

Operational and Construction Noise Measurements

Operational and Construction Noise Measurements

Gallo Winery Water Innovation and Energy Facility

On-Site Operation Noise

Noise-Generating Equipment

Equipment Type	Individual Equipment		Combined Equipment		
	SPL Lmax at 50 ft	Acoustic Usage Factor	No. of Pieces	SPL Lmax at 50 ft	SPL Leq at 50 ft
Pumps	81	1.00	3	86	85.8
COMBINED EQUIPMENT (SPL AT 50 FEET)	--	--	3	85.8	85.8

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA		
Anomalous Excess Attenuation	0.000	dBA		
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet		
FTA Ground Attenuation Factor G	0.643	dBA		
	Upper Bound: Wave Spreading and Atmospheric Absorption Only; No Ground Attenuation		Lower Bound: Includes Substantial Ground Attenuation	
Distance from Construction Site (feet)	Outdoor Leq	Outdoor L8	Outdoor Leq	Outdoor L8
50	86	89	86	89
3,200	47	50	36	39
4,200	44	47	32	35
5,000	42	45	29	32

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.

**Gallo Winery Water Innovation and Energy Facility
 Eastside Expansion On-Site Operation Noise
 Noise-Generating Equipment**

Equipment Type	Individual Equipment		Combined Equipment		
	SPL Lmax at 50 ft	Acoustic Usage Factor	No. of Pieces	SPL Lmax at 50 ft	SPL Leq at 50 ft
Presses and Conveyors Systems	75	1.00	1	75	75.0
Cooling and Refrigeration Condenser Unit	68	1.00	7	76	76.5
COMBINED EQUIPMENT (SPL AT 50 FEET)	--	--	8	78.8	78.8

J. C. Brennan & Associates, Inc. 2011. Environmental Noise Assessment, E. & J. Gallo Winery Expansion, Merced County, California. October 18. (Job # 2011-162.) Auburn, CA.
 Prepared for: ICF International, San Francisco, CA.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dB		
Anomalous Excess Attenuation	0.000	dB		
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet		
FTA Ground Attenuation Factor G	0.643	dB		
	Upper Bound: Wave Spreading and Atmospheric Absorption Only; No Ground Attenuation		Lower Bound: Includes Substantial Ground Attenuation	
Distance from Construction Site (feet)	Outdoor Leq	Outdoor L8	Outdoor Leq	Outdoor L8
50	79	82	79	82
3,500	39	42	28	31
2,500	43	46	32	35
2,500	43	46	32	35

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.

**Gallo Winery Water Innovation and Energy Facility
Construction Noise Summary**

Phase No.	Construction Phase	Noise Levels Leq (dBA)		
		R-1	R-2	R-3
1	Mobilization	31	27	25
2	Rough Grading	33	30	27
3	Footing Excavation for Facility	31	27	25
4	Trenching, Underground Utility Installation and Backfill (Offsite)	31	27	25
5	Trenching, Underground Utility Installation and Backfill (Offsite)	31	65	28
6	Forming and Placement of Rebar and Concrete for Facilities	30	26	24
7	Structural Steel Erection	32	29	26
8	Equipment Installation	32	29	26
9	Installation of Facility Piping, Mechanical, and Electrical	32	29	26
10	Control Building Finish Work and Furnishings	31	27	25
11	Fine Grading	30	26	24
12	Site Concrete	29	25	22
13	Finish Site Work	24	20	18
Noise Levels with Overlapping On-Site Construction Phases		38	34	32
Maximum Noise Levels with Overlapping Construction Phases		38	66	32

Gallo Winery Water Innovation and Energy Facility

Construction Phase: Mobilization

Noise-Generating Construction Equipment

Equipment Type	Individual Equipment		Combined Equipment		
	SPL Lmax at 50 ft	Acoustic Usage Factor	No. of Pieces	SPL Lmax at 50 ft	SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20			
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40			
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16			
Dozer	82	0.40			
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40	1	76	72.0
Excavator	81	0.40			
Flat Bed Truck	74	0.40	1	74	70.0
Front End Loader	79	0.40			
Generator	81	0.50			
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40			
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40	1	84	80.0
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	--	--	3	85.0	81.0

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA		
Anomalous Excess Attenuation	0.000	dBA		
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet		
FTA Ground Attenuation Factor G	0.643	dBA		
	Upper Bound: Wave Spreading and Atmospheric Absorption Only; No Ground Attenuation		Lower Bound: Includes Substantial Ground Attenuation	
Distance from Construction Site (feet)	Outdoor Leq	Outdoor L8	Outdoor Leq	Outdoor L8
50	81	84	81	84
3,200	43	46	31	34
4,200	40	43	27	30
5,000	38	41	25	28

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.

Gallo Winery Water Innovation and Energy Facility

Construction Phase: Rough Grading

Noise-Generating Construction Equipment

Equipment Type	Individual Equipment		Combined Equipment		
	SPL Lmax at 50 ft	Acoustic Usage Factor	No. of Pieces	SPL Lmax at 50 ft	SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20			
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40			
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16			
Dozer	82	0.40	1	82	78.0
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40			
Excavator	81	0.40	1	81	77.0
Flat Bed Truck	74	0.40			
Front End Loader	79	0.40			
Generator	81	0.50			
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40			
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40	1	84	80.0
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40			
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	--	--	3	87.3	83.3

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA		
Anomalous Excess Attenuation	0.000	dBA		
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet		
FTA Ground Attenuation Factor G	0.643	dBA		
	Upper Bound: Wave Spreading and Atmospheric Absorption Only; No Ground Attenuation		Lower Bound: Includes Substantial Ground Attenuation	
Distance from Construction Site (feet)	Outdoor Leq	Outdoor L8	Outdoor Leq	Outdoor L8
50	83	86	83	86
3,200	45	48	33	36
4,200	42	45	30	33
5,000	40	43	27	30

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.

Gallo Winery Water Innovation and Energy Facility

Construction Phase: Footing Excavation for Facility

Noise-Generating Construction Equipment

Equipment Type	Individual Equipment		Combined Equipment		
	SPL Lmax at 50 ft	Acoustic Usage Factor	No. of Pieces	SPL Lmax at 50 ft	SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20			
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40			
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16			
Dozer	82	0.40			
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40	1	76	72.0
Excavator	81	0.40	1	81	77.0
Flat Bed Truck	74	0.40			
Front End Loader	79	0.40			
Generator	81	0.50	1	81	78.0
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40			
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40			
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	--	--	3	84.6	81.1

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA		
Anomalous Excess Attenuation	0.000	dBA		
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet		
FTA Ground Attenuation Factor G	0.643	dBA		
	Upper Bound: Wave Spreading and Atmospheric Absorption Only; No Ground Attenuation		Lower Bound: Includes Substantial Ground Attenuation	
Distance from Construction Site (feet)	Outdoor Leq	Outdoor L8	Outdoor Leq	Outdoor L8
50	81	84	81	84
3,200	43	46	31	34
4,200	40	43	27	30
5,000	38	41	25	28

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.

Gallo Winery Water Innovation and Energy Facility
Construction Phase: Trenching, Underground Utility Installation and Backfill (Onsite)
Noise-Generating Construction Equipment

Equipment Type	Individual Equipment		Combined Equipment		
	SPL Lmax at 50 ft	Acoustic Usage Factor	No. of Pieces	SPL Lmax at 50 ft	SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20			
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40			
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16			
Dozer	82	0.40			
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40	1	76	72.0
Excavator	81	0.40	1	81	77.0
Flat Bed Truck	74	0.40			
Front End Loader	79	0.40			
Generator	81	0.50	1	81	78.0
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40			
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40			
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	--	--	3	84.6	81.1

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA		
Anomalous Excess Attenuation	0.000	dBA		
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet		
FTA Ground Attenuation Factor G	0.643	dBA		
	Upper Bound: Wave Spreading and Atmospheric Absorption Only; No Ground Attenuation		Lower Bound: Includes Substantial Ground Attenuation	
Distance from Construction Site (feet)	Outdoor Leq	Outdoor L8	Outdoor Leq	Outdoor L8
50	81	84	81	84
3,200	43	46	31	34
4,200	40	43	27	30
5,000	38	41	25	28

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.

Gallo Winery Water Innovation and Energy Facility
Construction Phase: Trenching, Underground Utility Installation and Backfill (Offsite)

Noise-Generating Construction Equipment

Equipment Type	Individual Equipment		Combined Equipment		
	SPL Lmax at 50 ft	Acoustic Usage Factor	No. of Pieces	SPL Lmax at 50 ft	SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20			
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40			
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16			
Dozer	82	0.40			
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40	1	76	72.0
Excavator	81	0.40	1	81	77.0
Flat Bed Truck	74	0.40			
Front End Loader	79	0.40			
Generator	81	0.50	1	81	78.0
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40			
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40			
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	--	--	3	84.6	81.1

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA		
Anomalous Excess Attenuation	0.000	dBA		
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet		
FTA Ground Attenuation Factor G	0.643	dBA		
	Upper Bound: Wave Spreading and Atmospheric Absorption Only; No Ground Attenuation		Lower Bound: Includes Substantial Ground Attenuation	
Distance from Construction Site (feet)	Outdoor Leq	Outdoor L8	Outdoor Leq	Outdoor L8
50	81	84	81	84
3,200	43	46	31	34
200	69	72	65	68
3,900	41	44	28	31

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.

Gallo Winery Water Innovation and Energy Facility
Construction Phase: Forming and Placement of Rebar and Concrete for Facilities
Noise-Generating Construction Equipment

Equipment Type	Individual Equipment		Combined Equipment		
	SPL Lmax at 50 ft	Acoustic Usage Factor	No. of Pieces	SPL Lmax at 50 ft	SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20			
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40	1	79	75.0
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16			
Dozer	82	0.40			
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40			
Excavator	81	0.40			
Flat Bed Truck	74	0.40	1	74	70.0
Front End Loader	79	0.40			
Generator	81	0.50	1	81	78.0
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40			
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40			
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	--	--	3	83.6	80.2

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA		
Anomalous Excess Attenuation	0.000	dBA		
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet		
FTA Ground Attenuation Factor G	0.643	dBA		
	Upper Bound: Wave Spreading and Atmospheric Absorption Only; No Ground Attenuation		Lower Bound: Includes Substantial Ground Attenuation	
Distance from Construction Site (feet)	Outdoor Leq	Outdoor L8	Outdoor Leq	Outdoor L8
50	80	83	80	83
3,200	42	45	30	33
4,200	39	42	26	29
5,000	37	40	24	27

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.

Gallo Winery Water Innovation and Energy Facility

Construction Phase: Structural Steel Erection

Noise-Generating Construction Equipment

Equipment Type	Individual Equipment		Combined Equipment		
	SPL Lmax at 50 ft	Acoustic Usage Factor	No. of Pieces	SPL Lmax at 50 ft	SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20			
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40			
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16			
Dozer	82	0.40			
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40			
Excavator	81	0.40			
Flat Bed Truck	74	0.40	1	74	70.0
Front End Loader	79	0.40			
Generator	81	0.50	1	81	78.0
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40			
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40	1	84	80.0
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	--	--	3	86.0	82.4

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA		
Anomalous Excess Attenuation	0.000	dBA		
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet		
FTA Ground Attenuation Factor G	0.643	dBA		
	Upper Bound: Wave Spreading and Atmospheric Absorption Only; No Ground Attenuation		Lower Bound: Includes Substantial Ground Attenuation	
Distance from Construction Site (feet)	Outdoor Leq	Outdoor L8	Outdoor Leq	Outdoor L8
50	82	85	82	85
3,200	44	47	32	35
4,200	41	44	29	32
5,000	39	42	26	29

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.

Gallo Winery Water Innovation and Energy Facility

Construction Phase: Equipment Installation

Noise-Generating Construction Equipment

Equipment Type	Individual Equipment		Combined Equipment		
	SPL Lmax at 50 ft	Acoustic Usage Factor	No. of Pieces	SPL Lmax at 50 ft	SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20			
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40			
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16			
Dozer	82	0.40			
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40			
Excavator	81	0.40			
Flat Bed Truck	74	0.40	1	74	70.0
Front End Loader	79	0.40			
Generator	81	0.50	1	81	78.0
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40			
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40	1	84	80.0
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	--	--	3	86.0	82.4

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA		
Anomalous Excess Attenuation	0.000	dBA		
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet		
FTA Ground Attenuation Factor G	0.643	dBA		
	Upper Bound: Wave Spreading and Atmospheric Absorption Only; No Ground Attenuation		Lower Bound: Includes Substantial Ground Attenuation	
Distance from Construction Site (feet)	Outdoor Leq	Outdoor L8	Outdoor Leq	Outdoor L8
50	82	85	82	85
3,200	44	47	32	35
4,200	41	44	29	32
5,000	39	42	26	29

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.

Gallo Winery Water Innovation and Energy Facility
Construction Phase: Installation of Facility Piping, Mechanical, and Electrical
Noise-Generating Construction Equipment

Equipment Type	Individual Equipment		Combined Equipment		
	SPL Lmax at 50 ft	Acoustic Usage Factor	No. of Pieces	SPL Lmax at 50 ft	SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20			
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40			
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16			
Dozer	82	0.40			
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40			
Excavator	81	0.40			
Flat Bed Truck	74	0.40	1	74	70.0
Front End Loader	79	0.40			
Generator	81	0.50	1	81	78.0
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40			
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40	1	84	80.0
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	--	--	3	86.0	82.4

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA		
Anomalous Excess Attenuation	0.000	dBA		
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet		
FTA Ground Attenuation Factor G	0.643	dBA		
	Upper Bound: Wave Spreading and Atmospheric Absorption Only; No Ground Attenuation		Lower Bound: Includes Substantial Ground Attenuation	
Distance from Construction Site (feet)	Outdoor Leq	Outdoor L8	Outdoor Leq	Outdoor L8
50	82	85	82	85
3,200	44	47	32	35
4,200	41	44	29	32
5,000	39	42	26	29

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.

Gallo Winery Water Innovation and Energy Facility
Construction Phase: Control Building Finish Work and Furnishings
Noise-Generating Construction Equipment

Equipment Type	Individual Equipment		Combined Equipment		
	SPL Lmax at 50 ft	Acoustic Usage Factor	No. of Pieces	SPL Lmax at 50 ft	SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20			
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40			
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16			
Dozer	82	0.40			
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40	1	76	72.0
Excavator	81	0.40			
Flat Bed Truck	74	0.40	1	74	70.0
Front End Loader	79	0.40			
Generator	81	0.50			
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40			
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40	1	84	80.0
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	--	--	3	85.0	81.0

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA		
Anomalous Excess Attenuation	0.000	dBA		
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet		
FTA Ground Attenuation Factor G	0.643	dBA		
	Upper Bound: Wave Spreading and Atmospheric Absorption Only; No Ground Attenuation		Lower Bound: Includes Substantial Ground Attenuation	
Distance from Construction Site (feet)	Outdoor Leq	Outdoor L8	Outdoor Leq	Outdoor L8
50	81	84	81	84
3,200	43	46	31	34
4,200	40	43	27	30
5,000	38	41	25	28

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.

Gallo Winery Water Innovation and Energy Facility

Construction Phase: Fine Grading

Noise-Generating Construction Equipment

Equipment Type	Individual Equipment		Combined Equipment		
	SPL Lmax at 50 ft	Acoustic Usage Factor	No. of Pieces	SPL Lmax at 50 ft	SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20			
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40			
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16			
Dozer	82	0.40	1	82	78.0
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40	1	76	72.0
Excavator	81	0.40			
Flat Bed Truck	74	0.40			
Front End Loader	79	0.40			
Generator	81	0.50			
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40			
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50	1	77	74.0
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40			
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	--	--	3	84.0	80.2

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA		
Anomalous Excess Attenuation	0.000	dBA		
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet		
FTA Ground Attenuation Factor G	0.643	dBA		
	Upper Bound: Wave Spreading and Atmospheric Absorption Only; No Ground Attenuation		Lower Bound: Includes Substantial Ground Attenuation	
Distance from Construction Site (feet)	Outdoor Leq	Outdoor L8	Outdoor Leq	Outdoor L8
50	80	83	80	83
3,200	42	45	30	33
4,200	39	42	26	29
5,000	37	40	24	27

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.

Gallo Winery Water Innovation and Energy Facility

Construction Phase: Site Concrete

Noise-Generating Construction Equipment

Equipment Type	Individual Equipment		Combined Equipment		
	SPL Lmax at 50 ft	Acoustic Usage Factor	No. of Pieces	SPL Lmax at 50 ft	SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20			
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40	1	79	75.0
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16			
Dozer	82	0.40			
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40			
Excavator	81	0.40			
Flat Bed Truck	74	0.40	1	74	70.0
Front End Loader	79	0.40	1	79	75.0
Generator	81	0.50			
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40			
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40			
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	--	--	3	82.6	78.7

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA		
Anomalous Excess Attenuation	0.000	dBA		
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet		
FTA Ground Attenuation Factor G	0.643	dBA		
	Upper Bound: Wave Spreading and Atmospheric Absorption Only; No Ground Attenuation		Lower Bound: Includes Substantial Ground Attenuation	
Distance from Construction Site (feet)	Outdoor Leq	Outdoor L8	Outdoor Leq	Outdoor L8
50	79	82	79	82
3,200	40	43	29	32
4,200	37	40	25	28
5,000	35	38	22	25

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.

Gallo Winery Water Innovation and Energy Facility

Construction Phase: Finish Site Work

Noise-Generating Construction Equipment

Equipment Type	Individual Equipment		Combined Equipment		
	SPL Lmax at 50 ft	Acoustic Usage Factor	No. of Pieces	SPL Lmax at 50 ft	SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20			
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40			
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16			
Dozer	82	0.40			
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40	1	76	72.0
Excavator	81	0.40			
Flat Bed Truck	74	0.40	1	74	70.0
Front End Loader	79	0.40			
Generator	81	0.50			
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40			
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40			
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	--	--	2	78.1	74.1

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA		
Anomalous Excess Attenuation	0.000	dBA		
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet		
FTA Ground Attenuation Factor G	0.643	dBA		
	Upper Bound: Wave Spreading and Atmospheric Absorption Only; No Ground Attenuation		Lower Bound: Includes Substantial Ground Attenuation	
Distance from Construction Site (feet)	Outdoor Leq	Outdoor L8	Outdoor Leq	Outdoor L8
50	74	77	74	77
3,200	36	39	24	27
4,200	33	36	20	23
5,000	31	34	18	21

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.