

Appendix F Noise Measurements, Modeling Results, and Barrier Analysis

The noise analysis methods and criteria applied are discussed in Sections 2.4.1.1 and 2.4.1.2. Noise measurements and modeling were conducted at noise-sensitive land use locations that could be affected by the project (Appendix A, Figures A-1 through A-13). Table F-1 lists the noise modeling results for Phases 1 and 2. Table F-2 lists the results for Phases 3 through 5. These tables identify the locations that exceed the noise abatement threshold criteria that require evaluation of noise barriers (see criteria described in Section 2.4.1.2).

The future predicted noise levels at each of the evaluation locations are shown in Table F-3 for Phases 1 and 2, and in Table F-4 for Phases 3 through 5. The results of the evaluation of potential barriers considered, based on noise-reduction effectiveness, number of homes effectively protected, and a brief summary of whether the barrier identified and evaluated is reasonable from a present cost and effectiveness consideration are listed in Table 2.4-2 in the main text of this report for Phases 1 and 2, and in Table 2.4-3 for Phases 3 through 5.

TABLE F-1

Noise Modeling Results - Phases 1 and 2

Location	Description	Development Predates 1978? (Yes or No)	Existing Worst Hour Noise Level Leq(hr)	Future No Project Worst Hour Noise Level Leq(hr)	Future Project Worst Hour Noise Level Leq(hr)	Noise Increase (+) or Decrease (-)	Impact Type (S, A/E, CR or NONE)
West Leg	EB Route 4 w/o I-680	(Receivers South of EB State Route 4; Station 89+00 to 112+00) (Figures A-1 to A-3)					
W-S-1	Rear yard of 1295 Paradise Cir.	Yes	64	64	65	1	NONE
W-S-2	Front yard of 1320 Paradise Cir.	Yes	62	62	64	1	NONE
W-S-3	Rear yard of 1391 Paradise Cir.	Yes	68	69	70	2	A/E
W-S-4	Front of 1404 Myrtlewood Ct.	Yes	60	60	61	1	NONE
W-S-5	Front of 2161 Elderwood Dr. ~ 16 m. from the centerline of Muir Rd. and 39 m. from the edge of Route 4 fill section.	Yes	67	68	68	1	A/E
W-S-LT	Rear yard of 1541 Deerwood Dr. ~ 24 m. from the edge of Route 4 fill section. (Offset Measurement)	Yes	69	69	71	2	A/E
W-S-6	~ 13 m. from the center of the near lane of Muir Rd. at Fountainhead Dr.	Yes	64	65	65	1	NONE
W-S-7	Rear yard of 2205 Highcliff Ct.	No	61	61	62	1	NONE
W-S-8	Rear yard of 2127 North Peak Place.	No	66	66	67	2	A/E
W-S-9	Rear yard of 1134 Temple Dr.	Yes	60	61	60	-1	NONE
W-S-10	Front of 1121 Temple Dr.	Yes	63	63	60	-3	NONE
W-S-M1	Rear yard of single-family residence on Paradise Cir. east of W-S-1.	Yes	68	68	69	1	A/E
W-S-M2	Rear yard of single-family residence on Deerwood Dr. east of W-S-LT.	Yes	69	70	71	1	A/E
W-S-M3	Rear yard of single-family residence on Deerwood Dr. east of W-S-LT and south of W-S-M2.	Yes	66	66	67	1	A/E
W-S-M4	Second row receiver on Deerwood Dr. south of W-S-LT.	Yes	60	60	62	1	NONE
W-S-M5	Second row receiver, multi-family residence south of W-S-6.	Yes	58	58	59	1	NONE
W-S-M6	Rear yard of single-family residence, west of Sweetwater Dr. and adjacent to Muir Rd.	No	62	62	63	1	NONE
W-S-M7	Second row receiver, single-family residence west of Sweetwater Dr.	No	57	57	58	1	NONE
W-S-M8	Second row receiver, single-family residence east of Sweetwater Dr.	No	54	54	55	1	NONE
W-S-M9	Second row receiver, single-family residence on North Peak Pl.	No	61	61	62	1	NONE
W-S-M10	Second row receiver, rear yard of single family residence at the end of North Peak Pl.	No	63	63	64	1	NONE
W-S-M11	Third row receiver, rear yard of single family residence at the end of East View Pl.	No	59	59	60	1	NONE
W-S-M12	Rear yard of single-family residence, west of W-S-8 and adjacent to Muir Rd.	No	65	65	66	2	A/E

Impact Type S = Substantial Increase (12 dBA or more)
A/E = Approach or Exceed NAC
CR = Class Room Noise (Sec 216 of Streets & Hwys Code)

TABLE F-1

Noise Modeling Results - Phases 1 and 2

Location	Description	Development Predates 1978? (Yes or No)	Existing Worst Hour Noise Level Leq(hr)	Future No Project Worst Hour Noise Level Leq(hr)	Future Project Worst Hour Noise Level Leq(hr)	Noise Increase (+) or Decrease (-)	Impact Type (S, A/E, CR or NONE)
West Leg	WB Route 4 w/o I-680	(Receivers North of WB State Route 4; Station 89+00 to 112+00) (Figures A-1 to A-3)					
W-N-LT	Rear yard of 104 Morning Glory Ln.	No	68	68	69	1	A/E
W-N-1	Front of 106 Williamson Ct.	No	62	62	63	1	NONE
W-N-2	1785 Arnold Dr. ~15 m. from the centerline of the near lane of Arnold Dr.	Yes	69	70	70	1	A/E
W-N-3	Holiday Hills north of Arnold Drive ~ 63 m. from edge of Arnold Dr.	No	64	65	66	1	A/E
W-N-4	Holiday Hills north of Arnold Drive ~ 38 m. from edge of Arnold Dr.	No	68	68	69	1	A/E
W-N-5	Rear yard of residence at Arnold-Glacier intersection.	Yes	64	64	65	1	NONE
W-N-6	Rear yard of 2006 Fries Ct.	No	61	62	63	2	NONE
W-N-7	Rear yard of 2040 Arnold Dr.	No	61	61	62	2	NONE
W-N-M1	Multi-family residence (Eastgate Apartments) on Arnold Drive west of W-N-LT.	No	61	61	62	1	NONE
W-N-M2	Second row receiver, single family residence in Williamson Ct.	No	62	62	63	1	NONE
W-N-M3	Single family residence on Holiday Hills Dr.	No	63	63	64	1	NONE
W-N-M4	Multi-family residence in Shadowbrook development west of W-N-1.	No	59	59	60	1	NONE
W-N-M5	Single family residence on Fig Tree Lane.	Yes	65	66	66	1	A/E
W-N-M6	Multi-family residence in Shadowbrook development near common outdoor use area.	No	64	64	65	1	NONE
W-N-M7	Rear yard of single family residence in Williamson Ct.	No	68	68	69	1	NONE
W-N-M8	Eastgate Apartments unshielded area near patios.	No	64	64	65	1	NONE
N-W-M6	Multi-family residences, between Hanson Ct. and Blum Rd.	Yes	67	68	69	2	A/E
N-W-M7	Single family residence, on Blum Rd.	Yes	68	69	70	2	A/E

Impact Type S = Substantial Increase (12 dBA or more)
A/E = Approach or Exceed NAC
CR = Class Room Noise (Sec 216 of Streets & Hwys Code)

TABLE F-1

Noise Modeling Results - Phases 1 and 2

Location	Description	Development Predates 1978? (Yes or No)	Existing Worst Hour Noise Level Leq(hr)	Future No Project Worst Hour Noise Level Leq(hr)	Future Project Worst Hour Noise Level Leq(hr)	Noise Increase (+) or Decrease (-)	Impact Type (S, A/E, CR or NONE)
South Leg	NB I-680	(I-680 between Concord Avenue and Interchange; Station 101+00 to 113+00) (Figures A-10 and A-11)					
S-E-LT1	West of 360 Avenida Flores in Rancho Diablo Mobile Home Park. ~ 188 m. from Rt. 4 and ~ 216 m. from I-680.	Yes	60	63	65	6	NONE
S-E-1	351 Flores in Rancho Diablo Mobile Home Park.	Yes	60	62	61	2	NONE
S-E-2	Near 265 Minoru Dr. in Concord Cascade Mobile Home Park.	Yes	70	71	73	4	A/E
S-E-3	~ 34 m. from the edge of NB I-680 at mobile home property line.	Yes	72	73	74	2	A/E
S-E-LT2	~ 16 m. from a 4.9 m. barrier near mobile homes.	Yes	67	68	78	12	A/E, S²
S-E-4	159 Algiers Lane in Concord Cascade Mobile Home Park.	Yes	62	63	77	15	A/E, S²
S-E-5	155 Algiers Lane in Concord Cascade Mobile Home Park.	Yes	64	65	74	11	A/E
S-E-M1	Back yard of single family home on Minoru Dr. (west side of street) north of S-E-2.	Yes	68	69	71	3	A/E
S-E-M2	Back yard of single family home on Minoru Dr. (west side of street) south of S-E-3.	Yes	68	69	79	10	A/E
S-E-M3	Second Row Receiver, single family home on the corner of Minoru Dr. and Amate Way.	Yes	65	66	74	10	A/E
S-E-M4	Single family home on Calle Molino north of S-E-4.	Yes	62	63	77	15	A/E, S²
S-E-M5	Single family residence on Medina Dr. (middle section of road) south of S-E-4.	Yes	63	64	77	14	A/E, S²
S-E-M6	Single family residence on Medina Dr. (southernmost corner of road) south of S-E-4.	Yes	63	64	72	9	A/E
S-E-M7	Second row receiver, front yard of single family residence on Medina Dr. south east of S-E-4.	Yes	66	67	76	10	A/E
S-E-M8	Single family home on Minoru Dr. east of S-E-M1.	Yes	59	60	67	8	A/E
S-E-M9	Single family home on Minoru Dr. south of S-E-M1.	Yes	59	60	68	9	A/E

2 A noise impact would result as noise levels would approach or exceed the NAC and would substantially increase (12 dBA or more) at land uses represented by these receivers.

Impact Type S = Substantial Increase (12 dBA or more)
 A/E = Approach or Exceed NAC
 CR = Class Room Noise (Sec 216 of Streets & Hwys Code)

TABLE F-2

Noise Modeling Results - Phases 3, 4, and 5

Location	Description	Development Predates 1978? (Yes or No)	Existing Worst Hour Noise Level Leq(hr)	Future No Project Worst Hour Noise Level Leq(hr)	Future Project Worst Hour Noise Level Leq(hr)	Noise Increase (+) or Decrease (-)	Impact Type (S, A/E, CR or NONE)
East Leg EB Route 4 e/o I-680 (State Route 4 Station 118+00 to 122+00) (Figure 2-4)							
E-S-1	Corner of Avenida Flores and Via Peralta in Rancho Diablo Mobile Home Park.	Yes	64	65	67	3	A/E
E-S-2	Front of 317 Avenida Flores ~ 87 m. from the centerline of the near lane of Route 4 in Rancho Diablo Mobile Home Park.	Yes	67	68	69	2	A/E
E-S-3	319 La Vina in Rancho Diablo Mobile Home Park.	Yes	65	65	68	3	A/E
E-S-4	Northeast corner of the Rancho Diablo Mobile Home Park at the intersection of Avenida Flores and Via Peralta.	Yes	69	70	72	3	A/E
E-S-M1	Mobile home on Avenida Flores west of E-S-2.	Yes	67	67	70	3	A/E
E-S-M2	Second Row Receiver, Mobile home on Via Peratta south of E-S-3.	Yes	63	64	66	3	A/E

East Leg EB Route 4 e/o I-680 (State Route 4 Station 136+00 to 146+00) (Figures 2-6 and 2-7)							
E-S-5	2364 Dalis Drive ~ 8 m. from a 1.5 m. barrier.	No	64	64	66	2	A/E
E-S-6	South of 2364 Dalis Drive.	No	67	67	69	2	A/E
E-S-6A	2323 Dalis Drive.	No	62	62	64	2	NONE
E-S-6B	2289 Dalis Drive.	No	59	59	61	2	NONE
E-S-M3	Back yard of Mobile home on Dalis Dr. east of E-S-5.	No	64	65	66	2	A/E
E-S-M4	Rear yard of Mobile home on Dalis Dr. southeast of E-S-5.	No	61	62	63	2	NONE
E-S-7	99 A Street south of commercial area.	Yes	62	63	65	3	NONE
E-S-LT1	~38 m. from the edge of the EB Rt. 4 to SB Rt. 242 connector ramp at setback of adjacent condominiums. (Offset measurement)	Yes	68	69	71	2	A/E
E-S-8	Northeast portion of condominium development near EB Rt. 4 to SB Rt. 242 connector ramp.	Yes	67	68	69	2	A/E
E-S-8A	~22 m. from the edge of the EB Rt. 4 to SB Rt. 242 connector ramp at setback of adjacent condominiums (#3815).	Yes	69	70	72	2	A/E
E-S-M5	Single family residence at the north end of Northwood Dr.	Yes	68	68	70	2	A/E
E-S-M6	Single family residence west of Northwood Dr, next to off ramp of eastbound 4 to southbound 242.	Yes	69	70	70	2	A/E

Impact Type S = Substantial Increase (12 dBA or more)
A/E = Approach or Exceed NAC
CR = Class Room Noise (Sec 216 of Streets & Hwys Code)

TABLE F-2

Noise Modeling Results - Phases 3, 4, and 5

Location	Description	Development Predates 1978? (Yes or No)	Existing Worst Hour Noise Level Leq(hr)	Future No	Future Project	Noise Increase (+) or Decrease (-)	Impact Type (S, A/E, CR or NONE)
				Project Worst Hour Noise Level Leq(hr)	Worst Hour Noise Level Leq(hr)		
East Leg	EB Route 4 e/o Route 242	(State Route 4 Station 148+00 to 156+00) (Figure 2-8)					
E-S-9	Front of 3638 Montreal Circle.	Yes	62	63	64	2	NONE
E-S-10	Rear yard of 3669 Montreal Circle.	Yes	59	60	61	2	NONE
E-S-11	Rear yard of 3726 Salsbury ~ 5 m. south of the ROW chain-link fence.	Yes	67	--	--	--	A/E
E-S-12	Rear yard of 3744 Salsbury.	Yes	68	--	--	--	A/E
E-S-M7	Rear yard of single family residence on western side of Montreal Cir. Southwest of E-S-9.	Yes	64	65	65	2	NONE
E-S-M8	Rear yard of single family residence on western side of Montreal Cir. west of E-S-9.	Yes	64	64	65	1	NONE
E-S-M9	Rear yard of 3726 Salsbury.	Yes	63	--	--	--	NONE
E-S-M10	Second Row Receiver on Salsbury Dr.	Yes	62	--	--	--	NONE
E-S-M11	Rear yard of single family residence on St. George Ct.	Yes	66	--	--	--	A/E
E-S-13	Front of 3799 Bayview Dr.	Yes	63	--	--	--	NONE
E-S-14	Rear yard of 3802 Bayview Dr. ~ 70 m. from the centerline of the near travel lane.	Yes	72	--	--	--	A/E
E-S-15	Rear yard of 3820 Bayview Circle ~ 60 m. south of centerline of near EB Rt. 4 travel lane.	Yes	75	--	--	--	A/E ¹
E-S-LT2	Rear yard of 3820 Bayview Circle ~ 60 m. south of centerline of near EB Rt. 4 travel lane.	Yes	77	--	--	--	A/E ¹
E-S-16	Rear yard of 3874 Bayview Circle ~ 53 m. south of centerline of near EB Rt. 4 travel lane.	Yes	75	--	--	--	A/E ¹
E-S-17	Front of 3891 Bayview Dr.	Yes	62	--	--	--	NONE
E-S-18	Front of 3951 Bayview Dr.	Yes	61	--	--	--	NONE
E-S-19	Front of 3933 Bayview Dr.	Yes	61	--	--	--	NONE
E-S-20	Park on Bayview Street overlooking Rt. 4 ~ 1.5 m. from chain-link fence.	Yes	68	--	--	--	A/E

1 The noise impact would be considered severe at noise-sensitive land uses represented by these receivers.

Impact Type S = Substantial Increase (12 dBA or more)
 A/E = Approach or Exceed NAC
 CR = Class Room Noise (Sec 216 of Streets & Hwys Code)

TABLE F-2

Noise Modeling Results - Phases 3, 4, and 5

Location	Description	Development Predates 1978? (Yes or No)	Existing Worst Hour Noise Level Leq(hr)	Future No Project Worst Hour Noise Level Leq(hr)	Future Project Worst Hour Noise Level Leq(hr)	Noise Increase (+) or Decrease (-)	Impact Type (S, A/E, CR or NONE)
N-E-1	Side yard of 55 Rutherford ~ 17 m. from the right-of-way fence.	Yes	70	71	71	1	A/E
N-E-LT	Rear yard of 48 Rutherford Ln. ~ 20 m. from the edge of the near NB I-680 travel lane.	Yes	68	69	69	1	A/E
N-E-2	Front of 45 Rutherford ~ 83 m. from the centerline of the near NB travel lane.	Yes	67	68	69	2	A/E
N-E-3	Front of 5A Rutherford.	Yes	66	67	68	2	A/E
N-E-4	~ 31 m. from the centerline of the near NB I-680 travel lane in apartment complex.	No	68	69	71	3	A/E
N-E-M1	Back yard of single family home (private driveway) off of Rutherford Dr. north of N-E-1.	Yes	65	66	66	1	A/E
N-E-M2	Second row receiver, side yard of single family residence, east of N-E-1.	Yes	66	67	67	1	A/E
N-E-M3	Front yard of single family residence, at north end of Meyers Dr., north of N-E-4.	Yes	70	71	72	3	A/E

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TABLE F-2

Noise Modeling Results - Phases 3, 4, and 5

Location	Description	Development Predates 1978? (Yes or No)	Existing Worst Hour Noise Level Leq(hr)	Future No Project Worst Hour Noise Level Leq(hr)	Future Project Worst Hour Noise Level Leq(hr)	Noise Increase (+) or Decrease (-)	Impact Type (S, A/E, CR or NONE)
North Leg	SB I-680	(Receivers West of SB I-680; Station 118+00 to 129+00) (Figures 2-12 and 2-13)					
N-W-1	Setback of 4685 Pacheco Blvd. ~ 72 m. from the centerline of the near SB I-680 travel lane.	Yes	63	64	63	1	NONE
N-W-2	Setback of 4685 Pacheco Blvd. ~ 35 m. from the centerline of the near SB I-680 travel lane.	Yes	69	69	69	1	A/E
N-W-3	~ 77 m. from the centerline of the near I-680 SB travel lane.	Yes	65	66	66	1	A/E
N-W-4	Rear yard of 4795 Pacheco Blvd. ~ 102 m. from the centerline of the near I-680 SB travel lane.	No	64	65	65	1	NONE
N-W-M1	Single family residence between 680 and Pacheco Blvd. south of N-W-2.	Yes	71	72	71	1	A/E
N-W-M1A	Single family residence between 680 and Pacheco Blvd. north of N-W-1.	Yes	70	71	70	0	A/E
N-W-M2	Second row receiver, single family residence between 680 and Pacheco Blvd. north of N-W-3.	No	67	68	68	1	A/E
N-W-M3	Single family residence between 680 and Pacheco Blvd.	Yes	67	68	67	1	A/E
N-W-M4	Single family residence, between Hanson Ct. and Blum Rd.	Yes	68	69	70	2	A/E
N-W-M5	Single family residence, on Blum Rd.	Yes	68	69	70	2	A/E
N-W-M6	Multi-family residences, between Hanson Ct. and Blum Rd.	Yes	67	68	69	2	A/E
N-W-M7	Single family residence, on Blum Rd.	Yes	68	69	70	2	A/E
N-W-M8	Second row receiver, Multi family residences on Hanson Ct. (Lower level)	Yes	67	68	69	2	A/E
N-W-M9	Second row receiver, Multi family residences on Hanson Ct. (Upper level.)	Yes	68	69	69	1	A/E
N-W-LT	Rear yard of 4710 Blum. ~ 38 m. from the edge of I-680 SB.	Yes	69	70	71	2	A/E
N-W-5	Front of # 160 Hanson Ct. ~ 100 m. from the edge of I-680 SB.	Yes	67	68	69	2	A/E

Impact Type S = Substantial Increase (12 dBA or more)
A/E = Approach or Exceed NAC
CR = Class Room Noise (Sec 216 of Streets & Hwys Code)

TABLE F-3

Phase 1 and 2 Predicted Noise Levels and Reduction with Barriers in Place

Location	Future Worst Hour Noise Leq (hr)	Noise Barrier ID or Location	Future Noise Levels (dBA) with Barrier in Place							Noise Level Reduction (dBA) Achieved by Barrier					
			1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier	1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier	
			South Leg	NB I-680 s/o SR 4											
SW1A - NB680 EOS SW + NB680-WB4 CONNECTOR EOS SW															
S-E-LT1	65	SW1 A	65	64	64	63	62	--	0	1	1	2	3	--	
S-E-1	61	SW1 A	60	60	60	59	58	--	1	1	1	2	3	--	
S-E-2	73	SW1 A	73	72	72	72	72	--	0	1	1	1	1	--	
S-E-3	74	SW1 A	72	71	71	70	70	--	2	2	3	3	4	--	
S-E-LT2	78	SW1 A	74	72	71	69	68	--	4	6	8	9	11	--	
S-E-4	77	SW1 A	74	72	71	69	68	--	3	5	6	8	9	--	
S-E-5	74	SW1 A	72	71	70	68	67	--	2	3	4	6	7	--	
S-E-M1	71	SW1 A	71	70	70	70	70	--	0	0	0	1	1	--	
S-E-M2	79	SW1 A	74	71	70	68	67	--	5	7	9	11	12	--	
S-E-M3	74	SW1 A	73	72	71	69	68	--	2	3	4	5	7	--	
S-E-M4	77	SW1 A	73	72	70	69	68	--	4	5	7	8	10	--	
S-E-M5	77	SW1 A	74	72	71	69	68	--	3	5	6	8	9	--	
S-E-M6	72	SW1 A	70	70	68	67	66	--	2	3	4	5	6	--	
S-E-M7	76	SW1 A	72	71	69	68	67	--	4	5	7	8	9	--	
S-E-M8	67	SW1 A	67	67	67	67	67	--	0	0	1	1	1	--	
S-E-M9	68	SW1 A	68	68	67	67	67	--	0	1	1	1	2	--	
SW1B - Option 1 - NB680 EOS SW (4.2m) + NB680-WB4 CONNECTOR EOS SW (4.2m) + MAINLINE EOS SW (Varies)															
S-E-2	74	SW1 B O1	72	71	69	68	67	--	2	3	5	6	6	--	
S-E-3	74	SW1 B O1	73	71	70	69	68	--	1	2	4	5	6	--	
S-E-M1	71	SW1 B O1	69	68	66	65	65	--	2	3	4	5	6	--	
S-E-M8	67	SW1 B O1	67	67	67	66	65	--	0	0	1	1	2	--	
S-E-M9	68	SW1 B O1	68	68	68	67	67	--	0	0	1	1	2	--	
SW1B - Option 2 - NB680 EOS SW (4.2m) + NB680-WB4 CONNECTOR EOS SW (4.2m) + ROW SW (Varies)															
S-E-2	74	SW1 B O2	70	68	66	65	64	64	3	5	7	8	9	10	
S-E-3	74	SW1 B O2	68	66	65	65	64	64	5	7	9	9	9	10	
S-E-M1	71	SW1 B O2	68	67	65	64	63	62	2	4	6	7	8	8	
S-E-M8	67	SW1 B O2	67	66	66	65	64	64	1	1	1	2	3	4	
S-E-M9	68	SW1 B O2	67	66	66	66	65	64	2	2	2	3	3	4	

Notes: Noise barriers should not exceed 4.3 m in height when located 4.5 m or less from the edge of the traveled way, and should not exceed 5.0 m in height above the ground line when located more than 4.5 from the traveled way.
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TABLE F-3

Phase 1 and 2 Predicted Noise Levels and Reduction with Barriers in Place

Location	Future Worst Hour Noise Leq (hr)	Noise Barrier ID or Location	Future Noise Levels (dBA) with Barrier in Place						Noise Level Reduction (dBA) Achieved by Barrier					
			1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier	1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier
			West Leg EB Route 4											
W-S-1	65	SW5	64	64	63	63	62	--	1	1	2	2	3	--
W-S-2	64	SW5	63	62	61	60	59	--	1	2	3	4	4	--
W-S-3	70	SW5	69	68	67	66	65	--	1	2	3	4	5	--
W-S-4	61	SW5	61	60	59	58	57	--	1	1	2	3	4	--
W-S-5	68	SW5	68	68	67	67	67	66	1	1	1	2	2	2
W-S-LT	71	SW5	69	68	66	65	64	64	2	3	4	5	6	7
W-S-6	65	EB 4 EOS	65	65	65	65	65	--	0	0	0	0	0	--
W-S-7	62	EB 4 EOS	62	62	62	62	62	--	0	0	0	0	0	--
W-S-8	67	EB 4 EOS	67	66	65	64	64	--	0	1	2	3	4	--
W-S-9	60	EB 4 EOS	58	58	57	57	57	--	2	2	2	3	3	--
W-S-10	60	EB 4 EOS	59	59	59	59	59	--	1	1	1	2	2	--
W-S-M1	69	SW5	67	66	65	64	63	--	2	3	4	5	6	--
W-S-M2	71	SW5	71	70	69	68	66	66	0	0	2	3	4	5
W-S-M3	67	SW5	67	67	66	65	64	63	0	0	1	2	3	4
W-S-M4	62	SW5	61	60	59	58	57	57	1	1	2	3	4	5
W-S-M5	59	EB 4 EOS	59	59	59	59	59	--	0	0	0	0	0	--
W-S-M6	63	EB 4 EOS	63	63	63	63	63	--	0	0	0	0	0	--
W-S-M7	58	EB 4 EOS	58	58	58	58	58	--	0	0	0	0	0	--
W-S-M8	55	EB 4 EOS	55	55	55	55	55	--	0	0	0	0	0	--
W-S-M9	62	EB 4 EOS	61	60	60	59	58	--	1	2	2	3	4	--
W-S-M10	64	EB 4 EOS	63	63	62	61	61	--	1	2	2	3	3	--
W-S-M11	60	EB 4 EOS	60	59	59	59	59	--	0	1	1	1	2	--
W-S-M12	66	EB 4 EOS	66	66	66	65	64	--	0	0	1	1	2	--
West Leg WB Route 4														
W-N-LT	69	SW6	67	66	65	65	64	--	2	3	3	4	5	--
W-N-1	63	SW6	62	62	60	59	59	--	1	1	2	3	4	--
W-N-2	70	SW6	70	69	69	68	67	--	0	1	2	2	3	--
W-N-3	66	WB 4 EOS	65	65	64	63	62	--	0	1	1	2	3	--
W-N-4	69	WB 4 EOS	68	67	67	66	65	--	1	2	2	3	4	--
W-N-5	65	--	65	65	65	65	65	--	0	0	0	0	0	--
W-N-6	63	--	63	63	63	63	63	--	0	0	0	0	0	--
W-N-7	62	--	62	62	62	62	62	--	0	0	0	0	0	--
W-N-M1	62	SW6					61	--	--	--	--	--	1	--
W-N-M2	63	SW6	63	62	61	60	59	--	0	1	2	3	4	--
W-N-M3	64	WB 4 EOS	64	64	63	62	61	--	0	1	1	2	3	--
W-N-M4	60	SW6	--	--	--	--	60	--	--	--	--	--	0	--
W-N-M5	66	SW6	--	--	--	--	63	--	--	--	--	--	3	--
W-N-M6	65	SW6	--	--	--	--	61	--	--	--	--	--	4	--
W-N-M7	69	SW6	--	--	--	--	64	--	--	--	--	--	5	--
W-N-M8	65	SW6	--	--	--	--	62	--	--	--	--	--	3	--

Notes: Noise barriers should not exceed 4.3 m in height when located 4.5 m or less from the edge of the traveled way, and should not exceed 5.0 m in height above the ground line when located more than 4.5 from the traveled way.

TABLE F-4

Noise Modeling Results with Barriers in Place (Phases 3, 4, and 5)

Location	Project Worst Hour Leq (hr)	Noise Barrier ID or Location	Predicted Noise Levels (dBA)						Noise Increase in dBA					
			1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier	1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier
North Leg SB I-680 n/o SR 4														
N-W-M3	67	SW2	67	67	67	67	67	--	0	0	0	0	0	--
N-W-M5	70	SW2	66	64	63	62	61	--	4	6	7	8	9	--
N-W-M6	69	SW2	66	64	63	62	61	--	3	5	6	7	8	--
N-W-M7	70	SW2	66	65	64	63	61	--	3	5	6	7	8	--
N-W-LT	71	SW2	67	66	65	64	62	--	4	6	7	8	9	--
N-W-5	69	SW2	66	65	64	63	61	--	3	4	5	6	8	--
North Leg NB I-680 n/o SR 4														
N-E-1	71	SW3	69	68	66	65	64	--	2	3	4	6	7	--
N-E-LT	69	SW3	68	66	64	63	62	--	1	3	5	6	7	--
N-E-2	69	SW3	67	66	65	63	62	--	2	3	4	6	7	--
N-E-3	68	SW3	66	65	63	62	61	--	2	3	5	6	7	--
N-E-4	71	SW3	66	65	64	63	62	--	5	6	7	8	9	--
N-E-M1	66	SW3	66	65	65	65	64	--	0	0	1	1	2	--
N-E-M2	67	SW3	66	66	65	64	63	--	1	1	2	3	4	--
N-E-M3	72	SW3	68	66	65	64	63	--	5	7	8	9	10	--
North Leg SB I-680 n/o SR 4														
N-W-3	66	SW4 A	64	63	61	60	59	--	2	3	4	6	7	--
N-W-4	65	SW4 A	63	62	61	59	58	--	1	3	4	5	6	--
N-W-M1	71	SW4 A	70	69	68	67	66	--	1	2	3	4	5	--
N-W-M2	68	SW4 A	67	66	65	63	62	--	1	2	3	5	6	--
N-W-M1A	70	SW4 B	68	66	65	64	63	--	3	4	6	7	8	--
N-W-1	63	SW4 B	63	63	62	62	61	--	0	1	1	2	2	--
N-W-2	69	SW4 B	67	66	65	64	63	--	2	3	4	6	6	--

Notes: Noise barriers should not exceed 4.3 m in height when located 4.5 m or less from the edge of the traveled way, and should not exceed 5.0 m in height above the ground line when located more than 4.5 from the traveled way.

TABLE F-4

Noise Modeling Results with Barriers in Place (Phases 3, 4, and 5)

Location	Project Worst Hour Leq (hr)	Noise Barrier ID or Location	Predicted Noise Levels (dBA)							Noise Increase in dBA					
			1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier	1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier	
East Leg EB Route 4 e/o I-680															
SW7 - Option 1 - SB680-EB4 CONNECTOR EOS SW															
E-S-1	67	SW7 O1	66	65	65	65	64	--	1	1	2	2	3	--	
E-S-2	69	SW7 O1	67	67	66	66	66	--	1	2	3	3	3	--	
E-S-3	68	SW7 O1	67	66	65	64	63	--	1	2	3	4	4	--	
E-S-4	72	SW7 O1	69	68	67	66	64	--	3	4	5	6	7	--	
E-S-M1	70	SW7 O1	67	67	66	65	64	--	2	3	4	5	6	--	
E-S-M2	66	SW7 O1	65	65	64	63	63	--	1	2	2	3	4	--	
SW7 - Option 2 - EB4 MAINLINE EOS SW + SB680-EB4 CONNECTOR EOS SW															
E-S-1	67	SW7 O2	--	--	--	--	63	--	--	--	--	--	4	--	
E-S-2	69	SW7 O2	--	--	--	--	64	--	--	--	--	--	5	--	
E-S-3	68	SW7 O2	--	--	--	63	63	--	--	--	--	5	5	--	
E-S-4	72	SW7 O2	--	--	66	65	64	--	--	--	6	7	8	--	
E-S-M1	70	SW7 O2	--	--	--	65	64	--	--	--	--	5	6	--	
E-S-M2	66	SW7 O2	--	--	--	--	62	--	--	--	--	--	4	--	
SW7 - Option 3 - ROW SW															
E-S-1	67	SW7 O3	67	67	66	65	64	--	0	0	0	1	2	3	
E-S-2	69	SW7 O3	68	67	65	63	62	--	0	1	2	4	6	7	
E-S-3	68	SW7 O3	68	68	67	67	66	--	0	0	0	1	1	2	
E-S-4	72	SW7 O3	70	69	69	68	67	--	2	2	3	4	5	5	
E-S-M1	70	SW7 O3	69	68	67	65	64	--	0	0	1	3	4	6	
E-S-M2	66	SW7 O3	66	66	66	66	65	--	0	0	0	0	1	1	
East Leg EB Route 4 e/o I-680															
E-S-5	66	SW8	65	64	62	61	60	--	1	2	3	5	6	--	
E-S-6	69	SW8	66	66	65	64	63	--	2	3	4	5	5	--	
E-S-6A	64	SW8	63	62	61	60	59	--	1	1	3	4	5	--	
E-S-6B	61	SW8	60	60	59	58	58	--	0	1	1	2	3	--	
E-S-M3	66	SW8	65	64	63	61	60	--	1	2	3	5	6	--	
E-S-M4	63	SW8	63	62	61	60	59	--	1	1	2	3	4	--	
E-S-7	65	--	65	65	65	65	65	--	0	0	0	0	0	--	
East Leg EB Route 4 e/o I-680															
E-S-LT1	71	SW9	69	68	67	66	65	--	1	2	3	5	6	--	
E-S-8	69	SW9	69	68	68	66	65	--	0	1	2	3	4	--	
E-S-8A	72	SW9	71	70	69	67	66	--	1	2	3	4	6	--	
E-S-M5	70	SW9	69	69	68	68	67	--	1	1	2	2	3	--	
E-S-M6	70	SW9	70	69	68	67	66	--	1	1	3	4	5	--	

Notes: Noise barriers should not exceed 4.3 m in height when located 4.5 m or less from the edge of the traveled way, and should not exceed 5.0 m in height above the ground line when located more than 4.5 from the traveled way.

TABLE F-4

Noise Modeling Results with Barriers in Place (Phases 3, 4, and 5)

Location	Project Worst Hour Leq (hr)	Noise Barrier ID or Location	Predicted Noise Levels (dBA)							Noise Increase in dBA					
			1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier	1.8 m Barrier	2.4 m Barrier	3.0 m Barrier	3.6 m Barrier	4.2 m Barrier	4.8 m Barrier	
East Leg	EB Route 4 e/o Route 242														
E-S-9	--	SW10 ?	--	--	--	--	--	--	--	--	--	--	--	--	--
E-S-10	--	SW10 ?	--	--	--	--	--	--	--	--	--	--	--	--	--
E-S-11	--	SW10 ?	--	--	--	--	--	--	--	--	--	--	--	--	--
E-S-12	--	SW10 ?	--	--	--	--	--	--	--	--	--	--	--	--	--
E-S-M7	--	SW10 ?	--	--	--	--	--	--	--	--	--	--	--	--	--
E-S-M8	--	SW10 ?	--	--	--	--	--	--	--	--	--	--	--	--	--
E-S-M9	--	SW10 ?	--	--	--	--	--	--	--	--	--	--	--	--	--
E-S-M10	--	SW10 ?	--	--	--	--	--	--	--	--	--	--	--	--	--
E-S-M11	--	SW10 ?	--	--	--	--	--	--	--	--	--	--	--	--	--
E-S-13	--	SW10 ?	--	--	--	--	--	--	--	--	--	--	--	--	--
E-S-14	--	SW10 ?	--	--	--	--	--	--	--	--	--	--	--	--	--
E-S-15	--	SW10 ?	--	--	--	--	--	--	--	--	--	--	--	--	--
E-S2-LT	--	SW10 ?	--	--	--	--	--	--	--	--	--	--	--	--	--
E-S-16	--	SW10 ?	--	--	--	--	--	--	--	--	--	--	--	--	--
E-S-17	--	SW10 ?	--	--	--	--	--	--	--	--	--	--	--	--	--
E-S-18	--	SW10 ?	--	--	--	--	--	--	--	--	--	--	--	--	--
E-S-19	--	SW10 ?	--	--	--	--	--	--	--	--	--	--	--	--	--
E-S-20	--	SW10 ?	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes: Noise barriers should not exceed 4.3 m in height when located 4.5 m or less from the edge of the traveled way, and should not exceed 5.0 m in height above the ground line when located more than 4.5 from the traveled way.