STATE OF U-12
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RALEIGH, N.C. 1/6 L SHOULOER MEDIAN 1 MILE INITIAL PLACEMENT 2700' 1500' 1000' MERGE TAPER BUFFFR SEE NOTE 7 (SEE NOTE 8) SPACE MESSAGE MESSAGE NO. 2 NO. 1 LEFT LANE CLOSED AHEAD LEFT LANE LEFT MERGE LANE RIGHT W20-5 W20-5 CLOSED CHANGEABLE MESSAGE SIGN DIVIDED SHOULDER TAPER **MEDIAN** 1/3 L EMPORARY

ED MULTI-LANI NGL HSI 750' LANE 1 MILE INITIAL PLACEMENT 2700 1500' 1000' MERGE TAPER **BUFFER** SEE NDTE 7 **STANDARD** OADWA (SEE NOTE 8) SPACE MESSAGE NO. 2 MESSAGE ROADWA NO. 1 CLOSED AHEAD CLOSED RIGHT MERGE W20-5 W20-5 LANE LEFT CLOSED CHANGEABLE MESSAGE DRAWING **CLOSURE** Ó **GENERAL** NOTES 8- PLACE CHANGEABLE MESSAGE SIGN (CMS) ON THE OUTSIDE OF THE TRAVELWAY AS DIRECTED BY THE ENGINEER. PLACE CMS APPROXIMATELY 1 MILE IN ADVANCE OF THE W20-5 SIGNS. IF TRAFFIC BACKS UP TO WHERE THE CMS IS INITIALLY PLACED, RELOCATE CMS 1/2 MILE IN ADVANCE OF ANTICIPATED BACKUP. CONTINUE TO MONITOR TRAFFIC, MOVE CMS APPROXIMATELY 1/2 MILE IN ADVANCE OF ANTICIPATED BACKUP. IF NECESSARY USE THIS STD. FOR ONE-WAY CITY TYPE STREETS WHERE SIGNS MAY BE MOUNTED ON BOTH SIDES OF THE ROADWAY. ₹ PLACE ARROW BOARDS ON THE SHOULDER (PAVED OR UNPAVED). PLACE ARROW BOARDS WITHIN THE TAPER IF SHOULDERS DO NOT EXIST. MEET THE REQUIREMENTS FOR STOPPING SIGHT DISTANCE AT THE ARROW BOARD LOCATION. IF NEEDED, EXTEND LANE CLOSURES AT THE BUFFER SPACE, SUCH THAT STOPPING SIGHT DISTANCE TO THE ARROW BOARD IS MET (SEE STD. 1101.11 SHEET 2). Ĭ ANE FOR 9- DO NOT EXCEED A 2 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER. S PLACE DRUMS IN TAPERS AT THE MAXIMUM SPACING EQUAL IN FEET TO THE POSTED SPEED LIMIT. PLACE DRUMS ALONG THE WORK AREA AT THE MAXIMUM SPACING EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT. .0SE 4- REFER TO STD. 1101.11, FOR "L" DISTANCE AND BUFFER SPACE. 

CLOSED **CLOSURES** FOR LANE MPH) 9 ROADWAY ANE ROADWAYS R **TEMPORA** ENGLISH MULTI FOR DED DIVI

SHEET 4 OF 15

NORTH CAROLINA OF TRANSPORTATION ISION OF HIGHWAYS RALEIGH, N.C.

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STATE

DRAWING STANDARD

**LEGEND** 

LEFT LANE CLOSURE

200' MIN

RIGHT LANE CLOSURE

200' MIN.

ROLL-AHEAD

DISTANCE

(SEE NOTE 7)

**WORK AREA** 

**WORK AREA** 

TMA

ROLL-AHEAD

DISTANCE

(SEE NOTE 7)

FLASHING ARROW BOARD (TYPE C) FLASHING ARROW BOARD, TYPE "C" (96"X48" MIN.), "CAUTION MODE"

TRUCK MOUNTED ATTENUATOR (TMA)

CHANGEABLE MESSAGE SIGN (CMS)

PORTABLE SIGN

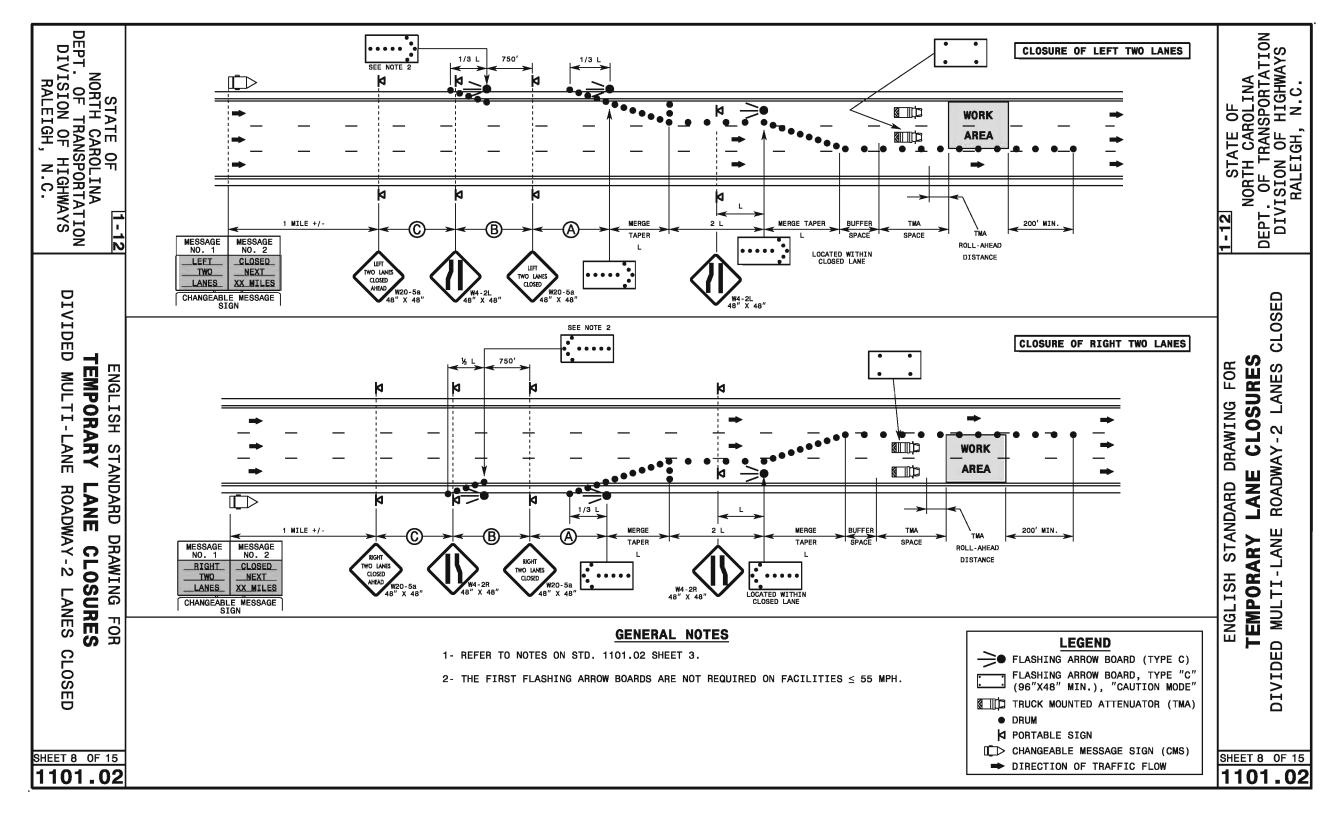
DIRECTION OF TRAFFIC FLOW

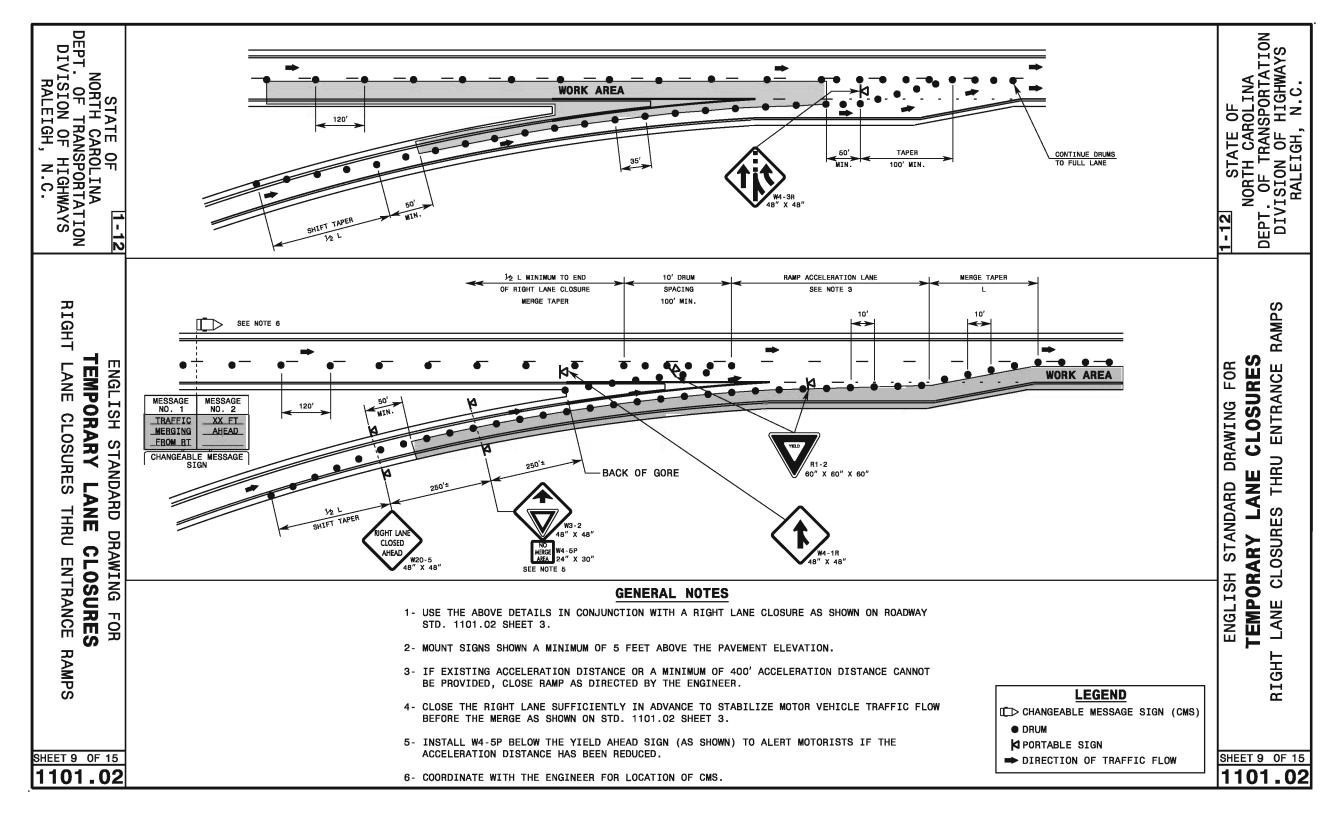
0F 15 SHEET 4

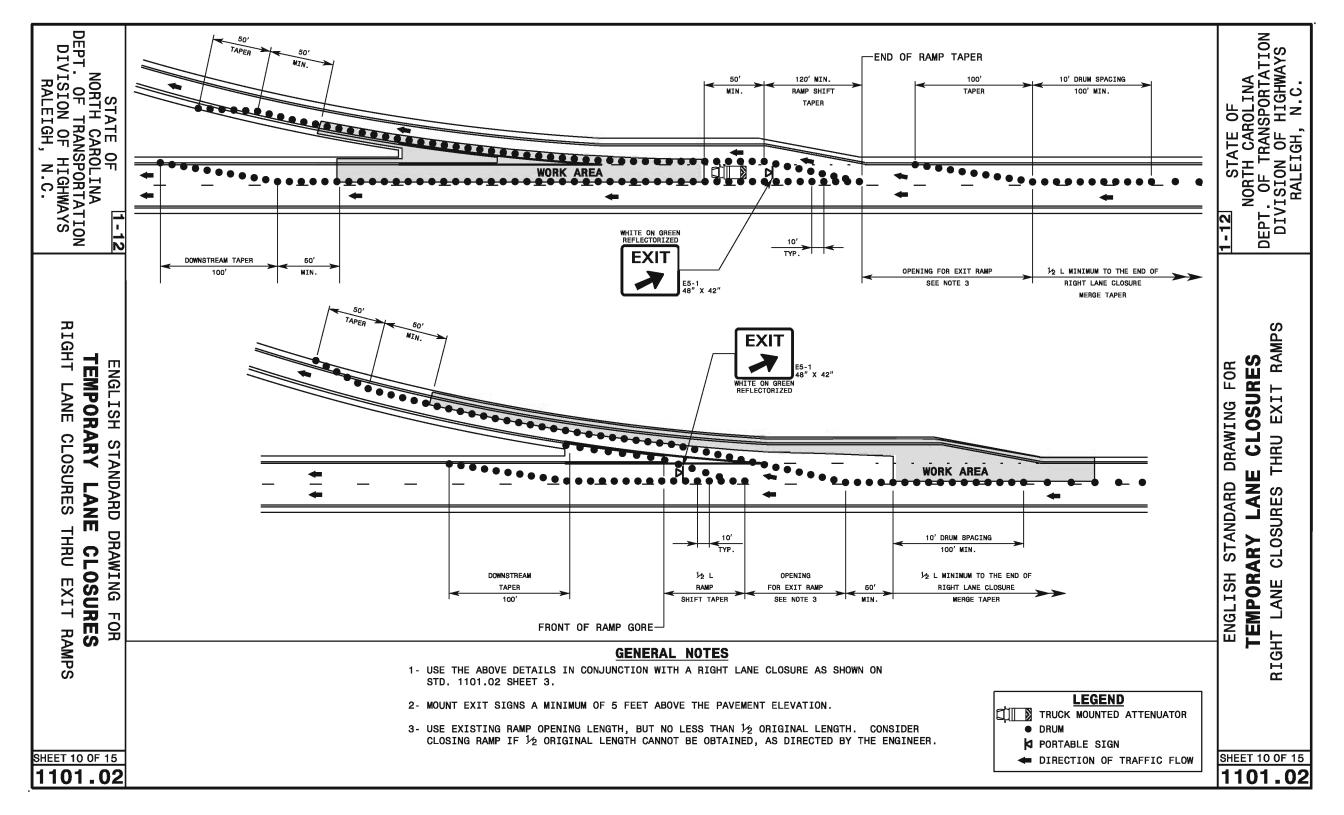
5- REFER TO STD. 1101.02 SHEETS 9 AND 10 FOR TREATMENT OF LANE CLOSURES THRU INTERCHANGES.

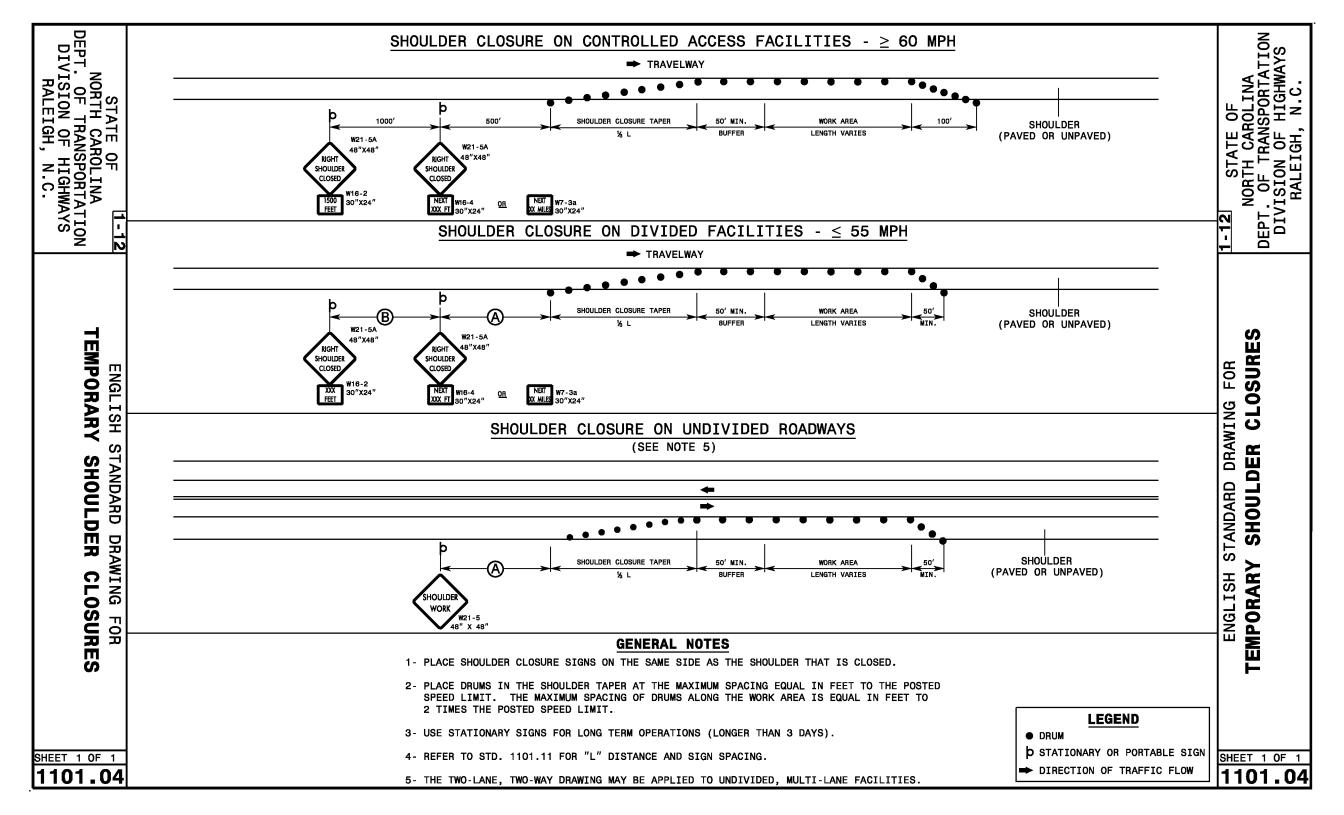
INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC. REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.

POSITION THE TMA TO MAINTAIN A ROLL-AHEAD DISTANCE AS RECOMMENDED BY THE MANUFACTURER AND CONTINUOUSLY ADVANCE TMA'S AS WORK PROGRESSES.









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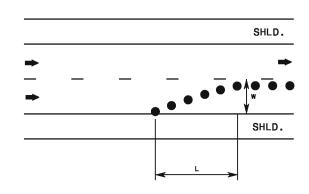
> TRAFFIC NGL HSI CONTROL STANDARD

DISTANCE AND DESIGN CHANNELIZING DRAWING TABLE FOR

DEVICE

SHEET 1 OF 4

#### EXAMPLE OF "L" & "W" DESIGNATIONS



#### TAPER LENGTH CRITERIA FOR CHANNELIZING DEVICES IN WORK ZONES

TYPES OF TAPERS	TAPER LENGTH
UPSTREAM TAPER	
MERGING TAPER	L MINIMUM
SHIFTING TAPER	1 <sub>2</sub> L MINIMUM
SHOULOER TAPER	½ L MINIMUM
TWO-WAY TRAFFIC TAPER	50 - 100 FEET MAXIMUM

	QUICK REFERENCE - "L" DISTANCE TABLE											
	MINIMUM LONGITUDINAL DISTANCE "L" (FEET) (ROUNDED VALUES)											
POSTED SPEED "S"	LATERAL WIDTH "W" (FEET)											
"S" (MPH)	1	2	3	4	5	6	7	8	9	10	11	12
20	10	15	20	30	35	40	50	55	60	70	75	80
25	15	25	35	45	55	65	75	85	95	105	115	125
30	15	30	45	60	75	90	105	120	135	150	165	180
35	25	45	65	85	105	125	145	165	185	205	225	245
40	30	55	80	110	135	160	190	215	240	270	295	320
45	45	90	135	180	225	270	315	360	405	450	495	540
50	50	100	150	200	250	300	350	400	450	500	550	600
55	55	110	165	220	275	330	385	440	495	550	605	660
60	60	120	180	240	300	360	420	460	540	600	660	720
85	65	130	195	260	325	390	455	520	585	650	715	780
70	70	140	210	280	350	420	490	560	630	700	770	640

#### **GENERAL NOTES**

1- TABLE FOR "L" DISTANCE IS BASED ON CHANNELIZATION TAPER FORMULA FROM THE M.U.T.C.D.

SPEED LIMIT **FORMULA** 40 MPH OR LESS L<sub>MIN</sub>= W x S 45 MPH OR GREATER

L = MINIMUM TAPER LENGTH IN FEET (LONGITUDINAL DISTANCE)

W = WIDTH OF OFFSET IN FEET (LATERAL DISTANCE)

S = POSTED SPEED LIMIT, OR OFF-PEAK 85 PERCENTILE SPEED IN MPH PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED IN MPH

2- "L" DISTANCE IS FOR APPLICATION WITH CHANNELIZING DEVICE AND PAVEMENT MARKING TAPERS AND TRANSITIONS. CHANNELIZING DEVICES INCLUDE DRUMS, CONES, TUBULAR MARKERS, BARRICADES, RAISED ASPHALT ISLANDS, AND VERTICAL PANELS.

**CHANNELIZING** DRAWING DESIGN STANDARD AND CONTROL DISTANCE ENGLISH TRAFFIC

NORTH DEPT. OF TI DIVISION

**TABLES** 

CRITERI

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FOR

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ENGLISH STANDAR TRAFFIC CONTROL BUFF ER SPACE SIGHT **DESIGN** DISTANCE

**STANDARD** DRAWING **TABLI** 8

ES

DESIGN	MINIMUM SIG	MINIMUM Longitudinal	
SPEED (MPH)	STOPPING SIGHT DISTANCE (FEET)	PASSING SIGHT DISTANCE (FEET)	BUFFER SPACE (FEET)
30	200	1090	85
35	250	1280	120
40	305	1470	155
45	360	1625	195
50	425	1835	240
55	495	1985	290
60	570	2135	345
65	645	2285	405
70	730	2480	470
75	820	2580	540
80	910	2660	615

#### **GENERAL NOTES**

- 1- TABLES ARE BASED ON THE AASHTO GREEN BOOK "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AND THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES". MINIMUM SIGHT DISTANCE VALUES ARE FOR PASSENGER CAR VEHICLES ON WET AND LEVEL ROADWAYS. CONSULT THE AASHTO GREEN BOOK TO MAKE FINAL DETERMINATION OF STOPPING SIGHT DISTANCE REQUIREMENTS.
- 2- BUFFER SPACE TABLE IS BASED ON THE BRAKING DISTANCE PORTION OF STOPPING SIGHT DISTANCE FOR WET AND LEVEL PAVEMENTS.
- 3- USE OF STOPPING SIGHT DISTANCE IN TRAFFIC CONTROL PLAN APPLICATIONS INCLUDES PROVIDING SIGHT DISTANCE FOR TRAFFIC APPROACHING A LANE CLOSURE. PROVIDE 2-LANE, 2-WAY ROADWAYS STOPPING SIGHT DISTANCE TO THE FLAGGER. FOR LANE CLOSURES ON MULTILANE ROADWAYS PROVIDE STOPPING SIGHT DISTANCE TO THE BEGINNING OF THE LANE CLOSURE MERGE TAPER, OR FLASHING ARROW BOARD. EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED.
- 4- USE OF MINIMUM PASSING SIGHT DISTANCE TABLE IN TRAFFIC CONTROL PLAN APPLICATIONS INCLUDES PROVIDING SIGHT DISTANCE REQUIREMENTS FOR PLACEMENT OF PAVEMENT MARKING PASSING/NO-PASSING ZONES FOR 2-LANE, 2-WAY ROADWAYS.

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

**TABLES** FOR DRAWING DESIGN STANDARD CONTROL **ENGLISH** BUFFER TRAFFIC

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NORTH CAROLINA . OF TRANSPORTATION ISION OF HIGHWAYS RALEIGH, N.C. STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS RALEIGH NORTH DEPT. OF TH DIVISION TEMPORARY BARRIER **FLARE RATES** POSTED SPEED LIMIT (MPH) 1-12 ANCHOREO (A:B) UNANCHORED (A:B) ≤ 30 8:1 7:1 8:1 35 9:1 40 10:1 8:1 45 12:1 10 : 1 50 14:1 11:1 **TABLES** TRAFFIC 55 18 : 1 12 : 1 60 18:1 14:1 TEMPORARY 19:1 15 : 1 RATES FOR **ENGLISH** 70 20 : 1 15 : 1 DRAWING DESIGN FLARE CONTROL STANDARD **BARRIER** BARRIER STANDARD CONTROL TEMPORARY BARRIER PARALLEL TO TRAVEL LANE DESIGN DRAWING **FLARE** LENGTH OF FLARE **TEMPORARY** ENGLISH **RATES** TRAFFIC FOR **TABLES GENERAL NOTES** 1- REFER TO 2002 ROADSIDE DESIGN GUIDE. 2- A BARRIER IS CONSIDERED FLARED WHEN IT IS NOT PARALLEL TO THE EDGE OF THE TRAVELWAY. 3- THE PRIMARY USE OF BARRIERS ARE FOR WORK AREA PROTECTION. WHEN SERVING THE ADDITIONAL FUNCTION OF A CHANNELIZING DEVICE, SUCH AS WHEN SHIFTING TRAFFIC, BARRIER TAPERS SHALL MEET STANDARD CHANNELIZING TAPER LENGTHS AS SHOWN ON STD. 1101.11 SHEET 1. SHEET 3 OF 4 SHEET 3 OF 4 1101

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DIVISION OF HIGHWAYS
RALEIGH, N.C.

TRAFFIC SPACING C

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CONTROL

SIGNS I

**TABLES** 

**ENGLISH** 

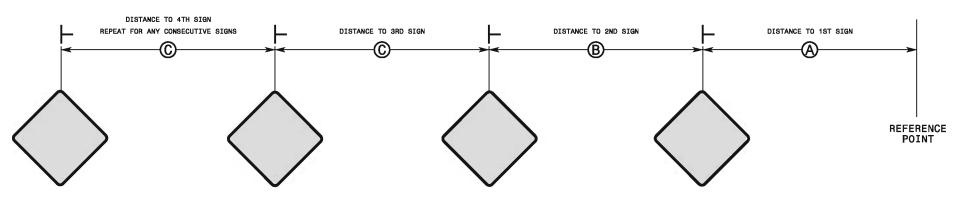
STANDARD

DRAWING

FOR

ADVANCE WARNING SIGN Spacing Chart					
RECOMMENDED Distance Between Signs (Feet)±					
<b>(A)</b>	B	0			
200	200	200			
350	350	350			
500	500	500			
1000	1500	2700			
	G CHART R DISTANO 200 350 500	RECOMMENDE			

STATIONARY OR PORTABLE SIGNS



**GENERAL NOTES** 

- 1- REFER TO 2009 MUTCD.
- 2- USE THIS STANDARD DRAWING IN CONJUNCTION WITH OTHER TRAFFIC CONTROL ROADWAY STANDARD DRAWINGS WHERE SIGN SPACING DISTANCES A, B, C, ARE SPECIFIED.
- 3- APPLY THE ADVANCE WARNING SIGN SPACING CHART WHERE A SERIES OF 2 OR MORE SIGNS ARE USED. ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE. FIELD ADJUST AS VARIOUS CONDITIONS OCCUR, SUCH AS LIMITED SIGHT DISTANCE, OBSTRUCTION INTERFERENCE, ETC.

ENGLISH STANDARD DRAWING FOR TRAFFIC CONTROL DESIGN TABLES

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

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SIGNS

**TEMPORARY** 

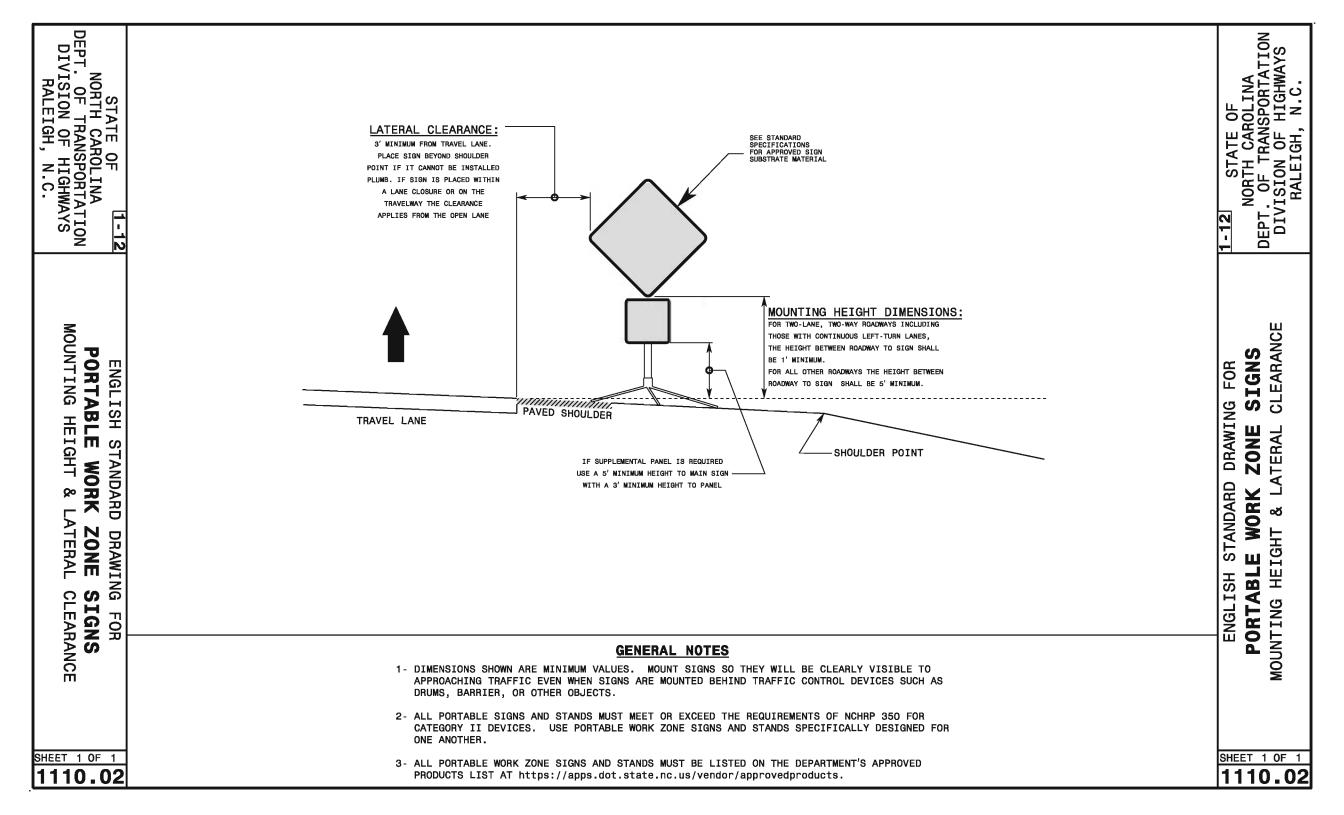
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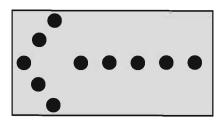
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**ENGL** FLASHING HSI. STANDARD ARROW DRAWING **BOARDS** 

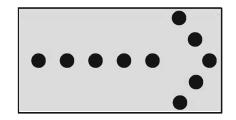
FOR

### FLASHING ARROW BOARD MODES

#### FLASHING ARROW RIGHT LANE CLOSURE



FLASHING ARROW LEFT LANE CLOSURE



TYPICAL FLASHING ARROW BOARD

FLASHING ARROW BOARD TYPE

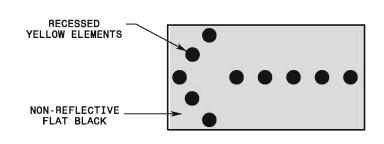
MINIMUM LEGIBILITY

DISTANCE

(MILES)

MINIMUM NUMBER

OF ELEMENTS



MINIMUM SIZE

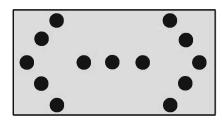
(W x H INCHES

96 X 48

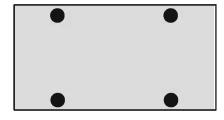
PANEL

TYPE

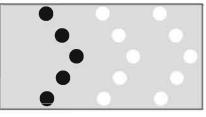
FLASHING DOUBLE ARROW CENTER LANE CLOSURE



FLASHING CAUTION MODE



MOVING CHEVRON



ONE CHEVRON WILL BE LIT ON THE BOARD AT A TIME, MOVING TOWARD THE DIRECTION OF OPEN TRAFFIC

#### **GENERAL NOTES**

- 1- DO NOT USE STRAIGHT-LINE CAUTION OR CHEVRON DISPLAYS.
- 2- USE A MINIMUM MOUNTING HEIGHT OF 7 FEET FROM GROUND LEVEL TO THE BOTTOM OF THE PANEL FOR TRAILER-MOUNTED ARROW BOARDS, EXCEPT ON VEHICLE-MOUNTED PANELS WHICH SHOULD BE AS HIGH AS PRACTICAL.
- 3- USE ARROW BOARD ELEMENTS CAPABLE OF A MINIMUM 50 PERCENT DIMMING FROM THEIR FULL RATED LAMP VOLTAGE. USE FULL LAMP VOLTAGE DURING THE DAY, AND USE THE DIMMED MODE AT NIGHT.
- 4- DO NOT USE ARROW BOARDS IN FLASHING ARROW MODE ON A TWO-LANE, TWO-WAY ROADWAY DURING A ONE LANE OPERATION, NOR ON MULTILANE ROADWAYS WHEN SHIFTING ALL TRAFFIC LANES LATERALLY.
- 5- SEE THE DEPARTMENT'S APPROVED PRODUCTS LIST AT https://apps.dot.state.nc.us/vendor/approvedproducts.

# BOARDS STANDARD DRAWING **ARROW** FLASHING **ENGLISH**

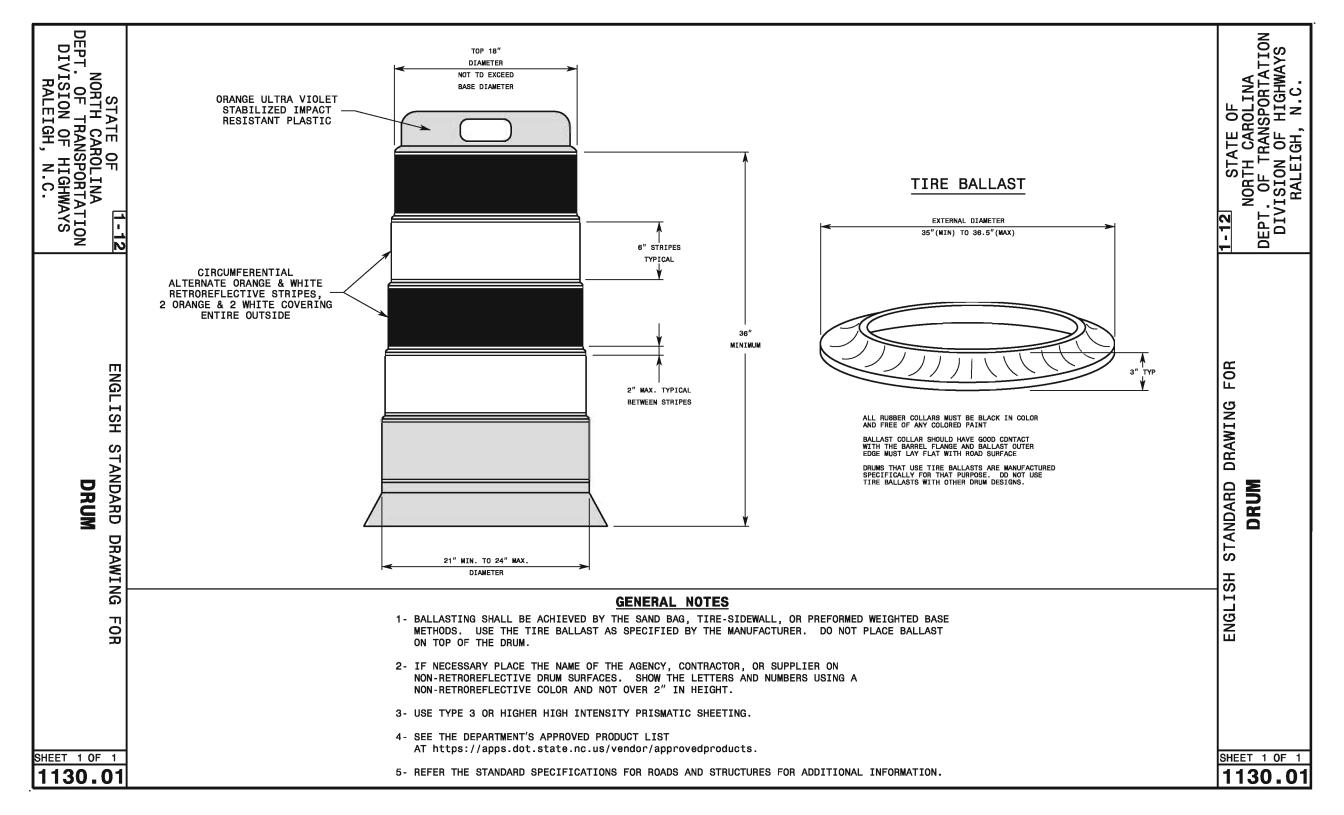
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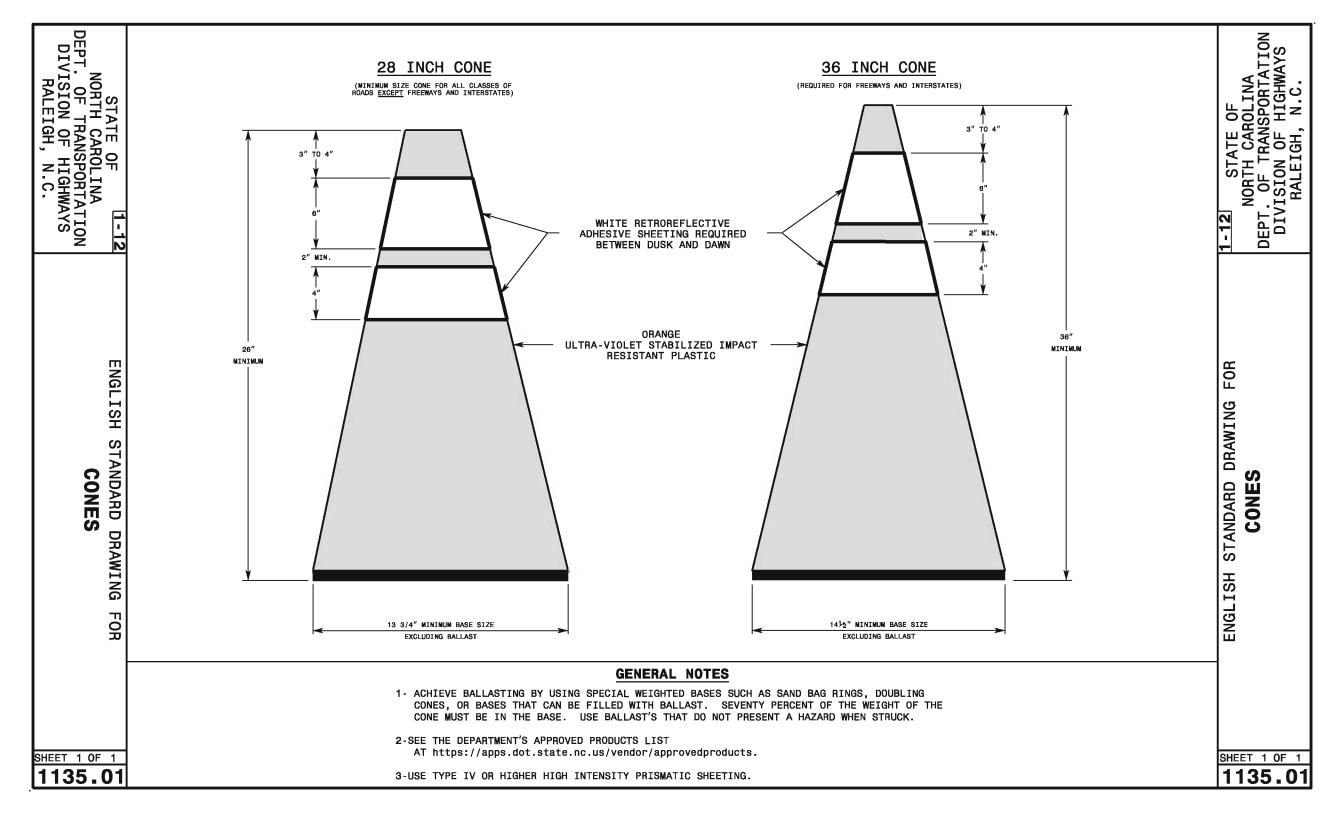
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### WORK NGLISH VEHICLE STANDARD LIGHTING DEL INEAT DRAWING I Q N SYSTEMS FOR

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#### LIGHT SYSTEM OPTIONS

- I. TRUCKS WITHOUT DUMP BODIES CHOICE OF EITHER:

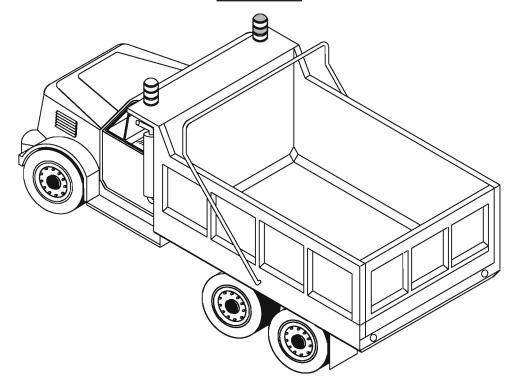
  A. LIGHT BARS (15" MINIMUM) EITHER LED OR ROTATING FLASH
  WITH FULL AMBER LIGHTS AND AMBER DOME OR LIGHT BARS
  MAY BE HALF AMBER/HALF WHITE WITH AMBER DOME.
  (ALL WHITE LIGHT SYSTEMS ARE PROHIBITED)
- B. 2 HIGH INTENSITY STROBES (CLASS 2) AMBER LED/AMBER FLASH AND AMBER DOME MOUNTED ON EACH SIDE OF THE HEADBOARD
- II. TRUCKS WITH DUMP BODIES- (NOT REQUIRED, BUT ENCOURAGED)
- A. 2 HIGH INTENSITY STROBES (CLASS 2)- AMBER LED/AMBER FLASH AND AMBER DOME MOUNTED ON EACH SIDE DF THE CAB PROTECTOR

## BLACK STRIPES NON-REFLECTIVE YELLOW STRIPES REFLECTIVE SHEETING TRAILER LIGHT SYSTEM

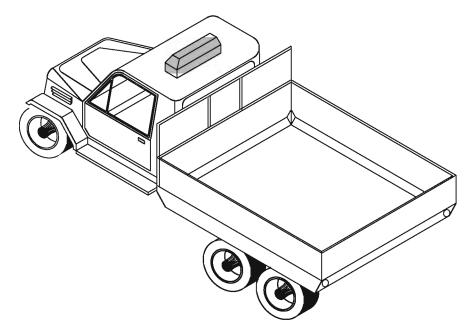
TMA DELINEATION

ENTIRE END OF ATTENUATOR SHALL BE DELINEATED

**DUMP BODY** 







#### **GENERAL NOTES FOR TMA REQUIREMENTS**

- 1- WHEN TMA'S USED FOR SHADOW VEHICLES, CONTACT THE TMA MANUFACTURER FOR SPECIFIC TRUCK REQUIREMENTS.
- 2- TMA MUST MEET OR EXCEED THE REQUIREMENTS OF NCHRP 350 TEST LEVEL II FOR WORK ZONES WITH POSTED SPEED LIMIT OF 45 MPH OR LESS; OR TEST LEVEL III FOR WORK ZONES WITH POSTED SPEED LIMIT OF 50 MPH OR GREATER. TMA MAY EITHER BE TRUCK MOUNTED OR TRAILER MOUNTED.
- 3- SEE THE DEPARTMENT'S APPROVED PRODUCT LIST AT https://apps.dot.state.nc.us/vendor/approvedproducts.

SYSTEMS FOR NOI STANDARD DRAWING **DELINEAT** LIGHTING **TMA** VEHICLE AND WORK

NORTH CARŎĹINA . OF TRANSPORTATION /ISION OF HIGHWAYS RALEIGH, N.C.

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STATE OF
NORTH CAROLINA
EPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS 4" MIN. DIAMETER NOT TO EXCEED BASE DIAMETER DEPT OF T DIVISION NORTH 6" MAX. STRIPES TYPICAL CIRCUMFERENTIAL ALTERNATE FLUORESCENT WHITE & ORANGE RETROREFLECTIVE STRIPES, 2 ORANGE & WHITE MINIMUM COVERING ENTIRE OUTSIDE TYPICAL BALLAST 20" MAX. BALLAST CIRCULAR DR EQUAL IN FOR ENGLISH 42" SIZE POLYGONAL SHAPE MINIMUM DRAWING 2" MAX. TYPICAL BETWEEN STRIPES NON-REFLECTIVE SKINNY-DRUM SKINNY-DRUM STANDARD ORANGE ULTRA-VIOLET STABILIZED IMPACT RESISTANT PLASTIC STANDARD DRAWING BALLAST WILL BE A MINIMUM OF 15 POUNDS **ENGLISH** FOR 7.5" MIN. **GENERAL NOTES** 1- USE BALLAST AS SPECIFIED BY THE MANUFACTURER. DO NOT PLACE BALLAST ON TOP OF THE 3- REFER TO SECTION 1180, STANDARD SPECIFICATIONS FOR ROADS AND INSTRUCTIONS FOR DRUM. ADDITIONAL REQUIREMENTS. 2- IF NECESSARY, PLACE THE NAME OF THE AGENCY, CONTRACTOR, OR SUPPLIER ON 4- USE TYPE 3 OR HIGHER HIGH INTENSITY PRISMATIC SHEETING. NON-RETROREFLECTIVE SURFACES. SHOW THE LETTERS AND NUMBERS USING A NON-RETROREFLECTIVE COLOR AND NOT OVER 2" IN HEIGHT. 5- SEE THE DEPARTMENT'S APPROVED PRODUCTS LIST SHEET 1 OF 1 SHEET 1 OF 1 AT https://apps.dot.state.nc.us/vendor/approvedproducts.

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