



**Attachment E**

**ESTIMATES OF COUNTERMEASURE EFFECTIVENESS REDUCTION (R) FACTORS**

**September, 1997**

Number	Description	All	PDO	INJ/FAT	Night	Wet	Pedestrian	Left	Right	Angle	Rear	Head	Side	Fixed	Ran
60	Install delineators at curve - rural [Curve crashes only]	0.16													
13	Install concrete median barrier [median and cross-median crashes only]			0.61											
14	Install painted median	0.12													
15	Install 2WLTL - existing pavement							0.10					0.32		
41	Widen pavement to provide 2WLTL							0.20			0.20		0.20		
16	Install left turn bay & extra pavement without signal							0.20			0.20				
17	Install left turn bay & extra pavement with signal							0.20			0.20				
37	Widen roadway, rural section, no additional lanes	0.38		0.30											
38	Widen roadway, rural section, including additional lanes	0.38		0.30											
39	Widen for left turn lane, including resurfacing							0.20			0.20		0.20		
40	Widen for right turn lane, including resurfacing								0.20		0.20		0.20		
42	Stabilize berms - rural section	0.38		0.30											
20	Upgrade existing flasher	0.20													
21	Install flasher	0.50													
22	Upgrade existing signal - general	0.20													
23	Reconstruct existing signal - major	0.27													
24	Install traffic signal - all types							0.10	0.10	0.80	-0.10		0.10		
25	Revise signal timing	0.10													
26	Add pedestrian heads						0.50								
27	Add left turn phase with new left turn lane							0.40			0.20				
28	Add left turn phase with existing left turn lane							0.30			0.10				





WHEN USING MULTIPLE COUNTERMEASURES, THE TOTAL REDUCTION FATOR IS:  
 $R1 + (1-R1)R2 + (1-R1)(1-R2)R3 + (1-R1) (1-R2)(1-R3)R4 + \dots = RT$

COST OF CRASHES FOR DETERMING ROR (2003)

SYSTEM	PDO	INJ/FAT
Rural State Highways	\$ 9,617	\$68,582
Counties and Unincorporated Villages	\$ 9,562	\$61,362
Cities and Incorporated Villages	\$12,472	\$42,390