Appendix H

Noise Modeling Outputs

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FORMS FIELD DATA REPORT

Field Noise Measurement Data

Record: 1310	
Project Name	*Santa Cruz Water Rights EIR*
Project #	*11633*
Observer(s)	*Michael Carr, INCE*
Date	*2020-05-13*

Meteorological Conditions	
Temp (F)	*65*
Humidity % (R.H.)	*35*
Wind	*Light*
Wind Speed (MPH)	*2*
Wind Direction	*North*
Sky	*Clear*

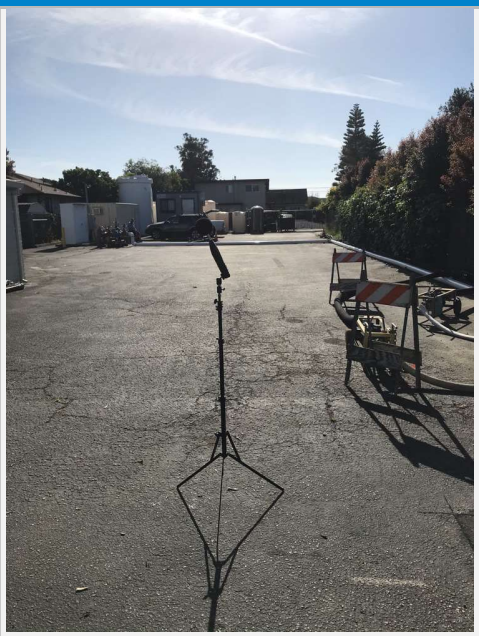
Instrument and Calibrator Information	
Instrument Name	
Instrument Name Lookup Key	
Manufacturer	*Larson Davis*
Model	*831*
Serial Number	*2559*
Calibration Date	*042019*
Calibrator Name	
Calibrator Name Lookup Key	
Calibrator Manufacturer	*Larson Davis*
Calibrator Model	*Cal 200*
Pre-Test (dBA SPL)	*114*
Windscreen	*Yes*
Weighting?	*A-WTD*
Slow/Fast?	*Slow*

Monitoring	
Record #	*ST-1*
Site ID	*Beltz 8*
Site Location Lat/Long	*36.966815, -121.968616*
Begin (Time)	*08:43:00*
End (Time)	*08:58:00*
Leq	*42.9*
Lmax	*62*
Lmin	*35.9*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Birds and foliage*
Other Noise Sources (Background)	*Birds, Distant Aircraft, Distant Dog Barking, Distant Traffic, Rustling Leaves*
Other Noise Sources Additional Description	*Distant emergency sirens*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

Description / Photos

Terrain	*Mixed*

Site Photos

Photo	
Comments / Description	*Looking East*

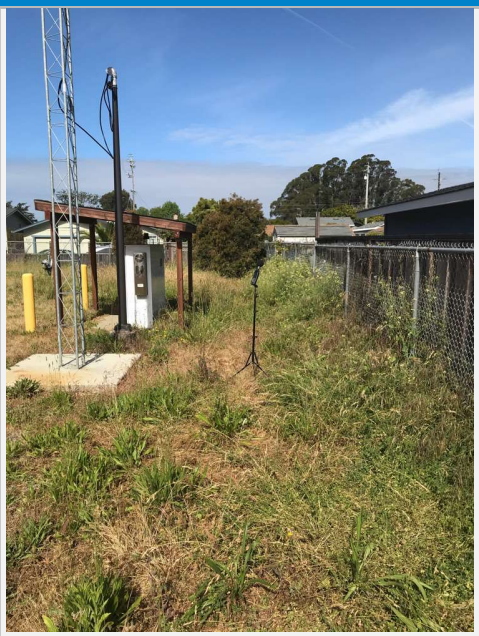
Monitoring

Record #	*ST-2*
Site ID	*Beltz 10*
Site Location Lat/Long	*36.966023, -121.971761*
Begin (Time)	*09:20:00*
End (Time)	*09:35:00*
Leq	*59.4*
Lmax	*61*
Lmin	*58.6*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Industrial*
Other Noise Sources Additional Description	*Cooling fan for VFD control for submersible pump.*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

Description / Photos

Terrain	*Soft*

Site Photos

Photo	
Comments / Description	*Looking West towards vfd power supply*

Monitoring

Record #	*ST-3*
Site ID	*Beltz 12*
Site Location Lat/Long	*36.984490, -121.968026*
Begin (Time)	*10:07:00*
End (Time)	*10:22:00*
Leq	*53.6*
Lmax	*68.7*
Lmin	*46.5*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
Other Noise Sources (Background)	*Distant Aircraft, Distant Industrial, Rustling Leaves*
Other Noise Sources Additional Description	*Traffic on Hwy 1, industrial area activity, birds, occasional hammering, fork lift loading truck ~125' north*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

FORMS FIELD DATA REPORT

Source Info and Traffic Counts	
Number of Lanes	1
Lane Width (feet)	10
Roadway Width (feet)	20
Roadway Width (m)	6.1
Distance to Roadway (feet)	50
Distance to Roadway (m)	15.3
Distance Measured to Centerline or Edge of Pavement?	Centerline
Roadway Type	AC
Estimated Vehicle Speed (MPH)	15
Speeds Estimated by:	Driving the Pace

Traffic Counts	
Vehicle Count Summary	A 4, MT 1, HT 0, B 0, MC 0
Select Method for Recording Count Duration	Enter Manually
Counting Both Directions?	Yes
Count Duration (minutes)	15
Vehicle Count Tally	
Select Method for Vehicle Counts	Use Counter (+/-)
Number of Vehicles - Autos	4
Number of Vehicles - Medium Trucks	1
Number of Vehicles - Heavy Trucks	0
Number of Vehicles - Buses	0
Number of Vehicles - Motorcyles	0

Description / Photos	
Terrain	Soft

Site Photos	
Photo	
Comments / Description	Looking towards existing tanks

Monitoring	
Record #	ST-4
Site ID	Beltz 9
Site Location Lat/Long	36.962287, -121.972853
Begin (Time)	10:40:00
End (Time)	10:55:00
Leq	45.7
Lmax	58.1
Lmin	36.7
Other Lx (Specify Metric)	L
Primary Noise Source	Traffic
Other Noise Sources (Background)	Birds, Distant Aircraft, Distant Dog Barking, Distant Kids Playing, Rustling Leaves
Is the same instrument and calibrator being used as previously noted?	Yes
Are the meteorological conditions the same as previously noted?	Yes

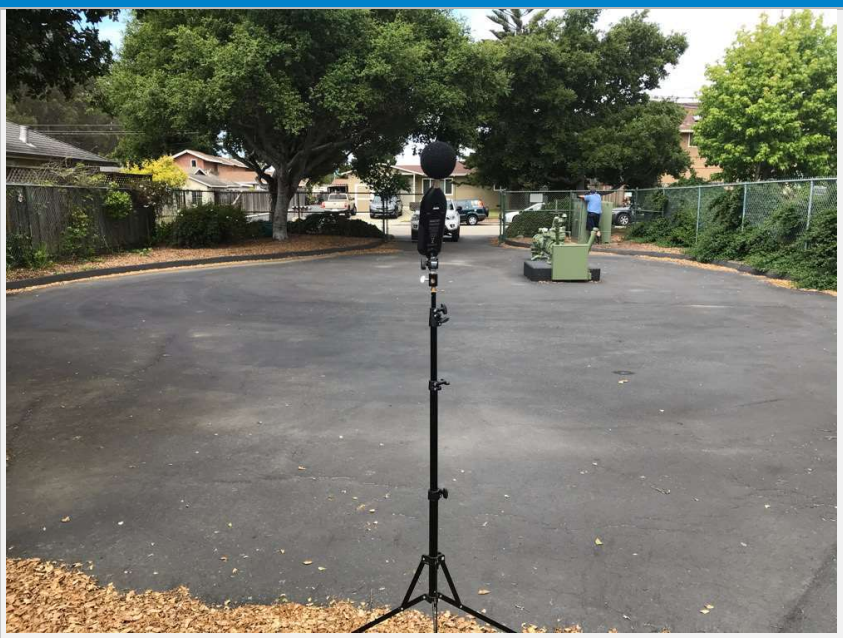
Source Info and Traffic Counts	
Number of Lanes	2
Lane Width (feet)	12
Roadway Width (feet)	24
Roadway Width (m)	7.3
Distance to Roadway (feet)	124
Distance to Roadway (m)	37.8
Distance Measured to Centerline or Edge of Pavement?	Centerline
Roadway Type	AC
Estimated Vehicle Speed (MPH)	25
Speeds Estimated by:	Driving the Pace
Posted Speed Limit Sign (MPH)	25

Traffic Counts	
Vehicle Count Summary	A 37, MT 0, HT 0, B 0, MC 0
Select Method for Recording Count Duration	Enter Manually
Counting Both Directions?	Yes
Count Duration (minutes)	15
Vehicle Count Tally	
Select Method for Vehicle Counts	Use Counter (+/-)
Number of Vehicles - Autos	37
Number of Vehicles - Medium Trucks	0
Number of Vehicles - Heavy Trucks	0
Number of Vehicles - Buses	0
Number of Vehicles - Motorcyles	0

Description / Photos

Terrain	*Mixed*

Site Photos

Photo	
Comments / Description	*Looking towards 30th Ave.*

Appendix H

Traffic Noise Model Calculations

Project: 11633 - Santa Cruz Water Rights Project

Noise Level Descriptor: Ldn
Site Conditions: Soft
Traffic Input: ADT
Traffic K-Factor:

Segment Description and Location				Input										Output				
						Distance to Directional Centerline, (feet)$_4$		Traffic Distribution Characteristics						Ldn,	Distance to Contour, (feet)$_3$			
Number	Name	From	To	ADT	Speed (mph)	Near	Far	% Auto	% Med	% Hvy	% Day	% Eve	% Night	(dBA)$_{5,6,7}$	70 dBA	65 dBA	60 dBA	55 dBA
Existing Conditions																		
1	Hwy 1			102,000	65	100	100	94.0%	3.8%	2.2%	80.0%		20.0%	79.4	421	908	1955	4213
2	41st	South of Cory		24,232	45	100	100	97.0%	2.0%	1.0%	80.0%		20.0%	67.8	72	155	333	718
3	41st	Portola	SP RR	13,732	25	100	100	97.0%	2.0%	1.0%	80.0%		20.0%	59.0	19	40	86	186
4	Brommer	Bulb Ave	41st	6,664	25	100	100	97.0%	2.0%	1.0%	80.0%		20.0%	55.9	11	25	53	115
5	Portola	West of 41st		16,056	25	100	100	97.0%	2.0%	1.0%	80.0%		20.0%	59.7	21	44	96	206
6	Soquel Dr	Rodeo Gulch	41st	23,618	35	100	100	97.0%	2.0%	1.0%	80.0%		20.0%	64.7	44	95	206	443
7	Hwy 9			21,900	25	100	100	95.0%	3.6%	1.4%	80.0%		20.0%	61.9	29	62	134	288
8	Hwy 17			60,100	65	100	100	96.9%	1.5%	1.6%	80.0%		20.0%	76.7	279	602	1297	2794

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Appendix H

Traffic Noise Model Calculations

Project: 11633 - Santa Cruz Water Rights Project

Noise Level Descriptor: Leq
Site Conditions: Soft
Traffic Input: ADT
Traffic K-Factor: 10

Segment Description and Location				Input										Output				
						Distance to Directional Centerline, (feet)$_4$		Traffic Distribution Characteristics							Distance to Contour, (feet)$_3$			
Number	Name	From	To	ADT	Speed (mph)	Near	Far	% Auto	% Med	% Hvy	% Day	% Eve	% Night	Leq, (dBA)$_{5,6,7}$	70 dBA	65 dBA	60 dBA	55 dBA
Existing Conditions																		
1	Beltz 8																	
2	Hwy 1			102,000	65	5730	5730	94.0%	3.8%	2.2%	80.0%		20.0%	52.3	380	819	1764	3801
3	41st	Portola	SP RR	13,732	25	1050	1050	97.0%	2.0%	1.0%	80.0%		20.0%	43.0	17	36	78	167
4	Brommer	Bulb Ave	41st	6,664	25	1185	1185	97.0%	2.0%	1.0%	80.0%		20.0%	39.1	10	22	48	103
5	Portola	West of 41st		16,056	25	1200	1200	97.0%	2.0%	1.0%	80.0%		20.0%	42.9	19	40	86	186
														53.4				
	Beltz 9																	
6	Hwy 1			102,000	65	7650	7650	94.0%	3.8%	2.2%	80.0%		20.0%	50.4	380	819	1764	3801
7	41st	Portola	SP RR	13,732	25	2300	2300	97.0%	2.0%	1.0%	80.0%		20.0%	37.9	17	36	78	167
8	Brommer	Bulb Ave	41st	6,664	25	2750	2750	97.0%	2.0%	1.0%	80.0%		20.0%	33.6	10	22	48	103
9	Portola	West of 41st		16,056	25	425	425	97.0%	2.0%	1.0%	80.0%		20.0%	49.6	19	40	86	186
														53.2				
	Beltz 10																	
10	Hwy 1			102,000	65	5850	5850	94.0%	3.8%	2.2%	80.0%		20.0%	52.2	380	819	1764	3801
11	41st	Portola	SP RR	13,732	25	1000	1000	97.0%	2.0%	1.0%	80.0%		20.0%	43.4	17	36	78	167
12	Brommer	Bulb Ave	41st	6,664	25	1250	1250	97.0%	2.0%	1.0%	80.0%		20.0%	38.8	10	22	48	103
13	Portola	West of 41st		16,056	25	1200	1200	97.0%	2.0%	1.0%	80.0%		20.0%	42.9	19	40	86	186
														53.3				
	Beltz 12																	
14	Hwy 1			102,000	65	550	550	94.0%	3.8%	2.2%	80.0%		20.0%	67.6	380	819	1764	3801
15	41st	South of Cory		24,232	45	860	860	97.0%	2.0%	1.0%	80.0%		20.0%	53.2	65	140	301	648
16	Soquel Dr	Rodeo Gulch	41st	23,618	35	1000	1000	97.0%	2.0%	1.0%	80.0%		20.0%	49.0	40	86	185	400
														67.8				

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Appendix H

Traffic Noise Model Calculations

Project: 11633 - Santa Cruz Water Rights Project

Noise Level Descriptor: Leq
Site Conditions: Soft
Traffic Input: ADT
Traffic K-Factor: 10

Segment Description and Location				Input										Output				
						Distance to Directional Centerline, (feet)$_4$		Traffic Distribution Characteristics						Leq,	Distance to Contour, (feet)$_3$			
Number	Name	From	To	ADT	Speed (mph)	Near	Far	% Auto	% Med	% Hvy	% Day	% Eve	% Night	(dBA)$_{5,6,7}$	70 dBA	65 dBA	60 dBA	55 dBA
Existing Conditions																		
	Tait																	
17	Hwy 1			102,000	65	2900	2900	94.0%	3.8%	2.2%	80.0%		20.0%	56.8	380	819	1764	3801
18	River Road			5,800	25	190	190	97.0%	2.0%	1.0%	80.0%		20.0%	50.4	9	20	44	94
														57.7				
	Felton																	
19	River Road			8,000	25	315	315	97.0%	2.0%	1.0%	80.0%		20.0%	48.5	12	25	54	117
	SVWD Intertie Pipeline																	
20	Hwy 1			102,000	65	100	100	94.0%	3.8%	2.2%	80.0%		20.0%	78.7	380	819	1764	3801
21	Hwy 1			102,000	65	850	850	94.0%	3.8%	2.2%	80.0%		20.0%	64.8	380	819	1764	3801
	SVWD Intertie Pump Station																	
22	Hwy 1			102,000	65	700	700	94.0%	3.8%	2.2%	80.0%		20.0%	66.0	380	819	1764	3801
	Soquel Village Pipeline																	
23	Hwy 1			102,000	65	330	330	94.0%	3.8%	2.2%	80.0%		20.0%	70.9	380	819	1764	3801
24	Hwy 1			102,000	65	1750	1750	94.0%	3.8%	2.2%	80.0%		20.0%	60.1	380	819	1764	3801
25	Soquel Dr	Rodeo Gulch	41st	23,618	35	130	130	97.0%	2.0%	1.0%	80.0%		20.0%	62.3	40	86	185	400
	Park Ave Pipeline																	
26	Hwy 1			102,000	65	270	270	94.0%	3.8%	2.2%	80.0%		20.0%	72.2	380	819	1764	3801
27	Hwy 1			102,000	65	1850	1850	94.0%	3.8%	2.2%	80.0%		20.0%	59.7	380	819	1764	3801
28	Soquel Dr	Rodeo Gulch	41st	23,618	35	120	120	97.0%	2.0%	1.0%	80.0%		20.0%	62.8	40	86	185	400

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Appendix H

Traffic Noise Model Calculations

Project: 11633 - Santa Cruz Water Rights Project

Noise Level Descriptor: Leq
Site Conditions: Soft
Traffic Input: ADT
Traffic K-Factor: 10

Segment Description and Location				Input										Output				
						Distance to Directional Centerline, (feet)$_4$		Traffic Distribution Characteristics						Leq,	Distance to Contour, (feet)$_3$			
Number	Name	From	To	ADT	Speed (mph)	Near	Far	% Auto	% Med	% Hvy	% Day	% Eve	% Night	(dBA)$_{5,6,7}$	70 dBA	65 dBA	60 dBA	55 dBA
Existing Conditions																		
	McGregor Pump Station upgrades																	
29	Hwy 1			102,000	65	210	210	94.0%	3.8%	2.2%	80.0%		20.0%	73.9	380	819	1764	3801
	Freedom Blvd Pump Station																	
30	Hwy 1			102,000	65	875	875	94.0%	3.8%	2.2%	80.0%		20.0%	64.6	380	819	1764	3801
31	Freedom Blvd	North of Soquel		16,015	45	150	150	97.0%	2.0%	1.0%	80.0%		20.0%	62.7	49	106	228	492
	Valencia Pump Station																	
32	Hwy 1			102,000	65	5700	5700	94.0%	3.8%	2.2%	80.0%		20.0%	52.4	380	819	1764	3801
33	Freedom Blvd	North of Soquel		16,015	45	720	720	97.0%	2.0%	1.0%	80.0%		20.0%	52.5	49	106	228	492

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Santa Cruz ASR

Mobilization, set up of drilling equipment and conductor casing install

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	472	60.0
	124	75.0
	100	77.4
	150	72.9
	200	69.6
	250	67.1
	300	65.1
	350	63.4
	400	61.9
	450	60.6
	500	59.4
	550	58.3

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Grader	**1**	85	0.4
Auger Drill Rig	**1**	85	0.2
Front End Loader	**1**	80	0.4
Tractor	**1**	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Grader	81.0
Auger Drill Rig	78.0
Front End Loader	76.0
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
85.2

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Santa Cruz ASR

Pilot borehole drilling

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	465	60.0
	122	75.0
	100	77.2
	150	72.7
	200	69.4
	250	66.9
	300	64.9
	350	63.2
	400	61.7
	450	60.4
	500	59.2
	550	58.1

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Auger Drill Rig	**1**	85	0.2
Gradall	**1**	85	0.4
Pumps	**1**	77	0.5
Tractor	**1**	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Auger Drill Rig	78.0
Gradall	81.0
Pumps	74.0
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
85.0

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Santa Cruz ASR

Ream (enlarge borehole) + Caliper Survey

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	465	60.0
	122	75.0
	100	77.2
	150	72.7
	200	69.4
	250	66.9
	300	64.9
	350	63.2
	400	61.7
	450	60.4
	500	59.2
	550	58.1

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Auger Drill Rig	**1**	85	0.2
Gradall	**1**	85	0.4
Pumps	**1**	77	0.5
Tractor	**1**	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Auger Drill Rig	78.0
Gradall	81.0
Pumps	74.0
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
85.0

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Santa Cruz ASR

Well Construction (Casing install, gravel pack + Seal)

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	435	60.0
	178	70.0
	100	76.5
	150	71.9
	200	68.7
	250	66.2
	300	64.2
	350	62.4
	400	61.0
	450	59.6
	500	58.5
	550	57.4

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Dozer	1	85	0.4
Front End Loader	1	80	0.4
Tractor	1	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level [2]	L_{eq} dBA at 50 feet[2]
Dozer	81.0
Front End Loader	76.0
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
84.3

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Santa Cruz ASR

Well Development (Air Lift + Swab)

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	400	60.0
	164	70.0
	100	75.5
	150	71.0
	200	67.8
	250	65.3
	300	63.2
	350	61.5
	400	60.0
	450	58.7
	500	57.5
	550	56.4

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Auger Drill Rig	**1**	85	0.2
Gradall	**1**	85	0.4
Pumps	**1**	77	0.5

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Auger Drill Rig	78.0
Gradall	81.0
Pumps	74.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
83.3

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

$L_{eq}(equip) = E.L. + 10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Santa Cruz ASR

Well Development (Test Pump Install, Pumping)

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	410	60.0
	168	70.0
	100	75.9
	150	71.3
	200	68.1
	250	65.6
	300	63.5
	350	61.8
	400	60.3
	450	59.0
	500	57.8
	550	56.7

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Generator	**1**	82	0.5
Gradall	**1**	85	0.4
Pumps	**1**	77	0.5

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Generator	79.0
Gradall	81.0
Pumps	74.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
83.6

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Santa Cruz ASR

Well Testing (step plus constant rate tests)

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	410	60.0
	168	70.0
	100	75.9
	150	71.3
	200	68.1
	250	65.6
	300	63.5
	350	61.8
	400	60.3
	450	59.0
	500	57.8
	550	56.7

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Generator	**1**	82	0.5
Gradall	**1**	85	0.4
Pumps	**1**	77	0.5

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Generator	79.0
Gradall	81.0
Pumps	74.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
83.6

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

$L_{eq}(equip) = E.L. + 10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Santa Cruz ASR

Test Pump Removal, well alignment and video survey. Demobilization of Well Drilling equipment

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	465	60.0
	122	75.0
	100	77.2
	150	72.7
	200	69.5
	250	67.0
	300	64.9
	350	63.2
	400	61.7
	450	60.4
	500	59.2
	550	58.1

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Crane	1	85	0.16
Gradall	1	85	0.4
Front End Loader	1	80	0.4
Tractor	1	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level [2]	L_{eq} dBA at 50 feet[2]
Crane	77.0
Gradall	81.0
Front End Loader	76.0
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
85.0

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

$L_{eq}(equip) = E.L. + 10*\log (U.F.) - 20*\log (D/50) - 10*G*\log (D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Santa Cruz ASR

Mobilization, set up of drilling equipment and conductor casing install

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	472	58.4
	124	73.4
	100	75.8
	150	71.2
	200	68.0
	250	65.5
	300	63.5
	350	61.7
	400	60.2
	450	58.9
	500	57.7
	550	56.7

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Grader	1	85	0.4
Tractor	1	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Grader	81.0
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
83.6

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

$L_{eq}(equip) = E.L. + 10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Santa Cruz ASR

Injection line, Backflow and Meter Install, Electrical Conduit and control Installation, Storm Drain Line Connection

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	590	60.0
	240	70.0
	100	79.9
	150	75.3
	200	72.1
	250	69.6
	300	67.5
	350	65.8
	400	64.3
	450	63.0
	500	61.8
	550	60.7

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Concrete Saw	**1**	90	0.2
Excavator	**1**	85	0.4
Gradall	**1**	85	0.4
Pumps	**1**	77	0.5
Tractor	**1**	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Concrete Saw	83.0
Excavator	81.0
Gradall	81.0
Pumps	74.0
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
87.6

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Intertie

Pipeline Installation

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	485	60.0
	127	75.0
	100	77.7
	150	73.2
	200	69.9
	250	67.4
	300	65.4
	350	63.7
	400	62.2
	450	60.9
	500	59.7
	550	58.6

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Grader	**1**	85	0.4
Excavator	**1**	85	0.4
Tractor	**1**	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Grader	81.0
Excavator	81.0
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
85.5

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Intertie

Paving

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	500	60.0
	131	75.0
	100	78.0
	150	73.5
	200	70.3
	250	67.7
	300	65.7
	350	64.0
	400	62.5
	450	61.2
	500	60.0
	550	58.9

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Paver	**1**	85	0.5
Paver	**1**	85	0.5
Roller	**1**	85	0.2

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Paver	82.0
Paver	82.0
Roller	78.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
85.8

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

$L_{eq}(equip) = E.L. + 10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Intertie Pumpstation

Site Preparation

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	470	60.0
	193	70.0
	100	77.4
	150	72.8
	200	69.6
	250	67.1
	300	65.1
	350	63.3
	400	61.8
	450	60.5
	500	59.3
	550	58.3

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Dozer	**1**	85	0.4
Tractor	**1**	84	0.4
Tractor	**1**	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level [2]	L_{eq} dBA at 50 feet[2]
Dozer	81.0
Tractor	80.0
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
85.2

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

$L_{eq}(equip) = E.L. + 10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Intertie Pumpstation

Building Construction

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	518	60.0
	136	75.0
	100	78.4
	150	73.9
	200	70.7
	250	68.2
	300	66.1
	350	64.4
	400	62.9
	450	61.6
	500	60.4
	550	59.3

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Man Lift	1	85	0.2
Concrete Mixer Truck	1	85	0.4
Gradall	1	85	0.4
Tractor	1	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Man Lift	78.0
Concrete Mixer Truck	81.0
Gradall	81.0
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
86.2

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Intertie Pumpstation

Architectural Coating

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	208	60.0
	85.5	70.0
	100	68.2
	150	63.7
	200	60.5
	250	58.0
	300	55.9
	350	54.2
	400	52.7
	450	51.4
	500	50.2
	550	49.1

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Compressor (air)	1	80	0.4
Ground Type		Soft	
Source Height		5	
Receiver Height		5	
Ground Factor		0.58	

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Compressor (air)	76.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
76.0

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

$L_{eq}(equip) = E.L. + 10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Intertie Pumpstation

Paving

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	355	60.0
	146	70.0
	100	74.2
	150	69.7
	200	66.4
	250	63.9
	300	61.9
	350	60.2
	400	58.7
	450	57.4
	500	56.2
	550	55.1

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Paver	1	85	0.5
Ground Type		Soft	
Source Height		5	
Receiver Height		5	
Ground Factor		0.58	

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Paver	82.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
82.0

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

$L_{eq}(equip) = E.L. + 10*\log (U.F.) - 20*\log (D/50) - 10*G*\log (D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Intertie Pumpstation

Testing

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	272	60.0
	111	70.0
	100	71.2
	150	66.7
	200	63.4
	250	60.9
	300	58.9
	350	57.2
	400	55.7
	450	54.4
	500	53.2
	550	52.1

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Generator	1	82	0.5
Ground Type		Soft	
Source Height		5	
Receiver Height		5	
Ground Factor		0.58	

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Generator	79.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
79.0

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

$L_{eq}(equip) = E.L. + 10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Intertie Pumpstation Upgrade

Demolition (removal/replacement of equipment)

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	470	58.9
	193	68.9
	100	76.2
	150	71.7
	200	68.5
	250	66.0
	300	63.9
	350	62.2
	400	60.7
	450	59.4
	500	58.2
	550	57.1

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Excavator	**1**	85	0.4
Pumps	**1**	77	0.5
Tractor	**1**	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Excavator	81.0
Pumps	74.0
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
84.0

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Intertie Pumpstation Upgrade

Structural Rehabilitation

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	518	58.1
	136	73.1
	100	76.6
	150	72.0
	200	68.8
	250	66.3
	300	64.2
	350	62.5
	400	61.0
	450	59.7
	500	58.5
	550	57.4

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Compressor (air)	**1**	80	0.4
Concrete Mixer Truck	**1**	85	0.4
Generator	**1**	82	0.5
Pumps	**1**	77	0.5

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Compressor (air)	76.0
Concrete Mixer Truck	81.0
Generator	79.0
Pumps	74.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
84.3

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Intertie Pumpstation Upgrade

Building Construction

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	510	60.0
	134	75.0
	100	78.3
	150	73.7
	200	70.5
	250	68.0
	300	65.9
	350	64.2
	400	62.7
	450	61.4
	500	60.2
	550	59.1

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Tractor	**1**	84	0.4
Generator	**1**	82	0.5
Paver	**1**	85	0.5
Man Lift	**1**	85	0.2

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Tractor	80.0
Generator	79.0
Paver	82.0
Man Lift	78.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
86.0

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Intertie Pumpstation Upgrade

Testing

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	272	60.0
	111	70.0
	100	71.2
	150	66.7
	200	63.4
	250	60.9
	300	58.9
	350	57.2
	400	55.7
	450	54.4
	500	53.2
	550	52.1

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Generator	**1**	82	0.5
Ground Type		Soft	
Source Height		5	
Receiver Height		5	
Ground Factor		0.58	

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Generator	79.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
79.0

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

$L_{eq}(equip) = E.L. + 10*\log (U.F.) - 20*\log (D/50) - 10*G*\log (D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Tait Diversion Improvements

Site Preparation

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	500	60.0
	131	75.0
	100	78.0
	150	73.5
	200	70.2
	250	67.7
	300	65.7
	350	64.0
	400	62.5
	450	61.1
	500	60.0
	550	58.9

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Excavator	**1**	85	0.4
Grader	**1**	85	0.4
Pumps	**1**	77	0.5
Tractor	**1**	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Excavator	81.0
Grader	81.0
Pumps	74.0
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
85.8

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Tait Diversion Improvements

Intake Design Upgrade

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	500	58.9
	131	73.9
	100	76.9
	150	72.4
	200	69.2
	250	66.7
	300	64.6
	350	62.9
	400	61.4
	450	60.1
	500	58.9
	550	57.8

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Crane	1	85	0.16
Generator	1	82	0.5
Concrete Mixer Truck	1	85	0.4
Compressor (air)	1	80	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Crane	77.0
Generator	79.0
Concrete Mixer Truck	81.0
Compressor (air)	76.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
84.7

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

$L_{eq}(equip) = E.L. + 10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Tait Diversion Improvements

Hydraulic Modifications

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	470	60.1
	193	70.1
	100	77.4
	150	72.9
	200	69.7
	250	67.2
	300	65.1
	350	63.4
	400	61.9
	450	60.6
	500	59.4
	550	58.3

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Excavator	**1**	85	0.4
Generator	**1**	82	0.5
Pumps	**1**	77	0.5
Tractor	**1**	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Excavator	81.0
Generator	79.0
Pumps	74.0
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
85.2

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

$L_{eq}(equip) = E.L. + 10*\log (U.F.) - 20*\log (D/50) - 10*G*\log (D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Tait Diversion Improvements

Improvments to Check Dam

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	518	58.9
	136	73.9
	100	77.3
	150	72.8
	200	69.6
	250	67.1
	300	65.0
	350	63.3
	400	61.8
	450	60.5
	500	59.3
	550	58.2

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Concrete Mixer Truck	**1**	85	0.4
Concrete Pump Truck	**1**	82	0.2
Compressor (air)	**1**	80	0.4
Excavator	**1**	85	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Concrete Mixer Truck	81.0
Concrete Pump Truck	75.0
Compressor (air)	76.0
Excavator	81.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
85.1

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Tait Diversion Improvements

Fish Passage Upgrades

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	475	60.0
	124	75.0
	100	77.4
	150	72.9
	200	69.7
	250	67.2
	300	65.1
	350	63.4
	400	61.9
	450	60.6
	500	59.4
	550	58.3

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Excavator	**1**	85	0.4
Tractor	**1**	84	0.4
Generator	**1**	82	0.5
Pumps	**1**	77	0.5

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Excavator	81.0
Tractor	80.0
Generator	79.0
Pumps	74.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
85.2

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Tait Diversion Improvements

Site CleanupTesting

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	355	59.0
	146	69.0
	100	73.2
	150	68.7
	200	65.5
	250	63.0
	300	60.9
	350	59.2
	400	57.7
	450	56.4
	500	55.2
	550	54.1

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Excavator	**1**	85	0.4
Ground Type		Soft	
Source Height		5	
Receiver Height		5	
Ground Factor		0.58	

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Excavator	81.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
81.0

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

$L_{eq}(equip) = E.L. + 10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold

Appendix H

Project-Generated Construction Source Noise Prediction Model

SCWRP - Tait Diversion Improvements

Site CleanupTesting

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	25	85.8
	146	66.0
	100	70.2
	150	65.7
	200	62.5
	250	60.0
	300	57.9
	350	56.2
	400	54.7
	450	53.4
	500	52.2
	550	51.1

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
auger drill rig	**1**	85	0.2
Ground Type		Soft	
Source Height		5	
Receiver Height		5	
Ground Factor		0.58	

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
auger drill rig	78.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
78.0

Sources:

1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.

2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

$L_{eq}(equip) = E.L. + 10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

*Project specific threshold