

## **APPENDIX D**

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### Noise Modeling Results

Predicted Levee Noise Levels

**Appendix D**

SAFCA Levee Improvement Project  
 Clearing and Grubbing/Stripping  
 NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	63.6	79.3
200	57.6	73.3
300	54.0	69.7
400	51.5	67.2
500	49.6	65.3
600	48.0	63.7
700	46.7	62.4
800	45.5	61.2
900	44.5	60.2
1000	43.6	59.3
1100	42.8	58.5
1200	42.0	57.7
1300	41.3	57.0
1400	40.7	56.4
1500	40.1	55.8
1600	39.5	55.2
1700	39.0	54.7
1800	38.5	54.2
Threshold*	900	60.2

<b>Assumptions:</b>			
	Reference Noise Levels ( $L_{max}$ ) @50 feet		
	Mitigated	Unmitigated	Usage Factor
Scraper	80	88	0.4
Loader	75	79	0.4
Water Truck	75	91	0.4
			$H_{eff} = 10$
			$G = 0.57$
<b>Calculations:</b>		$L_{eq}$ dBA @ 100 feet	
	Mitigated	Unmitigated	
Scraper	68.3	76.3	
Loader	63.3	67.3	
Water Truck	63.3	79.3	
<b>Cumulative:</b>		$L_{eq}$ dBA @ 100 feet	
	Mitigated	Unmitigated	
	63.6	79.3	

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Construction Equipment Noise Emission Levels, page 8. The equation  $L_{eq}(equip) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

\* The threshold specific for this Project.

$G$  = the constant that accounts for topography and ground effects.

$H_{eff}$  = the sum of average path heights on either side of a topographical feature. Utilized to determine the  $G$  factor.

**Appendix D**  
 SAFCA Levee Improvement Project  
 Levee Degrading  
 NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	63.8	79.3
200	57.7	73.3
300	54.2	69.7
400	51.7	67.2
500	49.8	65.3
600	48.2	63.7
700	46.9	62.4
800	45.7	61.2
900	44.7	60.2
1000	43.8	59.3
1100	42.9	58.5
1200	42.2	57.7
1300	41.5	57.0
1400	40.8	56.4
1500	40.2	55.8
1600	39.7	55.2
1700	39.2	54.7
1800	38.7	54.2
Threshold*	2600	35.5
		51.0

Assumptions:	Reference Noise Levels ( $L_{max}$ ) @50 feet		
	Mitigated	Unmitigated	Usage Factor
Scraper	80	88	0.4
Loader	75	79	0.4
Water Truck	75	91	0.4
Dozer	75	80	0.4
			$H_{eff} = 10$
			$G = 0.57$
Calculations:	$L_{eq}$ dBA @ 100 feet		
	Mitigated	Unmitigated	
Scraper	68.3	76.3	
Loader	63.3	67.3	
Water Truck	63.3	79.3	
Dozer	63.3	68.3	
Cumulative:	$L_{eq}$ dBA @ 100 feet		
	Mitigated	Unmitigated	
	63.8	79.3	

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Construction Equipment Noise Emission Levels, page 8. The equation  $L_{eq}(equip) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

\* The threshold specific for this Project.

$G$  = the constant that accounts for topography and ground effects.

$H_{eff}$  = the sum of average path heights on either side of a topographical feature. Utilized to determine the  $G$  factor.

**Appendix D**

SAFCA Levee Improvement Project  
 Demolish Canal and Tree Removal  
 NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	72.3	79.3
200	66.3	73.3
300	62.7	69.7
400	60.2	67.2
500	58.3	65.3
600	56.7	63.7
700	55.4	62.4
800	54.2	61.2
900	53.2	60.2
1000	52.3	59.3
1100	51.5	58.5
1200	50.7	57.7
1300	50.0	57.0
1400	49.4	56.4
1500	48.8	55.8
1600	48.2	55.2
1700	47.7	54.7
1800	47.2	54.2
Threshold*	2300	45.0
		52.0

<b>Assumptions:</b>			
	Reference Noise Levels ( $L_{max}$ ) @50 feet		
	Mitigated	Unmitigated	Usage Factor
<b>Excavator</b>	80	85	0.4
<b>Loader</b>	75	79	0.4
<b>Haul Truck</b>	84	91	0.4
			<b>H<sub>eff</sub> = 10</b>
			<b>G = 0.57</b>
<b>Calculations:</b>		<b>L<sub>eq</sub> dBA @ 100 feet</b>	
	Mitigated	Unmitigated	
<b>Excavator</b>	68.3	73.3	
<b>Loader</b>	63.3	67.3	
<b>Haul Truck</b>	72.3	79.3	
<b>Cumulative:</b>		<b>L<sub>eq</sub> dBA @ 100 feet</b>	
	Mitigated	Unmitigated	
	72.3	79.3	

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Construction Equipment Noise Emission Levels, page 8. The equation  $L_{eq}(equip) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

\* The threshold specific for this Project.

**G** = the constant that accounts for topography and ground effects.

**H<sub>eff</sub>** = the sum of average path heights on either side of a topographical feature. Utilized to determine the **G** factor.

**Appendix D**

SAFCA Levee Improvement Project  
 Cutoff Wall Construction  
 NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	72.3	79.3
200	66.3	73.3
300	62.7	69.7
400	60.2	67.2
500	58.3	65.3
600	56.7	63.7
700	55.4	62.4
800	54.2	61.2
900	53.2	60.2
1000	52.3	59.3
1100	51.5	58.5
1200	50.7	57.7
1300	50.0	57.0
1400	49.4	56.4
1500	48.8	55.8
1600	48.2	55.2
1700	47.7	54.7
1800	47.2	54.2
Threshold*	2300	45.0
		52.0

<b>Assumptions:</b>			
	Reference Noise Levels ( $L_{max}$ ) @50 feet		
	Mitigated	Unmitigated	Usage Factor
Generator	75	78	1
Loader	75	79	0.4
Haul Truck	84	91	0.4
Slurry Pump	75	76	0.5
Excavators	80	85	0.4
			$H_{eff} = 10$
			$G = 0.57$
<b>Calculations:</b>	$L_{eq}$ dBA @ 100 feet		
	Mitigated	Unmitigated	
Generator	67.3	70.3	
Loader	63.3	67.3	
Haul Truck	72.3	79.3	
Slurry Pump	64.3	65.3	
Excavators	68.3	73.3	
<b>Cumulative:</b>	$L_{eq}$ dBA @ 100 feet		
	Mitigated	Unmitigated	
	72.3	79.3	

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Construction Equipment Noise Emission Levels, page 8. The equation  $L_{eq}(equip) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

\* The threshold specific for this Project.

$G$  = the constant that accounts for topography and ground effects.

$H_{eff}$  = the sum of average path heights on either side of a topographical feature. Utilized to determine the  $G$  factor.

**Appendix D**

SAFCA Levee Improvement Project  
 Borrow Site Excavation  
 NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	72.3	79.3
200	66.3	73.3
300	62.7	69.7
400	60.2	67.2
500	58.3	65.3
600	56.7	63.7
700	55.4	62.4
800	54.2	61.2
900	53.2	60.2
1000	52.3	59.3
1100	51.5	58.5
1200	50.7	57.7
1300	50.0	57.0
1400	49.4	56.4
1500	48.8	55.8
1600	48.2	55.2
1700	47.7	54.7
1800	47.2	54.2
Threshold*	2300	52.0

<b>Assumptions:</b>			
	Reference Noise Levels ( $L_{max}$ ) @50 feet		
	Mitigated	Unmitigated	Usage Factor
<b>Excavators</b>	80	85	0.4
<b>Loader</b>	75	79	0.4
<b>Haul Truck</b>	84	91	0.4
			<b>H<sub>eff</sub> = 10</b>
			<b>G = 0.57</b>
<b>Calculations:</b>			
	L <sub>eq</sub> dBA @ 100 feet		
	Mitigated	Unmitigated	
<b>Excavators</b>	68.3	73.3	
<b>Loader</b>	63.3	67.3	
<b>Haul Truck</b>	72.3	79.3	
<b>Cumulative:</b>			
	L <sub>eq</sub> dBA @ 100 feet		
	Mitigated	Unmitigated	
	72.3	79.3	

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Construction Equipment Noise Emission Levels, page 8. The equation  $L_{eq}(equip) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

\* The threshold specific for this Project.

**G** = the constant that accounts for topography and ground effects.

**H<sub>eff</sub>** = the sum of average path heights on either side of a topographical feature. Utilized to determine the **G** factor.

**Appendix D**  
 SAFCA Levee Improvement Project  
 Levee Raising  
 NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	63.8	79.6
200	57.7	73.6
300	54.2	70.0
400	51.7	67.5
500	49.8	65.6
600	48.2	64.0
700	46.9	62.7
800	45.7	61.5
900	44.7	60.5
1000	43.8	59.6
1100	42.9	58.8
1200	42.2	58.0
1300	41.5	57.3
1400	40.8	56.7
1500	40.2	56.1
1600	39.7	55.5
1700	39.2	55.0
1800	38.7	54.5
Threshold*	2600	35.5
		51.3

<b>Assumptions:</b>			
	Reference Noise Levels ( $L_{max}$ ) @50 feet		
	Mitigated	Unmitigated	Usage Factor
<b>Roller</b>	74	80	0.5
<b>Haul Truck</b>	75	91	0.4
<b>Water Truck</b>	75	91	0.4
<b>Dozer</b>	75	80	0.4
			<b>H<sub>eff</sub> = 10</b>
			<b>G = 0.57</b>
<b>Calculations:</b>	L <sub>eq</sub> dBA @ 100 feet		
	Mitigated	Unmitigated	
<b>Roller</b>	63.3	69.3	
<b>Haul Truck</b>	63.3	79.3	
<b>Water Truck</b>	63.3	79.3	
<b>Dozer</b>	63.3	68.3	
<b>Cumulative:</b>	L <sub>eq</sub> dBA @ 100 feet		
	Mitigated	Unmitigated	
	63.8	79.6	

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Construction Equipment Noise Emission Levels, page 8. The equation  $L_{eq}(equip) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

\* The threshold specific for this Project.

**G** = the constant that accounts for topography and ground effects.

**H<sub>eff</sub>** = the sum of average path heights on either side of a topographical feature. Utilized to determine the **G** factor.

**Appendix D**

SAFCA Levee Improvement Project  
 Surface Drainage Outlets  
 NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	73.3	79.4
200	67.3	73.3
300	63.8	69.8
400	61.3	67.3
500	59.3	65.4
600	57.8	63.8
700	56.4	62.5
800	55.3	61.3
900	54.2	60.3
1000	53.3	59.4
1100	52.5	58.5
1200	51.7	57.8
1300	51.0	57.1
1400	50.4	56.4
1500	49.8	55.8
1600	49.2	55.3
1700	48.7	54.8
1800	48.2	54.3
Threshold*	2600	45.0
		51.1

<b>Assumptions:</b>			
	Reference Noise Levels ( $L_{max}$ ) @50 feet		
	Mitigated	Unmitigated	Usage Factor
<b>Backhoe</b>	75	85	0.4
<b>Paver</b>	80	89	0.5
<b>Haul Truck</b>	84	91	0.4
<b>Compactor</b>	80	85	0.2
<b>Concrete Truck</b>	85	90	0.4
			<b>H<sub>eff</sub> = 10</b>
			<b>G = 0.57</b>
<b>Calculations:</b>			
	L <sub>eq</sub> dBA @ 100 feet		
	Mitigated	Unmitigated	
<b>Backhoe</b>	63.3	73.3	
<b>Paver</b>	69.3	78.3	
<b>Haul Truck</b>	72.3	79.3	
<b>Compactor</b>	65.3	70.3	
<b>Concrete Truck</b>	73.3	78.3	
<b>Cumulative:</b>			
	L <sub>eq</sub> dBA @ 100 feet		
	Mitigated	Unmitigated	
	73.3	79.4	

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Construction Equipment Noise Emission Levels, page 8. The equation  $L_{eq}(equip) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

\* The threshold specific for this Project.

**G** = the constant that accounts for topography and ground effects.

**H<sub>eff</sub>** = the sum of average path heights on either side of a topographical feature. Utilized to determine the **G** factor.

## Appendix D

SAFCA Levee Improvement Project  
Construct Relief Wells and Drainage Canals  
NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	73.3	78.3
200	67.3	72.3
300	63.7	68.7
400	61.2	66.2
500	59.3	64.3
600	57.7	62.7
700	56.4	61.4
800	55.2	60.2
900	54.2	59.2
1000	53.3	58.3
1100	52.5	57.5
1200	51.7	56.7
1300	51.0	56.0
1400	50.4	55.4
1500	49.8	54.8
1600	49.2	54.2
1700	48.7	53.7
1800	48.2	53.2
Threshold*	2600	45.0

Assumptions:			
	Reference Noise Levels (L <sub>max</sub> ) @50 feet		
	Mitigated	Unmitigated	Usage Factor
Drill Rig	80	98	0.4
Roller	74	80	0.5
Support Truck	55	65	0.4
Excavator	85	90	0.2
Concrete Truck	85	90	0.4
			H <sub>eff</sub> = 10
			G = 0.57
Calculations:			
	L <sub>eq</sub> dBA @ 100 feet		
	Mitigated	Unmitigated	
Drill Rig	68.3	86.3	
Roller	63.3	69.3	
Support Truck	43.3	53.3	
Excavator	70.3	75.3	
Concrete Truck	73.3	78.3	
Cumulative:			
	L <sub>eq</sub> dBA @ 100 feet		
	Mitigated	Unmitigated	
	73.3	78.3	

### Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Construction Equipment Noise Emission Levels, page 8. The equation  $L_{eq}(\text{equip}) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

### Notes:

\* The threshold specific for this Project.

**G** = the constant that accounts for topography and ground effects.

**H<sub>eff</sub>** = the sum of average path heights on either side of a topographical feature. Utilized to determine the **G** factor.

**Appendix D**

SAFCA Levee Improvement Project  
 Site Restoration and Demobilization  
 NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	68.3	79.3
200	62.3	73.3
300	58.7	69.7
400	56.2	67.2
500	54.3	65.3
600	52.7	63.7
700	51.4	62.4
800	50.2	61.2
900	49.2	60.2
1000	48.3	59.3
1100	47.5	58.5
1200	46.7	57.7
1300	46.0	57.0
1400	45.4	56.4
1500	44.8	55.8
1600	44.2	55.2
1700	43.7	54.7
1800	43.2	54.2
Threshold*	1050	47.9

Assumptions:	Reference Noise Levels (L <sub>max</sub> ) @50 feet		
	Mitigated	Unmitigated	Usage Factor
Water Truck	75	84	0.4
Haul Truck	75	91	0.4
Hydroseed Truck	80	88	0.4

H<sub>eff</sub> = 10  
 G = 0.57

Calculations:	L <sub>eq</sub> dBA @ 100 feet	
	Mitigated	Unmitigated
Water Truck	63.3	72.3
Haul Truck	63.3	79.3
Hydroseed Truck	68.3	76.3

Cumulative:	L <sub>eq</sub> dBA @ 100 feet	
	Mitigated	Unmitigated
	68.3	79.3

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Construction Equipment Noise Emission Levels, page 8. The equation  $L_{eq}(equip) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

\* The threshold specific for this Project.

**G** = the constant that accounts for topography and ground effects.

**H<sub>eff</sub>** = the sum of average path heights on either side of a topographical feature. Utilized to determine the **G** factor.

SAFCA Levee Improvement Project  
 NLIP  
 Summary of Predicted Action Noise Levels

<b>Action</b>	<b>Mitigated</b>	<b>Unmitigated</b>	<b>Distance to Noise Contours in feet</b>	
			<b>50 dBA Contour</b>	<b>45 dBA Contour</b>
1 Clearing and Grubbing/Strippng	63.6	79.3	477.8	849.7
2 Levee Degrading	63.8	79.3	487.6	867.1
3 Demolish Canal and Tree Removal	72.3	79.3	1300.8	2313.2
4 Cutoff Wall Construction	72.3	79.3	1300.8	2313.2
5 Borrow Site Excavation	72.3	79.3	1300.8	2313.2
6 Levee Raising	63.8	79.6	487.6	867.1
7 Surface Drainage Outlets	73.3	79.4	1466.5	2607.8
8 Construct Relief Wells and Drainage Canals	73.3	78.3	1459.6	2595.5
9 Site Restoration and Demobilization	68.3	79.3	820.7	1459.5

Predicted Canal Noise Levels

**Appendix D**

SAFCA Canal Improvement Project  
 Clearing and Grubbing/Strippng  
 NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	63.6	79.3
200	57.6	73.3
300	54.0	69.7
400	51.5	67.2
500	49.6	65.3
600	48.0	63.7
700	46.7	62.4
800	45.5	61.2
900	44.5	60.2
1000	43.6	59.3
1100	42.8	58.5
1200	42.0	57.7
1300	41.3	57.0
1400	40.7	56.4
1500	40.1	55.8
1600	39.5	55.2
1700	39.0	54.7
1800	38.5	54.2
Threshold*	900	60.2

<b>Assumptions:</b>			
	Reference Noise Levels ( $L_{max}$ ) @50 feet		
	Mitigated	Unmitigated	Usage Factor
<b>Dozer</b>	75	85	0.4
<b>Loader</b>	75	79	0.4
<b>Water Truck</b>	75	91	0.4
			<b>H<sub>eff</sub> = 10</b>
			<b>G = 0.57</b>
<b>Calculations:</b>			
	L <sub>eq</sub> dBA @ 100 feet		
	Mitigated	Unmitigated	
<b>Dozer</b>	63.3	73.3	
<b>Loader</b>	63.3	67.3	
<b>Water Truck</b>	63.3	79.3	
<b>Cumulative:</b>			
	L <sub>eq</sub> dBA @ 100 feet		
	Mitigated	Unmitigated	
	63.6	79.3	

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Constuction Equipment Noise Emission Levels, page 8. The equation  $L_{eq}(equip) = E.L.+10*\log (U.F.) - 20*\log (D/50) - 10*G*\log (D/50)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

\* The threshold specific for this Project.

**G** = the constant that accounts for topography and ground effects.

**H<sub>eff</sub>** = the sum of average path heights on either side of a topographical feature. Utilized to determine the **G** factor.

**Appendix D**

SAFCA Canal Improvement Project

Dewatering

NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	73.3	79.3
200	67.3	73.3
300	63.7	69.7
400	61.2	67.2
500	59.3	65.3
600	57.7	63.7
700	56.4	62.4
800	55.2	61.2
900	54.2	60.2
1000	53.3	59.3
1100	52.5	58.5
1200	51.7	57.7
1300	51.0	57.0
1400	50.4	56.4
1500	49.8	55.8
1600	49.2	55.2
1700	48.7	54.7
1800	48.2	54.2
Threshold*	2600	45.0
		51.0

<b>Assumptions:</b>			
	Reference Noise Levels ( $L_{max}$ ) @50 feet		
	Mitigated	Unmitigated	Usage Factor
<b>Crane</b>	75	83	0.16
<b>Loader</b>	75	79	0.4
<b>Pile Driver</b>	95	101	0.04
<b>Generator</b>	75	78	1
			<b>H<sub>eff</sub> = 10</b>
			<b>G = 0.57</b>
<b>Calculations:</b>	L <sub>eq</sub> dBA @ 100 feet		
	Mitigated	Unmitigated	
<b>Crane</b>	59.3	67.3	
<b>Loader</b>	63.3	67.3	
<b>Pile Driver</b>	73.3	79.3	
<b>Generator</b>	67.3	70.3	
<b>Cumulative:</b>	L <sub>eq</sub> dBA @ 100 feet		
	Mitigated	Unmitigated	
	73.3	79.3	

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Construction Equipment Noise Emission Levels, page 8.

The equation  $L_{eq}(equip) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

\* The threshold specific for this Project.

**G** = the constant that accounts for topography and ground effects.

**H<sub>eff</sub>** = the sum of average path heights on either side of a topographical feature. Utilized to determine the **G** factor.

**Appendix D**  
 SAFCA Canal Improvement Project  
 Excavation  
 NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	63.3	67.3
200	57.3	61.3
300	53.7	57.7
400	51.2	55.2
500	49.3	53.3
600	47.7	51.7
700	46.4	50.4
800	45.2	49.2
900	44.2	48.2
1000	43.3	47.3
1100	42.5	46.5
1200	41.7	45.7
1300	41.0	45.0
1400	40.4	44.4
1500	39.8	43.8
1600	39.2	43.2
1700	38.7	42.7
1800	38.2	42.2
Threshold*	2300	36.0
		40.0

<b>Assumptions:</b>			
<b>Reference Noise Levels (L<sub>max</sub>) @50 feet</b>			
	Mitigated	Unmitigated	Usage Factor
<b>Excavator</b>	80	85	0.4
<b>Loader</b>	75	79	0.4
			<b>H<sub>eff</sub> = 10</b>
			<b>G = 0.57</b>
<b>Calculations:</b>		<b>L<sub>eq</sub> dBA @ 100 feet</b>	
	Mitigated	Unmitigated	
<b>Excavator</b>	68.3	73.3	
<b>Loader</b>	63.3	67.3	
<b>Cumulative:</b>		<b>L<sub>eq</sub> dBA @ 100 feet</b>	
	Mitigated	Unmitigated	
	63.3	67.3	

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Construction Equipment Noise Emission Levels, page 8. The equation  $L_{eq}(equip) = E.L. + 10 \log(U.F.) - 20 \log(D/50) - 10 \log(G) \log(D/50)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

\* The threshold specific for this Project.

**G** = the constant that accounts for topography and ground effects.

**H<sub>eff</sub>** = the sum of average path heights on either side of a topographical feature. Utilized to determine the **G** factor.

**Appendix D**

SAFCA Canal Improvement Project  
 Foundation Construction  
 NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	73.3	79.3
200	67.3	73.3
300	63.7	69.7
400	61.2	67.2
500	59.3	65.3
600	57.7	63.7
700	56.4	62.4
800	55.2	61.2
900	54.2	60.2
1000	53.3	59.3
1100	52.5	58.5
1200	51.7	57.7
1300	51.0	57.0
1400	50.4	56.4
1500	49.8	55.8
1600	49.2	55.2
1700	48.7	54.7
1800	48.2	54.2
Threshold*	2600	45.0
		51.0

<b>Assumptions:</b>			
	Reference Noise Levels ( $L_{max}$ ) @50 feet		
	Mitigated	Unmitigated	Usage Factor
<b>Generator</b>	78	75	1
<b>Loader</b>	75	79	0.4
<b>Pile Driver</b>	95	101	0.04
<b>Crane</b>	75	83	0.16
			<b>H<sub>eff</sub> = 10</b>
			<b>G = 0.57</b>
<b>Calculations:</b>	L <sub>eq</sub> dBA @ 100 feet		
	Mitigated	Unmitigated	
<b>Generator</b>	70.3	67.3	
<b>Loader</b>	63.3	67.3	
<b>Pile Driver</b>	73.3	79.3	
<b>Crane</b>	59.3	67.3	
<b>Cumulative:</b>	L <sub>eq</sub> dBA @ 100 feet		
	Mitigated	Unmitigated	
	73.3	79.3	

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Construction Equipment Noise Emission Levels, page 8. The equation  $L_{eq}(equip) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

\* The threshold specific for this Project.

**G** = the constant that accounts for topography and ground effects.

**H<sub>eff</sub>** = the sum of average path heights on either side of a topographical feature. Utilized to determine the **G** factor.

**Appendix D**  
 SAFCA Canal Improvement Project  
 Concrete Construction  
 NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	67.3	70.6
200	61.2	64.6
300	57.7	61.0
400	55.2	58.5
500	53.3	56.6
600	51.7	55.0
700	50.4	53.7
800	49.2	52.5
900	48.2	51.5
1000	47.3	50.6
1100	46.4	49.7
1200	45.7	49.0
1300	45.0	48.3
1400	44.3	47.7
1500	43.7	47.1
1600	43.2	46.5
1700	42.7	46.0
1800	42.2	45.5
Threshold*	2300	40.0
		43.3

<b>Assumptions:</b>			
	Reference Noise Levels ( $L_{max}$ ) @50 feet		
	Mitigated	Unmitigated	Usage Factor
<b>Boom Truck</b>	80	85	0.4
<b>Generator</b>	75	78	1
<b>Concrete Pump</b>	75	82	0.4
			<b>H<sub>eff</sub> = 10</b>
			<b>G = 0.57</b>
<b>Calculations:</b>			
	L <sub>eq</sub> dBA @ 100 feet		
	Mitigated	Unmitigated	
<b>Boom Truck</b>	68.3	73.3	
<b>Generator</b>	67.3	70.3	
<b>Concrete Pump</b>	63.3	70.3	
<b>Cumulative:</b>			
	L <sub>eq</sub> dBA @ 100 feet		
	Mitigated	Unmitigated	
	67.3	70.6	

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Construction Equipment Noise Emission Levels, page 8. The equation  $L_{eq}(equip) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

\* The threshold specific for this Project.

**G** = the constant that accounts for topography and ground effects.

**H<sub>eff</sub>** = the sum of average path heights on either side of a topographical feature. Utilized to determine the **G** factor.

**Appendix D**  
 SAFCA Canal Improvement Project  
 Pipeline Construction  
 NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	65.3	79.3
200	59.3	73.3
300	55.7	69.7
400	53.2	67.2
500	51.3	65.3
600	49.7	63.7
700	48.4	62.4
800	47.2	61.2
900	46.2	60.2
1000	45.3	59.3
1100	44.5	58.5
1200	43.7	57.7
1300	43.0	57.0
1400	42.4	56.4
1500	41.8	55.8
1600	41.2	55.2
1700	40.7	54.7
1800	40.2	54.2
Threshold*	2300	38.0
		52.0

<b>Assumptions:</b>			
	Reference Noise Levels ( $L_{max}$ ) @50 feet		
	Mitigated	Unmitigated	Usage Factor
Excavator	75	85	0.4
Welder	73	75	0.4
Water Truck	75	91	0.4
Compactor	80	85	0.2
Crane	75	83	0.16
Loader	75	79	0.4
			$H_{eff} = 10$
<b>Calculations:</b>	$L_{eq}$ dBA @ 100 feet		$G = 0.57$
	Mitigated	Unmitigated	
Excavator	63.3	73.3	
Welder	61.3	63.3	
Water Truck	63.3	79.3	
Compactor	65.3	70.3	
Crane	59.3	67.3	
Loader	63.3	67.3	
<b>Cumulative:</b>	$L_{eq}$ dBA @ 100 feet		
	Mitigated	Unmitigated	
	65.3	79.3	

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Construction Equipment Noise Emission Levels, page 8. The equation  $L_{eq}(equip) = E.L. + 10 \log(U.F.) - 20 \log(D/50) - 10 \log(G) \log(D/50)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

\* The threshold specific for this Project.

$G$  = the constant that accounts for topography and ground effects.

$H_{eff}$  = the sum of average path heights on either side of a topographical feature. Utilized to determine the  $G$  factor.

**Appendix D**

SAFCA Canal Improvement Project  
 Backfill and Finish Grading  
 NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	65.3	79.3
200	59.3	73.3
300	55.7	69.7
400	53.2	67.2
500	51.3	65.3
600	49.7	63.7
700	48.4	62.4
800	47.2	61.2
900	46.2	60.2
1000	45.3	59.3
1100	44.5	58.5
1200	43.7	57.7
1300	43.0	57.0
1400	42.4	56.4
1500	41.8	55.8
1600	41.2	55.2
1700	40.7	54.7
1800	40.2	54.2
Threshold*	1050	58.9

<b>Assumptions:</b>			
	Reference Noise Levels ( $L_{max}$ ) @50 feet		
	Mitigated	Unmitigated	Usage Factor
<b>Loader</b>	75	85	0.4
<b>Dozer</b>	74	80	0.4
<b>Water Truck</b>	75	91	0.4
<b>Compactor</b>	80	85	0.2
<b>Grader</b>	75	85	0.08
			$H_{eff} = 10$
			$G = 0.57$
<b>Calculations:</b>	$L_{eq}$ dBA @ 100 feet		
	Mitigated	Unmitigated	
<b>Loader</b>	63.3	73.3	
<b>Dozer</b>	62.3	68.3	
<b>Water Truck</b>	63.3	79.3	
<b>Compactor</b>	65.3	70.3	
<b>Grader</b>	56.3	66.3	
<b>Cumulative:</b>	$L_{eq}$ dBA @ 100 feet		
	Mitigated	Unmitigated	
	65.3	79.3	

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Construction Equipment Noise Emission Levels, page 8. The equation  $L_{eq}(equip) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

\* The threshold specific for this Project.

$G$  = the constant that accounts for topography and ground effects.

$H_{eff}$  = the sum of average path heights on either side of a topographical feature. Utilized to determine the  $G$  factor.

**Appendix D**

SAFCA Canal Improvement Project  
 Electrical and Mechanical Equipment Installation  
 NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	59.3	67.3
200	53.3	61.3
300	49.8	57.8
400	47.3	55.3
500	45.3	53.3
600	43.7	51.7
700	42.4	50.4
800	41.2	49.2
900	40.2	48.2
1000	39.3	47.3
1100	38.5	46.5
1200	37.7	45.7
1300	37.0	45.0
1400	36.4	44.4
1500	35.8	43.8
1600	35.2	43.2
1700	34.7	42.7
1800	34.2	42.2
Threshold*	1050	46.9

Assumptions:			
	Reference Noise Levels (L <sub>max</sub> ) @50 feet		
	Mitigated	Unmitigated	Usage Factor
Crane	75	83	0.16
			H <sub>eff</sub> = 10
			G = 0.57
Calculations:		L <sub>eq</sub> dBA @ 100 feet	
	Mitigated	Unmitigated	
Crane	59.3	67.3	
Cumulative:		L <sub>eq</sub> dBA @ 100 feet	
	Mitigated	Unmitigated	
	59.3	67.3	

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Construction Equipment Noise Emission Levels, page 8. The equation  $L_{eq}(equip) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

\* The threshold specific for this Project.

**G** = the constant that accounts for topography and ground effects.

**H<sub>eff</sub>** = the sum of average path heights on either side of a topographical feature. Utilized to determine the **G** factor.

**Appendix D**  
 SAFCA Canal Improvement Project  
 Erosion Control  
 NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	63.3	72.3
200	57.3	66.3
300	53.7	62.7
400	51.2	60.2
500	49.3	58.3
600	47.7	56.7
700	46.4	55.4
800	45.2	54.2
900	44.2	53.2
1000	43.3	52.3
1100	42.5	51.5
1200	41.7	50.7
1300	41.0	50.0
1400	40.4	49.4
1500	39.8	48.8
1600	39.2	48.2
1700	38.7	47.7
1800	38.2	47.2
Threshold*	2300	36.0
		45.0

<b>Assumptions:</b>			
Reference Noise Levels ( $L_{max}$ ) @50 feet			
	Mitigated	Unmitigated	Usage Factor
<b>Hydrosed Truck</b>	80	88	0.4
<b>Water Truck</b>	75	84	0.4
			<b>H<sub>eff</sub> = 10</b>
			<b>G = 0.57</b>
<b>Calculations:</b>		<b>L<sub>eq</sub> dBA @ 100 feet</b>	
	Mitigated	Unmitigated	
<b>Hydrosed Truck</b>	68.3	76.3	
<b>Water Truck</b>	63.3	72.3	
<b>Cumulative:</b>		<b>L<sub>eq</sub> dBA @ 100 feet</b>	
	Mitigated	Unmitigated	
	63.3	72.3	

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Construction Equipment Noise Emission Levels, page 8. The equation  $L_{eq}(equip) = E.L. + 10 \log(U.F.) - 20 \log(D/50) - 10 \log(G)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

\* The threshold specific for this Project.

**G** = the constant that accounts for topography and ground effects.

**H<sub>eff</sub>** = the sum of average path heights on either side of a topographical feature. Utilized to determine the **G** factor.

**Appendix D**

SAFCA Canal Improvement Project  
 Demobilization and Clean Up  
 NLIP

Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA)	
	Mitigated	Unmitigated
100	63.3	67.3
200	57.3	61.3
300	53.7	57.7
400	51.2	55.2
500	49.3	53.3
600	47.7	51.7
700	46.4	50.4
800	45.2	49.2
900	44.2	48.2
1000	43.3	47.3
1100	42.5	46.5
1200	41.7	45.7
1300	41.0	45.0
1400	40.4	44.4
1500	39.8	43.8
1600	39.2	43.2
1700	38.7	42.7
1800	38.2	42.2
Threshold*	2300	36.0
		40.0

Assumptions:			
Reference Noise Levels (L <sub>max</sub> ) @50 feet			
	Mitigated	Unmitigated	Usage Factor
Trucks	75	91	0.4
Loader	75	79	0.4
			H <sub>eff</sub> = 10
			G = 0.57
Calculations:		L <sub>eq</sub> dBA @ 100 feet	
	Mitigated	Unmitigated	
Trucks	63.3	79.3	
Loader	63.3	67.3	
Cumulative:		L <sub>eq</sub> dBA @ 100 feet	
	Mitigated	Unmitigated	
	63.3	67.3	

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Synthesis 218, Table 3, Construction Equipment Noise Emission Levels, page 8. The equation  $L_{eq}(equip) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$  is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

\* The threshold specific for this Project.

G = the constant that accounts for topography and ground effects.

H<sub>eff</sub> = the sum of average path heights on either side of a topographical feature. Utilized to determine the G factor.

SAFCA Canal Improvement Project  
 NLIP  
 Summary of Predicted Action Noise Levels

	<b>Action</b>	<b>Mitigated</b>	<b>Unmitigated</b>	<b>Distance to Noise Contours in feet</b>	
				<b>50 dBA Contour</b>	<b>45 dBA Contour</b>
1	Clearing and Grubbing/Strippng	63.6	79.3	477.8	849.7
2	Dewatering	73.3	79.3	1459.5	2595.4
3	Excavation	63.3	67.3	461.5	820.7
4	Foundation Construction	73.3	79.3	1459.5	2595.4
5	Concrete Construction	67.3	70.6	729.8	1297.7
6	Pipeline Construction	65.3	79.3	580.9	1033.1
7	Backfill and Finish Grading	65.3	79.3	580.7	1032.6
8	Electrical and Mechanical Equipment Installation	59.3	67.3	291.9	519.1
9	Erosion Control	63.3	72.3	461.5	820.7
10	Demobilization and Clean Up	63.3	67.3	461.5	820.7

Haul Truck Trip Noise

**Truck Hauling Noise on Area Roads**

<b>Construction Site</b>	<b>Amount of Extraction Material (cubic yards)</b>	<b>Truck Loads</b>	<b>One-Way Truck Trips</b>	<b># of Haul Days</b>	<b>Hauling Hours per Day</b>	<b>Trips/Day</b>	<b>Trips/Hour</b>	<b>Day Peak Leq (dBA) 50 ft. from c.l.</b>
Natomas Cross Canal	580,000	38,667	77,334	85	10	910	91	67.9
Sac River East Levee	1,307,000	87,134	174,268	108	20	1,614	81	70.4
Canal Relocation/Construction	26,800	1,787	3,574	37	10	97	10	58.2

cubic yards per truck      15  
 speed of travel (mph)      15  
 Active Half Width (ft.)      6

## Contour 6 Traffic Noise Modeling

**NATOMAS CROSS CANAL – HAUL TRUCKS**

RUN NAME: HAUL TRUCKS      RUN DATE: 22 AUGUST 2007

TRAFFIC DISTRIBUTION PERCENTAGES

DAY      EVENING      NIGHT

---      -----      -----

AUTOS

1.00      1.00      1.00

M-TRUCKS

1.00      1.00      1.00

H-TRUCKS

92.00      1.00      1.00

ADT: 910    DAY PEAK: 54.59999847412109    NITE PEAK: 81.9000091

SPEED: 35    ACTIVE HALF WIDTH (FT): 6

SITE CHARACTERISTICS: SOFT    GRADE (PERCENT): .5

BARRIER TYPE:NONE

DAY PEAK LEQ AT 50 FT FROM CL WITHOUT BARRIER: 67.90521240234375

NITE PEAK LEQ AT 50 FT FROM CL WITHOUT BARRIER: 69.66521453857422

**SACRAMENTO RIVER EAST LEVEE – HAUL TRUCKS**

RUN NAME: HAUL TRUCKS      RUN DATE: 22 AUGUST 2007

TRAFFIC DISTRIBUTION PERCENTAGES

DAY      EVENING      NIGHT

---      -----      -----

AUTOS

1.00      1.00      1.00

M-TRUCKS

1.00      1.00      1.00

H-TRUCKS

92.00      1.00      1.00

ADT: 1614    DAY PEAK: 96.83999633789062    NITE PEAK: 145.26001614

SPEED: 35    ACTIVE HALF WIDTH (FT): 6

SITE CHARACTERISTICS: SOFT    GRADE (PERCENT): .5

BARRIER TYPE:NONE

DAY PEAK LEQ AT 50 FT FROM CL WITHOUT BARRIER: 70.39376831054688

NITE PEAK LEQ AT 50 FT FROM CL WITHOUT BARRIER: 72.15377044677734

**CANAL RELOCATION/CONSTRUCTION – HAUL TRUCKS**

RUN NAME: HAUL TRUCKS      RUN DATE: 22 AUGUST 2007

TRAFFIC DISTRIBUTION PERCENTAGES

DAY	EVENING	NIGHT
---	-----	-----
AUTOS		
1.00	1.00	1.00
M-TRUCKS		
1.00	1.00	1.00
H-TRUCKS		
92.00	1.00	1.00

ADT: 97    DAY PEAK: 5.820000171661377    NITE PEAK: 8.730000970000001

SPEED: 35    ACTIVE HALF WIDTH (FT): 6

SITE CHARACTERISTICS: SOFT    GRADE (PERCENT): .5

BARRIER TYPE:NONE

DAY PEAK LEQ AT 50 FT FROM CL WITHOUT BARRIER: 58.18282318115234

NITE PEAK LEQ AT 50 FT FROM CL WITHOUT BARRIER: 59.94282150268555