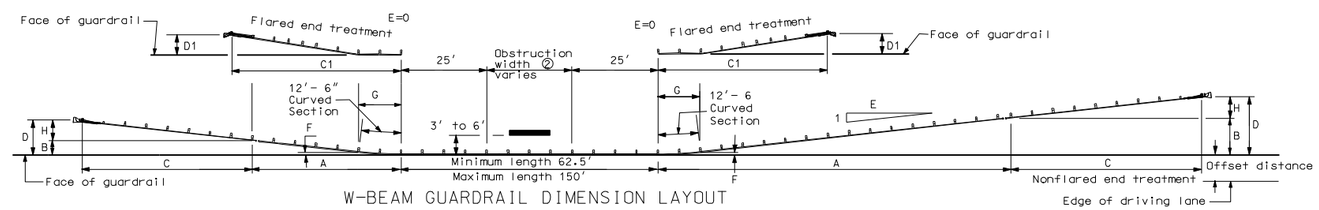
D-764-16

GUARDRAIL AT OBSTRUCTIONS
60 MPH DESIGN LENGTH OF NEED TABLES

FLARED GUARDRAIL SECTION

DESIGN TRAFFIC VOLUME	Guardrail offset distance	APPROACH SIDE A	B	C	D	C1	D1	E	OPPOSITE SIDE A	B	C	D	C1	D1	E	TOTAL W-BEAM LENGTH ① 0'-12.5' Obstruction width	12.5'-25' Obstruction width	25'-37.5' Obstruction width	37.5'-50.0 Obstruction width	50'-62.5' Obstruction width	62.5'-75' Obstruction width	75'-87.5' Obstruction width	87.5'-100' Obstruction width
		FT	FT	FT	FT	FT	FT		FT	FT	FT	FT	FT	FT		FT	FT	FT	FT	FT	FT	FT	FT
UNDER 250 ADT	10	37.42	2.40	49.85	6.23			13	0	0	50.00	0	49.79	4.00	0	100.0	112.5	125.0	137.5	150.0	162.5	175.0	187.5
	9	37.42	2.40	49.85	6.23			13	0	0	50.00	0	49.79	4.00	0	100.0	112.5	125.0	137.5	150.0	162.5	175.0	187.5
	8	49.88	3.36	49.85	7.19			13	0	0	50.00	0	49.79	4.00	0	112.5	125.0	137.5	150.0	162.5	175.0	187.5	200.0
	7	49.88	3.36	49.85	7.19			13	0	0	50.00	0	49.79	4.00	0	112.5	125.0	137.5	150.0	162.5	175.0	187.5	200.0
	6	62.35	4.32	49.85	8.15			13	0	0	50.00	0	49.79	4.00	0	125.0	137.5	150.0	162.5	175.0	187.5	200.0	212.5
	5	62.35	4.32	49.85	8.15			13	0	0	50.00	0	49.79	4.00	0	125.0	137.5	150.0	162.5	175.0	187.5	200.0	212.5
	4	74.81	5.27	49.85	9.10			13	0	0	50.00	0	49.79	4.00	0	137.5	150.0	162.5	175.0	187.5	200.0	212.5	225.0
	3	74.81	5.27	49.85	9.10			13	0	0	50.00	0	49.79	4.00	0	137.5	150.0	162.5	175.0	187.5	200.0	212.5	225.0
	2	87.27	6.23	49.85	10.06			13	0	0	50.00	0	49.79	4.00	0	150.0	162.5	175.0	187.5	200.0	212.5	225.0	237.5
	1	99.74	7.19	49.85	11.02			13	0	0	50.00	0	49.79	4.00	0	162.5	175.0	187.5	200.0	212.5	225.0	237.5	250.0
	0	99.74	7.19	49.85	11.02			13	0	0	50.00	0	49.79	4.00	0	162.5	175.0	187.5	200.0	212.5	225.0	237.5	250.0
800-250 ADT	10	49.88	3.36	49.85	7.19			13	0	0	50.00	0	49.79	4.00	0	112.5	125.0	137.5	150.0	162.5	175.0	187.5	200.0
	9	62.35	4.32	49.85	8.15			13	0	0	50.00	0	49.79	4.00	0	125.0	137.5	150.0	162.5	175.0	187.5	200.0	212.5
	8	62.35	4.32	49.85	8.15			13	0	0	50.00	0	49.79	4.00	0	125.0	137.5	150.0	162.5	175.0	187.5	200.0	212.5
	7	74.81	5.27	49.85	9.10			13	0	0	50.00	0	49.79	4.00	0	137.5	150.0	162.5	175.0	187.5	200.0	212.5	225.0
	6	74.81	5.27	49.85	9.10			13	0	0	50.00	0	49.79	4.00	0	137.5	150.0	162.5	175.0	187.5	200.0	212.5	225.0
	5	87.27	6.23	49.85	10.06			13	12.49	0.48	49.85	4.31			13	162.5	162.5	175.0	187.5	200.0	212.5	225.0	237.5
	4	99.74	7.19	49.85	11.02			13	12.49	0.48	49.85	4.31			13	175.0	187.5	200.0	212.5	225.0	237.5	250.0	262.5
	3	99.74	7.19	49.85	11.02			13	24.95	1.44	49.85	5.27			13	187.5	200.0	212.5	225.0	237.5	250.0	262.5	275.0
	2	112.20	8.15	49.85	11.98			13	24.95	1.44	49.85	5.27			13	200.0	212.5	225.0	237.5	250.0	262.5	275.0	287.5
	1	112.20	8.15	49.85	11.98			13	37.42	2.40	49.85	6.23			13	212.5	225.0	237.5	250.0	262.5	275.0	287.5	300.0
	0	124.66	9.11	49.85	12.94			13	37.42	2.40	49.85	6.23			13	225.0	237.5	250.0	262.5	275.0	287.5	300.0	312.5
2000-800 ADT	10	62.35	4.32	49.85	8.15			13	0	0	50.00	0	49.79	4.00	0	125.0	137.5	150.0	162.5	175.0	187.5	200.0	212.5
	9	74.81	5.27	49.85	9.10			13	0	0	50.00	0	49.79	4.00	0	137.5	150.0	162.5	175.0	187.5	200.0	212.5	225.0
	8	74.81	5.27	49.85	9.10			13	0	0	50.00	0	49.79	4.00	0	137.5	150.0	162.5	175.0	187.5	200.0	212.5	225.0
	7	87.27	6.23	49.85	10.06			13	12.49	0.48	49.85	4.31			13	162.5	162.5	175.0	187.5	200.0	212.5	225.0	237.5
	6	87.27	6.23	49.85	10.06			13	12.49	0.48	49.85	4.31			13	162.5	175.0	187.5	200.0	212.5	225.0	237.5	250.0
	5	99.74	7.19	49.85	11.02			13	24.95	1.44	49.85	5.27			13	175.0	187.5	200.0	212.5	225.0	237.5	250.0	262.5
	4	99.74	7.19	49.85	11.02			13	24.95	1.44	49.85	5.27			13	187.5	200.0	212.5	225.0	237.5	250.0	262.5	275.0
	3	112.20	8.15	49.85	11.98			13	37.42	2.40	49.85	6.23			13	212.5	225.0	237.5	250.0	262.5	275.0	287.5	300.0
	2	112.20	8.15	49.85	11.98			13	37.42	2.40	49.85	6.23			13	212.5	225.0	237.5	250.0	262.5	275.0	287.5	300.0
	1	124.66	9.11	49.85	12.94			13	49.88	3.36	49.85	7.19			13	237.5	250.0	262.5	275.0	287.5	300.0	312.5	325.0
	0	124.66	9.11	49.85	12.94			13	49.88	3.36	49.85	7.19			13	237.5	250.0	262.5	275.0	287.5	300.0	312.5	325.0
6000-2000 ADT	10	87.27	6.23	49.85	10.06			13	12.49	0.48	49.85	4.31			13	162.5	175.0	187.5	200.0	212.5	225.0	237.5	250.0
	9	87.27	6.23	49.85	10.06			13	12.49	0.48	49.85	4.31			13	162.5	175.0	187.5	200.0	212.5	225.0	237.5	250.0
	8	99.74	7.19	49.85	11.02			13	24.95	1.44	49.85	5.27			13	187.5	200.0	212.5	225.0	237.5	250.0	262.5	275.0
	7	99.74	7.19	49.85	11.02			13	24.95	1.44	49.85	5.27			13	187.5	200.0	212.5	225.0	237.5	250.0	262.5	275.0
	6	112.20	8.15	49.85	11.98			13	37.42	2.40	49.85	6.23			13	212.5	225.0	237.5	250.0	262.5	275.0	287.5	300.0
	5	112.20	8.15	49.85	11.98			13	37.42	2.40	49.85	6.23			13	212.5	225.0	237.5	250.0	262.5	275.0	287.5	300.0
	4	124.66	9.11	49.85	12.94			13	49.88	3.36	49.85	7.19			13	237.5	250.0	262.5	275.0	287.5	300.0	312.5	325.0
	3	124.66	9.11	49.85	12.94			13	49.88	3.36	49.85	7.19			13	237.5	250.0	262.5	275.0	287.5	300.0	312.5	325.0
	2	137.13	10.07	49.85	13.90			13	62.35	4.32	49.85	8.15			13	262.5	275.0	287.5	300.0	312.5	325.0	337.5	350.0
	1	137.13	10.07	49.85	13.90			13	62.35	4.32	49.85	8.15			13	262.5	275.0	287.5	300.0	312.5	325.0	337.5	350.0
	0	149.59	11.02	49.85	14.85			13	74.81	5.27	49.85	9.10			13	287.5	300.0	312.5	325.0	337.5	350.0	362.5	375.0
OVER 6000 ADT	10	99.74	7.19	49.85	11.02			13	24.95	1.44	49.85	5.27			13	187.5	200.0	212.5	225.0	237.5	250.0	262.5	275.0
	9	112.20	8.15	49.85	11.98			13	37.42	2.40	49.85	6.23			13	212.5	225.0	237.5	250.0	262.5	275.0	287.5	300.0
	8	112.20	8.15	49.85	11.98			13	37.42	2.40	49.85	6.23			13	212.5	225.0	237.5	250.0	262.5	275.0	287.5	300.0
	7	124.66	9.11	49.85	12.94			13	49.88	3.36	49.85	7.19			13	237.5	250.0	262.5	275.0	287.5	300.0	312.5	325.0
	6	124.66	9.11	49.85	12.94			13	49.88	3.36	49.85	7.19			13	237.5	250.0	262.5	275.0	287.5	300.0	312.5	325.0
	5	137.13	10.07	49.85	13.90			13	62.35	4.32	49.85	8.15			13	262.5	275.0	287.5	300.0	312.5	325.0	337.5	350.0
	4	137.13	10.07	49.85	13.90			13	62.35	4.32	49.85	8.15			13	262.5	275.0	287.5	300.0	312.5	325.0	337.5	350.0
	3	149.59	11.02	49.85	14.85			13	74.81	5.27	49.85	9.10			13	287.5	300.0	312.5	325.0	337.5	350.0	362.5	375.0
	2	149.59	11.02	49.85	14.85			13	74.81	5.27	49.85	9.10			13	287.5	300.0	312.5	325.0	337.5	350.0	362.5	375.0
	1	162.06	11.99	49.85	15.82			13	87.27	6.23	49.85	10.06			13	312.5	325.0	337.5	350.0	362.5	375.0	387.5	400.0
	0	162.06	11.99	49.85	15.82			13	87.27	6.23	49.85	10.06			13	312.5	325.0	337.5	350.0	362.5	375.0	387.5	400.0



W-BEAM GUARDRAIL DIMENSION LAYOUT

NOTES:

The contractor shall use wood posts for the W-beam guardrail and end treatment section.

① Does not include end treatment section.
② The width of the obstruction shall be rounded up to the nearest 12'-6" length.

Design Speed	F	G	H	R
	FT	FT	FT	FT
60	0.48	12.49	3.83	162.82

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

09-01-98

REVISIONS

DATE	CHANGE
03-09-99	Revised layout
12-21-00	Revised flared end treatment
02-07-03	Removed 3 cable guardrail
12-01-04	PE Stamp added

This document was originally issued and sealed by MARK S GAYDOS, Registration Number PE-3418, on 12/01/04 and the original document is stored at the North Dakota Department of Transportation