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DEPARTMENT OF TRANSPORTATION
ROADWAY DESIGN DIVISION
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CLAY BRIGHT
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BILL LEE
GOVERNOR

INSTRUCTIONAL BULLETIN NO. 19-04

Regarding New Standard Drawings for RD11s And Existing RD01 Drawings

Effective August 9, 2019 letting (May 29, 2019 Turn-in), the following standard drawings have been developed to confirm AASHTO, "A policy on Geometric Design of Highways" and Streets, 6th Edition, 2011.

The Roadway Design CADD unit will not make changes to existing criteria files to accommodate changes in cross slope for third, fourth and additional travel lanes as shown in Roadway Standard Drawings **RD11-SE-1, RD11-TS-2A, RD11-TS-2B, RD11-TS-3A, RD11-TS-3B, RD11-TS-3C, RD11-TS-5, RD11-TS-5A and RD11-TS-5B.** Designers shall refer to the Geopak Road Course Guide, Exercise 13, Page 13-7, Step 5 and manually input the slopes for additional lanes as specified in the listed Standard Drawings.

Changes in slopes for additional travel lanes as shown in Roadway Standard Drawings **RD11-SE-1, RD11-TS-2A, RD11-TS-2B, RD11-TS-3A, RD11-TS-3B, RD11-TS-3C, RD11-TS-5, RD11-TS-5A and RD11-TS-5B** does not apply to resurfacing projects.

Also, Chapter 5, Index of Standard Drawings, of the Roadway Design Guidelines has been revised to incorporate these changes.

New Standard Drawings:

DRAWING NUMBER	REVISION DATE	DESCRIPTION
RD11-LR-1(1)		MINIMUM RUNOFF LENGTHS (L_R) FOR URBAN HIGHWAYS
RD11-LR-2(1)		MINIMUM RUNOFF LENGTHS (L_R) FOR RURAL HIGHWAYS
RD11-S-11(1)		DESIGN AND CONSTRUCTION DETAILS FOR ROADSIDE SLOPE DEVELOPMENT
RD11-S-11A(1)		ROADSIDE DITCH DETAILS FOR DESIGN AND CONSTRUCTION

DRAWING NUMBER	REVISION DATE	DESCRIPTION
RD11-S-11B[2]		DESIGN AND CONSTRUCTION DETAILS FOR ROCK CUT SLOPE AND CATCHMENT (Replaced RD01-S-11B)
RD11-SA-1[1]		SAFETY APPROACH TO UNDERPASSES GRADING DESIGN AND SLOPE PROTECTION
RD11-SD-1[1]		INTERSECTION SIGHT DISTANCE DESIGN AND GENERAL NOTES
RD11-SD-2[1]		INTERSECTION SIGHT DISTANCE LANDSCAPE AND OBSTRUCTION
RD11-SD-3[1]		INTERSECTION SIGHT DISTANCE 2-LANE ROADWAYS
RD11-SD-4[1]		INTERSECTION SIGHT DISTANCE 4-LANE AND 5-LANE UNDIVIDED ROADWAYS
RD11-SD-5[1]		INTERSECTION SIGHT DISTANCE 4-LANE DIVIDED HIGHWAYS
RD11-SD-6[1]		INTERSECTION SIGHT DISTANCE 6-LANE DIVIDED HIGHWAYS
RD11-SD-7[2]		INTERSECTION SIGHT DISTANCE FOR PASSIVE RAILROAD HIGHWAY GRADE CROSSINGS
RD11-SE-1[2]		TRANSITION AND CROSS SLOPE DETAILS
RD11-SE-2[2]		SUPERELEVATION TRANSITION DETAILS FOR UNDIVIDED ROADWAYS
RD11-SE-2A[2]		SUPERELEVATION TRANSITION SECTIONS FOR UNDIVIDED ROADWAYS
RD11-SE-3[2]		SUPERELEVATION TRANSITION DETAILS FOR DIVIDED ROADWAYS
RD11-SE-3A[2]		SUPERELEVATION TRANSITION SECTIONS FOR DIVIDED ROADWAYS
RD11-TS-1[1]		DESIGN STANDARDS FOR LOW-VOLUME ROADS
RD11-TS-1A[2]		DESIGN STANDARDS FOR LOCAL ROADS AND STREETS
RD11-TS-2[1]		DESIGN STANDARDS FOR COLLECTORS, 2-LANE ROADS AND STREETS

DRAWING NUMBER	REVISION DATE	DESCRIPTION
RD11-TS-2A[2]		DESIGN STANDARDS FOR COLLECTOR HIGHWAYS WITH DEPRESSED MEDIAN (4 AND 6 LANE)
RD11-TS-2B[2]		DESIGN STANDARDS FOR COLLECTOR HIGHWAYS WITH FLUSH MEDIAN (4 AND 6 LANE)
RD11-TS-3[2]		DESIGN STANDARD FOR ARTERIAL HIGHWAYS (2-LANE)
RD11-TS-3A[1]		DESIGN STANDARDS FOR ARTERIAL HIGHWAYS WITH DEPRESSED MEDIAN (4 AND 6 LANE)
RD11-TS 3B[2]		DESIGN STANDARDS FOR ARTERIAL HIGHWAYS WITH FLUSH MEDIAN (4 AND 6 LANE)
RD11-TS-3C[2]		DESIGN STANDARDS FOR ARTERIALS WITH INDEPENDENT ROADWAYS (4 AND 6 LANE)
RD11-TS-4[2]		DESIGN STANDARDS FOR ARTERIAL AND FREEWAY RAMPS (1, 2 AND 3 LANE)
RD11-TS-5[1]		DESIGN STANDARDS FOR FREEWAYS WITH DEPRESSED MEDIAN (4 AND 6 LANE)
RD11-TS-5A[2]		DESIGN STANDARDS FOR FREEWAYS WITH INDEPENDENT ROADWAYS (4 AND 6 LANE)
RD11-TS-5B[2]		DESIGN STANDARDS FOR FREEWAYS WITH MEDIAN BARRIER (4 AND 6 LANE)
RD11-TS-5W[1]		TYPICAL DETAIL FOR INSIDE LANE WIDENING OF FREEWAYS
RD11-TS-6[1]		TYPICAL CURB & GUTTER SECTIONS WITH SHOULDERS AND WITH GRASS STRIPS
RD11-TS-6A[1]		TYPICAL CURB & GUTTER SECTIONS WITHOUT SHOULDERS AND WITH GRASS STRIPS
RD11-TS-6B[1]		TYPICAL CURB AND GUTTER SECTIONS WITH SHOULDERS AND WITHOUT GRASS STRIPS
RD11-TS-6C[1]		TYPICAL CURB AND GUTTER SECTIONS WITHOUT SHOULDERS AND WITHOUT GRASS STRIPS
RD11-TS-7[1]		DESIGN STANDARDS 2-LANE CURB & GUTTER WITH CONTINUOUS 2-WAY LEFT-TURN LANE WITHOUT GRASS STRIPS

DRAWING NUMBER	REVISION DATE	DESCRIPTION
RD11-TS-7A[1]		DESIGN STANDARDS 2-LANE CURB & GUTTER WITH CONTINUOUS 2-WAY LEFT-TURN LANE WITH GRASS STRIPS
RD11-TS-7B[2]		DESIGN STANDARDS 2-LANE HIGHWAYS WITH CONTINUOUS 2-WAY LEFT-TURN LANE
RD11-TS-9[2]		DESIGN STANDARDS FOR SINGLE LANE URBAN AND RURAL ROUNDABOUTS
RD11-TS-10[2]		DESIGN STANDARDS FOR MULTI-LANE URBAN AND RURAL ROUNDABOUTS
Revised Standard Drawings:		
RD01-TS-6[3]	01-07-19	TYPICAL CURB AND GUTTER SECTIONS WITH SHOULDERS
RD01-TS-6A[3]	01-07-19	TYPICAL CURB AND GUTTER SECTIONS WITHOUT SHOULDERS
RD01-TS-7A[3]	01-07-19	DESIGN STANDARDS 2 LANE CURB & GUTTER WITH CONTINUOUS 2-WAY LEFT-TURN LANE
RD01-TS-9[3]	01-07-19	DESIGN STANDARDS FOR SINGLE LANE URBAN AND RURAL ROUNDABOUTS
RD01-TS-10[3]	01-07-19	DESIGN STANDARDS FOR MULTI-LANE URBAN AND RURAL ROUNDABOUTS

Note 1: F.H.W.A. approval was given on 01/24/19.
Note 2: F.H.W.A. approval was given on 02/26/19.
Note 3: Minor revisions, revised details and/or notes, redrew sheet.

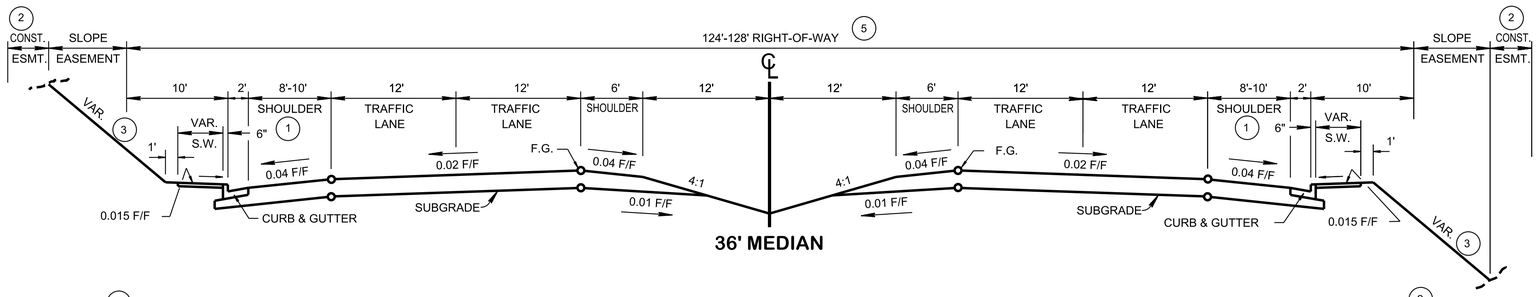
These standard drawings revised the Roadway Design Guidelines, Chapter 5, Index of Standard Drawings and are available online.

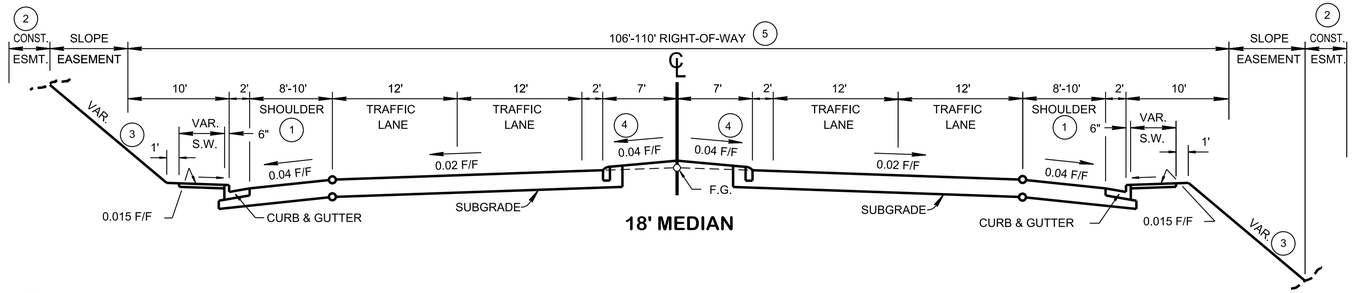
Standard Drawings:
https://www.tn.gov/content/tn/tdot/roadway-design/standard-drawings-library/standard-roadway-drawings.html

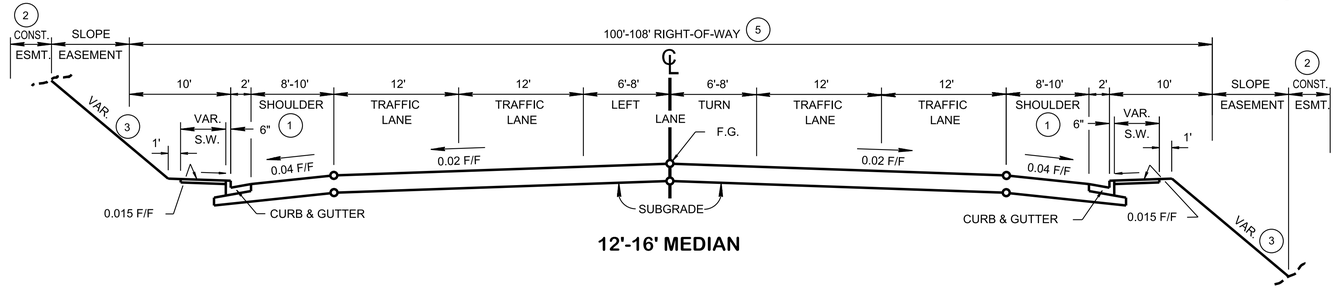
Roadway Design Guidelines:
https://www.tn.gov/content/tn/tdot/roadway-design/design-standards/design-guidelines.html

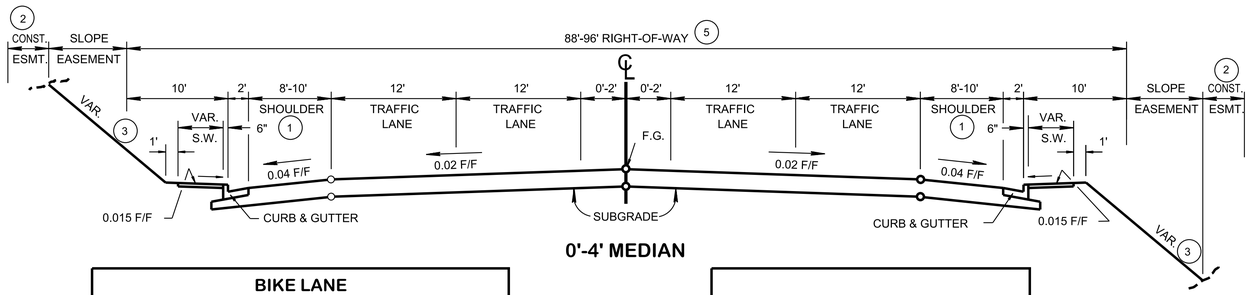
Jennifer Lloyd, PE
Civil Engineering Director
Roadway Design Division

KJL:ARH:RBB:LLP
February 15, 2019



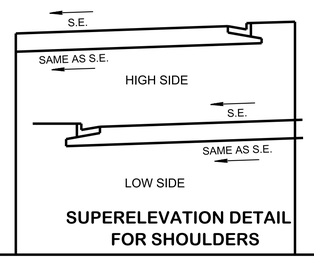




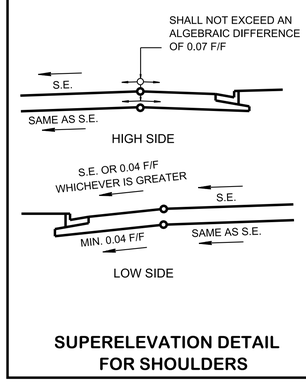


BIKE LANE SHOULDER CROSS SLOPES

ON PROJECTS, WHERE IN THE NEAR FUTURE THE SHOULDER MAY BE USED AS A THROUGH TRAFFIC LANE, THE PAVEMENT SLOPE (0.02 FOOT/FOOT) SHOULD BE USED ON THE SHOULDER IN PLACE OF THE 0.04 FOOT/FOOT SLOPE SHOWN ON THE TYPICAL SECTION. SEE DETAIL FOR SUPERELEVATION OF SHOULDER WITH 0.02 FOOT/FOOT SLOPE.



SUPERELEVATION DETAIL FOR SHOULDERS



SUPERELEVATION DETAIL FOR SHOULDERS

GENERAL NOTES

DESIGN SPEED

THESE SECTIONS ARE FOR 45 MILES PER HOUR OR LESS. IF HIGHER SPEED IS PROPOSED USE RD01-TS-6B.

ALIGNMENT

SEE STANDARD DRAWING S-PL-6.

SUPERELEVATION AND MEDIAN BARRIERS

SEE APPROPRIATE STANDARD DRAWINGS IN THE RD01-SE-SERIES AND S-SSMB-SERIES.

SHOULDER

(1) IF SHOULDERS LESS THAN 8', USE STANDARD DRAWING RD01-TS-6A.

8' MIN. SHOULDER IS REQUIRED FOR VEHICLE EMERGENCIES AND TO PROVIDE PROPER HORIZONTAL OFFSET TO PEDESTRIAN FACILITIES. UNDER NO CIRCUMSTANCES SHALL THE SHOULDER BE CONSIDERED TO FACILITATE PEDESTRIAN ACCESS. LOCATIONS WHERE EXISTING ROADWAY IS LACKING MIN 8' SHOULDER WIDTH (3R PROJECTS-RESURFACING, RETROFITTING, AND RECONSTRUCTION), MIN 4' SHALL BE PROVIDED. IN SOME INSTANCES, ADJUSTMENT TO LANE WIDTH MAY BE REQUIRED.

CONSTRUCTION EASEMENT

(2) 10' MINIMUM DESIRABLE.

SLOPES

(3) ON URBAN PROJECTS, THE BACKSLOPE AND FORESLOPE DESIGN WILL VERY FROM PROJECT TO PROJECT; AS A GENERAL RULE 3:1 SLOPES OR FLATTER ARE DESIRABLE AND ARE THE MAXIMUM IN REGION IV. 2:1 SLOPES ARE APPLICABLE IN AREAS WHERE RIGHT-OF-WAY RESTRICTIONS OR COST WARRANTS A STEEPER THAN 3:1 SLOPE.

CURBS

(4) MEDIAN CURBS WILL BE 6" SLOPING CURBS. OUTSIDE CURBS WILL BE 6" SLOPING CURBS (SEE MM SERIES DRAWINGS). 6" VERTICAL CURBS MAY BE USED IN URBAN ZONES.

SIDEWALKS AND BIKE LANES

SIDEWALK WIDTH SHALL NOT INCLUDE THE 6" WIDTH OF PROPOSED CURB. SIDEWALK SHALL BE A MINIMUM OF 5' WIDE. REFER TO MM-CR-SERIES FOR CURB RAMP DETAILS. IF BIKE LANE IS PROPOSED, BIKE LANE SHALL BE PLACED AS FAR AWAY AS POSSIBLE FROM THE EDGE OF TRAVELED WAY. SEE BIKE LANE BUFFER DETAILS ON STANDARD DRAWING MM-PM-3.

SEE STANDARD DRAWING MM-TS-2 FOR MINIMUM SIDEWALK LATERAL OFFSET/ BUFFER FROM TRAFFIC LANE. THE MINIMUM REQUIRED BUFFER MAY BE COMPOSED OF ANY COMBINATION OF SHOULDER, PARKING LANE, BIKE LANE, CURB AND GUTTER, AND GRASS STRIP WIDTH.

PARKING LANES

FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS," AASHTO, 2011 PAGE NUMBERS 4-72 THROUGH 4-74, 5-14, 6-14, 7-34, AND TO THE CURRENT MUTCD.

3R PROJECTS-RESURFACING, RETROFITTING, AND RECONSTRUCTION

LOCATIONS WHERE EXISTING ROADWAY IS LACKING MIN 8' SHOULDER WIDTH, MIN 4' SHALL BE PROVIDED. IN SOME INSTANCES, ADJUSTMENT TO LANE WIDTH MAY BE REQUIRED. IF MIN 4' SHOULDER CANNOT BE ACHIEVED DUE TO THE ROW LIMITATIONS, UTILITY CONFLICTS, ETC, THEN ADDITIONAL MITIGATION STRATEGIES SUCH AS REDUCING DESIGN SPEED OR GROUND MOUNTED ADVANCED WARNING SIGNS SHALL BE CONSIDERED.

SERVICE APPURTENANCE

(5) SERVICE APPURTENANCE (LARGE SIGNS STRUCTURES, SIGNAL, LUMINARY AND UTILITY POLES) SHALL BE PLACED OUTSIDE THE PEDESTRIAN ACCESSIBLE SPACE, PREFERABLE OUTSIDE THE SIDEWALK AREA AND INSIDE RIGHT-OF-WAY.

REV. 10-15-02: NEW SHEET. REPLACES RD-TS-6.

◘ REV. 7-31-13: REVISED SIDEWALK WIDTH.

◘ REV: 1-25-16: REVISED GENERAL NOTES.

REV: 10-10-16: REVISED GENERAL NOTES. CLARIFIED SIDEWALK DIMENSION.

◘ REV: 01-07-19: ADDED SIDEWALK LATERAL OFFSET / BUFFER REQUIREMENT TO GENERAL NOTES. REVISED CURBS GENERAL NOTE AND ADDED NOTER NO. (5). ADJUSTED DRAWING NAME AND REDREW SHEET.

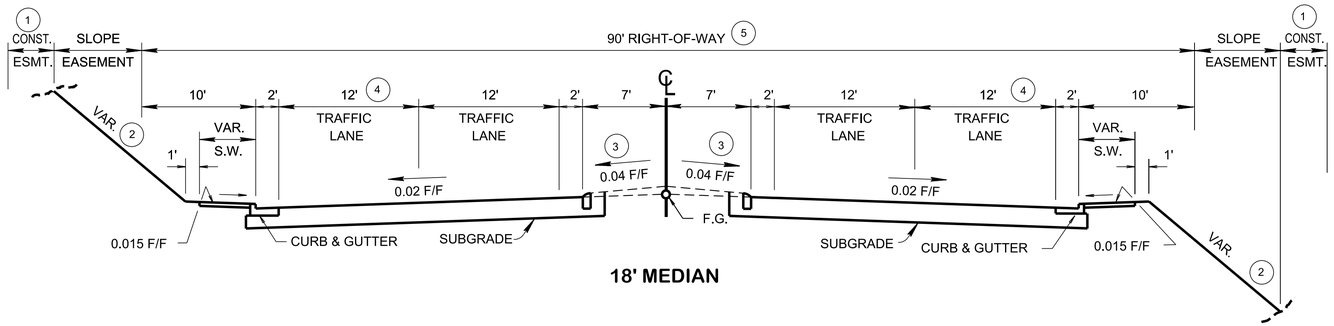
◘ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

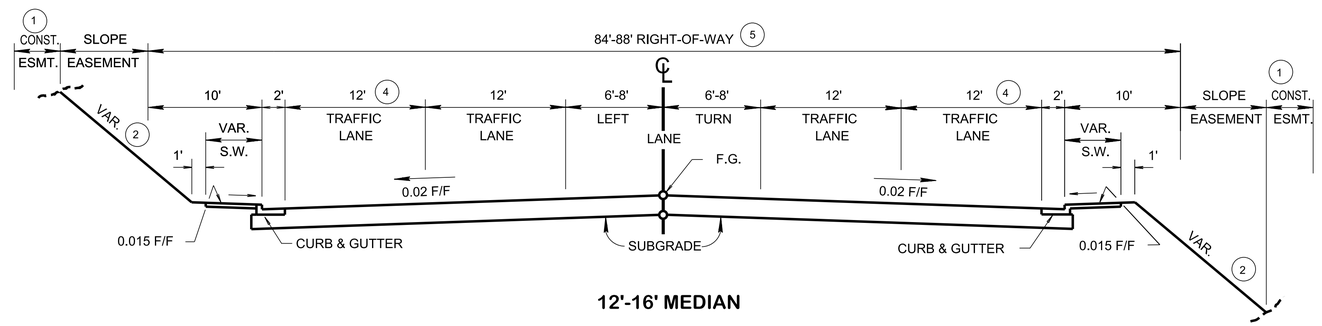
TYPICAL CURB AND GUTTER SECTIONS WITH SHOULDERS

10-15-2002 | RD01-TS-6

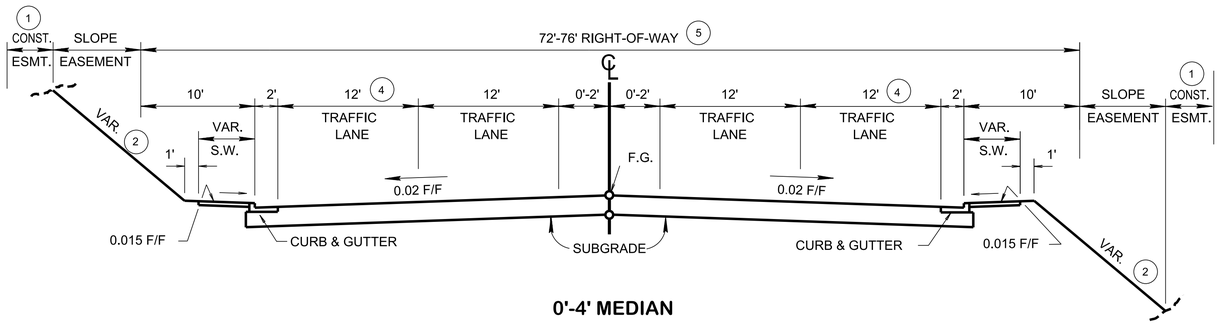
NOT TO SCALE



18' MEDIAN



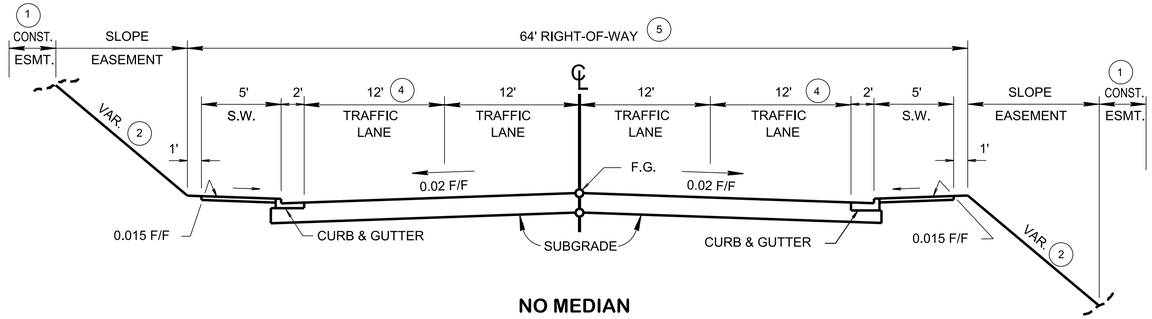
12'-16' MEDIAN



0'-4' MEDIAN

NOTE

THE "NO MEDIAN" TYPICAL, SHOWN BELOW, IS NOT TO BE USED UNLESS THE OTHER TYPICALS SHOWN ABOVE ARE NOT APPLICABLE, BECAUSE THE COST OF RIGHT-OF-WAY REQUIREMENTS FOR WIDER SECTIONS WOULD BE PROHIBITIVE.



NO MEDIAN

GENERAL NOTES

DESIGN SPEED

THESE SECTIONS ARE FOR 45 MILES PER HOUR OR LESS.

ALIGNMENT

SEE APPROPRIATE STANDARD DRAWING IN THE RD01-TS-SERIES FOR HORIZONTAL AND VERTICAL ALIGNMENT.

SUPERELEVATION AND MEDIAN BARRIERS

SEE APPROPRIATE STANDARD DRAWING IN THE RD01-SE-SERIES AND THE "ROADSIDE DESIGN GUIDE," AASHTO, 2002, FOR MEDIAN BARRIERS.

CONSTRUCTION EASEMENT

(1) 10 FEET MINIMUM DESIRABLE.

SLOPES

(2) ON URBAN PROJECTS THE BACKSLOPE AND FORESLOPE DESIGN WILL VARY FROM PROJECT TO PROJECT, AS A GENERAL RULE USE THE FOLLOWING:

3:1 SLOPES OR FLATTER ARE DESIRABLE AND 2:1 SLOPES ARE APPLICABLE IN AREAS WHERE RIGHT-OF-WAY RESTRICTIONS OR COST WARRANTS A STEEPER THAN 3:1 SLOPE. THE MAXIMUM SLOPE IN REGION IV IS 3:1.

MEDIAN CURBS

(3) MEDIAN CURBS WILL BE SLOPING CURBS. VERTICAL CURBS WILL NOT BE PERMITTED.

SIDEWALKS

SIDEWALK WIDTH SHALL NOT INCLUDE THE SIX INCH WIDTH OF PROPOSED CURB, SIDEWALK SHALL BE A MINIMUM OF FIVE FEET WIDE.

SEE STANDARD DRAWING MM-TS-2 FOR MINIMUM SIDEWALK LATERAL OFFSET/ BUFFER FROM TRAFFIC LANE.

BICYCLE PROVISIONS

(4) SEE STANDARD DRAWING MM-TS-1 WHEN BICYCLE LANE PROVISIONS ARE REQUIRED AND MM-PM-1 THRU MM-PM-5 FOR PAVEMENT MARKING INFORMATION.

SERVICE APPURTENANCE

(5) SERVICE APPURTENANCE (LARGE SIGNS STRUCTURES, SIGNAL, LUMINARY AND UTILITY POLES) SHALL BE PLACED OUTSIDE THE PEDESTRIAN ACCESSIBLE SPACE, PREFERABLE OUTSIDE THE SIDEWALK AREA AND INSIDE RIGHT-OF-WAY.

REV. 10-15-02: NEW SHEET. REPLACES RD-TS-6A.

◘ REV. 1-24-12: ADDED REFERENCE TO NOTE 4.

◘ REV. 7-31-13: REVISED SIDEWALK WIDTH.

◘ REV. 01-07-19: ADDED SIDEWALK LATERAL OFFSET/ BUFFER REQUIREMENT TO GENERAL NOTES. REVISED SIDEWALK CROSS SLOPE FROM 2% TO 1.5%. REVISED BICYCLE PROVISIONS GENERAL NOTE AND ADDED NOTE NO. (5). ADJUSTED DRAWING NAME AND REDREW SHEET.

◘ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

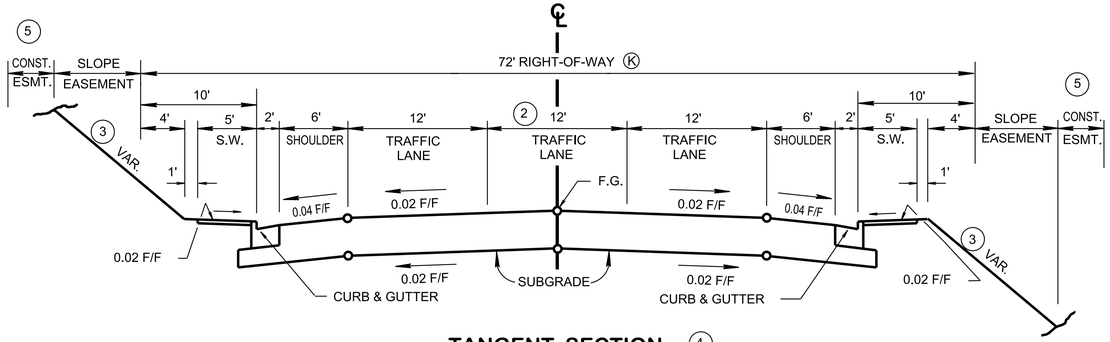
TYPICAL CURB AND GUTTER SECTIONS WITHOUT SHOULDERS

10-15-2002 | RD01-TS-6A

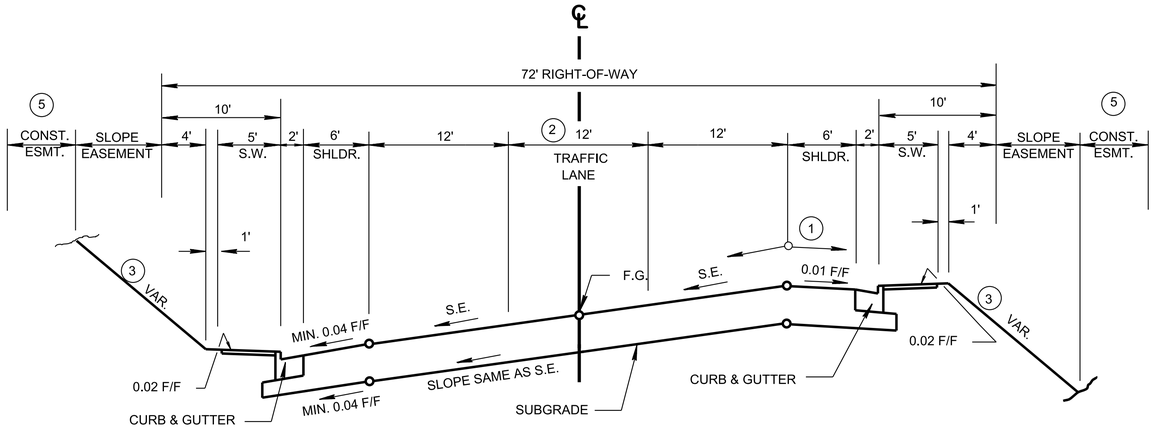
NOT TO SCALE

REV. 10-15-02: NEW SHEET. REPLACES RD-TS-7A.

■ REV. 01-07-19: ADDED GENERAL NOTE NO. (K). REDREW SHEET.



TANGENT SECTION (4)



SUPERELEVATED SECTION (4)

FOOTNOTES

(1) THE SLOPES OF THE SHOULDER AND ROADWAY PAVEMENT SHALL NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 0.07 FOOT PER FOOT.

(2) THE DESIRABLE LANE WIDTH IN INDUSTRIAL AREAS WITH HEAVY TRUCK TRAFFIC IS 14 FEET.

(3) ON URBAN PROJECTS THE BACKSLOPE AND FORESLOPE DESIGN WILL VARY FROM PROJECT TO PROJECT, AS A GENERAL RULE USE THE FOLLOWING:

3:1 SLOPES OR FLATTER ARE DESIRABLE AND 2:1 SLOPES ARE APPLICABLE IN AREAS WHERE RIGHT-OF-WAY RESTRICTIONS OR COST WARRANTS A STEEPER THAN 3:1 SLOPE. THE MAXIMUM SLOPE IN REGION IV IS 3:1.

(4) THESE TYPICAL SECTIONS WERE DEVELOPED FOR LOCAL ROADS AND STREETS AND COLLECTOR ROADS WITH DESIGN SPEEDS 45 MILES PER HOUR AND LOWER. IF A CTWLTL IS NEEDED ABOVE 45 MILES PER HOUR OR ON AN ARTERIAL, THE DESIGNER WILL REFER TO THE PROPER RD01-TS-SERIES SHEET FOR TYPICAL SECTION REQUIREMENTS.

(5) 10 FEET MINIMUM DESIRABLE.

GENERAL NOTES

(A) FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS," AASHTO, 2001.

(B) PAGE NUMBERS REFERRED TO ON THIS DRAWING ARE FROM "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS," AASHTO, 2001.

(C) REFERENCE SHOULD ALSO BE MADE TO THE "ROADSIDE DESIGN GUIDE," AASHTO, 2002.

(D) MINIMUM RIGHT-OF WAY IS THAT REQUIRED TO ACCOMMODATE SLOPES AND EROSION CONTROL FEATURES (15 TO 20 FEET OUTSIDE THE SLOPE LINES IS DESIRABLE IN RURAL AREAS).

(E) ALL NEW AND REHABILITATED BRIDGES SHALL BE DESIGNED FOR HS-20 LOADING. THE MINIMUM CLEAR WIDTH FOR NEW AND REHABILITATED BRIDGES SHALL BE EQUAL TO THE FULL WIDTH OF THE APPROACH ROADWAY, CURB-TO-CURB OR FULL SHOULDER WIDTH AS APPLICABLE.

(F) FOR EXISTING BRIDGES TO REMAIN IN PLACE, THEY SHOULD HAVE ADEQUATE STRENGTH AND A WIDTH AT LEAST EQUAL TO THE WIDTH OF THE TRAVELED WAY PLUS 2-FEET CLEARANCE ON EACH SIDE. BRIDGES SHOULD BE CONSIDERED FOR ULTIMATE WIDENING OR REPLACEMENT IF THEY DO NOT PROVIDE AT LEAST 3-FEET CLEARANCE ON EACH SIDE OR ARE NOT CAPABLE OF HS-20 LOADINGS. AS AN INTERIM MEASURE, ALL BRIDGES THAT ARE LESS THAN FULL WIDTH SHOULD BE CONSIDERED FOR SPECIAL NARROW BRIDGE TREATMENTS SUCH AS SIGNING AND PAVEMENT MARKING.

(G) THIS TYPICAL SECTION IS DESIGNED TO ACCOMMODATE AN AVERAGE DAILY TRAFFIC OF 5,000 TO 12,500 VEHICLES PER DAY, WHICH IS CONSIDERED TO BE THE TRAFFIC VOLUME NEEDED TO JUSTIFY THE CONTINUOUS TWO-WAY LEFT TURN LANE (CTWLTL) FOR A 2-LANE HIGHWAY. THE TYPICAL SECTION DESIGN FOR VOLUMES LESS THAN 5,000 VEHICLES PER DAY USES THE DESIGN STANDARDS SHOWN ON STANDARD DRAWINGS RD01-TS-1, RD01-TS-2 AND RD01-TS-3.

(H) WHEN ENCOUNTERING MAJOR INTERSECTIONS. DO NOT EXTEND THE CONTINUOUS TWO-WAY LEFT TURN LANE (CTWLTL) UP TO THE INTERSECTION. TERMINATE THE CTWLTL IN ADVANCE OF THE INTERSECTION TO ALLOW DEVELOPMENT OF AN EXCLUSIVE LEFT-TURN LANE. MINOR INTERSECTIONS MAY NOT WARRANT AN EXCLUSIVE LEFT-TURN LANE. STRIPING DETAILS ARE SHOWN ON T-M-1 OR CURRENT EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES."

(I) ON WIDENING OF EXISTING TWO-LANE HIGHWAY TO THREE-LANE HIGHWAY THE SHOULDER WIDTH MAY BE REDUCED TO ZERO FEET AND THE ROADWAY LANE WIDTH TO ELEVEN (11) FEET UNDER THE FOLLOWING CONDITIONS:

(I1) THE DESIGN ADT IS 12,500 VEHICLES PER DAY OR LESS.

(I2) THE DESIGN SPEED IS 35 MILES PER HOUR OR LESS.

(I3) THERE ARE RESTRICTED AND/OR LIMITED CLEARANCES FOR RIGHT-OF-WAY DUE TO THE EXISTING SOCIAL, ENVIRONMENTAL OR ECONOMIC CONDITIONS.

(I4) WHEN SUFFICIENT NUMBERS OF ACCIDENTS AND/OR DELAYS IN TRAFFIC EXIST DUE TO MID-BLOCK LEFT TURNS TO JUSTIFY A CONTINUOUS LEFT TURN LANE ON EXISTING TWO-LANE ROADWAY.

(J) SEE DETAIL A FOR GUARDRAIL PLACEMENT AND GUARDRAIL STANDARD DRAWINGS (S-GR-SERIES).

(K) **SERVICE APPURTENANCE** (LARGE SIGNS STRUCTURES, SIGNAL, LUMINARY AND UTILITY POLES) SHALL BE PLACED OUTSIDE THE PEDESTRIAN ACCESSIBLE SPACE, PREFERABLE OUTSIDE THE SIDEWALK AREA AND INSIDE RIGHT-OF-WAY.

■ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

DESIGN STANDARDS 2 LANE CURB & GUTTER WITH CONTINUOUS 2-WAY LEFT-TURN LANE

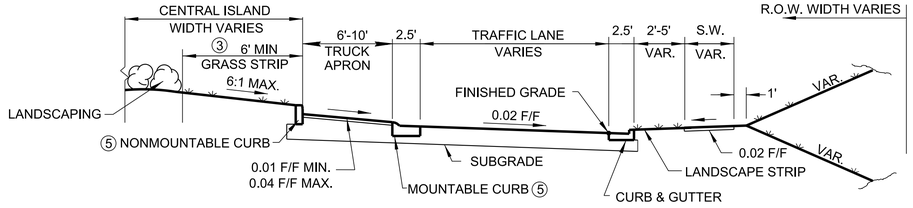
10-15-2002 | RD01-TS-7A

NOT TO SCALE

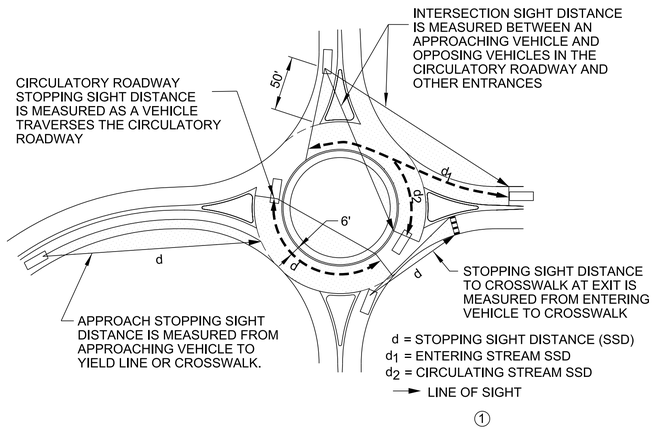
REV. 2-1-12: ADDED OPTIONAL PEDESTRIAN RAIL.

REV. 6-15-12: RENAMED SHEET FROM RD-TS-9. ADDED NOTE (M).

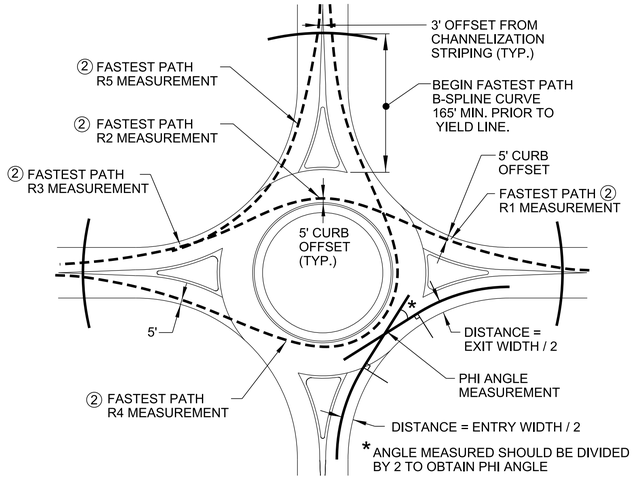
REV. 01-07-19: REVISED NOTE NO. (5). REDREW SHEET.



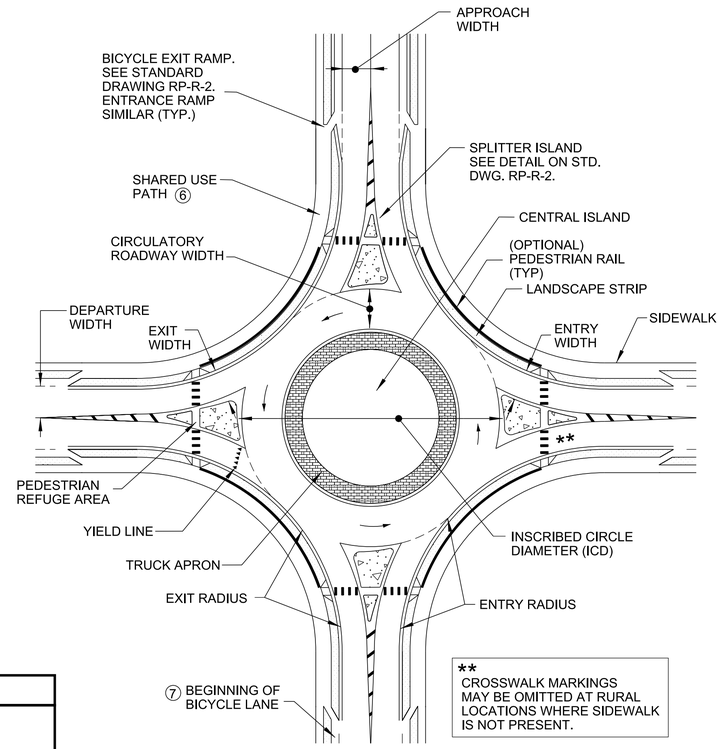
ROUNDABOUT TYPICAL SECTION



ROUNDABOUT SIGHT DISTANCE

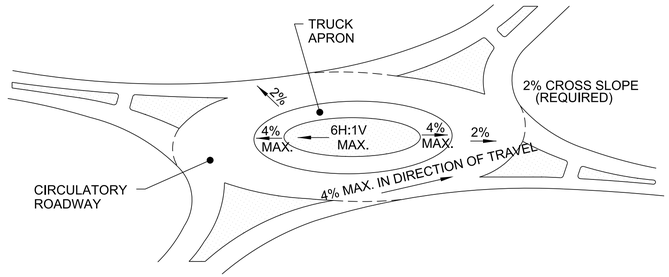


ROUNDABOUT DESIGN CHECKS



TYPICAL PLAN VIEW OF ROUNDABOUT

SEE GENERAL NOTE (K)



CIRCULATORY ROADWAY SLOPES

NOTE: TRUCK APRON CROSS SLOPE SHOULD MATCH CIRCULATORY ROADWAY CROSS SLOPE OR MAY BE INCREASED UP TO 4 PERCENT MAX.

DESIGN STANDARDS FOR SINGLE LANE ROUNDABOUTS

	URBAN	RURAL	NOTES
DESIGN SPEED	20 MPH	25 MPH	SEE FHWA EXHIBIT 6-4
INSCRIBED CIRCLE DIAMETER (8)	105' - 150'	130' - 150'	MEASURED FROM CURB FACE TO CURB FACE
CIRCULATORY ROADWAY WIDTH	1.0 - 1.2 TIMES THE MAXIMUM ENTRY WIDTH	1.0 - 1.2 TIMES THE MAXIMUM ENTRY WIDTH	————
ENTRY WIDTH	18' - 22'	18' - 22'	MEASURED FROM CURB FACE TO CURB FACE
ENTRY RADIUS	65' - 90'	65' - 90'	————
EXIT WIDTH	SAME AS ENTRY WIDTH	SAME AS ENTRY WIDTH	SAME AS ENTRY WIDTH
EXIT RADIUS	200' - 1000'	200' - 1000'	————
APPROACH/DEPARTURE WIDTH	WIDTH OF APPROACHING LANE	WIDTH OF APPROACHING LANE	DOES NOT INCLUDE BIKE LANE OR GUTTER
DAILY SERVICE VOLUME (WITH CAPACITY ANALYSIS) APPROXIMATELY 25,000 VEH/DAY			

DESIGN NOTES

(1) FASTEST PATH CHECKS SHOULD BE COMPLETED PRIOR TO INTERSECTION SIGHT DISTANCE BEING CHECKED. STOPPING SIGHT DISTANCE AND INTERSECTION SIGHT DISTANCE SHOULD BE CHECKED FOR ALL APPROACHES. REFER TO "ROUNDABOUTS; AN INFORMATIONAL GUIDE," FHWA, 2000 AND RD01-SD-1 THRU 7 FOR ADDITIONAL GUIDANCE.

(2) CONSTRUCT A B-SPLINE (SHOWN AS DASHED LINE) FOR THE THROUGH, LEFT TURN, AND RIGHT TURN MOVEMENTS. B-SPLINE SHOULD TOUCH THE 5' CURB OFFSETS AT THE POINTS INDICATED FOR THE R1, R2, R3, R4 AND R5 MEASUREMENTS. MEASURE THE RADIUS OF THE B-SPLINE AT EACH POINT. MEASUREMENT SHOULD BE BETWEEN 65' AND 85' LONG. FOR THE R1 MEASUREMENT, THE RADIUS SHOULD NOT BE MEASURED THROUGH THE YIELD LINE.

(3) PROVIDE 6' MINIMUM UNOBSTRUCTED HORIZONTAL CLEARANCE FROM THE NON-MOUTABLE CURB TO THE CENTRAL ISLAND LANDSCAPING TO ALLOW FOR CIRCULATORY ROADWAY SIGHT DISTANCE, ACTUAL DISTANCE MAY BE GREATER AND SHOULD BE DETERMINED AFTER SIGHT DISTANCE CHECKS ARE COMPLETE, BUT SHALL NOT BE LESS THAN 6 FEET.

(4) SPLITTER ISLAND SHOULD BE A RAISED MEDIAN WITH CONCRETE HARDSCAPING (PREFERED). SPLITTER ISLAND SHOULD EXTEND A MINIMUM OF 50' FROM THE YIELD LINE. SEE STANDARD DRAWING MM-CR-4 FOR ADDITIONAL DETAILS.

(5) FOR MOUNTABLE CURB BETWEEN CIRCULATORY ROADWAY AND TRUCK APRON, SEE STANDARD DRAWING RP-R-2. FOR NONMOUNTABLE CURB BETWEEN TRUCK APRON AND CENTRAL ISLAND, SEE STANDARD DRAWING RP-VC-10.

(6) SIDEWALK SHALL BE WIDENED TO ACCOMODATE BICYCLES AND PEDESTRIANS AT ROUNDABOUT (SHARED USE PATH). SEE STANDARD DRAWING RD01-TS-8 FOR ADDITIONAL DETAILS.

(7) SEE STANDARD DRAWINGS T-M-10, 11 AND 12 FOR SIGNING AND PAVEMENT MARKINGS FOR SHARED USE PATHS AND BICYCLE LANES.

(8) ASSUMES APPROXIMATELY 90-DEGREE ANGLES BETWEEN ENTRIES AND NO MORE THAN FOUR ENTRIES TO THE ROUNDABOUT.

GENERAL NOTES

(A) FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS", AASHTO, 2001.

(B) REFERENCE SHOULD BE MADE TO "ROUNDABOUTS: AN INFORMATIONAL GUIDE", FHWA, 2000. REFERENCE SHOULD ALSO BE MADE TO THE "ROADSIDE DESIGN GUIDE", AASHTO, 2002.

(C) THIS STANDARD DRAWING IS INTENDED TO BE USED AS GUIDANCE FOR THE DESIGN OF SINGLE LANE URBAN AND RURAL ROUNDABOUTS. FOR MULTI-LANE DESIGNS, SEE STANDARD DRAWING RD01-TS-10.

(D) TRUCK TURNING TEMPLATES SHOULD BE PERFORMED ON ALL TURNING MOVEMENTS WITHIN THE ROUNDABOUT. A WB-62 VEHICLE SHOULD BE USED WHERE APPROPRIATE.

(E) STANDARD AASHTO GUIDELINES FOR ISLAND DESIGN SHOULD BE FOLLOWED FOR SPLITTER ISLAND DESIGNS, INCLUDING LARGER NOSE RADII AT APPROACH CORNERS AND OFFSETTING CURB LINES AT THE APPROACH ENDS OF THE SPLITTER ISLAND.

(F) MAXIMUM LONGITUDINAL GRADE IN THE DIRECTION OF TRAVEL THROUGH THE CIRCULATORY ROADWAY SHALL BE 4 PERCENT.

(G) USE OF A RIGHT-TURN BYPASS LANE MAY BE WARRANTED FROM THE ROUNDABOUT TRAFFIC MODEL.

(H) ROUNDABOUT APPROACHES WITH SPEEDS OF 45 MPH OR GREATER ARE CONSIDERED HIGH SPEED APPROACHES. REFER TO SECTION 6.5 OF THE "ROUNDABOUTS: AN INFORMATIONAL GUIDE", FHWA, 2000 FOR ADDITIONAL INFORMATION ON DESIGN OF ROUNDABOUTS WITH HIGH SPEED APPROACHES.

(I) MINI ROUNDABOUTS, TRAFFIC CIRCLES, AND ROTARIES ARE NOT CONSIDERED ROUNDABOUTS AND SHOULD NOT BE DESIGNED TO THE STANDARDS ON THIS DRAWING.

(J) ROADWAY SHOULDERS AND BICYCLE LANE SHALL END PRIOR TO THE CIRCULATORY ROADWAY.

(K) FOR ROUNDABOUT CONSTRUCTION DETAILS, SEE STANDARD DRAWING RP-R-2.

(L) OPTIONAL PEDESTRIAN RAIL SHALL NOT CAUSE A CONFLICT WITH INTERSECTION SIGHT DISTANCE.

(M) SEE T-M-17 FOR MARKING DETAILS.

NOT TO SCALE

◘ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

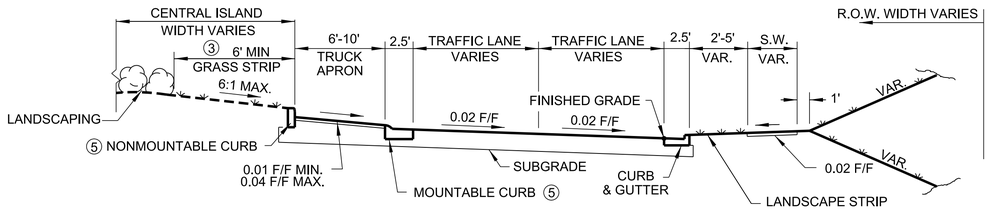
DESIGN STANDARDS FOR SINGLE LANE URBAN AND RURAL ROUNDABOUTS

4-28-10 | RD01-TS-9

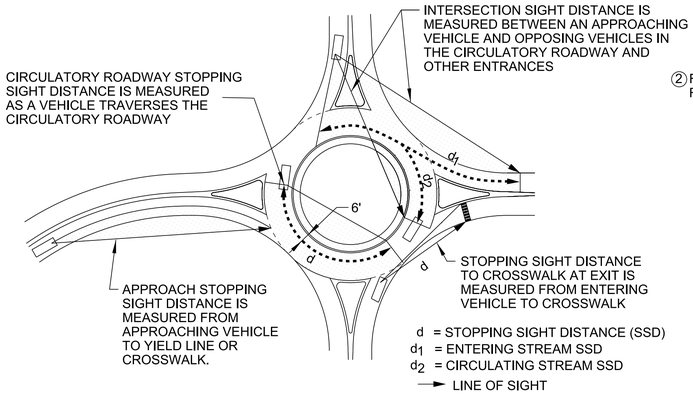
REV. 2-1-12: ADDED OPTIONAL PEDESTRIAN RAIL.

REV. 6-15-12: RENAMED SHEET FROM RD-TS-10. ADDED NOTE Ⓜ.

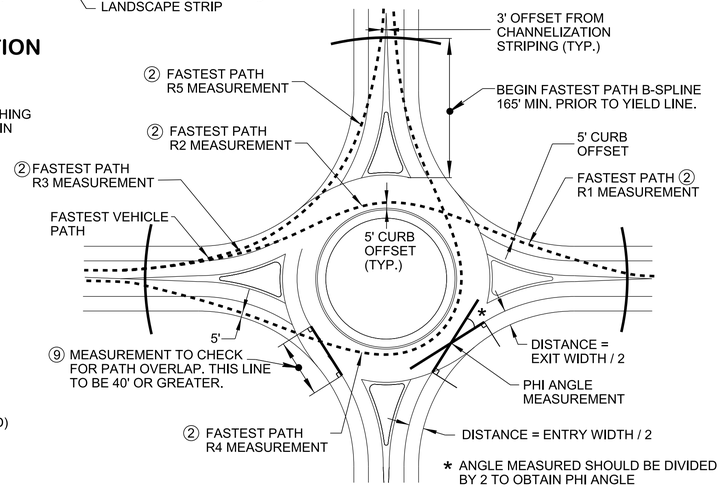
REV. 01-07-19: REVISED NOTE NO. ⑤. REDREW SHEET.



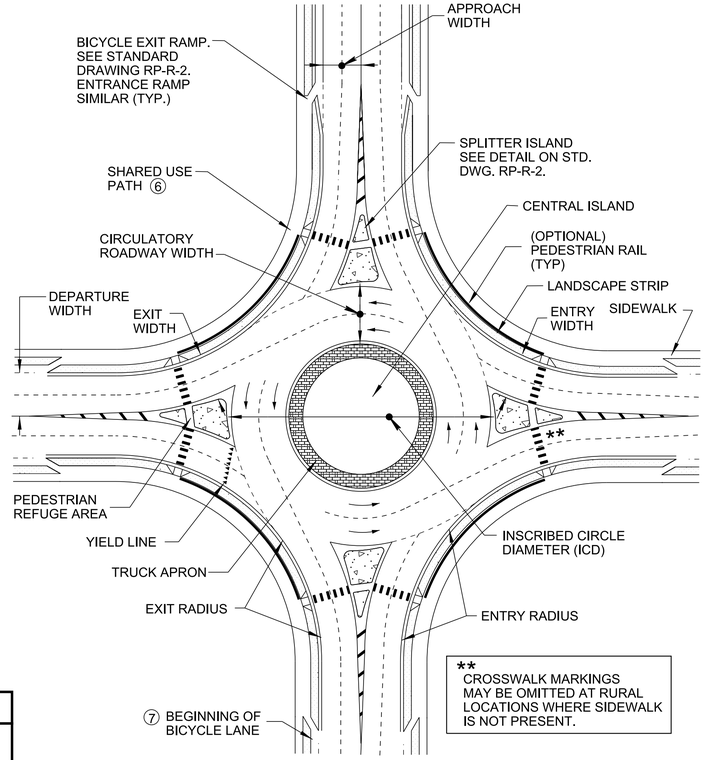
ROUNDABOUT TYPICAL SECTION



ROUNDABOUT SIGHT DISTANCE ①

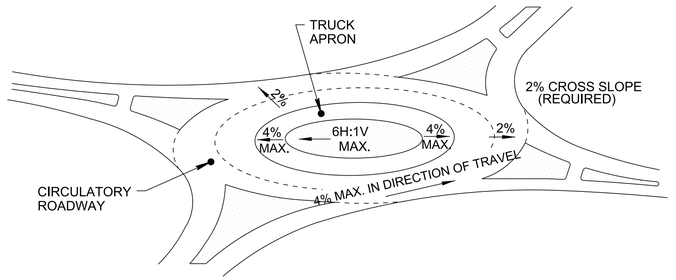


ROUNDABOUT DESIGN CHECKS



TYPICAL PLAN VIEW OF MULTI-LANE ROUNDABOUT

SEE GENERAL NOTE Ⓚ



CIRCULATORY ROADWAY SLOPES

NOTE: TRUCK APRON CROSS SLOPE SHOULD MATCH CIRCULATORY ROADWAY CROSS SLOPE OR MAY BE INCREASED UP TO 4 PERCENT MAX.

DESIGN STANDARDS FOR SINGLE LANE ROUNDABOUTS

	URBAN	RURAL	NOTES
DESIGN SPEED	20 MPH	30 MPH	SEE FHWA EXHIBIT 6-4
INSCRIBED CIRCLE DIAMETER ⑧	150' - 220'	165' - 220'	MEASURED FROM CURB FACE TO CURB FACE
CIRCULATORY ROADWAY WIDTH	1.0 - 1.2 TIMES THE MAXIMUM ENTRY WIDTH	1.0 - 1.2 TIMES THE MAXIMUM ENTRY WIDTH	————
ENTRY WIDTH	24' - 28'	24' - 28'	MEASURED FROM CURB FACE TO CURB FACE
ENTRY RADIUS	65' - 100'	65' - 100'	————
EXIT WIDTH	SAME AS ENTRY WIDTH	SAME AS ENTRY WIDTH	SAME AS ENTRY WIDTH
EXIT RADIUS	200' - 1000'	200' - 1000'	————
APPROACH/DEPARTURE WIDTH	WIDTH OF APPROACHING LANE	WIDTH OF APPROACHING LANE	DOES NOT INCLUDE BIKE LANE OR GUTTER
DAILY SERVICE VOLUME (WITH CAPACITY ANALYSIS) APPROXIMATELY 45,000 VEH/DAY			

DESIGN NOTES

① FASTEST PATH CHECKS SHOULD BE COMPLETED PRIOR TO INTERSECTION SIGHT DISTANCE BEING CHECKED. STOPPING SIGHT DISTANCE AND INTERSECTION SIGHT DISTANCE SHOULD BE CHECKED FOR ALL APPROACHES. REFER TO "ROUNDABOUTS; AN INFORMATIONAL GUIDE," FHWA, 2000 AND RD01-SD-1 THRU 7 FOR ADDITIONAL GUIDANCE.

② CONSTRUCT A B-SPLINE (SHOWN AS DASHED LINE) FOR THE THROUGH, LEFT TURN, AND RIGHT TURN MOVEMENTS. B-SPLINE SHOULD TOUCH THE 5' CURB OFFSETS AT THE POINTS INDICATED FOR THE R1, R2, R3, R4 AND R5 MEASUREMENTS. MEASURE THE RADIUS OF THE B-SPLINE AT EACH POINT. MEASUREMENT SHOULD BE BETWEEN 65' AND 85' LONG. FOR THE R1 MEASUREMENT, THE RADIUS SHOULD NOT BE MEASURED THROUGH THE YIELD LINE.

③ PROVIDE 6' MINIMUM UNOBSTRUCTED HORIZONTAL CLEARANCE FROM THE NON-MOUTABLE CURB TO THE CENTRAL ISLAND LANDSCAPING TO ALLOW FOR CIRCULATORY ROADWAY SIGHT DISTANCE, ACTUAL DISTANCE MAY BE GREATER AND SHOULD BE DETERMINED AFTER SIGHT DISTANCE CHECKS ARE COMPLETE, BUT SHALL NOT BE LESS THAN 6 FEET.

④ SPLITTER ISLAND SHOULD BE A RAISED MEDIAN WITH CONCRETE HARDSCAPING (PREFERED). SPLITTER ISLAND SHOULD EXTEND A MINIMUM OF 50' FROM THE YIELD LINE. SEE STANDARD DRAWING RP-H-6 FOR ADDITIONAL DETAILS.

⑤ FOR MOUNTABLE CURB BETWEEN CIRCULATORY ROADWAY AND TRUCK APRON, SEE STANDARD DRAWING RP-R-2. FOR NONMOUNTABLE CURB BETWEEN TRUCK APRON AND CENTRAL ISLAND, SEE STANDARD DRAWING RP-VC-10.

⑥ SIDEWALK SHALL BE WIDENED TO ACCOMODATE BICYCLES AND PEDESTRIANS AT ROUNDABOUT (SHARED USE PATH). SEE STANDARD DRAWING RD-TS-8 FOR ADDITIONAL DETAILS.

⑦ SEE STANDARD DRAWINGS T-M-10, 11 AND 12 FOR SIGNING AND MARKINGS FOR SHARED USE PATHS AND BICYCLE LANES.

⑧ ASSUMES APPROXIMATELY 90-DEGREE ANGLES BETWEEN ENTRIES AND NO MORE THAN FOUR ENTRIES TO THE ROUNDABOUT.

⑨ PATH OVERLAP SHOULD BE MEASURED AT THE ENTRANCE AND EXITS OF MULTI-LANE ROUNDABOUTS. LINE SHOULD BE DRAWN TANGENT TO THE CENTER OF THE ENTRANCE/EXIT AND CIRULATORY ROADWAY.

GENERAL NOTES

Ⓐ FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS", AASHTO, 2001.

Ⓑ REFERENCE SHOULD BE MADE TO "ROUNDABOUTS: AN INFORMATIONAL GUIDE", FHWA, 2000. REFERENCE SHOULD ALSO BE MADE TO THE "ROADSIDE DESIGN GUIDE", AASHTO, 2002.

Ⓒ THIS STANDARD DRAWING IS INTENDED TO BE USED AS GUIDANCE FOR THE DESIGN OF MULTI - LANE URBAN AND RURAL ROUNDABOUTS. FOR SINGLE LANE DESIGNS, SEE STANDARD DRAWING RD-TS-9.

Ⓓ TRUCK TURNING TEMPLATES SHOULD BE PERFORMED ON ALL TURNING MOVEMENTS WITHIN THE ROUNDABOUT. A WB-62 VEHICLE SHOULD BE USED WHERE APPROPRIATE.

Ⓔ STANDARD AASHTO GUIDELINES FOR ISLAND DESIGN SHOULD BE FOLLOWED FOR SPLITTER ISLAND DESIGNS, INCLUDING LARGER NOSE RADII AT APPROACH CORNERS AND OFFSETTING CURB LINES AT THE APPROACH ENDS OF THE SPLITTER ISLAND.

Ⓕ MAXIMUM LONGITUDINAL GRADE IN THE DIRECTION OF TRAVEL THROUGH THE CIRCULATORY ROADWAY SHALL BE 4 PERCENT.

Ⓖ USE OF A RIGHT-TURN BYPASS LANE MAY BE WARRANTED FROM THE ROUNDABOUT TRAFFIC MODEL.

Ⓗ ROUNDABOUT APPROACHES WITH SPEEDS OF 45 MPH OR GREATER ARE CONSIDERED HIGH SPEED APPROACHES. REFER TO SECTION 6.5 OF THE "ROUNDABOUTS: AN INFORMATIONAL GUIDE", FHWA, 2000 FOR ADDITIONAL INFORMATION ON DESIGN OF ROUNDABOUTS WITH HIGH SPEED APPROACHES.

Ⓘ MINI ROUNDABOUTS, TRAFFIC CIRCLES, AND ROTARIES ARE NOT CONSIDERED ROUNDABOUTS AND SHOULD NOT BE DESIGNED TO THE STANDARDS ON THIS DRAWING.

Ⓙ ROADWAY SHOULDERS AND BICYCLE LANE SHALL END PRIOR TO THE CIRCULATORY ROADWAY.

Ⓚ FOR ROUNDABOUT CONSTRUCTION DETAILS, SEE STANDARD DRAWING RP-R-2.

Ⓛ OPTIONAL PEDESTRIAN RAIL SHALL NOT CAUSE A CONFLICT WITH INTERSECTION SIGHT DISTANCE.

Ⓜ SEE T-M-17 FOR MARKING DETAILS.

◘ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

DESIGN STANDARDS FOR MULTI-LANE URBAN AND RURAL ROUNDABOUTS

4-28-10 RD01-TS-10

NOT TO SCALE

DESIGN RUNOFF LENGTHS (L_R) (1)

E MAX = 0.04 DESIRABLE

(3) e_d (%)	V = 20 (MPH)						V = 25 (MPH)						V = 30 (MPH)						V = 35 (MPH)						V = 40 (MPH)						V = 45 (MPH)						V = 50 (MPH)						V = 55 (MPH)						V = 60 (MPH)					
	R MIN. (FT)	Number of Lanes					R MIN. (FT)	Number of Lanes					R MIN. (FT)	Number of Lanes					R MIN. (FT)	Number of Lanes					R MIN. (FT)	Number of Lanes					R MIN. (FT)	Number of Lanes					R MIN. (FT)	Number of Lanes					R MIN. (FT)	Number of Lanes					R MIN. (FT)	Number of Lanes				
		2	3	4	5	6		2	3	4	5	6		2	3	4	5	6		2	3	4	5	6		2	3	4	5	6		2	3	4	5	6		2	3	4	5	6		2	3	4	5	6		2	3	4	5	6
NC	107	0	0	0	0	0	198	0	0	0	0	0	333	0	0	0	0	0	510	0	0	0	0	0	762	0	0	0	0	0	1039	0	0	0	0	0	7220	0	0	0	0	0	8650	0	0	0	0	0	10300	0	0	0	0	0
2	92	32	40	49	57	65	167	34	43	51	60	69	273	36	45	55	64	73	408	39	48	58	68	78	593	41	52	62	72	83	794	44	55	67	78	89	4940	48	60	72	84	96	5950	51	64	77	89	103	7080	53	66	80	93	107
2.2	91	36	44	54	62	72	165	38	47	57	66	76	270	40	50	60	70	80	404	43	53	64	75	86	586	46	57	68	80	91	785	49	61	73	86	98	4280	53	66	79	92	106	5180	56	70	84	98	113	6190	59	73	88	103	118
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(2)

METHOD 2 ← (4) → METHOD 5

E MAX = 0.06 ALLOWABLE

(3) e_d (%)	V = 20 (MPH)						V = 25 (MPH)						V = 30 (MPH)						V = 35 (MPH)						V = 40 (MPH)						V = 45 (MPH)						V = 50 (MPH)						V = 55 (MPH)						V = 60 (MPH)					
	R MIN. (FT.)	Number of Lanes					R MIN. (FT.)	Number of Lanes					R MIN. (FT.)	Number of Lanes					R MIN. (FT.)	Number of Lanes					R MIN. (FT.)	Number of Lanes					R MIN. (FT.)	Number of Lanes					R MIN. (FT.)	Number of Lanes					R MIN. (FT.)	Number of Lanes					R MIN. (FT.)	Number of Lanes				
		2	3	4	5	6		2	3	4	5	6		2	3	4	5	6		2	3	4	5	6		2	3	4	5	6		2	3	4	5	6		2	3	4	5	6		2	3	4	5	6		2	3	4	5	6
NC	107	0	0	0	0	0	198	0	0	0	0	0	333	0	0	0	0	0	510	0	0	0	0	0	762	0	0	0	0	0	1039	0	0	0	0	0	7870	0	0	0	0	0	9410	0	0	0	0	0	11100	0	0	0	0	0
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2.8	89	45	57	68	79	91	161	48	60	72	84	96	263	51	63	76	89	102	393	54	67	81	95	109	567	58	72	87	101	116	758	62	77	93	109	125	3800	67	84	101	118	135	4580	71	89	107	125	144	5440	75	93	112	131	150
3	89	49	61	73	85	98	160	51	64	77	90	103	261	55	68	82	95	110	389	58	72	87	102	117	561	62	77	93	109	125	750	67	83	100	117	134	3480	72	90	108	126	145	4200	77	95	115	134	154	4990	80	100	120	140	161
3.2	88	52	65	78	91	104	159	55	68	82	96	110	259	58	72	87	102	117	385	62	77	93	108	124	556	66	82	99	116	133	742	71	89	107	124	143	3200	77	96	115	134	154	3860	82	102	123	143	164	4600	85	106	128	149	172
3.4	88	55	69	83	96	111	158	58	73	87	102	117	256	62	77	93	108	124	382	66	82	99	115	132	550	70	88	106	123	141	734	76	94	113	132	152	2940	82	102	122	143	164	3560	87	108	130	152	174	4250	91	113	136	159	182
3.6	87	58	73	88	102	117	157	62	77	93	108	124	254	65	81	98	115	132	378	70	87	105	122	140	544	74	93	112	130	150	726	80	100	120	140	161	2710	86	108	130	151	174	3290	92	114	138	161	185	3940	96	120	144	168	193
3.8	87	62	77	92	108	124	155	65	81	98	114	131	252	69	86	104	121	139	375	74	92	110	129	148	539	79	98	118	138	158	718	84	105	127	148	170	2490	91	114	137	160	183	3040	97	121	146	170	195	3650	101	126	152	177	204
4	86	65	81	97	114	130	154	69	85	103	120	138	250	73	91	109	127	146	371	77	96	116	135	156	533	83	103	124	145	166	711	89	111	133	156	179	2300	96	120	144	168	193	2810	102	127	153	179	205	3390	107	133	160	187	214
4.2	85	68	85	102	119	137	153	72	90	108	126	145	248	76	95	115	134	153	368	81	101	122	142	163	528	87	108	130	152	175	703	93	116	140	163	188	2110	101	125	151	176	203	2590	107	134	161	188	216	3140	112	139	168	196	225
4.4	85	71	89	107	125	143	152	75	94	113	132	152	246	80	100	120	140	161	365	85	106	128	149	171	523	91	113	137	159	183	696	98	122	147	171	197	1940	106	131	158	185	212	2400	112	140	169	197	226	2920	117	146	176	205	236
4.6	84	75	93	112	131	150	151	79	98	118	138	159	244	84	104	125	146	168	361	89	111	134	156	179	518	95	118	143	167	191	689	102	127	153	179	205	1780	110	137	166	193	222	2210	117	146	176	206	236	2710	123	153	184	215	247
4.8	84	78	97	117	136	156	150	82	102	123	144	165	242	87	109	131	153	175	358	93	116	139	163	187	513	99	124	149	174	200	682	107	133	160	187	214	1640	115	143	173	202	232	2050	123	153	184	214	246	2510	128	159	192	224	257
5	83	81	101	122	142	163	149	86	107	129	150	172	240	91	113	136	159	183	355	97	120	145	169	195	508	103	129	155	181	208	675	111	138	167	194	223	1510	120	149	180	210	241	1890	128	159	191	223	257	2330	133	166	200	233	268
5.2	83	84	105	126	148	169	148	89	111	134	156	179	238	95	118	142	165	190	352	101	125	151	176	202	503	108	134	161	188	216	668	116	144	173	202	232	1390	125	155	187	218	251	1750	133	165	199	232	267	2160	139	173	208	243	279
5.4	82	88	109	131	153	176	147	93	115	139	162	186	236	98	122	147	172	197	349	105	130	157	183	210	498	112	139	168	196	225	662	120	149	180	210	241	1280	130	161	194	227	260	1610	138	172	207	241	277	1990	144	179	216	252	289
5.6	82	91	113	136	159	183	146	96	120	144	168	193	234	102	127	153	178	205	346	108	135	163	190	218	494	116	144	174	203	233	655	124	155	187	218	250	1160	134	167	202	235	270	1470	143	178	214	250	287	1830	149	186	224	261	300
5.8	81	94	117	141	165	189	145	99	124	149	174	200	233	105	131	158	185	212	343	112	140	168	196	226	489	120	149	180	210	241	649	129	160	193	226	259	1040	139	173	209	244	280	1320	148	184	222	259	298	1650	155	193	232	271	311
6	81	97	121	146	170	196	144	103	128	154	180	207	231	109	136	164	191	219	340	116	145	174	203	233	485	124	155	186	217	250	643	133	166	200	233	268	833	144	179	216	252	289	1060	153	191	230	268	308	1330	160	199	240	280	322

(2)

METHOD 2 ← (4) → METHOD 5

DESIGN NOTES

(1) SEE STANDARD DRAWING RD11-SE-1 FOR EQUATIONS, LEGEND AND GENERAL NOTES. TABLES ARE BASED ON MINIMUM RADII, SUPERELEVATION, SPEED AND NUMBER OF LANES ROTATED.

(2) SPIRALS ARE RECOMMENDED FOR DESIGN SPEED OF 50 MPH OR GREATER AND DESIGN SUPERELEVATION OF 3 PERCENT OR GREATER.

(3) TABLE VALUES ARE FOR MINIMUM RADIUS OF CURVE AND SUPERELEVATION RUNOFF LENGTH. SEE STANDARD DRAWING RD11-SE-1 FOR EQUATIONS TO CALCULATE TANGENT RUNOUT LENGTH AND TOTAL TRANSITION LENGTH.

(4) TABLE VALUES FOR URBAN LOW SPEED SUPERELEVATION (45 MPH OR LESS) ARE CALCULATED USING THE DISTRIBUTION METHOD 2 OF . ALL OTHER VALUES ARE CALCULATED USING METHOD 5.

NOT TO SCALE

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

MINIMUM RUNOFF LENGTHS (L_R) FOR URBAN HIGHWAYS

01-01-2019 | RD11-LR-1

DESIGN RUNOFF LENGTHS (L_R) ①

E MAX = 0.08 DESIRABLE

③ e_d (%)	V = 20 (MPH)						V = 25 (MPH)						V = 30 (MPH)					
	R MIN. (FT.)	Number of lanes					R MIN. (FT.)	Number of lanes					R MIN. (FT.)	Number of lanes				
		2	3	4	5	6		2	3	4	5	6		2	3	4	5	6
NC	1640	0	0	0	0	0	2370	0	0	0	0	0	3240	0	0	0	0	0
2	1190	32	40	49	57	65	1720	34	43	51	60	69	1720	36	45	55	64	73
2.2	1070	36	44	54	62	72	1550	38	47	57	66	76	2130	40	50	60	70	80
2.4	959	39	48	58	68	78	1400	41	51	62	72	83	1930	44	54	65	76	88
2.6	872	42	52	63	74	85	1280	45	55	67	78	90	1760	47	59	71	83	95
2.8	796	45	57	68	79	91	1170	48	60	72	84	96	1610	51	63	76	89	102
3	730	49	61	73	85	98	1070	51	64	77	90	103	1480	55	68	82	95	110
3.2	672	52	65	78	91	104	985	55	68	82	96	110	1370	58	72	87	102	117
3.4	620	55	69	83	96	111	911	58	73	87	102	117	1270	62	77	93	108	124
3.6	572	58	73	88	102	117	845	62	77	93	108	124	1180	65	81	98	115	132
3.8	530	62	77	92	108	124	784	65	81	98	114	131	1100	69	86	104	121	139
4	490	65	81	97	114	130	729	69	85	103	120	138	1030	73	91	109	127	146
4.2	453	68	85	102	119	137	678	72	90	108	126	145	955	76	95	115	134	153
4.4	418	71	89	107	125	143	630	75	94	113	132	152	893	80	100	120	140	161
4.6	384	75	93	112	131	150	585	79	98	118	138	159	834	84	104	125	146	168
4.8	349	78	97	117	136	156	542	82	102	123	144	165	779	87	109	131	153	175
5	314	81	101	122	142	163	499	86	107	129	150	172	727	91	113	136	159	183
5.2	284	84	105	126	148	169	457	89	111	134	156	179	676	95	118	142	165	190
5.4	258	88	109	131	153	176	420	93	115	139	162	186	627	98	122	147	172	197
5.6	236	91	113	136	159	183	387	96	120	144	168	193	582	102	127	153	178	205
5.8	216	94	117	141	165	189	358	99	124	149	174	200	542	105	131	158	185	212
6	199	97	121	146	170	196	332	103	128	154	180	207	506	109	136	164	191	219
6.2	184	101	125	151	176	202	308	106	132	159	186	214	472	113	140	169	197	227
6.4	170	104	129	156	182	209	287	110	137	165	192	221	442	116	145	175	204	234
6.6	157	107	133	161	187	215	267	113	141	170	198	227	413	120	149	180	210	241
6.8	146	110	137	165	193	222	248	117	145	175	204	234	386	124	154	185	216	249
7	135	114	141	170	199	228	231	120	149	180	210	241	360	127	158	191	223	256
7.2	125	117	145	175	204	235	214	123	154	185	216	248	336	131	163	196	229	263
7.4	115	120	149	180	210	241	198	127	158	190	222	255	312	135	168	202	235	270
7.6	105	123	153	185	216	248	182	130	162	195	228	262	287	138	172	207	242	278
7.8	94	126	157	190	221	254	164	134	166	201	234	269	261	142	177	213	248	285
8	76	130	162	195	227	261	134	137	171	206	240	276	214	145	181	218	255	292

e_d (%)	V = 35 (MPH)						V = 40 (MPH)						V = 45 (MPH)					
	R MIN. (FT.)	Number of lanes					R MIN. (FT.)	Number of lanes					R MIN. (FT.)	Number of lanes				
		2	3	4	5	6		2	3	4	5	6		2	3	4	5	6
NC	4260	0	0	0	0	0	5410	0	0	0	0	0	6710	0	0	0	0	0
2	3120	39	48	58	68	78	3970	41	52	62	72	83	4930	44	55	67	78	89
2.2	2800	43	53	64	75	86	3570	46	57	68	80	91	4440	49	61	73	86	98
2.4	2540	46	58	70	81	93	3240	50	62	74	87	100	4030	53	66	80	93	107
2.6	2320	50	63	75	88	101	2960	54	67	81	94	108	3690	58	72	87	101	116
2.8	2130	54	67	81	95	109	2720	58	72	87	101	116	3390	62	77	93	109	125
3	1960	58	72	87	102	117	2510	62	77	93	109	125	3130	67	83	100	117	134
3.2	1820	62	77	93	108	124	2330	66	82	99	116	133	2900	71	89	107	124	143
3.4	1690	66	82	99	115	132	2170	70	88	106	123	141	2700	76	94	113	132	152
3.6	1570	70	87	105	122	140	2020	74	93	112	130	150	2520	80	100	120	140	161
3.8	1470	74	92	110	129	148	1890	79	98	118	138	158	2360	84	105	127	148	170
4	1370	77	96	116	135	156	1770	83	103	124	145	166	2220	89	111	133	156	179
4.2	1280	81	101	122	142	163	1660	87	108	130	152	175	2080	93	116	140	163	188
4.4	1200	85	106	128	149	171	1560	91	113	137	159	183	1960	98	122	147	171	197
4.6	1130	89	111	134	156	179	1470	95	118	143	167	191	1850	102	127	153	179	205
4.8	1060	93	116	139	163	187	1390	99	124	149	174	200	1750	107	133	160	187	214
5	991	97	120	145	169	195	1310	103	129	155	181	208	1650	111	138	167	194	223
5.2	929	101	125	151	176	202	1230	108	134	161	188	216	1560	116	144	173	202	232
5.4	870	105	130	157	183	210	1160	112	139	168	196	225	1480	120	149	180	210	241
5.6	813	108	135	163	190	218	1090	116	144	174	203	233	1390	124	155	187	218	250
5.8	761	112	140	168	196	226	1030	120	149	180	210	241	1320	129	160	193	226	259
6	713	116	145	174	203	233	965	124	155	186	217	250	1250	133	166	200	233	268
6.2	669	120	149	180	210	241	909	128	160	192	224	258	1180	138	172	207	241	277
6.4	628	124	154	186	217	249	857	132	165	199	232	266	1110	142	177	213	249	286
6.6	590	128	159	192	224	257	808	137	170	205	239	274	1050	147	183	220	257	295
6.8	553	132	164	197	230	265	761	141	175	211	246	283	990	151	188	227	264	304
7	518	135	169	203	237	272	716	145	180	217	253	291	933	156	194	233	272	313
7.2	485	139	173	209	244	280	672	149	185	223	261	299	878	160	199	240	280	322
7.4	451	143	178	215	251	288	628	153	191	230	268	308	822	164	205	247	288	331
7.6	417	147	183	221	257	296	583	157	196	236	275	316	765	169	210	253	296	339
7.8	380	151	188	226	264	303	533	161	201	242	282	324	701	173	216	260	303	348
8	314	155	193	232	271	311	444	166	206	248	290	333	587	178	221	267	311	357

e_d (%)	V = 50 (MPH)						V = 55 (MPH)					
	R MIN. (FT.)	Number of lanes					R MIN. (FT.)	Number of lanes				
		2	3	4	5	6		2	3	4	5	6
NC	8150	0	0	0	0	0	9720	0	0	0	0	0
2	5990	48	60	72	84	96	7150	51	64	77	89	103
2.2	5400	53	66	79	92	106	6450	56	70	84	98	113
2.4	4910	58	72	86	101	116	5870	61	76	92	107	123
2.6	4490	62	78	94	109	125	5370	66	83	100	116	133
2.8	4130	67	84	101	118	135	4950	71	89	107	125	144
3	3820	72	90	108	126	145	4580	77	95	115	134	154
3.2	3550	77	96	115	134	154	4250	82	102	123	143	164
3.4	3300	82	102	122	143	164	3970	87	108	130	152	174
3.6	3090	86	108	130	151	174	3710	92	114	138	161	185
3.8	2890	91	114	137	160	183	3480	97	121	146	170	195
4	2720	96	120	144	168	193	3270	102	127	153	179	205
4.2	2560	101	125	151	176	203	3080	107	134	161	188	216
4.4	2410	106	131	158	185	212	2910	112	140	169	197	226
4.6	2280	110	137	166	193	222	2750	117	146	176	206	236
4.8	2160	115	143	173	202	232	2610	123	153	184	214	246
5	2040	120	149	180	210	241	2470	128	159	191	223	257
5.2	1930	125	155	187	218	251	2350	133	165	199	232	267
5.4	1830	130	161	194	227	260	2230	138	172	207	241	277
5.6	1740	134	167	202	235	270	2120	143	178	214	250	287
5.8	1650	139	173	209	244	280	2010	148	184	222	259	298
6	1560	144	179	216	252	289	1920	153	191	230	268	308
6.2	1480	149	185	223	260	299	1820	158	197	237	277	318
6.4	1400	154	191	230	269	309	1730	163	203	245	286	328
6.6	1330	158	197	238	277	318	1650	169	210	253	295	339
6.8	1260	163	203	245	286	328	1560	174	216	260	304	349
7	1190	168	209	252	294	338	1480	179	223	268	313	359
7.2	1120	173	215	259	302	347	1400	184	229	276	322	369
7.4	1060	178	221	266	311	357	1320	189	235	283	331	380
7.6	980	182	227	274	319	367	1230	194	242	291	340	390
7.8	901	187	233	281	328	376	1140	199	248	299	349	400
8	758	192	239	288	336	386	960	204	254	306	357	411

e_d (%)	V = 60 (MPH)						V = 65 (MPH)						V = 70 (MPH)					
	R MIN. (FT.)	Number of lanes					R MIN. (FT.)	Number of lanes					R MIN. (FT.)	Number of lanes				
		2	3	4	5	6		2	3	4	5	6		2	3	4	5	6
NC	11500	0	0	0	0	0	12900	0	0	0	0	0	14500	0	0	0	0	0
2	8440	53	66	80	93	107	9510	56	69	84	98	112	10700	60	75	90	105	121
2.2	7620	59	73	88	103	118	8600	61	76	92	107	123	9660	66	82	99	116	133
2.4	6930	64	80	96	112	129	7830	67	83	100	117	135	8810	72	90	108	126	145
2.6	6350	69	86	104	121	139	7180	73	90	109	127	146	8090	78	97	117	137	157
2.8	5850	75	93	112	131	150	6630	78	97	117	137	157	7470	84	105	126	147	169
3	5420	80	100	120	140	161	6140	84	104	126	147	168	6930	90	112	135	158	181
3.2	5040	85	106	128	149	172	5720	89	111	134	156	179	6460	96	120	144	168	193
3.4	4700	91	113	136	159	182	5350	95	118	142	166	191	6050	102	127	153	179	205
3.6	4400	96	120	144	168	193	5010	100	125	151	176	202	5680	108	134	162	189	217
3.8	4140	101	126	152	177	204	4710	106	132	159	186	213	5350	114	142	171	200	229
4	3890	107	133	160	187	214	4450	112	139	167	195	224	5050	120	149	180	210	241
4.2	3670	112	139	168	196	225	4200	117	146	176	205	236	4780	126	157	189	221	253
4.4	3470	117	146	176	205	236	3980	123	153	184	215	247	4540	132	164	198	231	265
4.6	3290	123	153	184	215	247	3770	128	160	193	225	258	4310	138	172	207	242	277
4.8	3120	128	159	192	224	257	3590	134	167	201	234	269	4100	144	179	216	252	289
5	2960	133	166	200	233	268	3410	140	174	209	244	280	3910	150	187	225	263	302
5.2	2820	139	173	208	243	279	3250	145	181	218	254	292	3740	156	194	234	273	314
5.4	2680	144	179	216	252	289	3110	151	188	226	264	303	3570	162	202	243	284	326
5.6	2550	149	186	224	261	300	2970	156	195	234	273	314	3420	168	209	252	294	338 ②
5.8	2430	155	193	232	271	311	2840	162	202	243	283	325	3280	174	217	261	305	350
6	2320	160	199	240	280	322	2710	167	208	251	293	337	3150	180	224	270	315	362
6.2	2210	165	206	248	289	332	2600	173	215	260	303	348	3020	186	232	279	326	374
6.4	2110	171	212	256	299	343	2490	179	222	268	313	359	2910	192	239	288	336	386
6.6	2010	176	219	264	308	354	2380	184	229	276	322	370	2790	198	247	297	347	398
6.8	1910	181	226	272	317	364	2280	190	236	285	332	381	2690	204	254	306	357	410
7	1820	187	232	280	327	375	2180	195	243	293	342	393	2580	210	261	315	368	422
7.2	1720	192	239	288	336	386	2070	201	250	301	352	404	2470	216	269	324	378	434
7.4	1630	197	246	296	345	397	1970	207	257	310	361	415	2350	222	276	333	389	446
7.6	1530	203	252	304	355	407	1850	212	264	318	371	426	2230	228	284	342	399	458
7.8	1410	208	259	312	364	418	1720	218	271	327	381	438	2090	234	291	351	410	470
8	1200	213	266	320	373	429	1480	223	278	335	391	449	1810	240	299	360	420	482

DESIGN NOTES

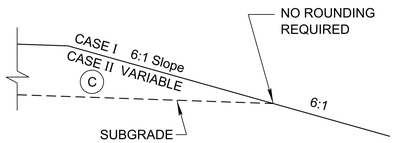
① SEE STANDARD DRAWING RD11-SE-1 FOR EQUATIONS, LEGEND AND GENERAL NOTES. TABLES ARE BASED ON MINIMUM RADII, SUPERELEVATION, SPEED AND NUMBER OF LANES ROTATED.

② SPIRALS ARE RECOMMENDED FOR DESIGN SPEED OF 50 MPH OR GREATER AND DESIGN SUPERELEVATION OF 3 PERCENT OR GREATER.

③ TABLE VALUES ARE FOR MINIMUM RADIUS OF CURVE AND SUPERELEVATION RUNOFF LENGTH. SEE STANDARD DRAWING RD11-SE-1 FOR EQUATIONS TO CALCULATE TANGENT RUNOUT LENGTH AND TOTAL TRANSITION LENGTH.

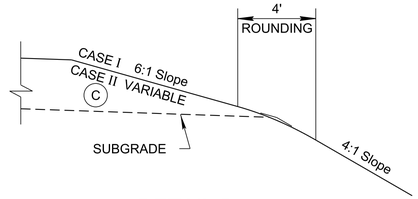
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

MINIMUM RUNOFF LENGTHS (L_R) FOR RURAL HIGHWAYS

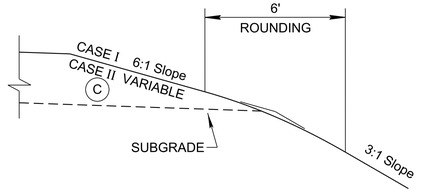


DETAIL A

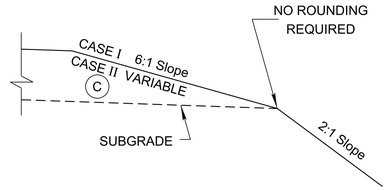
(WHERE FORESLOPE ARE EQUAL NO ROUNDING IS REQUIRED)



DETAIL B



DETAIL C

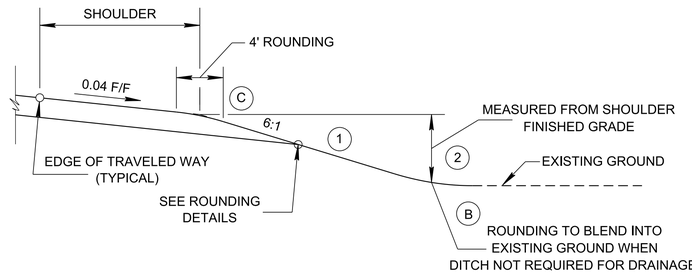


DETAIL D

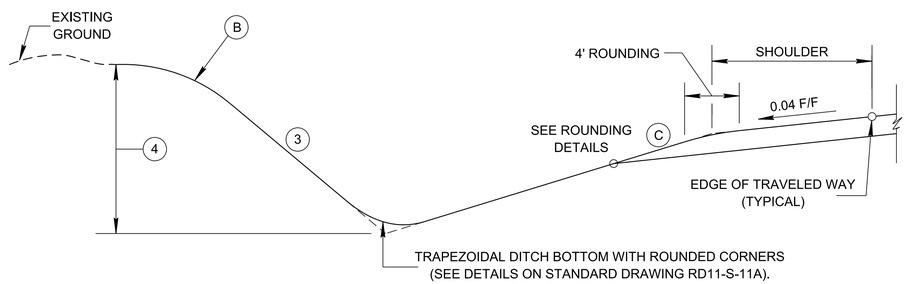
NON-TRAVERSIBLE FILL/CUT SLOPE

ROUNDING DETAILS

CASE I (6:1 FORESLOPE IS SHOWN)



FILL SLOPES



CUT SLOPES

GENERAL SLOPE TABLE (A)			
CASE I		CASE II	
FILL SLOPES (1)	HEIGHT OF FILL (2)	FILL SLOPES (1)	HEIGHT OF FILL (2)
6:1	0'-7'	4:1	0'-6'
4:1	7'-15'	3:1	6'-8'
3:1	15'-28'	2:1	8'-12'
2:1	OVER 28'	1.5:1	OVER 12'
CUT SLOPES (3)	DEPTH OF CUT (4)	CUT SLOPES (3)	DEPTH OF CUT (4)
4:1	0'-15'	4:1	0'-6'
3:1	15'-20'	3:1	6'-8'
2:1	OVER 20'	2:1	8'-12'
NA	NA	1.5:1	OVER 12'

CASE I : FOR ALL FREEWAYS AND ARTERIALS. ALSO FOR COLLECTORS WITH A POSTED SPEED OF 45 MILES PER HOUR OR GREATER.

CASE II : FOR LOCAL ROADS AND STREETS AND COLLECTORS (STANDARD DRAWINGS RD11-TS-1, 1A, & 2).

SPECIAL NOTE

ROUNDING AND ROADSIDE SLOPE DETAILS SHOWN ON THIS SHEET ARE APPLICABLE TO OUTSIDE SHOULDER ONLY, ON PROJECTS AS DESCRIBED IN CASE I AND CASE II ABOVE. FOR DETAILS OF INSIDE SHOULDERS ON MULTI-LANE ROADWAYS, SEE APPROPRIATE STANDARD DRAWINGS.

DESIGN NOTES

(A) FILL AND/OR CUT SLOPE RATIOS SHALL BE RECOMMENDED OR APPROVED BY THE MATERIALS AND TEST, GEOTECHNICAL ENGINEERING SECTION. SEE RD11-S-11B FOR ROCK CUT SLOPE AND CATCHMENT DETAILS.

(B) SLOPES AT THE TOE OF FILLS AND TOP OF CUTS SHALL BE ROUNDED TO BLEND INTO THE EXISTING TERRAIN.

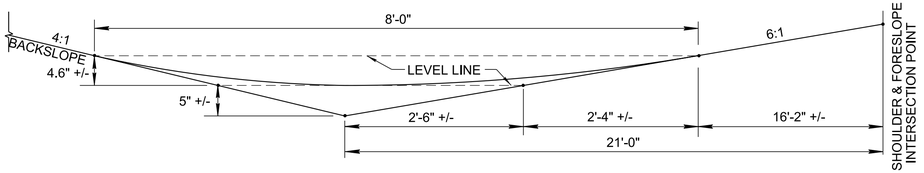
(C) SEE APPROPRIATE RD11-TS SERIES DRAWING FOR FORESLOPE.

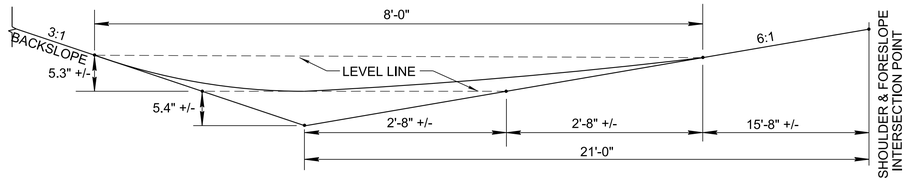
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

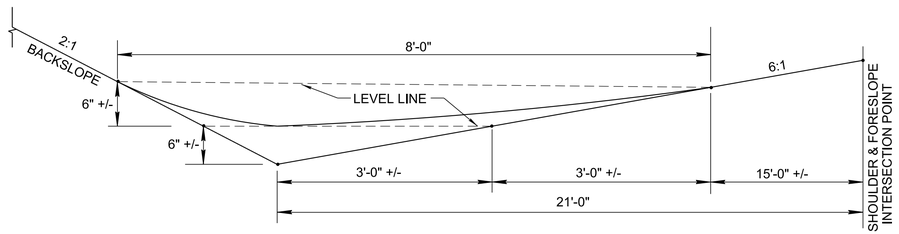
DESIGN AND CONSTRUCTION DETAILS FOR ROADSIDE SLOPE DEVELOPMENT

01-01-2019 | RD11-S-11

NOT TO SCALE

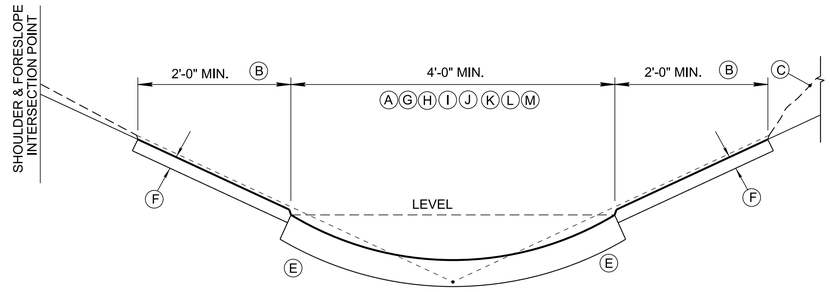






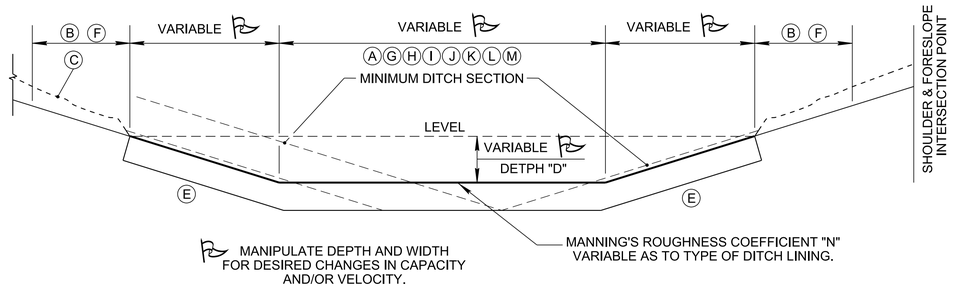
TRAVERSABLE DITCH ROUNDING DETAILS

FOR ROADSIDE DITCHES LOCATED INSIDE CLEAR ZONE
(DIMENSIONED FOR FIELD LAYOUT)



"V" DITCH DETAIL Ⓓ

(MINIMUM CUT DITCHES SIMILAR EXCEPT FOR GEOMETRIC
LAYOUT, ON LEFT SIDE OF THIS SHEET.)



TRAPEZOIDAL DITCH DETAIL Ⓓ

SECTION SHOWING DITCH ADJUSTMENT FOR
VARIATIONS IN HYDRAULIC REQUIREMENTS
SEE FIGURES 3-6 AND 3-7, ROADSIDE DESIGN GUIDE, 2011
FOR PREFERRED CHANNEL CROSS-SECTION.

DESIGN NOTES

Ⓐ CUT SLOPE DITCHES AND SPECIAL DITCHES AT THE TOE OF FILLS WITHIN THE CLEAR ZONE SHALL BE BASED UPON THIS GEOMETRICAL CONFIGURATION REGARDLESS OF THE TYPE OF DITCH LINING REQUIRED FOR EROSION RETARDANCE. IF HYDRAULIC REQUIREMENTS DICTATE A GREATER CAPACITY THAN THE MINIMUM SHOWN HERE, THE BOTTOM OF THE TRAPEZOID MAY BE WIDENED BUT THE CORNERS SHALL REMAIN ROUNDED. DITCHES OUTSIDE OF THE CLEAR ZONE OR ALONG FILL SLOPES STEEPER THAN 3:1 MAY BE VARIED AS REQUIRED TO MEET CONDITIONS AS DICTATED BY HYDRAULIC REQUIREMENTS AND TERRAIN, EXCEPT THAT DESIGN AND CONSTRUCTION ENGINEERS SHOULD STRIVE FOR AESTHETIC BLENDING OF ANY GRADING OR STRUCTURE REQUIRED FOR THE FUNCTIONING OF THE ROADWAY FACILITY.

Ⓑ 2'-0" MINIMUM SOD STRIP OR OTHER RECOMMENDED EROSION CONTROL MATERIAL SHALL BE PLACED ADJACENT TO CONCRETE-PAVED OR RIP-RAP DITCH BOTTOM LINING IN ACCORDANCE WITH SECTION 803 OF THE CURRENT TDOT STANDARD SPECIFICATIONS AND/OR CURRENT SPECIAL PROVISION(S). ON BACK SLOPES, MATERIAL MAY BE EXTENDED TO BLEND INTO EXISTING VEGETATION WHEN FEASIBLE, AS DETERMINED BY THE ENGINEER.

Ⓒ ALL SLOPES OR EXISTING GROUND DISTURBED BY CONSTRUCTION SHALL BE SEEDED IN ACCORDANCE WITH SECTION 801 OF THE CURRENT TDOT STANDARD SPECIFICATIONS AND/OR CURRENT SPECIAL PROVISION(S) REGARDING THE SAME, UNLESS OTHERWISE INDICATED ON PLANS.

Ⓓ FOR EXISTING GROUND, THE DESIGNER AND THE CONSTRUCTION ENGINEER SHOULD ENDEAVOR TO PLACE THE DITCH IN CUT UNLESS STEEP TERRAIN RENDERS THIS UNFEASIBLE.

Ⓔ FOR DITCH SUB-GRADE, THE SUB-GRADE SHALL BE PREPARED AND COMPACTED IN ACCORDANCE WITH SECTION 205 OF THE CURRENT STANDARD SPECIFICATIONS TO A DENSITY OF NOT LESS THAN 95 %, PROCTOR (AASHTO T-99). PAYMENT FOR PREPARATION AND COMPACTION OF THE DITCH SUB-GRADE WILL BE MADE UNDER ITEM 203-01, ROAD & DRAINAGE EXCAVATION (UNCLASSIFIED), UNLESS OTHERWISE DESIGNATED ON THE PLANS.

Ⓕ THE SOD STRIP SHALL HAVE A UNIFORM THICKNESS OF NOT LESS THAN 1 INCH.

Ⓖ CONCRETE, RIP-RAP, SOD, TURF REINFORCEMENT MATTING, OR OTHER DITCH LINING. THE TYPE OF LINING FOR EACH INDIVIDUAL DITCH ALONG THE ROADWAY WILL BE DESIGNATED ON THE PLANS IN ACCORDANCE WITH SYMBOLS AS SHOWN ON STANDARD DRAWING RD-L-1 AND THE PLANS. DECISIONS REGARDING THE TYPE OF LINING TO BE SPECIFIED ON PLANS WILL BE MADE BY THE DESIGNER, BASED UPON THE TYPE THAT WILL BEST SATISFY THE HYDRAULIC REQUIREMENTS AT THE LEAST COST. SEE TDOT DRAINAGE MANUAL, CHAPTER 5 FOR GUIDANCE.

Ⓗ DESIGNS FOR THE SOD DITCH SHALL BE IN ACCORDANCE WITH THE TDOT DRAINAGE MANUAL, CHAPTER 5.

Ⓘ FOR DITCH LINER SELECTION, TURF REINFORCEMENT MATTING IS THE PREFERRED TYPE OF DITCH LINER. THE DESIGN OF CONCRETE DITCHES SHOULD BE AVOIDED WHENEVER POSSIBLE. SEE TDOT DRAINAGE MANUAL CHAPTER 5 FOR GUIDANCE ON DITCH LINER SELECTION. RIP-RAP OR CONCRETE DITCH LININGS SHOULD BE CONSIDERED ONLY AFTER THE ALLOWABLE DEPTHS COMBINED WITH WIDTH ADJUSTMENTS WITHIN FEASIBLE LIMITS ("FEASIBLE LIMITS" TO BE DETERMINED BY THE DESIGNER, BASED UPON RIGHT-OF-WAY OR OTHER CASE-BY-CASE SITUATIONS) HAVE BEEN STUDIED.

Ⓙ THE SUBGRADE OF THE DITCH SHALL BE GRADED SO THAT THE SOD STRIP SHALL BE 1/2" MINIMUM TO 1" MAXIMUM ABOVE THE CONCRETE STRIP, AND/OR THE SEEDED SLOPE.

Ⓚ IN ALL CONCRETE DITCHES, FORMED OR SAWED CONTRACTION JOINTS (1/4" WIDE AND 1" DEEP) WILL BE REQUIRED AT A MAXIMUM OF 20' INTERVALS AND ONE-HALF (1/2) TRANSVERSE PRE-MOLDED FIBER EXPANSION JOINTS WILL BE REQUIRED AT 60' INTERVALS, COST TO BE INCLUDED IN THE PRICE BID FOR THE PAY ITEM FOR PAVED DITCHES. SEE STANDARD DRAWING RP-J-9 FOR JOINT DETAILS.

Ⓛ WHEN CONCRETE DITCHES ARE USED, THE CONCRETE WILL BE 4" THICK.

Ⓜ WHEN RIP-RAP DITCHES ARE USED, THE TYPE AND THICKNESS OF RIP-RAP WILL BE SPECIFIED ON THE PLANS AND MUST BE PLACED OVER GEOTEXTILE FABRIC.

Ⓝ PAY ITEMS:

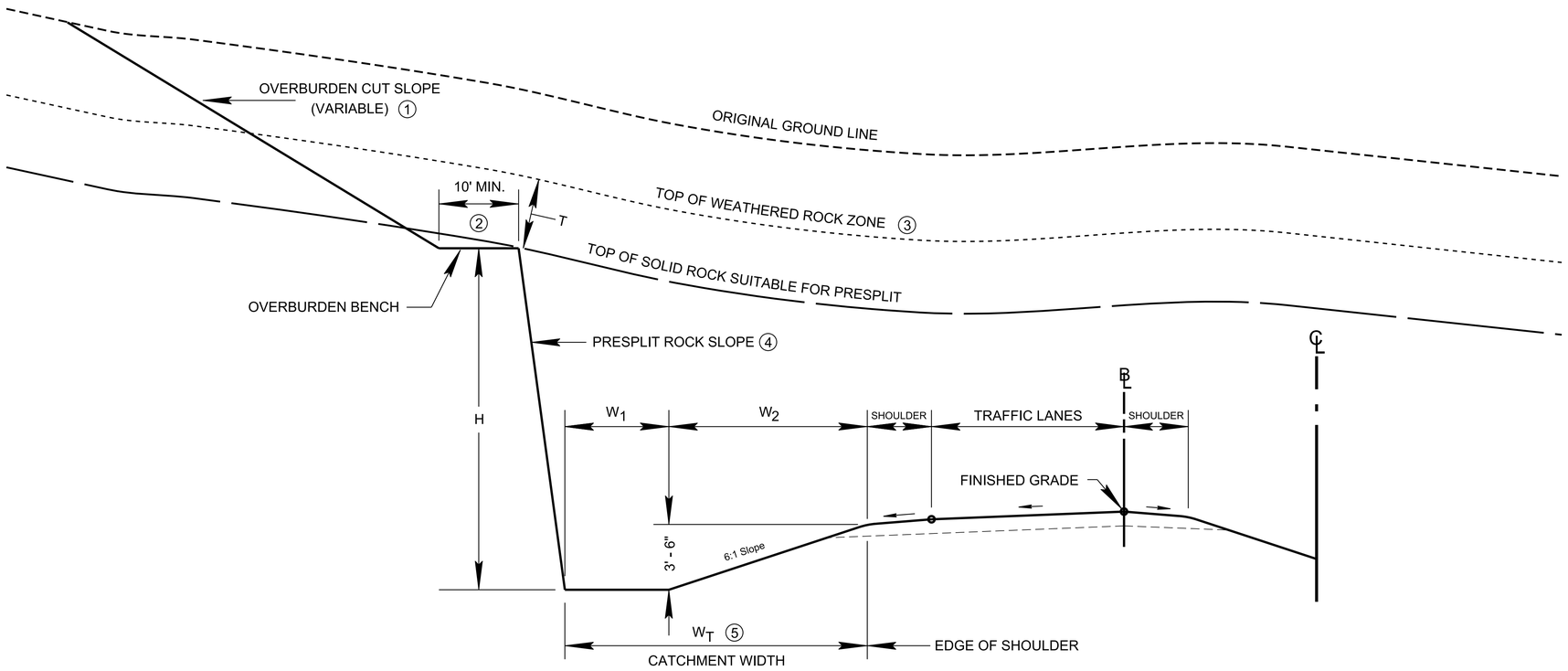
604-01.01	CLASS A CONCRETE (ROADWAY)	C.Y.	709-05.09	MACHINED RIP-RAP (CLASS C)	TON
709-05.06	MACHINED RIP-RAP (CLASS A-1)	TON	740-10.03	GEOTEXTILE (TYPE III) (EROSION CONTROL)	S.Y.
709-05.08	MACHINED RIP-RAP (CLASS B)	TON	803-01	SODDING (NEW SOD)	S.Y.
703-01	CEMENT CONCRETE DITCH PAVING	C.Y.			

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

ROADSIDE DITCH DETAILS FOR DESIGN AND CONSTRUCTION

01-01-2019 | RD11-S-11A

NOT TO SCALE



ROCK CUT SLOPE AND CATCHMENT DETAILS

PRESPLIT ROCK CUT SLOPE TABLE

H (FT)	VERTICAL		SLOPING 1 H : 4 V OR FLATTER	
	W_T (FT) ⑤	W_1 (FT)	W_T (FT)	W_1 (FT)
0 - 40	21	0	21	0
40 - 50	21	0	27	6
50 - 60	24	3	33	12
60 - 70	28	7	37	16
70 - 80	32	11	41	20
80 - 120	36	15	45	24
120 - 160	40	19	51	30
160 - 200	52	31	63	42

DESIGN NOTES

① SEE GEOTECHNICAL REPORT FOR ALLOWABLE OVERBURDEN CUT SLOPE RECOMMENDATIONS.

② OVERBURDEN BENCH TO BE MINIMUM OF 10' WIDE AS SPECIFIED IN GEOTECHNICAL REPORT. NO INTERMEDIATE BENCHES ARE TO BE USED UNLESS RECOMMENDED IN THE REPORT.

③ TOP OF WEATHERED ROCK ZONE (HENCE, THE THICKNESS -T) WILL BE VARIABLE. GEOTECHNICAL REPORT WILL PROVIDE PROJECT SPECIFIC GUIDANCE ON THICKNESS TO USE IN THE CROSS-SECTION DEVELOPMENT. THIS ZONE MAY CONTAIN ROCK PINNACLES, ROCK LENSES, OR WEATHERED ROCK MIXED WITH SOIL. BLASTING MAY BE REQUIRED TO REMOVE. CONSIDER EXCAVATION ITEM IN THIS ZONE TO BE UNCLASSIFIED, COMMON.

④ PRESPLIT SLOPE TO BE PROVIDED FOR SPECIFIC ROCK CUT INTERVALS IN GEOTECHNICAL REPORT. IT IS ASSUMED PRESPLIT FACES WILL BE FORMED OR SCALED OF LOOSE ROCKS AND OVERHANGS IN ACCORDANCE WITH TDOT STANDARD SPECIFICATIONS.

⑤ W_T IS HORIZONTAL DISTANCE FROM SHOULDER (MID-POINT OF SLOPE ROUNDING) TO BASE OF PRESPLIT ROCK SLOPE. W_T WILL BE 21 FEET OR GREATER IN ALL CASES. FOR ALL FORESLOPES OTHER THAN 6:1, SEE GEOTECHNICAL REPORT.

GENERAL NOTES

Ⓐ IF W_T CANNOT BE ACHIEVED DUE TO RIGHT-OF-WAY RESTRICTIONS OR EXCESSIVE EXCAVATION, THEN A COMBINATION OF A NARROWER ROCKFALL DITCH (W_1), ROCKFALL CATCHMENT FENCE OR BARRIER, OR ROCKSLOPE MESHING WILL BE REQUIRED. CONTACT GEOTECHNICAL ENGINEERING SECTION OR GEOTECHNICAL CONSULTANT FOR GUIDANCE.

Ⓑ A UNIFORM CATCHMENT WIDTH (W_T) BASED ON THE HIGHEST ROCK CUT SLOPE (H), SHOULD BE USED.

Ⓒ FOR LONG CUT SLOPES WHERE A PREDOMINANT CUT HEIGHT EXISTS FOR SEVERAL STATIONS, UTILIZE W_T FOR THAT GIVEN CUT HEIGHT (H). TRANSITION TO VARIOUS CATCHMENT WIDTHS ON A RATIO NO GREATER THAN 4 FEET HORIZONTAL W_T PER 100 FOOT STATION INTERVAL.

(Replaced Std Dwg RD01-S-11B)

STATE OF TENNESSE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

DESIGN AND CONSTRUCTION DETAILS FOR ROCK CUT SLOPE AND CATCHMENT

01-07-2019 | RD11-S-11B

NOT TO SCALE

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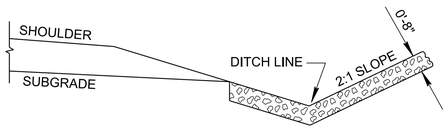
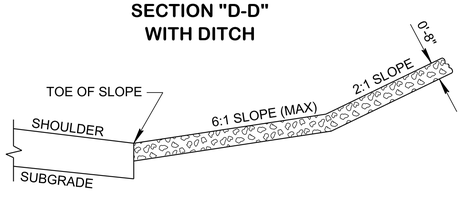
RIP-RAP DETAILS

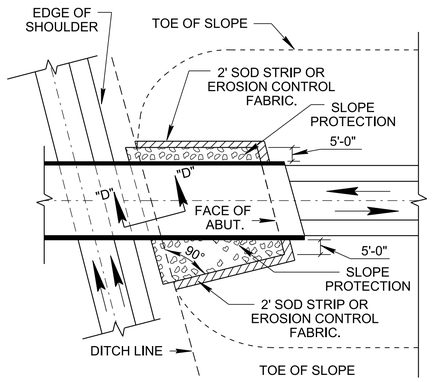


SECTION "D-D"
WITH DITCH

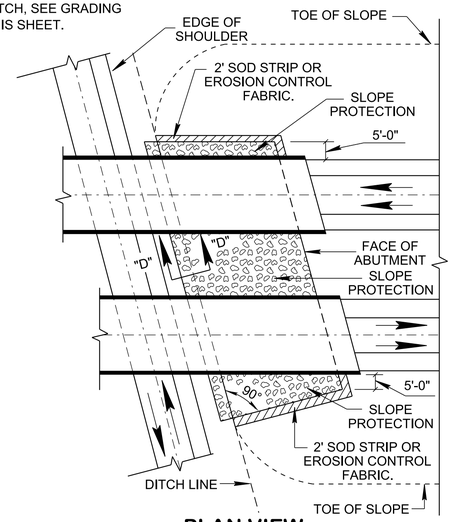


SECTION "D-D"
WITH DITCH

NOTE: PLAN VIEWS ARE SHOWN WITH DITCH. FOR VIEW WITHOUT DITCH, SEE GRADING DESIGN LAYOUT ON THIS SHEET.



PLAN VIEW
SINGLE BRIDGE



PLAN VIEW
DUAL BRIDGES

DESIGN NOTES

(A) ALL WORK INDICATED ON THIS DRAWING SHALL BE PERFORMED IN ACCORDANCE WITH THE

(B) PAYMENT FOR ALL ITEMS DIRECTLY INDICATED OR IMPLIED ON THIS DRAWING WILL BE MADE UNDER APPROPRIATE ITEM NUMBER(S) AND DESCRIPTION(S) RECORDED ELSEWHERE IN THE PLANS.

NOTES TO DESIGNERS:

(C) WHEN EXISTING PHYSICAL CONDITIONS OF THE APPROACH AND TRANSITION ZONE ARE SO UNIQUE AS TO WARRANT INDIVIDUAL DESIGN, A CONTOUR PLAN SHALL BE PREPARED TO PROVIDE THE CONSTRUCTION ENGINEER WITH DATA FOR CONSTRUCTION TO THE INTENDED LINES AND GRADES.

(D) IN RARE CASES WHEN A STEEP (GREATER THAN 3:1) FILL SLOPE IS UNAVOIDABLE WITHIN THE SAFETY APPROACH ZONE, A BARRIER WILL BE INDICATED ON PLANS IN ACCORDANCE WITH DESIGN POLICY SET OUT IN THE "S-GR-" SERIES OF STANDARD DRAWINGS.

MACHINED RIP-RAP SLOPE PROTECTION NOTES

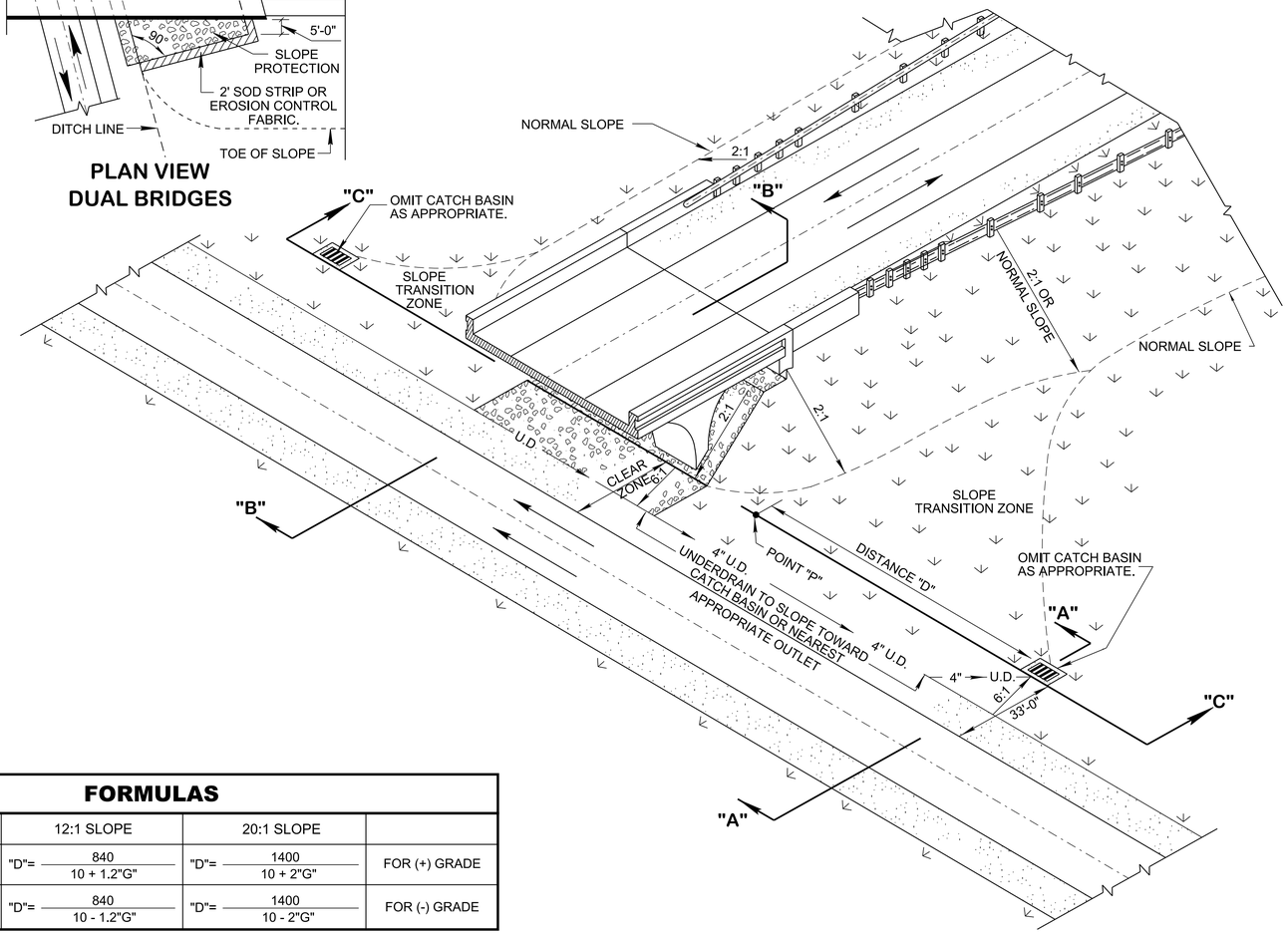
(1) MACHINED RIP-RAP FOR SLOPE PROTECTION SHALL BE TWO (2) INCHES TO SIX (6) INCHES IN SIZE, UNIFORMLY GRADED AND MEET THE REQUIREMENTS OF SUBSECTION 709 OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION. IT IS TO BE PAID FOR UNDER ITEM NO. 709-05.05, MACHINED RIP-RAP (CLASS A-3) PER TON.

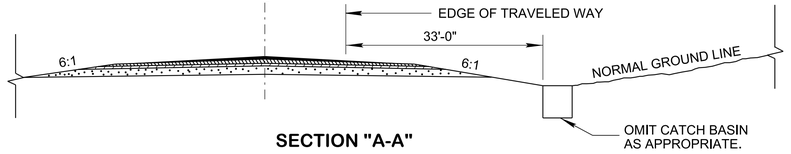
(2) AGGREGATE SHALL BE PLACED TO A DEPTH OF EIGHT (8) INCHES MEASURED PERPENDICULAR TO THE SLOPE FLUSH WITH THE EMBANKMENT SLOPE UNDER THE BRIDGE, SHALL EXTEND FROM THE FACE OF THE ABUTMENTS OR END BENTS ACROSS THE BERM AND DOWN THE SLOPE TO A POINT AS SHOWN IN SECTION "D-D" ABOVE, AND SHALL EXTEND LATERALLY TO FIVE (5) FEET BEYOND THE OUTER EDGES OF THE SUPERSTRUCTURE.

(3) THE CRUSHED AGGREGATE MAY BE DUMPED IN PLACE. PLACING SHALL BE CONDUCTED IN A MANNER TO PRODUCE A UNIFORM SURFACE VARYING NO MORE THAN TWO (2) INCHES IN FOUR (4) FEET FROM A TRUE PLANE. HAND PLACINGS MAY BE REQUIRED AS NECESSARY TO CORRECT IRREGULARITIES EXCEEDING THE SPECIFIED TOLERANCES.

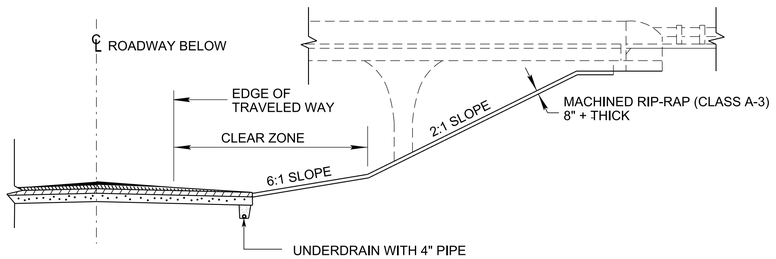
(4) WHERE THE MEDIAN IS OVER 60 FEET, THE SLOPE PROTECTION SHALL EXTEND TO THE WIDTH REQUIRED FOR EACH SEPARATE STRUCTURE AND THE AREA BETWEEN THE SLOPE PROTECTION OF EACH STRUCTURE SHALL BE SODDED.

(5) WHERE THE MEDIAN IS 60 FEET OR LESS, THE SLOPE PROTECTION SHALL EXTEND AS SHOWN IN THE PLAN VIEW ABOVE.





SECTION "A-A"

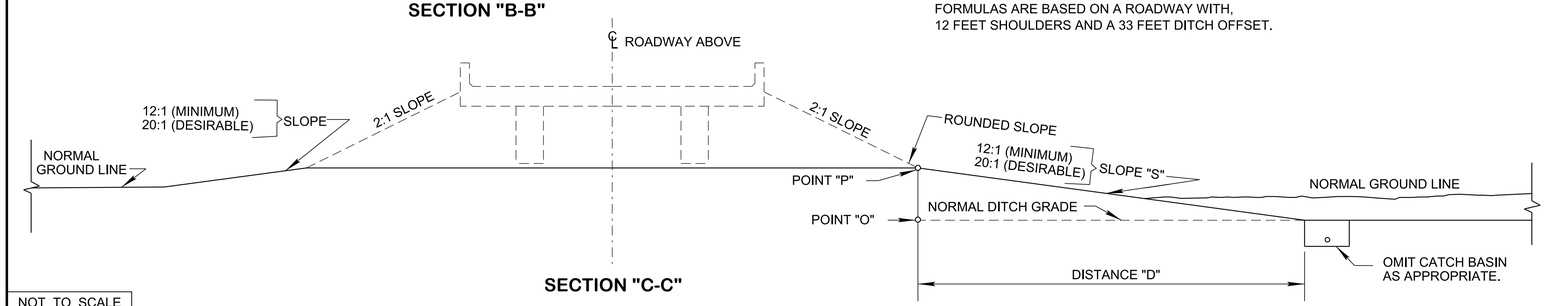


SECTION "B-B"

FORMULAS

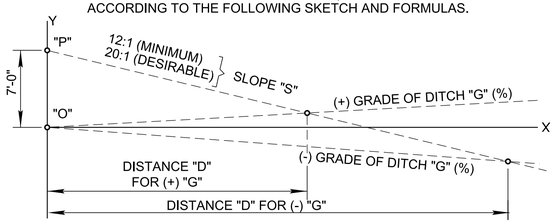
GENERAL	12:1 SLOPE	20:1 SLOPE	
$D = \frac{700 \times S}{100 + (S \times G)}$	$D = \frac{840}{10 + 1.2G}$	$D = \frac{1400}{10 + 2G}$	FOR (+) GRADE
$D = \frac{700 \times S}{100 - (S \times G)}$	$D = \frac{840}{10 - 1.2G}$	$D = \frac{1400}{10 - 2G}$	FOR (-) GRADE

FORMULAS ARE BASED ON A ROADWAY WITH, 12 FEET SHOULDERS AND A 33 FEET DITCH OFFSET.



SECTION "C-C"

NOTE: THE SKETCH BELOW ASSUMES A 0.0 % GRADE ON THE ROADWAY APPROACHING THE HAZARD (BRIDGE PIER). TO COMPENSATE FOR VARIABLE GRADES, SOLVE FOR "D" ACCORDING TO THE FOLLOWING SKETCH AND FORMULAS.



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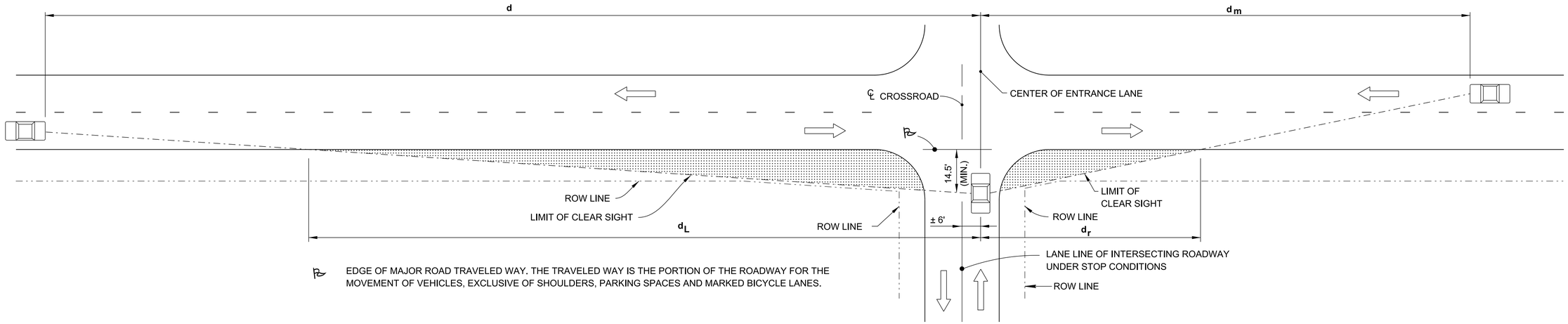
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

SAFETY APPROACH TO UNDERPASSES GRADING DESIGN AND SLOPE PROTECTION

01-01-2019 | RD11-SA-1



ORIGIN OF CLEAR SIGHT LINE ON MINOR ROAD, STOP CONDITIONS

GENERAL NOTES

1. FOR ALL NEW CONSTRUCTION AND RECONSTRUCTION PROJECTS, DESIGNERS SHOULD ENSURE THAT INTERSECTION SIGHT DISTANCE IS PROVIDED IN ADDITION TO ADEQUATE STOPPING SIGHT DISTANCE AT ALL INTERSECTIONS, RAILROAD CROSSINGS WITHOUT TRAIN ACTIVATED WARNING DEVICES, AND COMMERCIAL DRIVES. DESIGN INFORMATION AND VALUES FOR SIGHT DISTANCE AT INTERSECTIONS AND RAILROAD CROSSINGS CAN BE FOUND IN "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), CHAPTER 9, INTERSECTIONS.

2. INTERSECTION SIGHT DISTANCE SHOULD ALSO BE PROVIDED AT ALL PRIVATE DRIVES AND FIELD ENTRANCES WHEN FEASIBLE. IN THE EVENT THAT INTERSECTION SIGHT DISTANCE CANNOT BE ACHIEVED, THE DESIGNER SHALL VERIFY THAT STOPPING SIGHT DISTANCE IS PROVIDED. INTERSECTION SIGHT DISTANCE SHOULD ALWAYS BE PROVIDED FOR A LEFT TURN MOVEMENT FROM THE MAJOR ROAD INTO A PRIVATE DRIVE OR FIELD ENTRANCE.

3. DESIGNERS SHOULD CONSIDER ALL FEATURES THAT COULD LIMIT ADEQUATE SIGHT DISTANCE INCLUDING BUILDINGS, PARKED VEHICLES, HIGHWAY STRUCTURES, ROADSIDE HARDWARE, HEDGES, TREES, BUSHES, UNMOWED GRASS, TALL CROPS, WALLS, FENCES, SLOPES, AND THE TERRAIN ITSELF. THE DETERMINATION OF WHETHER AN OBJECT CONSTITUTES A SIGHT OBSTRUCTION SHOULD CONSIDER THE HORIZONTAL AND VERTICAL ALIGNMENT OF BOTH INTERSECTING ROADWAYS, AS WELL AS THE HEIGHT AND POSITION OF THE OBJECT. IN MAKING THIS DETERMINATION, THE ASSUMED DRIVER'S EYE SHOULD BE 3'-6" ABOVE THE SURFACE OF THE INTERSECTING ROAD FOR PASSENGER CARS. FOR LANDSCAPING, THE MATURE SIZE OF THE ITEM SHALL BE USED.

4. IN AREAS OF LIMITED RIGHT-OF-WAY ACQUISITION, SUCH AS A CURB AND GUTTER SECTION, ADDITIONAL RIGHT- OF-WAY MAY NEED TO BE ACQUIRED TO ENSURE THAT INTERSECTION SIGHT DISTANCE CAN BE ACHIEVED OR MAINTAINED. IN THE EVENT THAT IT IS NOT FEASIBLE TO OBTAIN MINIMUM INTERSECTION SIGHT DISTANCE OR TO ACQUIRE ADEQUATE RIGHT-OF-WAY TO ENSURE INTERSECTION SIGHT DISTANCE CAN BE MAINTAINED, THE DESIGN MANAGER WILL DOCUMENT IN THE PROJECT FILE THE REASON AND STEPS TAKEN TO MITIGATE. INTERSECTION SIGHT DISTANCE IS NOT ONE OF THE TEN CONTROLLING ELEMENTS OF DESIGN AS DETAILED IN THE ROADWAY DESIGN GUIDELINES; THEREFORE, DESIGN EXCEPTIONS NEED NOT BE SUBMITTED.

5. DESIGNERS SHALL SHOW SIGHT LINES FOR ALL INTERSECTIONS IN THE DESIGN CADD FILE. SIGHT LINES SHALL ONLY BE SHOWN ON THE PRESENT AND/OR PROPOSED LAYOUT SHEETS WHEN RIGHT-OF-WAY IS REQUIRED FOR THE PURPOSE OF ESTABLISHING OR MAINTAINING INTERSECTION SIGHT DISTANCE. SIGHT LINES SHOULD ALSO BE SHOWN FOR ALL INTERSECTIONS AND DRIVES ON ALL LANDSCAPING PLANS.

6. THE MINIMUM DRIVER EYE SETBACK OF 14.5' FROM THE EDGE OF THE TRAVELED WAY MAY BE ADJUSTED ON ANY INTERSECTION LEG ONLY WHEN JUSTIFIED BY A SITE SPECIFIC FIELD STUDY OF VEHICLE STOPPING POSITION AND DRIVER EYE POSITION.

7. FOR SIGNALIZED INTERSECTIONS, SIGHT DISTANCES SHOULD BE DEVELOPED BASED ON AASHTO "CASE D- INTERSECTIONS WITH TRAFFIC SIGNAL CONTROL". AT SIGNALIZED INTERSECTIONS. THE FIRST VEHICLE STOPPED ON ONE APPROACH SHOULD BE VISIBLE TO THE DRIVER OF THE FIRST VEHICLE STOPPED ON EACH OF THE OTHER APPROACHES. LEFT-TURNING VEHICLES SHOULD HAVE SUFFICIENT SIGHT DISTANCE TO SELECT GAPS IN ONCOMING TRAFFIC AND COMPLETE LEFT TURNS. APART FROM THESE SIGHT CONDITIONS, THERE ARE GENERALLY NO OTHER APPROACH OR DEPARTURE SIGHT TRIANGLES NEEDED FOR SIGNALIZED INTERSECTIONS. HOWEVER, IF THE TRAFFIC SIGNAL IS TO BE PLACED ON TWO-WAY FLASHING OPERATION (I.E. FLASHING YELLOW ON THE MAJOR-ROAD APPROACHES AND FLASHING RED ON THE MINOR-ROAD APPROACHES) UNDER OFF-PEAK OR NIGHTTIME CONDITIONS, THEN THE APPROPRIATE DEPARTURE SIGHT TRIANGLES FOR CASE B, BOTH TO THE LEFT AND TO THE RIGHT, SHOULD BE PROVIDED FOR THE MINOR-ROAD APPROACHES. IN ADDITION, IF RIGHT TURNS ON A RED SIGNAL ARE TO BE PERMITTED FROM ANY APPROACH, THEN THE APPROPRIATE DEPARTURE SIGHT TRIANGLE TO THE LEFT FOR CASE B2 SHOULD BE PROVIDED TO ACCOMMODATE RIGHT TURNS FROM THAT APPROACH.

8. WHERE CURVATURE, SUPERELEVATION, ADVERSE SPLIT PROFILES OR OTHER CONDITIONS PRECLUDE THE USE OF STANDARD TREE SIZES AND SPACING, PROOF OF VIEW AND SIGHT DISTANCE RESTRAINTS SHOULD BE DETAILED IN THE PLANS.

9. INTERSECTION SIGHT DISTANCE VALUES ARE PROVIDED FOR PASSENGER VEHICLES, SINGLE UNIT (SU) VEHICLES AND COMBINATION VEHICLES. INTERSECTION SIGHT DISTANCE BASED ON THE PASSENGER VEHICLE IS SUITABLE FOR MOST INTERSECTIONS. WHERE SUBSTANTIAL VOLUMES OF HEAVY VEHICLES ENTER THE MAJOR-ROAD, SUCH AS FROM RAMP TERMINALS WITH STOP CONTROL OR ROADWAYS SERVING TRUCK TERMINALS, THE USE OF TABULATED VALUES FOR (SU) VEHICLES OR COMBINATION VEHICLES SHOULD BE CONSIDERED.

10. THE INFORMATION SHOWN IS INTENDED SOLELY FOR THE PURPOSE OF CLEAR SIGHT DEVELOPMENT AND MAINTENANCE AT INTERSECTING HIGHWAYS, ROADS AND STREETS, AND IS NOT INTENDED TO BE USED TO ESTABLISH ROADWAY AND ROADSIDE SAFETY EXCEPT AS RELATED TO INTERSECTION SIGHT CORRIDORS.

11. THE INTERSECTION SIGHT DISTANCE TABLES DO NOT SUPERCEDE AASHTO STOPPING SIGHT DISTANCE REQUIREMENTS. THE DESIGNER MUST ENSURE THAT STOPPING SIGHT DISTANCES ARE MET.

12. DETAILS ARE BASED ON "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), CHAPTER 9, INTERSECTION SIGHT DISTANCE, CASES B AND F, AND THE DEPARTMENT PRACTICES FOR CHANNELIZED MEDIAN OPENINGS (LEFT TURNS ON MAJOR ROADWAYS).

LEGEND

AREAS FREE OF SIGHT OBSTRUCTIONS

DEFINITIONS

d = CLEAR LINE SIGHT DISTANCE

d_r = CLEAR LINE OF SIGHT DISTANCE TO THE RIGHT FROM THE MINOR ROADWAY

d_L = CLEAR LINE OF SIGHT DISTANCE TO THE LEFT FROM THE MINOR ROADWAY

DESIGN NOTES

A. DETAILS APPLY TO BOTH RURAL AND URBAN INTERSECTIONS UNDER STOP SIGN CONTROL OR FLASHING BEACON CONTROL. FOR FULL SIGNAL CONTROLLED INTERSECTIONS SEE DESIGN NOTE NO 7.

B. INTERSECTION SIGHT DISTANCE (d) APPLIES TO NORMAL AND SKEWED INTERSECTIONS (INTERSECTING ANGLES BETWEEN 60° AND 120°), AND WHERE VERTICAL AND/OR HORIZONTAL CURVES ARE PRESENT. SIGHT DISTANCE (d) IS MEASURED ALONG THE MAJOR ROADWAY FROM THE CENTER OF THE ENTRANCE LANE OF THE MINOR ROADWAY TO THE CENTER OF THE NEAR APPROACH LANE (RIGHT OR LEFT) OF THE MAJOR ROADWAY. DISTANCES d_L AND d_r ARE MEASURED FROM THE CENTERLINE OF THE ENTRANCE LANE (CROSS ROAD) OF THE MINOR ROADWAY TO A POINT ON THE EDGE OF THE NEAR SIDE OUTER TRAFFIC LANE ON THE MAJOR ROADWAY. DISTANCE d_m IS MEASURED FROM THE CENTERLINE OF THE ENTRANCE LANE OF THE MINOR ROADWAY TO A POINT ON THE MEDIAN CLEAR ZONE LIMIT OR HORIZONTAL CLEARANCE LIMIT FOR THE FAR SIDE ROADWAY OF THE MAJOR ROADWAY.

C.
1. THE LIMITS OF CLEAR SIGHT DEFINE A CORRIDOR THROUGHOUT WHICH A CLEAR LINE OF SIGHT MUST BE PRESERVED. SEE VERTICAL LIMITS OF CLEAR SIGHT DETAIL ON SHEET RD11-SD-2.
2. CLEAR SIGHT MUST BE PROVIDED BETWEEN VEHICLES AT INTERSECTION STOP LOCATIONS AND VEHICLES ON THE MAJOR ROADWAY WITHIN DIMENSION 'd'.
3. SINCE OBSERVATIONS ARE MADE IN BOTH DIRECTIONS ALONG THE LINE OF SIGHT, THE REFERENCE DATUM BETWEEN ROADWAYS IS 3'-6" ABOVE RESPECTIVE PAVEMENTS.

D. BARRIER SYSTEMS WITHIN INTERSECTION SIGHT CORRIDORS, WHERE PENETRATION INTO THE CLEAR LINE OF SIGHT MIGHT OCCUR, SHALL BE LOCATED TO PROVIDE THE LEAST ADVERSE AFFECT PRACTICAL.

E. ALL PROPERTY NEEDED TO ACHIEVE SIGHT DISTANCE AT INTERSECTIONS SHOULD BE ACQUIRED AS RIGHT-OF-WAY.

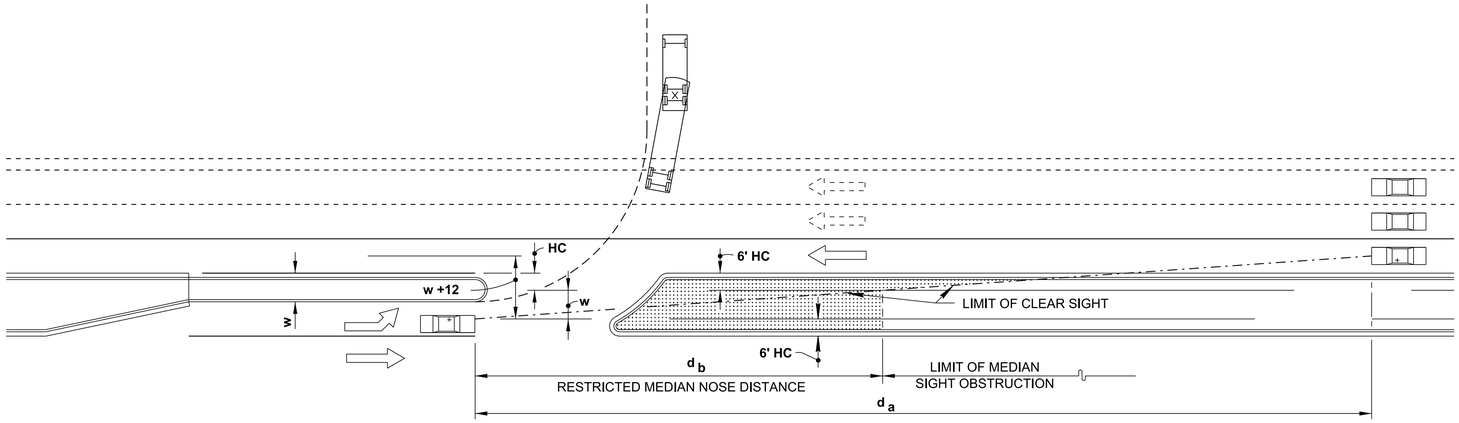
F. SIGHT DISTANCE VALUES IN THESE STANDARD DRAWINGS ARE APPROXIMATE FOR GENERALLY FLAT AREAS WHERE THE ROADWAY GRADES ARE IN THE APPROXIMATE RANGE OF 0% TO 6%. FOR LOCATIONS WHERE ROADWAYS ARE CURVED OR WITH GRADES GREATER THAN 6%, THE DESIGNER IS DIRECTED TO ENSURE THAT STOPPING SIGHT DISTANCES COMPLY WITH "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK) AS CURRENTLY ADOPTED BY TDOT.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

INTERSECTION SIGHT DISTANCE DESIGN AND GENERAL NOTES

01-01-2019 | RD11-SD-1

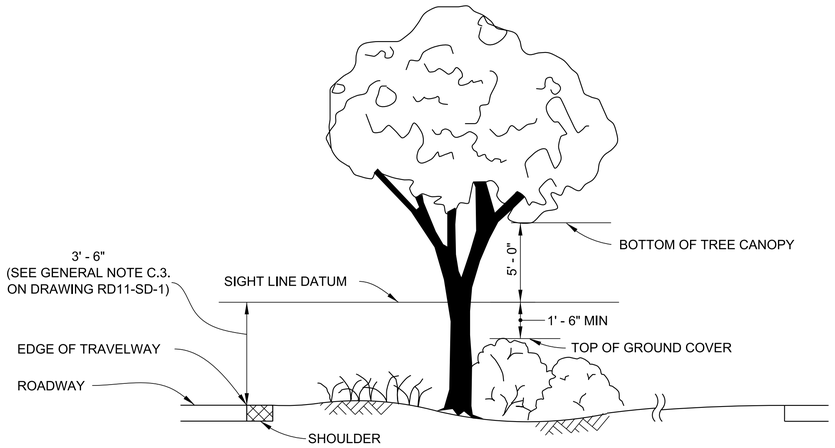
NOT TO SCALE



CHANNELIZED DIRECTIONAL MEDIAN OPENINGS

LEGEND

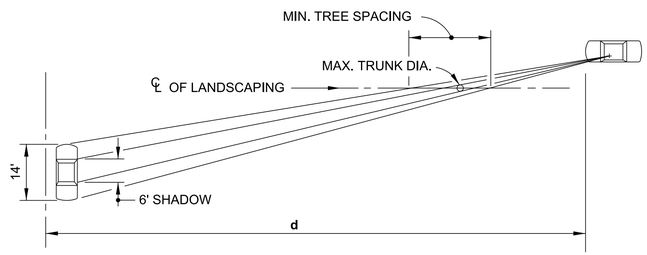
AREAS FREE OF SIGHT OBSTRUCTIONS



THE INTENT OF THIS STANDARD IS TO PROVIDE A WINDOW WITH VERTICAL LIMITS OF NOT LESS THAN 5' ABOVE AND 1' - 6" BELOW THE SIGHT LINE DATUM, AND HORIZONTAL LIMITS DEFINED BY THE LIMITS OF CLEAR SIGHT.

VERTICAL LIMITS OF CLEAR SIGHT DISTANCE

(SEE FOOTNOTE C.1. ON SHEET RD11-SD-1)



HORIZONTAL LIMITS OF CLEAR SIGHT DISTANCE

CHANNELIZED DIRECTIONAL MEDIAN OPENINGS

d_a (CLEAR LINE SIGHT DISTANCE IN FEET)									
POSTED SPEED (M.P.H.)	1 LANE CROSSED			2 LANE CROSSED			3 LANE CROSSED		
	P	SU	COMB.	P	SU	COMB.	P	SU	COMB.
30	245	290	335	265	320	365	290	350	395
35	285	335	390	310	370	425	335	410	460
40	325	385	445	355	425	485	385	465	525
45	365	430	500	400	480	545	430	525	590

THE d_a VALUES IN THE TABLE ARE APPLICABLE TO URBAN, PREDOMINANTLY CURBED ROADWAYS WITH DESIGN SPEEDS OF 45 MPH OR LESS AND ARE BASED ON , CHAPTER 9, INTERSECTION SIGHT DISTANCE, CASES B AND F, AND THE DEPARTMENT PRACTICES FOR CHANNELIZED MEDIAN OPENINGS (LEFT TURNS ON MAJOR ROADWAYS). FOR HORIZONTAL CLEARANCE (HC) OF SIX FEET (6'), THE VALUES FOR d_b MAY BE DETERMINED BY THE EQUATION $d_b = d_a$ (**w**/(**w+12**)). FOR ROADWAYS WITH NONRESTRICTED CONDITIONS, d_a AND d_b SHOULD BE BASED ON THE GEOMETRY FOR THE LEFT TURN STORAGE AND ON CLEAR ZONE WIDTHS. THE **w** IS THE MEDIAN WIDTH.

P = PASSENGER VEHICLE, SU = SINGLE UNIT TRUCK, COMB. = COMBINATION

CLEAR SIGHT DESIGN NOTES

THE CORRIDOR DEFINED BY THE LIMITS OF CLEAR SIGHT IS A RESTRICTED PLANTING AREA. DRIVERS OF VEHICLES ON THE INTERSECTING ROADWAY AND VEHICLES ON THE MAJOR ROADWAY SHOULD BE ABLE TO SEE EACH OTHER CLEARLY THROUGHOUT THE LIMITS OF 'd' AND 'd_a'. IF IN THE ENGINEER'S JUDGEMENT, LANDSCAPING INTERFERES WITH THE LINE OF SIGHT CORRIDOR PRESCRIBED BY THESE STANDARDS, THE ENGINEER MAY REARRANGE, RELOCATE OR ELIMINATE PLANTINGS. PLANTS WITHIN THE RESTRICTED AREAS ARE LIMITED TO SELECTIONS AS FOLLOWS:

GROUND COVER & TRUNKED PLANTS (SEPARATE OR COMBINED):

GROUND COVERS - PLANT SELECTION OF LOW GROWING VEGETATION WHICH AT MATURITY DOES NOT ATTAIN A HEIGHT GREATER THAN 18" BELOW THE SIGHT LINE DATUM. FOR GROUND COVER IN COMBINATION WITH TREES. THE FOLLOWING HEIGHTS BELOW THE SIGHT LINE DATUM WILL APPLY: 24" FOR TREES < 11" DIA.

TRUNKED PLANTS - PLANT SELECTION OF A MATURE TRUNK DIAMETER 4" OR LESS MEASURED AT 6" ABOVE THE GROUND. CANOPY OR HIGH BORNE FOLIAGE SHALL NEVER BE LOWER THAN 5' ABOVE THE SIGHT LINE DATUM. THESE SELECTIONS SHALL BE SPACED NO CLOSER THAN 20'.

TREES:

WHERE LEFT TURNS FROM THE MAJOR ROAD ARE PERMITTED , NO TREES SHALL BE LOCATED WITHIN THE DISTANCE 'd_b'.

WHERE LEFT TURN LANES ARE PRESENT, THE FOLLOWING REQUIREMENTS APPLY FOR MINIMUM DISTANCE:

(A) FOR LOW SPEED FACILITIES (DESIGN SPEED LESS THAN 50 M.P.H.), SIZE AND SPACING SHALL CONFORM TO THE TABLE BELOW. NO TREES SHALL BE PERMITTED WITHIN 100' OF THE RESTRICTED MEDIAN NOSE (MEASURED FROM THE EDGE OF PAVEMENT).

(B) FOR HIGH SPEEDS FACILITIES (DESIGN SPEED 50 M.P.H. OR GREATER) NO TREES SHALL BE PERMITTED WITHIN 200' OF THE RESTRICTED MEDIAN NOSE. BEYOND THIS LIMIT, SIZE AND SPACING SHALL CONFORM TO THE TABLE BELOW.

TREES CAN BE USED WITH LAWN; PAVERS; PAVEMENT; GRAVEL, BARK OR WOOD CHIP BEDS; GROUND COVERS OR OTHER DEPARTMENT APPROVED MATERIAL. THE CLEAR SIGHT WINDOW MUST BE IN CONFORMANCE WITH THE 'WINDOW DETAIL' MODIFIED TO ATTAIN THE HEIGHT REQUIREMENTS LISTED IN 'GROUND COVERS' ABOVE. TREE SIZE AND SPACING SHALL CONFORM TO THE FOLLOWING TABULAR VALUES:

DESIGN SPEED (MPH)		30	35	40	45	50	55	60
MINIMUM SPACING (FT) (Center to Center of Trunk)	4" ≤ Ø ≤ 11"	22	27	33	40	45	52	60
	12" ≤ Ø ≤ 18"	91	108	126	146	165	173	193

Ø = DIAMETER OF TREES WITHIN LIMITS OF SIGHT WINDOW (INCHES)

SIZES AND SPACINGS ARE BASED ON THE FOLLOWING CONDITIONS:

(A) A SINGLE LINE OF TREES IN THE MEDIAN PARALLEL TO BUT NOT NECESSARILY COLINEAR WITH THE CENTERLINE,
(B) A STRAIGHT APPROACHING MAINLINE, WITHIN SKEW LIMITS AS DESCRIBED IN DESIGN NOTE B ON RD11-SD-1.
(C) TREES ≤ 11" IN DIAMETER CASTING A VERTICAL 6' WIDE SHADOW BAND ON A VEHICLE ENTERING AT STOP BAR LOCATION WHEN VIEWED BY MAINLINE DRIVER BEGINNING AT DISTANCE 'd'; SEE SHADOW DIAGRAM.
(D) TREES WITH DIAMETERS ≤ 11" INTERMIXED WITH TREES WITH DIAMETERS 11" ≤ 18" ARE TO BE SPACED BASED ON TREES WITH DIAMETERS > 11" ≤ 18".

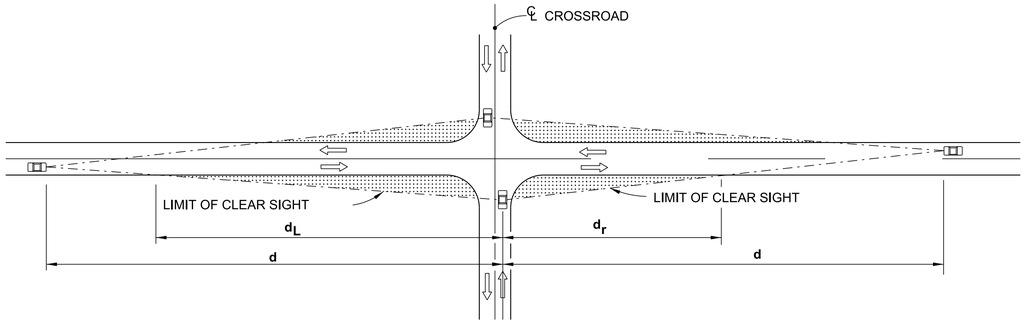
FOR ANY OTHER CONDITIONS THE TREE SIZES, SPACINGS AND LOCATIONS SHALL BE DETAILED IN THE PLANS; SEE RD11-SD-1, DESIGN NOTE NO. 8.

NOT TO SCALE

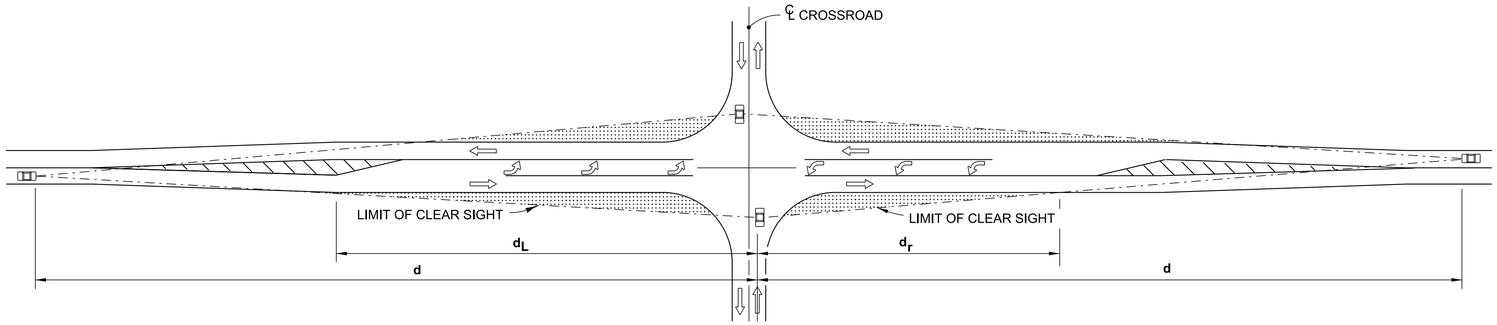
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

INTERSECTION SIGHT DISTANCE LANDSCAPE AND OBSTRUCTION

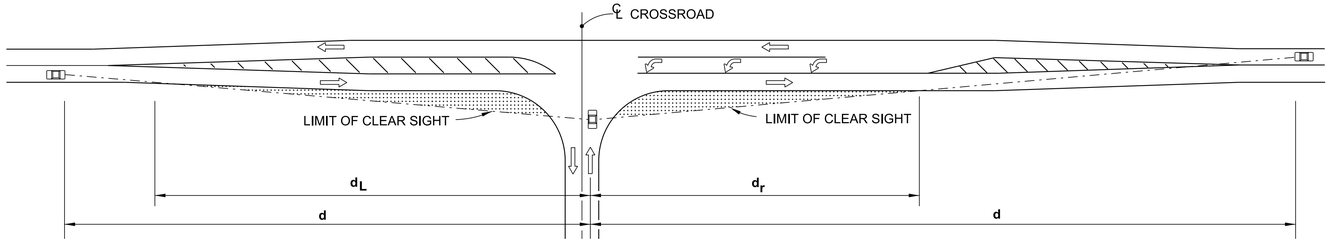
01-01-2019 RD11-SD-2



2 LANE UNDIVIDED ROADWAY - SYMMETRICAL



FLARED FOR OPPOSING LEFT TURN CENTERED ON ALIGNMENT - 2 LANE 2 WAY



FLARED FOR SINGLE SIDE LEFT TURN CENTERED ON ALIGNMENT - 2 LANE 2 WAY

LEGEND

AREAS FREE OF SIGHT OBSTRUCTIONS

NOTE: SEE RD11-SD-1 FOR INTERSECTING ROADWAY ORIGIN OF CLEAR SIGHT AND QUADRANT CORNER CLIPS.

Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)
15	170	120	75
20	225	160	100
25	280	195	125
30	335	240	150
35	390	275	175
40	445	315	200
45	500	350	225
50	555	390	250
55	610	430	275
60	665	470	300
65	720	510	325
70	775	550	350

PASSENGER VEHICLE

Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)
15	210	150	95
20	280	200	125
25	350	250	160
30	420	295	190
35	490	345	220
40	560	395	250
45	630	445	280
50	700	495	310
55	770	545	345
60	840	595	375
65	910	645	405
70	980	695	440

SU VEHICLE

Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)
15	255	180	115
20	340	240	155
25	425	300	190
30	510	360	225
35	595	420	265
40	680	480	305
45	765	540	340
50	850	605	380
55	930	660	415
60	1015	720	450
65	1100	780	490
70	1185	840	530

COMBINATION VEHICLE

2 LANE UNDIVIDED

SIGHT DISTANCE (d) AND RELATED DISTANCES (d_r, d_L) (FEET)

Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)
15	180	100	70
20	235	130	90
25	295	165	115
30	355	195	135
35	415	225	155
40	475	260	180
45	530	290	200
50	590	325	220
55	650	355	245
60	710	390	265
65	765	420	290
70	825	455	315

PASSENGER VEHICLE

Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)
15	225	125	85
20	300	165	115
25	375	205	145
30	450	250	170
35	525	290	200
40	600	330	225
45	675	370	255
50	750	410	285
55	825	450	310
60	900	490	340
65	975	530	370
70	1050	575	400

SU VEHICLE

Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)
15	270	150	105
20	360	200	140
25	450	250	170
30	540	295	205
35	630	345	240
40	720	395	270
45	810	445	305
50	900	495	340
55	990	540	375
60	1080	590	405
65	1170	640	440
70	1260	690	475

COMBINATION VEHICLE

2 LANE 2 WAY - FLARED FOR LEFT TURNS

SIGHT DISTANCE (d) AND RELATED DISTANCES (d_r, d_L) (FEET)

SPECIAL NOTES

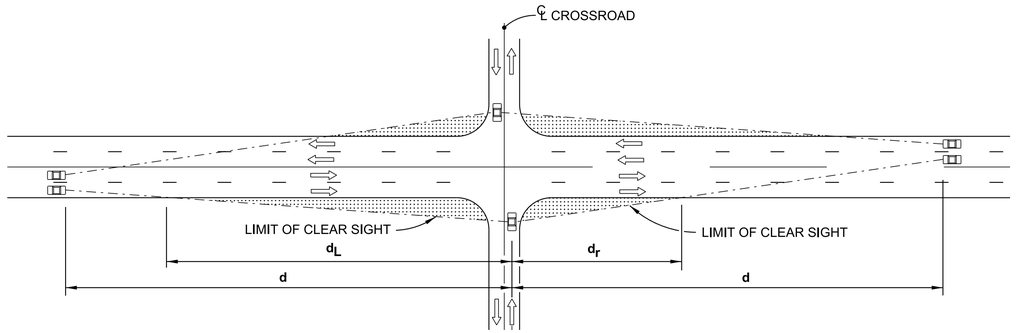
1. INTERSECTION SIGHT DISTANCE VALUES ARE PROVIDED FOR PASSENGER VEHICLES, SINGLE UNIT (SU) VEHICLES AND COMBINATION VEHICLES. INTERSECTION SIGHT DISTANCE BASED ON THE PASSENGER VEHICLE IS SUITABLE FOR MOST INTERSECTIONS. WHERE SUBSTANTIAL VOLUMES OF HEAVY VEHICLES ENTER THE MAJOR-ROAD, SUCH AS FROM RAMP TERMINALS WITH STOP CONTROL OR ROADWAYS SERVING TRUCK TERMINALS, THE USE OF TABULATED VALUES FOR (SU) VEHICLES OR COMBINATION VEHICLES SHOULD BE CONSIDERED.
2. ALL PROPERTY NEEDED TO ACHIEVE SIGHT DISTANCE AT INTERSECTIONS SHOULD BE ACQUIRED AS RIGHT-OF-WAY. SEE STD DWG RD11-SD-1 FOR RIGHT-OF-WAY LINE PLACEMENT.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

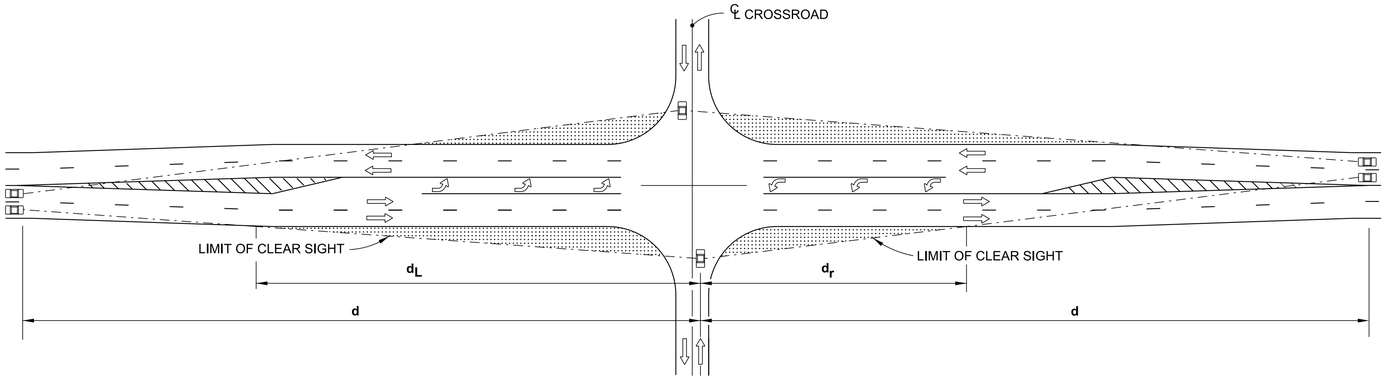
INTERSECTION SIGHT DISTANCE 2-LANE ROADWAYS

01-01-2019 | RD11-SD-3

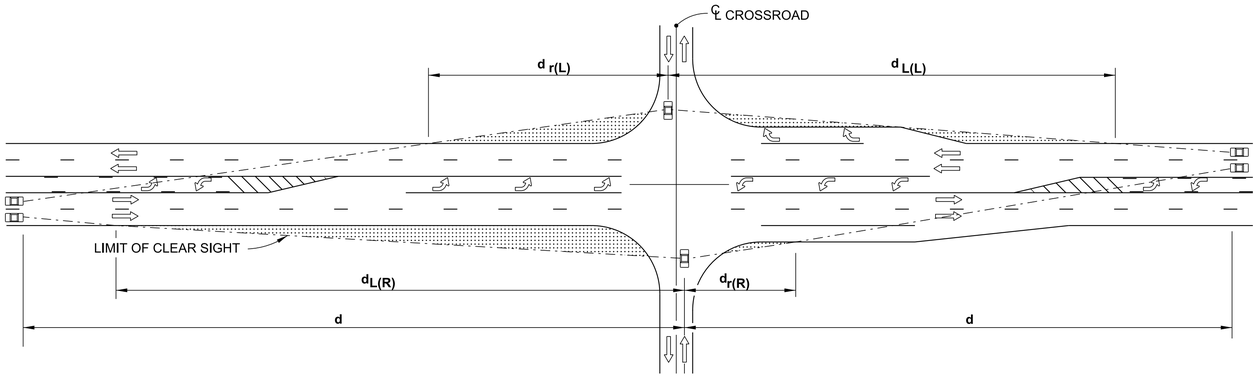
NOT TO SCALE



4 LANE UNDIVIDED - SYMMETRICAL



4 LANE UNDIVIDED FLARED - SYMMETRICAL



5 LANE FLARED WITH RIGHT TURNS

LEGEND

AREAS FREE OF SIGHT OBSTRUCTIONS

NOTE: SEE RD11-SD-1 FOR INTERSECTING ROADWAY ORIGIN OF CLEAR SIGHT AND QUADRANT CORNER CLIPS.

NOT TO SCALE

SPECIAL NOTES

1. INTERSECTION SIGHT DISTANCE VALUES ARE PROVIDED FOR PASSENGER VEHICLES, SINGLE UNIT (SU) VEHICLES AND COMBINATION VEHICLES. INTERSECTION SIGHT DISTANCE BASED ON THE PASSENGER VEHICLE IS SUITABLE FOR MOST INTERSECTIONS. WHERE SUBSTANTIAL VOLUMES OF HEAVY VEHICLES ENTER THE MAJOR-ROAD, SUCH AS FROM RAMP TERMINALS WITH STOP CONTROL OR ROADWAYS SERVING TRUCK TERMINALS, THE USE OF TABULATED VALUES FOR (SU) VEHICLES OR COMBINATION VEHICLES SHOULD BE CONSIDERED.
2. ALL PROPERTY NEEDED TO ACHIEVE SIGHT DISTANCE AT INTERSECTIONS SHOULD BE ACQUIRED AS RIGHT-OF-WAY. SEE STD DWG RD11-SD-1 FOR RIGHT-OF-WAY LINE PLACEMENT.

Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)
30	355	250	115
35	415	295	135
40	475	335	155
45	530	375	175
50	590	420	195
55	650	460	215
60	710	500	230
65	765	545	250
70	825	585	270

PASSENGER VEHICLE

Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)
30	450	320	150
35	525	375	170
40	600	425	200
45	675	480	220
50	750	535	245
55	825	585	270
60	900	640	295
65	975	690	320
70	1050	745	345

SU VEHICLE

Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)
30	540	380	180
35	630	445	205
40	720	510	235
45	810	580	265
50	900	635	295
55	990	700	325
60	1080	765	355
65	1170	825	380
70	1260	890	410

COMBINATION VEHICLE

SIGHT DISTANCE (d) AND RELATED DISTANCES (d_r, d_L) (FEET)

4 LANE UNDIVIDED

Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)
30	375	205	125
35	440	240	145
40	500	275	165
45	565	310	185
50	625	345	205
55	690	380	225
60	750	415	245
65	815	445	265
70	880	480	285

PASSENGER VEHICLE

Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)
30	485	265	160
35	565	310	185
40	645	355	210
45	725	400	235
50	805	440	265
55	885	485	290
60	965	530	315
65	1045	570	340
70	1125	615	370

SU VEHICLE

Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)
30	570	315	190
35	665	365	220
40	760	415	250
45	855	470	280
50	950	520	310
55	1045	575	340
60	1140	625	375
65	1235	675	405
70	1330	730	435

COMBINATION VEHICLE

SIGHT DISTANCE (d) AND RELATED DISTANCES (d_r, d_L) (FEET)

4 LANE UNDIVIDED FLARED - SYMMETRICAL

Design Speed (MPH)	d (FT)	$d_{L\,(R)}$ (FT)	$d_{r\,(R)}$ (FT)	$d_{L\,(L)}$ (FT)	$d_{r\,(L)}$ (FT)
30	375	265	20	270	125
35	440	310	20	310	145
40	500	355	25	355	165
45	565	400	25	400	185
50	625	445	30	445	205
55	690	490	35	490	225
60	750	535	35	535	245
65	815	575	40	575	265
70	880	620	40	620	285

PASSENGER VEHICLE

Design Speed (MPH)	d (FT)	$d_{L\,(R)}$ (FT)	$d_{r\,(R)}$ (FT)	$d_{L\,(L)}$ (FT)	$d_{r\,(L)}$ (FT)
30	485	340	25	340	160
35	565	400	25	400	185
40	645	455	30	455	210
45	725	510	35	510	235
50	805	570	40	570	265
55	885	625	40	625	290
60	965	680	45	680	315
65	1045	740	50	740	340
70	1125	795	50	795	370

SU VEHICLE

Design Speed (MPH)	d (FT)	$d_{L\,(R)}$ (FT)	$d_{r\,(R)}$ (FT)	$d_{L\,(L)}$ (FT)	$d_{r\,(L)}$ (FT)
30	570	405	30	405	190
35	665	470	30	470	220
40	760	540	35	540	250
45	855	605	40	605	280
50	950	675	45	675	310
55	1045	740	50	740	340
60	1140	805	55	805	375
65	1235	875	55	875	405
70	1330	940	60	940	435

COMBINATION VEHICLE

SIGHT DISTANCE (d) AND RELATED DISTANCES ($d_{L\,(R)}$, $d_{r\,(R)}$, $d_{L\,(L)}$, $d_{r\,(L)}$) (FEET)

5 LANE FLARED WITH RIGHT TURN LANES

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INTERSECTION SIGHT DISTANCE 4-LANE AND 5-LANE UNDIVIDED ROADWAYS

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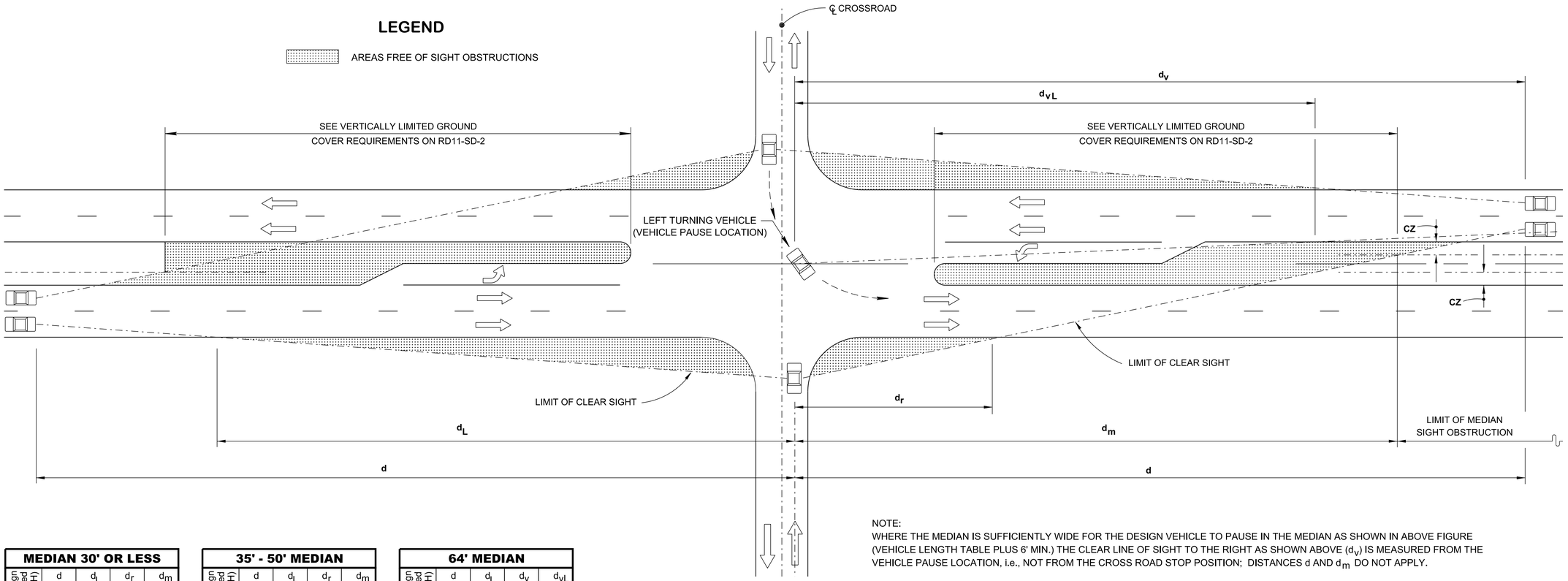
LEGEND

AREAS FREE OF SIGHT OBSTRUCTIONS



NOTE:
WHERE THE MEDIAN IS SUFFICIENTLY WIDE FOR THE DESIGN VEHICLE TO PAUSE IN THE MEDIAN AS SHOWN IN ABOVE FIGURE (VEHICLE LENGTH TABLE PLUS 6' MIN.) THE CLEAR LINE OF SIGHT TO THE RIGHT AS SHOWN ABOVE (d_V) IS MEASURED FROM THE VEHICLE PAUSE LOCATION, i.e., NOT FROM THE CROSS ROAD STOP POSITION; DISTANCES d AND d_m DO NOT APPLY.

INTERMEDIATE SEMI-TRAILER (WB-40)

SIGHT DISTANCES (d) & (d_V) AND RELATED DISTANCES (d_L, d_r, d_m & d_{VL}) (FEET)

MEDIAN 30' OR LESS				
Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)	d_m (FT)
30	620	440	120	530
35	720	510	140	620
40	830	590	160	710
45	930	660	170	790
50	1030	730	190	880
55	1140	810	210	970
60	1240	880	230	1060
65	1340	950	250	1140
70	1450	1030	270	1240

35' - 50' MEDIAN				
Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)	d_m (FT)
30	670	480	110	590
35	790	560	130	690
40	900	640	140	790
45	1010	720	160	890
50	1120	800	180	980
55	1230	870	190	1080
60	1350	950	210	1180
65	1460	1040	230	1270
70	1570	1110	250	1380

64' MEDIAN				
Design Speed (MPH)	d (FT)	d_L (FT)	d_V (FT)	d_{VL} (FT)
30	470	340	510	360
35	540	390	600	430
40	620	440	680	490
45	700	500	770	550
50	780	560	850	610
55	850	610	930	660
60	930	660	1020	730
65	1010	720	1100	780
70	1090	780	1190	850

SINGLE-UNIT TRUCK (SU-30) **PASSENGER VEHICLE (P)**

SIGHT DISTANCES (d) & (d_V) AND RELATED DISTANCES (d_L, d_r, d_m & d_{VL}) (FEET)

MEDIAN 35' OR LESS				
Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)	d_m (FT)
30	540	390	100	460
35	630	450	100	540
40	720	510	120	620
45	810	580	130	690
50	900	640	150	770
55	990	700	160	850
60	1080	770	180	920
65	1170	830	190	1000
70	1260	900	200	1070

40'-64' MEDIAN				
Design Speed (MPH)	d (FT)	d_L (FT)	d_V (FT)	d_{VL} (FT)
30	380	270	420	300
35	440	320	490	350
40	500	360	560	400
45	570	410	630	450
50	630	450	700	500
55	690	490	770	550
60	750	530	840	600
65	820	580	910	650
70	880	620	980	700

MEDIAN 22' OR LESS				
Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)	d_m (FT)
30	390	280	90	330
35	460	330	100	380
40	520	370	110	440
45	590	420	130	490
50	650	460	140	540
55	720	510	160	600
60	780	560	170	650
65	850	600	180	700
70	910	660	200	770

25'-64' MEDIAN				
Design Speed (MPH)	d (FT)	d_L (FT)	d_V (FT)	d_{VL} (FT)
30	290	210	340	240
35	340	240	390	280
40	390	280	450	320
45	430	310	500	360
50	480	340	560	400
55	530	380	610	430
60	580	410	670	480
65	630	450	720	510
70	670	480	780	550

SPECIAL NOTES

1. INTERSECTION SIGHT DISTANCE VALUES ARE PROVIDED FOR PASSENGER VEHICLES, SINGLE UNIT (SU) VEHICLES AND COMBINATION VEHICLES. INTERSECTION SIGHT DISTANCE BASED ON THE PASSENGER VEHICLE IS SUITABLE FOR MOST INTERSECTIONS. WHERE SUBSTANTIAL VOLUMES OF HEAVY VEHICLES ENTER THE MAJOR-ROAD, SUCH AS FROM RAMP TERMINALS WITH STOP CONTROL OR ROADWAYS SERVING TRUCK TERMINALS, THE USE OF TABULATED VALUES FOR (SU) VEHICLES OR COMBINATION VEHICLES SHOULD BE CONSIDERED.
2. ALL PROPERTY NEEDED TO ACHIEVE SIGHT DISTANCE AT INTERSECTIONS SHOULD BE ACQUIRED AS RIGHT-OF-WAY. SEE STD DWG RD11-SD-1 FOR RIGHT-OF-WAY LINE PLACEMENT.

VEHICLE LENGTH TABLE

VEHICLE TYPE	VEHICLE LENGTH (FT.)
PASSENGER (P)	19
SINGLE UNIT (SU)	30
LARGE SCHOOL BUS	40
WB-40	45.5
WB-67	73.5

DESIGN NOTES

- (A) SEE RD11-SD-1 FOR ORIGIN OF CLEAR SIGHT LINE ON THE ROAD.
- (B) VALUES SHOWN IN THE TABLES ARE THE GOVERNING (CONTROLLING) SIGHT DISTANCES CALCULATED BASED ON "AASHTO CASE B - INTERSECTION WITH STOP CONTROL ON THE MINOR ROAD."
- (C) DEFINITIONS:
  - d THE CLEAR LINE OF SIGHT DISTANCE.
  - d_{VL} THE CLEAR LINE OF SIGHT TO THE RIGHT IS THE DISTANCE MEASURED FOR THE VEHICLE PAUSE LOCATION TO THE EDGE OF THE INSIDE TRAVEL LANE.
  - CZ CLEAR ZONE WIDTH FOR NONRESTRICTED CONDITIONS (6' MIN. FOR RESTRICTED CONDITIONS).
  - d_m DISTANCE MEASURED FROM THE CENTERLINE OF THE ENTRANCE LANE OF THE MINOR ROADWAY TO A POINT ON THE MEDIAN CLEAR ZONE LIMIT OR HORIZONTAL CLEARANCE LIMIT FOR THE FAR SIDE ROADWAY OF THE MAJOR ROADWAY.
  - d_V THE CLEAR LINE OF SIGHT DISTANCE FOR A VEHICLE ON THE APPROACH ROADWAY TO A PAUSED VEHICLE IN THE MEDIAN.
  - d_r CLEAR LINE OF SIGHT DISTANCE TO THE RIGHT FROM THE MINOR ROADWAY
- (D) SEE SHEET RD11-SD-2 FOR MEDIAN LANDSCAPE REQUIREMENTS.

NOT TO SCALE

4 LANE DIVIDED HIGHWAYS

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INTERSECTION SIGHT DISTANCE 4-LANE DIVIDED HIGHWAYS

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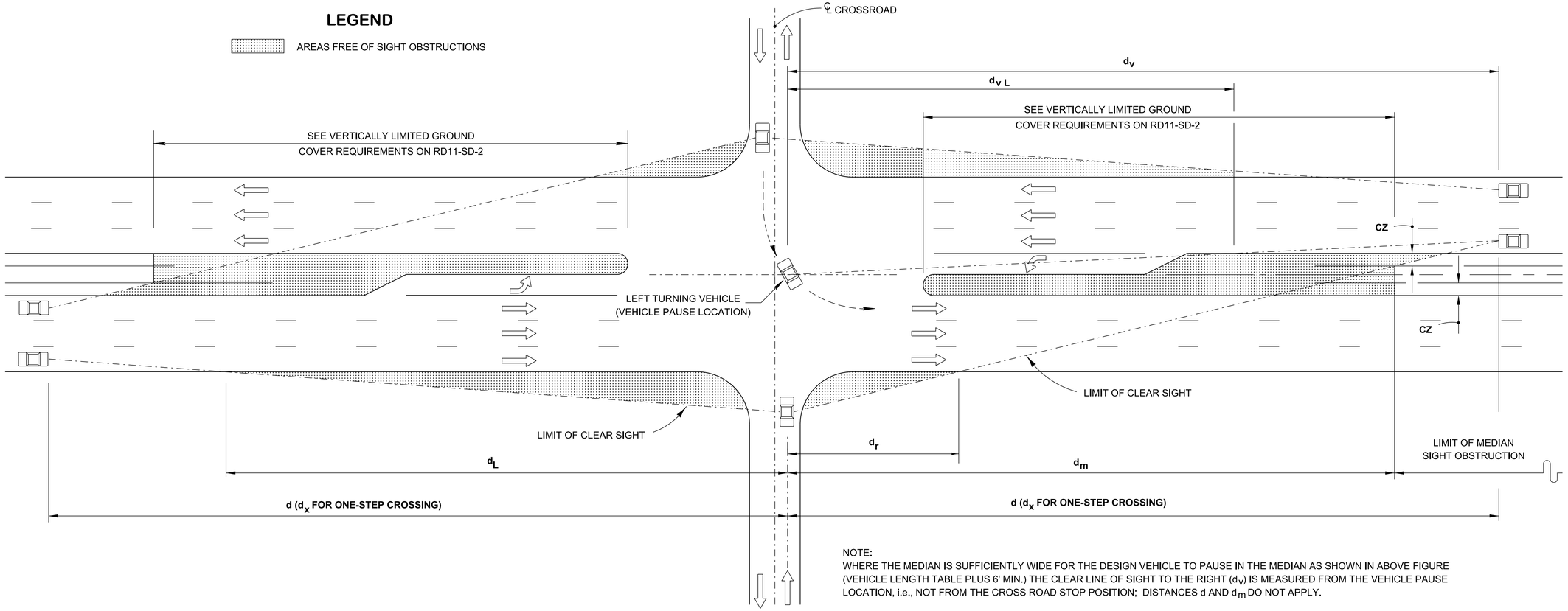

NOTE:
WHERE THE MEDIAN IS SUFFICIENTLY WIDE FOR THE DESIGN VEHICLE TO PAUSE IN THE MEDIAN AS SHOWN IN ABOVE FIGURE (VEHICLE LENGTH TABLE PLUS 6' MIN.) THE CLEAR LINE OF SIGHT TO THE RIGHT (d_V) IS MEASURED FROM THE VEHICLE PAUSE LOCATION, i.e., NOT FROM THE CROSS ROAD STOP POSITION; DISTANCES d AND d_m DO NOT APPLY.

MEDIAN 30' OR LESS

Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)	d_m (FT)
30	670	480	110	590
35	780	560	130	680
40	890	630	150	780
45	1000	710	160	870
50	1103	780	180	960
55	1220	870	200	1060
60	1330	950	220	1160
65	1440	1020	230	1260
70	1550	1100	250	1350

35' - 50' MEDIAN

Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)	d_m (FT)
30	710	510	100	630
35	820	580	120	730
40	940	670	130	840
45	1060	750	150	950
50	1170	830	160	1040
55	1290	920	180	1150
60	1410	1000	200	1260
65	1520	1080	210	1350
70	1640	1160	230	1460

64' MEDIAN

Design Speed (MPH)	d (FT)	d_L (FT)	d_v (FT)	d_{vL} (FT)
30	500	360	510	370
35	580	410	600	430
40	660	470	680	490
45	750	530	770	550
50	830	590	850	610
55	910	650	930	660
60	990	700	1020	730
65	1070	760	1100	780
70	1160	820	1190	850

INTERMEDIATE SEMI-TRAILER (WB-40)

SIGHT DISTANCES (d), (d_V) & (d_X) AND RELATED DISTANCES (d_L, d_r, d_m& d_{VL}) (FEET)

MEDIAN 35' OR LESS

Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)	d_m (FT)
30	580	410	100	500
35	670	480	120	580
40	770	550	130	660
45	860	610	150	740
50	960	680	170	830
55	1060	750	180	910
60	1150	820	200	990
65	1250	880	220	1070
70	1340	950	230	1150

40'-64' MEDIAN

Design Speed (MPH)	d (FT)	d_L (FT)	d_v (FT)	d_{vL} (FT)
30	420	290	420	300
35	480	340	490	350
40	450	320	560	400
45	620	440	630	450
50	680	490	700	500
55	750	530	770	550
60	820	580	840	600
65	880	630	910	650
70	950	680	980	700

SINGLE-UNIT TRUCK (SU-30)

MEDIAN 22' OR LESS

Design Speed (MPH)	d (FT)	d_L (FT)	d_r (FT)	d_m (FT)
30	420	300	80	360
35	490	350	90	420
40	560	400	100	480
45	630	450	120	540
50	700	500	130	600
55	770	550	140	660
60	840	600	150	720
65	900	640	160	770
70	970	690	180	830

25'-64' MEDIAN

Design Speed (MPH)	d (FT)	d_L (FT)	d_v (FT)	d_{vL} (FT)
30	310	220	340	240
35	360	260	390	280
40	420	300	450	320
45	470	340	500	360
50	520	370	560	400
55	570	410	610	440
60	620	440	670	480
65	670	480	720	510
70	720	510	780	560

PASSENGER VEHICLE (P)

6 LANE DIVIDED HIGHWAYS

NOT TO SCALE

SPECIAL NOTES

(1) INTERSECTION SIGHT DISTANCE VALUES ARE PROVIDED FOR PASSENGER VEHICLES, SINGLE UNIT (SU) VEHICLES AND COMBINATION VEHICLES. INTERSECTION SIGHT DISTANCE BASED ON THE PASSENGER VEHICLE IS SUITABLE FOR MOST INTERSECTIONS. WHERE SUBSTANTIAL VOLUMES OF HEAVY VEHICLES ENTER THE MAJOR-ROAD, SUCH AS FROM RAMP TERMINALS WITH STOP CONTROL OR ROADWAYS SERVING TRUCK TERMINALS, THE USE OF TABULATED VALUES FOR (SU) VEHICLES OR COMBINATION VEHICLES SHOULD BE CONSIDERED.

(2) ALL PROPERTY NEEDED TO ACHIEVE SIGHT DISTANCE AT INTERSECTIONS SHOULD BE ACQUIRED AS RIGHT-OF-WAY. SEE STD DWG RD11-SD-1 FOR RIGHT-OF-WAY LINE PLACEMENT.

VEHICLE LENGTH TABLE

VEHICLE TYPE	VEHICLE LENGTH (FT.)
PASSENGER (P)	19
SINGLE UNIT (SU)	30
LARGE SCHOOL BUS	40
WB-40	45.5
WB-67	73.5

DESIGN NOTES

Ⓐ SEE RD11-SD-1 FOR ORIGIN OF CLEAR SIGHT LINE ON THE ROAD.

Ⓑ VALUES SHOWN IN THE TABLES ARE THE GOVERNING (CONTROLLING) SIGHT DISTANCES CALCULATED BASED ON "AASHTO CASE B - INTERSECTION WITH STOP CONTROL ON THE MINOR ROAD."

Ⓒ DEFINITIONS:

- d THE CLEAR LINE OF SIGHT DISTANCE.
- d_{vL} THE CLEAR LINE OF SIGHT TO THE RIGHT IS THE DISTANCE MEASURED FOR THE VEHICLE PAUSE LOCATION TO THE EDGE OF THE INSIDE TRAVEL LANE.
- CZ CLEAR ZONE WIDTH FOR NONRESTRICTED CONDITIONS (6' MIN. FOR RESTRICTED CONDITIONS).
- d_m DISTANCE MEASURED FROM THE CENTERLINE OF THE ENTRANCE LANE OF THE MINOR ROADWAY TO A POINT ON THE MEDIAN CLEAR ZONE LIMIT OR HORIZONTAL CLEARANCE LIMIT FOR THE FAR SIDE ROADWAY OF THE MAJOR ROADWAY.
- d_v THE CLEAR LINE OF SIGHT DISTANCE FOR A VEHICLE ON THE APPROACH ROADWAY TO A PAUSED VEHICLE IN THE MEDIAN.
- d_r CLEAR LINE OF SIGHT DISTANCE TO THE RIGHT FROM THE MINOR ROADWAY

Ⓓ SEE SHEET RD11-SD-2 FOR MEDIAN LANDSCAPE REQUIREMENTS.

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INTERSECTION SIGHT DISTANCE 6-LANE DIVIDED HIGHWAYS

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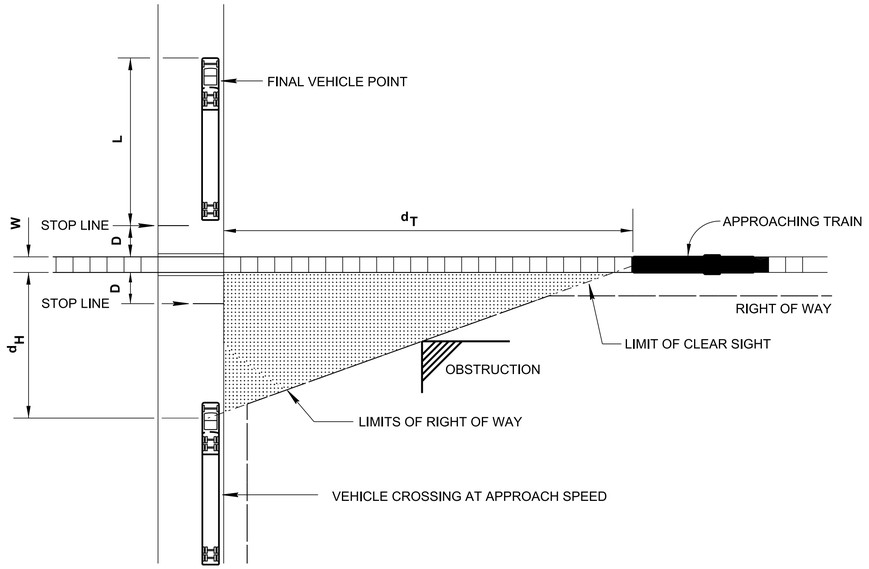
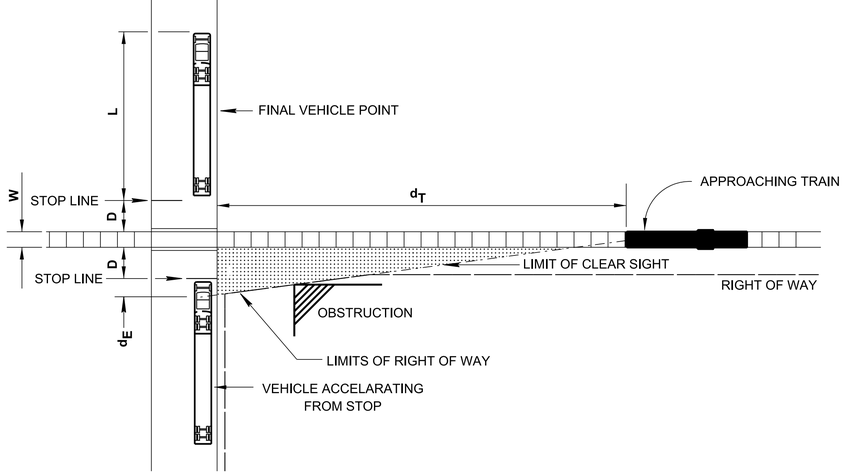


CASE A

APPROACHING VEHICLE TO SAFELY CROSS OR STOP AT RAILROAD CROSSING
(FOR CLARITY RIGHT OF WAY LINES ARE NOT SHOWN FOR THE OTHER QUADRANTS)



CASE B

VEHICLE DEPARTING FROM STOPPED POSITION TO SAFELY CROSS RAILROAD TRACK
(FOR CLARITY RIGHT OF WAY LINES ARE NOT SHOWN FOR THE OTHER QUADRANTS)

LEGEND

AREAS FREE OF SIGHT OBSTRUCTIONS

NOT TO SCALE

DESIGN SIGHT DISTANCES FOR COMBINATION VEHICLE PASSIVE RAILROAD HIGHWAY GRADE CROSSINGS

CONDITIONS: SINGLE RR TRACK 90° CROSSING, DESIGN VEHICLE WB-67, FLAT HIGHWAY GRADES, PASSIVE CROSSING

TRAIN SPEED (MPH)	CASE B VEHICLE DEPARTURE FROM STOP	CASE A MOVING VEHICLE					
	VEHICLE SPEED (MPH) (V_v)						
	0	10	20	30	40	50	60
	SIGHT DISTANCE ALONG RAILROAD TRACT, d_T (FT)						
10	255	155	110	102	102	106	112
20	509	310	220	203	205	213	225
30	794	465	331	305	307	319	337
40	1019	619	441	407	409	426	450
50	1273	774	551	509	511	532	562
60	1528	929	661	610	614	639	675
70	1783	1084	771	712	716	745	787
80	2037	1239	882	814	818	852	899
90	2292	1394	992	915	920	958	1012
STOPPING SIGHT DISTANCE ALONG HIGHWAY FROM RR CROSSING, d_H(FT) ㉔							
		69	135	220	324	447	589

㉔ ADD D = 15' TO d_H TO STOP BAR.

GENERAL NOTES

① SIGHT DISTANCES ARE REQUIRED IN ALL QUADRANTS OF THE CROSSING.

② CORRECTIONS MUST BE MADE FOR CONDITIONS OTHER THAN SHOWN IN THE TABLE, SUCH AS, MULTIPLE RAILS, SKEW, ASCENDING AND DESCENDING GRADES, AND CURVATURE OF HIGHWAYS AND RAILS. FOR CONDITION ADJUSTMENTS AND ADDITIONAL INFORMATION, REFER TO RAILROAD-HIGHWAY GRADE CROSSINGS UNDER CHAPTER 9 OF "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).

③ DEFINITIONS:

- d_H = SIGHT-DISTANCE LEG ALONG HIGHWAY ALLOWS A VEHICLE PROCEEDING TO SPEED V_v TO CROSS TRACKS EVEN THOUGH A TRAIN IS OBSERVED AT A DISTANCE d_T FROM THE CROSSING OR TO STOP THE VEHICLE WITHOUT ENCROACHMENT OF THE CROSSING AREA (FT)
- V_v = SPEED OF THE VEHICLE (MPH)
- W = DISTANCE BETWEEN OUTER RAILS (FOR A SINGLE TRACK, THIS VALUE IS 5 FT.)
- D = DISTANCE FROM THE STOP LINE OR FRONT OF THE VEHICLE TO THE NEAREST RAIL, WHICH IS ASSUMED TO BE 15 FT.
- d_E = DISTANCE FROM THE DRIVER TO THE FRONT OF THE VEHICLE, WHICH IS ASSUMED TO BE 8 FT.
- L = LENGTH OF VEHICLE, WHICH IS ASSUMED TO BE 73.5 FT. (WB-67)
- d_T = SIGHT DISTANCE ALONG RR TRACK
- V_T = SPEED OF THE TRAIN (M.P.H.) (DESIGNER SHOULD OBTAIN THIS INFORMATION FROM THE UTILITIES OFFICE)

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INTERSECTION SIGHT DISTANCE FOR PASSIVE RAILROAD HIGHWAY GRADE CROSSINGS

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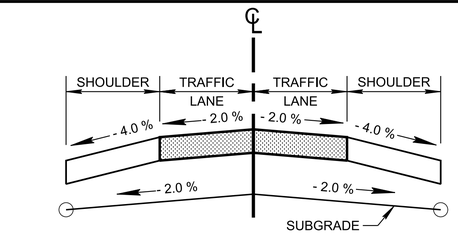
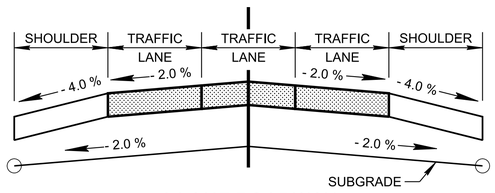
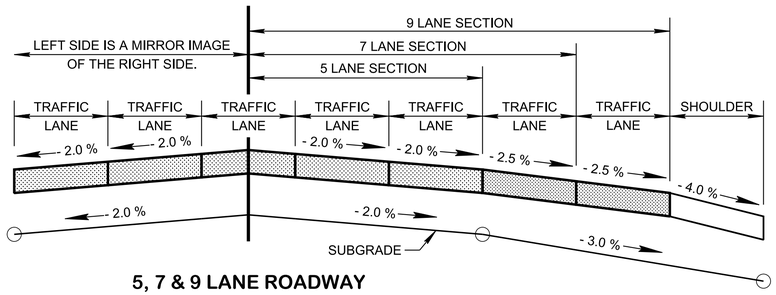


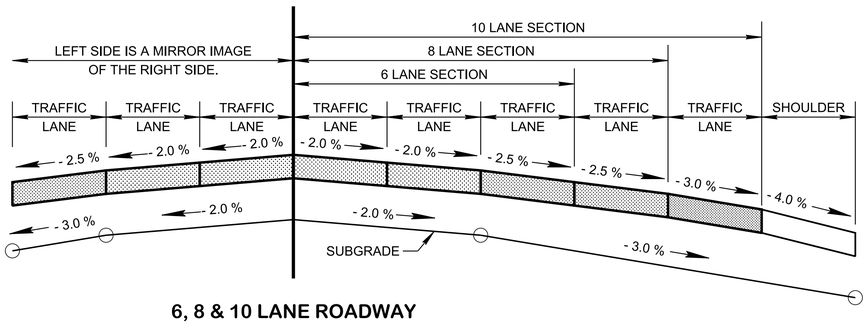
2 LANE ROADWAY



3 LANE ROADWAY

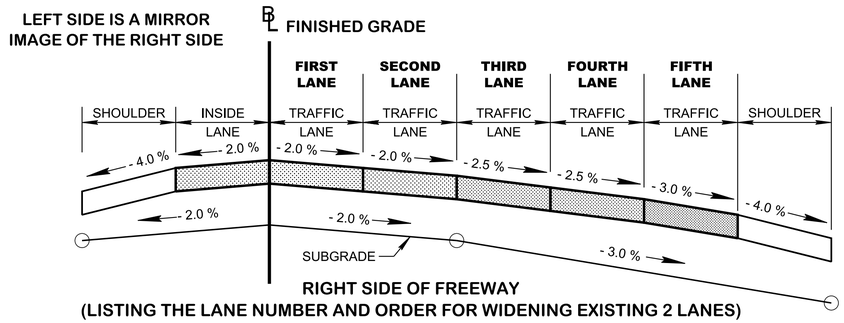


5, 7 & 9 LANE ROADWAY



6, 8 & 10 LANE ROADWAY

PAVEMENT AND SUBGRADE MINIMUM CROSS SLOPE DETAILS FOR NON DIVIDED ROADWAYS



RIGHT SIDE OF FREEWAY
(LISTING THE LANE NUMBER AND ORDER FOR WIDENING EXISTING 2 LANES)

PAVEMENT AND SUBGRADE MINIMUM CROSS SLOPE DETAILS FOR DIVIDED FREEWAYS

NOT TO SCALE

SUPERELEVATION TRANSITION EQUATIONS

$$L = L_R + L_T$$

$$L_R = \frac{(W\, n\, 1)\, e_d}{\Delta\,\%}\,(b_w)$$

$$L_T = \frac{NC}{e_d} L_R$$

SUPERELEVATION RUNOFF LENGTH (L_R) ADJUSTMENT FACTORS

NUMBER OF TOTAL LANES	n_1	b_w
2	1	1.00
3	1.5	0.83
4	2	0.75
5	2.5	0.70
6	3	0.67

MAXIMUM RELATIVE GRADIENT

V	Δ %	V	Δ %
20	0.74	50	0.50
25	0.70	55	0.47
30	0.66	60	0.45
35	0.62	65	0.43
40	0.58	70	0.40
45	0.54		

MINIMUM RADII AND DESIGN SUPERELEVATION RATES

SEE , P 3-33 THRU 3-58.

e_{MAX} = 4% (15-45 MPH) P. 3-55, TABLE 3-13b (METHOD 2)
4% (50-60 MPH) P. 3-44, TABLE 3-8 (METHOD 5)

e_{MAX} = 6% (15-45 MPH) P. 3-55, TABLE 3-13b (METHOD 2)
6% (50-60 MPH) P. 3-45, TABLE 3-9 (METHOD 5)

e_{MAX} = 8% (15-70 MPH) P. 3-47, TABLE 3-10b (METHOD 5)

e_{MAX} = 10% (15-70 MPH) P. 3-49, TABLE 3-11b (METHOD 5)

FOR SUPERELEVATION RUNOFF FOR HORIZONTAL CURVES SEE , P 3-59 THRU 3-84.

SUPERELEVATION RUNOFF (L_R) P. 3-65, TABLE 3-17b

NOTE: USE SUPERELEVATION TRANSITION EQUATIONS IF MORE THAN 2 LANES (n1) ARE ROTATED. SEE P. 3-61 FOR ADDITIONAL INFORMATION.

LEGEND

R	MINIMUM RADIUS OF CURVE (FT)
V	ASSUMED DESIGN SPEED (MPH)
e_d	DESIGNED RATE OF SUPERELEVATION (%)
W	LANE WIDTH (TABLES ASSUME LANE WIDTH OF 12 FT PER LANE)
n_1	NUMBER OF LANES ROTATED
b_w	ADJUSTMENT FACTOR FOR NUMBER OF LANES ROTATED
Δ %	MAXIMUM RELATIVE GRADIENT (%)
L	TOTAL TRANSITION LENGTH
L_T	TANGENT RUNOUT LENGTH
L_R	SUPERELEVATION RUNOFF LENGTH
NC	NORMAL CROWN (TABLES ASSUME 2% AS NC) (%)
RC	REVERSE CROWN
LN	NUMBER OF TRAVEL LANES

GENERAL NOTES

1. FOR SPECIFIC CONDITIONS NOT COVERED, REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).
2. TABLE VALUES FOR URBAN LOW SPEED SUPERELEVATION (45 MPH OR LESS) ARE CALCULATED USING THE DISTRIBUTION METHOD 2 OF "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK). ALL OTHER VALUES ARE CALCULATED USING METHOD 5.
3. ALL HORIZONTAL CURVES SHALL BE SUPERELEVATED IN ACCORDANCE WITH "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 AND SUPERELEVATION STANDARD DRAWINGS, UNLESS OTHERWISE SHOWN ON THE PLANS.
4. SPIRALS ARE RECOMMENDED FOR DESIGN SPEED OF 50 MPH OR GREATER AND DESIGN SUPERELEVATION OF 3 PERCENT OR GREATER.
5. DESIGNERS SHALL SELECT THE MORE CONSERVATIVE (LARGER VALUE) SUPERELEVATION RATE IF THE DESIGN RADIUS USED FALLS BETWEEN TWO RADII LISTED IN THE TABLE.
6. THE TRANSITION LENGTHS FOUND IN THE SUPERELEVATION TABLES ARE CONSIDERED MINIMUM AND MAY BE ROUNDED UP IN MULTIPLES OF 25 OR 50 FEET TO ALLOW FOR SIMPLIFIED CALCULATIONS.
7. WHEN USING THE 4 OR 6 LANE HIGHWAY WITH MEDIAN DETAIL, THE INSIDE EDGE OF PAVEMENT (MEDIAN) SHOULD BE HELD LEVEL AND THE DIFFERENCE IN ELEVATION BETWEEN THE EXTREME TRAVELED WAY EDGES SHOULD BE LIMITED TO THAT NEEDED TO SUPERELEVATE THE ROADWAY.
8. ALIGNMENT DESIGNS SHOULD BE SO ARRANGED AS TO AVOID SUPERELEVATION TRANSITIONS ON BRIDGE DECKS TO PREVENT PONDING IN THE AREAS OF ZERO SUPERELEVATION IN THE CROWN CHANGE ZONE.
9. USE RURAL SUPERELEVATION RATES ON ALL URBAN FREEWAYS AND EXPRESSWAYS EXCEPT VIADUCTS.
10. DESIGNERS SHALL MAINTAIN A MINIMUM PROFILE GRADE OF 0.5 PERCENT THROUGH THE TRANSITION SECTION.
11. DESIGNERS SHALL MAINTAIN A MINIMUM EDGE OF PAVEMENT GRADE OF 0.2 PERCENT (0.5 PERCENT FOR CURBED ROADS) THROUGH THE TRANSITION SECTION.
12. DESIGNERS SHALL MAINTAIN A CONSTANT GRADIENT THROUGHOUT THE TRANSITION LENGTH.
13. SEE STANDARD DRAWINGS FOR SUPERELEVATION TRANSITION DETAILS.
    1) TWO, THREE AND FIVE LANE UNDIVIDED: RD11-SE-2 AND RD11-SE-2A
    2) FOUR LANE DIVIDED: RD11-SE-3 AND RD11-SE-3A
14. FOR HIGH-TYPE ALIGNMENTS, SUPERELEVATION RUNOFF LENGTHS LONGER THAN THOSE SHOWN IN RD11-SE SERIES MAY BE DESIRABLE. IN THIS CASE, DRAINAGE NEEDS OR THE DESIRE FOR SMOOTHNESS IN THE TRAVELED-WAY-EDGE PROFILES MAY CALL FOR A SMALL INCREASE IN RUNOFF LENGTH (FROM PAGE 3-63 "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011).

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

TRANSITION AND CROSS SLOPE DETAILS

01-01-2019 RD11-SE-1

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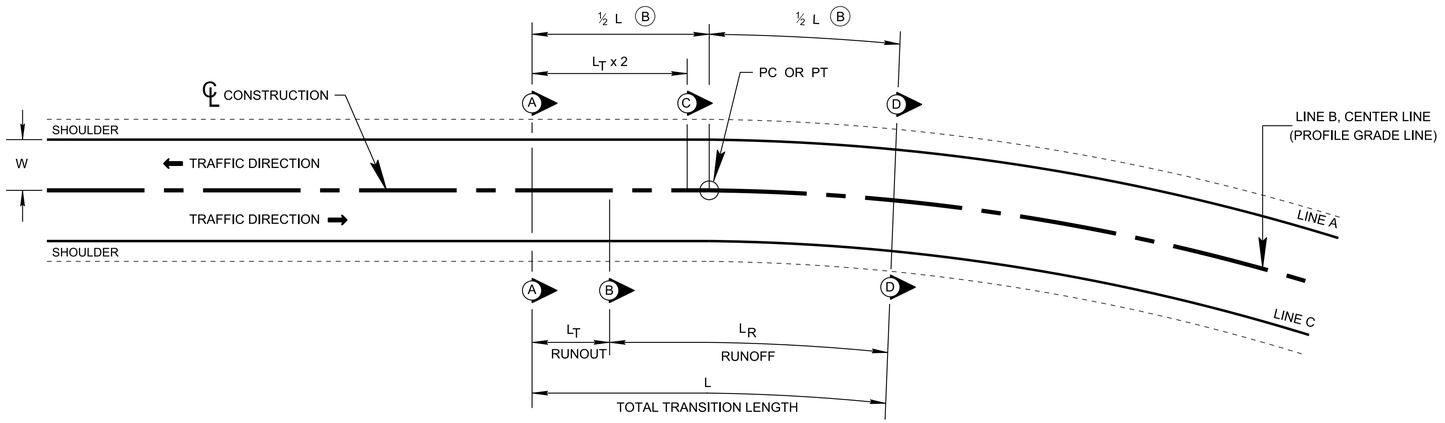
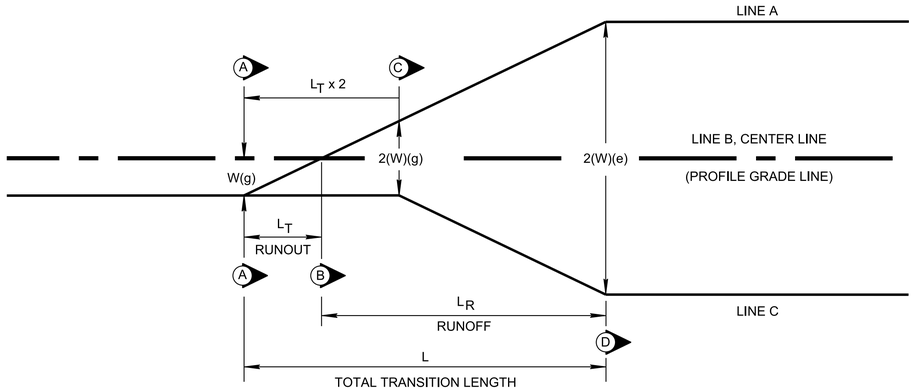
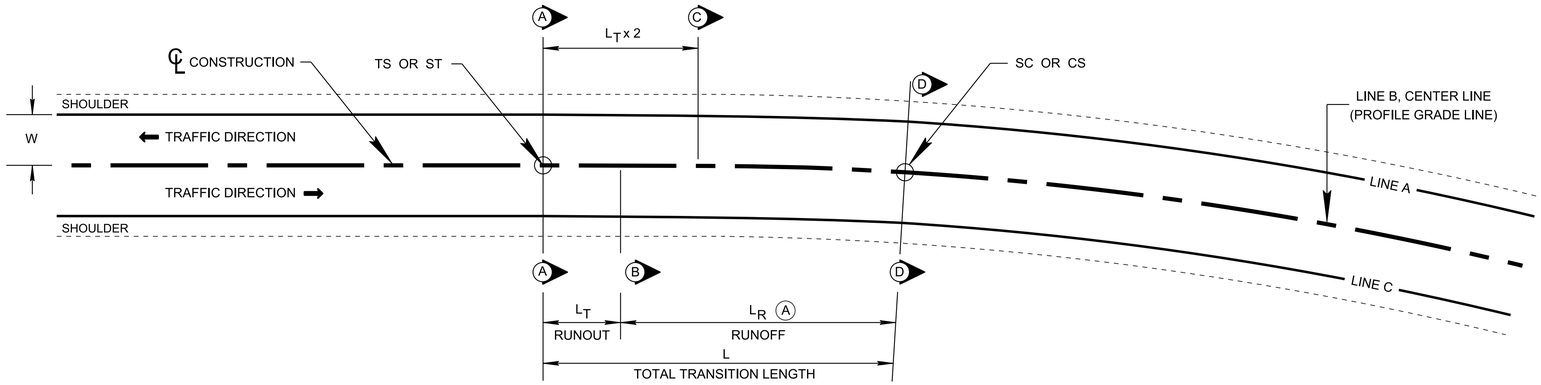


TRANSITION DETAILS - TANGENT TO CURVE



DIAGRAMMATIC PROFILES OF THE PAVEMENT EDGE LINES

SEE STANDARD DRAWING RD11-SE-2A FOR ADDITIONAL DETAILS



TRANSITION DETAILS - SPIRAL CURVE

LEGEND

PC = POINT OF CURVATURE
PT = POINT OF TANGENCY
TS = TANGENT TO SPRIAL
ST = SPRIAL TO TANGENT
SC = SPIRAL TO CURVE
CS = CURVE TO SPIRAL
◯➤ = SECTION VIEW (SEE RD11-SE-2A)
L = TOTAL TRANSITION LENGTH = DISTANCE REQUIRED TO TRANSITION FROM NORMAL CROWN (2%) TO FULL SUPERELEVATION (**e**). INCLUDES SUPERELEVATION RUNOFF (L_R) AND TANGENT RUNOUT (L_T) LENGTH.
½ L = 50% OF TOTAL TRANSITION LENGTH (L)
W = LANE WIDTH (1 LANE) (TABLES ASSUME 12FT LANES)
g = NORMAL CROSS SLOPE (0.02 FT/FT)
L_R = DISTANCE TO CHANGE CROSS SLOPE FROM 0% TO e
e = SUPERELEVATION RATE (FT/FT)
L_T = DISTANCE TO CHANGE CROSS SLOPE FROM -2% TO 0%
S = NORMAL SHOULDER SLOPE

DESIGN NOTES

(A) SPIRAL CURVE LENGTH COINCIDES WITH TOTAL TRANSITION LENGTH.

(B) ½ OF TOTAL TRANSITION LENGTH UNLESS SHOWN OTHERWISE ON PLANS.

GENERAL NOTES

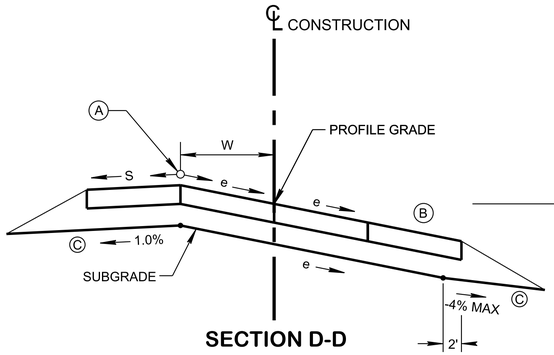
1. REFER TO SPECIFIC CURVE DATA CONTAINED IN PROJECT PLANS FOR TOTAL TRANSITION LENGTH (L) AND FULL SUPERELEVATION (e).
2. WHEN SPIRAL CURVES ARE REQUIRED, THE TOTAL TRANSITION LENGTH (L) WILL BE PLACED WITHIN THE SPIRAL. WHEN SPIRAL CURVE TRANSITIONS ARE NOT REQUIRED, 50% OF THE TOTAL TRANSITION LENGTH TO BE PLACED EQUALLY ON EITHER SIDE OF THE PC AND PT UNLESS OTHERWISE SHOWN ON THE PLANS.
3. UNLESS OTHERWISE SPECIFIED, ALL LENGTHS ARE MEASURED ALONG THE CENTERLINE OF CONSTRUCTION.
4. SUPERELEVATION ON THIS STANDARD ARE SHOWN FOR CURVES TO THE RIGHT. CURVES TO THE LEFT ARE MIRROR IMAGE OF WHAT IS SHOWN.
5. AXIS OF ROTATION COINCIDES WITH PROFILE GRADE LOCATION.
6. THIS DRAWING IS TO BE USED IN CONJUNCTION WITH STANDARD DRAWING RD11-SE-2A AND RD11-LR SERIES.
7. USE FORMULAS ON STANDARD DRAWING RD11-SE-1 TO DETERMINE TOTAL TRANSITION LENGTH (L).

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

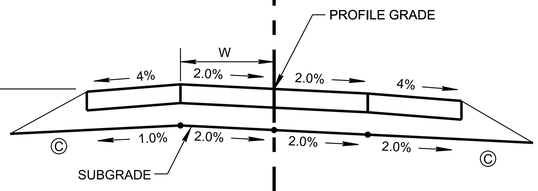
SUPERELEVATION TRANSITION DETAILS FOR UNDIVIDED ROADWAYS

01-01-2019 | RD11-SE-2

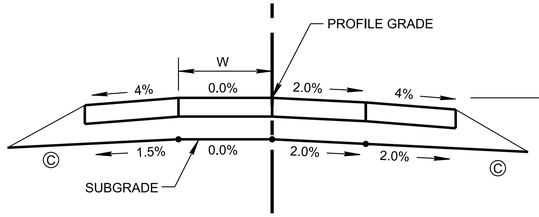
NOT TO SCALE



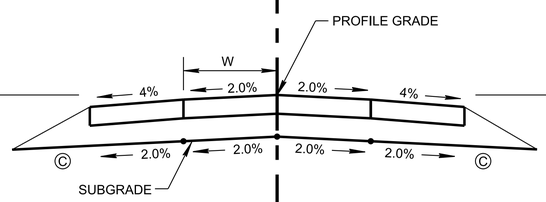
SECTION D-D
(FULL SUPERELEVATION)



SECTION C-C
(REVERSE CROWN)



SECTION B-B
(REMOVE ADVERSE CROWN)

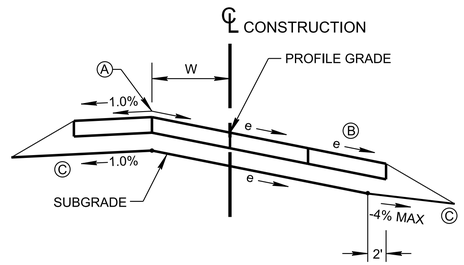


SECTION A-A
(NORMAL CROWN)

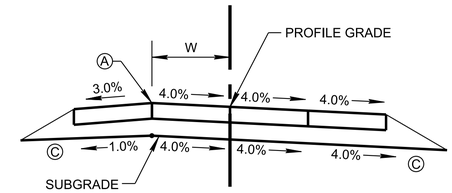
L R

L T x 2

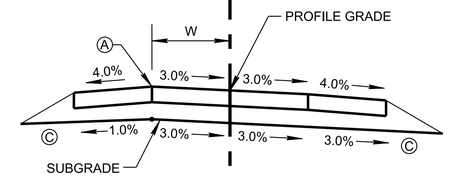
L T



(SECTION WHERE e = 6.0%)



(SECTION WHERE LOW SIDE SHOULDER CROWN BREAK RULE OCCURS WHERE e = 4%)



(SECTION WHERE HIGH SIDE SHOULDER CROWN BREAK RULE OCCURS WHERE e = 3%)

SECTION WHERE SHOULDER SLOPE TRANSITION BEGINS

DESIGN NOTES

Ⓐ HIGH SIDE SHOULDER: MAINTAIN NORMAL SHOULDER CROSS SLOPE (S), UNTIL THE CROSS SLOPE BREAK WITH THE ADJACENT PAVEMENT REACHES A MAXIMUM ALGEBRAIC DIFFERENCE IN GRADES OF 7%. THEN THE SHOULDER SLOPE SHALL BEGIN TO ROTATE TO MAINTAIN THE ALGEBRAIC DIFFERENCE IN GRADES OF 7% BETWEEN THE SHOULDER AND ROADWAY SLOPE.

Ⓑ LOW SIDE SHOULDER: MAINTAIN NORMAL SHOULDER CROSS SLOPE (S) UNTIL THE ADJACENT PAVEMENT SLOPE EQUALS (S), THEN THE SLOPE OF THE SHOULDER ROTATES AT THE SAME CROSS SLOPE AS THE ADJACENT PAVEMENT.

Ⓒ SUBGRADE SLOPE:
FOR SHOULDERS IN TANGENT SECTION:
THE SUBGRADE MATCHES THE PAVEMENT SLOPE AND NOT THE SHOULDER SLOPE.

FOR SHOULDERS IN FULL SUPERELEVATION SECTION;
LOW SIDE MATCHES THE PAVEMENT SLOPE AND NOT THE SHOULDER SLOPE UNTIL SUPERELEVATION REACHES 4%. WHEN THE SUPERELEVATION IS GREATER THAN 4% THE SUBGRADE WILL HAVE A BREAK IN SUBGRADE 2' BACK UNDER THE SHOULDER AND THE GRADE RUNNING OUT WILL MAINTAIN A 4% SLOPE. SEE SECTION D-D FOR DETAILS.
HIGH SIDE SHOULDER AND ADJACENT PAVEMENT SUBGRADE CHANGE MUST NOT EXCEED AN ALGEBRAIC DIFFERENCE IN GRADES OF 7%.

WHEN SUBGRADE TRANSITIONS FROM LOW SIDE TO HIGH SIDE ON THE OUTSIDE SHOULDER FOR SUPERELEVATION; THE SHOULDER SUBGRADE ON THE OUTSIDE MUST ROTATE UP FROM 2% TO 1%. THIS SUBGRADE TRANSITION FOR THE SHOULDER, OCCURS DURING THE TRANSITION FROM NORMAL CROWN TO REVERSE CROWN. SEE SECTIONS A-A, B-B AND C-C FOR DETAILS.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

SUPERELEVATION TRANSITION SECTIONS FOR UNDIVIDED ROADWAYS

01-01-2019 | RD11-SE-2A

NOT TO SCALE

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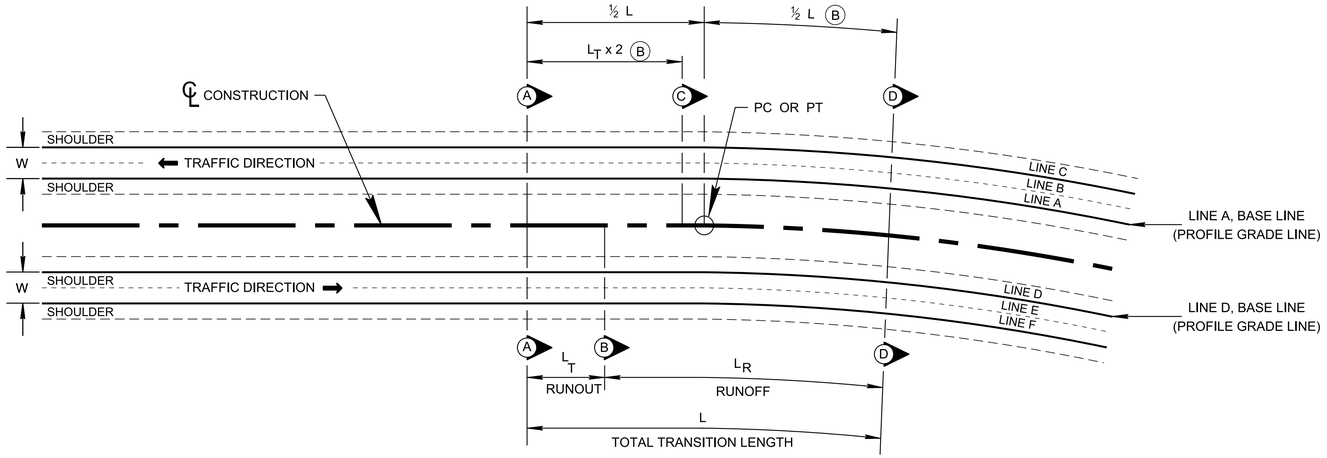
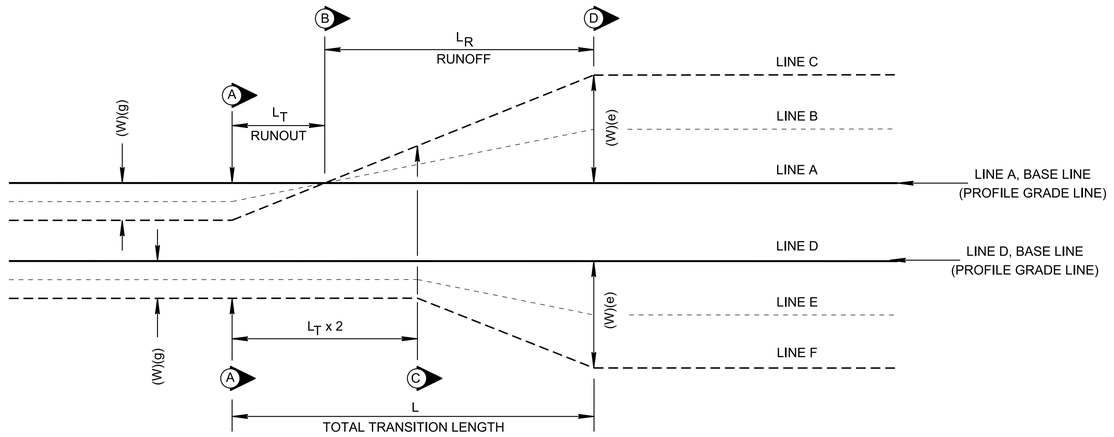
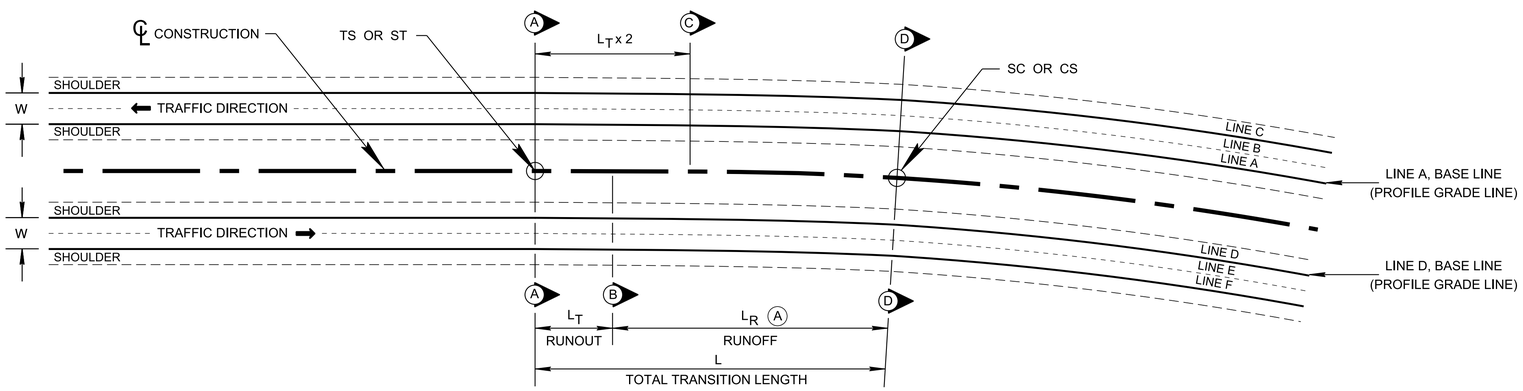


TRANSITION DETAILS - TANGENT TO CURVE



DIAGRAMMATIC PROFILES OF THE PAVEMENT EDGE LINES

SEE STANDARD DRAWING RD11-SE-3A FOR ADDITIONAL DETAILS



TRANSITION DETAILS - SPIRAL CURVE

NOT TO SCALE

LEGEND

PC = POINT OF CURVATURE
PT = POINT OF TANGENCY
TS = TANGENT TO SPRIAL
ST = SPRIAL TO TANGENT
SC = SPIRAL TO CURVE
CS = CURVE TO SPIRAL
◯➤ = SECTION VIEW (SEE RD11-SE-3A)
L = TOTAL TRANSITION LENGTH = DISTANCE REQUIRED TO TRANSITION FROM NORMAL CROWN (2%) TO FULL SUPERELEVATION (e). INCLUDES SUPERELEVATION RUNOFF (L_R) AND TANGENT RUNOUT (L_T) LENGTH.
½ L = 50% OF TOTAL TRANSITION LENGTH (L)
W = LANE WIDTH (1 LANE) (TABLES ASSUME 12FT LANES)
g = NORMAL CROSS SLOPE (0.02 FT/FT)
L_R = DISTANCE TO CHANGE CROSS SLOPE FROM 0% TO e
e = SUPERELEVATION RATE (FT/FT)
L_T = DISTANCE TO CHANGE CROSS SLOPE FROM -2% TO 0%
S = NORMAL SHOULDER SLOPE

DESIGN NOTES

(A) SPIRAL CURVE LENGTH COINCIDES WITH TOTAL TRANSITION LENGTH.

(B) ½ OF TOTAL TRANSITION LENGTH UNLESS SHOWN OTHERWISE ON PLANS.

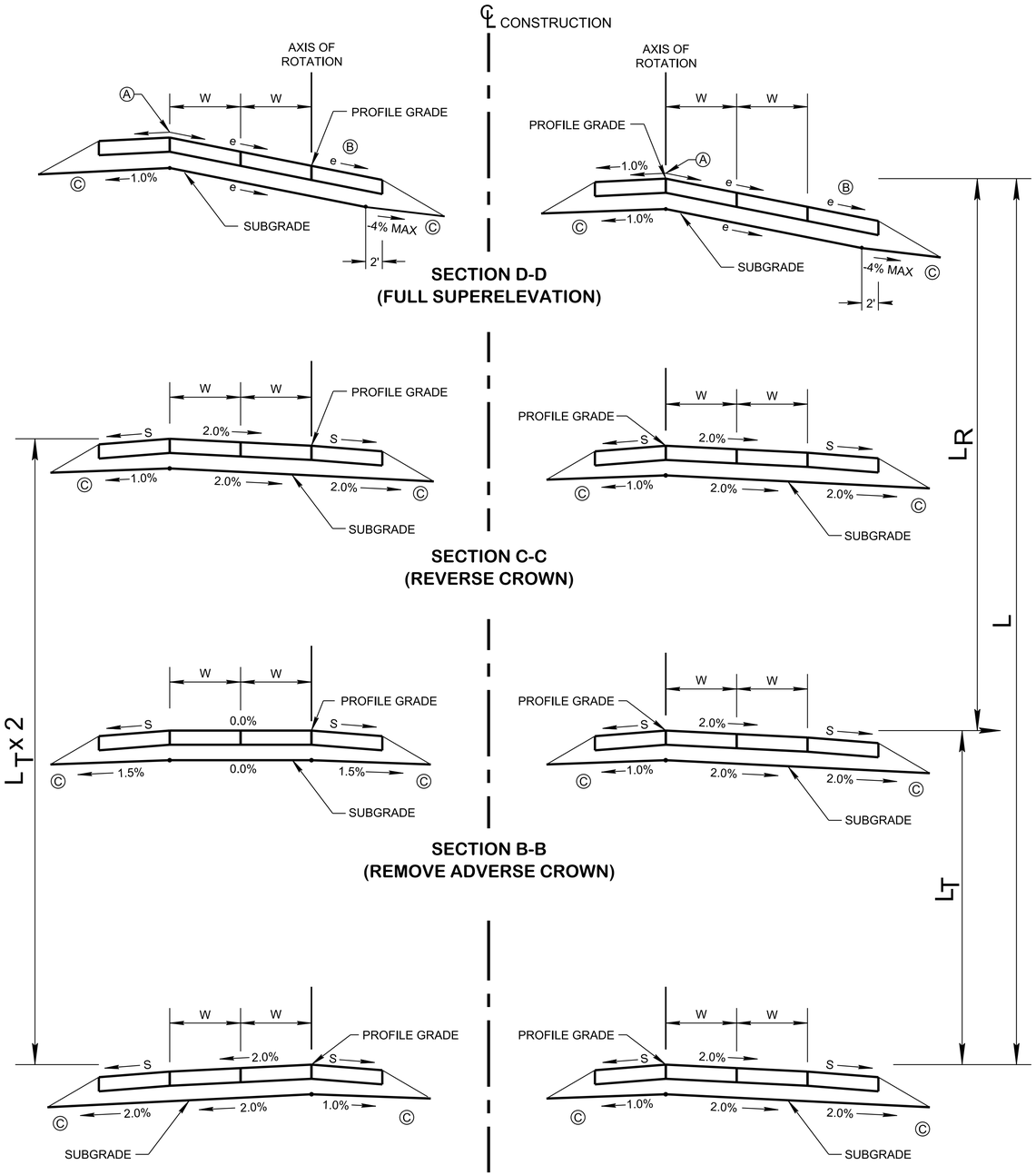
GENERAL NOTES

1. REFER TO SPECIFIC CURVE DATA CONTAINED IN PROJECT PLANS FOR TOTAL TRANSITION LENGTH (L) AND FULL SUPERELEVATION (e).
2. WHEN SPIRAL CURVES ARE REQUIRED, THE TOTAL TRANSITION LENGTH (L) WILL BE PLACED WITHIN THE SPIRAL. WHEN SPIRAL CURVE TRANSITIONS ARE NOT REQUIRED, 50% OF THE TOTAL TRANSITION LENGTH TO BE PLACED EQUALLY ON EITHER SIDE OF THE PC AND PT UNLESS OTHERWISE SHOWN ON THE PLANS.
3. UNLESS OTHERWISE SPECIFIED, ALL LENGTHS ARE MEASURED ALONG THE CENTERLINE OF CONSTRUCTION.
4. SUPERELEVATION ON THIS STANDARD ARE SHOWN FOR CURVES TO THE RIGHT. CURVES TO THE LEFT ARE MIRROR IMAGE OF WHAT IS SHOWN.
5. AXIS OF ROTATION COINCIDES WITH PROFILE GRADE LOCATION.
6. THIS DRAWING IS TO BE USED IN CONJUNCTION WITH STANDARD DRAWING RD11-SE-3A AND RD11-LR SERIES.
7. USE FORMULAS ON STANDARD DRAWING RD11-SE-1 TO DETERMINE TOTAL TRANSITION LENGTH (L).

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

SUPERELEVATION TRANSITION DETAILS FOR DIVIDED ROADWAYS

01-01-2019 | RD11-SE-3



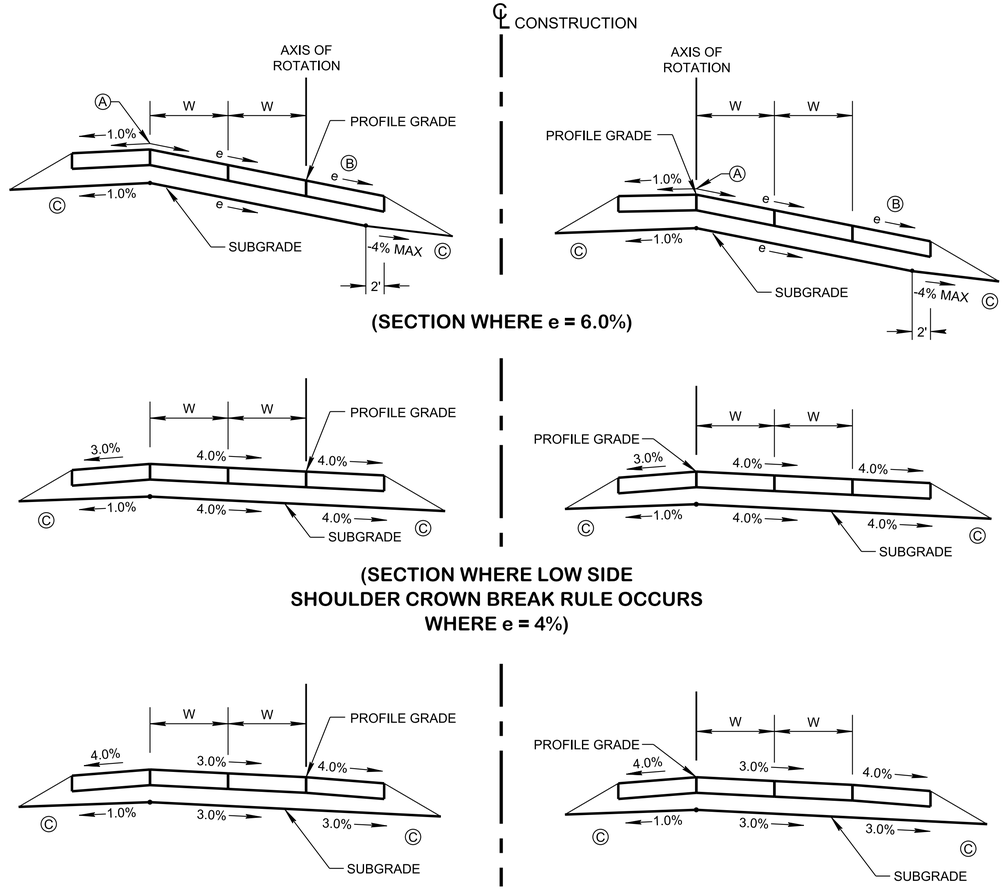
SECTION D-D
(FULL SUPERELEVATION)

SECTION C-C
(REVERSE CROWN)

SECTION B-B
(REMOVE ADVERSE CROWN)

SECTION A-A
(NORMAL CROWN)

LEFT ROADWAY **RIGHT ROADWAY**



(SECTION WHERE e = 6.0%)

(SECTION WHERE LOW SIDE SHOULDER CROWN BREAK RULE OCCURS WHERE e = 4%)

(SECTION WHERE HIGH SIDE SHOULDER CROWN BREAK RULE OCCURS WHERE e = 3%)

LEFT ROADWAY **RIGHT ROADWAY**

SECTION WHERE SHOULDER SLOPE TRANSITION BEGINS

DESIGN NOTES

(A) HIGH SIDE SHOULDER: MAINTAIN NORMAL SHOULDER CROSS SLOPE (S), UNTIL THE CROSS SLOPE BREAK WITH THE ADJACENT PAVEMENT REACHES A MAXIMUM ALGEBRAIC DIFFERENCE IN GRADES OF 7%. THEN THE SHOULDER SLOPE SHALL BEGIN TO ROTATE TO MAINTAIN THE ALGEBRAIC DIFFERENCE IN GRADES OF 7% BETWEEN THE SHOULDER AND ROADWAY SLOPE.

(B) LOW SIDE SHOULDER: MAINTAIN NORMAL SHOULDER CROSS SLOPE (S) UNTIL THE ADJACENT PAVEMENT SLOPE EQUALS (S), THEN THE SLOPE OF THE SHOULDER ROTATES AT THE SAME CROSS SLOPE AS THE ADJACENT PAVEMENT.

(C) SUBGRADE SLOPE:
FOR SHOULDERS IN TANGENT :
THE OUTSIDE SUBGRADE MATCHES THE PAVEMENT SLOPE AND NOT THE SHOULDER SLOPE.
THE INSIDE SUBGRADE IS -1% FOR LEFT AND RIGHT ROADWAYS.

FOR SHOULDERS IN FULL SUPERELEVATION SECTION;
LOW SIDE MATCHES THE PAVEMENT SLOPE AND NOT THE SHOULDER SLOPE UNTIL SUPERELEVATION REACHES 4%. WHEN THE SUPERELEVATION IS GREATER THAN 4% THE SUBGRADE WILL HAVE A BREAK IN SUBGRADE 2' BACK UNDER THE SHOULDER AND THE GRADE RUNNING OUT WILL MAINTAIN A 4% SLOPE. SEE SECTION D-D FOR DETAILS.
HIGH SIDE SHOULDER AND ADJACENT PAVEMENT SUBGRADE CHANGE MUST NOT EXCEED AN ALGEBRAIC DIFFERENCE IN GRADES OF 7%.

WHEN SUBGRADE TRANSITIONS FROM LOW SIDE TO HIGH SIDE ON THE LEFT ROADWAY FOR SUPERELEVATION;
THE SHOULDER SUBGRADE ON THE OUTSIDE MUST ROTATE UP FROM 2% TO 1% AND THE SHOULDER SUBGRADE ON THE INSIDE MUST ROTATE DOWN FROM 1% TO 2%. THIS SUBGRADE TRANSITION FOR THE INSIDE AND OUTSIDE SHOULDER OCCURS DURING THE TRANSITION FROM NORMAL CROWN TO REVERSE CROWN. SEE SECTIONS A-A, B-B AND C-C FOR DETAILS.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

SUPERELEVATION TRANSITION SECTIONS FOR DIVIDED ROADWAYS

01-01-2019 RD11-SE-3A

NOT TO SCALE

TABLE I MINIMUM DESIGN SPEEDS FOR LOW-VOLUME ROADS

TYPE OF TERRAIN	DESIGN SPEED (MPH) FOR SPECIFIED DESIGN ADT (VEH/DAY)			
	UNDER 50	50 TO 250	250 TO 400	400 TO 2,000
LEVEL	30	30	40	50
ROLLING	20 (J)	30	30	40
MOUNTAINOUS	20 (J)	20 (J)	20 (J)	30

TABLE II
DESIGN STANDARDS FOR LOW-VOLUME LOCAL ROADS AND STREETS (ADT ≤ 400)

DESIGN SPEED (MPH) (J)				15	20	25	30	35	40
PROPOSED APPROACH ROADWAY (FEET)	RURAL LOCAL ROADS			18	18	18	18	18	18
	RECREATIONAL AND SCENIC ROADS			18	18	18	18	18	20
	INDUSTRIAL/COMMERCIAL ACCESS			20	20	22	24	24	24
	URBAN LOCAL ROADS LOW DEVELOPMENT DENSITY (2.0 OR LESS DWELLINGS/ACRE)			20	20	20	20	20	20
	URBAN LOCAL ROADS MEDIUM DEVELOPMENT DENSITY (2.1 TO 6 DWELLINGS/ACRE)			28	28	28	28	28	28
MINIMUM HORIZONTAL CURVE RADIUS (FEET) BY SUPERELEVATION RATE	ALL CLASSIFICATIONS (G)	NC	-2%	50	107	198	333	510	762
			0%	47	99	181	300	454	667
		RC	2%	44	92	167	273	408	593
			3%	43	89	160	261	389	561
			4%	42	86	154	250	371	533
			5%	41	83	149	240	355	508
			6%	39	81	144	231	340	485
			7%	38	78	139	222	327	464
			8%	38	76	134	214	314	444
MINIMUM STOPPING SIGHT DISTANCE (FEET)	ADT 0 TO 100 (VEH/DAY)			65	90	115	135	170	215
	ADT 101 TO 400 (VEH/DAY)			65	95	125	165	205	250
MINIMUM " K " VALUES	CREST VERTICAL CURVE	ADT 0 TO 100 (VEH/DAY)		2	4	7	9	14	22
		ADT 101 TO 400 (VEH/DAY)		2	5	8	13	20	29
	SAG VERTICAL CURVE			10	17	26	37	49	64
MAXIMUM GRADE (%)	TYPE OF TERRAIN	LEVEL		9	8	7	7	7	7
		ROLLING		12	11	11	10	10	9
		MOUNTAINOUS		17	16	15	14	13	12

FOR SUPERELEVATION SEE STANDARD DRAWINGS RD11-SE SERIES (G)

DESIGN NOTES

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHALL BE THE SAME IN ALL SITUATIONS.

(B) MAXIMUM 2(H):1(V) OR AS RECOMMENDED BY THE GEOTECHNICAL OFFICE. WHEN A 2(H):1(V) SLOPE IS USED, AND THE FILL HEIGHT EXCEEDS SIX FT., GUARDRAIL SHOULD BE CONSIDERED. WHERE RIGHT-OF-WAY IS NOT AN ISSUE, STANDARD DRAWING RD11-S-11 (CASE II) SLOPES MAY BE USED.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SITE-SPECIFIC CONDITIONS AND ENGINEERING JUDGMENT OF THE DESIGNER SHOULD BE THE TWO PRIMARY DETERMINANTS OF THE APPROPRIATE CLEAR ZONE WIDTH FOR LOW-VOLUME LOCAL ROADS. AT LOCATIONS WHERE A CLEAR ZONE OF 6 FEET OR MORE IN WIDTH CAN BE PROVIDED AT LOW COST AND WITH MINIMUM SOCIAL/ENVIRONMENTAL IMPACT, SUCH CLEAR ZONE SHOULD BE CONSIDERED. WHERE PROVISION OF A CLEAR ZONE IS NOT PRACTICAL, NONE IS REQUIRED.

(F) FOR BRIDGE PROJECTS WHERE THE TOTAL APPROACH ROADWAY WIDTH (TRAVELED WAY PLUS SHOULDERS) IS SURFACED, THAT SURFACE WIDTH SHOULD BE CARRIED ACROSS THE STRUCTURE. THE WIDTH OF THE BRIDGE CANNOT BE LESS THAN THE PROPOSED ROADWAY WIDTH SELECTED FROM TABLE 1. THE TOTAL APPROACH ROADWAY WIDTH CANNOT BE LESS THAN THE EXISTING ROADWAY WIDTH, AS DETERMINED ABOVE. HOWEVER, ON UNSURFACED RURAL ROADS, WITHOUT DEFINED TRAVELED WAY OR DEFINED SHOULDERS, THE WIDTH DETERMINED FROM TABLE 1 WILL SUFFICE.

(G) FOR THE DESIGN OF SUPERELEVATION TRANSITIONS, USE THE SUPERELEVATION DESIGN SPEED LISTED DIRECTLY ABOVE THE SELECTED MINIMUM HORIZONTAL CURVE RADIUS. FOR EXISTING ROADS WHERE SUPERELEVATION IS NOT PRESENT AND NO SITE-SPECIFIC SAFETY PROBLEM IS KNOWN, SUPERELEVATION MAY NOT BE NECESSARY. REMOVAL OF NORMAL CROWN BY SUPERELEVATING THE ENTIRE ROADWAY AT THE NORMAL CROSS SLOPE MAY BE USED UNLESS SUPERELEVATION IS NEEDED AS DETERMINED BY THE DESIGNER. THE DESIGNER SHOULD ASSESS THE PROJECT SITE AND USE ENGINEERING JUDGEMENT WHEN MAKING THIS DETERMINATION. FOR UNPAVED ROADS, REMOVAL OF NORMAL CROWN BY SUPERELEVATING THE ENTIRE ROADWAY AT THE NORMAL CROSS SLOPE MAY BE USED OR SUPERELEVATION MAY BE ELIMINATED.

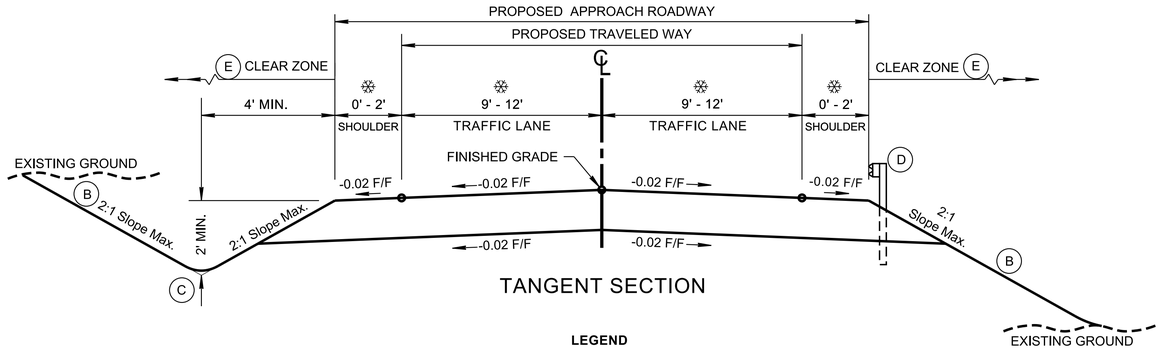
(H) THESE STRUCTURES SHOULD BE ANALYZED INDIVIDUALLY, TAKING INTO CONSIDERATION THE CLEAR WIDTH PROVIDED, TRAFFIC VOLUMES, REMAINING LIFE OF THE STRUCTURE, PEDESTRIAN VOLUMES, SNOW STORAGE, DESIGN SPEED, ACCIDENT RECORD, AND OTHER PERTINENT FACTORS.

(I) CURB-TO-CURB OR BETWEEN RAILS, WHICHEVER IS THE LESSER.

(J) DESIGN SPEED SHOULD BE SELECTED BASED ON ACTUAL OR ANTICIPATED OPERATING SPEED AND CONDITIONS ON THE ROAD BEING DESIGNED.

(K) DESIGN LOADING: ALL NEW AND REHABILITATED BRIDGES SHALL BE DESIGNED FOR HL-93 LOADING.

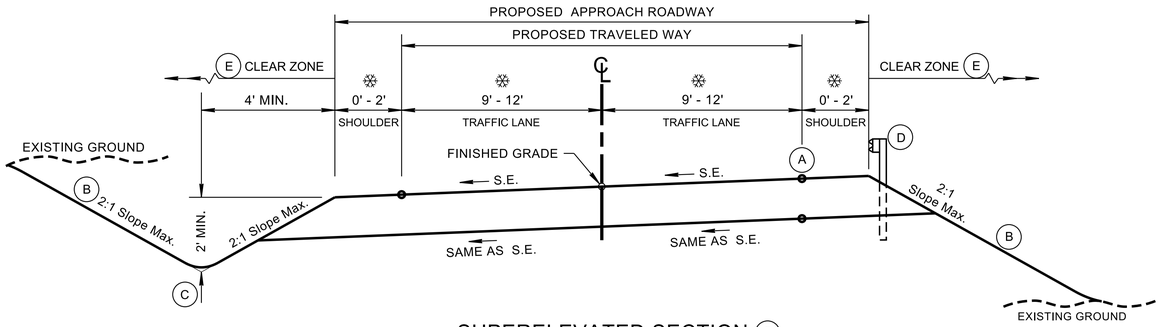
(L) FOR NEW CONSTRUCTION OR RECONSTRUCTION PROJECTS: THE MINIMUM CLEAR WIDTH FOR NEW BRIDGES SHALL BE EQUAL TO THE FULL WIDTH OF THE APPROACH ROADWAY (CURB-TO-CURB OR FULL SHOULDER WIDTH AS APPLICABLE). WIDTH SHOULD BE AVAILABLE FOR FARM EQUIPMENT USE AS REQUIRED.



TANGENT SECTION

LEGEND

❄ SEE TABLE II FOR WIDTHS



SUPERELEVATED SECTION (G)

BRIDGE DESIGN - MINIMUM CLEAR WIDTHS AND DESIGN LOADINGS (K) (L)

DESIGN ADT (VEH/DAY)	MINIMUM CLEAR (A) WIDTH (FEET) (I)	DESIGN LOADING (STRUCTURAL CAPACITY) FOR NEW AND RECONSTRUCTED BRIDGES	(F) DESIGN LOADING (STRUCTURAL CAPACITY) FOR EXISTING BRIDGES TO REMAIN IN PLACE (H)
0 TO 100	18	HL-93	H-15
101 TO 400	20	HL-93	H-15

GENERAL NOTES

1. THIS STANDARD DRAWING IS INTENDED TO BE USED FOR THE DESIGN OF LOW-VOLUME ROADWAYS CLASSIFIED AS LOCAL ROADS. FOR ADDITIONAL GUIDANCE NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO AASHTO "GUIDELINES FOR GEOMETRIC DESIGN OF LOW-VOLUME ROADS," (2019).
2. PROJECTS WITH DESIGN SPEEDS GREATER THAN 40 MPH SHALL USE STANDARD DRAWING RD11-TS-1A.
3. FOR INTERSECTION SIGHT DISTANCE, SEE SECTION 4.6 OF THE AASHTO "GUIDELINES FOR GEOMETRIC DESIGN OF LOW-VOLUME ROADS," (2019). FOR HIGHER ADT'S REFER TO THE RD11-SD-SERIES STANDARD DRAWINGS FOR ADDITIONAL GUIDANCE.
4. IF NO ABOVE GROUND UTILITIES ARE INVOLVED, MINIMUM RIGHT-OF-WAY SHOULD BE THE TRAVELED WAY PLUS CLEAR ZONE.
5. IF ABOVE GROUND UTILITIES ARE INVOLVED, MINIMUM RIGHT-OF-WAY SHOULD BE SUFFICIENT TO ACCOMMODATE THE UTILITIES OUTSIDE THE CLEAR ZONE.
6. DESIGNER SHOULD CONSIDER ANY KNOWN SITE-SPECIFIC SAFETY PROBLEMS AND TYPICAL DAILY USE OF THE ROADWAY WHEN DETERMINING ROADWAY GEOMETRICS ON A CASE-BY-CASE BASIS. SITE-SPECIFIC SAFETY PROBLEMS MAY BE INDICATED BY CRASH DATA, SKID MARKS, ROADSIDE DAMAGE, SPEED DATA, OR CONCERNS RAISED BY LOCAL OFFICIALS, POLICE, OR LOCAL RESIDENTS.
7. FOR EXISTING ROADS, CROSS-SECTION WIDTHS NEED NOT BE MODIFIED, EXCEPT IN THOSE CASES WHERE THERE IS KNOWN EVIDENCE OF A SITE-SPECIFIC SAFETY PROBLEM AS LONG AS THE MINIMUM CRITERIA, AS SHOWN IN TABLE I, IS MET.
8. FOR THIS STANDARD THE FOLLOWING ARE THE POSSIBLE ROADWAY USES:
   a. RURAL LOCAL ROADS SERVE A DUAL FUNCTION OF PROVIDING ACCESS TO ABUTTING PROPERTIES AS WELL AS PROVIDING THROUGH OR CONNECTING SERVICE BETWEEN OTHER LOCAL ROADS.
   b. RECREATIONAL AND SCENIC ROADS SERVE SPECIALIZED LAND USES, INCLUDING PARKS, TOURIST ATTRACTIONS, AND RECREATION FACILITIES, SUCH AS CAMPSITES OR BOAT-LAUNCH RAMPS. WHEN AVAILABLE, PEAK-SEASON ADT SHOULD BE USED FOR DESIGN.
   c. INDUSTRIAL OR COMMERCIAL ACCESS ROADS SERVE DEVELOPMENTS THAT MAY GENERATE A SIGNIFICANT PROPORTION OF TRUCK OR OTHER HEAVY VEHICLE TRAFFIC.
   d. URBAN LOCAL ROADWAYS SERVE A DUAL FUNCTION OF PROVIDING ACCESS TO ABUTTING PROPERTIES AS WELL AS PROVIDING THROUGH OR CONNECTING SERVICE BETWEEN OTHER LOCAL ROADS.
9. ROADWAY SURFACE TYPE SHOULD MATCH EXISTING SURFACE OR SHALL BE DETERMINED BY LOCAL GUIDELINES. WHEN EXISTING SURFACE IS ASPHALT, SEE DESIGN GUIDELINES FOR PAVEMENT DESIGN GUIDANCE.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

DESIGN STANDARDS FOR LOW-VOLUME ROADS

01-01-2019 | RD11-TS-1

NOT TO SCALE

MINIMUM CLEAR ROADWAY WIDTHS AND DESIGN LOADINGS FOR NEW AND RECONSTRUCTED BRIDGES (SEE PAGE 5-7)

DESIGN ADT (VEH/DAY)	DESIGN LOADING	MINIMUM CLEAR ROADWAY WIDTH OF BRIDGE (F)
UNDER 400	HL-93	TRAVELED WAY + 4 FT. (2 FT. EACH SIDE)
400 TO 2,000	HL-93	TRAVELED WAY + 6 FT. (3 FT. EACH SIDE)
OVER 2,000	HL-93	APPROACH ROADWAY WIDTH

MINIMUM STRUCTURAL CAPACITIES AND MINIMUM ROADWAY WIDTHS FOR EXISTING BRIDGES TO REMAIN IN PLACE (SEE PAGE 5-8) (H)

DESIGN ADT (VEH/DAY)	DESIGN LOADING (STRUCTURAL CAPACITY)	MINIMUM CLEAR ROADWAY WIDTH (FT) (I)
0 TO 50	H-15	20
50 TO 250	H-15	20
250 TO 1,500	H-15	22
1,500 TO 2,000	H-15	24
OVER 2,000	H-15	28

TABLE I MINIMUM DESIGN SPEEDS FOR LOCAL RURAL ROADS (SEE PAGE 5-2)

TYPE OF TERRAIN	DESIGN SPEED (MPH) FOR SPECIFIED DESIGN ADT (VEH/DAY)				
	UNDER 50	50 TO 250	250 TO 400	400 TO 2,000	2,000 AND OVER
LEVEL	30	30	40	50	50
ROLLING	20 (J)	30	30	40	40
MOUNTAINOUS	20 (J)	20 (J)	20 (J)	30	30

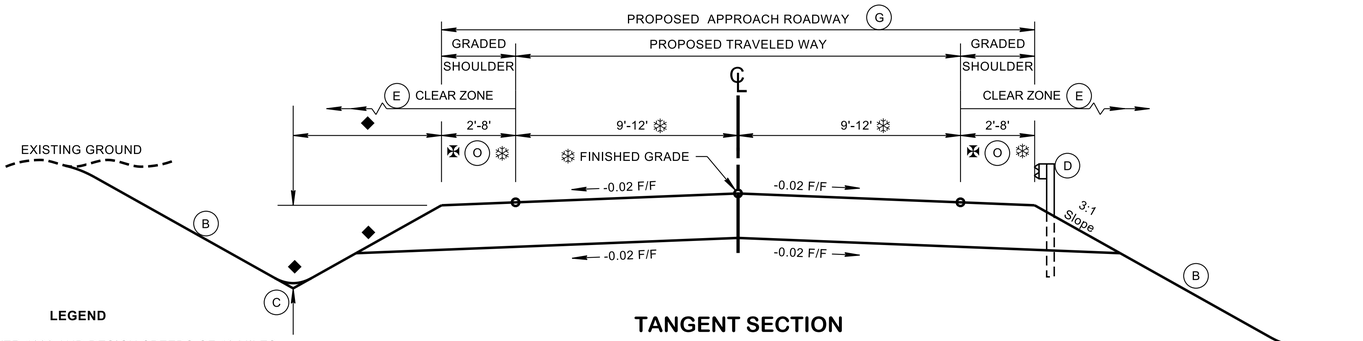
TABLE II LOCAL ROADS AND STREETS - DESIGN STANDARDS (L)

DESIGN STANDARDS (FOR GIVEN DESIGN SPEED)		DESIGN SPEEDS (MPH)							MINIMUM WIDTH OF SHOULDERS FOR ALL SPEEDS (FT) (SEE PAGE 5-6)
		15	20	25	30	35	40	45	
MINIMUM WIDTH OF TRAVELED WAY IN RURAL AREAS (FT) (SEE PAGE 5-6)	DESIGN ADT UNDER 400	18	18	18	18	18	18	20	2 (K)
	DESIGN ADT 400 - 1,500	20 (K)	20 (K)	20 (K)	20 (K)	20 (K)	20 (K)	22	4 (K) (M)
	DESIGN ADT 1,500 - 2,000	20	22	22	22	22	22	22	6
	DESIGN ADT OVER 2,000	22	24 (N)	24 (N)	24 (N)	24 (N)	24 (N)	24 (N)	8
MINIMUM RADIUS (FT) 0.04 MAX. S.E.		42	86	154	250	371	533	711	SEE PAGE 3-32
MINIMUM RADIUS (FT) 0.06 MAX. S.E.		39	81	144	231	340	485	643	
MINIMUM RADIUS (FT) 0.08 MAX. S.E.		38	76	134	214	314	444	587	
MAXIMUM RURAL GRADES %	LEVEL TERRAIN	9	8	7	7	7	7	7	SEE PAGE 5-3
	ROLLING TERRAIN	12	11	11	10	10	10	9	
	MOUNTAINOUS TERRAIN	17	16	15	14	14	13	12	
MINIMUM STOPPING SIGHT DISTANCE (FT)		80	115	155	200	250	305	360	SEE PAGE 5-4
MINIMUM "K" VALUE	CREST VERTICAL CURVE	3	7	12	19	29	44	61	
	SAG VERTICAL CURVE	10	17	26	37	49	64	79	
DESIGN PASSING SIGHT DISTANCE (FT)			400	450	500	550	600	700	SEE PAGE 5-5
MINIMUM "K" VALUE	PASSING SIGHT DISTANCE FOR CREST VERTICAL CURVE		57	72	89	108	129	175	

FOR SUPERELEVATION SEE STANDARD DRAWINGS RD11-SE SERIES

GENERAL NOTES

1. FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).
2. FOR URBAN AND SPECIAL PURPOSE ROADS (INCLUDING RECREATIONAL ROADS) DESIGN GUIDANCE AND CRITERIA, REFERENCE IS MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), PAGES 5-11 TO 5-34.
3. PAGE NUMBERS REFERRED TO ON THIS DRAWING ARE FROM "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).
4. REFERENCE IS ALSO MADE TO THE "ROADSIDE DESIGN GUIDE," AASHTO, 2011.
5. FOR INTERSECTION SIGHT DISTANCE AT INTERSECTIONS SEE PAGES 9-28 THROUGH 9-55 AND STANDARD DRAWING SD-SERIES.
6. IF NO ABOVE GROUND UTILITIES ARE INVOLVED, MINIMUM RIGHT-OF-WAY SHALL BE TRAVELED WAY PLUS CLEAR ZONE (MINIMUM OF 10 FEET EACH SIDE).
7. IF ABOVE GROUND UTILITIES ARE INVOLVED, MINIMUM RIGHT-OF-WAY SHALL BE SUFFICIENT TO ACCOMMODATE THE UTILITIES OUTSIDE THE CLEAR ZONE.
8. DESIRABLE RIGHT-OF-WAY IS SLOPE LINES PLUS TEN FEET.
9. THE DESIGN OF BRIDGES, CULVERTS, WALLS, TUNNELS, AND OTHER STRUCTURES SHOULD BE IN ACCORDANCE WITH THE CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. THE DESIGN LOADING SHOULD BE HL-93 CALIBRATED LIVE LOAD DESIGNATION.
10. IF A BIKE ROUTE IS TO BE INCLUDED AS PART OF THE PROPOSED ROADWAY, THE PAVED APPROACH ROADWAY WIDTH SHALL BE A MINIMUM OF 28 FT.



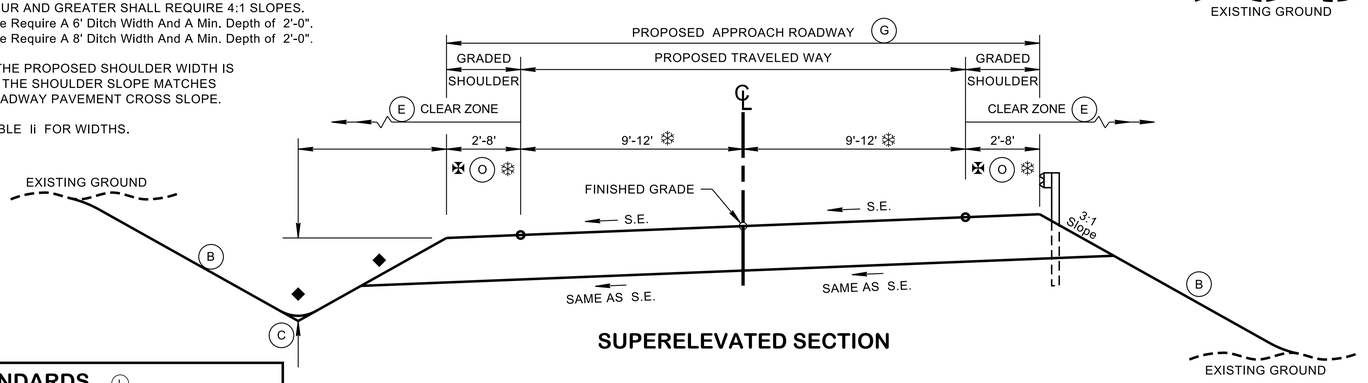
TANGENT SECTION

LEGEND

◆ ADTS OVER 1000 AND DESIGN SPEEDS OF 40 MILES PER HOUR AND GREATER SHALL REQUIRE 4:1 SLOPES. 3:1 Slope Require A 6' Ditch Width And A Min. Depth of 2'-0". 4:1 Slope Require A 8' Ditch Width And A Min. Depth of 2'-0".

✠ WHEN THE PROPOSED SHOULDER WIDTH IS 2' OR 4' THE SHOULDER SLOPE MATCHES THE ROADWAY PAVEMENT CROSS SLOPE.

❄ SEE TABLE Ii FOR WIDTHS.



SUPERELEVATED SECTION

DESIGN NOTES

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHOULD NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWING RD11-S-11 FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES, TOE OF FILL SLOPES AND SPECIAL ROCK TREATMENT.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONE.

(F) WHERE THE APPROACH ROADWAY WIDTH (TRAVELED WAY PLUS SHOULDERS) IS SURFACED, THAT SURFACE WIDTH SHOULD BE CARRIED ACROSS THE STRUCTURE.

(G) PROPOSED APPROACH ROADWAY WIDTH WILL NOT BE LESS THAN EXISTING WIDTH.

(H) THESE STRUCTURES SHOULD BE ANALYZED INDIVIDUALLY, TAKING INTO CONSIDERATION THE CLEAR WIDTH PROVIDED, TRAFFIC VOLUMES, REMAINING LIFE OF THE STRUCTURE, PEDESTRIAN VOLUMES, SNOW STORAGE, DESIGN SPEED, ACCIDENT RECORD, AND OTHER PERTINENT FACTORS.

(I) CLEAR WIDTH BETWEEN CURBS OR RAILS, WHICHEVER IS THE LESSER. MINIMUM CLEAR WIDTHS THAT ARE TWO FEET NARROWER MAY BE USED ON ROADS WITH FEW TRUCKS. IN NO CASE SHALL THE MINIMUM CLEAR WIDTH BE LESS THAN THE APPROACH TRAVELED WAY WIDTH.

(J) EFFORTS SHOULD BE MADE TO SELECT A DESIGN SPEED GREATER THAN 20 MILES PER HOUR. SEE PAGE 5-2 FOR FURTHER INFORMATION.

(K) FOR ROADS IN MOUNTAINOUS TERRAIN WITH A DESIGN YEAR ADT OF 0 TO 600 VEHICLES PER DAY AND THE DESIGN SPEED IS GREATER THAN OR EQUAL TO 15 MILES PER HOUR AND LESS THAN OR EQUAL TO 40 MPH, USE 18 FEET TRAVELED WAY WIDTH AND 2 FEET SHOULDER WIDTH.

(L) ALTHOUGH THE SELECTED DESIGN SPEED ESTABLISHES THE LIMITING VALUES OF CURVE RADIUS AND MINIMUM SIGHT DISTANCE THAT SHOULD BE USED IN DESIGN, THERE SHOULD BE NO RESTRICTION ON THE USE OF FLATTER HORIZONTAL CURVES OR GREATER SIGHT DISTANCES WHERE SUCH IMPROVEMENTS CAN BE PROVIDED AS A PART OF AN ECONOMICAL DESIGN (SEE PAGE 2-55).

(M) MAY BE USED TO ACHIEVE A MINIMUM ROADWAY WIDTH OF 30 FEET FOR DESIGN SPEEDS GREATER THAN 40 MILES PER HOUR.

(N) WHERE THE WIDTH OF THE TRAVELED WAY IS SHOWN AS 24 FEET, THE WIDTH MAY REMAIN AT 22 FEET ON RECONSTRUCTED HIGHWAYS WHERE ALIGNMENT AND SAFETY RECORDS ARE SATISFACTORY.

(O) SHOULDER SURFACE TREATMENT TO BE SPECIFIED BY THE ROADWAY DESIGN DIVISION'S PAVEMENT DESIGN SECTION. DESIGNERS SHOULD REFER TO THE DESIGN GUIDELINES FOR PAVEMENT REQUEST PROCEDURES. WHEN SHOULDERS ARE PAVED AND GRADED SHOULDER WIDTH IS 6 FEET OR GREATER, THE SHOULDER SHOULD BE PAVED TO THE GRADED SHOULDER WIDTH MINUS TWO FEET. WHEN SHOULDERS ARE PAVED AND THE GRADED SHOULDER WIDTH IS LESS THAN 6 FEET, THE SHOULDER SHOULD BE PAVED THE FULL WIDTH.

(P) **FOR NEW ROUTE CONSTRUCTION OR ROUTE RECONSTRUCTION PROJECTS:**

THE MINIMUM CLEAR WIDTH FOR NEW BRIDGES SHALL BE EQUAL TO THE FULL WIDTH OF THE APPROACH ROADWAY (CURB-TO-CURB OR FULL SHOULDER WIDTH AS APPLICABLE).

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

DESIGN STANDARDS FOR LOCAL ROADS AND STREETS

01-01-2019 RD11-TS-1A

NOT TO SCALE

MINIMUM CLEAR ROADWAY WIDTHS AND DESIGN LOADINGS FOR NEW AND RECONSTRUCTED BRIDGES (SEE PAGE 6-7)

DESIGN ADT (VEH/DAY)	DESIGN LOADING	MINIMUM CLEAR ROADWAY WIDTH OF BRIDGE (F)
UNDER 400	HL-93	TRAVELED WAY + 4 FT. (2 FT. EACH SIDE)
400 TO 1,500	HL-93	TRAVELED WAY + 6 FT. (3 FT. EACH SIDE)
1,500 TO 2,000	HL-93	TRAVELED WAY + 8 FT. (4 FT. EACH SIDE)
OVER 2,000	HL-93	APPROACH ROADWAY WIDTH

MINIMUM STRUCTURAL CAPACITIES AND MINIMUM ROADWAY WIDTHS FOR BRIDGES TO REMAIN IN PLACE (SEE PAGE 6-8) (G)

DESIGN ADT (VEH/DAY)	DESIGN LOADING (STRUCTURAL CAPACITY)	MINIMUM CLEAR ROADWAY WIDTH (FT) (H)
UNDER 400	H-15	22
400 TO 1,500	H-15	22
1,500 TO 2,000	H-15	24
OVER 2,000	H-15	28

TABLE I MINIMUM DESIGN SPEEDS FOR RURAL COLLECTOR ROADS (SEE PAGE 6-2)

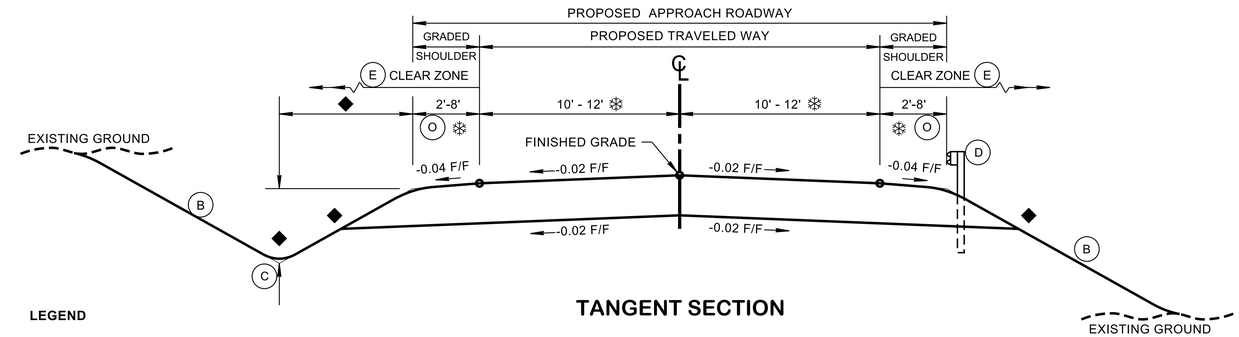
TYPE OF TERRAIN	DESIGN SPEED (MPH) FOR SPECIFIED DESIGN ADT (VEH/DAY)		
	0 TO 400	400 TO 2,000	OVER 2,000
LEVEL	40	50	60
ROLLING	30	40	50
MOUNTAINOUS	20 (I)	30	40

TABLE II COLLECTOR ROADS AND STREETS - DESIGN STANDARDS (M)

DESIGN STANDARDS (FOR GIVEN DESIGN SPEED)		DESIGN SPEEDS (MPH) 20	25	30	35	40	45	50	55	MINIMUM WIDTH OF SHOULDERS FOR ALL SPEEDS (FEET) (SEE PAGE 6-6)
MINIMUM WIDTH OF TRAVELED WAY IN RURAL AREAS (FT.) (J) (SEE PAGE 6-6) (N)	DESIGN ADT UNDER 400	20 (P)	20 (P)	20 (P)	20 (P)	20 (P)	20	20	22	2
	DESIGN ADT 400 - 1,500	20 (K)	20 (K)	20 (K)	20 (K)	20 (K)	22	22	22	4
	DESIGN ADT 1,500 - 2,000	20	22	22	22	22	22	22	24	6
	DESIGN ADT OVER 2,000	22	24	24	24	24	24	24	24	8
MINIMUM RADIUS (FT.) 0.04 MAX. S.E.		86	154	250	371	533	711	926	1190	SEE PAGE 3-32
MINIMUM RADIUS (FT.) 0.06 MAX. S.E.		81	144	231	340	485	643	833	1060	
MINIMUM RADIUS (FT.) 0.08 MAX. S.E.		76	134	214	314	444	587	758	960	
MAXIMUM RURAL GRADES % (L)	LEVEL TERRAIN	7	7	7	7	7	7	6	6	SEE PAGE 6-3
	ROLLING TERRAIN	10	10	9	9	8	8	7	7	
	MOUNTAINOUS TERRAIN	12	11	10	10	10	10	9	9	
MAXIMUM URBAN GRADES % (L)	LEVEL TERRAIN	9	9	9	9	9	8	7	7	SEE PAGE 6-12
	ROLLING TERRAIN	12	12	11	10	10	9	8	8	
	MOUNTAINOUS TERRAIN	14	13	12	12	12	11	10	10	
MINIMUM STOPPING SIGHT DISTANCE (FT.)		115	155	200	250	305	360	425	495	SEE PAGE 6-4
MINIMUM "K" VALUE	CREST VERTICAL CURVE	7	12	19	29	44	61	84	114	
	SAG VERTICAL CURVE	17	26	37	49	64	79	96	115	
DESIGN PASSING SIGHT DISTANCE (FT.)		400	450	500	550	600	700	800	900	SEE PAGE 6-5
MINIMUM "K" VALUE	PASSING SIGHT DISTANCE FOR CREST VERTICAL CURVE	57	72	89	108	129	175	229	289	
FOR SUPERELEVATION SEE STANDARD DRAWINGS RD11-SE SERIES										

GENERAL NOTES

1. FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).
2. PAGE NUMBERS REFERRED TO ON THIS DRAWING ARE FROM "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), UNLESS OTHERWISE NOTED.
3. REFERENCE SHOULD ALSO BE MADE TO THE "ROADSIDE DESIGN GUIDE," AASHTO, 2011.
4. FOR URBAN DESIGN GUIDANCE AND CRITERIA, SEE PAGES 6-11 THROUGH 6-20.
5. DESIRABLE RIGHT-OF-WAY IS SLOPE LINES PLUS FIFTEEN FEET.
6. FOR RURAL INTERSECTION DESIGN, SEE PAGE 6-9.
7. IF NO ABOVE GROUND UTILITIES ARE INVOLVED, MINIMUM RIGHT-OF-WAY SHALL BE TRAVELED WAY PLUS CLEAR ZONE.
8. IF ABOVE GROUND UTILITIES ARE INVOLVED, MINIMUM RIGHT-OF-WAY SHALL BE SUFFICIENT TO ACCOMMODATE THE UTILITIES OUTSIDE THE CLEAR ZONE.
9. FOR URBAN INTERSECTION DESIGN, SEE PAGE 6-18.
10. ALL NEW AND REHABILITATED BRIDGES SHALL BE DESIGNED FOR HL-93 LIVE LOADS. THE MINIMUM CLEAR WIDTH FOR NEW AND REHABILITATED BRIDGES SHALL BE EQUAL TO THE FULL WIDTH OF THE APPROACH ROADWAY, CURB-TO-CURB OR FULL SHOULDER WIDTH AS APPLICABLE.
11. IF A BIKE ROUTE IS TO BE INCLUDED AS PART OF THE PROPOSED ROADWAY, THE PAVED APPROACH ROADWAY WIDTH SHALL BE A MINIMUM OF 28 FT.

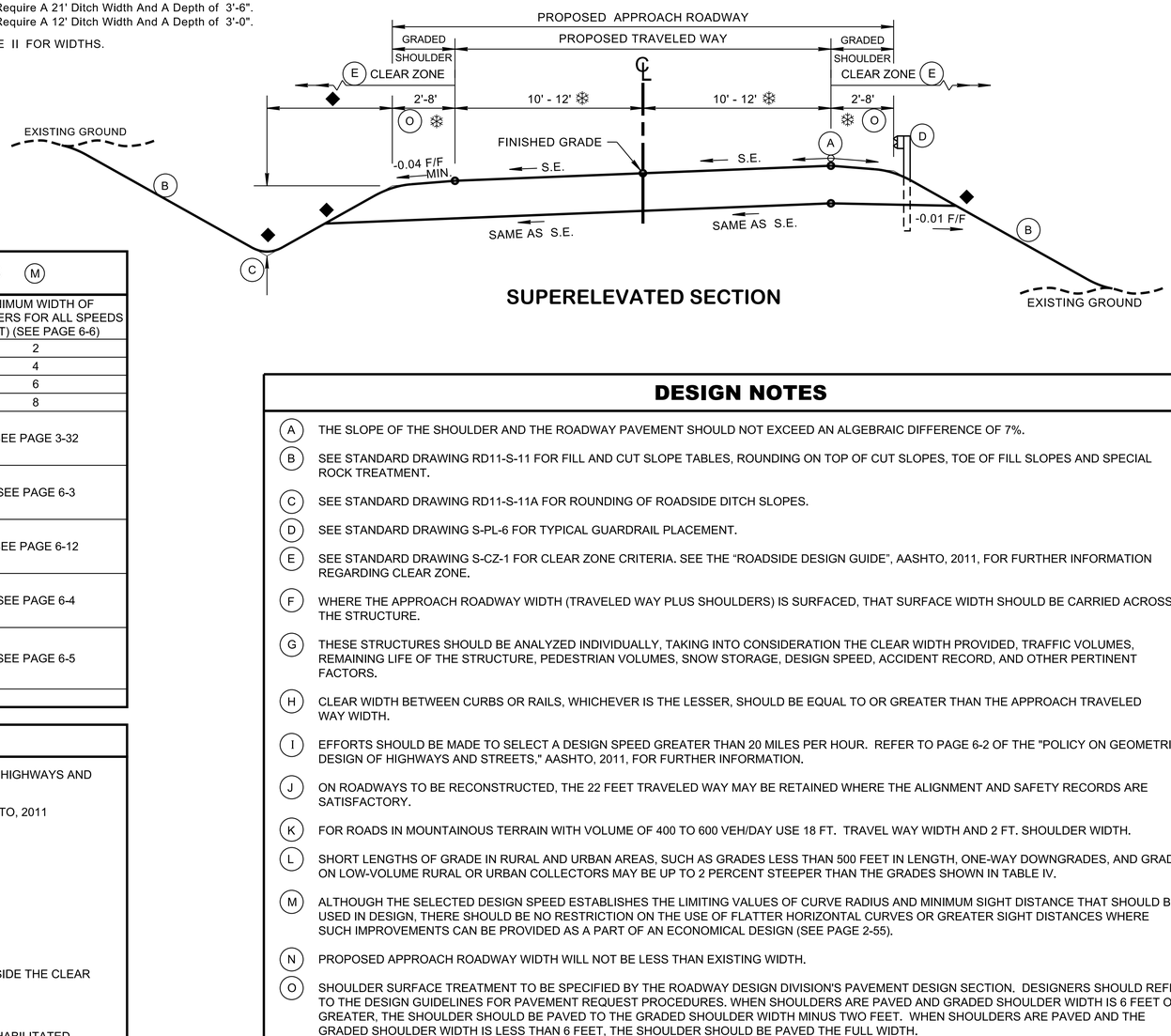


TANGENT SECTION

LEGEND

◆ ADTS OVER 400 AND DESIGN SPEEDS OF 50 MILES PER HOUR AND GREATER SHALL REQUIRE 6:1 SLOPES.
6:1 Slope Require A 21' Ditch Width And A Depth of 3'-6".
4:1 Slope Require A 12' Ditch Width And A Depth of 3'-0".

❄ SEE TABLE II FOR WIDTHS.



SUPERELEVATED SECTION

DESIGN NOTES

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHOULD NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWING RD11-S-11 FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES, TOE OF FILL SLOPES AND SPECIAL ROCK TREATMENT.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONE.

(F) WHERE THE APPROACH ROADWAY WIDTH (TRAVELED WAY PLUS SHOULDERS) IS SURFACED, THAT SURFACE WIDTH SHOULD BE CARRIED ACROSS THE STRUCTURE.

(G) THESE STRUCTURES SHOULD BE ANALYZED INDIVIDUALLY, TAKING INTO CONSIDERATION THE CLEAR WIDTH PROVIDED, TRAFFIC VOLUMES, REMAINING LIFE OF THE STRUCTURE, PEDESTRIAN VOLUMES, SNOW STORAGE, DESIGN SPEED, ACCIDENT RECORD, AND OTHER PERTINENT FACTORS.

(H) CLEAR WIDTH BETWEEN CURBS OR RAILS, WHICHEVER IS THE LESSER, SHOULD BE EQUAL TO OR GREATER THAN THE APPROACH TRAVELED WAY WIDTH.

(I) EFFORTS SHOULD BE MADE TO SELECT A DESIGN SPEED GREATER THAN 20 MILES PER HOUR. REFER TO PAGE 6-2 OF THE "POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS," AASHTO, 2011, FOR FURTHER INFORMATION.

(J) ON ROADWAYS TO BE RECONSTRUCTED, THE 22 FEET TRAVELED WAY MAY BE RETAINED WHERE THE ALIGNMENT AND SAFETY RECORDS ARE SATISFACTORY.

(K) FOR ROADS IN MOUNTAINOUS TERRAIN WITH VOLUME OF 400 TO 600 VEH/DAY USE 18 FT. TRAVEL WAY WIDTH AND 2 FT. SHOULDER WIDTH.

(L) SHORT LENGTHS OF GRADE IN RURAL AND URBAN AREAS, SUCH AS GRADES LESS THAN 500 FEET IN LENGTH, ONE-WAY DOWNGRADES, AND GRADES ON LOW-VOLUME RURAL OR URBAN COLLECTORS MAY BE UP TO 2 PERCENT STEEPER THAN THE GRADES SHOWN IN TABLE IV.

(M) ALTHOUGH THE SELECTED DESIGN SPEED ESTABLISHES THE LIMITING VALUES OF CURVE RADIUS AND MINIMUM SIGHT DISTANCE THAT SHOULD BE USED IN DESIGN, THERE SHOULD BE NO RESTRICTION ON THE USE OF FLATTER HORIZONTAL CURVES OR GREATER SIGHT DISTANCES WHERE SUCH IMPROVEMENTS CAN BE PROVIDED AS A PART OF AN ECONOMICAL DESIGN (SEE PAGE 2-55).

(N) PROPOSED APPROACH ROADWAY WIDTH WILL NOT BE LESS THAN EXISTING WIDTH.

(O) SHOULDER SURFACE TREATMENT TO BE SPECIFIED BY THE ROADWAY DESIGN DIVISION'S PAVEMENT DESIGN SECTION. DESIGNERS SHOULD REFER TO THE DESIGN GUIDELINES FOR PAVEMENT REQUEST PROCEDURES. WHEN SHOULDERS ARE PAVED AND GRADED SHOULDER WIDTH IS 6 FEET OR GREATER, THE SHOULDER SHOULD BE PAVED TO THE GRADED SHOULDER WIDTH MINUS TWO FEET. WHEN SHOULDERS ARE PAVED AND THE GRADED SHOULDER WIDTH IS LESS THAN 6 FEET, THE SHOULDER SHOULD BE PAVED THE FULL WIDTH.

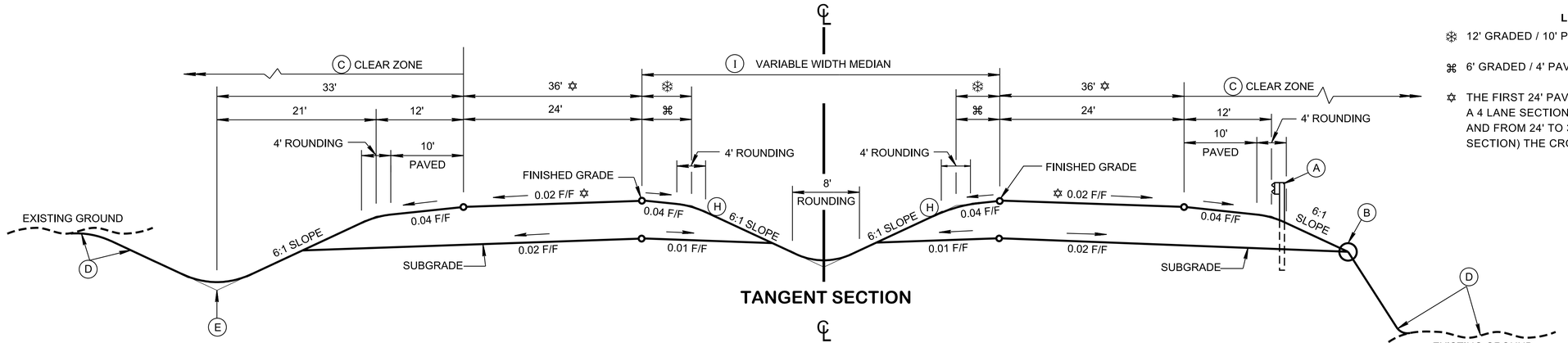
(P) AN 18 FT. MINIMUM WIDTH MAY BE USED FOR ROADWAYS WITH DESIGN ADT UNDER 250 VEHICLES PER DAY.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

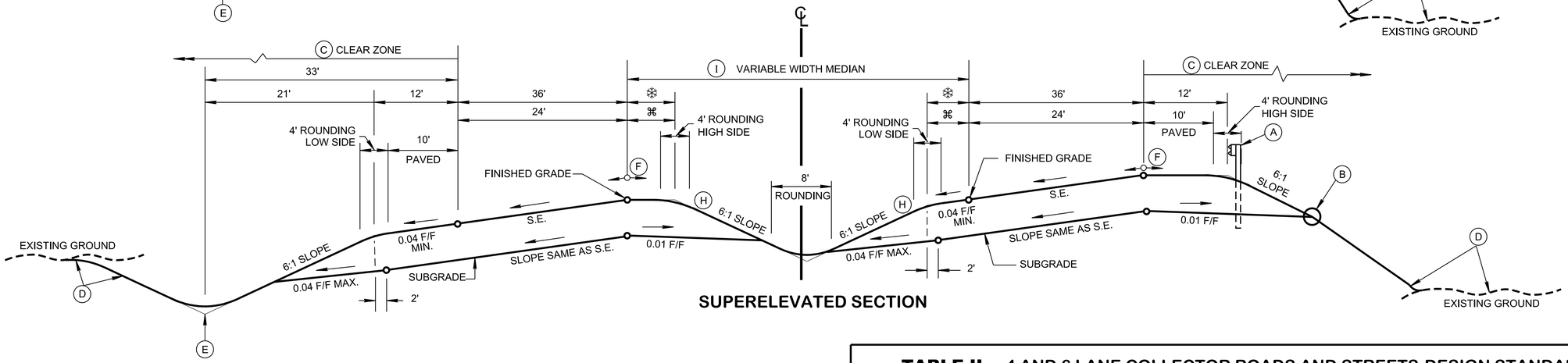
DESIGN STANDARDS FOR COLLECTORS, 2-LANE ROADS AND STREETS

01-01-2019 | RD11-TS-2

NOT TO SCALE



TANGENT SECTION



SUPERELEVATED SECTION

LEGEND

❄ 12' GRADED / 10' PAVED SHOULDER

⌘ 6' GRADED / 4' PAVED SHOULDER

✡ THE FIRST 24' PAVEMENT (FIRST & SECOND LANE ON A 4 LANE SECTION) THE CROSS-SLOPE IS -0.020 FT/FT AND FROM 24' TO 36' (THE THIRD LANE ON A 6 LANE SECTION) THE CROSS-SLOPE IS -0.025 FT/FT.

TABLE I
MINIMUM DESIGN SPEEDS FOR RURAL COLLECTOR ROADS (SEE PAGE 6-2)

TYPE OF TERRAIN	DESIGN SPEED (MPH)
LEVEL	60
ROLLING	50
MOUNTAINOUS	40

GENERAL NOTES

1. FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).
2. PAGE NUMBERS REFERRED TO ON THIS DRAWING ARE FROM "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), UNLESS OTHERWISE NOTED.
3. REFERENCE SHOULD ALSO BE MADE TO THE AASHTO "ROADSIDE DESIGN GUIDE," AASHTO, 2011.
4. DESIRABLE RIGHT-OF-WAY IS SLOPE LINES PLUS FIFTEEN FEET.
5. IF NO ABOVE GROUND UTILITIES ARE INVOLVED, MINIMUM RIGHT-OF-WAY SHALL BE TRAVELED WAY PLUS CLEAR ZONE.
6. IF ABOVE GROUND UTILITIES ARE INVOLVED, MINIMUM RIGHT-OF-WAY SHALL BE SUFFICIENT TO ACCOMMODATE THE UTILITIES OUTSIDE THE CLEAR ZONE.
7. ALL NEW AND REHABILITATED BRIDGES SHALL BE DESIGNED FOR HL-93 DESIGN LIVE LOADS. THE MINIMUM CLEAR WIDTH FOR NEW AND REHABILITATED BRIDGES SHALL BE EQUAL TO THE FULL WIDTH OF THE APPROACH ROADWAY, CURB-TO-CURB OR FULL SHOULDER WIDTH AS APPLICABLE.
8. FOR EXISTING BRIDGES TO REMAIN IN PLACE, THEY SHOULD HAVE ADEQUATE STRUCTURAL STRENGTH AND A WIDTH AT LEAST EQUAL TO THE WIDTH OF THE TRAVELED WAY PLUS 2 FEET CLEARANCE ON EACH SIDE. BRIDGES SHOULD BE CONSIDERED FOR ULTIMATE WIDENING OR REPLACEMENT IF THEY DO NOT PROVIDE AT LEAST 3 FEET CLEARANCE ON EACH SIDE OR DO NOT PROVIDE HL-93 LIVE LOADING CAPACITY. AS AN INTERIM MEASURE, ALL BRIDGES THAT ARE LESS THAN FULL WIDTH SHOULD BE CONSIDERED FOR SPECIAL NARROW BRIDGE TREATMENTS SUCH AS SIGNING AND PAVEMENT MARKING.
9. FOR ADDITIONAL URBAN DESIGN GUIDANCE AND CRITERIA, SEE PAGES 6-11 THROUGH 6-20.

TABLE II 4 AND 6 LANE COLLECTOR ROADS AND STREETS-DESIGN STANDARDS (G)

DESIGN STANDARDS (FOR GIVEN DESIGN SPEED)		DESIGN SPEEDS (MPH)							
		30	35	40	45	50	55	60	
MINIMUM RADIUS (FEET) 0.04 MAX. S.E.		250	371	533	711	926	1190	1500	SEE PAGE 3-32
MINIMUM RADIUS (FEET) 0.06 MAX. S.E.		231	340	485	643	833	1060	1330	
MINIMUM RADIUS (FEET) 0.08 MAX. S.E.		214	314	444	587	758	960	1200	
MAXIMUM RURAL GRADES %	LEVEL TERRAIN	7	7	7	7	6	6	5	SEE PAGE 6-3
	ROLLING TERRAIN	9	9	8	8	7	7	6	
	MOUNTAINOUS TERRAIN	10	10	10	10	9	9	8	
MAXIMUM URBAN GRADES %	LEVEL TERRAIN	9	9	9	8	7	7	6	SEE PAGE 6-12
	ROLLING TERRAIN	11	10	10	9	8	8	7	
	MOUNTAINOUS TERRAIN	12	12	12	11	10	10	9	
MINIMUM STOPPING SIGHT DISTANCE (FEET)		200	250	305	360	425	495	570	
MINIMUM "K" VALUE	CREST VERTICAL CURVE	19	29	44	61	84	114	151	SEE PAGE 6-4
	SAG VERTICAL CURVE	37	49	64	79	96	115	136	
FOR SUPERELEVATION SEE STANDARD DRAWINGS RD11-SE SERIES									

DESIGN NOTES

- (A) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.
- (B) SEE STANDARD DRAWING RD11-S-11 FOR ROUNDING DETAILS.
- (C) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.
- (D) SEE STANDARD DRAWING RD11-S-11 FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, AND SPECIAL ROCK CUT TREATMENT.
- (E) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.
- (F) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHOULD NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.
- (G) ALTHOUGH THE SELECTED DESIGN SPEED ESTABLISHES THE LIMITING VALUES OF CURVE RADIUS AND MINIMUM SIGHT DISTANCE THAT SHOULD BE USED IN DESIGN, THERE SHOULD BE NO RESTRICTION ON THE USE OF FLATTER HORIZONTAL CURVES OR GREATER SIGHT DISTANCES WHERE SUCH IMPROVEMENTS CAN BE PROVIDED AS A PART OF AN ECONOMICAL DESIGN (SEE PAGE 2-55).
- (H) 6:1 SLOPES ARE DESIRABLE. SLOPES RANGING BETWEEN 6:1 AND 4:1 MAY BE USED UNDER SPECIFIC ADVERSE CONDITIONS SUCH AS TO FACILITATE DRAINAGE OR TO ESTABLISH A LEFT TURN LANE.
- (I) 48 FEET MINIMUM. 64 FEET MINIMUM FOR A SIX LANE SECTION.

NOT TO SCALE

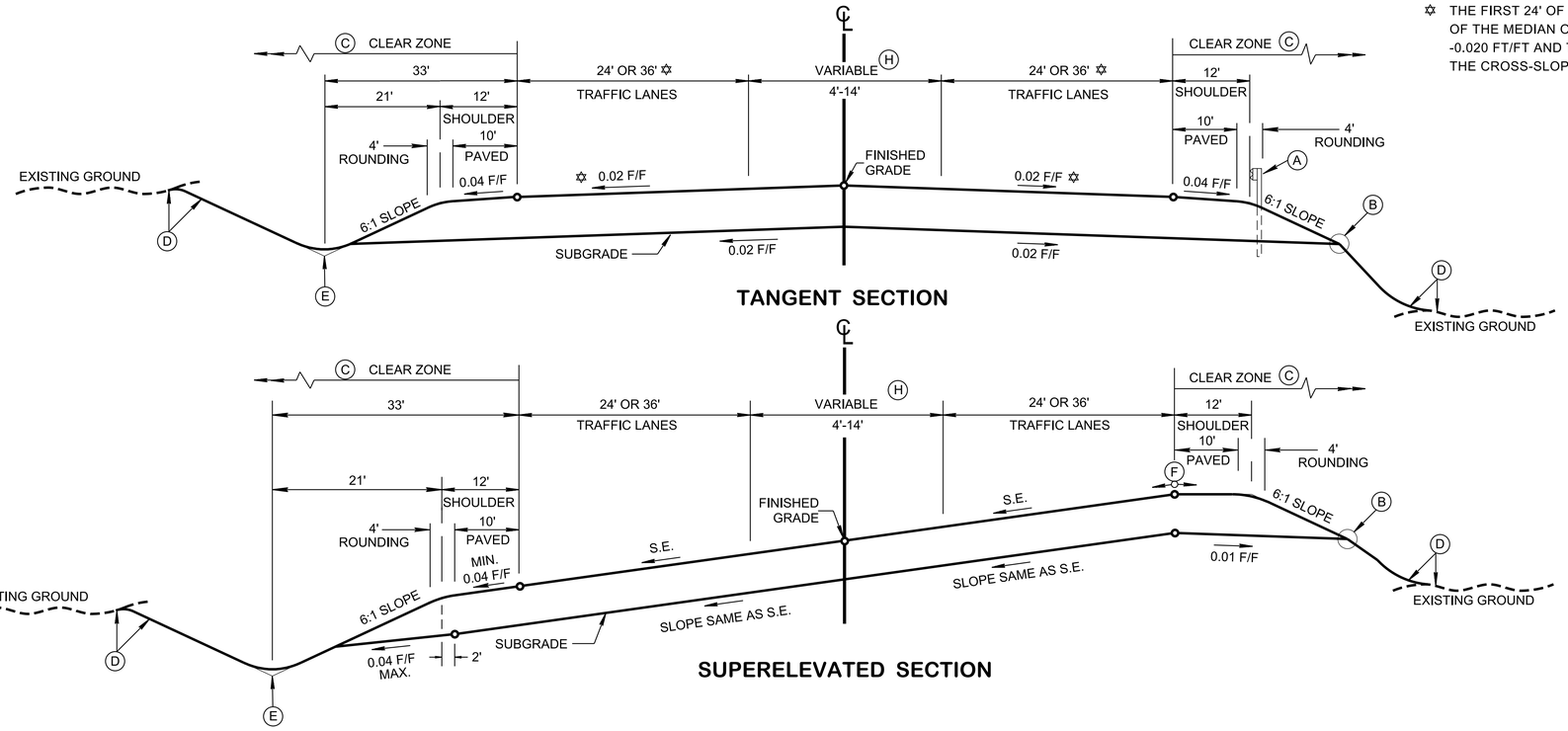
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

DESIGN STANDARDS FOR COLLECTOR HIGHWAYS WITH DEPRESSED MEDIAN (4 AND 6 LANE)

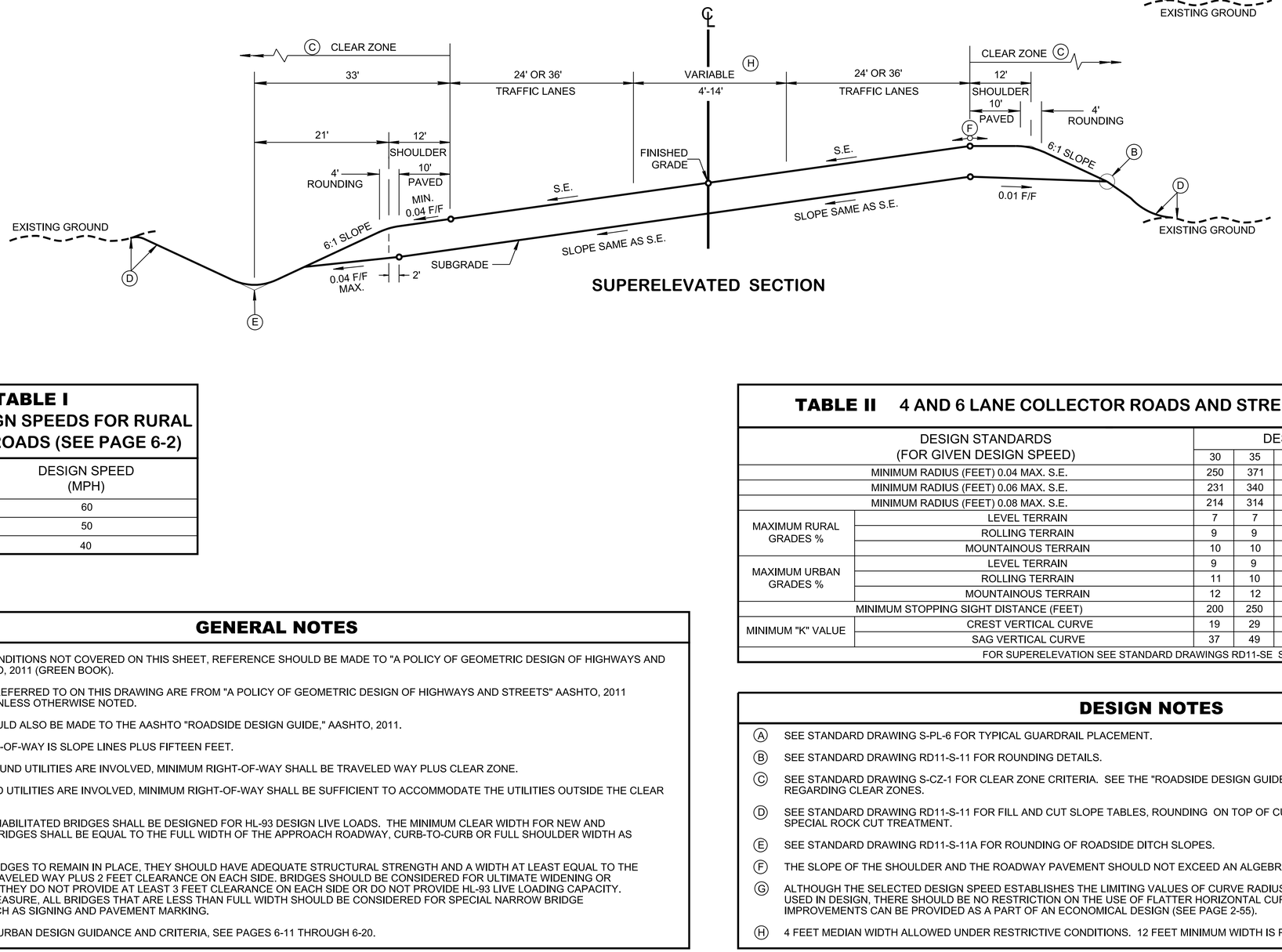
01-01-2019 | RD11-TS-2A

LEGEND

✡ THE FIRST 24' OF TRAFFIC LANES (FIRST & SECOND LANE AND ONE HALF OF THE MEDIAN ON EACH SIDE OF THE ROADWAY) THE CROSS-SLOPE IS -0.020 FT/FT AND THE TRAFFIC LANES FROM 24' TO 36' (THE THIRD LANE) THE CROSS-SLOPE IS -0.025 FT/FT.



TANGENT SECTION



SUPERELEVATED SECTION

TABLE I
MINIMUM DESIGN SPEEDS FOR RURAL COLLECTOR ROADS (SEE PAGE 6-2)

TYPE OF TERRAIN	DESIGN SPEED (MPH)
LEVEL	60
ROLLING	50
MOUNTAINOUS	40

GENERAL NOTES

1. FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).
2. PAGE NUMBERS REFERRED TO ON THIS DRAWING ARE FROM "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), UNLESS OTHERWISE NOTED.
3. REFERENCE SHOULD ALSO BE MADE TO THE AASHTO "ROADSIDE DESIGN GUIDE," AASHTO, 2011.
4. DESIRABLE RIGHT-OF-WAY IS SLOPE LINES PLUS FIFTEEN FEET.
5. IF NO ABOVE GROUND UTILITIES ARE INVOLVED, MINIMUM RIGHT-OF-WAY SHALL BE TRAVELED WAY PLUS CLEAR ZONE.
6. IF ABOVE GROUND UTILITIES ARE INVOLVED, MINIMUM RIGHT-OF-WAY SHALL BE SUFFICIENT TO ACCOMMODATE THE UTILITIES OUTSIDE THE CLEAR ZONE.
7. ALL NEW AND REHABILITATED BRIDGES SHALL BE DESIGNED FOR HL-93 DESIGN LIVE LOADS. THE MINIMUM CLEAR WIDTH FOR NEW AND REHABILITATED BRIDGES SHALL BE EQUAL TO THE FULL WIDTH OF THE APPROACH ROADWAY, CURB-TO-CURB OR FULL SHOULDER WIDTH AS APPLICABLE.
8. FOR EXISTING BRIDGES TO REMAIN IN PLACE, THEY SHOULD HAVE ADEQUATE STRUCTURAL STRENGTH AND A WIDTH AT LEAST EQUAL TO THE WIDTH OF THE TRAVELED WAY PLUS 2 FEET CLEARANCE ON EACH SIDE. BRIDGES SHOULD BE CONSIDERED FOR ULTIMATE WIDENING OR REPLACEMENT IF THEY DO NOT PROVIDE AT LEAST 3 FEET CLEARANCE ON EACH SIDE OR DO NOT PROVIDE HL-93 LIVE LOADING CAPACITY. AS AN INTERIM MEASURE, ALL BRIDGES THAT ARE LESS THAN FULL WIDTH SHOULD BE CONSIDERED FOR SPECIAL NARROW BRIDGE TREATMENTS SUCH AS SIGNING AND PAVEMENT MARKING.
9. FOR ADDITIONAL URBAN DESIGN GUIDANCE AND CRITERIA, SEE PAGES 6-11 THROUGH 6-20.

TABLE II 4 AND 6 LANE COLLECTOR ROADS AND STREETS-DESIGN STANDARDS (G)

DESIGN STANDARDS (FOR GIVEN DESIGN SPEED)		DESIGN SPEEDS (MPH)							
		30	35	40	45	50	55	60	
MINIMUM RADIUS (FEET) 0.04 MAX. S.E.		250	371	533	711	926	1190	1500	
MINIMUM RADIUS (FEET) 0.06 MAX. S.E.		231	340	485	643	833	1060	1330	SEE PAGE 3-32
MINIMUM RADIUS (FEET) 0.08 MAX. S.E.		214	314	444	587	758	960	1200	
MAXIMUM RURAL GRADES %	LEVEL TERRAIN	7	7	7	7	6	6	5	
	ROLLING TERRAIN	9	9	8	8	7	7	6	SEE PAGE 6-3
	MOUNTAINOUS TERRAIN	10	10	10	10	9	9	8	
MAXIMUM URBAN GRADES %	LEVEL TERRAIN	9	9	9	8	7	7	6	
	ROLLING TERRAIN	11	10	10	9	8	8	7	SEE PAGE 6-12
	MOUNTAINOUS TERRAIN	12	12	12	11	10	10	9	
MINIMUM STOPPING SIGHT DISTANCE (FEET)		200	250	305	360	425	495	570	
MINIMUM "K" VALUE	CREST VERTICAL CURVE	19	29	44	61	84	114	151	SEE PAGE 6-4
	SAG VERTICAL CURVE	37	49	64	79	96	115	136	
FOR SUPERELEVATION SEE STANDARD DRAWINGS RD11-SE SERIES									

DESIGN NOTES

(A) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(B) SEE STANDARD DRAWING RD11-S-11 FOR ROUNDING DETAILS.

(C) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

(D) SEE STANDARD DRAWING RD11-S-11 FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, AND SPECIAL ROCK CUT TREATMENT.

(E) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(F) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHOULD NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(G) ALTHOUGH THE SELECTED DESIGN SPEED ESTABLISHES THE LIMITING VALUES OF CURVE RADIUS AND MINIMUM SIGHT DISTANCE THAT SHOULD BE USED IN DESIGN, THERE SHOULD BE NO RESTRICTION ON THE USE OF FLATTER HORIZONTAL CURVES OR GREATER SIGHT DISTANCES WHERE SUCH IMPROVEMENTS CAN BE PROVIDED AS A PART OF AN ECONOMICAL DESIGN (SEE PAGE 2-55).

(H) 4 FEET MEDIAN WIDTH ALLOWED UNDER RESTRICTIVE CONDITIONS. 12 FEET MINIMUM WIDTH IS PREFERRED.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

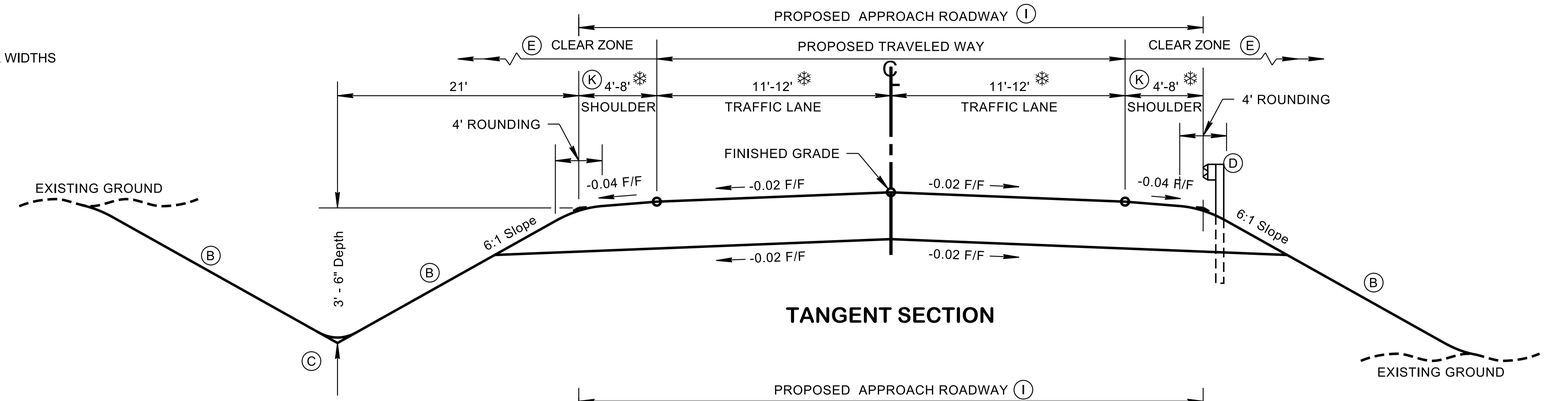
DESIGN STANDARDS FOR COLLECTOR HIGHWAYS WITH FLUSH MEDIAN (4 AND 6 LANE)

01-01-2019 RD11-TS-2B

NOT TO SCALE

LEGEND

❄ SEE TABLE II FOR WIDTHS



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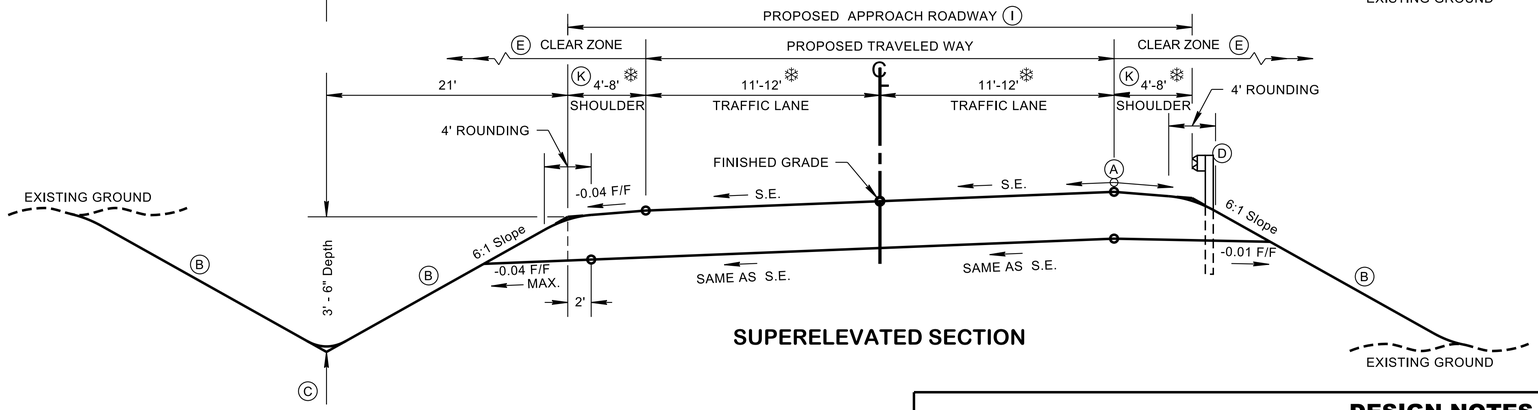


SUPERELEVATED SECTION

TABLE I
DESIGN SPEEDS FOR RURAL ARTERIAL ROADS (SEE PAGE 7-2) (H)

TYPE OF TERRAIN	DESIGN SPEED (MPH) (J)
LEVEL	60 - 75
ROLLING	50 - 60
MOUNTAINOUS	40 - 50

TABLE II 2-LANE ARTERIAL - DESIGN STANDARDS (G)

DESIGN STANDARDS (FOR GIVEN DESIGN SPEED)		DESIGN SPEEDS (MPH)									MINIMUM WIDTH OF SHOULDERS FOR ALL SPEEDS (FEET) (SEE PAGE 7-5)
		30	35	40	45	50	55	60	65	70	
MINIMUM WIDTH OF TRAVELED WAY IN RURAL AREAS (FT.) (SEE PAGE 7-5)	DESIGN ADT UNDER 400	22	22	22	22	22	22	24	24	24	4 (F)
	DESIGN ADT 400 - 1,500	22	22	22	22	22	22	24	24	24	6
	DESIGN ADT 1,500 - 2,000	22	22	22	22	24	24	24	24	24	6
	DESIGN ADT OVER 2,000	24	24	24	24	24	24	24	24	24	8
MINIMUM RADIUS (FT.) 0.04 MAX. S.E.		250	371	533	711	926	1190	1500			SEE PAGE 3-32
MINIMUM RADIUS (FT.) 0.06 MAX. S.E.		231	340	485	643	833	1060	1330			
MINIMUM RADIUS (FT.) 0.08 MAX. S.E.		214	314	444	587	758	960	1200	1485	1820	
MAXIMUM RURAL GRADES %	LEVEL TERRAIN			5	5	4	4	3	3	3	SEE PAGE 7-4
	ROLLING TERRAIN			6	6	5	5	4	4	4	
	MOUNTAINOUS TERRAIN			8	7	7	6	6	5	5	
MAXIMUM URBAN GRADES %	LEVEL TERRAIN	8	7	7	6	6	5	5			SEE PAGE 7-29
	ROLLING TERRAIN	9	8	8	7	7	6	6			
	MOUNTAINOUS TERRAIN	11	10	10	9	9	8	8			
MINIMUM STOPPING SIGHT DISTANCE (FT.)		200	250	305	360	425	495	570	645	730	SEE PAGE 7-3
MINIMUM "K" VALUE	CREST VERTICAL CURVE	19	29	44	61	84	114	151	193	247	SEE PAGE 3-155
	SAG VERTICAL CURVE	37	49	64	79	96	115	136	157	181	SEE PAGE 3-161
MINIMUM PASSING SIGHT DISTANCE (FT.)		500	550	600	700	800	900	1000	1100	1200	SEE PAGE 3-157
MINIMUM "K" VALUE	PASSING SIGHT DISTANCE FOR CREST VERTICAL CURVE	89	108	129	175	229	289	357	432	514	SEE PAGE 3-157
FOR SUPERELEVATION SEE STANDARD DRAWINGS RD11-SE SERIES											

DESIGN NOTES

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHOULD NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWING RD11-S-11 FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES, TOE OF FILL SLOPES AND SPECIAL ROCK TREATMENT.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONE.

(F) WHERE VOLUMES ARE LOW OR A NARROW SECTION IS NEEDED TO REDUCE CONSTRUCTION IMPACTS, THE SHOULDER WIDTH MAY BE A MINIMUM 2 FT. PROVIDED THAT BICYCLE USE IS NOT INTENDED TO BE ACCOMMODATED ON THE SHOULDER.

(G) ALTHOUGH THE SELECTED DESIGN SPEED ESTABLISHES THE LIMITING VALUES OF CURVE RADIUS AND MINIMUM SIGHT DISTANCE THAT SHOULD BE USED IN DESIGN, THERE SHOULD BE NO RESTRICTION ON THE USE OF FLATTER HORIZONTAL CURVES OR GREATER SIGHT DISTANCES WHERE SUCH IMPROVEMENTS CAN BE PROVIDED AS A PART OF AN ECONOMICAL DESIGN (SEE PAGE 2-55).

(H) URBAN DESIGN SPEEDS ARE GENERALLY IN THE RANGE OF 30 TO 60 MILES PER HOUR (SEE PAGE 7-27).

(I) PROPOSED ROADWAY WIDTH WILL NOT BE LESS THAN EXISTING WIDTH.

(J) FOR ADDITIONAL INFORMATION REGARDING DESIGN SPEEDS FOR RURAL ARTERIALS, SEE PAGE 7-2.

(K) SHOULDER SURFACE TREATMENT TO BE SPECIFIED BY THE ROADWAY DESIGN DIVISION'S PAVEMENT DESIGN SECTION. DESIGNERS SHOULD REFER TO THE DESIGN GUIDELINES FOR PAVEMENT REQUEST PROCEDURES. WHEN SHOULDERS ARE PAVED AND GRADED SHOULDER WIDTH IS 6 FEET OR GREATER, THE SHOULDER SHOULD BE PAVED TO THE GRADED SHOULDER WIDTH MINUS TWO FEET. WHEN SHOULDERS ARE PAVED AND THE GRADED SHOULDER WIDTH IS LESS THAN 6 FEET, THE SHOULDER SHOULD BE PAVED THE FULL WIDTH.

GENERAL NOTES

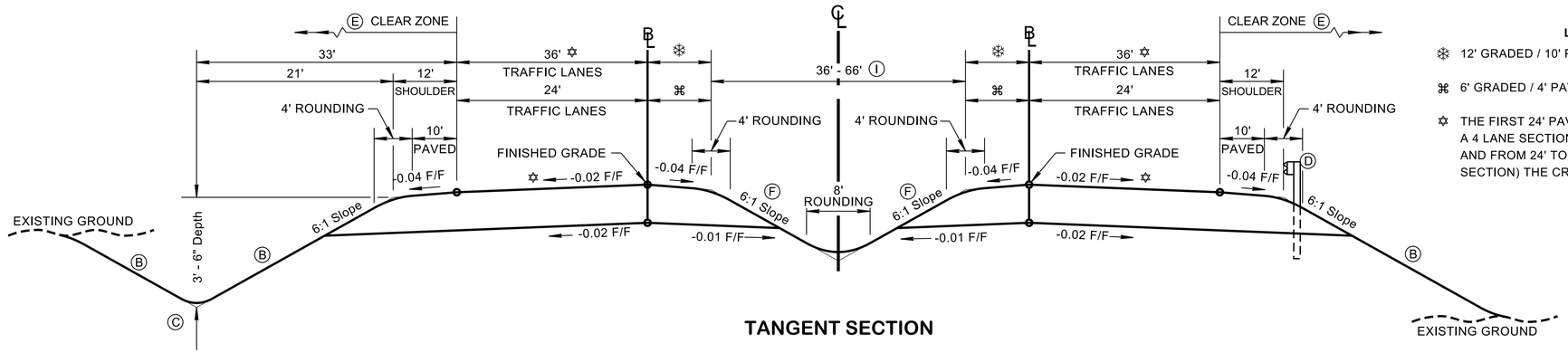
1. FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).
2. PAGE NUMBERS REFERRED TO ON THIS DRAWING ARE FROM "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), UNLESS OTHERWISE NOTED.
3. REFERENCE SHOULD ALSO BE MADE TO THE AASHTO "ROADSIDE DESIGN GUIDE," AASHTO, 2011.
4. DESIRABLE RIGHT-OF-WAY IS SLOPE LINES PLUS FIFTEEN FEET TO TWENTY FEET.
5. THE DESIGN OF BRIDGES, CULVERTS, WALLS, TUNNELS AND OTHER STRUCTURES SHALL BE IN ACCORDANCE WITH THE CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, THE DESIGN LOADING SHOULD BE THE HL-93 CALIBRATED LIVE LOAD DESIGNATION.
6. FOR EXISTING BRIDGES TO REMAIN IN PLACE, THEY SHOULD HAVE ADEQUATE STRUCTURAL STRENGTH AND A WIDTH AT LEAST EQUAL TO THE WIDTH OF THE TRAVELED WAY PLUS 2 FEET CLEARANCE ON EACH SIDE. BRIDGES SHOULD BE CONSIDERED FOR ULTIMATE WIDENING OR REPLACEMENT IF THEY DO NOT PROVIDE AT LEAST HL-93 LIVE LOADING CAPACITY. AS AN INTERIM MEASURE, FOR NARROW BRIDGES, SPECIAL SIGNING AND DELINEATION TREATMENTS MAY BE CONSIDERED.
7. FOR ADDITIONAL URBAN DESIGN GUIDANCE AND CRITERIA, SEE PAGES 7-26 THROUGH 7-56.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

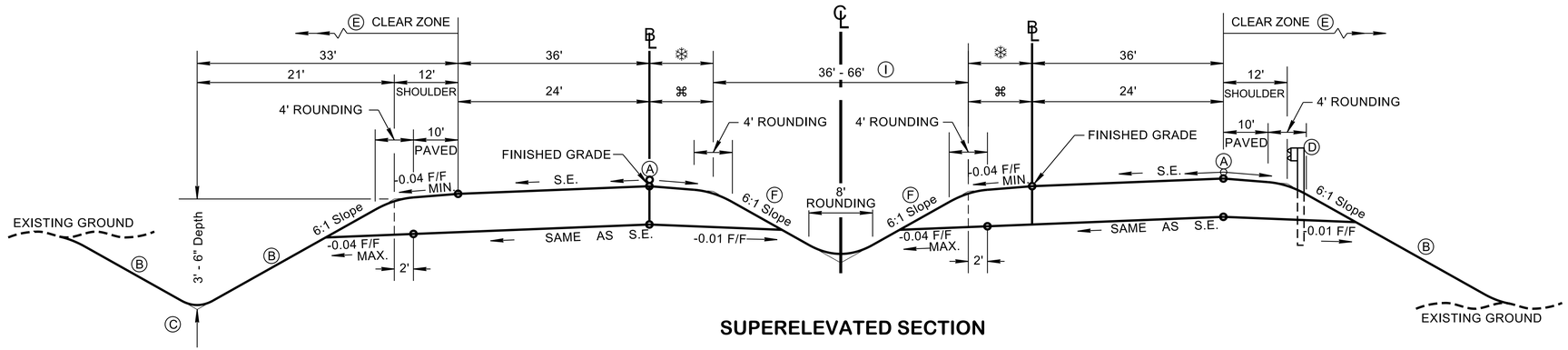
DESIGN STANDARDS FOR ARTERIAL HIGHWAYS (2 LANE)

01-01-2019 RD11-TS-3

NOT TO SCALE



TANGENT SECTION



SUPERELEVATED SECTION

LEGEND

- ❄ 12' GRADED / 10' PAVED SHOULDER
- ⌘ 6' GRADED / 4' PAVED SHOULDER
- ✡ THE FIRST 24' PAVEMENT (FIRST & SECOND LANE ON A 4 LANE SECTION) THE CROSS-SLOPE IS -0.020 FT/FT AND FROM 24' TO 36' (THE THIRD LANE ON A 6 LANE SECTION) THE CROSS-SLOPE IS -0.025 FT/FT.

TABLE I
DESIGN SPEEDS FOR RURAL ARTERIAL ROADS (SEE PAGE 7-2) (H)

TYPE OF TERRAIN	DESIGN SPEED (MPH)
LEVEL	60-70
ROLLING	50-60
MOUNTAINOUS	40-50

TABLE II 4 AND 6 LANE ARTERIAL - DESIGN STANDARDS (G)

DESIGN STANDARDS (FOR GIVEN DESIGN SPEED)		DESIGN SPEEDS (MPH)									REMARKS
		30	35	40	45	50	55	60	65	70	
MINIMUM RADIUS (FEET) 0.04 MAX. S.E.		250	371	533	711	926	1190	1500			SEE PAGE 3-32
MINIMUM RADIUS (FEET) 0.06 MAX. S.E.		231	340	485	643	833	1060	1330			
MINIMUM RADIUS (FEET) 0.08 MAX. S.E.		214	314	444	587	758	960	1200	1480	1810	
MAXIMUM RURAL GRADES %	LEVEL TERRAIN			5	5	4	4	3	3	3	SEE PAGE 7-4
	ROLLING TERRAIN			6	6	5	5	4	4	4	
	MOUNTAINOUS TERRAIN			8	7	7	6	6	5	5	
MAXIMUM URBAN GRADES %	LEVEL TERRAIN	8	7	7	6	6	5	5			SEE PAGE 7-29
	ROLLING TERRAIN	9	8	8	7	7	6	6			
	MOUNTAINOUS TERRAIN	11	10	10	9	9	8	8			
MINIMUM STOPPING SIGHT DISTANCE (FEET)		200	250	305	360	425	495	570	645	730	SEE PAGE 7-3
MINIMUM "K" VALUE	CREST VERTICAL CURVE	19	29	44	61	84	114	151	193	247	SEE PAGE 3-155
	SAG VERTICAL CURVE	37	49	64	79	96	115	136	157	181	SEE PAGE 3-161
FOR SUPERELEVATION SEE STANDARD DRAWINGS RD11-SE SERIES											

TABLE III MEDIAN WIDTHS

MINIMUM MEDIAN WIDTH (FT)	URBAN/ RURAL	# LANES	SPEED (MPH)
36' MINIMUM	URBAN	4	35-55
	URBAN	6	35-55
48' MINIMUM	RURAL	4	40-70
66' MINIMUM	RURAL	6	40-70

DESIGN NOTES

- (A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHOULD NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.
- (B) SEE STANDARD DRAWING RD11-S-11 FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES, TOE OF FILL SLOPES AND SPECIAL ROCK TREATMENT.
- (C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.
- (D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.
- (E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONE.
- (F) 6:1 SLOPES ARE DESIRABLE. SLOPES RANGING BETWEEN 6:1 AND 4:1 MAY BE USED UNDER SPECIFIC ADVERSE CONDITIONS SUCH AS TO FACILITATE DRAINAGE OR TO ESTABLISH A LEFT TURN LANE.
- (G) ALTHOUGH THE SELECTED DESIGN SPEED ESTABLISHES THE LIMITING VALUES OF CURVE RADIUS AND MINIMUM SIGHT DISTANCE THAT SHOULD BE USED IN DESIGN, THERE SHOULD BE NO RESTRICTION ON THE USE OF FLATTER HORIZONTAL CURVES OR GREATER SIGHT DISTANCES WHERE SUCH IMPROVEMENTS CAN BE PROVIDED AS A PART OF AN ECONOMICAL DESIGN (SEE PAGE 2-55).
- (H) URBAN DESIGN SPEEDS ARE GENERALLY IN THE RANGE OF 30 TO 60 MILES PER HOUR (SEE PAGE 7-27).
- (I) SEE TABLE III FOR MEDIAN WIDTHS.

GENERAL NOTES

1. FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).
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4. DESIRABLE RIGHT-OF-WAY IS SLOPE LINES PLUS FIFTEEN FEET TO TWENTY FEET.
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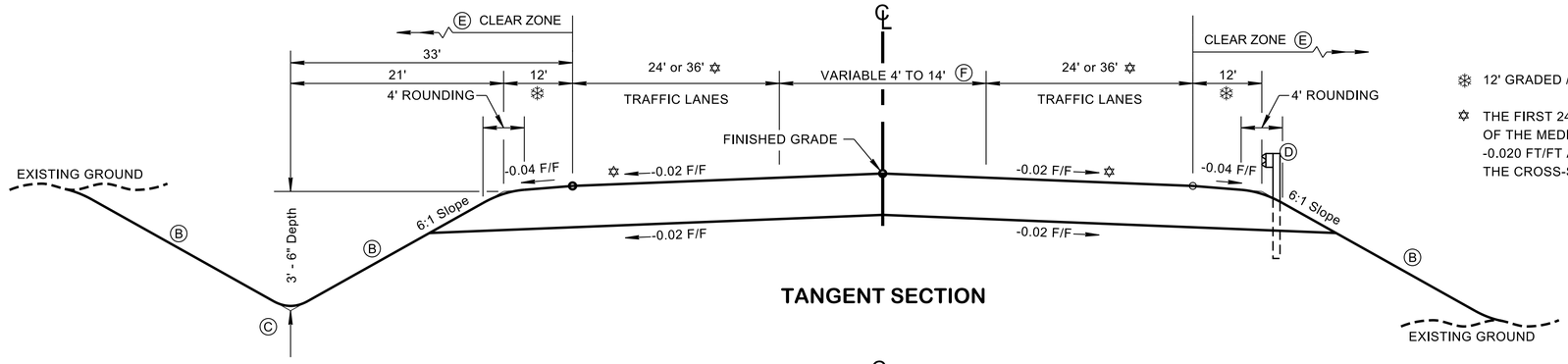
6. FOR EXISTING BRIDGES TO REMAIN IN PLACE, THEY SHOULD HAVE ADEQUATE STRUCTURAL STRENGTH AND A WIDTH AT LEAST EQUAL TO THE WIDTH OF THE TRAVELED WAY PLUS 2 FEET CLEARANCE ON EACH SIDE. BRIDGES SHOULD BE CONSIDERED FOR ULTIMATE WIDENING OR REPLACEMENT IF THEY DO NOT PROVIDE AT LEAST HL-93 LIVE LOADING CAPACITY. AS AN INTERIM MEASURE, FOR NARROW BRIDGES, SPECIAL SIGNING AND DELINEATION TREATMENTS MAY BE CONSIDERED.
7. FOR ADDITIONAL URBAN DESIGN GUIDANCE AND CRITERIA, SEE PAGES 7-26 THROUGH 7-56.
8. MINIMUM PASSING SIGHT DISTANCE IS NOT APPLICABLE FOR FOUR AND SIX LANE DIVIDED HIGHWAYS.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

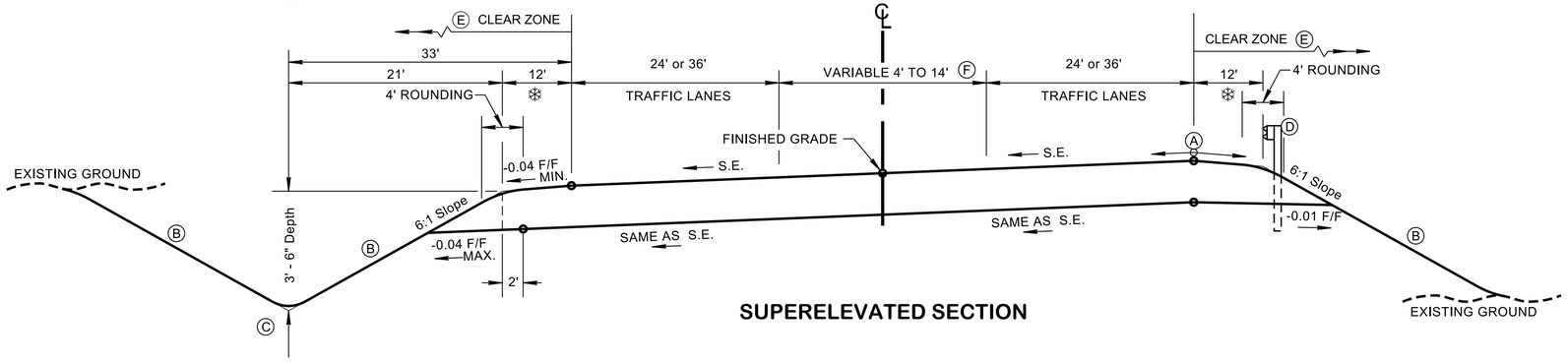
DESIGN STANDARDS FOR ARTERIAL HIGHWAYS WITH DEPRESSED MEDIAN (4 AND 6 LANE)

01-01-2019 | RD11-TS-3A

NOT TO SCALE



TANGENT SECTION



SUPERELEVATED SECTION

LEGEND

❄ 12' GRADED / 10' PAVED SHOULDER

✡ THE FIRST 24' OF TRAFFIC LANES (FIRST & SECOND LANE AND ONE HALF OF THE MEDIAN ON EACH SIDE OF THE ROADWAY) THE CROSS-SLOPE IS -0.020 FT/FT AND THE TRAFFIC LANES FROM 24' TO 36' (THE THIRD LANE) THE CROSS-SLOPE IS -0.025 FT/FT.

TABLE I
DESIGN SPEEDS FOR RURAL ARTERIAL ROADS (SEE PAGE 7-2) (H)

TYPE OF TERRAIN	DESIGN SPEED (MPH)
LEVEL	60-70
ROLLING	50-60
MOUNTAINOUS	40-50

TABLE II 4 AND 6 LANE ARTERIAL - DESIGN STANDARDS (G)

DESIGN STANDARDS (FOR GIVEN DESIGN SPEED)		DESIGN SPEEDS (MPH)									REMARKS
		30	35	40	45	50	55	60	65	70	
MINIMUM RADIUS (FEET) 0.04 MAX. S.E.		250	371	533	711	926	1190	1500			SEE PAGE 3-32
MINIMUM RADIUS (FEET) 0.06 MAX. S.E.		231	340	485	643	833	1060	1330			
MINIMUM RADIUS (FEET) 0.08 MAX. S.E.		214	314	444	587	758	960	1200	1480	1810	
MAXIMUM RURAL GRADES %	LEVEL TERRAIN			5	5	4	4	3	3	3	SEE PAGE 7-4
	ROLLING TERRAIN			6	6	5	5	4	4	4	
	MOUNTAINOUS TERRAIN			8	7	7	6	6	5	5	
MAXIMUM URBAN GRADES %	LEVEL TERRAIN	8	7	7	6	6	5	5			SEE PAGE 7-29
	ROLLING TERRAIN	9	8	8	7	7	6	6			
	MOUNTAINOUS TERRAIN	11	10	10	9	9	8	8			
MINIMUM STOPPING SIGHT DISTANCE (FEET)		200	250	305	360	425	495	570	645	730	SEE PAGE 7-3
MINIMUM "K" VALUE	CREST VERTICAL CURVE	19	29	44	61	84	114	151	193	247	SEE PAGE 3-155
	SAG VERTICAL CURVE	37	49	64	79	96	115	136	157	181	SEE PAGE 3-161
FOR SUPERELEVATION SEE STANDARD DRAWINGS RD11-SE SERIES											

TABLE III MEDIAN WIDTHS

MINIMUM MEDIAN WIDTH (FT)	URBAN/ RURAL	# LANES	SPEED (MPH)
36' MINIMUM	URBAN	4	35-55
	URBAN	6	35-55
48' MINIMUM	RURAL	4	40-70
66' MINIMUM	RURAL	6	40-70

DESIGN NOTES

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHOULD NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWING RD11-S-11 FOR FILL AND CUT SLOPE TABLES. ROUNDING ON TOP OF CUT SLOPES AND TOE ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES SPECIAL ROCK TREATMENT AND SUBGRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONE.

(F) 4 - 6 FEET MEDIAN WIDTH ALLOWED UNDER RESTRICTIVE CONDITIONS. 12 FEET MINIMUM MEDIAN WIDTH IS PREFERRED (SEE PAGE 7-14).

(G) ALTHOUGH THE SELECTED DESIGN SPEED ESTABLISHES THE LIMITING VALUES OF CURVE RADIUS AND MINIMUM SIGHT DISTANCE THAT SHOULD BE USED IN DESIGN, THERE SHOULD BE NO RESTRICTION ON THE USE OF FLATTER HORIZONTAL CURVES OR GREATER SIGHT DISTANCES WHERE SUCH IMPROVEMENTS CAN BE PROVIDED AS A PART OF AN ECONOMICAL DESIGN (SEE PAGE 2-55).

(H) URBAN DESIGN SPEEDS ARE GENERALLY IN THE RANGE OF 30 TO 60 MILES PER HOUR (SEE PAGE 7-27).

GENERAL NOTES

1. FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).
2. PAGE NUMBERS REFERRED TO ON THIS DRAWING ARE FROM "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), UNLESS OTHERWISE NOTED.
3. REFERENCE SHOULD ALSO BE MADE TO THE AASHTO "ROADSIDE DESIGN GUIDE," AASHTO, 2011.
4. DESIRABLE RIGHT-OF-WAY IS SLOPE LINES PLUS FIFTEEN FEET TO TWENTY FEET.
5. THE DESIGN OF BRIDGES, CULVERTS, WALLS, TUNNELS AND OTHER STRUCTURES SHALL BE IN ACCORDANCE WITH THE CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, THE DESIGN LOADING SHOULD BE THE HL-93 CALIBRATED LIVE LOAD DESIGNATION.
6. FOR EXISTING BRIDGES TO REMAIN IN PLACE, THEY SHOULD HAVE ADEQUATE STRUCTURAL STRENGTH AND A WIDTH AT LEAST EQUAL TO THE WIDTH OF THE TRAVELED WAY PLUS 2 FEET CLEARANCE ON EACH SIDE. BRIDGES SHOULD BE CONSIDERED FOR ULTIMATE WIDENING OR REPLACEMENT IF THEY DO NOT PROVIDE AT LEAST HL-93 LIVE LOADING CAPACITY. AS AN INTERIM MEASURE, FOR NARROW BRIDGES, SPECIAL SIGNING AND DELINEATION TREATMENTS MAY BE CONSIDERED.
7. FOR ADDITIONAL URBAN DESIGN GUIDANCE AND CRITERIA, SEE PAGES 7-26 THROUGH 7-56.
8. MINIMUM PASSING SIGHT DISTANCE IS NOT APPLICABLE FOR FOUR AND SIX LANE DIVIDED HIGHWAYS.

NOT TO SCALE

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

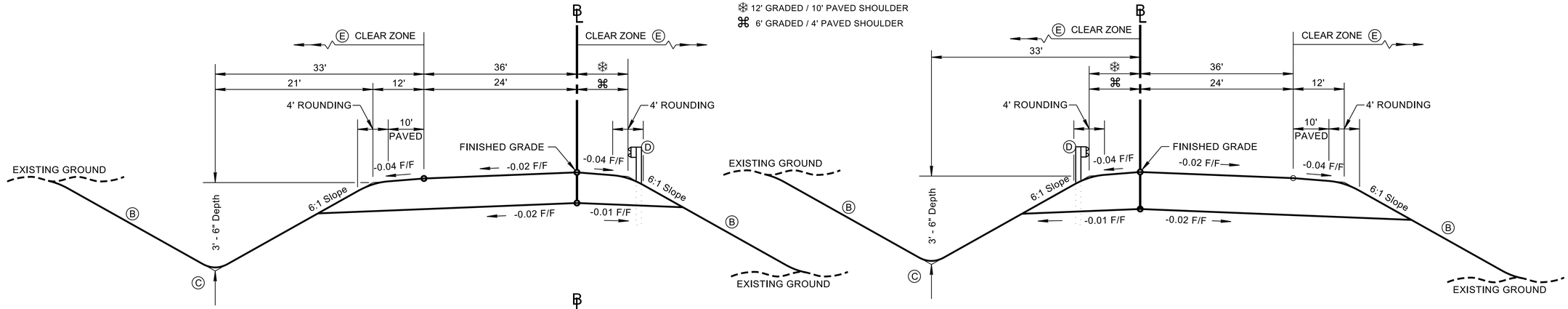
DESIGN STANDARDS FOR ARTERIAL HIGHWAYS WITH FLUSH MEDIAN (4 AND 6 LANE)

01-01-2019 RD11-TS-3B

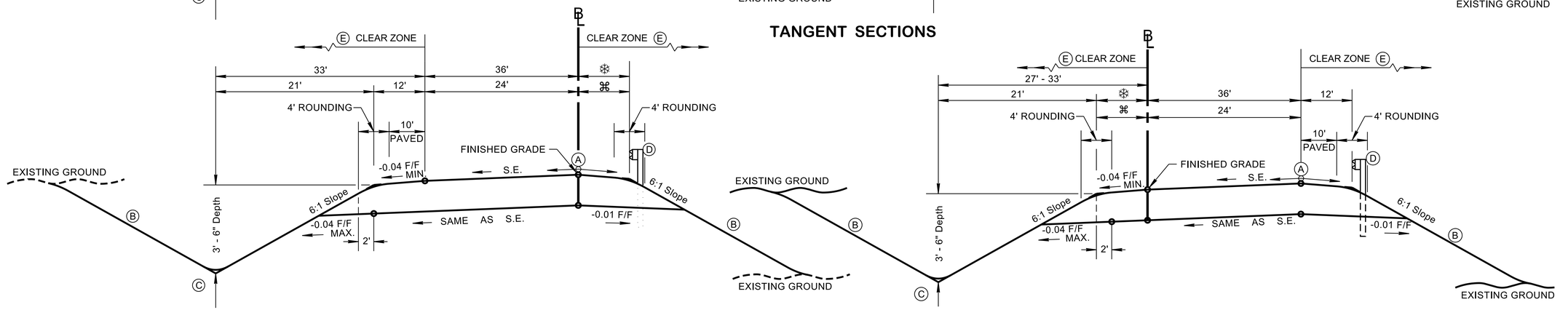
LEGEND

❄ 12' GRADED / 10' PAVED SHOULDER

⌘ 6' GRADED / 4' PAVED SHOULDER



TANGENT SECTIONS



SUPERELEVATED SECTIONS

TABLE I
DESIGN SPEEDS FOR RURAL ARTERIAL ROADS (SEE PAGE 7-2) (G)

TYPE OF TERRAIN	DESIGN SPEED (MPH)
LEVEL	60-70
ROLLING	50-60
MOUNTAINOUS	40-50

TABLE II 4 AND 6 LANE ARTERIAL - DESIGN STANDARDS (F)

DESIGN STANDARDS (FOR GIVEN DESIGN SPEED)		DESIGN SPEEDS (MPH) 30	35	40	45	50	55	60	65	70	
MINIMUM RADIUS (FEET) 0.04 MAX. S.E.		250	371	533	711	926	1190	1500			SEE PAGE 3-32
MINIMUM RADIUS (FEET) 0.06 MAX. S.E.		231	340	485	643	833	1060	1330			
MINIMUM RADIUS (FEET) 0.08 MAX. S.E.		214	314	444	587	758	960	1200	1480	1810	
MAXIMUM RURAL GRADES %	LEVEL TERRAIN			5	5	4	4	3	3	3	SEE PAGE 7-4
	ROLLING TERRAIN			6	6	5	5	4	4	4	
	MOUNTAINOUS TERRAIN			8	7	7	6	6	5	5	
MAXIMUM URBAN GRADES %	LEVEL TERRAIN	8	7	7	6	6	5	5			SEE PAGE 7-29
	ROLLING TERRAIN	9	8	8	7	7	6	6			
	MOUNTAINOUS TERRAIN	11	10	10	9	9	8	8			
MINIMUM STOPPING SIGHT DISTANCE (FEET)		200	250	305	360	425	495	570	645	730	SEE PAGE 7-3
MINIMUM "K" VALUE	CREST VERTICAL CURVE	19	29	44	61	84	114	151	193	247	SEE PAGE 3-155
	SAG VERTICAL CURVE	37	49	64	79	96	115	136	157	181	SEE PAGE 3-161
FOR SUPERELEVATION SEE STANDARD DRAWINGS RD11-SE SERIES											

TABLE III MEDIAN WIDTHS

MINIMUM MEDIAN WIDTH (FT)	URBAN/ RURAL	# LANES	SPEED (MPH)
36' MINIMUM	URBAN	4	35-55
	URBAN	6	35-55
48' MINIMUM	RURAL	4	40-70
66' MINIMUM	RURAL	6	40-70

DESIGN NOTES

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHOULD NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWING RD11-S-11 FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES, TOE OF FILL SLOPES AND SPECIAL ROCK TREATMENT.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 AND S-PL-6A FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONE.

(F) ALTHOUGH THE SELECTED DESIGN SPEED ESTABLISHES THE LIMITING VALUES OF CURVE RADIUS AND MINIMUM SIGHT DISTANCE THAT SHOULD BE USED IN DESIGN, THERE SHOULD BE NO RESTRICTION ON THE USE OF FLATTER HORIZONTAL CURVES OR GREATER SIGHT DISTANCES WHERE SUCH IMPROVEMENTS CAN BE PROVIDED AS A PART OF AN ECONOMICAL DESIGN (SEE PAGE 2-55).

(G) URBAN DESIGN SPEEDS ARE GENERALLY IN THE RANGE OF 30 TO 60 MILES PER HOUR (SEE PAGE 7-27).

GENERAL NOTES

1. FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).
2. PAGE NUMBERS REFERRED TO ON THIS DRAWING ARE FROM "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), UNLESS OTHERWISE NOTED.
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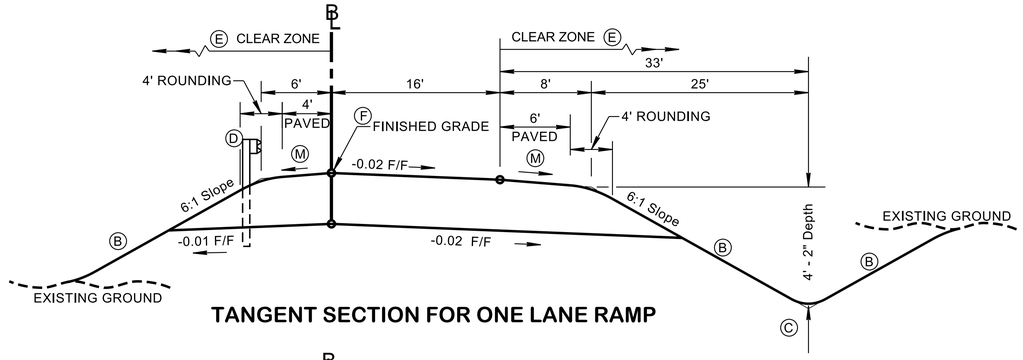
4. DESIRABLE RIGHT-OF-WAY IS SLOPE LINES PLUS FIFTEEN FEET TO TWENTY FEET.
5. THE DESIGN OF BRIDGES, CULVERTS, WALLS, TUNNELS AND OTHER STRUCTURES SHALL BE IN ACCORDANCE WITH THE CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, THE DESIGN LOADING SHOULD BE THE HL-93 CALIBRATED LIVE LOAD DESIGNATION.
6. FOR EXISTING BRIDGES TO REMAIN IN PLACE, THEY SHOULD HAVE ADEQUATE STRUCTURAL STRENGTH AND A WIDTH AT LEAST EQUAL TO THE WIDTH OF THE TRAVELED WAY PLUS 2 FEET CLEARANCE ON EACH SIDE. BRIDGES SHOULD BE CONSIDERED FOR ULTIMATE WIDENING OR REPLACEMENT IF THEY DO NOT PROVIDE AT LEAST HL-93 LIVE LOADING CAPACITY. AS AN INTERIM MEASURE, FOR NARROW BRIDGES, SPECIAL SIGNING AND DELINEATION TREATMENTS MAY BE CONSIDERED.
7. FOR ADDITIONAL URBAN DESIGN GUIDANCE AND CRITERIA, SEE PAGES 7-26 THROUGH 7-56.
8. MINIMUM PASSING SIGHT DISTANCE IS NOT APPLICABLE FOR FOUR AND SIX LANE DIVIDED HIGHWAYS.

NOT TO SCALE

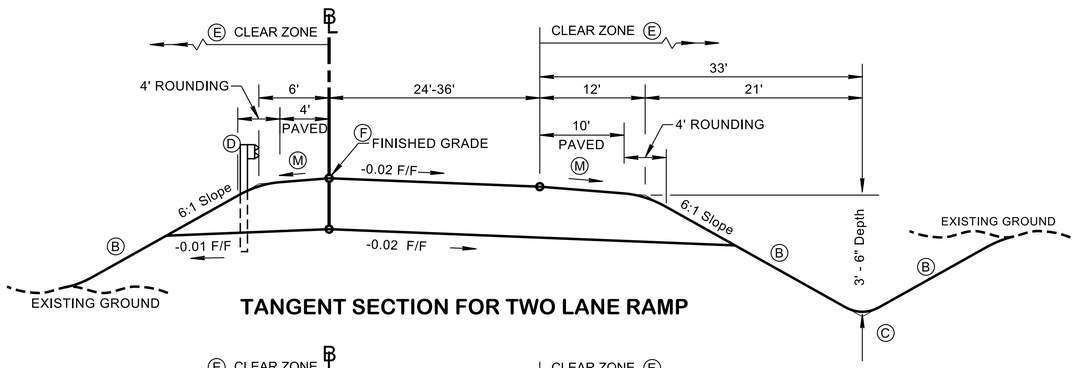
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

DESIGN STANDARDS FOR ARTERIALS WITH INDEPENDENT ROADWAYS (4 AND 6 LANE)

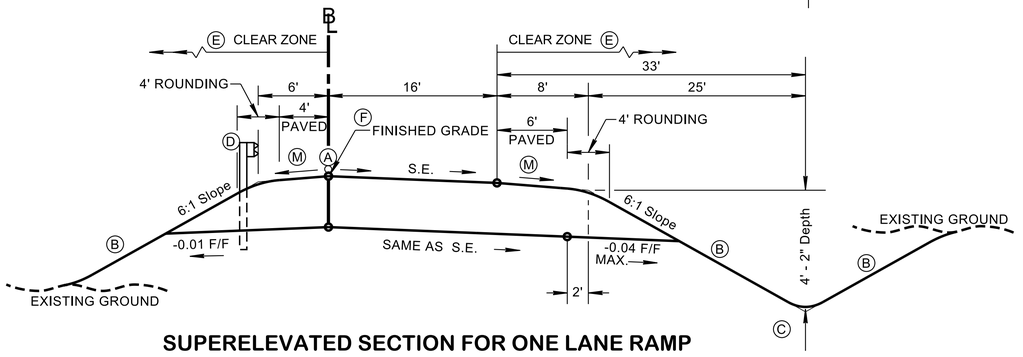
01-01-2019 | RD11-TS-3C



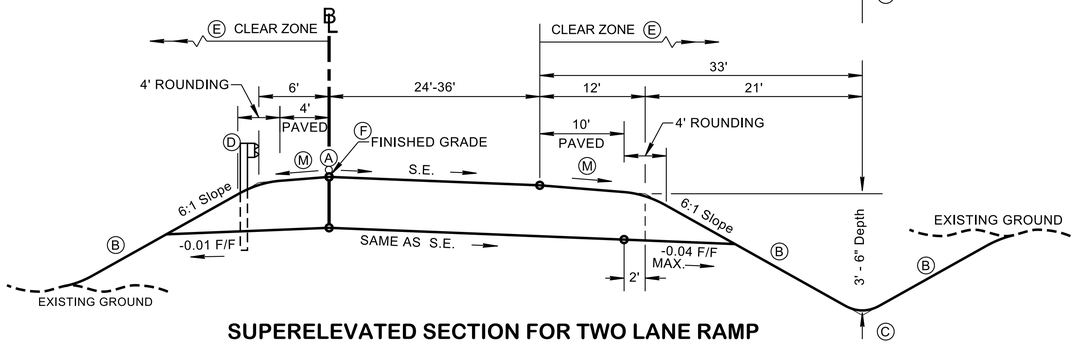
TANGENT SECTION FOR ONE LANE RAMP



TANGENT SECTION FOR TWO LANE RAMP



SUPERELEVATED SECTION FOR ONE LANE RAMP



SUPERELEVATED SECTION FOR TWO LANE RAMP

TABLE I GUIDE VALUES FOR RAMP DESIGN SPEED AS RELATED TO HIGHWAY DESIGN SPEED (SEE PAGE 10-89)

(H) HIGHWAY DESIGN (G) SPEEDS (MPH)	30	35	40	45	50	55	60	65	70	REMARKS
RAMP DESIGN SPEED (MPH) (J)										SEE PAGE 10-89
UPPER RANGE (85%)	25	30	35	40	45	48	50	55	60	
MIDDLE RANGE (70%)	20	25	30	33	35	40	45	45	50	
LOWER RANGE (50%)	15	18	20	23	25	28	30	30	35	

TABLE II STOPPING SIGHT DISTANCE FOR RAMPS (SEE PAGE 3-4) (I)

DESIGN SPEEDS (MPH)	15	20	25	30	35	40	45	50	55	60	65	70
MINIMUM, FEET	80	115	155	200	250	305	360	425	495	570	645	730

TABLE III LENGTHS OF CURVE FOR DIFFERENT COMPOUND CURVE RADII (SEE PAGE 3-58) (K)

RADIUS (FEET)	100	150	200	250	300	400	500 OR MORE
MINIMUM LENGTH OF HORIZONTAL CURVE							
ACCEPTABLE, FEET	40	50	60	80	100	120	140
DESIRABLE, FEET	60	70	90	120	140	180	200

DESIGN NOTES

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHOULD NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWING RD11-S-11 FOR FILL AND CUT SLOPE TABLES. ROUNDING ON TOP OF CUT SLOPES AND TOE ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES SPECIAL ROCK TREATMENT AND SUBGRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONE.

(F) WHEN THE RAMP PAVEMENT IS ADJACENT TO MAINLINE ROADWAY PAVEMENT, THE PROFILE GRADE WILL BE LOCATED ALONG THE MAINLINE EDGE OF PAVEMENT.

(G) DOES NOT PERTAIN TO THE RAMP TERMINALS WHICH SHOULD BE PROPERLY TRANSITIONED AND PROVIDED WITH SPEED CHANGE FACILITIES ADEQUATE FOR THE HIGHWAY SPEED INVOLVED.

(H) THE HIGHER HIGHWAY DESIGN SPEED SHOULD BE THE CONTROL.

(I) THE SIGHT DISTANCE ON A FREEWAY PRECEDING THE APPROACH NOSE OF AN EXIT RAMP SHOULD EXCEED THE MINIMUM FOR THE THROUGH TRAFFIC DESIGN SPEED DESIRABLY BY 25 PERCENT OR MORE.

(J) SEMI-DIRECT CONNECT AND DIRECT CONNECT AND 2-LANE RAMPS, USE MIDDLE RANGE AS MINIMUM. UPPER RANGE IS PREFERRED. LOWER RANGE MAY BE USED FOR RAMPS NOT CONNECTING TO FREEWAYS OR EXPRESSWAYS. LOOP DESIGN SPEED SHALL NOT BE LESS THAN 25 MILES PER HOUR.

(K) FOR RAMPS WITH COMPOUND CURVES, THE PREFERRED RATIO OF THE FLATTER RADIUS TO THE SHARPER RADIUS IS NOT TO EXCEED 1.75:1; HOWEVER, A 2:1 MINIMUM RATIO MAY BE USED (SEE PAGE 3-58).

(L) MAY BE 2% GREATER IN SPECIAL CASES OR WHERE TOPOGRAPHY LIMITS CONDITIONS. DOWN GRADES SHOULD DESIRABLY BE LIMITED TO 3 OR 4 PERCENT ON RAMPS WITH SHARP HORIZONTAL CURVATURE AND SIGNIFICANT HEAVY TRUCK OR BUS TRAFFIC.

(M) FOR CONCRETE RAMPS USE CONSTANT CROSS SLOPE FOR LANES AND SHOULDERS, FOR ASPHALT RAMPS USE .04 F/F FOR TANGENT SHOULDERS AND A CROSS SLOPE FOR SHOULDERS ON THE HIGH SIDE OF SUPERELEVATION SUCH THAT THE ALGEBRAIC DIFFERENCE BETWEEN CROSS SLOPE DOES NOT EXCEED 7%, THE CROSS SLOPE ON THE LOW SIDE SHALL BE THE MINIMUM OF 4% OR THE SUPERELEVATION RATE.

TABLE IV RECOMMENDED MAXIMUM DESIGN GRADES ON RAMPS (SEE PAGE 10-93)

DESIGN SPEED (MPH)	UPGRADE OR DOWNGRADE (L)
15-25	6-8%
25-30	5-7%
40	4-6%
45 OR GREATER	3-5%

GENERAL NOTES

(1) PAGE NUMBERS REFERRED TO ON THIS DRAWING, UNLESS OTHERWISE NOTED AND FOR SPECIFIC CONDITIONS NOT COVERED ON THIS DRAWING , REFEREE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).

(2) REFERENCE SHOULD ALSO BE MADE TO THE AASHTO "ROADSIDE DESIGN GUIDE," AASHTO, 2011.

(3) SECTIONS DRAWN LOOKING IN DIRECTION OF TRAVEL.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

DESIGN STANDARDS FOR ARTERIAL AND FREEWAY RAMPS (1, 2 AND 3 LANE)

10-01-2019 RD11-TS-4

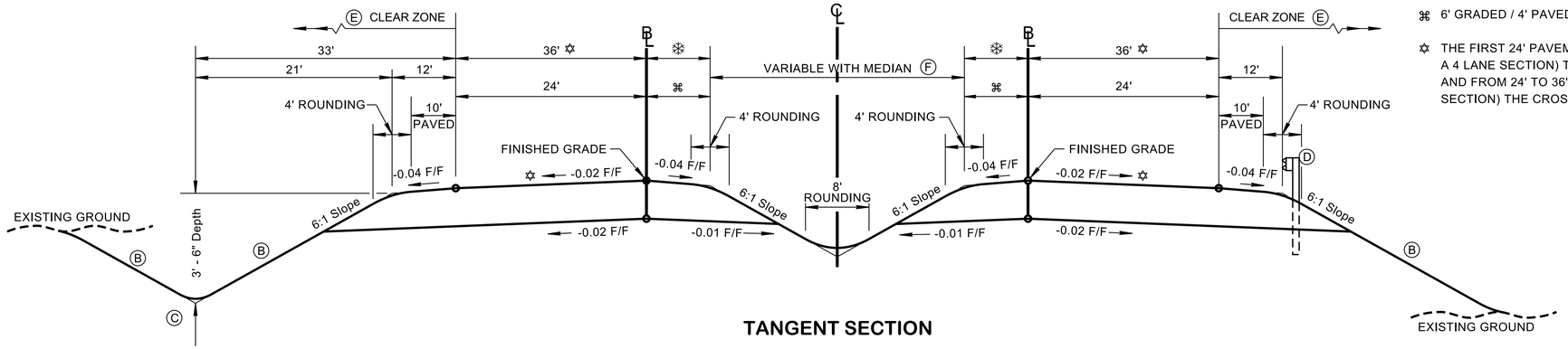
NOT TO SCALE

LEGEND

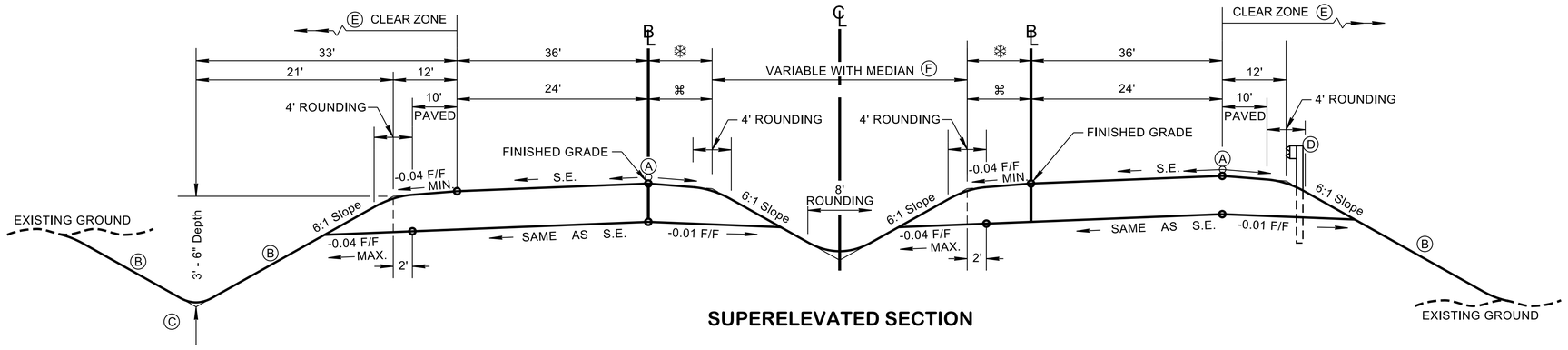
❄ 12' GRADED / 10' PAVED SHOULDER

⌘ 6' GRADED / 4' PAVED SHOULDER

✡ THE FIRST 24' PAVEMENT (FIRST & SECOND LANE ON A 4 LANE SECTION) THE CROSS-SLOPE IS -0.020 FT/FT AND FROM 24' TO 36' (THE THIRD LANE ON A 6 LANE SECTION) THE CROSS-SLOPE IS -0.025 FT/FT.



TANGENT SECTION



SUPERELEVATED SECTION

TABLE I DESIGN SPEEDS FOR FREEWAYS (SEE PAGES 8-1 & 8-2)	
LOCATION	MINIMUM DESIGN SPEED (MPH)
URBAN	50-60
RURAL	70
MOUNTAINOUS	50-60

TABLE II FREEWAY - DESIGN STANDARDS (H)

DESIGN STANDARDS (FOR GIVEN DESIGN SPEED)		DESIGN SPEEDS (MPH) 50	55	60	65	70	
MINIMUM RADIUS (FT.) 0.08 MAX. S.E.		758	960	1200	1480	1810	SEE PAGE 3-32
MINIMUM STOPPING SIGHT DISTANCE (FT.)		425	495	570	645	730	SEE PAGE 3-4
MINIMUM "K" VALUE	CREST VERTICAL CURVE	84	114	151	193	247	SEE PAGE 3-155
	SAG VERTICAL CURVE	96	115	136	157	181	SEE PAGE 3-161
MAXIMUM GRADES % (G)	LEVEL TERRAIN	4	4	3	3	3	SEE PAGE 8-4
	ROLLING TERRAIN	5	5	4	4	4	
	MOUNTAINOUS TERRAIN	6	6	6	5	5	
FOR SUPERELEVATION SEE STANDARD DRAWINGS RD11-SE SERIES							

DESIGN NOTES

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHOULD NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWING RD11-S-11 FOR FILL AND CUT SLOPE TABLES. ROUNDING ON TOP OF CUT SLOPES AND TOE ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES SPECIAL ROCK TREATMENT AND SUBGRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 AND S-PL-6A FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONE.

(F) MINIMUM MEDIAN WIDTH IS TO BE 48 FEET WITH 52 FEET PREFERRED WHEN USING 6 FEET WIDE INSIDE SHOULDERS. MINIMUM MEDIAN WIDTH IS TO BE 64 FEET WITH 68 FEET PREFERRED WHEN USING 12 FOOT WIDE INSIDE SHOULDERS.

(G) GRADES ONE PERCENT STEEPER THAN THE VALUE SHOWN MAY BE USED FOR EXTREME CASES IN URBAN AREAS WITH RIGHT-OF-WAY CONSTRAINTS OR WHERE NEEDED IN MOUNTAINOUS TERRAIN.

(H) ALTHOUGH THE SELECTED DESIGN SPEED ESTABLISHES THE LIMITING VALUES OF CURVE RADIUS AND MINIMUM SIGHT DISTANCE THAT SHOULD BE USED IN DESIGN, THERE SHOULD BE NO RESTRICTION ON THE USE OF FLATTER HORIZONTAL CURVES OR GREATER SIGHT DISTANCES WHERE SUCH IMPROVEMENTS CAN BE PROVIDED AS A PART OF AN ECONOMICAL DESIGN (SEE PAGE 2-55).

GENERAL NOTES

1. FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).
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3. REFERENCE SHOULD ALSO BE MADE TO THE AASHTO "ROADSIDE DESIGN GUIDE," AASHTO, 2011.
4. DESIRABLE RIGHT-OF-WAY IS SLOPE LINES PLUS TWENTY FEET.
5. THE DESIGN OF BRIDGES, CULVERTS, WALLS, TUNNELS AND OTHER STRUCTURES SHALL BE IN ACCORDANCE WITH THE CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. STRUCTURES CARRYING FREEWAY TRAFFIC SHOULD BE THE HL-93 CALIBRATED LIVE LOAD DESIGNATION.
6. FOR EXISTING BRIDGES TO REMAIN IN PLACE, THEY SHOULD HAVE ADEQUATE STRUCTURAL STRENGTH AND A WIDTH AT LEAST EQUAL TO THE WIDTH OF THE TRAVELED WAY PLUS 2 FEET CLEARANCE ON EACH SIDE. BRIDGES SHOULD BE CONSIDERED FOR ULTIMATE WIDENING OR REPLACEMENT IF THEY DO NOT PROVIDE AT LEAST 3 FEET CLEARANCE ON EACH SIDE OR DO NOT PROVIDE HL-93 LIVE LOADING CAPACITY. AS AN INTERIM MEASURE, FOR NARROW BRIDGES, SPECIAL SIGNING AND DELINEATION TREATMENTS MAY BE CONSIDERED.
7. FOR INTERSTATES, SEE THE CURRENT EDITION OF AASHTO'S "A POLICY ON DESIGN STANDARDS-INTERSTATE SYSTEM, 2016."

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

DESIGN STANDARDS FOR FREEWAYS WITH DEPRESSED MEDIAN (4 AND 6 LANE)

01-01-2019 RD11-TS-5

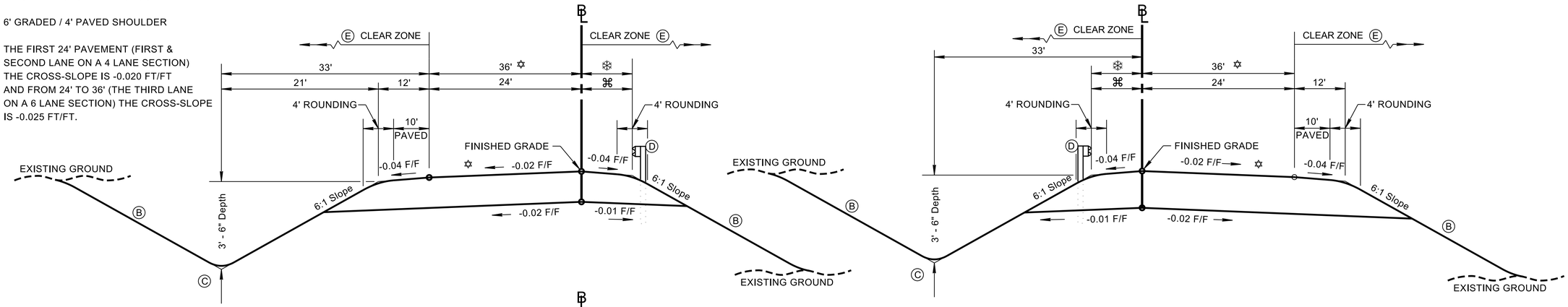
NOT TO SCALE

LEGEND

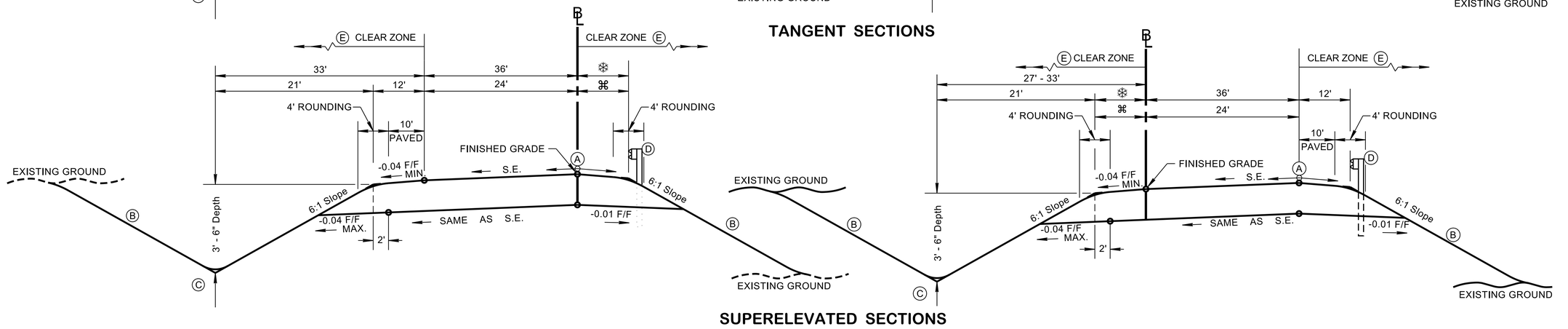
❄ 12' GRADED / 10' PAVED SHOULDER

⌘ 6' GRADED / 4' PAVED SHOULDER

✡ THE FIRST 24' PAVEMENT (FIRST & SECOND LANE ON A 4 LANE SECTION) THE CROSS-SLOPE IS -0.020 FT/FT AND FROM 24' TO 36' (THE THIRD LANE ON A 6 LANE SECTION) THE CROSS-SLOPE IS -0.025 FT/FT.



TANGENT SECTIONS



SUPERELEVATED SECTIONS

TABLE I
DESIGN SPEEDS FOR FREEWAYS (SEE PAGES 8-1 & 8-2)

LOCATION	MINIMUM DESIGN SPEED (MPH)
URBAN	50-60
RURAL	70
MOUNTAINOUS	50-60

TABLE II FREEWAY - DESIGN STANDARDS (G)

DESIGN STANDARDS (FOR GIVEN DESIGN SPEED)		DESIGN SPEEDS (MPH) 50	55	60	65	70	REMARKS
MINIMUM RADIUS (FT.) 0.08 MAX. S.E.		758	960	1200	1480	1810	SEE PAGE 3-32
MINIMUM STOPPING SIGHT DISTANCE (FT.)		425	495	570	645	730	SEE PAGE 3-4
MINIMUM "K" VALUE	CREST VERTICAL CURVE	84	114	151	193	247	SEE PAGE 3-155
	SAG VERTICAL CURVE	96	115	136	157	181	SEE PAGE 3-161
MAXIMUM GRADES % (F)	LEVEL TERRAIN	4	4	3	3	3	SEE PAGE 8-4
	ROLLING TERRAIN	5	5	4	4	4	
	MOUNTAINOUS TERRAIN	6	6	6	5	5	
FOR SUPERELEVATION SEE STANDARD DRAWINGS RD11-SE SERIES							

DESIGN NOTES

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHOULD NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWING RD11-S-11 FOR FILL AND CUT SLOPE TABLES. ROUNDING ON TOP OF CUT SLOPES AND TOE ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES SPECIAL ROCK TREATMENT AND SUBGRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONE.

(F) GRADES ONE PERCENT STEEPER THAN THE VALUE SHOWN MAY BE USED FOR EXTREME CASES IN URBAN AREAS WITH RIGHT-OF-WAY CONSTRAINTS OR WHERE NEEDED IN MOUNTAINOUS TERRAIN.

(G) ALTHOUGH THE SELECTED DESIGN SPEED ESTABLISHES THE LIMITING VALUES OF CURVE RADIUS AND MINIMUM SIGHT DISTANCE THAT SHOULD BE USED IN DESIGN, THERE SHOULD BE NO RESTRICTION ON THE USE OF FLATTER HORIZONTAL CURVES OR GREATER SIGHT DISTANCES WHERE SUCH IMPROVEMENTS CAN BE PROVIDED AS A PART OF AN ECONOMICAL DESIGN (SEE PAGE 2-55).

GENERAL NOTES

1. FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).
2. PAGE NUMBERS REFERRED TO ON THIS DRAWING ARE FROM "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), UNLESS OTHERWISE NOTED.
3. REFERENCE SHOULD ALSO BE MADE TO THE AASHTO "ROADSIDE DESIGN GUIDE," AASHTO, 2011.
4. DESIRABLE RIGHT-OF-WAY IS SLOPE LINES PLUS TWENTY FEET.
5. THE DESIGN OF BRIDGES, CULVERTS, WALLS, TUNNELS AND OTHER STRUCTURES SHALL BE IN ACCORDANCE WITH THE CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. STRUCTURES CARRYING FREEWAY TRAFFIC SHOULD BE HL-93 CALIBRATED LIVE LOAD DESIGNATION.
6. FOR EXISTING BRIDGES TO REMAIN IN PLACE, THEY SHOULD HAVE ADEQUATE STRUCTURAL STRENGTH AND A WIDTH AT LEAST EQUAL TO THE WIDTH OF THE TRAVELED WAY PLUS 2 FEET CLEARANCE ON EACH SIDE. BRIDGES SHOULD BE CONSIDERED FOR ULTIMATE WIDENING OR REPLACEMENT IF THEY DO NOT PROVIDE AT LEAST 3 FEET CLEARANCE ON EACH SIDE OR DO NOT PROVIDE HL-93 LIVE LOADING CAPACITY. AS AN INTERIM MEASURE, FOR NARROW BRIDGES, SPECIAL SIGNING AND DELINEATION TREATMENTS MAY BE CONSIDERED.
7. FOR INTERSTATES, SEE THE CURRENT EDITION OF AASHTO'S "A POLICY ON DESIGN STANDARDS-INTERSTATE SYSTEM."

NOT TO SCALE

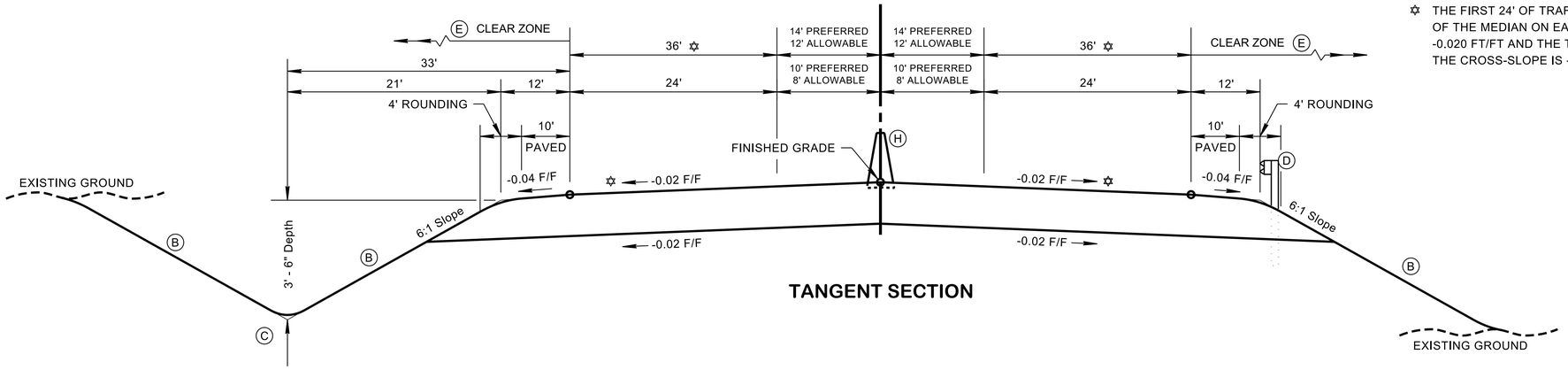
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

DESIGN STANDARDS FOR FREEWAYS WITH INDEPENDENT ROADWAYS (4 AND 6 LANE)

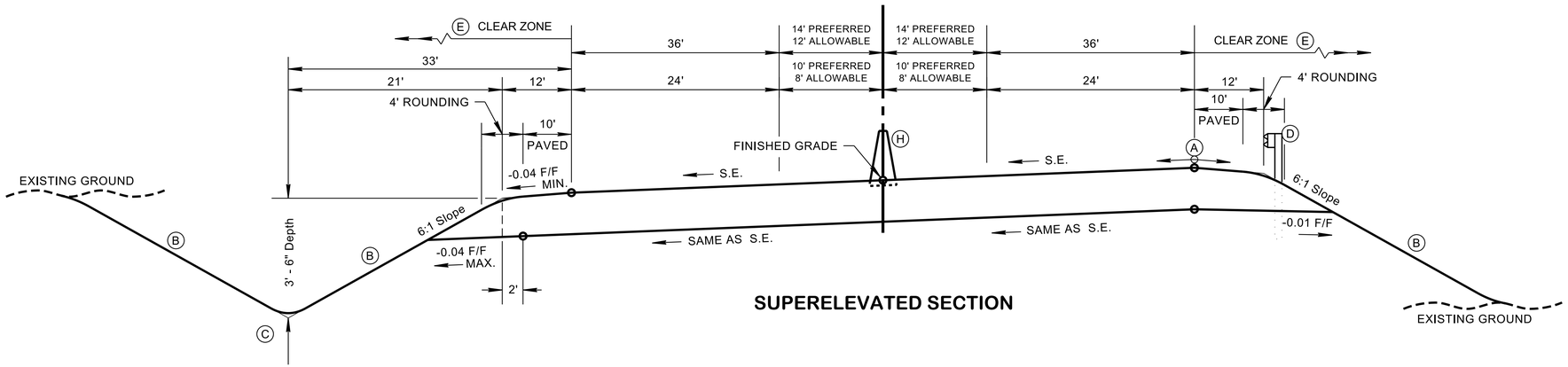
01-01-2019 | RD11-TS-5A

LEGEND

✡ THE FIRST 24' OF TRAFFIC LANES (FIRST & SECOND LANE AND ONE HALF OF THE MEDIAN ON EACH SIDE OF THE ROADWAY) THE CROSS-SLOPE IS -0.020 FT/FT AND THE TRAFFIC LANES FROM 24' TO 36' (THE THIRD LANE) THE CROSS-SLOPE IS -0.025 FT/FT.



TANGENT SECTION



SUPERELEVATED SECTION

TABLE I
MINIMUM DESIGN SPEEDS FOR FREEWAYS (SEE PAGES 8-1 & 8-2)

LOCATION	MINIMUM DESIGN SPEED (MPH)
URBAN	50-60
RURAL	70
MOUNTAINOUS	50-60

TABLE II FREEWAY - DESIGN STANDARDS (G)

DESIGN STANDARDS (FOR GIVEN DESIGN SPEED)		DESIGN SPEEDS (MPH) 50	55	60	65	70	REMARKS
MINIMUM RADIUS (FT.) 0.08 MAX. S.E.		758	960	1200	1480	1810	SEE PAGE 3-32
MINIMUM STOPPING SIGHT DISTANCE (FT.)		425	495	570	645	730	SEE PAGE 3-4
MINIMUM "K" VALUE	CREST VERTICAL CURVE	84	114	151	193	247	SEE PAGE 3-155
	SAG VERTICAL CURVE	96	115	136	157	181	SEE PAGE 3-161
MAXIMUM GRADES % (F)	LEVEL TERRAIN	4	4	3	3	3	SEE PAGE 8-4
	ROLLING TERRAIN	5	5	4	4	4	
	MOUNTAINOUS TERRAIN	6	6	6	5	5	
FOR SUPERELEVATION SEE STANDARD DRAWINGS RD11-SE SERIES							

DESIGN NOTES

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHOULD NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWING RD11-S-11 FOR FILL AND CUT SLOPE TABLES. ROUNDING ON TOP OF CUT SLOPES AND TOE ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES SPECIAL ROCK TREATMENT AND SUBGRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONE.

(F) GRADES ONE PERCENT STEEPER THAN THE VALUE SHOWN MAY BE USED FOR EXTREME CASES IN URBAN AREAS WITH RIGHT-OF-WAY CONSTRAINTS OR WHERE NEEDED IN MOUNTAINOUS TERRAIN.

(G) ALTHOUGH THE SELECTED DESIGN SPEED ESTABLISHES THE LIMITING VALUES OF CURVE RADIUS AND MINIMUM SIGHT DISTANCE THAT SHOULD BE USED IN DESIGN, THERE SHOULD BE NO RESTRICTION ON THE USE OF FLATTER HORIZONTAL CURVES OR GREATER SIGHT DISTANCES WHERE SUCH IMPROVEMENTS CAN BE PROVIDED AS A PART OF AN ECONOMICAL DESIGN (SEE PAGE 2-55).

(H) ALL MEDIAN BARRIER WALLS SHALL BE SINGLE SLOPE BARRIER WALL. FOR BARRIER WALL DETAILS SEE STANDARD DRAWING S-SSMB SERIES.

GENERAL NOTES

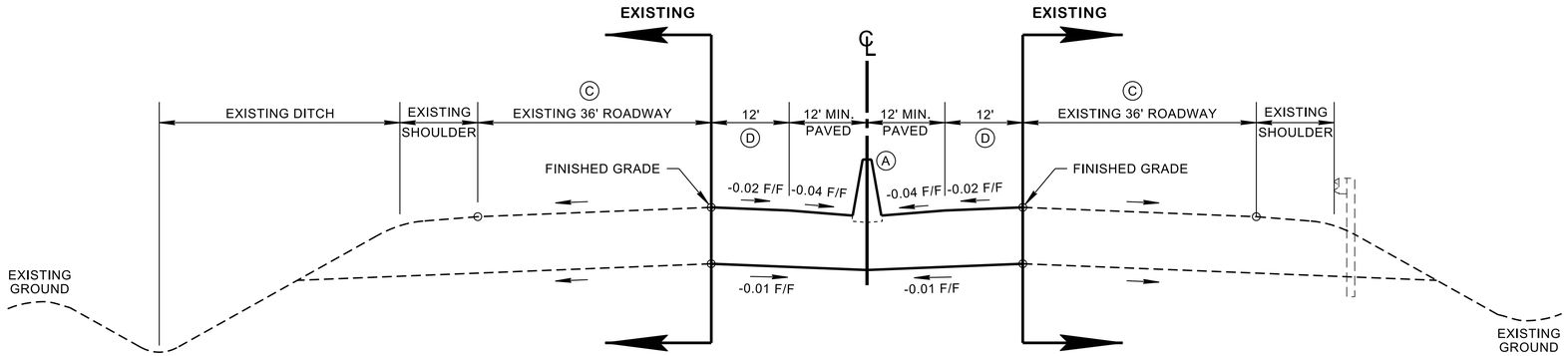
1. FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).
2. PAGE NUMBERS REFERRED TO ON THIS DRAWING ARE FROM "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), UNLESS OTHERWISE NOTED.
3. REFERENCE SHOULD ALSO BE MADE TO THE AASHTO "ROADSIDE DESIGN GUIDE," AASHTO, 2011.
4. DESIRABLE RIGHT-OF-WAY IS SLOPE LINES PLUS FIFTEEN FEET TO TWENTY FEET.
5. THE DESIGN OF BRIDGES, CULVERTS, WALLS, TUNNELS AND OTHER STRUCTURES SHALL BE IN ACCORDANCE WITH THE CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. STRUCTURES CARRYING FREEWAY TRAFFIC SHOULD BE HL-93 CALIBRATED LIVE LOAD DESIGNATION.
6. FOR EXISTING BRIDGES TO REMAIN IN PLACE, THEY SHOULD HAVE ADEQUATE STRUCTURAL STRENGTH AND A WIDTH AT LEAST EQUAL TO THE WIDTH OF THE TRAVELED WAY PLUS 2 FEET CLEARANCE ON EACH SIDE. BRIDGES SHOULD BE CONSIDERED FOR ULTIMATE WIDENING OR REPLACEMENT IF THEY DO NOT PROVIDE AT LEAST 3 FEET CLEARANCE ON EACH SIDE OR DO NOT PROVIDE HL-93 LIVE LOADING CAPACITY. AS AN INTERIM MEASURE, FOR NARROW BRIDGES, SPECIAL SIGNING AND DELINEATION TREATMENTS MAY BE CONSIDERED.
7. FOR INTERSTATES, SEE THE CURRENT EDITION OF AASHTO'S "A POLICY ON DESIGN STANDARDS-INTERSTATE SYSTEM," 2016.

NOT TO SCALE

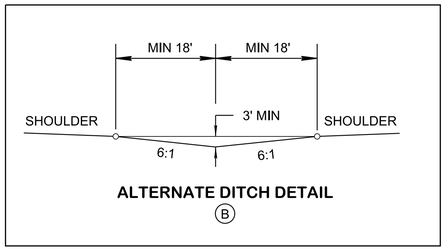
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

DESIGN STANDARDS FOR FREEWAYS WITH MEDIAN BARRIER (4 AND 6 LANE)

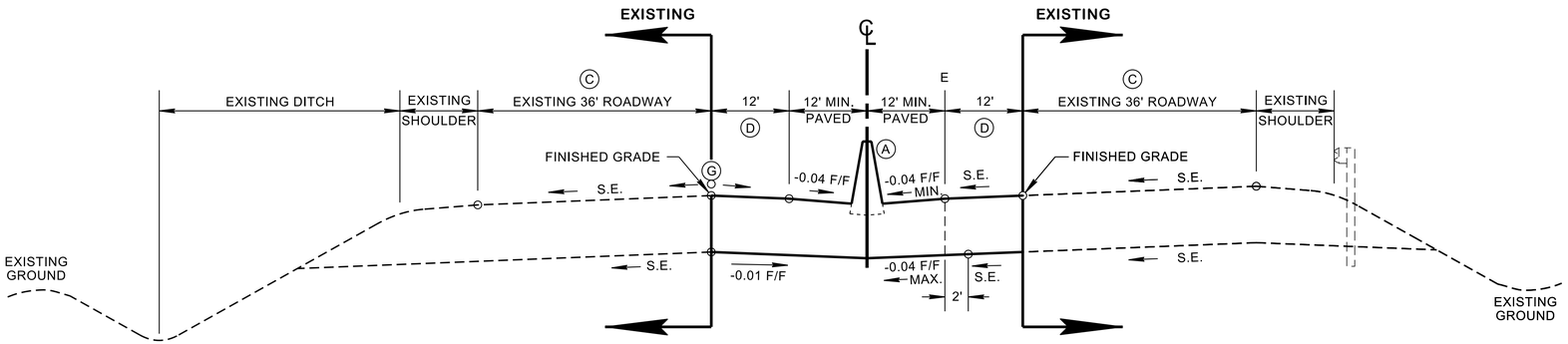
01-01-2019 | RD11-TS-5B



TANGENT SECTION



ALTERNATE DITCH DETAIL
(B)



SUPERELEVATED SECTION

DESIGN NOTES

(A) SEE STANDARD DRAWING S-SSMB SERIES FOR BARRIER WALL DETAILS.

(B) IF THE EXISTING MEDIAN IS WIDE ENOUGH, A MEDIAN DITCH MAY BE BUILT PROVIDING THAT THE DITCH IS AT LEAST 3 FEET DEEP AND THE FORE SLOPES ARE NO STEEPER THAN 6:1. SHORT SECTIONS OF DITCH BETWEEN SECTIONS OF MEDIAN WALL ARE UNDESIRABLE.

(C) EXISTING LANES TO REMAIN IN PLACE UNLESS OTHERWISE SPECIFIED.

(D) EXISTING INSIDE SHOULDERS REQUIRE FULL DEPTH REMOVAL UNLESS OTHERWISE SPECIFIED.

(E) GRADES ONE PERCENT STEEPER THAN THE VALUE SHOWN MAY BE USED FOR EXTREME CASES IN URBAN AREAS WITH RIGHT-OF-WAY CONSTRAINTS OR WHERE NEEDED IN MOUNTAINOUS TERRAIN.

(F) ALTHOUGH THE SELECTED DESIGN SPEED ESTABLISHES THE LIMITING VALUES OF CURVE RADIUS AND MINIMUM SIGHT DISTANCE THAT SHOULD BE USED IN DESIGN, THERE SHOULD BE NO RESTRICTION ON THE USE OF FLATTER HORIZONTAL CURVES OR GREATER SIGHT DISTANCES WHERE SUCH IMPROVEMENTS CAN BE PROVIDED AS A PART OF AN ECONOMICAL DESIGN (SEE PAGE 2-55).

(G) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHOULD NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

PURPOSE

THIS STANDARD IS ONLY TO BE USED FOR THE WIDENING OF EXISTING SIX LANE FREEWAYS WHERE THE NEW LANES TO BE ADDED UTILIZE THE EXISTING MEDIAN.

TABLE I FREEWAY - DESIGN STANDARDS (F)

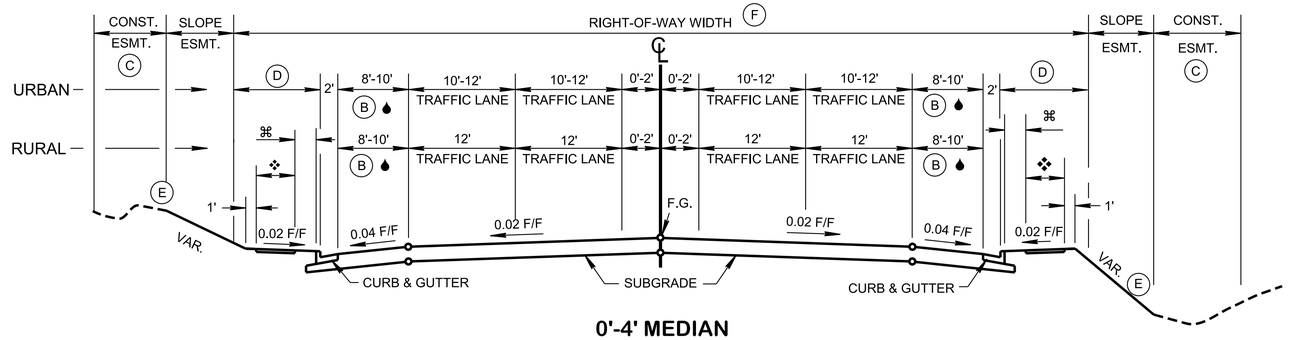
DESIGN STANDARDS (FOR GIVEN DESIGN SPEED)		DESIGN SPEEDS (MPH)					
		50	55	60	65	70	
MINIMUM RADIUS (FT.) 0.08 MAX. S.E.		758	960	1200	1480	1810	SEE PAGE 3-32
MINIMUM STOPPING SIGHT DISTANCE (FT.)		425	495	570	645	730	SEE PAGE 3-4
MINIMUM "K" VALUE	CREST VERTICAL CURVE	84	114	151	193	247	SEE PAGE 3-155
	SAG VERTICAL CURVE	96	115	136	157	181	SEE PAGE 3-161
MAXIMUM GRADES % (E)	LEVEL TERRAIN	4	4	3	3	3	SEE PAGE 8-4
	ROLLING TERRAIN	5	5	4	4	4	
	MOUNTAINOUS TERRAIN	6	6	6	5	5	
FOR SUPERELEVATION SEE STANDARD DRAWINGS RD11-SE SERIES							

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

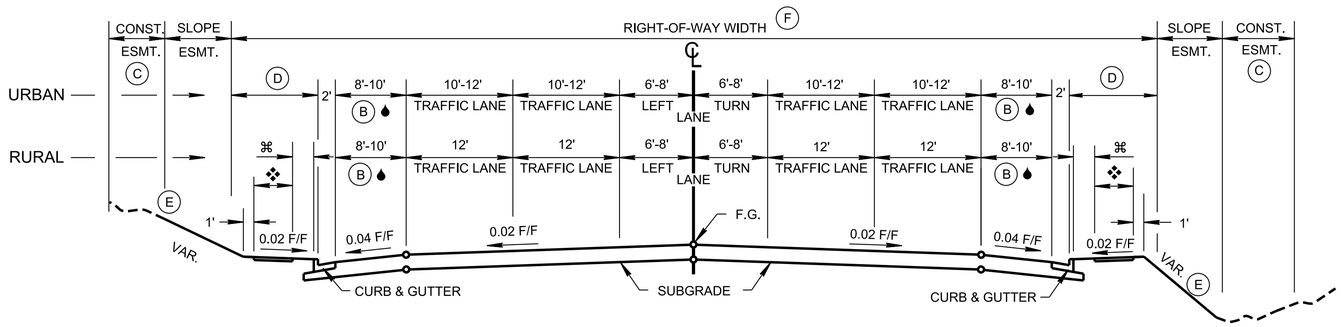
TYPICAL DETAILS FOR INSIDE LANE WIDENING OF FREEWAYS

01-01-2019 RD11-TS-5W

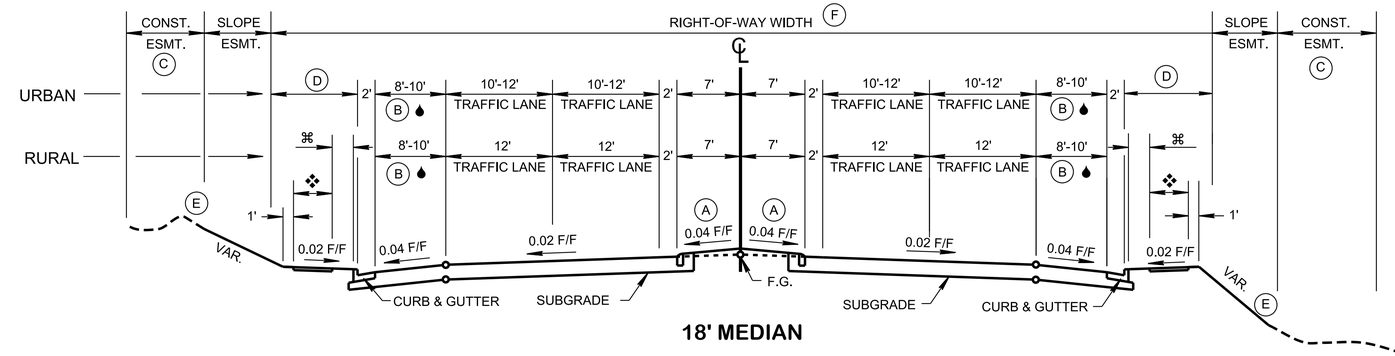
NOT TO SCALE



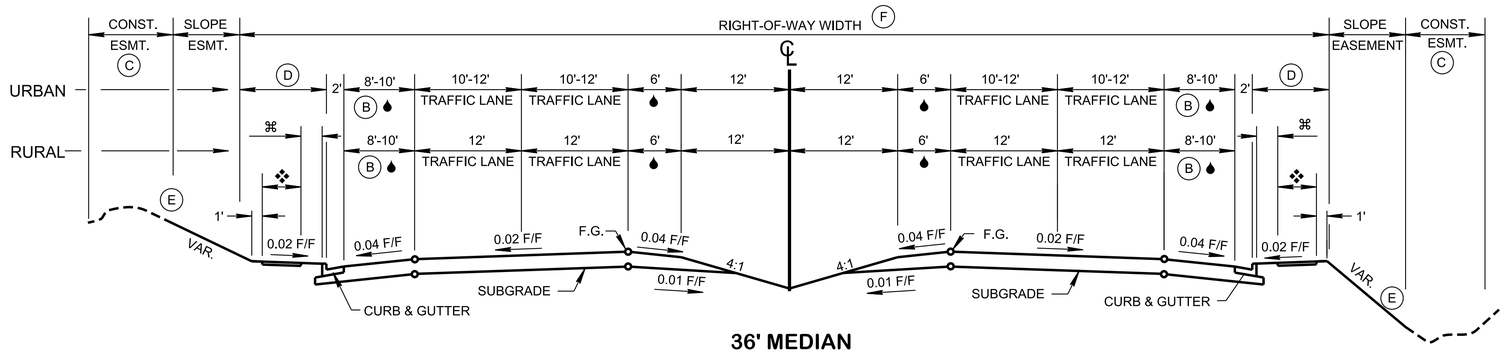
0'-4' MEDIAN



12'-16' MEDIAN



18' MEDIAN



36' MEDIAN

LEGEND

⌘ GRASS STRIP VARIES
(FOR LATERAL OFFSETS FOR SIDEWALK AND SHARED USE PATH SEE STD. DWG. MM-TS-2)

❖ SIDEWALK VARIES (5' MIN.)
(FOR LATERAL OFFSETS FOR SIDEWALK AND SHARED USE PATH SEE STD. DWG. MM-TS-2)
(FOR DETAILS FOR CONCRETE SIDEWALK SEE STD. DWG. MM-SW-1)

♦ SHOULDER
(FOR BIKE ACCOMMODATION DESIGN GUIDANCE SEE STD. DWG. MM-TS-1)

NOT TO SCALE

DESIGN NOTES

(A) MEDIAN CURBS - MEDIAN CURBS WILL BE SLOPING CURBS. VERTICAL CURBS WILL NOT BE PERMITTED.

(B) SHOULDER WIDTH - SHOULDER WIDTH WILL BE SPECIFIED IN THE TRANSPORTATION INVESTMENTS REPORT.

(C) CONSTRUCTION EASEMENT - 10 FEET MINIMUM IS DESIRABLE.

(D) RIGHT-OF-WAY WIDTH - 10 FT. MINIMUM WIDTH BEHIND FACE OF CURB. WHEN THE SIDEWALK IS LOCATED 9 FT OR MORE BEHIND THE FACE OF CURB, RIGHT-OF-WAY SHALL EXTEND 1 FT. BEHIND SIDEWALK.

(E) SLOPES - 3:1 SLOPES OR FLATTER ARE DESIRABLE AND ARE THE MAXIMUM IN REGION IV. 2:1 SLOPES ARE APPLICABLE IN AREAS WHERE RIGHT-OF-WAY RESTRICTIONS, ENVIRONMENTAL CONSIDERATIONS, OR COST WARRANTS A STEEPER THAN 3:1 SLOPE.

(F) **SERVICE APPURTENANCE** (LARGE SIGNS STRUCTURES, SIGNAL, LUMINARY AND UTILITY POLES) SHALL BE PLACED OUTSIDE THE PEDESTRIAN ACCESSIBLE SPACE, PREFERABLE OUTSIDE THE SIDEWALK AREA AND INSIDE RIGHT-OF-WAY.

GENERAL NOTES

(1) THESE SECTIONS ARE GENERALLY FOR URBAN AND SUBURBAN ROADWAYS WITH DESIGN SPEEDS OF 45 MILES PER HOUR OR LESS OR FOR RURAL AND SUBURBAN ROADWAYS WITH DESIGN SPEEDS OF 55 MPH OR LESS WHERE ENVIRONMENTAL OR OTHER FACTORS LIMIT THE RIGHT-OF-WAY AVAILABLE.

(2) OUTSIDE CURBS - FOR DESIGN SPEEDS OF LESS THAN 45 MPH, A 6" VERTICAL CURB SHOULD BE USED. FOR DESIGN SPEEDS 45-55 MPH, 6 INCH SLOPING CURBS SHALL BE USED.

(3) SUPERELEVATION AND MEDIAN BARRIERS - SEE "ROADSIDE DESIGN GUIDE", AASHTO 2011 AND RD11-SE-SERIES STANDARD DRAWINGS.

(4) SIDEWALKS - SEE STANDARD DRAWING RD11-TS-6B WHEN SIDEWALK IS LOCATED NEXT TO THE CURB. SIDEWALK WIDTH SHOULD BE A MINIMUM OF FIVE FEET WIDE. ALL SIDEWALKS SHALL BE ADA COMPLIANT.

(5) ABOVE GROUND UTILITIES - ABOVE GROUND UTILITIES SHOULD BE LOCATED BEHIND THE SIDEWALK AND CLOSE TO THE BACK OF RIGHT-OF-WAY.

(6) GRASS STRIP - ABOVE GROUND UTILITIES SHALL NOT BE PLACED IN THE GRASS STRIP. THE GRASS STRIP SHOULD BE 2 FT. TO 5 FT. WIDE.

(7) PARKING - REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), ARTERIALS- PAGE 7-34.

(8) BICYCLE AND PEDESTRIAN FACILITIES - REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), (PAGE 5-15 LOCAL ROADS, PAGE 6-7 RURAL COLLECTORS, PAGE 6-16 URBAN COLLECTORS, PAGE 7-25 URBAN ARTERIALS, AND PAGE 7-41 RURAL ARTERIALS) AND "GUIDE FOR THE DEVELOPMENT OF BICYCLE FACILITIES", AASHTO 2012 AND "GUIDE FOR THE PLANNING, DESIGN AND OPERATION OF PEDESTRIAN FACILITIES", AASHTO 2017. SEE STANDARD DRAWING NO. MM-TS-1 & 2 FOR DETAILS.

(9) **RURAL SECTIONS**

FOR DESIGN SPEED, ALIGNMENT, GRADE, AND OTHER DESIGN STANDARDS REFER TO THE FOLLOWING STANDARD DRAWINGS AS APPROPRIATE:

LOCAL ROADS - RD11-TS-1A
COLLECTOR ROADS - RD11-TS-2, RD11-TS-2A, RD11-TS-2B
ARTERIAL ROADS - RD11-TS-3, RD11-TS-3A, RD11-TS-3B, RD11-TS-3C

(10) **DESIGN SPEED - URBAN SECTIONS**

URBAN ROADS - DESIGN SPEEDS FOR URBAN ARTERIALS GENERALLY RANGE FROM 30-55 MPH WITH LOWER SPEEDS APPLYING IN CENTRAL BUSINESS DISTRICTS AND IN MORE DEVELOPED AREAS, WHILE HIGHER SPEEDS ARE MORE APPLICABLE TO OUTLYING SUBURBAN AND DEVELOPING AREAS.

COLLECTOR ROADS - DESIGN SPEEDS OF 30 MPH OR HIGHER SHOULD BE USED WITH CONSIDERATION GIVEN TO AVAILABLE RIGHT-OF-WAY, TERRAIN, ADJACENT DEVELOPMENT, AND PEDESTRIAN PRESENCE. SEE PAGE 2-53 THRU 2-58 AND 6-11 THRU 6-16 FOR ADDITIONAL INFORMATION.

LOCAL ROADS - DESIGN SPEED IS NOT A MAJOR FACTOR, FOR CONSISTENCY IN DESIGN ELEMENTS DESIGN SPEEDS RANGING FROM 20-30 MPH MAY BE USED.

(11) **GENERAL DESIGN CONSIDERATIONS AND CROSS-SECTIONAL ELEMENTS - URBAN SECTIONS**

SEE "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).

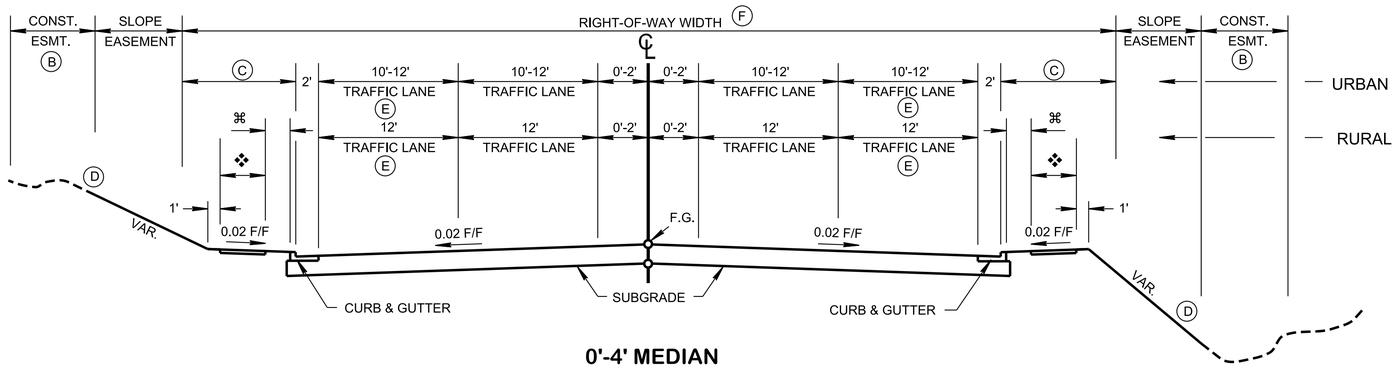
LOCAL ROADS - PAGES 5-11 THRU 5-19
COLLECTORS ROADS - PAGES 6-11 THRU 6-16
ARTERIAL ROADS - PAGES 7-26 THRU 7-38

(12) SUBURBAN ROADWAYS - FOR DESIGN OF ARTERIAL AND COLLECTOR ROADWAYS DESIGNERS SHOULD FOLLOW GUIDANCE FOR URBAN SECTIONS. FOR LOCAL ROADS CONSIDERATION SHOULD BE GIVEN TO THE CONTEXT OF THE ROADWAY REGARDING WHETHER THE FACILITY SHOULD BE DESIGNED TO URBAN OR RURAL STANDARDS.

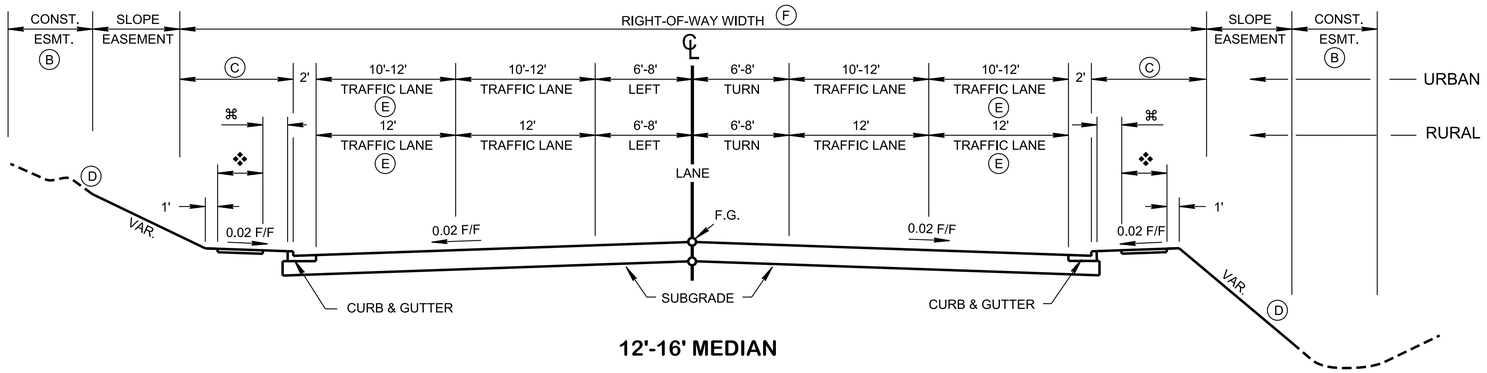
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

TYPICAL CURB & GUTTER SECTIONS WITH SHOULDERS AND WITH GRASS STRIPS

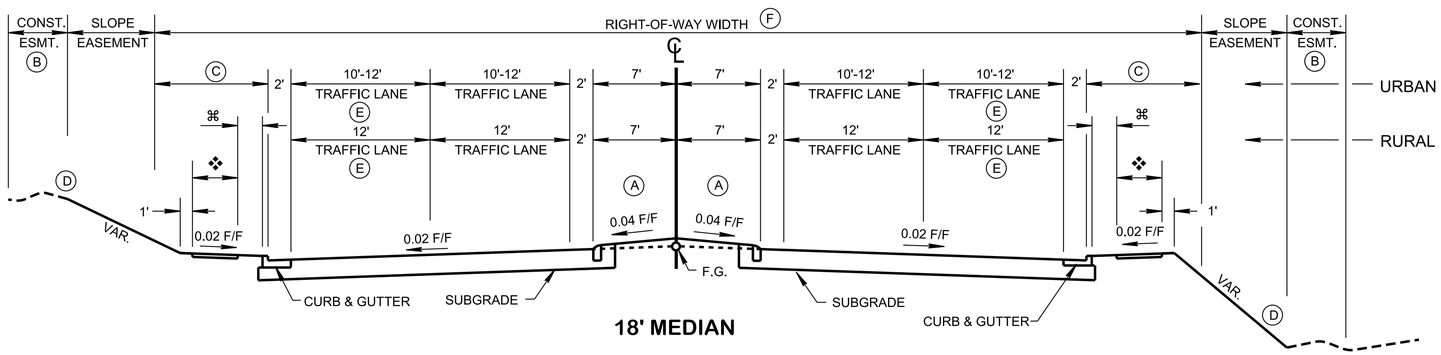
01-01-2019 | RD11-TS-6



0'-4' MEDIAN



12'-16' MEDIAN



18' MEDIAN

LEGEND

⌘ GRASS STRIP VARIES
(FOR LATERAL OFFSETS FOR SIDEWALK AND SHARED USE PATH SEE STD. DWG. MM-TS-2)

❖ SIDEWALK VARIES (5' MIN.)
(FOR LATERAL OFFSETS FOR SIDEWALK AND SHARED USE PATH SEE STD. DWG. MM-TS-2)
(FOR DETAILS FOR CONCRETE SIDEWALK SEE STD. DWG. MM-SW-1)

NOT TO SCALE

DESIGN NOTES

(A) MEDIAN CURBS - MEDIAN CURBS WILL BE SLOPING CURBS. VERTICAL CURBS WILL NOT BE PERMITTED.

(B) CONSTRUCTION EASEMENT - 10 FEET MINIMUM IS DESIRABLE.

(C) RIGHT-OF-WAY WIDTH - 10 FT. MINIMUM WIDTH BEHIND FACE OF CURB. WHEN THE SIDEWALK IS LOCATED 9 FT OR MORE BEHIND THE FACE OF CURB, RIGHT-OF-WAY SHALL EXTEND 1 FT. BEHIND SIDEWALK.

(D) SLOPES - 3:1 SLOPES OR FLATTER ARE DESIRABLE AND ARE THE MAXIMUM IN REGION IV. 2:1 SLOPES ARE APPLICABLE IN AREAS WHERE RIGHT-OF-WAY RESTRICTIONS, ENVIRONMENTAL CONSIDERATIONS, OR COST WARRANTS A STEEPER THAN 3:1 SLOPE.

(E) 14' LANE WIDTH SHOULD BE CONSIDERED FOR SHARED LANES. FOR BIKE ACCOMMODATION DESIGN GUIDANCE SEE STD. DWG. MM-TS-1.

(F) **SERVICE APPURTENANCE** (LARGE SIGNS STRUCTURES, SIGNAL, LUMINARY AND UTILITY POLES) SHALL BE PLACED OUTSIDE THE PEDESTRIAN ACCESSIBLE SPACE, PREFERABLE OUTSIDE THE SIDEWALK AREA AND INSIDE RIGHT-OF-WAY.

GENERAL NOTES

(1) THESE SECTIONS ARE FOR URBAN AND SUBURBAN ROADWAYS OR RURAL ROADWAYS WHERE ENVIRONMENTAL OR OTHER FACTORS LIMIT THE RIGHT-OF-WAY AVAILABLE WITH DESIGN SPEEDS OF 45 MILES PER HOUR OR LESS.

(2) OUTSIDE CURBS - FOR DESIGN SPEEDS OF LESS THAN 45 MPH, A 6" VERTICAL CURB SHOULD BE USED. FOR 45 MPH DESIGN, 6 INCH SLOPING CURBS SHALL BE USED.

(3) SUPERELEVATION AND MEDIAN BARRIERS - SEE "ROADSIDE DESIGN GUIDE", AASHTO 2011 AND RD11-SE-SERIES STANDARD DRAWINGS.

(4) SIDEWALKS - SEE STANDARD DRAWING RD11-TS-6C WHEN SIDEWALK IS LOCATED NEXT TO THE CURB. SIDEWALK WIDTH SHOULD BE A MINIMUM OF FIVE FEET WIDE. ALL SIDEWALKS SHALL BE ADA COMPLIANT.

(5) ABOVE GROUND UTILITIES - ABOVE GROUND UTILITIES SHOULD BE LOCATED BEHIND THE SIDEWALK AND CLOSE TO THE BACK OF RIGHT-OF-WAY.

(6) GRASS STRIP - ABOVE GROUND UTILITIES SHALL NOT BE PLACED IN THE GRASS STRIP. THE GRASS STRIP SHOULD BE 2 FT. TO 5 FT. WIDE.

(7) PARKING - REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), ARTERIALS- PAGE 7-34.

(8) BICYCLE AND PEDESTRIAN FACILITIES - REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), (PAGE 5-15 LOCAL ROADS, PAGE 6-7 RURAL COLLECTORS, PAGE 6-16 URBAN COLLECTORS, PAGE 7-25 URBAN ARTERIALS, AND PAGE 7-41 RURAL ARTERIALS) AND "GUIDE FOR THE DEVELOPMENT OF BICYCLE FACILITIES", AASHTO 2012 AND "GUIDE FOR THE PLANNING, DESIGN AND OPERATION OF PEDESTRIAN FACILITIES", AASHTO 2017. SEE STANDARD DRAWING NO. MM-TS-1 & 2 FOR DETAILS.

(9) **RURAL SECTIONS**

FOR DESIGN SPEED, ALIGNMENT, GRADE, AND OTHER DESIGN STANDARDS REFER TO THE FOLLOWING STANDARD DRAWINGS AS APPROPRIATE:

LOCAL ROADS - RD11-TS-1A
COLLECTOR ROADS - RD11-TS-2, RD11-TS-2A, RD11-TS-2B
ARTERIAL ROADS - RD11-TS-3, RD11-TS-3A, RD11-TS-3B, RD11-TS-3C

(10) **DESIGN SPEED - URBAN SECTIONS**

URBAN ROADS - DESIGN SPEEDS FOR URBAN ARTERIALS GENERALLY RANGE FROM 30-55 MPH WITH LOWER SPEEDS APPLYING IN CENTRAL BUSINESS DISTRICTS AND IN MORE DEVELOPED AREAS, WHILE HIGHER SPEEDS ARE MORE APPLICABLE TO OUTLYING SUBURBAN AND DEVELOPING AREAS.

COLLECTOR ROADS - DESIGN SPEEDS OF 30 MPH OR HIGHER SHOULD BE USED WITH CONSIDERATION GIVEN TO AVAILABLE RIGHT-OF-WAY, TERRAIN, ADJACENT DEVELOPMENT, AND PEDESTRIAN PRESENCE. SEE PAGE 2-53 THRU 2-58 AND 6-11 THRU 6-16 FOR ADDITIONAL INFORMATION.

LOCAL ROADS - DESIGN SPEED IS NOT A MAJOR FACTOR, FOR CONSISTENCY IN DESIGN ELEMENTS DESIGN SPEEDS RANGING FROM 20-30 MPH MAY BE USED.

(11) **GENERAL DESIGN CONSIDERATIONS AND CROSS-SECTIONAL ELEMENTS - URBAN SECTIONS**

SEE "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).

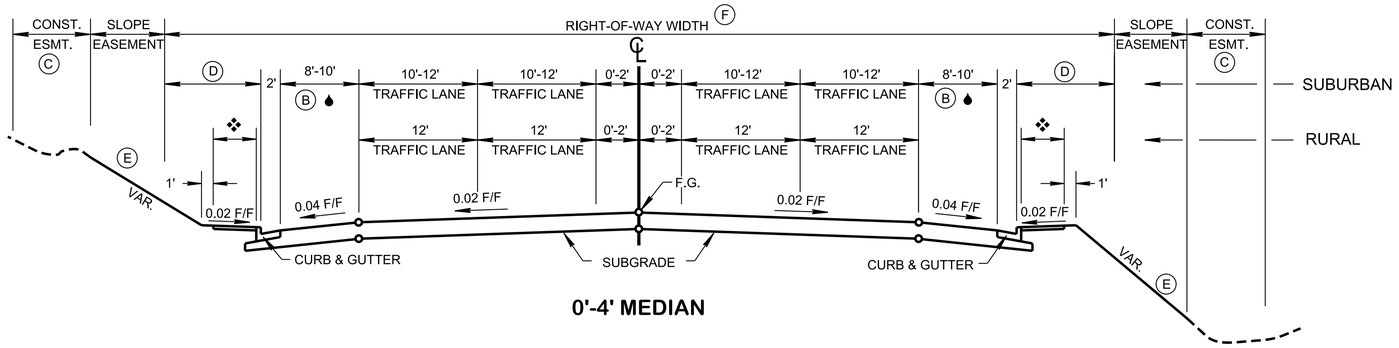
LOCAL ROADS - PAGES 5-11 THRU 5-19
COLLECTORS ROADS - PAGES 6-11 THRU 6-16
ARTERIAL ROADS - PAGES 7-26 THRU 7-38

(12) SUBURBAN ROADWAYS - FOR DESIGN OF ARTERIAL AND COLLECTOR ROADWAYS DESIGNERS SHOULD FOLLOW GUIDANCE FOR URBAN SECTIONS. FOR LOCAL ROADS CONSIDERATION SHOULD BE GIVEN TO THE CONTEXT OF THE ROADWAY REGARDING WHETHER THE FACILITY SHOULD BE DESIGNED TO URBAN OR RURAL STANDARDS.

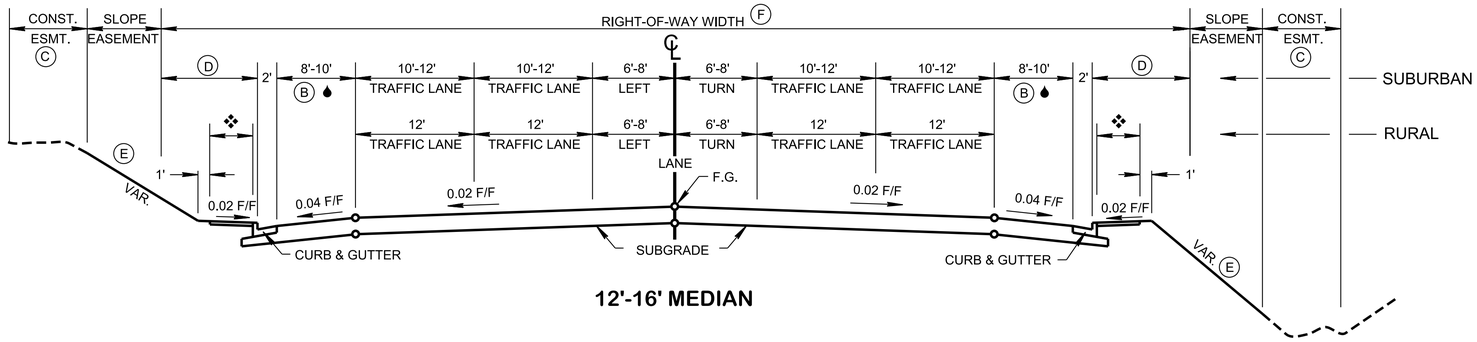
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

TYPICAL CURB & GUTTER SECTIONS WITHOUT SHOULDERS AND WITH GRASS STRIPS

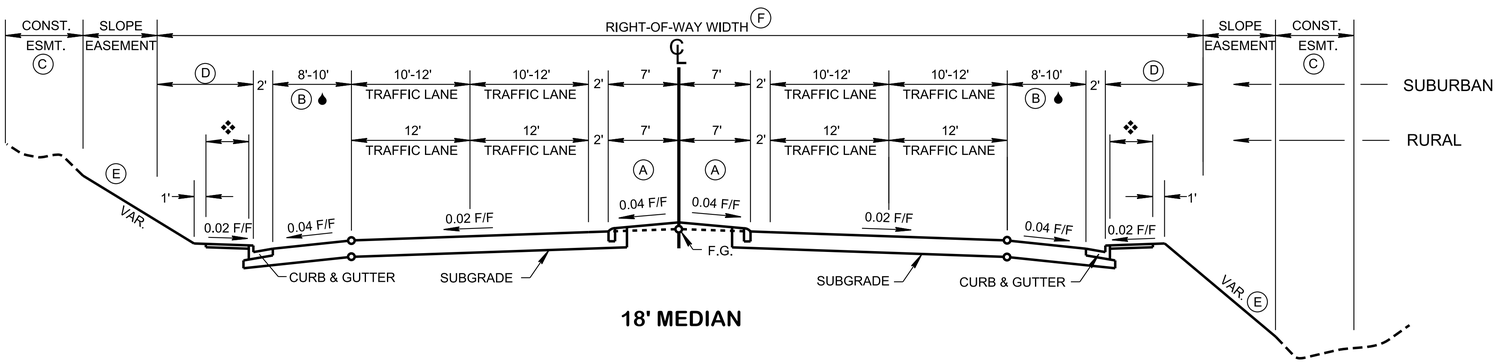
01-01-2019 | RD11-TS-6A



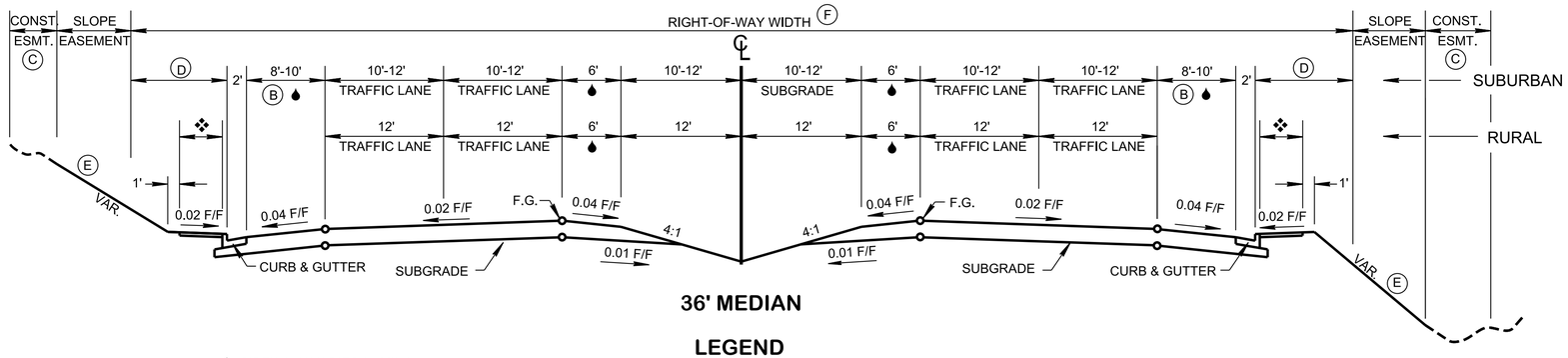
0'-4' MEDIAN



12'-16' MEDIAN



18' MEDIAN



36' MEDIAN

LEGEND

❖ SIDEWALK VARIES (5' MIN.)
(FOR LATERAL OFFSETS FOR SIDEWALK AND SHARED USE PATH SEE STD. DWG. MM-TS-2)
(FOR DETAILS FOR CONCRETE SIDEWALK SEE STD. DWG. MM-SW-1)

♦ SHOULDER
(FOR BIKE ACCOMMODATION DESIGN GUIDANCE SEE STD. DWG. MM-TS-1)

NOT TO SCALE

DESIGN NOTES

(A) MEDIAN CURBS - MEDIAN CURBS WILL BE SLOPING CURBS. VERTICAL CURBS WILL NOT BE PERMITTED.

(B) SHOULDER WIDTH - SHOULDER WIDTH WILL BE SPECIFIED IN THE TRANSPORTATION INVESTMENT REPORT.

(C) CONSTRUCTION EASEMENT - 10 FEET MINIMUM IS DESIRABLE.

(D) RIGHT-OF-WAY WIDTH - 10 FT. MINIMUM WIDTH BEHIND FACE OF CURB. WHEN THE SIDEWALK IS LOCATED 9 FT OR MORE BEHIND THE FACE OF CURB, RIGHT-OF-WAY SHALL EXTEND 1 FT. BEHIND SIDEWALK.

(E) SLOPES - 3:1 SLOPES OR FLATTER ARE DESIRABLE AND ARE THE MAXIMUM IN REGION IV. 2:1 SLOPES ARE APPLICABLE IN AREAS WHERE RIGHT-OF-WAY RESTRICTIONS, ENVIRONMENTAL CONSIDERATIONS, OR COST WARRANTS A STEEPER THAN 3:1 SLOPE.

(F) **SERVICE APPURTENANCE** (LARGE SIGNS STRUCTURES, SIGNAL, LUMINARY AND UTILITY POLES) SHALL BE PLACED OUTSIDE THE PEDESTRIAN ACCESSIBLE SPACE, PREFERABLE OUTSIDE THE SIDEWALK AREA AND INSIDE RIGHT-OF-WAY.

GENERAL NOTES

1. THIS STANDARD DRAWING IS INTENDED TO BE USED IN TRANSITIONAL ZONES (SUBURBAN) BETWEEN RURAL AND FULLY DEVELOPED URBAN AREAS WHERE CURB AND GUTTER IS NEEDED FOR DRAINAGE OR TO LIMIT RIGHT OF WAY, WITH DESIGN SPEEDS OF 55 MPH OR LESS.

2. OUTSIDE CURBS - FOR DESIGN SPEEDS OF LESS THAN 45 MPH, A 6" VERTICAL CURB SHOULD BE USED. FOR DESIGN SPEEDS 45-55 MPH, 6 INCH SLOPING CURBS SHALL BE USED.

3. SUPERELEVATION AND MEDIAN BARRIERS - SEE "ROADSIDE DESIGN GUIDE", AASHTO 2011 AND RD11-SE-SERIES STANDARD DRAWINGS.

4. SIDEWALKS - SEE STANDARD DRAWING RD11-TS-6 WHEN GRASS STRIP IS LOCATED BETWEEN THE CURB AND SIDEWALK. SIDEWALK WIDTH SHALL NOT INCLUDE THE SIX INCH WIDTH OF PROPOSED CURB. SIDEWALK WIDTH SHOULD BE A MINIMUM OF FIVE FEET WIDE. ALL SIDEWALKS SHALL BE ADA COMPLIANT.

5. ABOVE GROUND UTILITIES - ABOVE GROUND UTILITIES SHOULD BE LOCATED BEHIND THE SIDEWALK AND CLOSE TO THE BACK OF RIGHT-OF-WAY.

6. PARKING - REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), ARTERIALS- PAGE 7-34.

7. BICYCLE AND PEDESTRIAN FACILITIES - REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), (PAGE 5-15 LOCAL ROADS, PAGE 6-7 RURAL COLLECTORS, PAGE 6-16 URBAN COLLECTORS, PAGE 7-25 URBAN ARTERIALS, AND PAGE 7-41 RURAL ARTERIALS) AND "GUIDE FOR THE DEVELOPMENT OF BICYCLE FACILITIES", AASHTO 2012 AND "GUIDE FOR THE PLANNING, DESIGN AND OPERATION OF PEDESTRIAN FACILITIES", AASHTO 2017. SEE STANDARD DRAWING NO. MM-TS-1 & 2 FOR DETAILS.

8. **RURAL SECTIONS**

   FOR DESIGN SPEED, ALIGNMENT, GRADE, AND OTHER DESIGN STANDARDS REFER TO THE FOLLOWING STANDARD DRAWINGS AS APPROPRIATE:

   LOCAL ROADS - RD11-TS-1A
   COLLECTOR ROADS - RD11-TS-2, RD11-TS-2A, RD11-TS-2B
   ARTERIAL ROADS - RD11-TS-3, RD11-TS-3A, RD11-TS-3B, RD11-TS-3C

9. **DESIGN SPEED - URBAN SECTIONS**

   URBAN ROADS - DESIGN SPEEDS FOR URBAN ARTERIALS GENERALLY RANGE FROM 30-55 MPH WITH LOWER SPEEDS APPLYING IN CENTRAL BUSINESS DISTRICTS AND IN MORE DEVELOPED AREAS, WHILE HIGHER SPEEDS ARE MORE APPLICABLE TO OUTLYING SUBURBAN AND DEVELOPING AREAS.

   COLLECTOR ROADS - DESIGN SPEEDS OF 30 MPH OR HIGHER SHOULD BE USED WITH CONSIDERATION GIVEN TO AVAILABLE RIGHT-OF-WAY, TERRAIN, ADJACENT DEVELOPMENT, AND PEDESTRIAN PRESENCE. SEE PAGE 2-53 THRU 2-58 AND 6-11 THRU 6-16 FOR ADDITIONAL INFORMATION.

   LOCAL ROADS - DESIGN SPEED IS NOT A MAJOR FACTOR, FOR CONSISTENCY IN DESIGN ELEMENTS DESIGN SPEEDS RANGING FROM 20-30 MPH MAY BE USED.

10. **GENERAL DESIGN CONSIDERATIONS AND CROSS-SECTIONAL ELEMENTS - URBAN SECTIONS**

    SEE "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).

    LOCAL ROADS - PAGES 5-11 THRU 5-19
    COLLECTORS ROADS - PAGES 6-11 THRU 6-16
    ARTERIAL ROADS - PAGES 7-26 THRU 7-38

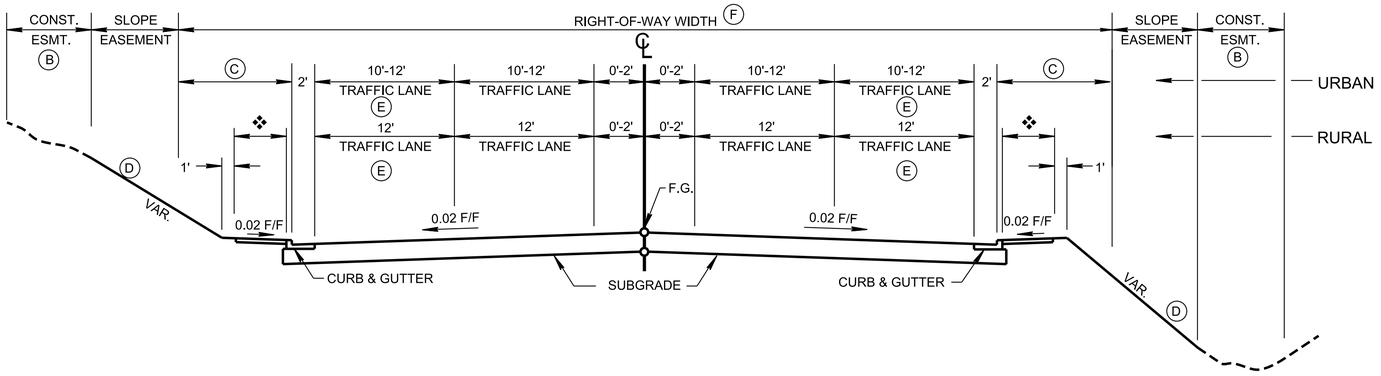
11. SUBURBAN ROADWAYS - FOR DESIGN OF ARTERIAL AND COLLECTOR ROADWAYS DESIGNERS SHOULD FOLLOW GUIDANCE FOR URBAN SECTIONS. FOR LOCAL ROADS CONSIDERATION SHOULD BE GIVEN TO THE CONTEXT OF THE ROADWAY REGARDING WHETHER THE FACILITY SHOULD BE DESIGNED TO URBAN OR RURAL STANDARDS.

12. ON STREET PARKING IS NOT PERMITTED ON HIGH SPEED SUBURBAN ROADWAYS.

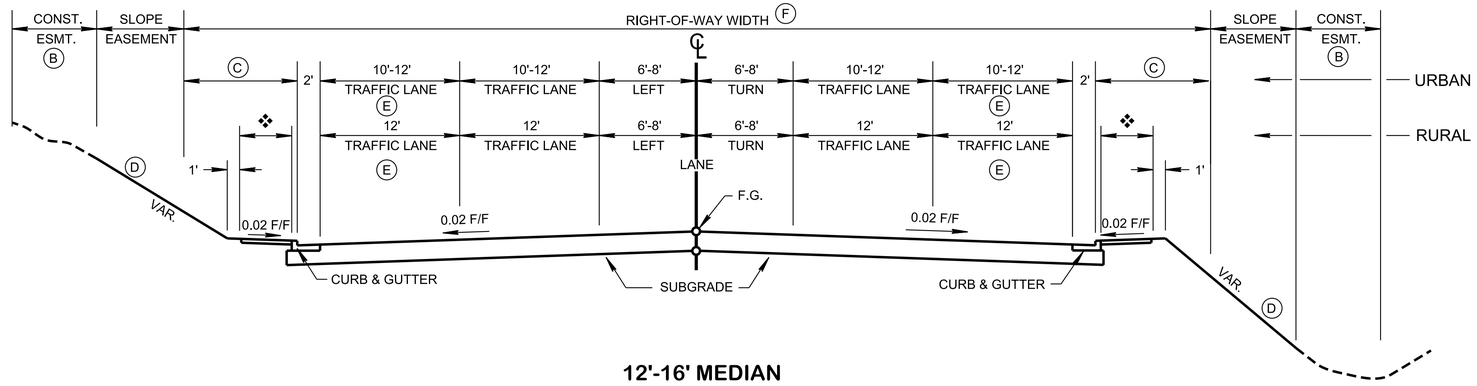
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

TYPICAL CURB & GUTTER SECTIONS WITH SHOULDERS AND WITHOUT GRASS STRIPS

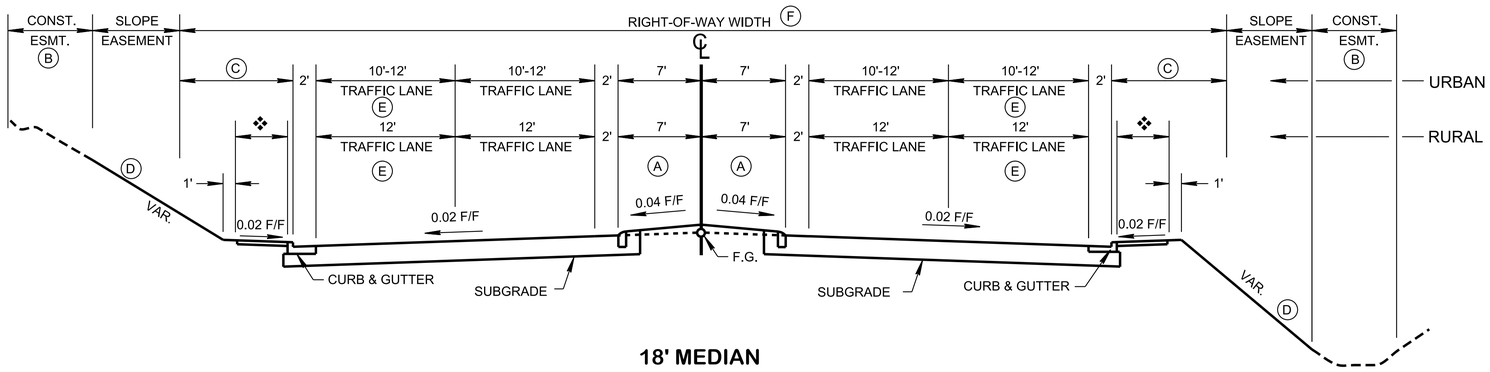
01-01-2019 | RD11-TS-6B



0'-4' MEDIAN



12'-16' MEDIAN



18' MEDIAN

LEGEND

❖
SIDEWALK VARIES (5' MIN.)
(FOR LATERAL OFFSETS FOR SIDEWALK AND SHARED USE PATH SEE STD. DWG. MM-TS-2)
(FOR DETAILS FOR CONCRETE SIDEWALK SEE STD. DWG. MM-SW-1)

DESIGN NOTES

Ⓐ MEDIAN CURBS - MEDIAN CURBS WILL BE SLOPING CURBS. VERTICAL CURBS WILL NOT BE PERMITTED.

Ⓑ CONSTRUCTION EASEMENT - 10 FEET MINIMUM IS DESIRABLE.

Ⓒ RIGHT-OF-WAY WIDTH - 10 FT. MINIMUM WIDTH BEHIND FACE OF CURB. WHEN THE SIDEWALK IS LOCATED 9 FT OR MORE BEHIND THE FACE OF CURB, RIGHT-OF-WAY SHALL EXTEND 1 FT. BEHIND SIDEWALK.

Ⓓ SLOPES - 3:1 SLOPES OR FLATTER ARE DESIRABLE AND ARE THE MAXIMUM IN REGION IV. 2:1 SLOPES ARE APPLICABLE IN AREAS WHERE RIGHT-OF-WAY RESTRICTIONS, ENVIRONMENTAL CONSIDERATIONS, OR COST WARRANTS A STEEPER THAN 3:1 SLOPE.

Ⓔ 14' LANE WIDTH SHOULD BE CONSIDERED FOR SHARED LANES.

Ⓕ **SERVICE APPURTENANCE** (LARGE SIGNS STRUCTURES, SIGNAL, LUMINARY AND UTILITY POLES) SHALL BE PLACED OUTSIDE THE PEDESTRIAN ACCESSIBLE SPACE, PREFERABLE OUTSIDE THE SIDEWALK AREA AND INSIDE RIGHT-OF-WAY.

GENERAL NOTES

① THESE SECTIONS ARE FOR URBAN AND SUBURBAN ROADWAYS OR RURAL ROADWAYS WHERE ENVIRONMENTAL OR OTHER FACTORS LIMIT THE RIGHT-OF-WAY AVAILABLE WITH DESIGN SPEEDS OF 45 MILES PER HOUR OR LESS.

② OUTSIDE CURBS - FOR DESIGN SPEEDS OF LESS THAN 45 MPH, A 6" VERTICAL CURB SHOULD BE USED. FOR 45 MPH DESIGN, 6 INCH SLOPING CURBS SHALL BE USED.

③ SUPERELEVATION AND MEDIAN BARRIERS - SEE "ROADSIDE DESIGN GUIDE", AASHTO 2011 AND RD11-SE-SERIES STANDARD DRAWINGS.

④ SIDEWALKS - SEE STANDARD DRAWING RD11-TS-6A WHEN GRASS STRIP IS LOCATED BETWEEN THE CURB AND SIDEWALK. SIDEWALK WIDTH SHALL NOT INCLUDE THE SIX INCH WIDTH OF PROPOSED CURB. SIDEWALK WIDTH SHOULD BE A MINIMUM OF FIVE FEET WIDE. ALL SIDEWALKS SHALL BE ADA COMPLIANT.

⑤ ABOVE GROUND UTILITIES - ABOVE GROUND UTILITIES SHOULD BE LOCATED BEHIND THE SIDEWALK AND CLOSE TO THE BACK OF RIGHT-OF-WAY.

⑥ PARKING - REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), ARTERIALS- PAGE 7-34.

⑦ BICYCLE AND PEDESTRIAN FACILITIES - REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), (PAGE 5-15 LOCAL ROADS, PAGE 6-7 RURAL COLLECTORS, PAGE 6-16 URBAN COLLECTORS, PAGE 7-25 URBAN ARTERIALS, AND PAGE 7-41 RURAL ARTERIALS) AND "GUIDE FOR THE DEVELOPMENT OF BICYCLE FACILITIES", AASHTO 2012 AND "GUIDE FOR THE PLANNING, DESIGN AND OPERATION OF PEDESTRIAN FACILITIES", AASHTO 2017. SEE STANDARD DRAWING NO. MM-TS-1 & 2 FOR DETAILS.

⑧ **RURAL SECTIONS**
FOR DESIGN SPEED, ALIGNMENT, GRADE, AND OTHER DESIGN STANDARDS REFER TO THE FOLLOWING STANDARD DRAWINGS AS APPROPRIATE:

LOCAL ROADS - RD11-TS-1
COLLECTOR ROADS - RD11-TS-2, RD11-TS-2A, RD11-TS-2B
ARTERIAL ROADS - RD11-TS-3, RD11-TS-3A, RD11-TS-3B, RD11-TS-3C

⑨ **DESIGN SPEED - URBAN SECTIONS**

URBAN ROADS - DESIGN SPEEDS FOR URBAN ARTERIALS GENERALLY RANGE FROM 30-55 MPH WITH LOWER SPEEDS APPLYING IN CENTRAL BUSINESS DISTRICTS AND IN MORE DEVELOPED AREAS, WHILE HIGHER SPEEDS ARE MORE APPLICABLE TO OUTLYING SUBURBAN AND DEVELOPING AREAS.

COLLECTOR ROADS - DESIGN SPEEDS OF 30 MPH OR HIGHER SHOULD BE USED WITH CONSIDERATION GIVEN TO AVAILABLE RIGHT-OF-WAY, TERRAIN, ADJACENT DEVELOPMENT, AND PEDESTRIAN PRESENCE. SEE PAGE 2-53 THRU 2-58 AND 6-11 THRU 6-16 FOR ADDITIONAL INFORMATION.

LOCAL ROADS - DESIGN SPEED IS NOT A MAJOR FACTOR, FOR CONSISTENCY IN DESIGN ELEMENTS DESIGN SPEEDS RANGING FROM 20-30 MPH MAY BE USED.

⑩ **GENERAL DESIGN CONSIDERATIONS AND CROSS-SECTIONAL ELEMENTS - URBAN SECTIONS**

SEE "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).

LOCAL ROADS - PAGES 5-11 THRU 5-19
COLLECTORS ROADS - PAGES 6-11 THRU 6-16
ARTERIAL ROADS - PAGES 7-26 THRU 7-38

⑪ SUBURBAN ROADWAYS - FOR DESIGN OF ARTERIAL AND COLLECTOR ROADWAYS DESIGNERS SHOULD FOLLOW GUIDANCE FOR URBAN SECTIONS. FOR LOCAL ROADS CONSIDERATION SHOULD BE GIVEN TO THE CONTEXT OF THE ROADWAY REGARDING WHETHER THE FACILITY SHOULD BE DESIGNED TO URBAN OR RURAL STANDARDS.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

TYPICAL CURB & GUTTER SECTIONS WITHOUT SHOULDERS AND WITHOUT GRASS STRIPS

01-01-2019 | RD11-TS-6C

NOT TO SCALE

LLP

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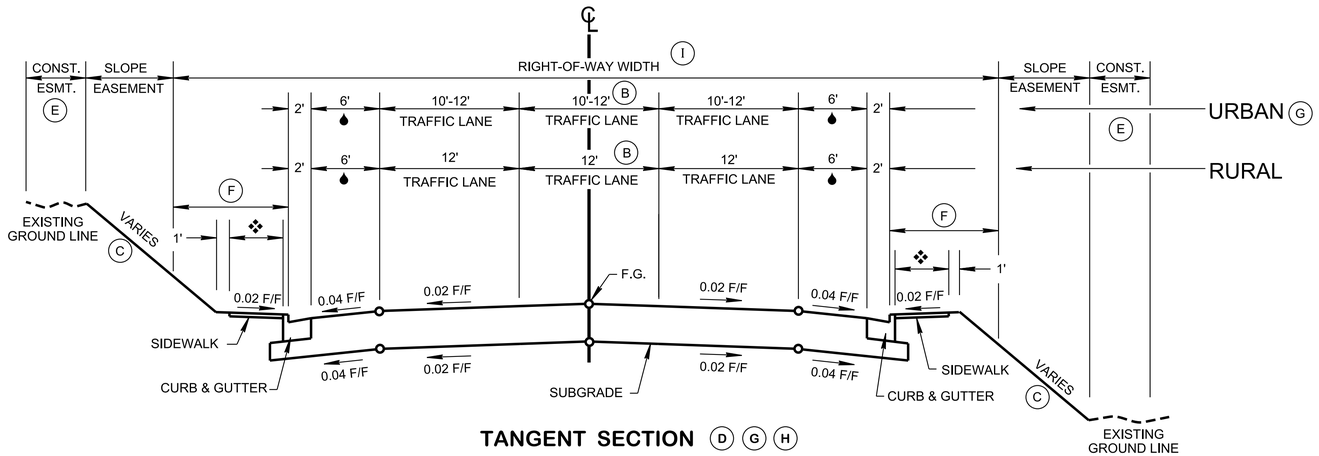
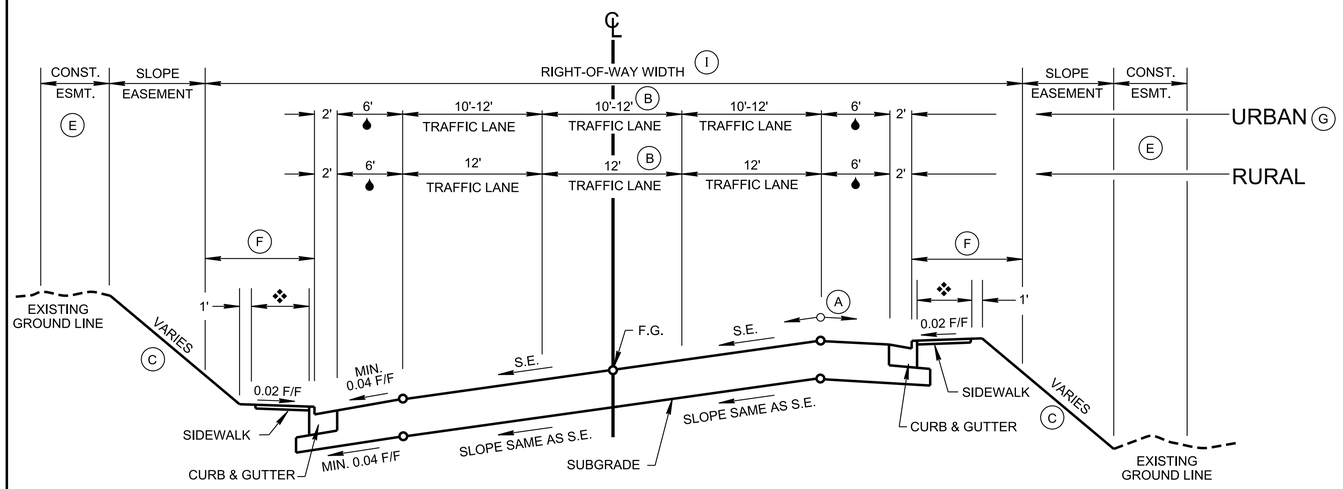
\\AG03SDCWF00010.net.ads.state.tn.us\Projects\Standard Drawings Folder\Working Folder for Eugene\DRAFT\100 ROADWAY DESIGN STANDARDS\Typical Sections and Design Criteria\RD11TS6C-20190101.dgn



TANGENT SECTION (D) (G) (H)



SUPERELEVATED SECTION (D) (G) (H)

LEGEND

❖
SIDEWALK VARIES (5' MIN.)
(FOR LATERAL OFFSETS FOR SIDEWALK AND SHARED USE PATH SEE STD. DWG. MM-TS-2)
(FOR DETAILS FOR CONCRETE SIDEWALK SEE STD. DWG. MM-SW-1)

♦
SHOULDER
(FOR BIKE ACCOMMODATION DESIGN GUIDANCE SEE STD. DWG. MM-TS-1)

NOT TO SCALE

DESIGN NOTES

(A) THE SLOPES OF THE SHOULDER AND ROADWAY PAVEMENT SHALL NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) THE DESIRABLE LANE WIDTH IN INDUSTRIAL AREAS WITH HEAVY TRUCK TRAFFIC IS 14 FEET.

(C) ON URBAN PROJECTS THE BACKSLOPE AND FORESLOPE DESIGN WILL VARY FROM PROJECT TO PROJECT, AS A GENERAL RULE USE THE FOLLOWING:

3:1 SLOPES OR FLATTER ARE DESIRABLE AND 2:1 SLOPES ARE APPLICABLE IN AREAS WHERE RIGHT-OF-WAY RESTRICTIONS OR COST WARRANTS A STEEPER THAN 3:1 SLOPE. THE MAXIMUM SLOPE IN REGION IV IS 3:1.

(D) THESE TYPICAL SECTIONS WERE DEVELOPED FOR LOCAL ROADS AND STREETS AND COLLECTOR ROADS WITH DESIGN SPEEDS 45 MILES PER HOUR AND LOWER. IF A CTWLTL IS NEEDED ABOVE 45 MILES PER HOUR OR ON AN ARTERIAL, THE DESIGNER WILL REFER TO THE PROPER RD11-TS-SERIES STANDARD DRAWING FOR TYPICAL SECTION REQUIREMENTS.

(E) 10 FEET MINIMUM DESIRABLE.

(F) 10' MINIMUM RIGHT-OF-WAY WIDTH IS REQUIRED BEHIND FACE OF CURB. WHEN THE BACKSIDE OF THE SIDEWALK IS 9' OR MORE FROM THE FACE OF THE CURB, RIGHT-OF-WAY SHALL EXTEND MINIMUM 1' BEHIND THE SIDEWALK.

(G) **URBAN ROADWAYS CROSS SECTIONAL ELEMENTS:**

FOR INFORMATION REGARDING WIDTH OF TRAVELED WAY, SHOULDERS, PARKING LANES, MEDIANS, CURBS, AND OTHER CROSS-SECTIONAL ELEMENTS FOR LOCAL ROADS, REFER TO PAGES 5-13 THROUGH 5-16 AND FOR COLLECTOR ROADS, REFER TO PAGES 6-13 THROUGH 6-16.

(H) **URBAN ROADWAYS GENERAL DESIGN CONSIDERATIONS:**

FOR INFORMATION REGARDING DESIGN SPEED, ALIGNMENT, GRADES, SUPERELEVATION, SIGHT DISTANCE, AND OTHER DESIGN CONSIDERATIONS FOR LOCAL ROADS, REFER TO PAGES 5-11 THROUGH 5-13 AND FOR COLLECTOR ROADS, REFER TO PAGES 6-11 THROUGH 6-13.

(I) **SERVICE APPURTENANCE** (LARGE SIGNS STRUCTURES, SIGNAL, LUMINARY AND UTILITY POLES) SHALL BE PLACED OUTSIDE THE PEDESTRIAN ACCESSIBLE SPACE, PREFERABLE OUTSIDE THE SIDEWALK AREA AND INSIDE RIGHT-OF-WAY.

GENERAL NOTES

(1) FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).

(2) REFERENCE SHOULD ALSO BE MADE TO THE AASHTO "ROADSIDE DESIGN GUIDE," AASHTO, 2011.

(3) THE DESIGN OF BRIDGES, CULVERTS, WALLS, TUNNELS AND OTHER STRUCTURES SHOULD BE IN ACCORDANCE WITH PRINCIPALS OF AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. THE DESIGN LOADING SHOULD BE THE HL-93 CALIBRATED LIVE LOAD DESIGNATION. THE MINIMUM CLEAR WIDTH FOR NEW AND REHABILITATED BRIDGES SHALL BE EQUAL TO THE FULL WIDTH OF THE APPROACH ROADWAY, CURB-TO-CURB OR FULL SHOULDER WIDTH AS APPLICABLE.

(4) FOR EXISTING BRIDGES TO REMAIN IN PLACE, THEY SHOULD HAVE ADEQUATE STRENGTH AND A WIDTH AT LEAST EQUAL TO THE WIDTH OF THE TRAVELED WAY PLUS 2-FEET CLEARANCE ON EACH SIDE. BRIDGES SHOULD BE CONSIDERED FOR ULTIMATE WIDENING OR REPLACEMENT IF THEY DO NOT PROVIDE AT LEAST 3-FEET CLEARANCE ON EACH SIDE OR BE HL-93 CALIBRATED LIVE LOAD CAPACITY. AS AN INTERIM MEASURE, ALL BRIDGES THAT ARE LESS THAN FULL WIDTH SHOULD BE CONSIDERED FOR SPECIAL NARROW BRIDGE TREATMENTS SUCH AS SIGNING AND PAVEMENT MARKING.

(5) THIS TYPICAL SECTION IS DESIGNED TO ACCOMMODATE AN AVERAGE DAILY TRAFFIC OF 5,000 TO 12,500 VEHICLES PER DAY, WHICH IS CONSIDERED TO BE THE TRAFFIC VOLUME NEEDED TO JUSTIFY THE TWO-WAY LEFT TURN LANE (TWLTL) FOR A 2-LANE HIGHWAY. THE TYPICAL SECTION DESIGN FOR VOLUMES LESS THAN 5,000 VEHICLES PER DAY USES THE DESIGN STANDARDS SHOWN ON STANDARD DRAWINGS RD11-TS-1, RD11-TS-2 AND RD11-TS-3.

(6) WHEN ENCOUNTERING MAJOR INTERSECTIONS, DO NOT EXTEND THE CONTINUOUS TWO-WAY LEFT TURN LANE (CTWLTL) UP TO THE INTERSECTION. TERMINATE THE CTWLTL IN ADVANCE OF THE INTERSECTION TO ALLOW DEVELOPMENT OF AN EXCLUSIVE LEFT-TURN LANE. MINOR INTERSECTIONS MAY NOT WARRANT AN EXCLUSIVE LEFT-TURN LANE. SEE STRIPING DETAILS SHOWN ON T-M-1 OR CURRENT EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES."

(7) ON WIDENING OF EXISTING TWO-LANE HIGHWAY TO THREE-LANE HIGHWAY THE SHOULDER WIDTH MAY BE REDUCED TO ZERO FEET AND THE ROADWAY LANE WIDTH TO ELEVEN (11) FEET UNDER THE FOLLOWING CONDITIONS:

- (7a) THE DESIGN ADT IS 20,000 VEHICLES PER DAY OR LESS.
- (7b) THE DESIGN SPEED IS 45 MILES PER HOUR OR LESS.
- (7c) THERE ARE RESTRICTED AND/OR LIMITED CLEARANCES FOR RIGHT-OF-WAY DUE TO THE EXISTING SOCIAL, ENVIRONMENTAL OR ECONOMIC CONDITIONS.
- (7d) WHEN SUFFICIENT NUMBERS OF ACCIDENTS AND/OR DELAYS IN TRAFFIC EXIST DUE TO MID-BLOCK LEFT TURNS TO JUSTIFY A CONTINUOUS LEFT TURN LANE ON EXISTING TWO-LANE ROADWAY.

(8) ABOVE GROUND UTILITIES SHOULD BE LOCATED BEHIND THE SIDEWALK AND CLOSE TO THE RIGHT-OF-WAY.

(9) WHEN SIDEWALK IS LOCATED NEXT TO THE CURB, SIDEWALK WIDTH SHALL NOT INCLUDE THE SIX INCH WIDTH OF PROPOSED CURB. SIDEWALK SHALL BE A MINIMUM OF FIVE FEET WIDE.

(10) IF DESIGN INCLUDES A GRASS STRIP, SEE STANDARD DRAWING RD11-TS-7A.

(11) SEE STANDARD DRAWING S-PL-6 & S-PL-6A FOR TYPICAL GUARDRAIL PLACEMENT.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

DESIGN STANDARDS 2-LANE CURB & GUTTER WITH CONTINUOUS 2-WAY LEFT-TURN LANE WITHOUT GRASS STRIPS

01-01-2019 | RD11-TS-7

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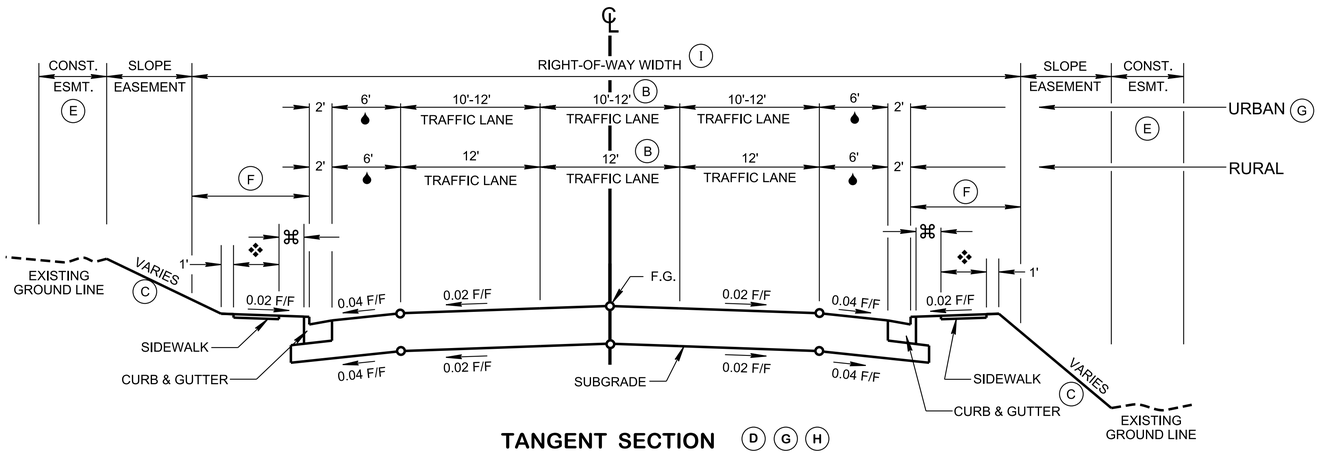
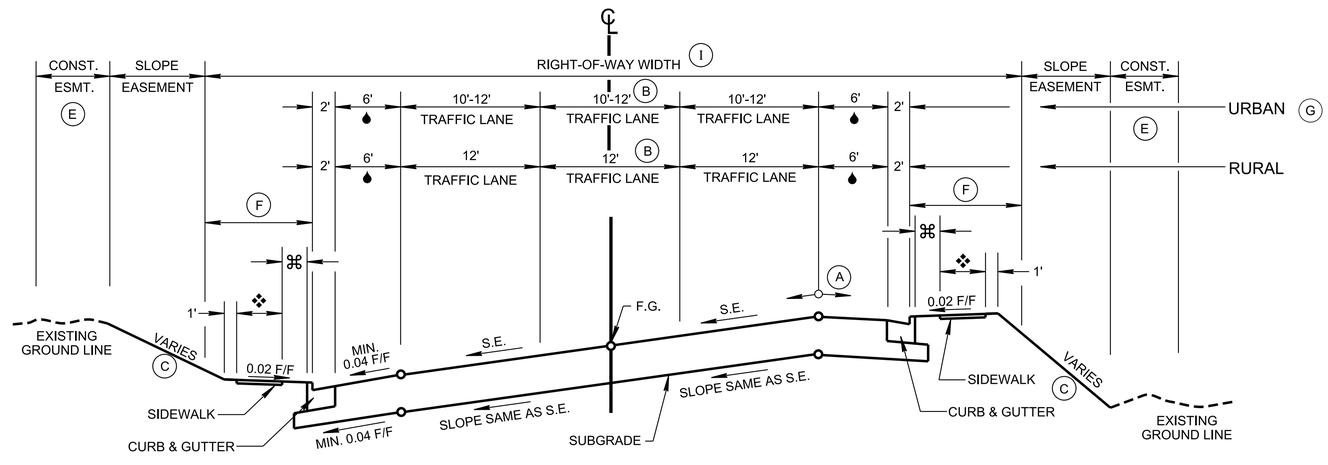


TANGENT SECTION (D) (G) (H)



SUPERELEVATED SECTION (D) (G) (H)

LEGEND

⌘
GRASS STRIP VARIES
(FOR LATERAL OFFSETS FOR SIDEWALK AND SHARED USE PATH SEE STD. DWG. MM-TS-2)

❖
SIDEWALK VARIES (5' MIN.)
(FOR LATERAL OFFSETS FOR SIDEWALK AND SHARED USE PATH SEE STD. DWG. MM-TS-2)
(FOR DETAILS FOR CONCRETE SIDEWALK SEE STD. DWG. MM-SW-1)

♦
SHOULDER
(FOR BIKE ACCOMMODATION DESIGN GUIDANCE SEE STD. DWG. MM-TS-1)

NOT TO SCALE

DESIGN NOTES

(A) THE SLOPES OF THE SHOULDER AND ROADWAY PAVEMENT SHALL NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) THE DESIRABLE LANE WIDTH IN INDUSTRIAL AREAS WITH HEAVY TRUCK TRAFFIC IS 14 FEET.

(C) ON URBAN PROJECTS THE BACKSLOPE AND FORESLOPE DESIGN WILL VARY FROM PROJECT TO PROJECT, AS A GENERAL RULE USE THE FOLLOWING:

3:1 SLOPES OR FLATTER ARE DESIRABLE AND 2:1 SLOPES ARE APPLICABLE IN AREAS WHERE RIGHT-OF-WAY RESTRICTIONS OR COST WARRANTS A STEEPER THAN 3:1 SLOPE. THE MAXIMUM SLOPE IN REGION IV IS 3:1.

(D) THESE TYPICAL SECTIONS WERE DEVELOPED FOR LOCAL ROADS AND STREETS AND COLLECTOR ROADS WITH DESIGN SPEEDS 45 MILES PER HOUR AND LOWER. IF A CTWLTL IS NEEDED ABOVE 45 MILES PER HOUR OR ON AN ARTERIAL, THE DESIGNER WILL REFER TO THE PROPER RD11-TS-SERIES STANDARD DRAWING FOR TYPICAL SECTION REQUIREMENTS.

(E) 10 FEET MINIMUM DESIRABLE.

(F) 10' MINIMUM RIGHT-OF-WAY WIDTH IS REQUIRED BEHIND FACE OF CURB. WHEN THE BACKSIDE OF THE SIDEWALK IS 9' OR MORE FROM THE FACE OF THE CURB, RIGHT-OF-WAY SHALL EXTEND MINIMUM 1' BEHIND THE SIDEWALK.

(G) **URBAN ROADWAYS CROSS SECTIONAL ELEMENTS:**

FOR INFORMATION REGARDING WIDTH OF TRAVELED WAY, SHOULDERS, PARKING LANES, MEDIANS, CURBS, AND OTHER CROSS-SECTIONAL ELEMENTS FOR LOCAL ROADS, REFER TO PAGES 5-13 THROUGH 5-16 AND FOR COLLECTOR ROADS, REFER TO PAGES 6-13 THROUGH 6-16.

(H) **URBAN ROADWAYS GENERAL DESIGN CONSIDERATIONS:**

FOR INFORMATION REGARDING DESIGN SPEED, ALIGNMENT, GRADES, SUPERELEVATION, SIGHT DISTANCE, AND OTHER DESIGN CONSIDERATIONS FOR LOCAL ROADS, REFER TO PAGES 5-11 THROUGH 5-13 AND FOR COLLECTOR ROADS, REFER TO PAGES 6-11 THROUGH 6-13.

(I) **SERVICE APPURTENANCE** (LARGE SIGNS STRUCTURES, SIGNAL, LUMINARY AND UTILITY POLES) SHALL BE PLACED OUTSIDE THE PEDESTRIAN ACCESSIBLE SPACE, PREFERABLE OUTSIDE THE SIDEWALK AREA AND INSIDE RIGHT-OF-WAY.

GENERAL NOTES

(1) FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).

(2) REFERENCE SHOULD ALSO BE MADE TO THE AASHTO "ROADSIDE DESIGN GUIDE," AASHTO, 2011.

(3) THE DESIGN OF BRIDGES, CULVERTS, WALLS, TUNNELS AND OTHER STRUCTURES SHOULD BE IN ACCORDANCE WITH PRINCIPALS OF AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. THE DESIGN LOADING SHOULD BE THE HL-93 CALIBRATED LIVE LOAD DESIGNATION. THE MINIMUM CLEAR WIDTH FOR NEW AND REHABILITATED BRIDGES SHALL BE EQUAL TO THE FULL WIDTH OF THE APPROACH ROADWAY, CURB-TO-CURB OR FULL SHOULDER WIDTH AS APPLICABLE.

(4) FOR EXISTING BRIDGES TO REMAIN IN PLACE, THEY SHOULD HAVE ADEQUATE STRENGTH AND A WIDTH AT LEAST EQUAL TO THE WIDTH OF THE TRAVELED WAY PLUS 2-FEET CLEARANCE ON EACH SIDE. BRIDGES SHOULD BE CONSIDERED FOR ULTIMATE WIDENING OR REPLACEMENT IF THEY DO NOT PROVIDE AT LEAST 3-FEET CLEARANCE ON EACH SIDE OR BE HL-93 CALIBRATED LIVE LOAD CAPACITY. AS AN INTERIM MEASURE, ALL BRIDGES THAT ARE LESS THAN FULL WIDTH SHOULD BE CONSIDERED FOR SPECIAL NARROW BRIDGE TREATMENTS SUCH AS SIGNING AND PAVEMENT MARKING.

(5) THIS TYPICAL SECTION IS DESIGNED TO ACCOMMODATE AN AVERAGE DAILY TRAFFIC OF 5,000 TO 12,500 VEHICLES PER DAY, WHICH IS CONSIDERED TO BE THE TRAFFIC VOLUME NEEDED TO JUSTIFY THE TWO-WAY LEFT TURN LANE (TWLTL) FOR A 2-LANE HIGHWAY. THE TYPICAL SECTION DESIGN FOR VOLUMES LESS THAN 5,000 VEHICLES PER DAY USES THE DESIGN STANDARDS SHOWN ON STANDARD DRAWINGS RD11-TS-1, RD11-TS-2 AND RD11-TS-3.

(6) WHEN ENCOUNTERING MAJOR INTERSECTIONS, DO NOT EXTEND THE CONTINUOUS TWO-WAY LEFT TURN LANE (CTWLTL) UP TO THE INTERSECTION. TERMINATE THE CTWLTL IN ADVANCE OF THE INTERSECTION TO ALLOW DEVELOPMENT OF AN EXCLUSIVE LEFT-TURN LANE. MINOR INTERSECTIONS MAY NOT WARRANT AN EXCLUSIVE LEFT-TURN LANE. SEE STRIPING DETAILS SHOWN ON T-M-1 OR CURRENT EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES."

(7) ON WIDENING OF EXISTING TWO-LANE HIGHWAY TO THREE-LANE HIGHWAY THE SHOULDER WIDTH MAY BE REDUCED TO ZERO FEET AND THE ROADWAY LANE WIDTH TO ELEVEN (11) FEET UNDER THE FOLLOWING CONDITIONS:

- (7a) THE DESIGN ADT IS 20,000 VEHICLES PER DAY OR LESS.
- (7b) THE DESIGN SPEED IS 45 MILES PER HOUR OR LESS.
- (7c) THERE ARE RESTRICTED AND/OR LIMITED CLEARANCES FOR RIGHT-OF-WAY DUE TO THE EXISTING SOCIAL, ENVIRONMENTAL OR ECONOMIC CONDITIONS.
- (7d) WHEN SUFFICIENT NUMBERS OF ACCIDENTS AND/OR DELAYS IN TRAFFIC EXIST DUE TO MID-BLOCK LEFT TURNS TO JUSTIFY A CONTINUOUS LEFT TURN LANE ON EXISTING TWO-LANE ROADWAY.

(8) ABOVE GROUND UTILITIES SHOULD BE LOCATED BEHIND THE SIDEWALK AND CLOSE TO THE RIGHT-OF-WAY.

(9) WHEN SIDEWALK IS LOCATED NEXT TO THE CURB, SIDEWALK WIDTH SHALL NOT INCLUDE THE SIX INCH WIDTH OF PROPOSED CURB. SIDEWALK SHALL BE A MINIMUM OF FIVE FEET WIDE.

(10) ABOVE GROUND UTILITIES SHALL NOT BE PLACED IN THE GRASS STRIP.

(11) IN URBAN ARES THE GRASS STRIP SHOULD BE 3' WIDE. IN SUBURBAN AREAS THE GRASS STRIP SHOULD BE 5' WIDE.

(12) SEE STANDARD DRAWING S-PL-6 & S-PL-6A FOR TYPICAL GUARDRAIL PLACEMENT.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

DESIGN STANDARDS 2-LANE CURB & GUTTER WITH CONTINUOUS 2-WAY LEFT-TURN LANE WITH GRASS STRIPS

01-01-2019 | RD11-TS-7A

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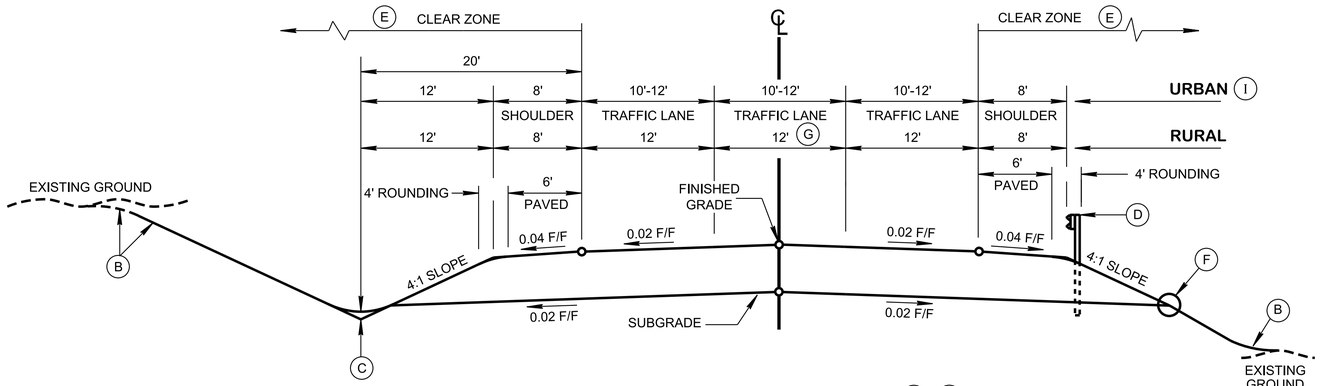
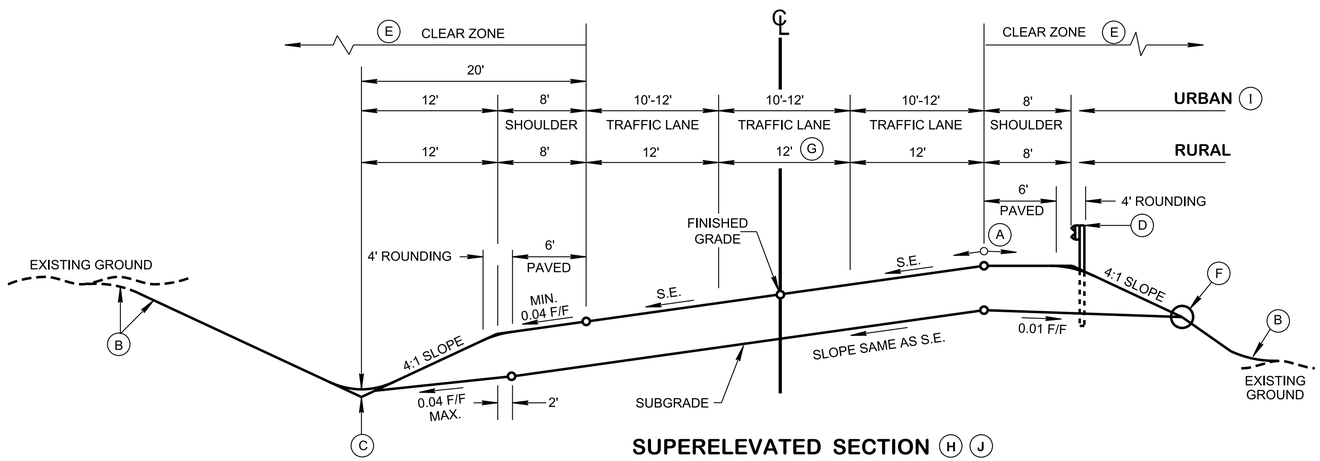


TANGENT SECTION (H) (J)



SUPERELEVATED SECTION (H) (J)

DESIGN NOTES

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHOULD NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWING RD11-S-11 FOR FILL AND CUT SLOPE TABLES. ROUNDIN ON TOP OF CUT SLOPES AND TOE ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPE SPECIAL ROCK TREATMENT AND SUBGRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 AND S-PL-6A FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE “ROADSIDE DESIGN GUIDE”, AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONE.

(F) SEE STANDARD DRAWING RD11-S-11 FOR ROUNDING DETAILS.

(G) THE DESIRABLE LANE WIDTH IN INDUSTRIAL AREAS WITH HEAVY TRUCK TRAFFIC IS 14 FEET.

(H) THESE TYPICAL SECTIONS WERE DEVELOPED FOR LOCAL ROADS AND STREETS AND COLLECTOR ROADS WITH DESIGN SPEEDS 45 MILES PER HOUR AND LOWER. IF A CONTINUOUS TWO WAY WITH LEFT TURN LANE (CTWLTL) IS NEEDED ABOVE 45 MILES PER HOUR OR ON AN ARTERIAL, THE DESIGNER WILL REFER TO THE PROPER RD11-TS-SERIES SHEET FOR TYPICAL SECTION REQUIREMENTS.

(I) **URBAN ROADWAYS CROSS SECTIONAL ELEMENTS:**

REFER TO PAGES 5-13 THROUGH 5-16 FOR INFORMATION REGARDING WIDTH OF TRAVELED WAY, PARKING LANES, MEDIANS, CURBS, AND OTHER CROSS-SECTIONAL ELEMENTS FOR LOCAL ROADS. REFER TO PAGES 6-13 THROUGH 6-16 FOR INFORMATION REGARDING WIDTH OF TRAVELED WAY, SHOULDERS, PARKING LANES, MEDIANS, CURBS, AND OTHER CROSS-SECTIONAL ELEMENTS FOR COLLECTOR ROADS.

(J) **URBAN ROADWAYS GENERAL DESIGN CONSIDERATIONS:**

REFER TO PAGES 5-11 THROUGH 5-13 FOR INFORMATION REGARDING DESIGN SPEED, ALIGNMENT, GRADES, SUPERELEVATION, SIGHT DISTANCE, AND OTHER DESIGN CONSIDERATIONS FOR LOCAL ROADS. REFER TO PAGES 6-11 THROUGH 6-13 FOR INFORMATION REGARDING DESIGN SPEED, ALIGNMENT, GRADES, SUPERELEVATION, SIGHT DISTANCE, AND OTHER DESIGN CONSIDERATIONS FOR COLLECTOR ROADS.

GENERAL NOTES

1. FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK).

2. PAGE NUMBERS REFERRED TO ON THIS DRAWING ARE FROM "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), UNLESS OTHERWISE NOTED.

3. REFERENCE SHOULD ALSO BE MADE TO THE AASHTO "ROADSIDE DESIGN GUIDE," AASHTO, 2011.

4. MINIMUM RIGHT-OF-WAY IS THAT REQUIRED TO ACCOMMODATE SLOPES AND EROSION CONTROL FEATURES (15 TO 20 FEET OUTSIDE THE SLOPE LINES IS DESIRABLE IN RURAL AREAS).

5. THE DESIGN OF BRIDGES, CULVERTS, WALLS, TUNNELS AND OTHER STRUCTURES SHOULD BE IN ACCORDANCE WITH PRINCIPALS OF AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. THE DESIGN LOADING SHOULD BE THE HL-93 CALIBRATED LIVE LOAD DESIGNATION. THE MINIMUM CLEAR WIDTH FOR NEW AND REHABILITATED BRIDGES SHALL BE EQUAL TO THE FULL WIDTH OF THE APPROACH ROADWAY, CURB-TO-CURB OR FULL SHOULDER WIDTH AS APPLICABLE.

6. FOR EXISTING BRIDGES TO REMAIN IN PLACE, THEY SHOULD HAVE ADEQUATE STRENGTH AND A WIDTH AT LEAST EQUAL TO THE WIDTH OF THE TRAVELED WAY PLUS 2-FEET CLEARANCE ON EACH SIDE. BRIDGES SHOULD BE CONSIDERED FOR ULTIMATE WIDENING OR REPLACEMENT IF THEY DO NOT PROVIDE AT LEAST 3-FEET CLEARANCE ON EACH SIDE OR BE HL-93 CALIBRATED LIVE LOAD CAPACITY. AS AN INTERIM MEASURE, ALL BRIDGES THAT ARE LESS THAN FULL WIDTH SHOULD BE CONSIDERED FOR SPECIAL NARROW BRIDGE TREATMENTS SUCH AS SIGNING AND PAVEMENT MARKING.

7. THIS TYPICAL SECTION IS DESIGNED TO ACCOMMODATE AN AVERAGE DAILY TRAFFIC OF 5,000 TO 12,500 VEHICLES PER DAY, WHICH IS CONSIDERED TO BE THE TRAFFIC VOLUME NEEDED TO JUSTIFY THE CONTINUOUS TWO-WAY LEFT TURN LANE (CTWLTL) FOR A 2-LANE HIGHWAY. THE TYPICAL SECTION DESIGN FOR VOLUMES LESS THAN 5,000 VEHICLES PER DAY USES THE DESIGN STANDARDS SHOWN ON STANDARD DRAWINGS RD11-TS-1, RD11-TS-2 AND RD11-TS-3.

8. WHEN ENCOUNTERING MAJOR INTERSECTIONS, DO NOT EXTEND THE CONTINUOUS TWO-WAY LEFT TURN LANE (CTWLTL) UP TO THE INTERSECTION. TERMINATE THE CTWLTL IN ADVANCE OF THE INTERSECTION TO ALLOW DEVELOPMENT OF AN EXCLUSIVE LEFT-TURN LANE. MINOR INTERSECTIONS MAY NOT WARRANT AN EXCLUSIVE LEFT-TURN LANE. SEE STRIPING DETAILS SHOWN ON T-M-1 OR CURRENT EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES."

9. ON WIDENING OF EXISTING TWO-LANE HIGHWAY TO THREE-LANE HIGHWAY THE SHOULDER WIDTH MAY BE REDUCED TO ZERO FEET AND THE ROADWAY LANE WIDTH TO ELEVEN (11) FEET UNDER THE FOLLOWING CONDITIONS:

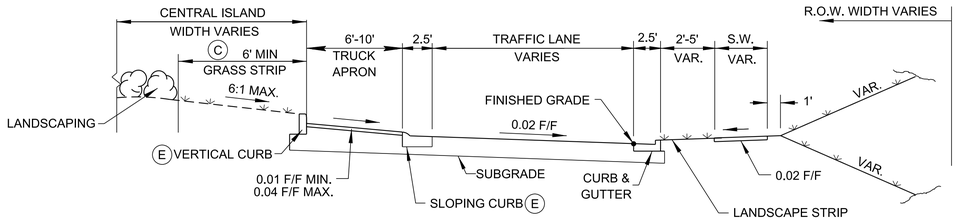
   - (9a) THE DESIGN ADT IS 20,000 VEHICLES PER DAY OR LESS.
   - (9b) THE DESIGN SPEED IS 45 MILES PER HOUR OR LESS.
   - (9c) THERE ARE RESTRICTED AND/OR LIMITED CLEARANCES FOR RIGHT-OF-WAY DUE TO THE EXISTING SOCIAL, ENVIRONMENTAL OR ECONOMIC CONDITIONS.
   - (9d) WHEN SUFFICIENT NUMBERS OF ACCIDENTS AND/OR DELAYS IN TRAFFIC EXIST DUE TO MID-BLOCK LEFT TURNS TO JUSTIFY A CONTINUOUS LEFT TURN LANE ON EXISTING TWO-LANE ROADWAY.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

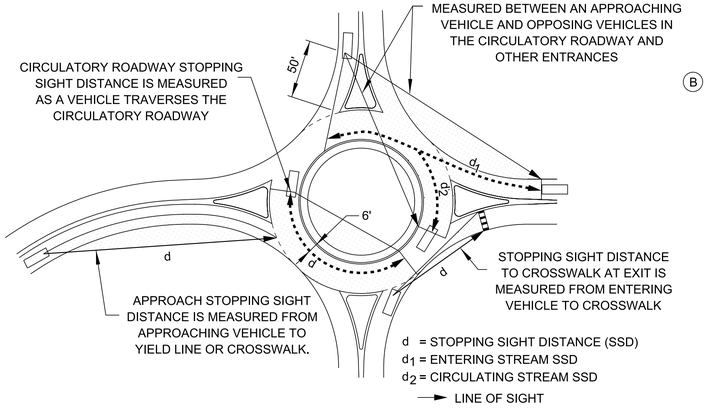
DESIGN STANDARDS 2-LANE HIGHWAYS WITH CONTINUOUS 2-WAY LEFT-TURN LANE

01-01-2019 | RD11-TS-7B

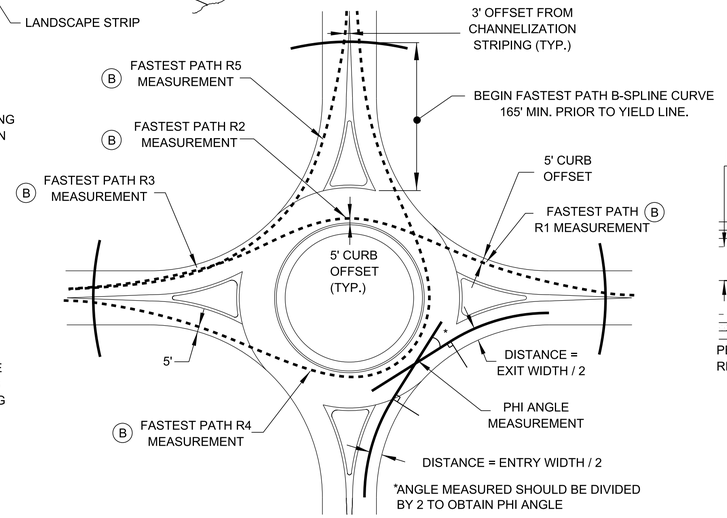
NOT TO SCALE



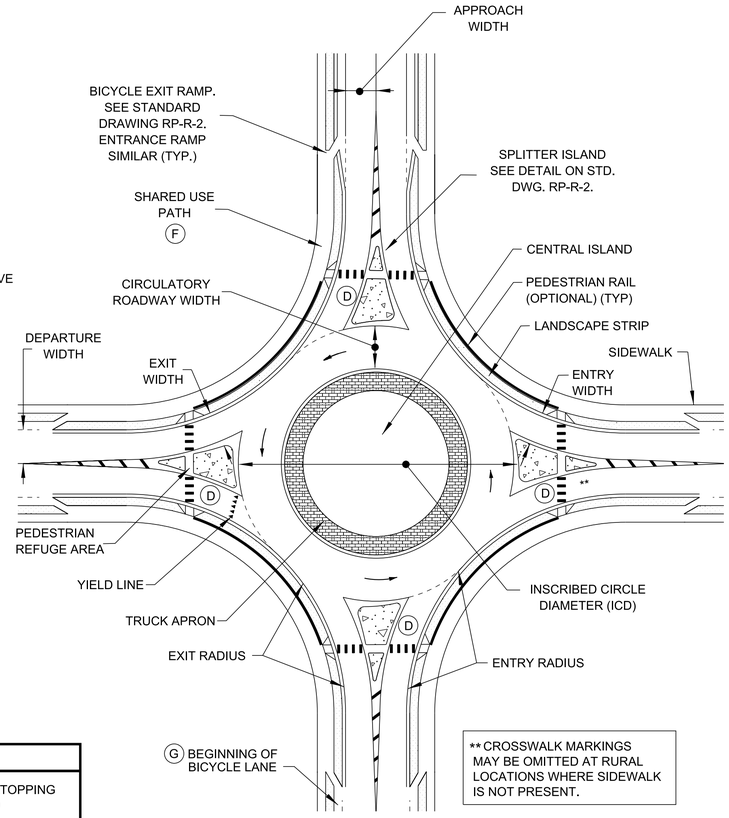
ROUNDABOUT TYPICAL SECTION



ROUNDABOUT SIGHT DISTANCE (A)

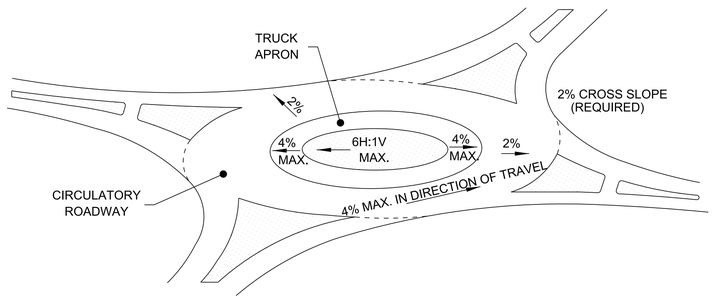


ROUNDABOUT DESIGN CHECKS



TYPICAL PLAN VIEW OF ROUNDABOUT

SEE GENERAL NOTE (11)



CIRCULATORY ROADWAY SLOPES

NOTE:
TRUCK APRON CROSS SLOPE SHOULD MATCH CIRCULATORY ROADWAY CROSS SLOPE OR MAY BE INCREASED UP TO 4 PERCENT MAX.

DESIGN STANDARDS FOR SINGLE LANE ROUNDABOUTS

	URBAN	RURAL	NOTES
DESIGN SPEED	20 MPH	25 MPH	SEE FHWA EXHIBIT 6-4
INSCRIBED CIRCLE DIAMETER (H)	100' - 130'	115' - 130'	MEASURED FROM CURB FACE TO CURB FACE
CIRCULATORY ROADWAY WIDTH	1.0 - 1.2 TIMES THE MAXIMUM ENTRY WIDTH	1.0 - 1.2 TIMES THE MAXIMUM ENTRY WIDTH	————
ENTRY WIDTH	18' - 22'	18' - 22'	MEASURED FROM CURB FACE TO CURB FACE
ENTRY RADIUS	65' - 90'	65' - 90'	————
EXIT WIDTH	SAME AS ENTRY WIDTH	SAME AS ENTRY WIDTH	SAME AS ENTRY WIDTH
EXIT RADIUS	200' - 1000'	200' - 1000'	————
APPROACH/DEPARTURE WIDTH	WIDTH OF APPROACHING LANE	WIDTH OF APPROACHING LANE	DOES NOT INCLUDE BIKE LANE OR GUTTER
DAILY SERVICE VOLUME (WITH CAPACITY ANALYSIS) APPROXIMATELY 25,000 VEH/DAY			

DESIGN NOTES

(A) FASTEST PATH CHECKS SHOULD BE COMPLETED PRIOR TO INTERSECTION SIGHT DISTANCE BEING CHECKED. STOPPING SIGHT DISTANCE AND INTERSECTION SIGHT DISTANCE SHOULD BE CHECKED FOR ALL APPROACHES. REFER TO "ROUNDABOUTS; AN INFORMATIONAL GUIDE," FHWA, 2000 AND RD11-SD-1 THRU 7 FOR ADDITIONAL GUIDANCE.

(B) CONSTRUCT A B-SPLINE (SHOWN AS DASHED LINE) FOR THE THROUGH, LEFT TURN, AND RIGHT TURN MOVEMENTS. B-SPLINE SHOULD TOUCH THE 5' CURB OFFSETS AT THE POINTS INDICATED FOR THE R1, R2, R3, R4 AND R5 MEASUREMENTS. MEASURE THE RADIUS OF THE B-SPLINE AT EACH POINT. MEASUREMENT SHOULD BE BETWEEN 65' AND 85' LONG. FOR THE R1 MEASUREMENT, THE RADIUS SHOULD NOT BE MEASURED THROUGH THE YIELD LINE.

(C) PROVIDE 6' MINIMUM UNOBSTRUCTED HORIZONTAL CLEARANCE FROM THE VERTICAL CURB TO THE CENTRAL ISLAND LANDSCAPING TO ALLOW FOR CIRCULATORY ROADWAY SIGHT DISTANCE, ACTUAL DISTANCE MAY BE GREATER AND SHOULD BE DETERMINED AFTER SIGHT DISTANCE CHECKS ARE COMPLETE, BUT SHALL NOT BE LESS THAN 6 FEET.

(D) SPLITTER ISLAND SHOULD BE A RAISED MEDIAN WITH CONCRETE HARDSCAPING (PREFERRED). SPLITTER ISLAND SHOULD EXTEND A MINIMUM OF 50' FROM THE YIELD LINE. SEE STANDARD DRAWING MM-CR-4 FOR ADDITIONAL DETAILS.

(E) FOR SLOPING CURB BETWEEN CIRCULATORY ROADWAY AND TRUCK APRON, SEE STANDARD DRAWING RP-R-2. FOR VERTICAL CURB BETWEEN TRUCK APRON AND CENTRAL ISLAND, SEE STANDARD DRAWING RP-VC-10.

(F) SIDEWALK SHALL BE WIDENED TO ACCOMMODATE BICYCLES AND PEDESTRIANS AT ROUNDABOUT (SHARED USE PATH). SEE STANDARD DRAWING MM-TS-3 FOR ADDITIONAL DETAILS.

(G) SEE STANDARD DRAWINGS MM-PM-1, 2 AND 3 FOR SIGNING AND PAVEMENT MARKINGS FOR SHARED USE PATHS AND BICYCLE LANES.

(H) ASSUMES APPROXIMATELY 90-DEGREE ANGLES BETWEEN ENTRIES AND NO MORE THAN FOUR ENTRIES TO THE ROUNDABOUT.

GENERAL NOTES

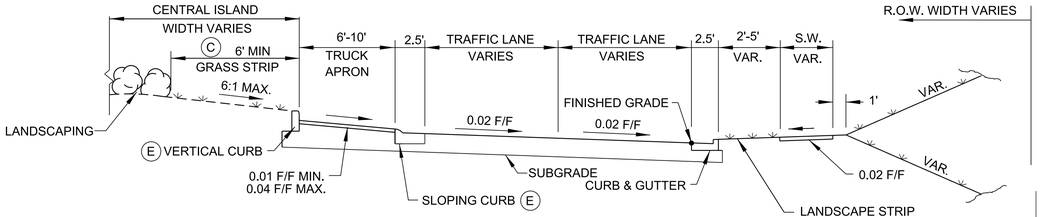
1. FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS", AASHTO, 2011.
2. REFERENCE SHOULD BE MADE TO "ROUNDABOUTS: AN INFORMATIONAL GUIDE", FHWA, 2000. REFERENCE SHOULD ALSO BE MADE TO THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011.
3. THIS STANDARD DRAWING IS INTENDED TO BE USED AS GUIDANCE FOR THE DESIGN OF SINGLE LANE URBAN AND RURAL ROUNDABOUTS. FOR MULTI-LANE DESIGNS, SEE STANDARD DRAWING RD11-TS-10.
4. TRUCK TURNING TEMPLATES SHOULD BE PERFORMED ON ALL TURNING MOVEMENTS WITHIN THE ROUNDABOUT. A WB-62 VEHICLE SHOULD BE USED WHERE APPROPRIATE.
5. STANDARD AASHTO GUIDELINES FOR ISLAND DESIGN SHOULD BE FOLLOWED FOR SPLITTER ISLAND DESIGNS, INCLUDING LARGER NOSE RADII AT APPROACH CORNERS AND OFFSETTING CURB LINES AT THE APPROACH ENDS OF THE SPLITTER ISLAND.
6. MAXIMUM LONGITUDINAL GRADE IN THE DIRECTION OF TRAVEL THROUGH THE CIRCULATORY ROADWAY SHALL BE 4 PERCENT.
7. USE OF A RIGHT-TURN BYPASS LANE MAY BE WARRANTED FROM THE ROUNDABOUT TRAFFIC MODEL.
8. ROUNDABOUT APPROACHES WITH SPEEDS OF 45 MPH OR GREATER ARE CONSIDERED HIGH SPEED APPROACHES. REFER TO SECTION 6.5 OF THE "ROUNDABOUTS: AN INFORMATIONAL GUIDE", FHWA, 2000 FOR ADDITIONAL INFORMATION ON DESIGN OF ROUNDABOUTS WITH HIGH SPEED APPROACHES.
9. MINI ROUNDABOUTS, TRAFFIC CIRCLES, AND ROTARIES ARE NOT CONSIDERED ROUNDABOUTS AND SHOULD NOT BE DESIGNED TO THE STANDARDS ON THIS DRAWING.
10. ROADWAY SHOULDERS AND BICYCLE LANE SHALL END PRIOR TO THE CIRCULATORY ROADWAY.
11. FOR ROUNDABOUT CONSTRUCTION DETAILS, SEE STANDARD DRAWING RP-R-2.
12. OPTIONAL PEDESTRIAN RAIL SHALL NOT CAUSE A CONFLICT WITH INTERSECTION SIGHT DISTANCE.
13. SEE T-M-17 FOR MARKING DETAILS.

NOT TO SCALE

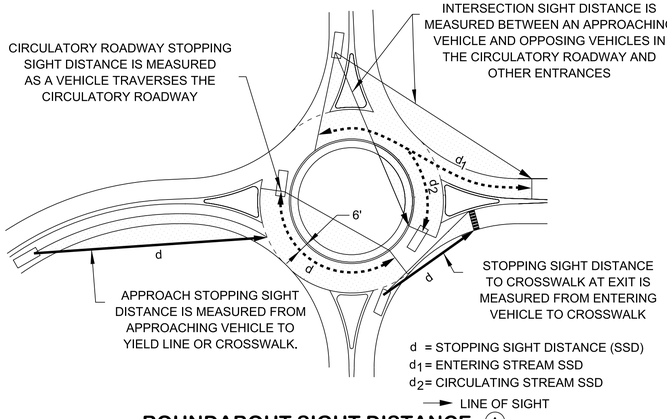
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

DESIGN STANDARDS FOR SINGLE LANE URBAN AND RURAL ROUNDABOUTS

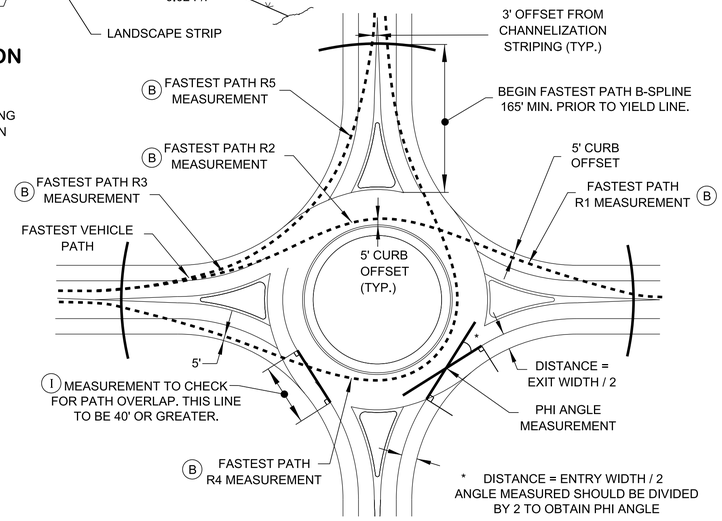
01-01-2019 | RD11-TS-9



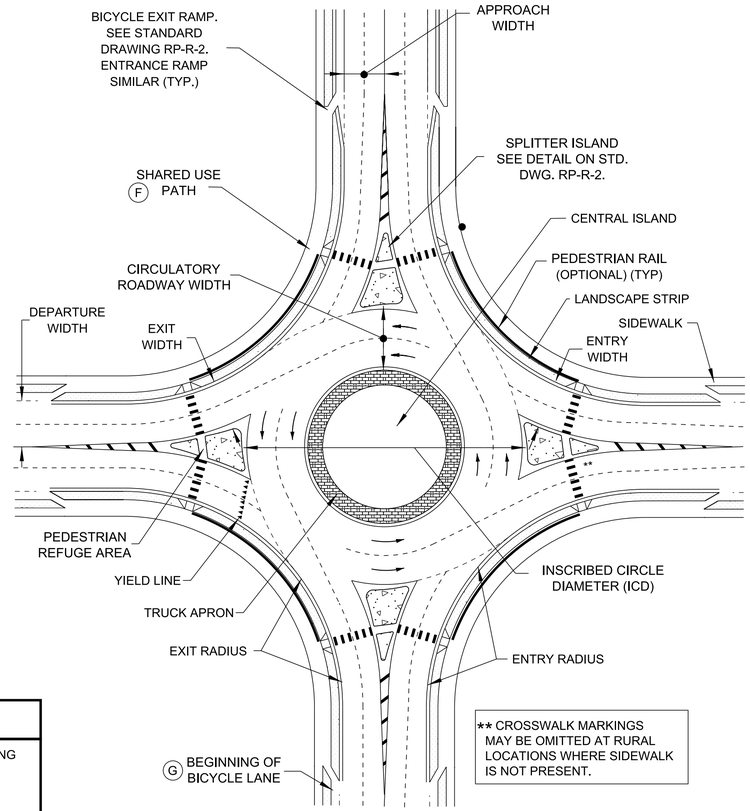
ROUNDABOUT TYPICAL SECTION



ROUNDABOUT SIGHT DISTANCE (A)

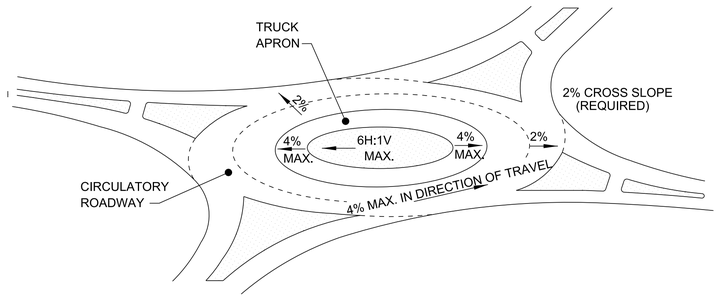


ROUNDABOUT DESIGN CHECKS



TYPICAL PLAN VIEW OF MULTI-LANE ROUNDABOUT

SEE GENERAL NOTE (K)



CIRCULATORY ROADWAY SLOPES

NOTE: TRUCK APRON CROSS SLOPE SHOULD MATCH CIRCULATORY ROADWAY CROSS SLOPE OR MAY BE INCREASED UP TO 4 PERCENT MAX.

DESIGN STANDARDS FOR SINGLE LANE ROUNDABOUTS

	URBAN	RURAL	NOTES
DESIGN SPEED	25 MPH	30 MPH	SEE FHWA EXHIBIT 6-4
INSCRIBED CIRCLE DIAMETER (H)	150' - 180'	180' - 200'	MEASURED FROM CURB FACE TO CURB FACE
CIRCULATORY ROADWAY WIDTH	1.0 - 1.2 TIMES THE MAXIMUM ENTRY WIDTH	1.0 - 1.2 TIMES THE MAXIMUM ENTRY WIDTH	————
ENTRY WIDTH	24' - 28'	24' - 28'	MEASURED FROM CURB FACE TO CURB FACE
ENTRY RADIUS	65' - 100'	65' - 100'	————
EXIT WIDTH	SAME AS ENTRY WIDTH	SAME AS ENTRY WIDTH	SAME AS ENTRY WIDTH
EXIT RADIUS	200' - 1000'	200' - 1000'	————
APPROACH/DEPARTURE WIDTH	WIDTH OF APPROACHING LANE	WIDTH OF APPROACHING LANE	DOES NOT INCLUDE BIKE LANE OR GUTTER
DAILY SERVICE VOLUME (WITH CAPACITY ANALYSIS) APPROXIMATELY 45,000 VEH/DAY			

DESIGN NOTES

(A) FASTEST PATH CHECKS SHOULD BE COMPLETED PRIOR TO INTERSECTION SIGHT DISTANCE BEING CHECKED. STOPPING SIGHT DISTANCE AND INTERSECTION SIGHT DISTANCE SHOULD BE CHECKED FOR ALL APPROACHES. REFER TO "ROUNDABOUTS; AN INFORMATIONAL GUIDE," FHWA, 2000 AND RD11-SD-1 THRU 7 FOR ADDITIONAL GUIDANCE.

(B) CONSTRUCT A B-SPLINE (SHOWN AS DASHED LINE) FOR THE THROUGH, LEFT TURN, AND RIGHT TURN MOVEMENTS. B-SPLINE SHOULD TOUCH THE 5' CURB OFFSETS AT THE POINTS INDICATED FOR THE R1, R2, R3, R4 AND R5 MEASUREMENTS. MEASURE THE RADIUS OF THE B-SPLINE AT EACH POINT. MEASUREMENT SHOULD BE BETWEEN 65' AND 85' LONG. FOR THE R1 MEASUREMENT, THE RADIUS SHOULD NOT BE MEASURED THROUGH THE YIELD LINE.

(C) PROVIDE 6' MINIMUM UNOBSTRUCTED HORIZONTAL CLEARANCE FROM THE VERTICAL CURB TO THE CENTRAL ISLAND LANDSCAPING TO ALLOW FOR CIRCULATORY ROADWAY SIGHT DISTANCE, ACTUAL DISTANCE MAY BE GREATER AND SHOULD BE DETERMINED AFTER SIGHT DISTANCE CHECKS ARE COMPLETE, BUT SHALL NOT BE LESS THAN 6 FEET.

(D) SPLITTER ISLAND SHOULD BE A RAISED MEDIAN WITH CONCRETE HARDSCAPING (PREFERRED). SPLITTER ISLAND SHOULD EXTEND A MINIMUM OF 50' FROM THE YIELD LINE. SEE STANDARD DRAWING MM-CR-4 FOR ADDITIONAL DETAILS.

(E) FOR SLOPING CURB BETWEEN CIRCULATORY ROADWAY AND TRUCK APRON, SEE STANDARD DRAWING RP-R-2. FOR VERTICAL CURB BETWEEN TRUCK APRON AND CENTRAL ISLAND, SEE STANDARD DRAWING RP-VC-10.

(F) SIDEWALK SHALL BE WIDENED TO ACCOMMODATE BICYCLES AND PEDESTRIANS AT ROUNDABOUT (SHARED USE PATH). SEE STANDARD DRAWING MM-TS-3 FOR ADDITIONAL DETAILS.

(G) SEE STANDARD DRAWINGS MM-PM-1, 2 AND 3 FOR SIGNING AND PAVEMENT MARKINGS FOR SHARED USE PATHS AND BICYCLE LANES.

(H) ASSUMES APPROXIMATELY 90-DEGREE ANGLES BETWEEN ENTRIES AND NO MORE THAN FOUR ENTRIES TO THE ROUNDABOUT.

(I) PATH OVERLAP SHOULD BE MEASURED AT THE ENTRANCE AND EXITS OF MULTI-LANE ROUNDABOUTS. LINE SHOULD BE DRAWN TANGENT TO THE CENTER OF THE ENTRANCE/EXIT AND CIRCULATORY ROADWAY.

GENERAL NOTES

(1) FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS", AASHTO, 2011.

(2) REFERENCE SHOULD BE MADE TO "ROUNDABOUTS: AN INFORMATIONAL GUIDE", FHWA, 2000. REFERENCE SHOULD ALSO BE MADE TO THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011.

(3) THIS STANDARD DRAWING IS INTENDED TO BE USED AS GUIDANCE FOR THE DESIGN OF SINGLE LANE URBAN AND RURAL ROUNDABOUTS. FOR MULTI-LANE DESIGNS, SEE STANDARD DRAWING RD11-TS-9.

(4) TRUCK TURNING TEMPLATES SHOULD BE PERFORMED ON ALL TURNING MOVEMENTS WITHIN THE ROUNDABOUT. A WB-62 VEHICLE SHOULD BE USED WHERE APPROPRIATE.

(5) STANDARD AASHTO GUIDELINES FOR ISLAND DESIGN SHOULD BE FOLLOWED FOR SPLITTER ISLAND DESIGNS, INCLUDING LARGER NOSE RADII AT APPROACH CORNERS AND OFFSETTING CURB LINES AT THE APPROACH ENDS OF THE SPLITTER ISLAND.

(6) MAXIMUM LONGITUDINAL GRADE IN THE DIRECTION OF TRAVEL THROUGH THE CIRCULATORY ROADWAY SHALL BE 4 PERCENT.

(7) USE OF A RIGHT-TURN BYPASS LANE MAY BE WARRANTED FROM THE ROUNDABOUT TRAFFIC MODEL.

(8) ROUNDABOUT APPROACHES WITH SPEEDS OF 45 MPH OR GREATER ARE CONSIDERED HIGH SPEED APPROACHES. REFER TO SECTION 6.5 OF THE "ROUNDABOUTS: AN INFORMATIONAL GUIDE", FHWA, 2000 FOR ADDITIONAL INFORMATION ON DESIGN OF ROUNDABOUTS WITH HIGH SPEED APPROACHES.

(9) MINI ROUNDABOUTS, TRAFFIC CIRCLES, AND ROTARIES ARE NOT CONSIDERED ROUNDABOUTS AND SHOULD NOT BE DESIGNED TO THE STANDARDS ON THIS DRAWING.

(10) ROADWAY SHOULDERS AND BICYCLE LANE SHALL END PRIOR TO THE CIRCULATORY ROADWAY.

(11) FOR ROUNDABOUT CONSTRUCTION DETAILS, SEE STANDARD DRAWING RP-R-2.

(12) OPTIONAL PEDESTRIAN RAIL SHALL NOT CAUSE A CONFLICT WITH INTERSECTION SIGHT DISTANCE.

(13) SEE STANDARD DRAWING T-M-17 FOR MARKING DETAILS.

NOT TO SCALE

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

DESIGN STANDARDS FOR MULTI-LANE URBAN AND RURAL ROUNDABOUTS

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