Lane Detection

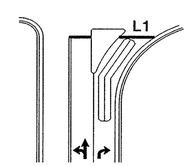


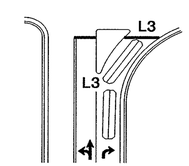
Standard Turn

L1 = 6ft X 40ft (1.8m X 12.0m) Quadrupole loop
L2 = 6ft X 6ft (1.8m X 1.8m) [Minimum] Presence loop
Wired separately
L3 = 6ft X 20ft (1.8m X 6.0m) Quadrupole loop
Wired in series



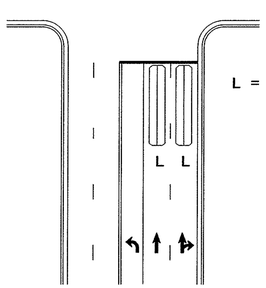
Wide Radius Turn





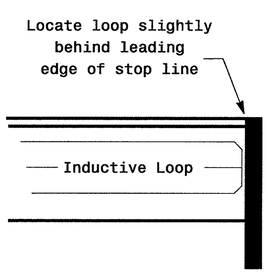
Channelized Turn

Side Street Detection



L = 6ft X 40ft (1.8m X 12.0m)
Quadrupole loop
Wired to separate detectors/channels

Presence Loop Placement at Stop Lines



Note:
Loop may be located in advance of stop line when stop line is greater than 15′ (4.5m) from edge of intersecting roadway; or, when loop detects a permissive or protected/permissive left turn.

Recommended Number of Turns

Single 6′ X 6′ (1.8m X 1.8m) loop (wired separately):

Length of Lead-in ft (m)	Number of Turns
< 250 (75)	3
250-375 (75-115)	4
375-525 (115-160)	5
> 525 (160)	6

Quadrupole loops: Use 2-4-2 turns

6′ X 15′ (1.8m X 4.6m) Loops:
Lead-in < 150′ (45 m), use 2 turns
Lead-in > 150′ (45 m), use 3 turns

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

Typical Loop Locations

PLAN DATE: June 2006	REVIEWED BY:	
PREPARED BY: P L Alexander	REVIEWED BY:	
REVISIONS	INIT.	DATE
Revise pavement markings		12/11/06

SCALE
N/A

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 23488 ENGINEER PAUL L. ALEXANDER
SIGNATURE
DATE 6/6/06
SIG. INVENTORY NO.

19-DEC-2006 14:29
s:\traffic\signals\lib turn lnmnisc\loop typical2006.dgn
palexander