

Table 3-30
Noise Reductions, Modifications, and Cost/Dwelling Sq.Ft.,
One-Story House: Type J

Room	Building Element	Modification by Noise Zone			
		60 - 65 dB	66 - 70 dB	71 - 75 dB	76 - 80 dB
Living Room	NR BEFORE	17.9	17.9	17.9	17.9
	Door 1 Window 1 Window 2 * Wall 1 Wall 2 * Roof 1 Floor 1 NR AFTER	HC+WS+ST 8P+STC25 8P+STorm 22.8	HC+WS+ST RSTC40 RSTC35 24.9	RSTC35 RSTC45 RSTC40 WDGY+2GY 30.2	RSTC40 RSTC45 RSTC45 WDGY+MGA WDGY+MGA VP+Ab+GY 35.7
Dining Room	NR BEFORE	20.3	20.3	20.3	20.3
	Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1 NR AFTER	 20.3	RSTC35 RSTC35 25.5	RSTC40 RSTC45 WDGY+MGA 30.3	RSTC45 RSTC45 WDGY+RGA WDGY+MGA VP+Ab+GY 35.2
Kitchen	NR BEFORE	15.8	15.8	15.8	15.8
	Door 1 Window 1 Wall 1 Roof 1 Floor 1 NR AFTER	HC+WS+ST 8P+STC25 20.7	RSTC35 RSTC45 24.5	RSTC40 RSTC45 24.7	RSTC40 RSTC45 VP+Ab+GY 25.0
Bedroom #1	NR BEFORE	22.2	22.2	22.2	22.2
	Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1 NR AFTER	 22.2	RSTC35 RSTC40 26.9	RSTC40 RSTC45 WDGY+RGA 30.2	RSTC40 RSTC45 WDGY+2GY WDGY+MGA VP+Ab+GY 34.9
Bedroom #2	NR BEFORE	22.2	22.2	22.2	22.2
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER	 22.2	RSTC40 27.4	RSTC45 WDGY+GYp 29.8	RSTC45 WDGY+MGA VP+Ab+GY 37.0
Library/Den	NR BEFORE	18.5	18.5	18.5	18.5
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER	RSTC40 23.4	RSTC35 WDGY+GYp 26.7	RSTC45 WDGY+RGA 29.9	RSTC45 WDGY+MGA VP+Ab+GY 34.7
Cost Per Dwelling Sq.Ft.	C/D. Sq.Ft.	\$3.34	\$9.13	\$13.40	\$18.06

* 5 dB shielding assumed.

Table 3-31
 Noise Reductions, Modifications, and Cost/Dwelling Sq.Ft.,
 One-Story House: Type K

Room	Building Element	Modifications by Noise Zone			
		60-65 dB	66-70 dB	71-75 dB	76-80 dB
Living Room	NR BEFORE	19.6	19.6	19.6	19.6
	Door 1 Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1 NR AFTER		SG+WS+SG 8P+STC25 8P+STC25	SG+WS+SG RSTC45 RSTC40 WDGY+2GY	SG+WS+SG RSTC45 RSTC45 WDGY+MGA WDGY+MGA VP+Ab+GY
Dining Room	NR BEFORE	20.3	20.3	20.3	20.3
	Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1 NR AFTER		RSTC35 RSTC35	RSTC40 RSTC45 WDGY+MGA	RSTC45 RSTC45 WDGY+MGA WDGY+MGA VP+Ab+GY
Kitchen	NR BEFORE	18.1	18.1	18.1	18.1
	Door 1 Window 1 Wall 1 Roof 1 Floor 1 NR AFTER	SC+SE+ST RSTC40	RSTC35 RSTC45	RSTC40 RSTC45	RSTC40 RSTC45 VP+Ab+GY
Bedroom #1	NR BEFORE	22.3	22.3	22.3	22.3
	Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1 NR AFTER		RSTC40 RSTC45	RSTC35 RSTC45 WDGY+RGA	RSTC35 RSTC40 WDGY+MG WDGY+MGA VP+Ab+GY
Bedroom #2	NR BEFORE	22.2	22.2	22.2	22.2
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER		RSTC35	RSTC45 WDGY+GYp	RSTC40 WDGY+MG VP+Ab+GY
Library/Den	NR BEFORE	18.5	18.5	18.5	18.5
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER	8P+STC25 WDGY+2GY	RSTC45 WDGY+GYp	RSTC45 WDGY+RGA	RSTC45 WDGY+MGA VP+Ab+GY
Cost Per Dwelling Sq.Ft.	C/D. Sq.Ft.	\$2.96	\$8.97	\$13.30	\$17.79

* 5 dB shielding assumed.

Table 3-32
Noise Reductions, Modifications, and Cost/Dwelling Sq.Ft.,
One-Story House: Type L

Room	Building Element	Modifications by Noise Zone			
		60 - 65 dB	66 - 70 dB	71 - 75 dB	76 - 80 dB
Living Room	NR BEFORE	16.2	16.2	16.2	16.2
	Door 1	SG+WStrp	SG+WS+SG	SG+WS+SG	SG+WS+SG
	Window 1	RSTC35	RSTC45	RSTC45	RSTC45
	Window 2 *	RSTC30	RSTC35	RSTC45	RSTC45
	Wall 1		WDGY+GYp	WDGY+MGA	WDGY+MGA
	Wall 2 *			WDGY+RGA	WDGY+MGA
	Roof 1	ELt+GYp	ELt+GYp	EL+Ab+GY	EL+SpC B
Floor 1					
NR AFTER		23.2	25.8	29.9	33.6
Dining Room	NR BEFORE	16.5	16.5	16.5	16.5
	Window 1 *	RSTC30	RSTC35	RSTC40	RSTC45
	Window 2	RSTC30	RSTC45	RSTC45	RSTC45
	Wall 1 *			WDGY+2GY	WDGY+MGA
	Wall 2		WDGY+GYp	WDGY+MGA	WDGY+MGA
	Roof 1	ELt+GYp	ELt+GYp	EL+Ab+GY	EL+SpC B
	Floor 1				
NR AFTER		22.5	25.3	30.5	36.0
Kitchen	NR BEFORE	15.7	15.7	15.7	15.7
	Door 1	SC+WStrp	RSTC40	RSTC40	RSTC40
	Window 1	RSTC40	RSTC45	RSTC45	RSTC45
	Wall 1				
	Roof 1	ELt+GYp	ELt+GYp	EL+Ab+GY	EL+SpC B
	Floor 1				
NR AFTER		20.4	23.4	24.3	25.0
Bedroom #1	NR BEFORE	17.9	17.9	17.9	17.9
	Window 1 *	RSTC30	RSTC30	RSTC40	RSTC40
	Window 2	RSTC35	RSTC45	RSTC45	RSTC45
	Wall 1 *			WDGY+GYp	WDGY+MG
	Wall 2		WDGY+GYp	WDGY+MGA	WDGY+MGA
	Roof 1	ELt+GYp	ELt+GYp	EL+Ab+GY	EL+SpC B
	Floor 1				
NR AFTER		24.2	25.2	30.2	35.6
Bedroom #2	NR BEFORE	17.8	17.8	17.8	17.8
	Window 1	RSTC30	RSTC45	RSTC45	RSTC45
	Wall 1		WDGY+GYp	WDGY+MGA	WDGY+MG
	Roof 1	ELt+GYp	ELt+GYp	EL+Ab+GY	EL+SpC B
	Floor 1				
NR AFTER		23.6	26.4	31.5	35.1
Library/Den	NR BEFORE	15.2	15.2	15.2	15.2
	Window 1	RSTC30	RSTC45	RSTC45	RSTC45
	Wall 1		WDGY+2GY	WDGY+MG	WDGY+MGA
	Roof 1	ELt+GYp	ELt+GYp	EL+Ab+GY	EL+SpC B
	Floor 1				
NR AFTER		20.6	25.7	29.5	34.6
Cost Per Dwelling Sq.Ft.	C/D. Sq.Ft.	\$7.39	\$10.27	\$18.15	\$22.77

* 5 dB shielding assumed.

Table 3-33
Noise Reductions, Modifications, and Cost/Dwelling Sq.Ft.,
One-Story House: Type M

Room	Building Element	Modifications by Noise Zone			
		60-65 dB	66-70 dB	71-75 dB	76-80 dB
Living Room	NR BEFORE Door 1 Window 1 Window 2 * Wall 1 Wall 2 * Roof 1 Floor 1	19.5	19.5 RSTC35 RSTC40	19.5 RSTC35 RSTC45 RSTC40 WDGY+2GY	19.5 RSTC40 RSTC45 RSTC45 WDGY+MGA WDGY+MG VP+Absrp
	NR AFTER	19.5	25.0	30.4	35.2
Dining Room	NR BEFORE Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1	20.3	20.3 RSTC35 RSTC35	20.3 RSTC40 RSTC45 WDGY+MGA	20.3 RSTC45 RSTC45 WDGY+RGA WDGY+MGA VP+Absrp
	NR AFTER	20.3	25.6	30.5	35.0
Kitchen	NR BEFORE Door 1 Window 1 Wall 1 Roof 1 Floor 1	18.1 RSTC35 8P+STC25	18.1 RSTC40 RSTC40	18.1 RSTC40 RSTC45	18.1 RSTC40 RSTC45 VP+Absrp
	NR AFTER	23.0	24.7	24.8	25.0
Bedroom #1	NR BEFORE Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1	22.3	22.3 RSTC35 RSTC40	22.3 RSTC35 RSTC45 WDGY+RGA	22.3 RSTC40 RSTC45 WDGY+MG WDGY+MGA VP+Absrp
	NR AFTER	22.3	27.0	30.1	35.6
Bedroom #2	NR BEFORE Window 1 Wall 1 Roof 1 Floor 1	22.2	22.2 RSTC35	22.2 RSTC45 WDGY+GYp	22.2 RSTC45 WDGY+MGA VP+Absrp
	NR AFTER	22.2	26.8	30.0	36.7
Library/Den	NR BEFORE Window 1 Wall 1 Roof 1 Floor 1	18.5 RSTC40	18.5 RSTC35 WDGY+GYp	18.5 RSTC45 WDGY+RGA	18.5 RSTC45 WDGY+MGA VP+Absrp
	NR AFTER	23.5	24.9	30.1	35.4
Cost Per Dwelling Sq.Ft.	C/D. Sq.Ft.	\$0.72	\$8.02	\$13.24	\$17.00

* 5 dB shielding assumed.

Table 3-34
 Noise Reductions, Modifications, and Cost/Dwelling Sq.Ft.,
 One-Story House: Type N

Room	Building Element	Modifications by Noise Zone			
		60 - 65 dB	66 - 70 dB	71 - 75 dB	76 - 80 dB
Living Room	NR BEFORE	20.6	20.6	20.6	20.6
	Door 1 Window 1 Window 2 * Wall 1 Wall 2 * Roof 1 Floor 1 NR AFTER		SC+SEald RSTC35 RSTC35 SJA+A+RG	RSTC35 RSTC40 RSTC35 WDGY+GYp WDGY+GYp SJA+A+RG	RSTC40 RSTC45 RSTC45 WDGY+MG WDGY+MG SJA+A+RG
Dining Room	NR BEFORE	21.9	21.9	21.9	21.9
	Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1 NR AFTER		RSTC40 RSTC40 SJA+A+RG	RSTC40 RSTC40 WDGY+GYp WDGY+GYp SJA+A+RG	RSTC45 RSTC45 WDGY+MGA WDGY+MG SJA+A+RG
Kitchen	NR BEFORE	18.6	18.6	18.6	18.6
	Door 1 Window 1 Wall 1 Roof 1 Floor 1 NR AFTER		RSTC40 RSTC45 SJA+A+RG	RSTC40 RSTC45 SJA+A+RG	RSTC40 RSTC45 SJA+A+RG
Bedroom #1	NR BEFORE	23.3	23.3	23.3	23.3
	Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1 NR AFTER		RSTC40 RSTC35 WDGY+GYp SJA+A+RG	RSTC40 RSTC40 WDGY+GYp WDGY+GYp SJA+A+RG	RSTC45 RSTC45 WDGY+MG WDGY+MG SJA+A+RG
Bedroom #2	NR BEFORE	23.4	23.4	23.4	23.4
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER		RSTC40 WDGY+GYp SJA+A+RG	RSTC40 WDGY+GYp SJA+A+RG	RSTC40 WDGY+MGA SJA+A+RG
Library/Den	NR BEFORE	20.0	20.0	20.0	20.0
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER		RSTC35 WDGY+GYp SJA+A+RG	RSTC40 WDGY+RGA SJA+A+RG	RSTC45 WDGY+MGA SJA+A+RG
Cost Per Dwelling Sq.Ft.	C/D. Sq.Ft.	\$0.00	\$12.01	\$15.45	\$18.34

* 5 dB shielding assumed.

Table 3-35
Noise Reductions, Modifications, and Cost/Dwelling Sq.Ft.,
One-Story House: Type O

Room	Building Element	Modifications by Noise Zone			
		60 - 65 dB	66 - 70 dB	71 - 75 dB	76 - 80 dB
Living Room	NR BEFORE	20.6	20.6	20.6	20.6
	Door 1 Window 1 Window 2 * Wall 1 Wall 2 * Roof 1 Floor 1 NR AFTER		SC+SE+ST RSTC45 RSTC35 SJM+GYp	RSTC35 RSTC45 RSTC40 WDGY+MGA WDGY+GYp SJM+GYp	RSTC40 RSTC45 RSTC45 WDGY+MGA WDGY+MGA SJM+A+RG FB+A+STd
Dining Room	NR BEFORE	21.9	21.9	21.9	21.9
	Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1 NR AFTER		RSTC40 RSTC45 WDGY+2GY SJM+GYp	RSTC40 RSTC45 WDGY+GYp WDGY+MGA SJM+GYp	RSTC45 RSTC45 WDGY+MGA WDGY+MGA SJM+A+RG FB+A+STd
Kitchen	NR BEFORE	18.6	18.6	18.6	18.6
	Door 1 Window 1 Wall 1 Roof 1 Floor 1 NR AFTER	RSTC35 RSTC45	RSTC40 RSTC45 SJM+GYp	RSTC40 RSTC45 SJM+GYp	RSTC40 RSTC45 SJM+A+RG FB+A+STd
Bedroom #1	NR BEFORE	23.3	23.3	23.3	23.3
	Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1 NR AFTER		RSTC45 RSTC45 WDGY+GYp WDGY+GYp SJM+GYp	RSTC35 RSTC45 WDGY+GYp WDGY+MGA SJM+GYp	RSTC45 RSTC45 WDGY+MG WDGY+MGA SJM+A+RG FB+A+STd
Bedroom #2	NR BEFORE	23.3	23.3	23.3	23.3
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER		RSTC45 WDGY+2GY SJM+GYp	RSTC45 WDGY+2GY SJM+GYp	RSTC45 WDGY+MGA SJM+A+RG FB+A+STd
Library/Den	NR BEFORE	20.0	20.0	20.0	20.0
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER		RSTC40 WDGY+GYp SJM+GYp	RSTC45 WDGY+MGA SJM+GYp	RSTC45 WDGY+MGA SJM+A+RG FB+A+STd
Cost Per Dwelling Sq.Ft.	C/D. Sq.Ft.	\$1.10	\$13.45	\$16.28	\$20.34

* 5 dB shielding assumed.

Table 3-36
Noise Reductions, Modifications, and Cost/Dwelling Sq.Ft.,
One-Story House: Type P

Room	Building Element	Modifications by Noise Zone			
		60 - 65 dB	66 - 70 dB	71 - 75 dB	76 - 80 dB
Living Room	NR BEFORE	18.4	18.4	18.4	18.4
	Door 1	SC+SE+ST	RSTC35	RSTC40	RSTC40
	Window 1	8G+STC25	RSTC35	RSTC45	RSTC45
	Window 2 *	8G+STC25	WDGY+GYp	RSTC40	RSTC45
	Wall 1				WDGY+MG
	Wall 2 *				WDGY+MG
	Roof 1	EL+Ab+GY	EL+Ab+GY	EL+Ab+GY	EL+Spc B
Floor 1					
NR AFTER		24.8	26.0	29.6	34.8
DiningRoom	NR BEFORE	19.4	19.4	19.4	19.4
	Window 1 *	8G+STC25	RSTC35	RSTC45	RSTC45
	Window 2	8G+STC25	RSTC35	RSTC45	RSTC40
	Wall 1 *		WDGY+GYp	WDGY+RGA	WDGY+MGA
	Wall 2			WDGY+2GY	WDGY+MGA
	Roof 1	EL+Ab+GY	EL+Ab+GY	EL+Ab+GY	EL+Spc B
	Floor 1				
NR AFTER		24.4	26.1	29.7	35.5
Kitchen	NR BEFORE	17.2	17.2	17.2	17.2
	Door 1	SC+SE+ST	RSTC40	RSTC40	RSTC40
	Window 1	8G+STC25	RSTC45	RSTC45	RSTC45
	Wall 1				
	Roof 1	EL+Ab+GY	EL+Ab+GY	EL+Ab+GY	EL+Spc B
	Floor 1				
NR AFTER		22.3	24.3	24.3	25.0
Bedroom #1	NR BEFORE	19.9	19.9	19.9	19.9
	Window 1 *	8G+STC25	RSTC35	RSTC45	RSTC45
	Window 2	8G+STC25	RSTC35	RSTC45	RSTC45
	Wall 1 *			WDGY+RGA	WDGY+MG
	Wall 2			WDGY+2GY	WDGY+MG
	Roof 1	EL+Ab+GY	EL+Ab+GY	EL+Ab+GY	EL+Spc B
	Floor 1				
NR AFTER		25.4	26.3	29.8	34.7
Bedroom #2	NR BEFORE	20.0	20.0	20.0	20.0
	Window 1	8G+STC25	RSTC35	RSTC45	RSTC45
	Wall 1			WDGY+RGA	WDGY+MG
	Roof 1	EL+Ab+GY	EL+Ab+GY	EL+Ab+GY	EL+Spc B
	Floor 1				
NR AFTER		25.6	26.6	30.5	35.0
Library/Den	NR BEFORE	18.1	18.1	18.1	18.1
	Window 1	8G+STC25	RSTC35	RSTC45	RSTC45
	Wall 1		WDGY+GYp	WDGY+MGA	WDGY+MGA
	Roof 1	EL+Ab+GY	EL+Ab+GY	EL+Ab+GY	EL+Spc B
	Floor 1				
NR AFTER		22.1	25.3	30.9	35.2
Cost Per Dwelling Sq.Ft.	C/D. Sq.Ft.	\$6.74	\$11.34	\$18.04	\$22.80

* 5 dB shielding assumed.

Table 3-37
Noise Reductions, Modifications, and Cost/Dwelling Sq.Ft.,
One-Story House: Type Q

Room	Building Element	Modifications by Noise Zone			
		60-65 dB	66-70 dB	71-75 dB	76-80 dB
Living Room	NR BEFORE	19.3	19.3	19.3	19.3
	Door 1 Window 1 Window 2 * Wall 1 Wall 2 * Roof 1 Floor 1 NR AFTER		SG+WStrp RSTC35 RSTC35 SJA+A+RG	SG+WS+SG RSTC40 RSTC40 WDGY+GYp WDGY+GYp SJA+A+RG	SG+WS+SG RSTC45 RSTC45 WDGY+MGA WDGY+MGA SJA+A+RG
Dining Room	NR BEFORE	20.0	20.0	20.0	20.0
	Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1 NR AFTER		RSTC35 RSTC35 SJA+A+RG	RSTC45 RSTC40 WDGY+2GY WDGY+GYp SJA+A+RG	RSTC45 RSTC45 WDGY+MGA WDGY+MGA SJA+A+RG
Kitchen	NR BEFORE	17.9	17.9	17.9	17.9
	Door 1 Window 1 Wall 1 Roof 1 Floor 1 NR AFTER	RSTC40 8P+STC25	RSTC40 RSTC45 SJA+A+RG	RSTC40 RSTC45 SJA+A+RG	RSTC40 RSTC45 SJA+A+RG
Bedroom #1	NR BEFORE	21.7	21.7	21.7	21.7
	Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1 NR AFTER		RSTC35 RSTC35 SJA+A+RG	RSTC45 RSTC40 WDGY+2GY WDGY+GYp SJA+A+RG	RSTC45 RSTC45 WDGY+MGA WDGY+MGA SJA+A+RG
Bedroom #2	NR BEFORE	21.7	21.7	21.7	21.7
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER		RSTC35 SJA+A+RG	RSTC40 WDGY+GYp SJA+A+RG	RSTC40 WDGY+MGA SJA+A+RG
Library/Den	NR BEFORE	18.3	18.3	18.3	18.3
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER	8P+STC25 WDGY+2GY	RSTC35 WDGY+GYp SJA+A+RG	RSTC45 WDGY+RGA SJA+A+RG	RSTC45 WDGY+MGA SJA+A+RG
Cost Per Dwelling Sq.Ft.	C/D. Sq.Ft.	\$3.08	\$7.63	\$16.50	\$18.37

* 5 dB shielding assumed.

Table 3-38
Noise Reductions, Modifications, and Cost/Dwelling Sq.Ft.,
One-Story House: Type R

Room	Building Element	Modifications by Noise Zone			
		60 - 65 dB	66 - 70 dB	71 - 75 dB	76 - 80 dB
Living Room	NR BEFORE	19.9	19.9	19.9	19.9
	Door 1 Window 1 Window 2 * Wall 1 Wall 2 * Roof 1 Floor 1 NR AFTER		SC+SEald RSTC40	RSTC35 RSTC40 RSTC35 VP+Absrp	RSTC40 RSTC45 RSTC40 HBLK+MGA HBLK+GYp VP+Absrp
Dining Room	NR BEFORE	21.2	21.2	21.2	21.2
	Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1 NR AFTER		8P+STC25 8P+STC25	RSTC35 RSTC35 VP+Absrp	RSTC45 RSTC45 HBLK+GYp HBLK+RGA VP+Absrp
Kitchen	NR BEFORE	18.9	18.9	18.9	18.9
	Door 1 Window 1 Wall 1 Roof 1 Floor 1 NR AFTER	SC+SE+ST 8P+STC25	SC+SE+ST 8P+STC25	RSTC35 RSTC40 VP+Absrp	RSTC40 RSTC45 VP+Absrp
Bedroom #1	NR BEFORE	23.5	23.5	23.5	23.5
	Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1 NR AFTER		8P+STC25 8P+STC25	RSTC35 RSTC35 VP+Absrp	RSTC35 RSTC45 HBLK+GYp HBLK+2GY VP+Absrp
Bedroom #2	NR BEFORE	23.2	23.2	23.2	23.2
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER		8P+STC25 HBLK+RGA	RSTC35 VP+Absrp	RSTC40 HBLK+2GY VP+Absrp
Library/Den	NR BEFORE	19.8	19.8	19.8	19.8
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER		8P+STC25	RSTC40 VP+Absrp	RSTC45 HBLK+2GY VP+Absrp
Cost Per Dwelling Sq.Ft.	C/D. Sq.Ft.	\$0.38	\$4.66	\$8.94	\$15.51

* 5 dB shielding assumed.

Table 3-39
Noise Reductions, Modifications, and Cost/Dwelling Sq.Ft.,
One-Story House: Type S

Room	Building Element	Modifications by Noise Zone			
		60 - 65 dB	66 - 70 dB	71 - 75 dB	76 - 80 dB
Living Room	NR BEFORE	21.5	21.5	21.5	21.5
	Door 1 Window 1 Window 2 * Wall 1 Wall 2 * Roof 1 Floor 1 NR AFTER		SC+SE+ST 8G+STC25 8G+STC25 BRIK+GYp BRIK+GYp	SC+SE+ST RSTC40 RSTC35	RSTC40 RSTC40 RSTC40 BRIK+2GY BRIK+2GY VP+Absrp
Dining Room	NR BEFORE	24.1	24.1	24.1	24.1
	Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1 NR AFTER			RSTC35 RSTC35	RSTC40 RSTC40 BRIK+2GY BRIK+GYp VP+Absrp
Kitchen	NR BEFORE	19.9	19.9	19.9	19.9
	Door 1 Window 1 Wall 1 Roof 1 Floor 1 NR AFTER		SC+SE+ST 8G+STorm	RSTC35 RSTC35	RSTC40 RSTC45 VP+Absrp
Bedroom #1	NR BEFORE	26.2	26.2	26.2	26.2
	Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1 NR AFTER			RSTC35 RSTC35	RSTC35 RSTC35 BRIK+GYp BRIK+GYp VP+Absrp
Bedroom #2	NR BEFORE	26.0	26.0	26.0	26.0
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER			RSTC35	RSTC35 BRIK+GYp VP+Absrp
Library/Den	NR BEFORE	22.7	22.7	22.7	22.7
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER		8G+STC25 BRIK+GYp	RSTC35	RSTC40 BRIK+GYp VP+Absrp
Cost Per Dwelling Sq.Ft.	C/D. Sq.Ft.	\$0.00	\$4.37	\$7.33	\$14.08

* 5 dB shielding assumed.

Table 3-40
Noise Reductions, Modifications, and Cost/Dwelling Sq.Ft.,
One-Story House: Type T

Room	Building Element	Modifications by Noise Zone			
		60 - 65 dB	66 - 70 dB	71 - 75 dB	76 - 80 dB
Living Room	NR BEFORE	21.1	21.1	21.1	21.1
	Door 1 Window 1 Window 2 * Wall 1 Wall 2 * Roof 1 Floor 1 NR AFTER		RSTC35 8G+STC25 8G+STC25	RSTC35 RSTC35 RSTC35 SJA+A+RG	RSTC40 RSTC45 RSTC45 BRIK+2GY BRIK+2GY SJA+A+RG
Dining Room	NR BEFORE	23.3	23.3	23.3	23.3
	Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1 NR AFTER		8G+STC25 8G+STC25 BRIK+RGA BRIK+RGA	RSTC35 RSTC35 SJA+A+RG	RSTC40 RSTC40 BRIK+2GY BRIK+GYp SJA+A+RG
Kitchen	NR BEFORE	19.6	19.6	19.6	19.6
	Door 1 Window 1 Wall 1 Roof 1 Floor 1 NR AFTER		SC+SE+ST 8G+STC25	SC+SE+ST RSTC40 SJA+A+RG	RSTC40 RSTC45 SJA+A+RG
Bedroom #1	NR BEFORE	25.0	25.0	25.0	25.0
	Window 1 * Window 2 Wall 1 * Wall 2 Roof 1 Floor 1 NR AFTER			RSTC35 RSTC35 SJA+A+RG	RSTC40 RSTC40 BRIK+2GY BRIK+GYp SJA+A+RG
Bedroom #2	NR BEFORE	24.9	24.9	24.9	24.9
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER			RSTC35 SJA+A+RG	RSTC40 BRIK+GYp SJA+A+RG
Library/Den	NR BEFORE	22.1	22.1	22.1	22.1
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER		8G+STC25 BRIK+MGA	RSTC35 SJA+A+RG	RSTC40 BRIK+GYp SJA+A+RG
Cost Per Dwelling Sq.Ft.	C/D. Sq.Ft.	\$0.00	\$6.33	\$9.32	\$16.33

* 5 dB shielding assumed.

Table 3-41
 Noise Reductions, Modifications, and Cost/Dwelling Sq.Ft.,
 Manufactured Home: Type U

Room	Building Element	Modifications by Noise Zone			
		MH L65	MH L70	MH L75	MH L80
Living Room	NR BEFORE	18.3	18.3	18.3	18.3
	Door 1	HC+WS+ST	HC+WS+ST	HC+WS+ST	HC+WS+ST
	Window 1	8G+STC25	RSTC35	RSTC45	RSTC45
	Window 2 *	8G+STC25	RSTC35	RSTC45	RSTC45
	Wall 1		WDGY+2GY	WDGY+2GY	WDGY+2GY
	Wall 2 *		WDGY+2GY	WDGY+2GY	WDGY+2GY
	Roof 1		VP+Absrp	VP+Absrp	VP+Absrp
	Floor 1			FV+Baf+A	FV+Baf+A
NR AFTER	23.2	25.3	25.7	25.8	
Kitchen	NR BEFORE	23.3	23.3	23.3	23.3
	Window 1		RSTC45	RSTC45	RSTC45
	Window 2 *		RSTC45	RSTC45	RSTC45
	Wall 1				
	Wall 2 *				
	Roof 1		VP+Absrp	VP+Absrp	VP+Absrp
Floor 1			FV+Baf+A	FV+Baf+A	
NR AFTER	23.3	27.4	27.7	27.7	
Bedroom #1	NR BEFORE	19.8	19.8	19.8	19.8
	Door 1		HC+WS+ST	HC+WS+ST	HC+WS+ST
	Window 1		RSTC35	RSTC45	RSTC45
	Window 2		RSTC35	RSTC45	RSTC45
	Wall 1		WDGY+GYp	WDGY+2GY	WDGY+2GY
	Wall 2		WDGY+GYp	WDGY+2GY	WDGY+2GY
	Wall 3 *			WDGY+2GY	WDGY+2GY
	Roof 1		VP+Absrp	VP+Absrp	VP+Absrp
Floor 1			FV+Baf+A	FV+Baf+A	
NR AFTER	19.8	25.4	27.8	27.8	
Bedroom #2	NR BEFORE	21.7	21.7	21.7	21.7
	Window 1		RSTC35	RSTC45	RSTC45
	Window 2		RSTC35	RSTC45	RSTC45
	Wall 1		WDGY+GYp	WDGY+2GY	WDGY+2GY
	Wall 2			WDGY+2GY	WDGY+2GY
	Wall 3 *			WDGY+2GY	WDGY+2GY
	Roof 1		VP+Absrp	VP+Absrp	VP+Absrp
	Floor 1			FV+Baf+A	FV+Baf+A
NR AFTER	21.7	25.4	30.4	30.4	
Cost Per Dwelling Sq.Ft.	C/D. Sq.Ft.	\$1.38	\$11.11	\$18.79	\$18.79

* 5 dB shielding assumed.

Table 3-42
Noise Reduction, Modifications, and Cost/Dwelling Sq.Ft.,
Two-Story Townhouse: Type V

Room	Building Element	Modifications by Noise Zone			
		60 - 65 dB	66 - 70 dB	71 - 75 dB	76 - 80 dB
Living Room	NR BEFORE Door 1 * Window 1 * Wall 1 * Roof 1 Floor 1	25.5	25.5	25.5 SC+SE+MT RSTC35	25.5 RSTC40 RSTC45 WDGY+RGA
	NR AFTER	25.5	25.5	30.2	35.8
Dining Room	NR BEFORE Window 1 Wall 1 Roof 1 Floor 1	24.4	24.4	24.4 RSTC40 WDGY+GYp	24.4 RSTC45 WDGY+RGA
	NR AFTER	24.4	24.4	31.6	35.1
Kitchen	NR BEFORE Door 1 Window 1 Wall 1 Roof 1 Floor 1	19.8 SG+WS+SG 8G+STorm	19.8 SG+WS+SG 8G+STorm	19.8 SG+WS+SG RSTC45	19.8 SG+WS+SG RSTC45
	NR AFTER	19.8	26.0	29.2	29.2
Bedroom #1	NR BEFORE Window 1 Wall 1 Roof 1 Floor 1	25.0	25.0	25.0 RSTC35 WDGY+GY	25.0 RSTC45 WDGY+MGA
	NR AFTER	25.0	25.0	30.4	35.3
Bedroom #2	NR BEFORE Window 1 * Wall 1 * Roof 1 Floor 1	28.8	28.8	28.8	28.8 RSTC45 WDGY+2GY
	NR AFTER	28.8	28.8	28.8	34.7
Bedroom #3	NR BEFORE Window 1 * Wall 1 * Roof 1 Floor 1	28.3	28.3	28.3 8G+STC25	28.3 RSTC45 WDGY+RGA
	NR AFTER	28.3	28.3	30.4	35.1
Basement	NR BEFORE Window 1 * Window 2 * Wall 1 * Roof 1 Floor 1	32.7	32.7	32.7	32.7 RSTC35 RSTC35
	NR AFTER	32.7	32.7	32.7	43.4
Cost Per Dwelling Sq.Ft.	C/D. Sq.Ft.	\$0.00	\$0.50	\$2.95	\$6.40

* 5 dB shielding assumed.

Table 3-43
 Noise Reductions, Modifications, and Cost/Dwelling Sq.Ft.,
 Two-Story Townhouse: Type W

Room	Building Element	Modifications by Noise Zone			
		60 - 65 dB	66 - 70 dB	71 - 75 dB	76 - 80 dB
Living Room	NR BEFORE Door 1 * Window 1 * Wall 1 * Roof 1 Floor 1	26.2	26.2	26.2 SC+SEald RSTC35	26.2 RSTC35 RSTC35
	NR AFTER	26.2	26.2	31.4	35.7
Dining Room	NR BEFORE Window 1 Wall 1 Roof 1 Floor 1	25.7	25.7	25.7 RSTC35	25.7 RSTC35
	NR AFTER	25.7	25.7	34.9	34.9
Kitchen	NR BEFORE Door 1 Window 1 Wall 1 Roof 1 Floor 1	20.0 SG+WS+SG	20.0 SG+WS+SG	20.0 SG+WS+SG RSTC35	20.0 SG+WS+SG RSTC45
	NR AFTER	20.0	24.9	31.1	32.2
Bedroom #1	NR BEFORE Window 1 Wall 1 Roof 1 Floor 1	26.7	26.7	26.7 RSTC35	26.7 RSTC40
	NR AFTER	26.7	26.7	34.1	35.1
Bedroom #2	NR BEFORE Window 1 * Wall 1 * Roof 1 Floor 1	30.1	30.1	30.1	30.1 RSTC35
	NR AFTER	30.1	30.1	30.1	35.3
Bedroom #3	NR BEFORE Window 1 * Wall 1 * Roof 1 Floor 1	29.7	29.7	29.7	29.7 RSTC35
	NR AFTER	29.7	29.7	29.7	35.2
Basement	NR BEFORE Window 1 * Window 2 * Wall 1 * Roof 1 Floor 1	32.7	32.7	32.7	32.7 RSTC35 RSTC35
	NR AFTER	32.7	32.7	32.7	43.4
Cost Per Dwelling Sq.Ft.	C/D. Sq.Ft.	\$0.00	\$0.41	\$1.98	\$3.85

* 5 dB shielding assumed.

Table 3-44
Noise Reductions, Modifications, and Cost/Dwelling Sq.Ft.,
Two-Story Townhouse: Type X

Room	Building Element	Modifications by Noise Zone			
		60 - 65 dB	66 - 70 dB	71 - 75 dB	76 - 80 dB
Living Room	NR BEFORE	24.5	24.5	24.5	24.5
	Door 1 * Window 1 * Window 2 * Wall 1 * Wall 2 * Roof 1 Floor 1			RSTC35 RSTC35 RSTC35	RSTC40 RSTC40 RSTC40 WDGY+RGA WDGY+RGA
	NR AFTER	24.5	24.5	30.1	
Dining Room	NR BEFORE	24.4		24.4	
	Window 1 Wall 1 Roof 1 Floor 1			RSTC40 WDGY+GYp	
	NR AFTER		24.4	31.6	35.1
Kitchen	NR BEFORE		19.2	19.2	19.2
	Door 1 Window 1 Wall 1 Wall 2 Roof 1 Floor 1		SG+WS+SG 8G+STC25	SG+WS+SG RSTC45	SG+WS+SG RSTC45
	NR AFTER	19.2	24.4	25.5	25.5
Bedroom #1	NR BEFORE	22.0	22.0	22.0	22.0
	Window 1 * Window 2 * Wall 1 * Wall 2 * Roof 1 Floor 1		8G+STC25 8G+STC25 WDGY+2GY WDGY+2GY	RSTC40 RSTC40 WDGY+2GY WDGY+2GY	RSTC45 RSTC45 WDGY+MGA WDGY+MGA
	NR AFTER	22.0	26.9	30.3	
Bedroom #2	NR BEFORE	25.9	25.9	25.9	
	Window 1 * Window 2 * Wall 1 * Wall 2 * Roof 1 Floor 1			RSTC35 RSTC35 WDGY+GYp WDGY+GYp	
	NR AFTER			31.0	35.0
Bedroom #3	NR BEFORE			28.3	28.3
	Window 1 * Wall 1 * Roof 1 Floor 1			RSTC35	RSTC45 WDGY+RGA
	NR AFTER			31.5	
Basement	NR BEFORE			32.7	
	Window 1 * Window 2 * Wall 1 * Roof 1 Floor 1				
	NR AFTER	32.7	32.7	32.7	43.4
Cost/Dwell.Sq.Ft.	C/D. Sq.Ft.	\$0.00	\$1.96	\$6.06	\$9.14

* 5 dB shielding assumed.

Table 3-45
 Noise Reductions, Modifications, and Cost/Dwelling Sq.Ft.,
 Two-Story Dwelling: Type Y

Room	Building Element	Modifications by Noise Zone			
		60 - 65 dB	66 - 70 dB	71 - 75 dB	76 - 80 dB
Living Room	NR BEFORE	20.1	20.1	20.1	20.1
	Door 1 Window 1 Window 2 Wall 1 Wall 2 Roof 1 Floor 1 NR AFTER		RSTC35 RSTC35 RSTC35	RSTC40 RSTC40 RSTC40 WDGY+2GY WDGY+GYp	RSTC40 RSTC45 RSTC45 WDGY+MGA WDGY+MGA
Dining Room	NR BEFORE	26.6	26.6	26.6	26.6
	Window 1 * Window 2 * Wall 1 * Wall 2 * Roof 1 Floor 1 NR AFTER			RSTC35 RSTC40 WDGY+GYp WDGY+GYp	RSTC40 RSTC40 WDGY+RGA WDGY+RGA
Kitchen	NR BEFORE	24.6	24.6	24.6	24.6
	Door 1 * Window 1 * Wall 1 * Wall 2 * Roof 1 Floor 1 NR AFTER			RSTC40 RSTC40	RSTC40 RSTC45
Family Room	NR BEFORE	24.8	24.8	24.8	24.8
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER			RSTC35 WDGY+GYp	RSTC45 WDGY+RGA
Bedroom #1	NR BEFORE	21.8	21.8	21.8	21.8
	Window 1 Window 2 Wall 1 Wall 2 Roof 1 Floor 1 NR AFTER		RSTC40 RSTC40	RSTC45 RSTC40 WDGY+2GY WDGY+2GY	RSTC40 RSTC40 WDGY+MGA WDGY+MGA
Bedroom #2	NR BEFORE	24.6	24.6	24.6	24.6
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER			RSTC35 WDGY+2GY VP+Absrp	RSTC45 WDGY+MG VP+Ab+GY

Table 3-45 (Continued)

Room	Building Element	Modifications by Noise Zone			
		60 - 65 dB	66 - 70 dB	71 - 75 dB	76 - 80 dB
Bedroom #3	NR BEFORE	22.3	22.3	22.3	22.3
	Window 1 Window 2 Wall 1 Wall 2 Roof 1 Floor 1 NR AFTER		RSTC35 RSTC35 WDGY+GYp WDGY+GYp	RSTC45 RSTC45 WDGY+2GY WDGY+GYp VP+Absrp	RSTC45 RSTC40 WDGY+MG WDGY+MGA VP+Ab+GY
Bedroom #4	NR BEFORE	26.5	26.5	26.5	26.5
	Window 1 * Window 2 * Wall 1 * Wall 2 * Roof 1 Floor 1 NR AFTER			RSTC40 RSTC40 WDGY+GYp VP+Absrp	RSTC40 RSTC35 WDGY+RGA WDGY+2GY VP+Ab+GY
Den	NR BEFORE	26.8	26.8	26.8	26.8
	Window 1 * Window 2 * Wall 1 * Wall 2 * Roof 1 Floor 1 NR AFTER			RSTC40 RSTC40 WDGY+GYp WDGY+GYp VP+Absrp	RSTC40 RSTC40 WDGY+2GY WDGY+2GY VP+Ab+GY
Basement	NR BEFORE	34.6	34.6	34.6	34.6
	Window 1 * Window 2 * Wall 1 Wall 2 * Roof 1 Floor 1 NR AFTER				
Cost Per Dwelling Sq.Ft.	C/D. Sq.Ft.	\$0.00	\$1.85	\$6.52	\$8.20

* 5 dB shielding assumed.

Table 3-46
 Noise Reductions, Modifications, and Cost/Dwelling Sq.Ft.,
 Two-Story Dwelling: Type Z

Room	Building Element	Modifications by Noise Zone			
		60 - 65 dB	66 - 70 dB	71 - 75 dB	76 - 80 dB
Living Room	NR BEFORE	21.1	21.1	21.1	21.1
	Door 1 Window 1 Window 2 Wall 1 Wall 2 Roof 1 Floor 1 NR AFTER		SC+SE+ST 8G+STC25 8G+STorm	SC+SE+ST RSTC35 RSTC40 BRIK+GYp	RSTC40 RSTC40 RSTC40 BRIK+GYp BRIK+GYp
Dining Room	NR BEFORE	28.7	28.7	28.7	28.7
	Window 1 * Window 2 * Wall 1 * Wall 2 * Roof 1 Floor 1 NR AFTER			RSTC35 RSTC35	RSTC35 RSTC35
Kitchen	NR BEFORE	25.9	25.9	25.9	25.9
	Door 1 * Window 1 * Wall 1 * Wall 2 * Roof 1 Floor 1 NR AFTER			SC+SE+ST RSTC35	RSTC35 RSTC35
Family Room	NR BEFORE	26.4	26.4	26.4	26.4
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER			RSTC35	RSTC35
Bedroom #1	NR BEFORE	24.0	24.0	24.0	24.0
	Window 1 Window 2 Wall 1 Wall 2 Roof 1 Floor 1 NR AFTER			RSTC35 RSTC35	RSTC40 RSTC35 BRIK+2GY BRIK+GYp
Bedroom #2	NR BEFORE	27.0	27.0	27.0	27.0
	Window 1 Wall 1 Roof 1 Floor 1 NR AFTER			RSTC35	RSTC40 VP+Absrp
		27.0	27.0	34.2	37.6

Table 3-46 (Continued)

Room	Building Element	Modifications by Noise Zone			
		60 - 65 dB	66 - 70 dB	71 - 75 dB	76 - 80 dB
Bedroom #3	NR BEFORE Window 1 Window 2 Wall 1 Wall 2 Roof 1 Floor 1	24.7	24.7	24.7 RSTC35 RSTC35	24.7 RSTC40 RSTC35
	NR AFTER	24.7	24.7	33.2	VP+Absrp 35.6
Bedroom #4	NR BEFORE Window 1 * Window 2 * Wall 1 * Wall 2 * Roof 1 Floor 1	28.4	28.4	28.4 RSTC35 RSTC35	28.4 RSTC35 RSTC35
	NR AFTER	28.4	28.4	34.7	VP+Absrp 36.8
Den	NR BEFORE Window 1 * Window 2 * Wall 1 * Wall 2 * Roof 1 Floor 1	28.8	28.8	28.8 RSTC35 RSTC35	28.8 RSTC35 RSTC35
	NR AFTER	28.8	28.8	34.8	VP+Absrp 36.9
Basement	NR BEFORE Window 1 * Window 2 * Wall 1 Wall 2 * Roof 1 Floor 1	34.6	34.6	34.6	34.6
	NR AFTER	34.6	34.6	34.6	34.6
Cost Per Dwelling Sq.Ft.	C/D. Sq.Ft.	\$0.00	\$0.30	\$3.30	\$4.52

* 5 dB shielding assumed.

take into account any information available about the specific dwelling being treated.

It was impossible to satisfy the noise goal for most of the dwelling categories in the 76–80 dB impact zone with the options provided in the computer model. More drastic measures could be used in actual circumstances. Only the modifications to house types C and H were completely successful in this zone. Many other homes, however, achieved the required sound insulation in all but one room, often the kitchen. For the remaining dwellings, no reasonable package of modifications could be identified. The measures given in the table represent an insufficient improvement in NLR. Of course, in an actual sound insulation project the measured exterior noise level would be used rather than the upper limit of 80 dB. If, for example, the actual outside noise level were 76 dB, the modifications would be more likely to provide adequate insulation. Many homes in the higher impact zones will not be modifiable in a cost-effective way.

3.6.2 Developing Cost Estimates From the Modifications Tables

Since the geographic region influences the types of houses usually built in a given community, Table 3–47 identifies the most common types found in each of the 11 regions shown in Figure 3–3. For any region, however, any of the 26 types may be encountered. The sound insulation methods used will be the same regardless of the locality. They depend only on noise exposure and existing NLR.

Most sound insulation costs depend on the overall size of the house. Wall, roof, attic, and floor treatment costs increase with larger dwellings. While the relationship is less obvious with windows, it still holds true: Larger houses feature more and bigger windows, so the modification or replacement cost goes up. The dwelling modifications suggested in Tables 3–21 to 3–46 give a cost per dwelling square foot for implementing the recommended construction features. This cost appears at the bottom of each column and can be multiplied by the living space of the home in square feet to get the overall cost. If the actual size is not known, Table 3–48 provides the average house size in each of the 11 geographic regions.

The values given are referenced to construction labor and materials rates for the Southern

California area in 1987. Table 3–49 gives geographic cost multipliers for other regions of the country. By using these multiplication factors it is possible to estimate the cost of modifying a home in any region of the country. An example in the next section shows how to use these cost factors. All these costs are, of course, subject to inflation.

It is always more efficient, and cost effective, to build a house with the acoustic performance in mind from the start. The materials used to modify a dwelling may be the same as those used in building it to begin with. But remodeling involves demolition costs, cleanup costs, and other extra costs involved with working on a built, possibly aged, probably inhabited dwelling. An effort has been made to reflect the difference between the cost to remodel and the extra cost of using good acoustic principles in the initial design and construction. The following cost multiplier may be applied to the costs quoted in Tables 3–21 to 3–46. The new construction cost calculated using this factor will represent costs attributable to sound insulation which would be added to standard house construction costs. Each individual residence is unique, but this cost factor is useful for developing global cost estimates. To get the new construction cost, multiply the cost per square foot by:

New Construction Cost Factor: 0.70

Figures 3–23 and 3–24 provide worksheets for estimating dwelling modification costs. Figure 3–23 uses the total number of dwellings in a project, the types of dwellings expected, the percentage of each type, the house size, and the cost per square foot for each type, to develop an overall cost for that noise exposure zone. The process is described in the next section and can be repeated for each impact zone. Figure 3–24 allows a more detailed examination of a specific dwelling to develop a cost for it. This cost can then be used in Figure 3–23 to customize the cost estimate based on specific information about the houses involved.

Section 4 discusses program management and cost estimation. It includes a more comprehensive analysis of project costs including contractor markup, ventilation systems, contingency fees, etc. The modification costs presented here are part of the overall cost structure. For rough costing purposes, the following construction-related costs may be used. Not all

Table 3-47

Most Common Dwelling Types in Each Region

Region	I	II	III	IV	V	VI	VIII	VII	IX	X	XI
Dwelling Type*	A B J K M	C E B F U	M R C N U	O I T D F	O I F D N	D I F E J	I O S T M	O I D F N	J I O T D	K E J B D	L Q K N

* Ranked from most to least common.

Table 3-48

1987 Average Dwelling Size for New Construction

Region	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Sq. Ft.	1,765	1,765	1,800	1,815	1,840	1,800	1,795	1,785	1,765	1,800	1,765

Table 3-49

Cost Multiplier for Each Region

Region	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Cost Multiplier	1.03	0.86	0.77	0.88	1.07	0.78	0.87	0.84	0.94	0.79	1.04

SINGLE NOISE ZONE MODIFICATION COSTS WORKSHEET

Region	DNL Zone	House Type	No. of Units	Cost/ Dwelling Sq.Ft.	Size (Sq.Ft.)	Unit Cost	TOTAL COST
		A					
		B					
		C					
		D					
		E					
		F					
		G					
		H					
		I					
		J					
		K					
		L					
		M					
		N					
		O					
		P					
		Q					
		R					
		S					
		T					
		U					
		V					
		W					
		X					
		Y					
		Z					
Zone Cost:							
Geographic Cost Factor:							
Adjusted Zone Cost:							

Figure 3-23. Single Noise Zone Modification Costs Worksheet.

INDIVIDUAL DWELLING MODIFICATION COST ESTIMATION WORKSHEET

Project: _____

Dwelling Identification: _____

ELEMENT	TYPE	NO.	UNIT COST	COST	
Sealing/ Caulking					Subtotal <input type="text"/>
Windows	Storm Secondary STC 35 STC 40 STC 45				Subtotal <input type="text"/>
Doors	Storm Secondary Acoustical Other				Subtotal <input type="text"/>
Attic/Ceiling	Absorption Barrier + Abs Other				Subtotal <input type="text"/>
Interior Wall	Gyp. panel Gyp. + SDB Furred-out Wall				Subtotal <input type="text"/>
Exterior Wall	Absorption Panel				Subtotal <input type="text"/>
Vent Baffles					Subtotal <input type="text"/>
Fireplace Treatment					Subtotal <input type="text"/>
Ventilation	Limited Moderate Extensive				Subtotal <input type="text"/>
TOTAL					<input type="text"/>

Figure 3-24. Individual Dwelling Modification Cost Estimate Worksheet.

ventilation systems will need to be provided "from scratch". The figure shown here is the cost of a complete system including ductwork.

Contractor Profit and Overhead:	20% of total
Contingency Fee –	
New Construction	5% of total
Remodeled	20% of total
HVAC System, Complete:	\$5,000

3.6.3 Cost Development Example

Before developing project costs, several parameters must be identified. They are:

1. Geographic Region (if needed to estimate the dwelling types involved – see Figure 3-3 and Table 3-3).
2. Noise exposure zone.
3. Number of dwellings of each type. (can use the percentage estimates based on which types are most common in each geographic region – see Table 3-3).
4. Cost per square foot to modify to house (Tables 3-21 to 3-46).
5. Size of house (can use average dwelling size based on geographic region if this is not known – see Table 3-48).

Figure 3-25 shows a worked-up example of a typical home sound insulation project. The project involves 50 homes divided among 5 house types in Region IV. The costs per dwelling square foot are taken from the 66-70 dB noise exposure column of Tables 3-24, 3-26, 3-29, 3-35, and 3-40. The average house size of 1,815 sq.ft. comes from Table 3-48. Multiplying the cost per dwelling square foot by the size of the house gives the unit dwelling cost for each house type. These costs are approximate and are rounded to the nearest ten dollars. Multiply this unit cost by the number of dwelling units of that type to get the total cost of modifying these residences. The dwelling type totals in the right-hand column are summed to estimate the cost of modifying all homes in the specified noise zone. Last, the geographic cost multiplier is used to get the equivalent cost in the given region.

SINGLE NOISE ZONE MODIFICATION COSTS WORKSHEET

Region	DNL Zone	House Type	No. of Units	Cost/ Dwelling Sq.Ft.	Size (Sq.Ft.)	Unit Cost	TOTAL COST
IV	66-70	A	5	3.23	1,815	\$5,860	\$29,300
		B					
		C					
		D					
		E					
		F	5	6.71	1,815	\$12,180	\$60,900
		G					
		H					
		I					
		J					
		K	10	7.62	1,815	\$13,830	\$138,300
		L					
		M					
		N					
		O					
		P	20	13.45	1,815	\$24,410	\$488,200
		Q					
		R					
		S					
		T					
		U	10	6.33	1,815	\$11,490	\$114,900
		V					
		W					
		X					
		Y					
		Z					
Zone Cost:							\$831,600
Geographic Cost Factor:							0.88
Adjusted Zone Cost:							\$731,800

Figure 3-25. Example Cost Estimate.