



# PARSONS BRINCKERHOFF COMPUTATION SHEET

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Made by C. Carney

Date October 25, 2013

Checked by C. Sharp

Date April 16, 2015

Subject 14633I Superelevation Calculations  
I-93 Northbound Mainline

Curve No. M\_I-93NB-1  
Speed 70 mph  
E<sub>max</sub> 8.00%  
Rate 1: 250  
Radius 3444  
Direction Left  
Width 24 Left 24 Right  
e 5.57%  
SC Sta. 1653+77.08  
CS Sta. 1665+62.47  
Runout 100.54 NC to "0" Section  
Runoff 280 "0" Section to FB  
Adj. Factor 0.75

Curve In (not applicable for 14633I)	Right	Curve Out Station	Left	
	5.57%	1665+62.47	-5.57%	FB
	5.32%	1665+75.00	-5.32%	
	4.82%	1666+00.00	-4.82%	
	4.33%	1666+25.00	-4.33%	
	3.83%	1666+50.00	-3.83%	
	3.33%	1666+75.00	-3.33%	
	2.83%	1667+00.00	-2.83%	
	2.34%	1667+25.00	-2.34%	
	2.00%	1667+41.93	-2.00%	RC
	1.84%	1667+50.00	-2.00%	
	1.34%	1667+75.00	-2.00%	
	0.84%	1668+00.00	-2.00%	
	0.35%	1668+25.00	-2.00%	
	0.00%	1668+42.47	-2.00%	"0"
	-0.15%	1668+50.00	-2.00%	
	-0.65%	1668+75.00	-2.00%	
	-1.14%	1669+00.00	-2.00%	
	-1.64%	1669+25.00	-2.00%	
	-2.00%	1669+43.01	-2.00%	NC

Adjusted Rate: 279 279



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14633I Superelevation Calculations

Curve No. M\_I-93NB-2  
Speed 70 mph  
E<sub>max</sub> 8.00%  
Rate 1: 250  
Radius 6615  
Direction Right  
Width 24 Left 24 Right  
e 3.13%  
SC Sta. 1708+39.62  
CS Sta. 1728+83.65  
Runout 127.80 NC to "0" Section  
Runoff 200 "0" Section to FB  
Adj. Factor 0.75

	Left	Curve In Station	Right	Left	Curve Out Station	Right	
NC	-2.00%	1705+11.82	-2.00%	3.13%	1728+83.65	-3.13%	FB
	-1.79%	1705+25.00	-2.00%	2.87%	1729+00.00	-2.87%	
	-1.40%	1705+50.00	-2.00%	2.48%	1729+25.00	-2.48%	
	-1.01%	1705+75.00	-2.00%	2.09%	1729+50.00	-2.09%	
	-0.62%	1706+00.00	-2.00%	2.00%	1729+55.85	-2.00%	RC
	-0.23%	1706+25.00	-2.00%	1.70%	1729+75.00	-2.00%	
"0"	0.00%	1706+39.62	-2.00%	1.31%	1730+00.00	-2.00%	
	0.16%	1706+50.00	-2.00%	0.92%	1730+25.00	-2.00%	
	0.55%	1706+75.00	-2.00%	0.53%	1730+50.00	-2.00%	
	0.94%	1707+00.00	-2.00%	0.14%	1730+75.00	-2.00%	
	1.34%	1707+25.00	-2.00%	0.00%	1730+83.65	-2.00%	"0"
	1.73%	1707+50.00	-2.00%	-0.26%	1731+00.00	-2.00%	
RC	2.00%	1707+67.42	-2.00%	-0.65%	1731+25.00	-2.00%	
	2.12%	1707+75.00	-2.12%	-1.04%	1731+50.00	-2.00%	
	2.51%	1708+00.00	-2.51%	-1.43%	1731+75.00	-2.00%	
	2.90%	1708+25.00	-2.90%	-1.82%	1732+00.00	-2.00%	
FB	3.13%	1708+39.62	-3.13%	-2.00%	1732+11.45	-2.00%	NC
Adjusted Rate:	355		355	355		355	



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Curve No. M\_I-93SB-1  
 Speed 70 mph  
 Emax 8.00%  
 Rate 1: 250  
 Radius 3300  
 Direction Left  
 Width 24 Left 24 Right  
 e 5.77%  
 SC Sta. 3656+33.58  
 CS Sta. 3667+37.46  
 Runout 103.99 NC to "0" Section  
 Runoff 300 "0" Section to FB  
 Adj. Factor 0.75

Curve In (not applicable for 14633I)	Right	Curve Out Station	Left	
	5.77%	3667+37.46	-5.77%	FB
	5.53%	3667+50.00	-5.53%	
	5.05%	3667+75.00	-5.05%	
	4.57%	3668+00.00	-4.57%	
	4.09%	3668+25.00	-4.09%	
	3.61%	3668+50.00	-3.61%	
	3.12%	3668+75.00	-3.12%	
	2.64%	3669+00.00	-2.64%	
	2.16%	3669+25.00	-2.16%	
	2.00%	3669+33.47	-2.00%	RC
	1.68%	3669+50.00	-2.00%	
	1.20%	3669+75.00	-2.00%	
	0.72%	3670+00.00	-2.00%	
	0.24%	3670+25.00	-2.00%	
	0.00%	3670+37.46	-2.00%	"0"
	-0.24%	3670+50.00	-2.00%	
	-0.72%	3670+75.00	-2.00%	
	-1.20%	3671+00.00	-2.00%	
	-1.68%	3671+25.00	-2.00%	
	-2.00%	3671+41.45	-2.00%	NC

Adjusted Rate: 289 289



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Curve No. M\_I-93SB-2  
Speed 70 mph  
E<sub>max</sub> 8.00%  
Rate 1: 250  
Radius 7382  
Direction Right  
Width 24 Left 24 Right  
e 2.83%  
SC Sta. 3710+07.67  
CS Sta. 3733+70.56  
Runout 141.34 NC to "0" Section  
Runoff 200 "0" Section to FB  
Adj. Factor 0.75

	Left	Curve In Station	Right	Left	Curve Out Station	Right		
NC	-2.00%	3706+66.33	-2.00%	2.83%	3733+70.56	-2.83%	FB	
	-1.88%	3706+75.00	-2.00%	2.77%	3733+75.00	-2.77%		
	-1.52%	3707+00.00	-2.00%	2.41%	3734+00.00	-2.41%		
	-1.17%	3707+25.00	-2.00%	2.06%	3734+25.00	-2.06%		
	-0.82%	3707+50.00	-2.00%	2.00%	3734+29.22	-2.00%		RC
	-0.46%	3707+75.00	-2.00%	1.71%	3734+50.00	-2.00%		
	-0.11%	3708+00.00	-2.00%	1.35%	3734+75.00	-2.00%		
"0"	0.00%	3708+07.67	-2.00%	1.00%	3735+00.00	-2.00%	"0"	
	0.25%	3708+25.00	-2.00%	0.64%	3735+25.00	-2.00%		
	0.60%	3708+50.00	-2.00%	0.29%	3735+50.00	-2.00%		
	0.95%	3708+75.00	-2.00%	0.00%	3735+70.56	-2.00%		
	1.31%	3709+00.00	-2.00%	-0.06%	3735+75.00	-2.00%		
RC	1.66%	3709+25.00	-2.00%	-0.42%	3736+00.00	-2.00%	RC	
	2.00%	3709+49.01	-2.00%	-0.77%	3736+25.00	-2.00%		
	2.01%	3709+50.00	-2.01%	-1.12%	3736+50.00	-2.00%		
	2.37%	3709+75.00	-2.37%	-1.48%	3736+75.00	-2.00%		
FB	2.72%	3710+00.00	-2.72%	-1.83%	3737+00.00	-2.00%	NC	
	2.83%	3710+07.67	-2.83%	-2.00%	3737+11.90	-2.00%		
Adjusted Rate:	393		393	393		393		