APPENDIX E

NOISE AND VIBRATION

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Reference Vibration Curve Adjustment Factors

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Table 1
Reference Vibration Curve Adjustment Factors (Existing Use)

Reference Curve Assumptions:				
Vehicle Type:	Locomotive Powered Passenger or Freight			
Speed (mph):	50			
Track:	Continuously Welded Rail (CWR)			
Geology:	Normal soil, inefficient at transmitting vibration			
Traffic Condition A (Chicago to Aurora):				
Train Type:	Locomotive Powered Freight and Passenger			
Speed (mph):	60			
Track:	CWR (same as reference case)			
Geology:	Till		149,704	Linear Ft
	Sand/Gravel/Sed		31,583	Linear Ft
	Total		181,287	Linear Ft
Reference Curve Adjustment Factors:				
Increased Speed:		1.6	dB, calc. per FTA guidance	
Track:		0	dB	
Geology:		10	dB, for till (efficient soil)	
		0	dB, for sand/gravel/sediment (inefficient soil)	
		8.3	dB, weighted average over section	
Total Adjustments:		9.8	dB	
Traffic Condition B (Aurora to Wyanet):				
Train Type:	Locomotive Powered Freight and Passenger			
Speed (mph):	70			
Track:	CWR (same as reference case)			
Geology:	Till		299,141	Linear Ft
	Sand/Gravel/Sed		105,188	Linear Ft
	Total		404,329	Linear Ft
Reference Curve Adjustment Factors:				
Increased Speed:		2.9	dB, calc. per FTA guidance	
Track:		0	dB	
Geology:		10	dB, for till (efficient soil)	
		0	dB, for sand/gravel/sediment (inefficient soil)	
		7.4	dB, weighted average over section	
Total Adjustments:		10.3	dB	

Table 1 (continued)

Traffic Condition C (Wyanet to Silvis):			
Train Type:	Locomotive Powered Freight (no existing passenger trains)		
Speed (mph):	35		
Track:	CWR (same as reference case)		
Geology:	Till	118,423	Linear Ft
	Sand/Gravel/Sed	110,877	Linear Ft
	Total	229,300	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-3.1	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	5.2	dB, weighted average over section	
Total Adjustments:	2.1	dB	
Traffic Condition D (Silvis to Rock Island):			
Train Type:	Locomotive Powered Freight (no existing passenger trains)		
Speed (mph):	5		
Track:	CWR (same as reference case)		
Geology:	Till	41,934	Linear Ft
	Sand/Gravel/Sed	14,437	Linear Ft
	Total	56,371	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-20.0	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	7.4	dB, weighted average over section	
Total Adjustments:	-12.6	dB	
Traffic Condition E (Rock Island to Iowa City):			
Train Type:	Locomotive Powered Freight (no existing passenger trains)		
Speed (mph):	35		
Track:	CWR (same as reference case)		
Geology:	Till	0	Linear Ft
	Sand/Gravel/Sed	268,415	Linear Ft
	Total	268,415	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-3.1	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	0.0	dB, weighted average over section	
Total Adjustments:	-3.1	dB	

Table 1 (continued)

Traffic Condition F (Iowa City):			
Train Type:	Locomotive Powered Freight (no existing passenger trains)		
Speed (mph):	5		
Track:	CWR (same as reference case)		
Geology:	Till	0	Linear Ft
	Sand/Gravel/Sed	14,129	Linear Ft
	Total	14,129	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-20.0	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	0.0	dB, weighted average over section	
Total Adjustments:	-20.0	dB	
Traffic Condition G (Iowa City to E. Des Moines):			
Train Type:	Locomotive Powered Freight (no existing passenger trains)		
Speed (mph):	35		
Track:	CWR (same as reference case)		
Geology:	Till	0	Linear Ft
	Sand/Gravel/Sed	589,517	Linear Ft
	Total	589,517	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-3.1	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	0.0	dB, weighted average over section	
Total Adjustments:	-3.1	dB	
Traffic Condition H (Des Moines):			
Train Type:	Locomotive Powered Freight (no existing passenger trains)		
Speed (mph):	10		
Track:	CWR (same as reference case)		
Geology:	Till	0	Linear Ft
	Sand/Gravel/Sed	73,699	Linear Ft
	Total	73,699	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-14.0	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	0.0	dB, weighted average over section	
Total Adjustments:	-14.0	dB	

Table 1 (continued)

Traffic Condition I (W. Des Moines to Council Bluffs):			
Train Type:	Locomotive Powered Freight (no existing passenger trains)		
Speed (mph):	35		
Track:	CWR (same as reference case)		
Geology:	Till	0	Linear Ft
	Sand/Gravel/Sed	653,157	Linear Ft
	Total	653,157	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-3.1	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	0.0	dB, weighted average over section	
Total Adjustments:	-3.1	dB	
Traffic Condition J (Council Bluffs to Omaha):			
Train Type:	Locomotive Powered Freight (no existing passenger trains)		
Speed (mph):	10		
Track:	CWR (same as reference case)		
Geology:	Till	16,353	Linear Ft
	Sand/Gravel/Sed	86,094	Linear Ft
	Total	102,447	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-14.0	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	1.6	dB, weighted average over section	
Total Adjustments:	-12.4	dB	

Chart 1
Ground Surface Vibration Curves - Existing Use

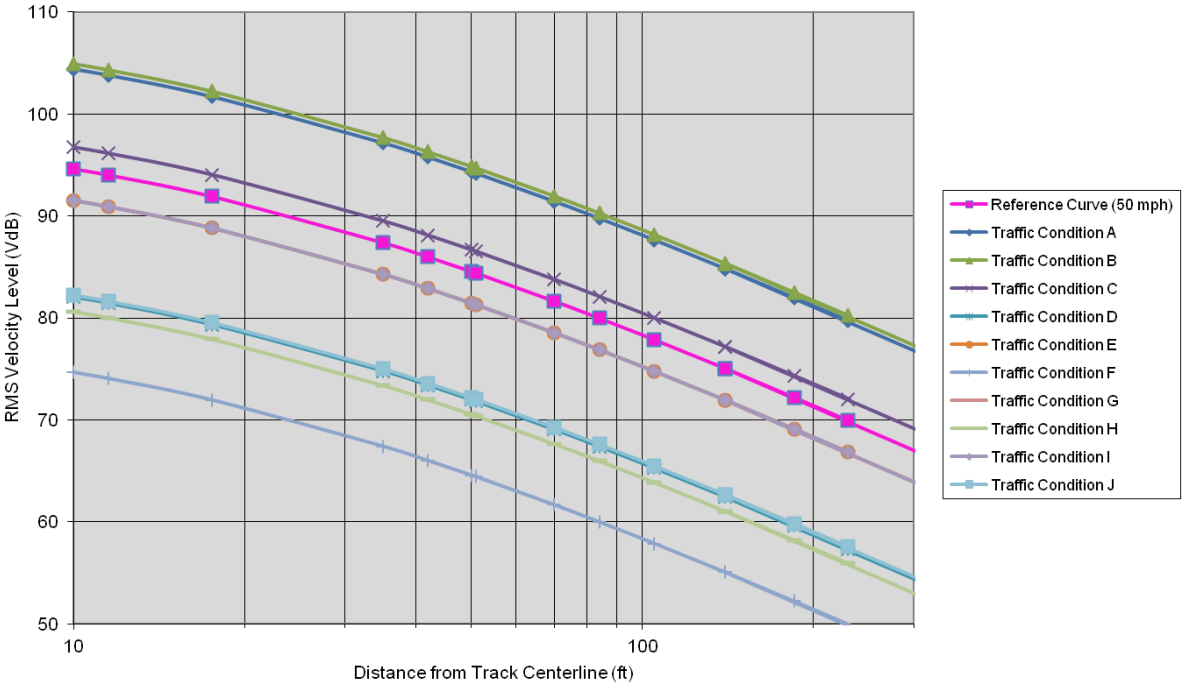


Table 2
Reference Vibration Curve Adjustment Factors (Future No-build Condition)

Reference Curve Assumptions:			
Vehicle Type:	Locomotive Powered Passenger or Freight		
Speed (mph):	50		
Track:	Continuously Welded Rail (CWR)		
Geology:	Normal soil, inefficient at transmitting vibration		
Traffic Condition A (Chicago to Aurora):			
Train Type:	Locomotive Powered Freight and Passenger		
Speed (mph):	60		
Track:	CWR (same as reference case)		
Geology:	Till	149,704	Linear Ft
	Sand/Gravel/Sed	31,583	Linear Ft
	Total	181,287	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	1.6	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	8.3	dB, weighted average over section	
Total Adjustments:	9.8	dB	
Traffic Condition B (Aurora to Wyanet):			
Train Type:	Locomotive Powered Freight and Passenger		
Speed (mph):	70		
Track:	CWR (same as reference case)		
Geology:	Till	299,141	Linear Ft
	Sand/Gravel/Sed	105,188	Linear Ft
	Total	404,329	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	2.9	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	7.4	dB, weighted average over section	
Total Adjustments:	10.3	dB	

Table 2 (continued)

Traffic Condition C (Wyanet to Silvis):			
Train Type:	Locomotive Powered Freight (no existing passenger trains)		
Speed (mph):	35		
Track:	CWR (same as reference case)		
Geology:	Till	118,423	Linear Ft
	Sand/Gravel/Sed	110,877	Linear Ft
	Total	229,300	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-3.1	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	5.2	dB, weighted average over section	
Total Adjustments:	2.1	dB	
Traffic Condition D (Silvis to Rock Island):			
Train Type:	Locomotive Powered Freight (no existing passenger trains)		
Speed (mph):	5		
Track:	CWR (same as reference case)		
Geology:	Till	41,934	Linear Ft
	Sand/Gravel/Sed	14,437	Linear Ft
	Total	56,371	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-20.0	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	7.4	dB, weighted average over section	
Total Adjustments:	-12.6	dB	
Traffic Condition E (Rock Island to Iowa City):			
Train Type:	Locomotive Powered Freight (no existing passenger trains)		
Speed (mph):	35		
Track:	CWR (same as reference case)		
Geology:	Till	0	Linear Ft
	Sand/Gravel/Sed	268,415	Linear Ft
	Total	268,415	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-3.1	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	0.0	dB, weighted average over section	
Total Adjustments:	-3.1	dB	

Table 2 (continued)

Traffic Condition F (Iowa City):			
Train Type:	Locomotive Powered Freight (no existing passenger trains)		
Speed (mph):	5		
Track:	CWR (same as reference case)		
Geology:	Till	0	Linear Ft
	Sand/Gravel/Sed	14,129	Linear Ft
	Total	14,129	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-20.0	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	0.0	dB, weighted average over section	
Total Adjustments:	-20.0	dB	
Traffic Condition G (Iowa City to E. Des Moines):			
Train Type:	Locomotive Powered Freight (no existing passenger trains)		
Speed (mph):	35		
Track:	CWR (same as reference case)		
Geology:	Till	0	Linear Ft
	Sand/Gravel/Sed	589,517	Linear Ft
	Total	589,517	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-3.1	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	0.0	dB, weighted average over section	
Total Adjustments:	-3.1	dB	
Traffic Condition H (Des Moines):			
Train Type:	Locomotive Powered Freight (no existing passenger trains)		
Speed (mph):	10		
Track:	CWR (same as reference case)		
Geology:	Till	0	Linear Ft
	Sand/Gravel/Sed	73,699	Linear Ft
	Total	73,699	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-14.0	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	0.0	dB, weighted average over section	
Total Adjustments:	-14.0	dB	

Table 2 (continued)

Traffic Condition I (W. Des Moines to Council Bluffs):			
Train Type:	Locomotive Powered Freight (no existing passenger trains)		
Speed (mph):	35		
Track:	CWR (same as reference case)		
Geology:	Till	0	Linear Ft
	Sand/Gravel/Sed	653,157	Linear Ft
	Total	653,157	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-3.1	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	0.0	dB, weighted average over section	
Total Adjustments:	-3.1	dB	
Traffic Condition J (Council Bluffs to Omaha):			
Train Type:	Locomotive Powered Freight (no existing passenger trains)		
Speed (mph):	10		
Track:	CWR (same as reference case)		
Geology:	Till	16,353	Linear Ft
	Sand/Gravel/Sed	86,094	Linear Ft
	Total	102,447	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-14.0	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	1.6	dB, weighted average over section	
Total Adjustments:	-12.4	dB	

Chart 2
Ground Surface Vibration Curves - Future No Build Condition

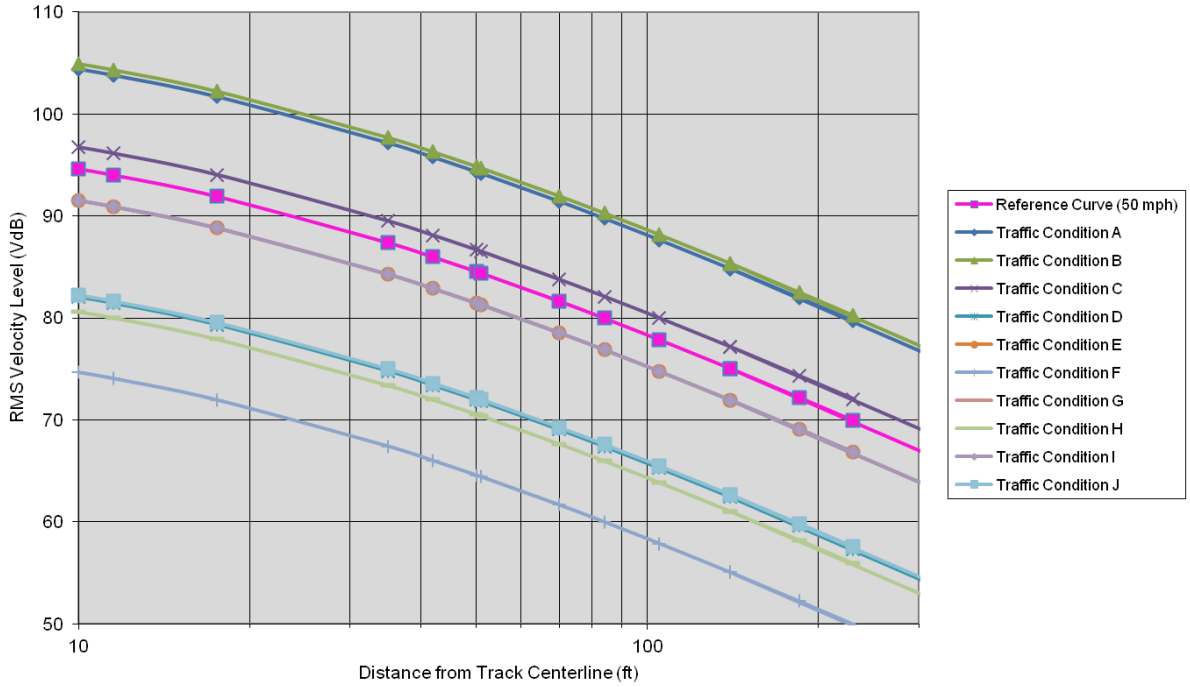


Table 3
Reference Vibration Curve Adjustment Factors (Future Build Condition)

Reference Curve Assumptions:				
Vehicle Type:	Locomotive Powered Passenger or Freight			
Speed (mph):	50			
Track:	Continuously Welded Rail (CWR)			
Geology:	Normal soil, inefficient at transmitting vibration			
Traffic Condition A (Chicago to Aurora):				
Train Type:	Locomotive Powered Freight and Passenger			
Speed (mph):	60			
Track:	CWR (same as reference case)			
Geology:	Till		149,704	Linear Ft
	Sand/Gravel/Sed		31,583	Linear Ft
	Total		181,287	Linear Ft
Reference Curve Adjustment Factors:				
Increased Speed:		1.6	dB, calc. per FTA guidance	
Track:		0	dB	
Geology:		10	dB, for till (efficient soil)	
		0	dB, for sand/gravel/sediment (inefficient soil)	
		8.3	dB, weighted average over section	
Total Adjustments:		9.8	dB	
Traffic Condition B (Aurora to Wyanet):				
Train Type:	Locomotive Powered Freight and Passenger			
Speed (mph):	100			
Track:	CWR (same as reference case)			
Geology:	Till		299,141	Linear Ft
	Sand/Gravel/Sed		105,188	Linear Ft
	Total		404,329	Linear Ft
Reference Curve Adjustment Factors:				
Increased Speed:		6.0	dB, calc. per FTA guidance	
Track:		0	dB	
Geology:		10	dB, for till (efficient soil)	
		0	dB, for sand/gravel/sediment (inefficient soil)	
		7.4	dB, weighted average over section	
Total Adjustments:		13.4	dB	

Table 3 (continued)

Traffic Condition C (Wyanet to Silvis):			
Train Type:	Locomotive Powered Freight and Passenger		
Speed (mph):	100		
Track:	CWR (same as reference case)		
Geology:	Till	118,423	Linear Ft
	Sand/Gravel/Sed	110,877	Linear Ft
	Total	229,300	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	6.0	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	5.2	dB, weighted average over section	
Total Adjustments:	11.2	dB	
Traffic Condition D (Silvis to Rock Island):			
Train Type:	Locomotive Powered Freight and Passenger		
Speed (mph):	40		
Track:	CWR (same as reference case)		
Geology:	Till	41,934	Linear Ft
	Sand/Gravel/Sed	14,437	Linear Ft
	Total	56,371	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-1.9	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	7.4	dB, weighted average over section	
Total Adjustments:	5.5	dB	
Traffic Condition E (Rock Island to Iowa City):			
Train Type:	Locomotive Powered Freight and Passenger		
Speed (mph):	100		
Track:	CWR (same as reference case)		
Geology:	Till	0	Linear Ft
	Sand/Gravel/Sed	268,415	Linear Ft
	Total	268,415	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	6.0	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	0.0	dB, weighted average over section	
Total Adjustments:	6.0	dB	

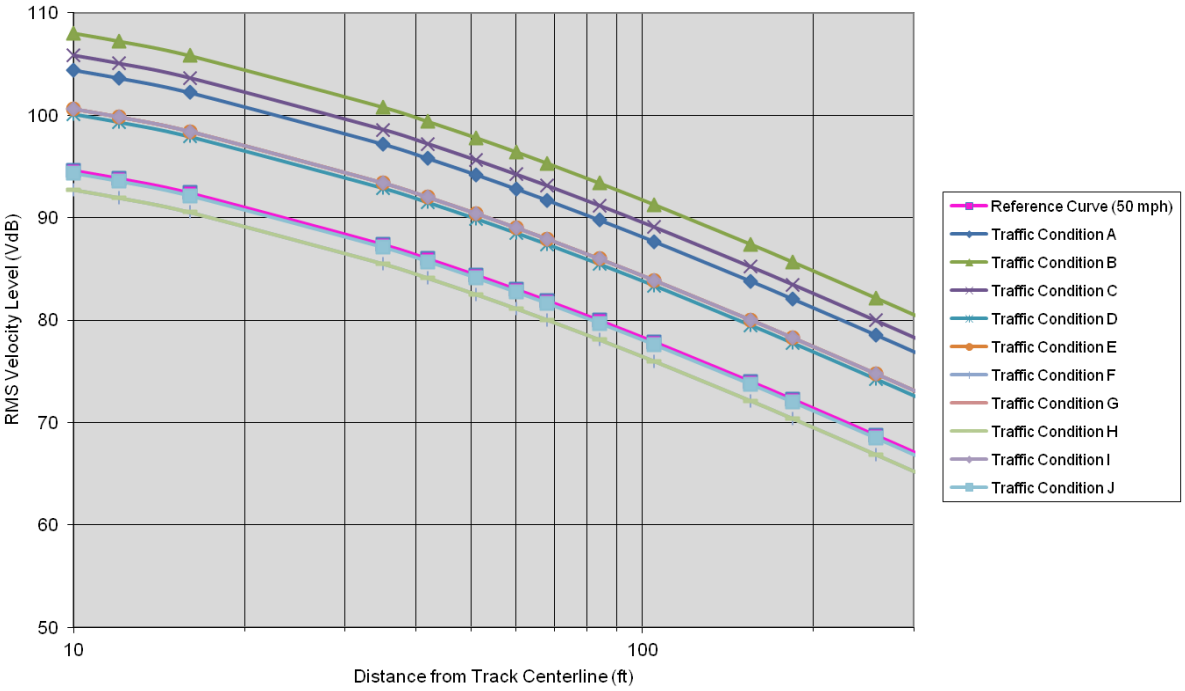
Table 3 (continued)

Traffic Condition F (Iowa City):			
Train Type:	Locomotive Powered Freight and Passenger		
Speed (mph):	40		
Track:	CWR (same as reference case)		
Geology:	Till	0	Linear Ft
	Sand/Gravel/Sed	14,129	Linear Ft
	Total	14,129	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-1.9	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	0.0	dB, weighted average over section	
Total Adjustments:	-1.9	dB	
Traffic Condition G (Iowa City to E. Des Moines):			
Train Type:	Locomotive Powered Freight and Passenger		
Speed (mph):	100		
Track:	CWR (same as reference case)		
Geology:	Till	0	Linear Ft
	Sand/Gravel/Sed	589,517	Linear Ft
	Total	589,517	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	6.0	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	0.0	dB, weighted average over section	
Total Adjustments:	6.0	dB	
Traffic Condition H (Des Moines):			
Train Type:	Locomotive Powered Freight and Passenger		
Speed (mph):	40		
Track:	CWR (same as reference case)		
Geology:	Till	0	Linear Ft
	Sand/Gravel/Sed	73,699	Linear Ft
	Total	73,699	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-1.9	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	0.0	dB, weighted average over section	
Total Adjustments:	-1.9	dB	

Table 3 (continued)

Traffic Condition I (W. Des Moines to Council Bluffs):			
Train Type:	Locomotive Powered Freight and Passenger		
Speed (mph):	100		
Track:	CWR (same as reference case)		
Geology:	Till	0	Linear Ft
	Sand/Gravel/Sed	653,157	Linear Ft
	Total	653,157	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	6.0	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	0.0	dB, weighted average over section	
Total Adjustments:	6.0	dB	
Traffic Condition J (Council Bluffs to Omaha):			
Train Type:	Locomotive Powered Freight and Passenger		
Speed (mph):	40		
Track:	CWR (same as reference case)		
Geology:	Till	16,353	Linear Ft
	Sand/Gravel/Sed	86,094	Linear Ft
	Total	102,447	Linear Ft
Reference Curve Adjustment Factors:			
Increased Speed:	-1.9	dB, calc. per FTA guidance	
Track:	0	dB	
Geology:	10	dB, for till (efficient soil)	
	0	dB, for sand/gravel/sediment (inefficient soil)	
	1.6	dB, weighted average over section	
Total Adjustments:	-0.3	dB	

Chart 3
Ground Surface Vibration Curves - Future Build Condition



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