

APPENDIX H

Noise Modeling Inputs and Outputs

Source to barrier distance Varies
Receiver to barrier distance Varies
Receiver height 5

magnitude of threshold (dBA) = 80
allowable hours over which Leq is to be averaged = 8 0 = temporary barrier (TB) of input height inserted between source and receptor

Construction Activity	Equipment	Total Equipment Qty	Reference Level (Leq or Lmax) @ 50 ft. from FHWA RCNM 2 Table	Air Quality/Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	Distance-Adjusted Level	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq	Source Elevation (ft)	Receiver Elevation (ft)	Barrier Height (ft)	Source to Barr. ("A") Horiz. (ft)	Rcvr. to Barr. ("B") Horiz. (ft)	Source to Rcvr. ("C") Horiz. (ft)	"A" (ft)	"B" (ft)	"C" (ft)	Path Length Diff. "P" (ft)	Abarr (dB)	Heff (with barrier)	Heff (w/out barrier)	G (with barrier)	G (without barrier)	ILbarr (dB)
Mobilization and Staging	Horizontal Bore Drill	2	87.0	Horizontal Bore Drill	140	75.5	8.00	480	79	9.0	5	0	5	135	140	10.3	135.1	140.1	0.00	0.1	7.0	7.0	0.6	0.6	0.1
	Backhoe	2	75.8	Backhoe	140	63.5	8.00	480	67	4.5	5	0	5	135	140	6.7	135.1	140.0	0.00	0.1	4.8	4.8	0.7	0.7	0.1
	Excavator	2	75.9	Excavator	140	63.8	8.00	480	67	6.2	5	0	5	135	140	8.0	135.1	140.0	0.00	0.1	5.6	5.6	0.7	0.7	0.1
Total for Mobilization and Staging Phase:																									
79.0																									
HDD and No. 7 Box Installation	Horizontal Bore Drill	2	87.0	Horizontal Bore Drill	140	75.5	8	480	79	9.0	5	0	5	135	140	10.3	135.1	140.1	0.00	0.1	7.0	7.0	0.6	0.6	0.1
	Flatbed Truck	2	74.2	Flatbed Truck	140	61.9	8	480	65	5.0	5	0	5	135	140	7.1	135.1	140.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
	Generator	2	67.1	Generator	140	54.8	8	480	58	4.5	5	0	5	135	140	6.7	135.1	140.0	0.00	0.1	4.8	4.8	0.7	0.7	0.1
Total for HDD and No. 7 Box Installation Phase:																									
78.7																									
Conduit Pulling, Trenching, Stie Restoration	Horizontal Bore Drill	2	87.0	Horizontal Bore Drill	140	75.5	6	360	77	9.0	5	0	5	135	140	10.3	135.1	140.1	0.00	0.1	7.0	7.0	0.6	0.6	0.1
	Backhoe	2	75.8	Backhoe	140	63.5	6	360	65	4.5	5	0	5	135	140	6.7	135.1	140.0	0.00	0.1	4.8	4.8	0.7	0.7	0.1
	Excavator	2	75.9	Excavator	140	63.8	6	360	66	6.2	5	0	5	135	140	8.0	135.1	140.0	0.00	0.1	5.6	5.6	0.7	0.7	0.1
Total for Conduit Pulling, Trenching, Stie Restoration Phase:																									
77.8																									

Source to barrier distance Varies
Receiver to barrier distance Varies
Receiver height 5

magnitude of threshold (dBA) = 80
allowable hours over which Leq is to be averaged = 8 0 = temporary barrier (TB) of input height inserted between source and receptor

Construction Activity	Equipment	Total Equipment Qty	Reference Level (Leq or Lmax) @ 50 ft. from FHWA RCNM 2 Table	Air Quality/Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	Distance- Adjusted Level	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq	Source Elevation (ft)	Receiver Elevation (ft)	Barrier Height (ft)	Source to Barr. ("A") Horiz. (ft)	Rcvr. to Barr. ("B") Horiz. (ft)	Source to Rcvr. ("C") Horiz. (ft)	"A" (ft)	"B" (ft)	"C" (ft)	Path Length Diff. "P" (ft)	Abarr (dB)	Heff (with barrier)	Heff (w/out barrier)	G (with barrier)	G (without barrier)	ILbarr (dB)
Mobilization and Staging	Horizontal Bore Drill	2	87.0	Horizontal Bore Drill	70	84.0	8.00	480	87	9.0	5	0	5	65	70	10.3	65.2	70.1	0.00	0.1	7.0	7.0	0.6	0.6	0.1
	Backhoe	2	75.8	Backhoe	70	72.2	8.00	480	75	4.5	5	0	5	65	70	6.7	65.2	70.0	0.00	0.1	4.8	4.8	0.7	0.7	0.1
	Excavator	2	75.9	Excavator	70	72.8	8.00	480	76	6.2	5	0	5	65	70	8.0	65.2	70.0	0.00	0.1	5.6	5.6	0.7	0.7	0.1
Total for Mobilization and Staging Phase:										87.6															
HDD and No. 7 Box Installation	Horizontal Bore Drill	2	87.0	Horizontal Bore Drill	70	84.0	8	480	87	9.0	5	0	5	65	70	10.3	65.2	70.1	0.00	0.1	7.0	7.0	0.6	0.6	0.1
	Flatbed Truck	2	74.2	Flatbed Truck	70	70.8	8	480	74	5.0	5	0	5	65	70	7.1	65.2	70.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
	Generator	2	67.1	Generator	70	63.4	8	480	66	4.5	5	0	5	65	70	6.7	65.2	70.0	0.00	0.1	4.8	4.8	0.7	0.7	0.1
Total for HDD and No. 7 Box Installation Phase:										87.2															
Conduit Pulling, Trenching, Stie Restoration	Horizontal Bore Drill	2	87.0	Horizontal Bore Drill	70	84.0	6	360	86	9.0	5	0	5	65	70	10.3	65.2	70.1	0.00	0.1	7.0	7.0	0.6	0.6	0.1
	Backhoe	2	75.8	Backhoe	70	72.2	6	360	74	4.5	5	0	5	65	70	6.7	65.2	70.0	0.00	0.1	4.8	4.8	0.7	0.7	0.1
	Excavator	2	75.9	Excavator	70	72.8	6	360	75	6.2	5	0	5	65	70	8.0	65.2	70.0	0.00	0.1	5.6	5.6	0.7	0.7	0.1
Total for Conduit Pulling, Trenching, Stie Restoration Phase:										86.3															

Construction Activity	Equipment	Total Equipment Qty	Reference Level (Leq or Lmax) @ 50 ft. from FHWA RCNM 2 Table	Air Quality/Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	Temporary Barrier Insertion Loss (dB)	Additional Noise Reduction	Distance-Adjusted Level	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq	Source Elevation (ft)	Receiver Elevation (ft)	Barrier Height (ft)	Source to Barr. ("A") Horiz. (ft)	Rcvr. to Barr. ("B") Horiz. (ft)	Source to Rcvr. ("C") Horiz. (ft)	"A" (ft)	"B" (ft)	"C" (ft)	Path Length Diff. "P" (ft)	Abarr (dB)	Heff (with barrier)	Heff (w/out barrier)	G (with barrier)	G (without barrier)	ILbarr (dB)
												Source to barrier distance: Varies Receiver to barrier distance: Varies Receiver height: 5 magnitude of threshold (dBA) = 80 allowable hours over which Leq is to be averaged = 8 0 = temporary barrier (TB) of input height inserted between source and receptor															
Mobilization and Staging	Horizontal Bore Drill	2	87.0	Horizontal Bore Drill	70	13.1		71.0	8.00	480	74	9.0	5	12	5	65	70	5.8	65.4	70.1	1.09	13.4	19.0	7.0	0.4	0.6	13.1
	Backhoe	2	75.8	Backhoe	70	0.1		72.2	8.00	480	75	4.5	5	0	5	65	70	6.7	65.2	70.0	0.00	0.1	4.8	4.8	0.7	0.7	0.1
	Excavator	2	75.9	Excavator	70	0.1		72.8	8.00	480	76	6.2	5	0	5	65	70	8.0	65.2	70.0	0.00	0.1	5.6	5.6	0.7	0.7	0.1
Total for Mobilization and Staging Phase:											79.8																
HDD and No. 7 Box Installation	Horizontal Bore Drill	2	87.0	Horizontal Bore Drill	70	13.1		71.0	8	480	74	9.0	5	12	5	65	70	5.8	65.4	70.1	1.09	13.4	19.0	7.0	0.4	0.6	13.1
	Flatbed Truck	2	74.2	Flatbed Truck	70	0.1		70.8	8	480	74	5.0	5	0	5	65	70	7.1	65.2	70.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
	Generator	2	67.1	Generator	70	0.1		63.4	8	480	66	4.5	5	0	5	65	70	6.7	65.2	70.0	0.00	0.1	4.8	4.8	0.7	0.7	0.1
Total for HDD and No. 7 Box Installation Phase:											77.3																
Conduit Pulling, Trenching, Site Restoration	Horizontal Bore Drill	2	87.0	Horizontal Bore Drill	70	13.1		71.0	6	360	73	9.0	5	12	5	65	70	5.8	65.4	70.1	1.09	13.4	19.0	7.0	0.4	0.6	13.1
	Backhoe	2	75.8	Backhoe	70	0.1		72.2	6	360	74	4.5	5	0	5	65	70	6.7	65.2	70.0	0.00	0.1	4.8	4.8	0.7	0.7	0.1
	Excavator	2	75.9	Excavator	70	0.1		72.8	6	360	75	6.2	5	0	5	65	70	8.0	65.2	70.0	0.00	0.1	5.6	5.6	0.7	0.7	0.1
Total for Conduit Pulling, Trenching, Site Restoration Phase:											78.6																

RCNM 2.0 Data	Measured level across four locations						calculated AUF%	RCNM 1.0 Data			Measured Level			Compare (average)			absolute value		
	Equipment Type	Source Height (ft)	Stationary?	Leq, dBA @ 50 ft		Lmax, dBA @ 50 ft		RCNM Equivalent Name	reported AUF%	Level @ 50 ft. (dBA)		RCMN 2.0 - RCNM 1.0			Lmax	Leq	AUF		
				Avg	Max	Avg				Max	Lmax	Leq	Lmax	Leq				AUF%	
Air-Operated Post Driver	7	TRUE	83.2	83.2	84.9	84.9	68	none	--	--	--	--	--	--	--	--	--	--	
Asphalt Distributor Truck (Asphalt Sprayer)	5	FALSE	0.0	0.0	69.7	70.8		none	--	--	--	--	--	--	--	--	--	--	
Auger Drill	6.4	TRUE	87.5	88.3	101.1	101.6	4	Auger Drill Rig	20	84.4	77.4	16.7	10.1	-16	17	10	16		
Backhoe	4.5	TRUE	75.8	77.4	83.6	84.3	17	Backhoe	40	77.6	73.6	6.0	2.2	-23	6	2	23		
Bar Bender	2	TRUE	66.3	67.1	74.7	76.4	15	Bar Bender	20	80	73	-5.3	-6.7	-5	5	7	5		
Blasting (Abrasive)	12.3	TRUE	100.3	103.3	103.0	105.9	54	Blasting	1	94	74	9.0	26.3	53	9	26	53		
Blasting (Explosive)	1	TRUE	82.8	84.2	92.7	94.4	10	Blasting	1	94	74	-1.3	8.8	9	1	9	9		
Chip Spreader	6	FALSE	0.0	0.0	76.7	77.2		none	--	--	--	--	--	--	--	--	--		
Compactor (Plate)	1	FALSE	0.0	0.0	74.6	74.6		Compactor (ground)	20	83.2	76.2	-8.6	--	--	9				
Compactor (Roller)	4.4	FALSE	0.0	0.0	82.4	83.1		Compactor (ground)	20	83.2	76.2	-0.8	--	--	1				
Compressor	4.3	TRUE	65.6	66.7	66.8	68.1	77	Compressor (air)	40	77.7	73.7	-10.9	-8.1	37	11	8	37		
Concrete Batch Plant	25	TRUE	86.6	88.7	90.0	92.5	46	Concrete Batch Plant	15	83	74.8	7.0	11.8	31	7	12	31		
Concrete Grinder	5	FALSE	0.0	0.0	96.7	96.7		none	--	--	--	--	--	--	--	--	--		
Concrete Mixer Truck	5	TRUE	81.1	81.1	82.4	82.4	74	Concrete Mixer Truck	40	78.8	74.8	3.6	6.3	34	4	6	34		
Concrete Pump Truck	5.7	TRUE	83.5	86.0	87.5	89.2	40	Concrete Pump Truck	20	81.4	74.4	6.1	9.1	20	6	9	20		
Concrete Saw	2.2	TRUE	85.4	86.2	88.1	88.4	54	Concrete Saw	20	89.6	82.6	-1.5	2.8	34	2	3	34		
Crane	7.7	TRUE	74.2	77.0	76.0	79.0	66	Crane	16	80.6	72.6	-4.6	1.6	50	5	2	50		
Directional Drill Rig	4	TRUE	67.9	67.9	79.6	79.6	7	Drill Rig Truck	20	79.1	72.2	0.5	-4.3	-13	1	4	13		
Dozer	5.3	TRUE	80.0	80.1	86.1	85.9	24	Dozer	40	81.7	77.7	4.4	2.3	-16	4	2	16		
Drum Mixer	3	TRUE	65.8	67.5	70.6	74.0	33	Drum Mixer	50	80	77	-9.4	-11.2	-17	9	11	17		
Dump Truck (Cyclical)	4.8	TRUE	81.7	81.7	91.6	91.6	10	Dump Truck	40	76.5	72.5	15.1	9.2	-30	15	9	30		
Dump Truck (Passby)	5.1	FALSE	0.0	0.0	73.1	74.3		Dump Truck	40	76.5	72.5	-3.4	--	--	3				
Excavator	6.2	TRUE	75.9	76.7	86.7	87.4	8	Excavator	40	80.7	76.7	6.0	-0.8	-32	6	1	32		
Flatbed Truck	5	FALSE	0.0	0.0	74.2	74.8		Flat Bed Truck	40	74.3	70.3	-0.1	--	--	0				
Front End Loader (Cyclical)	6	TRUE	72.4	72.4	81.4	81.4	12	Front End Loader	40	79.1	75.1	2.3	-2.7	-28	2	3	28		
Front End Loader (Passby)	5.4	FALSE	0.0	0.0	71.2	72.6		Front End Loader	40	79.1	75.1	-7.9	--	--	8				
Generator	4.5	TRUE	67.1	67.9	67.8	68.4	84	Generator	50	80.6	77.6	-12.8	-10.5	34	13	11	34		
Grader (passby)	6	FALSE	0.0	0.0	78.5	77.3		Grader	40	85	81	-6.5	--	--	6				
Hoe Ram	1	TRUE	91.7	90.8	98.8	97.6	20	Mounted Impact Hamme	20	90.3	87.5	8.5	4.2	0	8	4	0		
Horizontal Bore Drill	9	TRUE	87.0	87.0	87.8	87.8	84	Horiz. Boring Hydr. Jack	--	--	--	--	--	--	--	--	--		
Impact Pile Driver	5.3	TRUE	98.9	99.5	104.9	104.9	26	Impact Pile Driver	20	101.3	94.3	3.6	4.6	6	4	5	6		
Joint Sealer	3	FALSE	0.0	0.0	74.1	74.1		None	--	--	--	--	--	--	--	--	--		
Light Tower	3	TRUE	60.6	62.6	61.8	63.3	76	None	--	--	--	--	--	--	--	--	--		
Man Lift	5.8	TRUE	72.1	73.8	73.3	75.0	76	Man Lift	20	74.7	67.7	-1.4	4.4	56	1	4	56		
Movement Alarm	5.5	TRUE	79.1	79.1	80.4	80.4	73	None	--	--	--	--	--	--	--	--	--		
Mud Recycler	4	TRUE	73.3	73.3	73.8	73.8	88	None	--	--	--	--	--	--	--	--	--		
Power Tools - Air Hose	1	TRUE	92.8	92.8	99.9	99.9	19	None	--	--	--	--	--	--	--	--	--		
Power Tools - Chainsaw	1	TRUE	79.4	80.7	82.7	83.6	47	Chain Saw	20	83.7	76.7	-1.0	2.7	27	1	3	27		
Power Tools - Chipping Gun	1	TRUE	95.0	95.6	99.5	100.6	36	None	--	--	--	--	--	--	--	--	--		
Power Tools - Circular Saw	1	TRUE	72.9	75.9	76.1	78.6	48	None	--	--	--	--	--	--	--	--	--		
Power Tools - Grinder	1	TRUE	67.6	71.7	71.2	75.8	44	None	--	--	--	--	--	--	--	--	--		
Power Tools - Hammer Drill	1	TRUE	72.4	72.9	75.1	76.1	54	None	--	--	--	--	--	--	--	--	--		
Power Tools - Impact Wrench	1	TRUE	68.3	69.8	72.2	74.5	40	None	--	--	--	--	--	--	--	--	--		
Power Tools - Jackhammer	1	TRUE	91.0	92.1	95.4	95.9	36	Jackhammer	20	88.9	81.9	6.5	9.1	16	6	9	16		
Power Tools - Jig Saw	1	TRUE	91.9	91.9	94.6	94.6	53	None	--	--	--	--	--	--	--	--	--		
Power Tools - Nail Gun	1	TRUE	69.5	71.8	73.5	75.7	40	None	--	--	--	--	--	--	--	--	--		
Power Tools - Reciprocating Saw	1	TRUE	63.7	65.5	66.0	67.2	59	None	--	--	--	--	--	--	--	--	--		
Power Tools - Rivet Buster	1	TRUE	100.3	100.3	107.3	107.3	20	None	--	--	--	--	--	--	--	--	--		
Power Tools - Sander	1	TRUE	65.0	66.4	67.5	69.4	56	None	--	--	--	--	--	--	--	--	--		
Pavement Scarifier (Milling Machine)	6.5	FALSE	0.0	0.0	84.0	83.7		Pavement Scarifier	20	89.5	82.5	-5.5	--	--	6				
Paving - Asphalt (Paver + Dump Truck)	5	FALSE	0.0	0.0	81.8	84.1		Paver	50	77.2	74.2	4.6	--	--	5				
Paving - Asphalt (Paver + MTV + Dump Truck)	5.5	FALSE	0.0	0.0	82.8	82.8		Paver	50	77.2	74.2	5.6	--	--	6				
Paving - Concrete (Placer + Slipform Paver)	9	TRUE	87.2	87.2	90.8	90.8	43	Paver	50	77.2	74.2	13.6	13.0	-7	14	13	7		
Paving - Concrete (Texturing/Curing Machine)	8	TRUE	73.3	73.6	74.0	74.4	84	Paver	50	77.2	74.2	-3.2	-0.9	34	3	1	34		
Paving - Concrete (Triple Roller Tube Paver)	5	TRUE	85.1	86.1	88.4	88.9	46	Paver	50	77.2	74.2	11.2	10.9	-4	11	11	4		
Power Unit (Power Pack)	4.3	TRUE	81.2	82.4	81.6	82.8	91	None	--	--	--	--	--	--	--	--	--		
Pump	3.8	TRUE	72.8	73.7	73.9	74.7	77	Pumps	50	80.9	77.9	-7.0	-5.1	27	7	5	27		
Rock Drill	3.7	TRUE	91.5	91.5	95.3	94.6	42	Rock Drill	20	81	74	14.3	17.5	22	14	18	22		
Rumble Strip Grinding	6	FALSE	0.0	0.0	87.3	87.8		None	--	--	--	--	--	--	--	--	--		
Scraper	8	FALSE	0.0	0.0	92.4	92.4		Scraper	40	83.6	79.6	8.8	--	--	9				
Shot Crete Pump/Spray	4	TRUE	78.0	78.0	86.8	86.8	13	None	--	--	--	--	--	--	--	--	--		
Street Sweeper	5	FALSE	0.0	0.0	81.3	82.0		None	--	--	--	--	--	--	--	--	--		
Telescopic Handler (Forklift)	3	FALSE	0.0	0.0	88.3	89.2		None	--	--	--	--	--	--	--	--	--		
Vacuum Excavator (Vac-Truck)	5.6	TRUE	85.9	86.5	86.7	87.7	82	Vacuum Excavator	--	--	--	--	--	--	--	--	--		
Ventilation Fan	1.5	TRUE	61.7	62.3	63.2	63.8	72	Ventilation Fan	100	78.9	78.9	-15.7	-17.2	-28	16	17	28		
Vibratory Concrete Consolidator	2	TRUE	78.4	78.4	80.2	80.2	66	Vibratory Concrete Mixer	20	80	73	0.2	5.4	46	0	5	46		
Vibratory Pile Driver	1	TRUE	98.5	99.2	104.5	105.6	25	Vibratory Pile Driver	20	100.8	93.8	3.7	4.7	5	4	5	5		
Warning Horn (Air Horn)	5	TRUE	93.7	97.0	99.1	102.6	29	Warning Horn	5	83.2	70.2	15.9	23.5	24	16	24	24		
Water Spray Truck	5.2	FALSE	0.0	0.0	72.0	72.2		None	--	--	--	--	--	--	--	--	--		
Welding Machine	2.5	TRUE	71.2	73.9	72.1	74.7	81	Welder / Torch	40	74	70	-1.9	1.2	41	2	1	41		
minimum			0.0	0.0	61.8	63.3	4.5		1.0	74.0	67.7	-15.7	-17.2	-31.8	7	8	25		
maximum			100.3	103.3	107.3	107.3	91.1		100.0	101.3	94.3	16.7	26.3	56.3					
												32.4	43.5	88.1					