

**FRA Quiet Zone Risk Indices**

**Road Authority:** City of Kent, WA

**Railroad:** Union Pacific Railroad Company

**Date:** February 4, 2022

Crossing Number	ZoneID	SenarioID	US DOT Crossing	Street	Warning Device	SSM	Pre SSM	Initial Quiet Zone Risk Index w/o Horns (+66.8%)	Effectiveness of Pre-SSMs	Effectiveness of New SSMs	Risk Index With Horns (RIWH)	Risk Index with Pre-SSMs	Effectivness of Pre-ASMs	Risk Index with Pre-ASMs	ASM / Modified SSM Effectiveness	Quiet Zone Risk Index	Modified SSM Description
FRA Online Calculator									Calculations from FRA Spreadsheet								
1	58103	65967	396575R	South 212th Street	Gates	0	0	57,857	-	-	34,686	34,686	-	34,686	0.73	15,621	Modified Non-Traversable Curb Medians with or without Channelization Devices. 84 foot median west of the westerly gate. 120 foot median east of the easterly gate
2	58103	65967	396578L	West James Street	Gates	0	0	102,144	-	-	61,237	61,237	-	61,237	0.60	40,858	Modified Non-Traversable Curb Medians with or without Channelization Devices. 90 foot median west of the westerly gate. Commercial driveway 60 feet east of the easterly gate
3	58103	65967	396579T	West Smith Street	Gates	0	0	32,633	-	-	19,564	19,564	-	19,564	-	32,633	
4	58103	65967	396580M	West Meeker Street	Gates	0	0	25,588	-	-	15,341	15,341	-	15,341	-	25,588	
5	58103	65967	396581U	Willis Street/WA 516	Gates	13	0	7,502	-	0.80	22,490	22,490	-	22,490	-	7,502	
<b>Averages:</b>											30,664	30,664		30,664		<b>24,440</b>	

Nationwide Significant Risk Threshold (NSRT): 15,488  
 Risk Index with Horns (RIWH): 30,664  
 Quiet Zone Risk Index (QZRI): 24,440  
**QZ Risk Reduction Qualifies for Quiet Zone: Yes**

**Alternative Safety Measures - Modified SSMs per Appendix B or Part 222  
Calculations for Proposed Adjustment to SSM Effectiveness Rate**

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**Methodology**

The methodology for calculating the adjusted effectiveness assumes that each side of the crossing contributes one-half of the overall effectiveness of the crossing. The effectiveness of each side is calculated individually and the effectiveness of the entire crossing is calculated by adding the two sides together.

For example, if the effectiveness of a theoretical SSM is 0.60, each side contributes 0.30 to the total. For this example, assume the theoretical "left side" is 50% effective and the theoretical "right side" is 66% effective. The "left side" would contribute  $(0.60 / 2) * 50\% = 0.15$ . The "right side" would contribute  $(0.60 / 2) * 66\% = 0.198$ . The total proposed ASM effectiveness for of the crossing would be  $0.15 + 0.198 = 0.348$

**Calculations**

<b>396575R</b>	<b>S 212th St</b>	<b>ASM = Modified Gates with Medians. Regional trail crosses S 212th St to the west</b>
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Base SSM:	13	Non-Traversable Curb Medians with or without Channelization Devices
SSM Effectiveness Rate by Rule	0.8	
SSM Effectiveness per Side	0.4	
Intersection located within 100 feet of the crossing? (Yes/No)	No	
Required median length from gate, per side	100	feet

West side	Distance Provided	Min SSM- Allowed	Percent Provided	SSM Effectiveness per Side	Resulting Effectiveness
Distance from gate to intersection north side	>100	100	100%	0.400	0.400
Distance from gate to intersection south side	>100	100	100%	0.400	0.400
Distance from gate to end of median*	84	100	84%	0.400	0.336
Controlling Effectiveness for West Side					0.336

\* the Interurban Regional Trail crosses S 212th St 84 feet from the westerly gate

East side	Distance Provided	Min SSM- Allowed	Percent Provided	SSM Effectiveness per Side	Resulting Effectiveness
Distance from gate to intersection north side	>100	100	100%	0.400	0.400
Distance from gate to intersection south side	>100	100	100%	0.400	0.400
Distance from gate to end of median	120	100	100%	0.400	0.400
Controlling Effectiveness for West Side					0.400

Proposed ASM/Modified SSM Effectiveness Rate 0.736 (Sum of both sides)

396578L	W James St	ASM = Modified Gates with Medians. Regional trail crosses W James St St to the west
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Base SSM: 13 Non-Traversable Curb Medians with or without Channelization Devices  
SSM Effectiveness Rate by Rule 0.8  
SSM Effectiveness per Side 0.4

Intersection located within 100 feet of the crossing? (Yes/No) No  
Required median length from gate, per side 100 feet

West side	Distance Provided	Min SSM- Allowed	Percent Provided	SSM Effectiveness per Side	Resulting Effectiveness
Distance from gate to intersection north side	>100	100	100%	0.400	0.400
Distance from gate to intersection south side	>100	100	100%	0.400	0.400
Distance from gate to end of median*	90	100	90%	0.400	0.360
Controlling Effectivness for West Side					0.360

\* the Interurban Regional Trail crosses S 212th St 84 feet from the westerly gate

East side	Distance Provided	Min SSM- Allowed	Percent Provided	SSM Effectiveness per Side	Resulting Effectiveness
Distance from gate to intersection north side	>100	100	100%	0.400	0.400
Distance from gate to intersection south side	60	100	60%	0.400	0.240
Distance from gate to end of median	120	100	100%	0.400	0.400
Controlling Effectivness for West Side					0.240

Proposed ASM/Modified SSM Effectiveness Rate 0.600 (Sum of both sides)

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ZoneID	SenarioID	Crossing	Street	WarningDevice	SSM	PreSSM	RiskIndex	ASM Effectiveness Rate
58103	65967	396575R	South 212th Street	Gates	0	0	57856.83955	
58103	65967	396578L	West James Street	Gates	0	0	102143.9315	
58103	65967	396579T	West Smith Street	Gates	0	0	32632.64786	
58103	65967	396580M	West Meeker Street	Gates	0	0	25587.96945	
58103	65967	396581U	Willis Street/WA 516	Gates	13	0	7502.233448	

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58103	65967	396578L	West James Street	Gates	0	0	102143.9315	
58103	65967	396579T	West Smith Street	Gates	0	0	32632.64786	
58103	65967	396580M	West Meeker Street	Gates	0	0	25587.96945	
58103	65967	396581U	Willis Street/WA 516	Gates	0	0	37511.16724	

SSM No.	SSM Description	SSM Eff Rate
0	No SSM	0
1	Temporary Closure of a Public Highway-Rail Grade Crossing	1.00
2	Permanent Closure of a Public Highway-Rail Grade Crossing	1.00
3	Grade Separation of a Public Highway-Rail Grade Crossing	1.00
4	Four-Quadrant Gates Upgrade from Two Quadrant gates, No Vehicle Presence Detection	0.82
5	Four-Quadrant Gates Upgrade from Two Quadrant Gates, with medians and no Vehicle Presence Detection	0.92
6	Four-Quadrant Gates Upgrade from Two Quadrant Gates, with Vehicle Presence Detection	0.77
7	Four-Quadrant Gates Upgrade from Two Quadrant Gates, with medians and Vehicle Presence Detection	0.92
8	Four-Quadrant Gates New Installation, No Vehicle Presence Detection	0.82
9	Four-Quadrant Gates New Installation with medians and no Vehicle Presence Detection	0.92
10	Four-Quadrant Gates New Installation with Vehicle Presence Detection	0.77
11	Four-Quadrant Gates New Installation with medians and Vehicle Presence Detection	0.92
12	Mountable medians with Reflective Traffic Channelization Devices	0.75
13	Non-Traversable Curb Medians with or without Channelization Devices	0.80
14	One-Way Streets with Gates	0.82