APPENDIX D

Noise Modeling Results

Predicted Levee Noise Levels

Appendix D
SAFCA Levee 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	44.5	60.2

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

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

Cumulative:	L_{eq} **dBA @ 100 feet**	
	Mitigated	Unmitigated
	63.6	79.3

Sources:
Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 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*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 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, Syntesis 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_{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

Assumptions:

	Reference Noise Levels (L_{max}) @50 feet Mitigated	Unmitigated	Usage Factor
Excavator	80	85	0.4
Loader	75	79	0.4
Haul Truck	84	91	0.4

H_{eff} = 10
G = 0.57

Calculations:	L_{eq} dBA @ 100 feet Mitigated	Unmitigated
Excavator	68.3	73.3
Loader	63.3	67.3
Haul Truck	72.3	79.3

Cumulative:	L_{eq} dBA @ 100 feet Mitigated	Unmitigated
	72.3	79.3

Sources:
Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 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_{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
Cutoff Wall Construction
NLIP

		Resulting Cumulative Noise Level (Leq dBA)	
	Distance to Nearest Receiver in feet	**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

Assumptions:

	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

Calculations:	**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

Cumulative:	**L_{eq} dBA @ 100 feet**	
	Mitigated	Unmitigated
	72.3	79.3

Sources:
Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 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_{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	45.0	52.0

Assumptions:

	Reference Noise Levels (L_{max}) @50 feet Mitigated	Unmitigated	Usage Factor
Excavators	80	85	0.4
Loader	75	79	0.4
Haul Truck	84	91	0.4

Heff = 10
G = 0.57

Calculations:	L_{eq} dBA @ 100 feet Mitigated	Unmitigated
Excavators	68.3	73.3
Loader	63.3	67.3
Haul Truck	72.3	79.3

Cumulative:	L_{eq} dBA @ 100 feet Mitigated	Unmitigated
	72.3	79.3

Sources:
Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 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.
$\mathbf{H_{eff}}$ = 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 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

Assumptions:

	Reference Noise Levels (L_{max}) @50 feet Mitigated	Unmitigated	Usage Factor
Roller	74	80	0.5
Haul Truck	75	91	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
Roller	63.3	69.3
Haul Truck	63.3	79.3
Water Truck	63.3	79.3
Dozer	63.3	68.3

Cumulative:	L_{eq} dBA @ 100 feet Mitigated	Unmitigated
	63.8	79.6

Sources:
Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 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_{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
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

Assumptions:

	Reference Noise Levels (L_{max}) @50 feet		
	Mitigated	Unmitigated	Usage Factor
Backhoe	75	85	0.4
Paver	80	89	0.5
Haul Truck	84	91	0.4
Compactor	80	85	0.2
Concrete Truck	85	90	0.4

Heff = 10
G = 0.57

Calculations:

	L_{eq} dBA @ 100 feet	
	Mitigated	Unmitigated
Backhoe	63.3	73.3
Paver	69.3	78.3
Haul Truck	72.3	79.3
Compactor	65.3	70.3
Concrete Truck	73.3	78.3

Cumulative:

L_{eq} dBA @ 100 feet	
Mitigated	Unmitigated
73.3	79.4

Sources:
Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 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.
$\mathbf{H_{eff}}$ = 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
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	50.0

Assumptions:

	Reference Noise Levels (L_{max}) @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

Heff = 10
G = 0.57

Calculations:	L_{eq} **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_{eq} **dBA @ 100 feet**	
	Mitigated	Unmitigated
	73.3	78.3

Sources:
Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 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.
$\mathbf{H_{eff}}$ = 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
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	58.9

Assumptions:

	Reference Noise Levels (L_{max}) @50 feet Mitigated	Unmitigated	Usage Factor
Water Truck	75	84	0.4
Haul Truck	75	91	0.4
Hydroseed Truck	80	88	0.4

Heff = 10
G = 0.57

Calculations:	L_{eq} 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_{eq} dBA @ 100 feet Mitigated	Unmitigated
	68.3	79.3

Sources:
Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 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.
$\mathbf{H_{eff}}$ = 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

	Action	Mitigated	Unmitigated	Distance to Noise Contours in feet 50 dBA Contour	45 dBA Contour
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

		Resulting Cumulative Noise Level (Leq dBA)	
	Distance to Nearest Receiver in feet	**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	44.5	60.2

Assumptions:

	Reference Noise Levels (L_{max}) @50 feet		
	Mitigated	Unmitigated	Usage Factor
Dozer	75	85	0.4
Loader	75	79	0.4
Water Truck	75	91	0.4

H_{eff} = 10
G = 0.57

Calculations:	L_{eq} **dBA @ 100 feet**	
	Mitigated	Unmitigated
Dozer	63.3	73.3
Loader	63.3	67.3
Water Truck	63.3	79.3

Cumulative:	L_{eq} **dBA @ 100 feet**	
	Mitigated	Unmitigated
	63.6	79.3

Sources:
Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 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_{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
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

Assumptions:

	Reference Noise Levels (L_{max}) @50 feet Mitigated	Unmitigated	Usage Factor
Crane	75	83	0.16
Loader	75	79	0.4
Pile Driver	95	101	0.04
Generator	75	78	1

H_{eff} = 10
G = 0.57

Calculations:	L_{eq} dBA @ 100 feet Mitigated	Unmitigated
Crane	59.3	67.3
Loader	63.3	67.3
Pile Driver	73.3	79.3
Generator	67.3	70.3

Cumulative:	L_{eq} dBA @ 100 feet Mitigated	Unmitigated
	73.3	79.3

Sources:
Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 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_{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
Excavation
NLIP

		Resulting Cumulative Noise Level (Leq dBA)	
	Distance to Nearest Receiver in feet	**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_{max}) @50 feet		
	Mitigated	Unmitigated	Usage Factor
Excavator	80	85	0.4
Loader	75	79	0.4

Heff = 10
G = 0.57

Calculations:

	L_{eq} dBA @ 100 feet	
	Mitigated	Unmitigated
Excavator	68.3	73.3
Loader	63.3	67.3

Cumulative:

	L_{eq} dBA @ 100 feet	
	Mitigated	Unmitigated
	63.3	67.3

Sources:
Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 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.
$\mathbf{H_{eff}}$ = 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
Foundation Construction
NLIP

		Resulting Cumulative Noise Level (Leq dBA)	
	Distance to Nearest Receiver in feet	**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

Assumptions:

	Reference Noise Levels (L_{max}) @50 feet		
	Mitigated	Unmitigated	Usage Factor
Generator	78	75	1
Loader	75	79	0.4
Pile Driver	95	101	0.04
Crane	75	83	0.16

Heff = 10
G = 0.57

Calculations:	L_{eq} dBA @ 100 feet	
	Mitigated	Unmitigated
Generator	70.3	67.3
Loader	63.3	67.3
Pile Driver	73.3	79.3
Crane	59.3	67.3

Cumulative:	L_{eq} dBA @ 100 feet	
	Mitigated	Unmitigated
	73.3	79.3

Sources:
Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 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.
$\mathbf{H_{eff}}$ = 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
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

Assumptions:

	Reference Noise Levels (L_{max}) @50 feet Mitigated	Unmitigated	Usage Factor
Boom Truck	80	85	0.4
Generator	75	78	1
Concrete Pump	75	82	0.4

Heff = 10
G = 0.57

Calculations:	L_{eq} dBA @ 100 feet Mitigated	Unmitigated
Boom Truck	68.3	73.3
Generator	67.3	70.3
Concrete Pump	63.3	70.3

Cumulative:	L_{eq} dBA @ 100 feet Mitigated	Unmitigated
	67.3	70.6

Sources:
Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 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.
$\mathbf{H_{eff}}$ = 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
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

Assumptions:

	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
			Heff = 10

Calculations:

	L_{eq} dBA @ 100 feet	
	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

Cumulative:

	L_{eq} dBA @ 100 feet	
	Mitigated	Unmitigated
	65.3	79.3

G = 0.57

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 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.

$\mathbf{H_{eff}}$ = 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	44.9	58.9

Assumptions:

	Reference Noise Levels (L_{max}) @50 feet		
	Mitigated	Unmitigated	Usage Factor
Loader	75	85	0.4
Dozer	74	80	0.4
Water Truck	75	91	0.4
Compactor	80	85	0.2
Grader	75	85	0.08

Heff = 10
G = 0.57

Calculations:

	L_{eq} dBA @ 100 feet	
	Mitigated	Unmitigated
Loader	63.3	73.3
Dozer	62.3	68.3
Water Truck	63.3	79.3
Compactor	65.3	70.3
Grader	56.3	66.3

Cumulative:

	L_{eq} dBA @ 100 feet	
	Mitigated	Unmitigated
	65.3	79.3

Sources:
Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 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.
$\mathbf{H_{eff}}$ = 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

		Resulting Cumulative Noise Level (Leq dBA)	
	Distance to Nearest Receiver in feet	**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	38.9	46.9

Assumptions:

	Reference Noise Levels (L_{max}) @50 feet		
	Mitigated	Unmitigated	Usage Factor
Crane	75	83	0.16

Heff = 10
G = 0.57

Calculations:

	L_{eq} dBA @ 100 feet	
	Mitigated	Unmitigated
Crane	59.3	67.3

Cumulative:

L_{eq} dBA @ 100 feet	
Mitigated	Unmitigated
59.3	67.3

Sources:
Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 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.
$\mathbf{H_{eff}}$ = 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
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

Assumptions:

	Reference Noise Levels (L_{max}) @50 feet		
	Mitigated	Unmitigated	Usage Factor
Hydroseed Truck	80	88	0.4
Water Truck	75	84	0.4

Heff = 10
G = 0.57

Calculations:

	L_{eq} dBA @ 100 feet	
	Mitigated	Unmitigated
Hydroseed Truck	68.3	76.3
Water Truck	63.3	72.3

Cumulative:

	L_{eq} dBA @ 100 feet	
	Mitigated	Unmitigated
	63.3	72.3

Sources:
Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 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.
$\mathbf{H_{eff}}$ = 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
Demobilization and Clean Up
NLIP

		Resulting Cumulative Noise Level (Leq dBA)	
	Distance to Nearest Receiver in feet	**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_{max}) @50 feet		
	Mitigated	Unmitigated	Usage Factor
Trucks	75	91	0.4
Loader	75	79	0.4

Heff = 10
G = 0.57

Calculations:

	L_{eq} dBA @ 100 feet	
	Mitigated	Unmitigated
Trucks	63.3	79.3
Loader	63.3	67.3

Cumulative:

L_{eq} dBA @ 100 feet	
Mitigated	Unmitigated
63.3	67.3

Sources:
Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 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.
$\mathbf{H_{eff}}$ = 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

				Distance to Noise Contours in feet	
	Action	**Mitigated**	**Unmitigated**	**50 dBA Contour**	**45 dBA Contour**
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

Construction Site	Amount of Extraction Material (cubic yards)	Truck Loads	One-Way Truck Trips	# of Haul Days	Hauling Hours per Day	Trips/Day	Trips/Hour	Day Peak Leq (dBA) 50 ft. from c.l.
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