Chaska Creek Corporate Park

Sound Level Impact Analysis

January 2010

1.0 BACKGROUND

This report documents Bonestroo's evaluation of the noise impact expected from the proposed "Chaska Creek Corporate Park" development in Chaska, Minnesota.

The project study area is located approximately two miles northwest of the Chaska central business district. It is bounded by US 212, and Carver County Roads 10 and 110. The Corporate Park will be bisected north to south by an extension of Clover Ridge Road. At the current time, the site's land use is agricultural (the associated farmhouse is excluded from the project site). Adjacent land use is also predominantly agricultural and rural residential, although residential developments are nearby—directly to the north, and extending along Victoria Drive.

The proposed Chaska Creek Corporate Park development includes a variety of parcel sizes for corporate campuses, ranging from 3-5 acres up to 20+ acres. At the northeast corner of the development, an eight acre area is planned for retail/office uses such as a medical office building, restaurant, daycare facility, and drug store.

2.0 ROAD TRAFFIC SOUND LEVEL IMPACT ASSESSMENT

Bonestroo conducted a traffic sound level impact study for the proposed development. The temporary impact of sounds emanating from construction equipment was also assessed, qualitatively.

The impact of sound emissions from increased road traffic associated with the development was projected using the MNDOT MINNOISE computer model. Bonestroo performed a traffic study to develop the input data required to model current conditions—which served as a benchmark for impacts of the proposed development. The traffic study also projected post-development impact, out to the year 2030. Additionally, Bonestroo conducted background ambient noise monitoring at two sites in the project area. The impact assessment is based on existing and 2030 peak-hour traffic levels.

2.1 Minnesota Noise Standards

Minnesota Rules Chapter 7030.0040 codifies the Minnesota standards for noise. These standards describe the limiting levels of sound established on the basis of present knowledge for the preservation of health and welfare. These standards are designed to be consistent with sleep, speech, annoyance, and hearing conservation requirements for receivers within areas grouped according to land use activities.

Minnesota Rule 7030.030 states in part that:

"…. Any municipality having authority to regulate land use shall take all reasonable measures within its jurisdiction to prevent the establishment of land use activities listed in NAC 1, 2, or 3 in any location where the standards established in part 7030.0040 will be violated immediately upon establishment of the land use."

The Minnesota ambient sound pressure level standards are summarized in Table 2-1.

Table 2-1. Minnesota Sound Pressure Level Standards [dB(A)]

	7:00 AM to 10:00 PM		**10:00 PM to 7:00 AM**	
	L_{10}	**L_{50}**	**L_{10}**	**L_{50}**
NAC-1 (Residential)	65	60	55	50
NAC-2 (Commercial)	70	65	70	65
NAC-3 (Industrial)	80	75	80	75

L10 means the sound level which is exceeded for 10 percent of the time for a one-hour period. L50 means the sound level which is exceeded 50 percent of the time for a one-hour period. Sound pressure levels are expressed in dB(A). A dB(A) is a unit of sound pressure expressed in decibels and weighted for the purpose of approximating the human response to sound.

Minnesota Statutes, Section 116.07, Subdivision 2a, exempts noise from local and county roads from the requirements of these noise rules unless full control of access to the road has been acquired.

2.2 Federal Highway Administration Criteria

Certain highway expansion projects using federal funds must consider mitigation when the Federal Highway Administration (FHWA) noise abatement criteria are exceeded. Table 2-2 presents the FHWA criteria.

Table 2-2. FHWA Noise Abatement Criteria [hourly dB(A)]

Activity Category	L_{10}(h)	Activity Category Description
A	60 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if they are is to continue to serve its intended purpose.
B	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	75 (Exterior)	Developed lands, properties, or activities not include in Categories A or B above.
D	--	Undeveloped lands.
E	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

2.3 MINNOISE Model

The MINNOISE model is a modified (by the Minnesota Department of Transportation) version of the FHWA's Optima/Stamina model that is used to predict noise levels from highway projects and to assist with the development of noise barriers. For the Chaska Creek Corporate Park sound level study, Bonestroo used MINNOISE version 0.2, which was provided by Mr. Melvin Roseen of the Minnesota Department of Transportation.

2.4 Model Assumptions

Sound pressure level predictions were based on the following data and assumptions:

- The analysis was conducted for the peak "day" (afternoon rush hour: 5:00 pm to 6:00 pm) and peak "nighttime" (6:00 am to 7:00 am) traffic hours.
- Traffic data for current conditions and projections for the year 2030 for the study area were generated by Bonestroo and are provided in Appendix A.
- Shielding from natural or man-made barriers was not considered.
- The analysis assumed acoustically soft ground cover between the roadway and all receiver locations (alpha = 0.5).
- Vehicle mix was based on information from Bonestroo's traffic study, with a conservative assumption of one percent each of heavy trucks and medium trucks.
- Vehicle speeds were assumed to be constant, as presented in the Table 2-3.

Table 2-3. Vehicle Traffic Speed Inputs For Sound Propagation Modeling

	Constant Vehicle Speed (mph)	
Roadway	**Pre-Development**	**Post-Development**
US 212	60	60
CR10	45	45
CR110	45	45
Clover Ridge Road	45	45

Sound propagation modeling input and output files are provided in Appendix B.

2.5 Existing Sound Pressure Levels

2.5.1 Sound Propagation Modeling Results

Bonestroo used the MINNOISE computer model with the traffic and roadway information it developed to model the existing traffic-generated sound pressure levels in the vicinity of CR10. Sound level impacts were estimated for hypothetical receptor locations at various distances from the near edge of the right of way (ROW) in the project area.

The results of the modeling for the existing sound pressure levels are provided in Table 2-4. The table shows the distance to which State noise standards are exceeded for NAC-1 ("residential"), NAC-2 ("commercial"), and NAC-3 ("industrial") areas and the distance to which the Federal Highway Administration noise abatement criteria are exceeded. The State daytime standard is based on the suitability of an area for outdoor

use. Certain highway expansion projects using federal funds must consider mitigation when the Federal Highway Administration noise abatement criteria are exceeded.

Minnesota noise rules define nighttime as the hours between 10:00 p.m. and 7:00 a.m. Peak nighttime traffic typically occurs during the 6:00 a.m. – 7:00 a.m. hour.

Table 2-4. Existing Conditions CR10 Sound Propagation Modeling Results

Hwy. 10 (Engler Rd)	Daytime		Nighttime	
Distance From Near ROW (ft)	**L10 Standard [dB(A)]: NAC 1: 65 NAC 2: 70 NAC 3: 80**	**L50 Standard [dB(A)]: NAC 1: 60 NAC 2: 65 NAC 3: 75**	**L10 Standard [dB(A)]: NAC 1: 55 NAC 2: 70 NAC 3: 80**	**L50 Standard [dB(A)]: NAC 1: 50 NAC 2: 65 NAC 3: 75**
0	74.4	65.6	77.0	68.9
50	68.1	60.9	70.2	63.8
100	64.8	58.5	66.7	61.2
150	62.5	56.8	64.3	59.3
200	60.7	55.4	62.4	57.9
300	58.1	53.3	59.7	55.7
400	56.1	51.7	57.7	54.0
600	53.1	49.2	54.6	51.4
800	50.8	47.2	52.4	49.4
1000	49.0	45.6	50.5	47.7
1200	47.4	44.1	49.0	46.3
1500	45.4	42.2	46.9	44.3

= exceeds NAC1 standard

= exceeds NAC2 standard & FHWA criteria

= exceeds NAC2 standard & FHWA criteria

The nighttime NAC-1 (“residential”) standards are designed to prevent interference with sleep in a building with partially open windows. New residential developments are exempt from this standard if the buildings have year-round climate control and meet minimum construction standards for noise level attenuation.

2.5.2 Existing Sound Pressure Levels – Monitoring Results

In addition to the modeling of project area sound pressure levels, sound level monitoring was conducted at two locations within the project area to "ground truth" the existing sound level "nighttime" modeling results. Bonestroo measured sound pressure levels from 6:00 to 7:00 a.m. on December 18, 2009 at an elevation of five feet above ground level. Wind speed varied from calm to approximately 5 mph during the sampling. A Quest Model Noisepro DLX noise dosimeter was employed for the monitoring. The dosimeter was calibrated using a Quest Model QC-10 calibrator, immediately before and after the sampling period. Table 2-5 presents the monitoring results.

Table 2-5. Monitored Ambient Sound Pressure Levels [dB(A)]

	Monitored	
Site	**L10**	**L50**
S1	65.0	59.7
S2	63.8	59.3

Sites S1 and S2 were located 140 and 268 feet south of the southern edge of the CR10 ROW, respectively. Both sites were approximately 100 feet west of Clover Ridge Road. Complete statistical summaries of the sound pressure level monitoring results are provided in Appendix C.

2.6 Post-Development Sound Pressure Levels

Using the MINNOISE computer model and traffic and roadway information Bonestroo developed, the post-development sound pressure levels generated by traffic on roadways serving the project area were estimated. Sound level impacts were estimated for hypothetical receptor locations at various distances from the near edge of the ROW of the following roadways:

- US 212
- Carver County Road 10
- Carver County Road 110
- Clover Ridge Road

2.6.1 Post Development Sound Propagation Modeling Results

The results of the modeling for the 2030 post-development sound pressure levels are provided in Table 2-6. The table shows the distance to which State sound level standards are exceeded and the distance to which the Federal Highway Administration noise abatement criteria are exceeded.

The State noise standards are based on the suitability of an area for outdoor use. Certain highway expansion projects using federal funds must consider mitigation when the Federal Highway Administration noise abatement criteria are exceeded.

Table 2-6. Post-Development 2030 Modeled Sound Pressure Levels

Hwy. 10 (Engler Rd)	Daytime		Nighttime	
Distance From Near ROW (ft)	L10 Standard [dB(A)]: NAC 1: 65 NAC 2: 70 NAC 3: 80	L50 Standard [dB(A)]: NAC 1: 60 NAC 2: 65 NAC 3: 75	L10 Standard [dB(A)]: NAC 1: 55 NAC 2: 70 NAC 3: 80	L50 Standard [dB(A)]: NAC 1: 50 NAC 2: 65 NAC 3: 75
0	74.4	65.6	77.0	68.9
50	68.1	60.9	70.2	63.8
100	64.8	58.5	66.7	61.2
150	62.5	56.8	64.3	59.3
200	60.7	55.4	62.4	57.9
300	58.1	53.3	59.7	55.7
400	56.1	51.7	57.7	54.0
600	53.1	49.2	54.6	51.4
800	50.8	47.2	52.4	49.4
1000	49.0	45.6	50.5	47.7
1200	47.4	44.1	49.0	46.3
1500	45.4	42.2	46.9	44.3

Clover Ridge	Daytime		Nighttime	
Distance From Near ROW (ft)	L10 Standard [dB(A)]: NAC 1: 65 NAC 2: 70 NAC 3: 80	L50 Standard [dB(A)]: NAC 1: 60 NAC 2: 65 NAC 3: 75	L10 Standard [dB(A)]: NAC 1: 55 NAC 2: 70 NAC 3: 80	L50 Standard [dB(A)]: NAC 1: 50 NAC 2: 65 NAC 3: 75
0	76.7	68.3	74.8	65.7
50	69.6	62.7	67.9	60.3
100	66	60.1	64.4	57.7
150	63.6	58.2	62	56
200	61.7	56.8	60.2	54.6
300	59	54.6	57.5	52.5
400	56.9	52.9	55.5	50.9
600	53.9	50.4	52.5	48.4
800	51.6	48.3	50.2	46.4
1000	49.7	46.7	48.4	44.7
1200	48.2	45.2	46.8	43.3
1500	46.1	43.3	44.8	41.4

Hwy. 110 (Creek Rd.)	Daytime		Nighttime	
Distance From Near ROW (ft)	L10 Standard [dB(A)]: NAC 1: 65 NAC 2: 70 NAC 3: 80	L50 Standard [dB(A)]: NAC 1: 60 NAC 2: 65 NAC 3: 75	L10 Standard [dB(A)]: NAC 1: 55 NAC 2: 70 NAC 3: 80	L50 Standard [dB(A)]: NAC 1: 50 NAC 2: 65 NAC 3: 75
0	74.7	66.5	74.1	65.2
50	68.6	62	67.9	60.6
100	65.4	59.6	64.6	58.2
150	63.1	57.8	62.3	56.5
200	61.3	56.5	60.6	55.2
300	58.7	54.4	57.9	53.1
400	56.7	52.7	55.9	51.5
600	53.7	50.2	53	49
800	51.4	48.2	50.7	47.1
1000	49.6	46.5	48.9	45.4
1200	48.1	45.1	47.3	44
1500	46	43.2	45.3	42

Hwy. 212	Daytime		Nighttime	
Distance From Near ROW (ft)	L10 Standard [dB(A)]: NAC 1: 65 NAC 2: 70 NAC 3: 80	L50 Standard [dB(A)]: NAC 1: 60 NAC 2: 65 NAC 3: 75	L10 Standard [dB(A)]: NAC 1: 55 NAC 2: 70 NAC 3: 80	L50 Standard [dB(A)]: NAC 1: 50 NAC 2: 65 NAC 3: 75
0	80.2	75.4	80.2	75.4
50	74	70.9	74	70.9
100	71	68.3	71	68.3
150	68.9	66.5	68.9	66.5
200	67.3	65.1	67.3	65.1
300	64.9	62.9	64.9	62.9
400	63.1	61.2	63.1	61.2
600	60.3	58.7	60.3	58.7
800	58.2	56.6	58.2	56.6
1000	56.4	55	56.4	55
1200	54.9	53.5	54.9	53.5
1500	52.9	51.6	52.9	51.6
1800	51.2	49.9	51.2	49.9

= exceeds NAC1 standard

= exceeds NAC2 standard & FHWA criteria

= exceeds NAC2 standard & FHWA criteria

The nighttime NAC-1 (“residential”) standards are designed to prevent interference with sleep in a building with partially open windows. New residential developments are exempt from this standard if the buildings have year-round climate control and meet minimum construction standards for noise level attenuation.

Table 2-7 shows the approximate distance from the near edge of the roadway ROW to compliance with the Minnesota noise standards and FHWA criteria.

Table 2-7. Distances From Near Edge of ROW to Compliance

Minnesota State Standard - Day

Roadway	NAC1		NAC2		NAC3	
	L10	L50	L10	L50	L10	L50
US 212	300	600	150	300	50	50
CR10	100	100	50	50	0	0
CR110	150	100	50	50	0	0
Clover Ridge	150	150	50	50	0	0

Minnesota State Standard - Night

Roadway	NAC1		NAC2		NAC3	
	L10	L50	L10	L50	L10	L50
US 212	1200	1800	150	300	50	50
CR10	600	800	100	50	0	0
CR110	600	600	50	50	0	0
Clover Ridge	600	600	50	50	0	0

FHWA Criteria

Roadway	Activity Level B
	L10
US 212	150
CR10	50
CR110	50
Clover Ridge	50

3.0 CONSTRUCTION SOUND LEVEL IMPACT ASSESSMENT

Construction activities anticipated within the proposed Chaska Creek Corporate Park development will cause sound impacts within and outside of the project's perimeter. It is not possible to accurately quantify those impacts without currently unavailable details regarding the machinery to be used and activities that will be performed. In addition, the majority of earthmoving activities—usually the largest source of construction phase sound impacts—will be within the site's interior. This will provide significant sound dispersion prior to its impacting off-site receptors. Since outdoor construction activities will be limited to the daylight hours and indoor construction activities will be largely attenuated by the structures being built, construction noise is not expected to be an issue.

4.0 ANALYSIS

The following analysis assesses the reliability of the sound propagation model by comparing current monitored sound pressure levels with those computed by MINNOISE. The distance from post-development highways to compliance with the noise standards is then discussed, and compliance issues assessed. Implications of the State and federal standards are addressed.

4.1 Model Validation

The reliability with which the MINNOISE model simulates local sound propagation was assessed by comparing the ambient monitoring results (described in Section 2.5.2) to the model projections. Table 4-1 compares these data.

Table 4-1. Comparison of Monitored and Modeled Sound Pressure Levels

	Monitored		Modeled		Difference (Monitored-Modeled)	
Site	**L10**	**L50**	**L10**	**L50**	**L10**	**L50**
S1	65.0	59.7	62.5	56.4	2.5	3.3
S2	63.8	59.3	58.4	53.2	5.4	6.1

The model was found to under-predict ambient sound levels at Site S1 by about 3 dB(A) and S2 by about 5 dB(A). This is within the expected accuracy of the model. The under-prediction performance is probably due to only including CR10 as a sound source within the modeling simulation—ignoring other traffic and non-traffic sounds. The better agreement between monitoring and modeling results at the site closer to CR10 supports this interpretation.

4.2 State and Federal Criteria

Minnesota Rule 7030.030 states in part that:

> "...Any municipality having authority to regulate land use shall take all reasonable measures within its jurisdiction to prevent the establishment of land use activities listed in NAC 1, 2, or 3 in any location where the standards established in part 7030.0040 will be violated immediately upon establishment of the land use."

The Minnesota standards and FHWA criteria were presented in Sections 2.1 and 2.2, respectively.

4.3 Implication of Commercial Land Use Sound Level Impacts

The MINNOISE modeling performed by Bonestroo indicates that compliance with the state sound level standards for commercial land use can be achieved by maintaining the setbacks presented in Table 4-2.

Table 4-2. Minimum Setback; MN Standards - Commercial Land Use

Roadway	Minimum Setback (ft.) To Comply With MN Standards
US 212	150
CR10	100
CR110	50
Clover Ridge Road	50

4.4 Implication of Residential Land Use Sound Level Impacts

Minnesota's NAC-1 (residential) daytime standards are designed to protect areas that are intended for outdoor use. Therefore, development of areas for outdoor use (including decks and patios) that are within or near the "zones of non-compliance" defined in Table 2-6, would generally not be permissible unless it can be demonstrated that they will be in compliance with the State noise rules prior to approval by the City. This also applies to development within the proposed Chaska Creek Corporate Park that may impact off-site residential properties. Minnesota's NAC-1 nighttime standards are designed to prevent sleep interference. Residences can be constructed in areas with nighttime noise levels above the state standards (refer to Table 2-1) if they have year-round climate control and meet construction standards defined in MN Rule 7030.

Development of residential buildings that are within the "zones of non-compliance" defined in Table 2-6, is generally not permissible unless it can be demonstrated that they will be in compliance with the State noise rules prior to approval by the City. This also applies to development within the proposed Chaska Creek Corporate Park that may impact off-site residential properties. The MINNOISE modeling performed by Bonestroo indicates that compliance with the NAC-1 standards can be achieved by maintaining the setbacks presented in Table 4-3.

Table 4-3. Minimum Setback; MN Standards - Residential Land Use

Roadway	Minimum Setback (ft.) To Comply With MN Standards	
	Day	Night
US 212	600	1,800
CR10	100	800
CR110	150	600
Clover Ridge Road	150	600

4.5 Exemption from State Noise Standards

The Minnesota State Noise Standards do not apply to certain roadways outside the cities of Minneapolis and St. Paul. The exemption criteria are found in Minnesota Statutes 2000, Section 116.07 Subdivision 2a. The text of the exemption is provided as follows:

> "Subd. 2a. Exemptions from standards. No standards adopted by any state agency for limiting levels of noise in terms of sound pressure which may occur in the outdoor atmosphere shall apply to (1) segments of trunk highways constructed with federal interstate substitution money, provided that all reasonably available noise mitigation measures are employed to abate noise, (2) an existing or newly constructed segment of a highway, provided that all reasonably available noise mitigation measures, as approved by the commissioners of the department of transportation and pollution control agency, are employed to abate noise, **(3) except for the cities of Minneapolis and St. Paul, an existing or newly constructed segment of a road, street, or highway under the jurisdiction of a road authority of a town, statutory or home rule charter city, or county, except for roadways for which full control of access has been acquired,…"**

Subdivision 2a (3), highlighted in bold, is the exemption that applies to many local roadway projects, since full control of access has not been acquired for many of these facilities. In applying this exemption, full control of access means that the authority to control access is exercised to give preference to through traffic by providing access connections with selected public roads only and by *prohibiting crossings at grade* or direct private driveway connections.

Any proposed development that is expected to have noise levels above State standards due to noise from a County or City roadway within the project area may be exempt from the State noise rules under the above statute. The applicability of the exemption will be determined by whether there is adequate control of access to provide mitigation.

4.5 Applicability, Implications of FHWA Standards

Certain highway expansion projects using federal funds must consider mitigation when the Federal Highway Administration noise abatement criteria presented in Table 2-2 are exceeded. While these criteria are valuable in assessing the proposed development, they do not apply to the proposed action because it is not a federally-funded highway expansion.

5.0 CONCLUSIONS

The proposed development will is not expected to contain any significant sound emission sources. It will, however, result in increased traffic on the three adjacent roadways—with an accompanying increase in sound emissions. In addition, construction equipment and activities will cause a temporary increase in sound emissions and off-site impacts, in the course of construction.

While road traffic may not be subject to the State's noise standards, those standards are useful criteria for assessing the acceptability of the proposed development project. Bonestroo's sound propagation modeling of post-development traffic demonstrates that the State's standards applicable to commercial properties can be met by adopting setbacks of 50 feet for CR110 and Clover Ridge Road, 100 feet for CR10, and 150 feet for US 212.

The residential standards will generally be met at a distance of 600 feet from CR110 and Clover Ridge Road, 800 feet from CR10, and 1,800 feet from US 212. Lesser setbacks should be acceptable for structures equipped with year-round climate control systems, provided their construction is such that it attenuates outside sound.

There are currently approximately 25 residences in the subdivision located north of CR10 at Clover Ridge Road, to the north of the proposed development that would be potentially subject to sound levels in excess of the State's nighttime residential standard, subsequent to development of the proposed corporate park. Current modeled sound levels at most of these residences exceed the nighttime standard, at current traffic volumes. The increased traffic that would be attracted by the proposed development is expected to increase nighttime sound pressure levels at these residences by less than one decibel—an amount imperceptible by human hearing.

While traffic associated with the proposed project and related construction activities will impact both Corporate Park tenants and nearby residents, those impacts are expected to be modest—generally in accordance with the Minnesota state noise standards or, as in the case of construction sound emissions, of limited duration.

Appendix A
Current and Projected Year 2030 Traffic

Engler Boulevard at US 212 East Ramp													
	AM	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
A	Existing 2009	712	357	0	0	193	122	19	2	122	0	0	0
B	Growth factor	0	0	0	0	0	0	0	0	0	0	0	0
C (b*years)+1	Background	0	0	0	0	0	0	0	0	0	0	0	0
D	Approved trips	680	40	0	0	5	30	0	0	0	0	0	0
E (a+c+d)	No-build 2030	1392	397	0	0	198	152	19	2	122	0	0	0
F	site trips IN	937	937	937	937	937	937	937	937	937	937	937	937
G	site trips OUT	104	104	104	104	104	104	104	104	104	104	104	104
H	project dist% in					0.1		0.33					
I	project dist% out	0.33	0.1										
J (f*h)	Project trips IN	0	0	0	0	94	0	309	0	0	0	0	0
K (g*i)	Project trips OUT	34	10	0	0	0	0	0	0	0	0	0	0
L (e+j+k)	Build 2030	1426	407	0	0	292	152	328	2	122	0	0	0

Engler Boulevard at US 212 East Ramp													
	PM	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
A	Existing 2009	438	288	0	0	470	27	13	1	54	0	0	0
B	Growth factor	0	0	0	0	0	0	0	0	0	0	0	0
C (b*years)+1	Background	0	0	0	0	0	0	0	0	0	0	0	0
D	Approved trips	420	50	0	0	50	20	0	0	0	0	0	0
D (a+c)	No-build 2030	858	338	0	0	520	47	13	1	54	0	0	0
E	site trips IN	122	122	122	122	122	122	122	122	122	122	122	122
F	site trips OUT	886	886	886	886	886	886	886	886	886	886	886	886
G	project dist% in					0.1		0.33					
H	project dist% out	0.33	0.1										
I (e*g)	Project trips IN	0	0	0	0	12	0	40	0	0	0	0	0
J (f*h)	Project trips OUT	292	89	0	0	0	0	0	0	0	0	0	0
J (d + i + j)	Build 2030	1150	427	0	0	532	47	53	1	54	0	0	0

Engler Boulevard at US 212 West Ramp													
	AM	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
A	Existing 2009	0	1073	5	38	175	0	0	0	0	6	0	94
B	Growth factor	0	0	0	0	0	0	0	0	0	0	0	0
C (b*years)+1	Background	0	0	0	0	0	0	0	0	0	0	0	0
D	Approved trips	0	710	0	0	5	0	0	0	0	10	0	230
E (a+c+d)	No-build 2030	0	1783	5	38	180	0	0	0	0	16	0	324
F	site trips IN	937	937	937	937	937	937	937	937	937	937	937	937
G	site trips OUT	104	104	104	104	104	104	104	104	104	104	104	104
H	project dist% in					0.43							0.33
I	project dist% out		0.43	0.33									
J (f*h)	Project trips IN	0	0	0	0	403	0	0	0	0	0	0	309
K (g*i)	Project trips OUT	0	45	34	0	0	0	0	0	0	0	0	0
L (e+j+k)	Build 2030	0	1828	39	38	583	0	0	0	0	16	0	633

Engler Boulevard at US 212 West Ramp													
	PM	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
A	Existing 2009	0	344	12	83	388	0	0	0	0	98	0	748
B	Growth factor	0	0	0	0	0	0	0	0	0	0	0	0
C (b*years)+1	Background	0	0	0	0	0	0	0	0	0	0	0	0
D	Approved trips	0	440	0	0	50	0	0	0	0	30	0	735
D (a+c)	No-build 2030	0	784	12	83	438	0	0	0	0	128	0	1483
E	site trips IN	122	122	122	122	122	122	122	122	122	122	122	122
F	site trips OUT	886	886	886	886	886	886	886	886	886	886	886	886
G	project dist% in					0.43							0.33
H	project dist% out		0.43	0.33									
I (e*g)	Project trips IN	0	0	0	0	52	0	0	0	0	0	0	40
J (f*h)	Project trips OUT	0	381	292	0	0	0	0	0	0	0	0	0
J (d + i + j)	Build 2030	0	1165	304	83	490	0	0	0	0	128	0	1523

Engler Boulevard at Clover Ridge Drive													
	AM	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
A	Existing 2009	15	812	0	0	214	51	0	0	0	256	0	19
B	Growth factor	0	0	0	0	0	0	0	0	0	0	0	0
C (b*years)+1	Background	0	0	0	0	0	0	0	0	0	0	0	0
D	Approved trips	0	0	20	235	0	0	60	0	710	0	0	0
E (a+c+d)	No-build 2030	15	812	20	235	214	51	60	0	710	256	0	19
F	site trips IN	937	937	937	937	937	937	937	937	937	937	937	937
G	site trips OUT	104	104	104	104	104	104	104	104	104	104	104	104
H	project dist% in			0.2	0.76							0.01	
I	project dist% out							0.2	0.01	0.76			
J (f*h)	Project trips IN	0	0	187	712	0	0	0	0	0	0	9	0
K (g*i)	Project trips OUT	0	0	0	0	0	0	21	1	79	0	0	0
L (e+j+k)	Build 2030	15	812	207	947	214	51	81	1	789	256	9	19

Engler Boulevard at Clover Ridge Drive													
	PM	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
A	Existing 2009	21	259	0	0	835	269	0	0	0	109	0	30
B	Growth factor	0	0	0	0	0	0	0	0	0	0	0	0
C (b*years)+1	Background	0	0	0	0	0	0	0	0	0	0	0	0
D	Approved trips	0	0	65	785	0	0	40	0	440	0	0	0
D (a+c)	No-build 2030	21	259	65	785	835	269	40	0	440	109	0	30
E	site trips IN	122	122	122	122	122	122	122	122	122	122	122	122
F	site trips OUT	886	886	886	886	886	886	886	886	886	886	886	886
G	project dist% in			0.2	0.76							0.01	
H	project dist% out							0.2	0.01	0.76			
I (e*g)	Project trips IN	0	0	24	93	0	0	0	0	0	0	1	0
J (f*h)	Project trips OUT	0	0	0	0	0	0	177	9	673	0	0	0
J (d + i + j)	Build 2030	21	259	89	878	835	269	217	9	1113	109	1	30

EBL	=	Eastbound, left turning
EBT	=	Eastbound, through traffic
EBR	=	Eastbound, right turning
WBL	=	Westbound, left turning
WBR	=	Westbound, through traffic
MB:	=	Westbound, right turning
NBL	=	Northbound, left turning
NBT	=	Northbound, through traffic
NBR	=	Northbound, right turning
SBL	=	Southbound, left turning
SBT	=	Southbound, through traffic
SBR	=	Southbound, right turning

Appendix B

Sound Pressure Level Modeling: Input and Output Data Files

Contents:

Table B1.1 a: Current CR10 Day, Input

```
Hwy 10
1 3
2 2
EASTBOUND LANES
'CARS'    274   45
'MT'        3   45
'HT'        3   45
'L'/
'E1'   -2000  -20  0          0
'E2'    2000  -20  0          0
'L'/
WESTBOUND LANES
'CARS'   818   45
'MT'       8   45
'HT'       8   45
'L'/
'W1'   -2000   -33  0          0
'W2'    2000   -33  0          0
'L'/
5 12
Hwy 10 Receptors
'R1'   0      0   5
'R2'   0     50   5
'R3'   0    100   5
'M1'   0    140   5
'R4'   0    150   5
'R5'   0    200   5
'M2'   0    268   5
'R6'   0    300   5
'R7'   0    400   5
'R8'   0    600   5
'R9'   0    800   5
'R10'  0   1000   5
6 1
```

```
ALPHA VALUES
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
6 2
SHIELDING VALUES
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
7/
```

Table B1.1 b: Current CR10 Day, Output

```
          * MINNOISE Ver 0.2 BASED ON STAMINA
2.0/BCR  *
          * FHWA VERSION (MARCH 1982). A
TRAFFIC NOISE *
          * PREDICTION MODEL DEVELOPED
UNDER CONTRACT  *
          * BY BBN.                          *
          ********************************************


          ( INPUT UNITS- ENGLISH , OUTPUT
UNITS- ENGLISH )


 Hwy 10
 PROGRAM INITIALIZATION PARAMETERS

   HEIGHT   CODE    DESCRIPTION
    0.00      1  RECEIVER HEIGHT ADJUSTMENT
    1.00      2  A-WEIGHTED SOUND LEVEL ONLY
    0.00      3  HEIGHT ADJUSTMENT FOR
PASSENGER CARS (CARS)
    8.00      4  HEIGHT ADJUSTMENT FOR HEAVY
TRUCKS   (HT)
    2.30      5  HEIGHT ADJUSTMENT FOR MEDIUM
TRUCKS  (MT)


 ROADWAY   1     EASTBOUND LANES


                VEHICLE TYPE   VEHICLES/HOUR
SPEED
                   CARS           274.        45.
                   HT             3.        45.
                   MT             3.        45.
                  ------------COORDINATES-------------
                      X          Y          Z      GRADE
 E1                  -2000.0      -20.0        0.0      0
 E2                   2000.0      -20.0        0.0      0


 ROADWAY   2     WESTBOUND LANES


                VEHICLE TYPE   VEHICLES/HOUR
SPEED
                   CARS           818.        45.
                   HT             8.        45.
                   MT             8.        45.
                  ------------COORDINATES-------------
                      X          Y          Z      GRADE
 W1                  -2000.0      -33.0        0.0      0
 W2                   2000.0      -33.0        0.0      0
 Hwy 10 Receptors
                  ------------COORDINATES-------------
                      X          Y          Z
 R1                     0.0        0.0        5.0
 R2                     0.0       50.0        5.0
 R3                     0.0      100.0        5.0
 M1                     0.0      140.0        5.0
 R4                     0.0      150.0        5.0
 R5                     0.0      200.0        5.0
 M2                     0.0      268.0        5.0
 R6                     0.0      300.0        5.0
 R7                     0.0      400.0        5.0
 R8                     0.0      600.0        5.0
 R9                     0.0      800.0        5.0
 R10                    0.0     1000.0        5.0

  ALPHA FACTORS - ROADWAY
ACROSS,RECEIVER DOWN

  1 * 0.5 0.5
  2 * 0.5 0.5
  3 * 0.5 0.5
  4 * 0.5 0.5
  5 * 0.5 0.5
  6 * 0.5 0.5
  7 * 0.5 0.5
  8 * 0.5 0.5
  9 * 0.5 0.5
 10 * 0.5 0.5
 11 * 0.5 0.5
 12 * 0.5 0.5

  SHIELDING FACTORS - ROADWAY
ACROSS,RECEIVER DOWN

  1 * 0.0 0.0
  2 * 0.0 0.0
  3 * 0.0 0.0
  4 * 0.0 0.0
  5 * 0.0 0.0
  6 * 0.0 0.0
  7 * 0.0 0.0
  8 * 0.0 0.0
  9 * 0.0 0.0
 10 * 0.0 0.0
 11 * 0.0 0.0
 12 * 0.0 0.0

 Hwy 10
 RECEIVER    LEQ(H)   SIG   L10    L50    L90

 R1          70.5    7.0   73.9   65.0   56.0
 R2          64.1    5.7   67.7   60.4   53.1
 R3          60.9    5.0   64.4   58.0   51.6
 M1          59.1    4.6   62.5   56.6   50.7
 R4          58.7    4.5   62.1   56.3   50.5
 R5          57.0    4.2   60.4   55.0   49.6
 M2          55.2    3.9   58.5   53.5   48.5
 R6          54.5    3.8   57.7   52.9   48.1
 R7          52.7    3.5   55.7   51.3   46.9
 R8          49.9    3.1   52.8   48.8   44.8
 R9          47.8    2.9   50.5   46.8   43.2
 R10         46.0    2.7   48.7   45.2   41.7
```

Table B1.2 a: Current CR10 Night, Input

```
Hwy 10
1 3
2 2
EASTBOUND LANES
'CARS'    810   45
'MT'        8   45
'HT'        8   45
'L'/
'E1'   -2000  -20  0          0
'E2'    2000  -20  0          0
'L'/
WESTBOUND LANES
'CARS'   210   45
'MT'       2   45
'HT'       2   45
'L'/
'W1'   -2000   -33  0         0
'W2'    2000   -33  0         0
'L'/
5 12
Hwy 10 Receptors
'R1'   0      0   5
'R2'   0     50   5
'R3'   0    100   5
'M1'   0    140   5
'R4'   0    150   5
'R5'   0    200   5
'M2'   0    268   5
'R6'   0    300   5
'R7'   0    400   5
'R8'   0    600   5
'R9'   0    800   5
'R10'  0   1000   5
6 1
```

```
ALPHA VALUES
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
6 2
SHIELDING VALUES
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
7/
```

Table B1.2 b: Current CR10 Night, Output

```
          * MINNOISE Ver 0.2 BASED ON STAMINA
2.0/BCR  *
          * FHWA VERSION (MARCH 1982). A
TRAFFIC NOISE *
          * PREDICTION MODEL DEVELOPED
UNDER CONTRACT  *
          * BY BBN.                          *
          ********************************************


          ( INPUT UNITS- ENGLISH , OUTPUT
UNITS- ENGLISH )


 Hwy 10
 PROGRAM INITIALIZATION PARAMETERS

   HEIGHT   CODE    DESCRIPTION
    0.00      1  RECEIVER HEIGHT ADJUSTMENT
    1.00      2  A-WEIGHTED SOUND LEVEL ONLY
    0.00      3  HEIGHT ADJUSTMENT FOR
PASSENGER CARS (CARS)
    8.00      4  HEIGHT ADJUSTMENT FOR HEAVY
TRUCKS   (HT)
    2.30      5  HEIGHT ADJUSTMENT FOR MEDIUM
TRUCKS  (MT)


 ROADWAY   1     EASTBOUND LANES


                VEHICLE TYPE   VEHICLES/HOUR
SPEED
                   CARS           810.        45.
                   HT             8.        45.
                   MT             8.        45.
                  ------------COORDINATES-------------
                      X          Y          Z      GRADE
 E1                  -2000.0      -20.0        0.0      0
 E2                   2000.0      -20.0        0.0      0


 ROADWAY   2     WESTBOUND LANES


                VEHICLE TYPE   VEHICLES/HOUR
SPEED
                   CARS           210.        45.
                   HT             2.        45.
                   MT             2.        45.
                  ------------COORDINATES-------------
                      X          Y          Z      GRADE
 W1                  -2000.0      -33.0        0.0      0
 W2                   2000.0      -33.0        0.0      0
 Hwy 10 Receptors
                  ------------COORDINATES-------------
                      X          Y          Z
 R1                    0.0        0.0        5.0
 R2                    0.0       50.0        5.0
 R3                    0.0      100.0        5.0
 M1                    0.0      140.0        5.0
 R4                    0.0      150.0        5.0
 R5                    0.0      200.0        5.0
 M2                    0.0      268.0        5.0
 R6                    0.0      300.0        5.0
 R7                    0.0      400.0        5.0
 R8                    0.0      600.0        5.0
 R9                    0.0      800.0        5.0
 R10                   0.0     1000.0        5.0


   ALPHA FACTORS - ROADWAY
ACROSS,RECEIVER DOWN

  1 * 0.5 0.5
  2 * 0.5 0.5
  3 * 0.5 0.5
  4 * 0.5 0.5
  5 * 0.5 0.5
  6 * 0.5 0.5
  7 * 0.5 0.5
  8 * 0.5 0.5
  9 * 0.5 0.5
 10 * 0.5 0.5
 11 * 0.5 0.5
 12 * 0.5 0.5


   SHIELDING FACTORS - ROADWAY
ACROSS,RECEIVER DOWN

  1 * 0.0 0.0
  2 * 0.0 0.0
  3 * 0.0 0.0
  4 * 0.0 0.0
  5 * 0.0 0.0
  6 * 0.0 0.0
  7 * 0.0 0.0
  8 * 0.0 0.0
  9 * 0.0 0.0
 10 * 0.0 0.0
 11 * 0.0 0.0
 12 * 0.0 0.0


 Hwy 10
 RECEIVER    LEQ(H)   SIG   L10    L50    L90

 R1          71.4    7.0   74.8   65.8   56.8
 R2          64.4    5.9   67.9   60.4   52.9
 R3          60.9    5.1   64.4   57.9   51.3
 M1          59.0    4.8   62.5   56.4   50.3
 R4          58.6    4.7   62.1   56.1   50.1
 R5          56.9    4.3   60.3   54.7   49.2
 M2          55.1    4.0   58.4   53.2   48.1
 R6          54.4    3.9   57.6   52.6   47.7
 R7          52.5    3.6   55.6   51.0   46.5
 R8          49.7    3.2   52.6   48.5   44.4
 R9          47.5    2.9   50.3   46.5   42.7
 R10         45.8    2.8   48.5   44.9   41.3
```

Table B2.1 a: Projected 2030 US 212 Day, Input

```
2030;US 212;Day
1 3
2 2
NorthBOUND LANES
'CARS'   2499   60
'MT'       26   60
'HT'       26   60
'L'/
'N1'   -2000  -100  0          0
'N2'       2000  -100  0       0
'L'/
SouthBOUND LANES
'CARS'   2499  60
'MT'       1   60
'HT'       1   60
'L'/
'S1'   -2000   -30  0          0
'S2'       2000   -30  0       0
'L'/
5 13
Clover Ridge Receptors
'R1'   0      0   5
'R2'   0     50   5
'R3'   0    100   5
'R4'   0    150   5
'R5'   0    200   5
'R6'   0    300   5
'R7'   0    400   5
'R8'   0    600   5
'R9'   0    800   5
'R10'  0   1000   5
'R11'  0   1200   5
'R12'  0   1500   5
'R13'  0   1800   5
6 1
```

```
ALPHA VALUES
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
6 2
SHIELDING VALUES
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
7/
```

Table B2.1 b: Projected 2030 US 212 Day, Output

```
          * MINNOISE Ver 0.2 BASED ON STAMINA
2.0/BCR  *
          * FHWA VERSION (MARCH 1982). A
TRAFFIC NOISE *
          * PREDICTION MODEL DEVELOPED
UNDER CONTRACT  *
          * BY BBN.                        *
          **********************************************
          ( INPUT UNITS- ENGLISH , OUTPUT
UNITS- ENGLISH )
2030;US 212;Day
 PROGRAM INITIALIZATION PARAMETERS

   HEIGHT   CODE    DESCRIPTION
    0.00      1  RECEIVER HEIGHT ADJUSTMENT
    1.00      2  A-WEIGHTED SOUND LEVEL ONLY
    0.00      3  HEIGHT ADJUSTMENT FOR
PASSENGER CARS (CARS)
    8.00      4  HEIGHT ADJUSTMENT FOR HEAVY
TRUCKS   (HT)
    2.30      5  HEIGHT ADJUSTMENT FOR MEDIUM
TRUCKS  (MT)


 ROADWAY   1     NorthBOUND LANES


                VEHICLE TYPE   VEHICLES/HOUR
SPEED
                   CARS          2499.        60.
                   HT             26.        60.
                   MT             26.        60.
                  ------------COORDINATES-------------
                      X         Y         Z      GRADE
 N1                  -2000.0    -100.0      0.0      0
 N2                   2000.0    -100.0      0.0      0


 ROADWAY   2     SouthBOUND LANES


                VEHICLE TYPE   VEHICLES/HOUR
SPEED
                   CARS          2499.        60.
                   HT             1.         60.
                   MT             1.         60.
                  ------------COORDINATES-------------
                      X         Y         Z      GRADE
 S1                  -2000.0     -30.0      0.0      0
 S2                   2000.0     -30.0      0.0      0
 Clover Ridge Receptors
                  ------------COORDINATES-------------
                      X         Y         Z
 R1                    0.0       0.0       5.0
 R2                    0.0      50.0       5.0
 R3                    0.0     100.0       5.0
 R4                    0.0     150.0       5.0
 R5                    0.0     200.0       5.0
 R6                    0.0     300.0       5.0
 R7                    0.0     400.0       5.0
 R8                    0.0     600.0       5.0
 R9                    0.0     800.0       5.0
 R10                   0.0    1000.0       5.0
 R11                   0.0    1200.0       5.0
 R12                   0.0    1500.0       5.0
 R13                   0.0    1800.0       5.0

   ALPHA FACTORS - ROADWAY
ACROSS,RECEIVER DOWN

  1 * 0.5 0.5
  2 * 0.5 0.5
  3 * 0.5 0.5
  4 * 0.5 0.5
  5 * 0.5 0.5
  6 * 0.5 0.5
  7 * 0.5 0.5
  8 * 0.5 0.5
  9 * 0.5 0.5
 10 * 0.5 0.5
 11 * 0.5 0.5
 12 * 0.5 0.5
 13 * 0.5 0.5

   SHIELDING FACTORS - ROADWAY
ACROSS,RECEIVER DOWN

  1 * 0.0 0.0
  2 * 0.0 0.0
  3 * 0.0 0.0
  4 * 0.0 0.0
  5 * 0.0 0.0
  6 * 0.0 0.0
  7 * 0.0 0.0
  8 * 0.0 0.0
  9 * 0.0 0.0
 10 * 0.0 0.0
 11 * 0.0 0.0
 12 * 0.0 0.0
 13 * 0.0 0.0

 2030;US 212;Day
 RECEIVER    LEQ(H)   SIG   L10    L50    L90

 R1          77.0    3.8   80.2   75.4   70.6
 R2          71.6    2.4   74.0   70.9   67.7
 R3          68.8    2.1   71.0   68.3   65.7
 R4          66.9    1.8   68.9   66.5   64.2
 R5          65.5    1.7   67.3   65.1   62.9
 R6          63.2    1.5   64.9   62.9   61.0
 R7          61.5    1.4   63.1   61.2   59.4
 R8          58.8    1.3   60.3   58.7   57.0
 R9          56.8    1.2   58.2   56.6   55.1
 R10         55.1    1.1   56.4   55.0   53.5
 R11         53.6    1.1   54.9   53.5   52.1
 R12         51.7    1.1   52.9   51.6   50.2
 R13         50.0    1.0   51.2   49.9   48.6
```

Table B2.2 a: Projected 2030 US 212 Night, Input

```
2030;US 212;Night
1 3
2 2
NorthBOUND LANES
'CARS'   2499   60
'MT'       26   60
'HT'       26   60
'L'/
'N1'   -2000  -100  0          0
'N2'       2000  -100  0       0
'L'/
SouthBOUND LANES
'CARS'   2499  60
'MT'       1   60
'HT'       1   60
'L'/
'S1'   -2000   -30  0          0
'S2'       2000   -30  0       0
'L'/
5 15
Clover Ridge Receptors
'R1'   0      0   5
'R2'   0     50   5
'R3'   0    100   5
'R4'   0    150   5
'R5'   0    200   5
'R6'   0    300   5
'R7'   0    400   5
'R8'   0    600   5
'R9'   0    800   5
'R10'  0   1000   5
'R11'  0   1200   5
'R12'  0   1500   5
'R13'  0   1700   5
'R14'  0   1800   5
'R15'  0   2000   5
6 1
```

```
ALPHA VALUES
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
6 2
SHIELDING VALUES
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
7/
```

Table B2.2 b: Projected 2030 US 212 Night, Output

```
          * MINNOISE Ver 0.2 BASED ON STAMINA
2.0/BCR  *
          * FHWA VERSION (MARCH 1982). A
TRAFFIC NOISE *
          * PREDICTION MODEL DEVELOPED
UNDER CONTRACT  *
          * BY BBN.                        *
          ************************************************
          ( INPUT UNITS- ENGLISH , OUTPUT
UNITS- ENGLISH )
 2030;US 212;Night
 PROGRAM INITIALIZATION PARAMETERS

   HEIGHT   CODE    DESCRIPTION
    0.00      1  RECEIVER HEIGHT ADJUSTMENT
    1.00      2  A-WEIGHTED SOUND LEVEL ONLY
    0.00      3  HEIGHT ADJUSTMENT FOR
PASSENGER CARS (CARS)
    8.00      4  HEIGHT ADJUSTMENT FOR HEAVY
TRUCKS   (HT)
    2.30      5  HEIGHT ADJUSTMENT FOR MEDIUM
TRUCKS  (MT)
ROADWAY   1     NorthBOUND LANES
              VEHICLE TYPE   VEHICLES/HOUR
SPEED
                  CARS          2499.        60.
                  HT             26.        60.
                  MT             26.        60.
                 ------------COORDINATES-------------
                     X          Y          Z      GRADE
 N1                 -2000.0     -100.0       0.0      0
 N2                  2000.0     -100.0       0.0      0

 ROADWAY   2     SouthBOUND LANES

              VEHICLE TYPE   VEHICLES/HOUR
SPEED
                  CARS          2499.        60.
                  HT             1.         60.
                  MT             1.         60.
                 ------------COORDINATES-------------
                     X          Y          Z      GRADE
 S1                 -2000.0      -30.0       0.0      0
 S2                  2000.0      -30.0       0.0      0
 Clover Ridge Receptors
                 ------------COORDINATES-------------
                     X          Y          Z
 R1                    0.0        0.0        5.0
 R2                    0.0       50.0        5.0
 R3                    0.0      100.0        5.0
 R4                    0.0      150.0        5.0
 R5                    0.0      200.0        5.0
 R6                    0.0      300.0        5.0
 R7                    0.0      400.0        5.0
 R8                    0.0      600.0        5.0
 R9                    0.0      800.0        5.0
 R10                   0.0     1000.0        5.0
 R11                   0.0     1200.0        5.0
 R12                   0.0     1500.0        5.0
 R13                   0.0     1700.0        5.0
 R14                   0.0     1800.0        5.0
 R15                   0.0     2000.0        5.0

  ALPHA FACTORS - ROADWAY
ACROSS,RECEIVER DOWN

  1 * 0.5 0.5
  2 * 0.5 0.5
  3 * 0.5 0.5
  4 * 0.5 0.5
  5 * 0.5 0.5
  6 * 0.5 0.5
  7 * 0.5 0.5
  8 * 0.5 0.5
  9 * 0.5 0.5
 10 * 0.5 0.5
 11 * 0.5 0.5
 12 * 0.5 0.5
 13 * 0.5 0.5
 14 * 0.5 0.5
 15 * 0.5 0.5

  SHIELDING FACTORS - ROADWAY
ACROSS,RECEIVER DOWN

  1 * 0.0 0.0
  2 * 0.0 0.0
  3 * 0.0 0.0
  4 * 0.0 0.0
  5 * 0.0 0.0
  6 * 0.0 0.0
  7 * 0.0 0.0
  8 * 0.0 0.0
  9 * 0.0 0.0
 10 * 0.0 0.0
 11 * 0.0 0.0
 12 * 0.0 0.0
 13 * 0.0 0.0
 14 * 0.0 0.0
 15 * 0.0 0.0

 2030;US 212;Night
 RECEIVER    LEQ(H)   SIG   L10    L50    L90

 R1          77.0    3.8   80.2   75.4   70.6
 R2          71.6    2.4   74.0   70.9   67.7
 R3          68.8    2.1   71.0   68.3   65.7
 R4          66.9    1.8   68.9   66.5   64.2
 R5          65.5    1.7   67.3   65.1   62.9
 R6          63.2    1.5   64.9   62.9   61.0
 R7          61.5    1.4   63.1   61.2   59.4
 R8          58.8    1.3   60.3   58.7   57.0
 R9          56.8    1.2   58.2   56.6   55.1
 R10         55.1    1.1   56.4   55.0   53.5
 R11         53.6    1.1   54.9   53.5   52.1
 R12         51.7    1.1   52.9   51.6   50.2
 R13         50.6    1.0   51.8   50.5   49.1
 R14         50.0    1.0   51.2   49.9   48.6
 R15         49.0    1.0   50.2   48.9   47.6
```

Table B3.1 a: Projected 2030 CR10 Day, Input

```
2030;Hwy 10;Day
1 3
2 2
EASTBOUND LANES
'CARS'    362   45
'MT'        4   45
'HT'        4   45
'L'/
'E1'   -2000  -20  0          0
'E2'    2000  -20  0          0
'L'/
WESTBOUND LANES
'CARS'   818   45
'MT'       8   45
'HT'       8   45
'L'/
'W1'   -2000   -33  0          0
'W2'    2000   -33  0          0
'L'/
5 12
Hwy 10 Receptors
'R1'   0      0   5
'R2'   0     50   5
'R3'   0    100   5
'R4'   0    150   5
'R5'   0    200   5
'R6'   0    300   5
'R7'   0    400   5
'R8'   0    600   5
'R9'   0    800   5
'R10'  0   1000   5
'R11'  0   1200   5
'R12'  0   1500   5
6 1
ALPHA VALUES
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
6 2
SHIELDING VALUES
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
7/
```

Table B3.1 b: Projected 2030 CR10 Day, Output

```
*         MINNOISE        Ver     0.2     BASED
          ON      STAMINA         2.0/BCR *
*         FHWA    VERSION         (MARCH1982).
          A       TRAFFIC         NOISE   *
*         PREDICTION      MODEL   DEVELOPED
          UNDER   CONTRACT        *
*         BY      BBN.    *
(         INPUT   UNITS-  ENGLISH         ","
          OUTPUT          UNITS-  ENGLISH
          )
2030;Hwy        10;Day
PROGRAM         INITIALIZATION  PARAMETERS
          HEIGHT CODE   DESCRIPTION
0         1     RECEIVER        HEIGHT
          ADJUSTMENT
1         2     A-WEIGHTED      SOUND   LEVEL
          ONLY
0         3     HEIGHT  ADJUSTMENT      FOR
          PASSENGER       CARS    (CARS)
8         4     HEIGHT  ADJUSTMENT      FOR
          HEAVY   TRUCKS          (HT)
2.3       5     HEIGHT  ADJUSTMENT      FOR
          MEDIUM          TRUCKS          (MT)
ROADWAY         1       EASTBOUND       LANES

VEHICLE         TYPE    VEHICLES/HOUR
          SPEED
CARS      362   45

HT        4     45

MT        4     45

----------COORDINATES----------

X         Y     Z       GRADE

E1        -2000 -20     0       0

E2        2000  -20     0       0
ROADWAY         2       WESTBOUND       LANES
VEHICLE         TYPE    VEHICLES/HOUR
          SPEED
CARS      818   45
HT        8     45
MT        8     45
----------COORDINATES----------

W1        -2000 -33     0       0
X         Y     Z       GRADE
W2        2000  -33     0       0
Hwy       10    Receptors
----------COORDINATES----------

X         Y     Z
R1        0     0       5
R2        0     50      5
R3        0     100     5
R4        0     150     5
R5        0     200     5
R6        0     300     5
R7        0     400     5
R8        0     600     5
R9        0     800     5
R10       0     1000    5
R11       0     1200    5
R12       0     1500    5
ALPHA     FACTORS         -       ROADWAY
          "ACROSS,RECEIVER"       DOWN

1         *     0.5     0.5
2         *     0.5     0.5
3         *     0.5     0.5
4         *     0.5     0.5
5         *     0.5     0.5
6         *     0.5     0.5
7         *     0.5     0.5
8         *     0.5     0.5
9         *     0.5     0.5
10        *     0.5     0.5
11        *     0.5     0.5
12        *     0.5     0.5
SHIELDING       FACTORS         -
          ROADWAY         "ACROSS,RECEIVER"
          DOWN

1         *     0       0
2         *     0       0
3         *     0       0
4         *     0       0
5         *     0       0
6         *     0       0
7         *     0       0
8         *     0       0
9         *     0       0
10        *     0       0
11        *     0       0
12        *     0       0

2030;Hwy        10;Day
RECEIVER        LEQ(H)  SIG     L10     L50
          L90
R1        71    6.9     74.4    65.6    56.8
R2        64.5  5.6     68.1    60.9    53.7
R3        61.2  4.9     64.8    58.5    52.2
R4        59.1  4.5     62.5    56.8    51.1
R5        57.4  4.1     60.7    55.4    50.2
R6        54.9  3.7     58.1    53.3    48.6
R7        53    3.4     56.1    51.7    47.4
R8        50.3  3       53.1    49.2    45.4
R9        48.1  2.8     50.8    47.2    43.7
R10       46.4  2.7     49      45.6    42.2
R11       44.9  2.6     47.4    44.1    40.8
R12       42.9  2.5     45.4    42.2    39
```

Table B3.2 a: Projected 2030 CR10 Night, Input

```
2030;Hwy 10;Night
1 3
2 2
EASTBOUND LANES
'CARS'   1014   45
'MT'       10   45
'HT'       10   45
'L'/
'E1'   -2000  -20  0          0
'E2'    2000  -20  0          0
'L'/
WESTBOUND LANES
'CARS'   818   45
'MT'       8   45
'HT'       8   45
'L'/
'W1'   -2000   -33  0          0
'W2'    2000   -33  0          0
'L'/
5 12
Hwy 10 Receptors
'R1'   0      0   5
'R2'   0     50   5
'R3'   0    100   5
'R4'   0    150   5
'R5'   0    200   5
'R6'   0    300   5
'R7'   0    400   5
'R8'   0    600   5
'R9'   0    800   5
'R10'  0   1000   5
'R11'  0   1200   5
'R12'  0   1500   5
6 1
```

```
ALPHA VALUES
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
6 2
SHIELDING VALUES
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
7/
```

Table B3.2 b: Projected 2030 CR10 Night, Output

```
          ***********************************************
          * MINNOISE Ver 0.2 BASED ON STAMINA
2.0/BCR  *
          * FHWA VERSION (MARCH 1982). A
TRAFFIC NOISE *
          * PREDICTION MODEL DEVELOPED
UNDER CONTRACT  *
          * BY BBN.                          *
          ***********************************************



         ( INPUT UNITS- ENGLISH , OUTPUT
UNITS- ENGLISH )


 2030;Hwy 10;Night
 PROGRAM INITIALIZATION PARAMETERS

   HEIGHT   CODE    DESCRIPTION
    0.00      1  RECEIVER HEIGHT ADJUSTMENT
    1.00      2  A-WEIGHTED SOUND LEVEL ONLY
    0.00      3  HEIGHT ADJUSTMENT FOR
PASSENGER CARS (CARS)
    8.00      4  HEIGHT ADJUSTMENT FOR HEAVY
TRUCKS   (HT)
    2.30      5  HEIGHT ADJUSTMENT FOR MEDIUM
TRUCKS  (MT)


 ROADWAY   1     EASTBOUND LANES


                VEHICLE TYPE   VEHICLES/HOUR
SPEED
                   CARS          1014.        45.
                   HT             10.         45.
                   MT             10.         45.
                  ------------COORDINATES-------------
                      X          Y          Z      GRADE
 E1                  -2000.0     -20.0       0.0      0
 E2                   2000.0     -20.0       0.0      0


 ROADWAY   2     WESTBOUND LANES


                VEHICLE TYPE   VEHICLES/HOUR
SPEED
                   CARS           818.        45.
                   HT             8.          45.
                   MT             8.          45.
                  ------------COORDINATES-------------
                      X          Y          Z      GRADE
 W1                  -2000.0     -33.0       0.0      0
 W2                   2000.0     -33.0       0.0      0
 Hwy 10 Receptors
                  ------------COORDINATES-------------
                      X          Y          Z
 R1                    0.0        0.0        5.0
 R2                    0.0       50.0        5.0
 R3                    0.0      100.0        5.0
 R4                    0.0      150.0        5.0
 R5                    0.0      200.0        5.0
 R6                    0.0      300.0        5.0
 R7                    0.0      400.0        5.0
 R8                    0.0      600.0        5.0
 R9                    0.0      800.0        5.0
 R10                   0.0     1000.0        5.0
 R11                   0.0     1200.0        5.0
 R12                   0.0     1500.0        5.0

  ALPHA FACTORS - ROADWAY
ACROSS,RECEIVER DOWN

  1 * 0.5 0.5
  2 * 0.5 0.5
  3 * 0.5 0.5
  4 * 0.5 0.5
  5 * 0.5 0.5
  6 * 0.5 0.5
  7 * 0.5 0.5
  8 * 0.5 0.5
  9 * 0.5 0.5
 10 * 0.5 0.5
 11 * 0.5 0.5
 12 * 0.5 0.5

  SHIELDING FACTORS - ROADWAY
ACROSS,RECEIVER DOWN

  1 * 0.0 0.0
  2 * 0.0 0.0
  3 * 0.0 0.0
  4 * 0.0 0.0
  5 * 0.0 0.0
  6 * 0.0 0.0
  7 * 0.0 0.0
  8 * 0.0 0.0
  9 * 0.0 0.0
 10 * 0.0 0.0
 11 * 0.0 0.0
 12 * 0.0 0.0

 2030;Hwy 10;Night
 RECEIVER    LEQ(H)   SIG   L10    L50    L90

 R1          73.5     6.3   77.0   68.9   60.9
 R2          66.7     5.0   70.2   63.8   57.3
 R3          63.3     4.3   66.7   61.2   55.7
 R4          61.0     3.9   64.3   59.3   54.4
 R5          59.4     3.5   62.4   57.9   53.4
 R6          56.8     3.1   59.7   55.7   51.7
 R7          55.0     2.8   57.7   54.0   50.4
 R8          52.2     2.5   54.6   51.4   48.2
 R9          50.0     2.3   52.4   49.4   46.5
 R10         48.3     2.2   50.5   47.7   44.9
 R11         46.8     2.1   49.0   46.3   43.6
 R12         44.8     2.0   46.9   44.3   41.7
```

Table B4.1 a: Projected 2030 CR110 Day, Input

```
2030;Hwy 110;Day
1 3
2 2
EASTBOUND LANES
'CARS'    137   45
'MT'        1   45
'HT'        1   45
'L'/
'E1'   -2000  -20  0          0
'E2'       2000  -20  0       0
'L'/
WESTBOUND LANES
'CARS' 1313   45
'MT'       13   45
'HT'       13   45
'L'/
'W1'   -2000   -33  0         0
'W2'       2000   -33  0      0
'L'/
5 12
Hwy 110 Receptors
'R1'   0      0   5
'R2'   0     50   5
'R3'   0    100   5
'R4'   0    150   5
'R5'   0    200   5
'R6'   0    300   5
'R7'   0    400   5
'R8'   0    600   5
'R9'   0    800   5
'R10'  0   1000   5
'R11'  0   1200   5
'R12'  0   1500   5
6 1
```

```
ALPHA VALUES
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
6 2
SHIELDING VALUES
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
7/
```

Table B4.1 b: Projected 2030 CR110 Day, Output

```
          * MINNOISE Ver 0.2 BASED ON STAMINA
2.0/BCR  *
          * FHWA VERSION (MARCH 1982). A
TRAFFIC NOISE *
          * PREDICTION MODEL DEVELOPED
UNDER CONTRACT  *
          * BY BBN.                        *
          ************************************************


          ( INPUT UNITS- ENGLISH , OUTPUT
UNITS- ENGLISH )


 2030;Hwy 110;Day
 PROGRAM INITIALIZATION PARAMETERS

   HEIGHT   CODE    DESCRIPTION
    0.00      1  RECEIVER HEIGHT ADJUSTMENT
    1.00      2  A-WEIGHTED SOUND LEVEL ONLY
    0.00      3  HEIGHT ADJUSTMENT FOR
PASSENGER CARS (CARS)
    8.00      4  HEIGHT ADJUSTMENT FOR HEAVY
TRUCKS   (HT)
    2.30      5  HEIGHT ADJUSTMENT FOR MEDIUM
TRUCKS  (MT)


 ROADWAY   1     EASTBOUND LANES


              VEHICLE TYPE   VEHICLES/HOUR
SPEED
                  CARS           137.        45.
                  HT              1.        45.
                  MT              1.        45.
                 ------------COORDINATES-------------
                     X          Y          Z      GRADE
 E1                -2000.0      -20.0        0.0      0
 E2                 2000.0      -20.0        0.0      0


 ROADWAY   2     WESTBOUND LANES


              VEHICLE TYPE   VEHICLES/HOUR
SPEED
                  CARS          1313.        45.
                  HT              13.        45.
                  MT              13.        45.
                 ------------COORDINATES-------------
                     X          Y          Z      GRADE
 W1                -2000.0      -33.0        0.0      0
 W2                 2000.0      -33.0        0.0      0
 Hwy 110 Receptors
                 ------------COORDINATES-------------
                     X          Y          Z
 R1                    0.0        0.0        5.0
 R2                    0.0       50.0        5.0
 R3                    0.0      100.0        5.0
 R4                    0.0      150.0        5.0
 R5                    0.0      200.0        5.0
 R6                    0.0      300.0        5.0
 R7                    0.0      400.0        5.0
 R8                    0.0      600.0        5.0
 R9                    0.0      800.0        5.0
 R10                   0.0     1000.0        5.0
 R11                   0.0     1200.0        5.0
 R12                   0.0     1500.0        5.0

   ALPHA FACTORS - ROADWAY
ACROSS,RECEIVER DOWN

  1 * 0.5 0.5
  2 * 0.5 0.5
  3 * 0.5 0.5
  4 * 0.5 0.5
  5 * 0.5 0.5
  6 * 0.5 0.5
  7 * 0.5 0.5
  8 * 0.5 0.5
  9 * 0.5 0.5
 10 * 0.5 0.5
 11 * 0.5 0.5
 12 * 0.5 0.5

   SHIELDING FACTORS - ROADWAY
ACROSS,RECEIVER DOWN

  1 * 0.0 0.0
  2 * 0.0 0.0
  3 * 0.0 0.0
  4 * 0.0 0.0
  5 * 0.0 0.0
  6 * 0.0 0.0
  7 * 0.0 0.0
  8 * 0.0 0.0
  9 * 0.0 0.0
 10 * 0.0 0.0
 11 * 0.0 0.0
 12 * 0.0 0.0

 2030;Hwy 110;Day
 RECEIVER    LEQ(H)   SIG   L10    L50    L90

 R1          71.2    6.4   74.7   66.5   58.2
 R2          65.1    5.2   68.6   62.0   55.4
 R3          61.9    4.5   65.4   59.6   53.8
 R4          59.8    4.1   63.1   57.8   52.6
 R5          58.1    3.8   61.3   56.5   51.6
 R6          55.7    3.4   58.7   54.4   50.1
 R7          53.8    3.1   56.7   52.7   48.8
 R8          51.1    2.7   53.7   50.2   46.7
 R9          48.9    2.5   51.4   48.2   45.0
 R10         47.2    2.4   49.6   46.5   43.4
 R11         45.7    2.3   48.1   45.1   42.1
 R12         43.7    2.3   46.0   43.2   40.3
```

Table B4.2 a: Projected 2030 CR110 Night, Input

```
2030;Hwy 110;Day
1 3
2 2
EASTBOUND LANES
'CARS'    279   45
'MT'        3   45
'HT'        3   45
'L'/
'E1'   -2000  -20  0          0
'E2'       2000  -20  0       0
'L'/
WESTBOUND LANES
'CARS'  853   45
'MT'        9   45
'HT'        9   45
'L'/
'W1'   -2000   -33  0         0
'W2'       2000   -33  0      0
'L'/
5 12
Hwy 110 Receptors
'R1'   0      0   5
'R2'   0     50   5
'R3'   0    100   5
'R4'   0    150   5
'R5'   0    200   5
'R6'   0    300   5
'R7'   0    400   5
'R8'   0    600   5
'R9'   0    800   5
'R10'  0   1000   5
'R11'  0   1200   5
'R12'  0   1500   5
6 1
```

```
ALPHA VALUES
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
6 2
SHIELDING VALUES
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
7/
```

Table B4.2 b: Projected 2030 CR110 Night, Output

```
          * MINNOISE Ver 0.2 BASED ON STAMINA
2.0/BCR  *
          * FHWA VERSION (MARCH 1982). A
TRAFFIC NOISE *
          * PREDICTION MODEL DEVELOPED
UNDER CONTRACT  *
          * BY BBN.                    *

          ( INPUT UNITS- ENGLISH , OUTPUT
UNITS- ENGLISH )


 2030;Hwy 110;Day
 PROGRAM INITIALIZATION PARAMETERS

   HEIGHT   CODE    DESCRIPTION
    0.00      1  RECEIVER HEIGHT ADJUSTMENT
    1.00      2  A-WEIGHTED SOUND LEVEL ONLY
    0.00      3  HEIGHT ADJUSTMENT FOR
PASSENGER CARS (CARS)
    8.00      4  HEIGHT ADJUSTMENT FOR HEAVY
TRUCKS   (HT)
    2.30      5  HEIGHT ADJUSTMENT FOR MEDIUM
TRUCKS  (MT)


 ROADWAY   1     EASTBOUND LANES


              VEHICLE TYPE   VEHICLES/HOUR
SPEED
                  CARS           279.        45.
                  HT               3.        45.
                  MT               3.        45.
                 ------------COORDINATES-------------
                     X          Y          Z      GRADE
 E1                -2000.0      -20.0        0.0      0
 E2                 2000.0      -20.0        0.0      0


 ROADWAY   2     WESTBOUND LANES


              VEHICLE TYPE   VEHICLES/HOUR
SPEED
                  CARS           853.        45.
                  HT               9.        45.
                  MT               9.        45.
                 ------------COORDINATES-------------
                     X          Y          Z      GRADE
 W1                -2000.0      -33.0        0.0      0
 W2                 2000.0      -33.0        0.0      0
 Hwy 110 Receptors
                 ------------COORDINATES-------------
                     X          Y          Z
 R1                    0.0        0.0        5.0
 R2                    0.0       50.0        5.0
 R3                    0.0      100.0        5.0
 R4                    0.0      150.0        5.0
 R5                    0.0      200.0        5.0
 R6                    0.0      300.0        5.0
 R7                    0.0      400.0        5.0
 R8                    0.0      600.0        5.0
 R9                    0.0      800.0        5.0
 R10                   0.0     1000.0        5.0
 R11                   0.0     1200.0        5.0
 R12                   0.0     1500.0        5.0

   ALPHA FACTORS - ROADWAY
ACROSS,RECEIVER DOWN

  1 * 0.5 0.5
  2 * 0.5 0.5
  3 * 0.5 0.5
  4 * 0.5 0.5
  5 * 0.5 0.5
  6 * 0.5 0.5
  7 * 0.5 0.5
  8 * 0.5 0.5
  9 * 0.5 0.5
 10 * 0.5 0.5
 11 * 0.5 0.5
 12 * 0.5 0.5

   SHIELDING FACTORS - ROADWAY
ACROSS,RECEIVER DOWN

  1 * 0.0 0.0
  2 * 0.0 0.0
  3 * 0.0 0.0
  4 * 0.0 0.0
  5 * 0.0 0.0
  6 * 0.0 0.0
  7 * 0.0 0.0
  8 * 0.0 0.0
  9 * 0.0 0.0
 10 * 0.0 0.0
 11 * 0.0 0.0
 12 * 0.0 0.0

 2030;Hwy 110;Day
 RECEIVER    LEQ(H)   SIG   L10    L50    L90

 R1          70.7    6.9   74.1   65.2   56.4
 R2          64.3    5.7   67.9   60.6   53.4
 R3          61.1    5.0   64.6   58.2   51.9
 R4          58.9    4.5   62.3   56.5   50.8
 R5          57.2    4.2   60.6   55.2   49.8
 R6          54.8    3.7   57.9   53.1   48.3
 R7          52.9    3.4   55.9   51.5   47.1
 R8          50.1    3.1   53.0   49.0   45.1
 R9          48.0    2.9   50.7   47.1   43.4
 R10         46.3    2.7   48.9   45.4   41.9
 R11         44.7    2.6   47.3   44.0   40.6
 R12         42.8    2.5   45.3   42.0   38.8
```

Table B5.1 a: Projected 2030 Clover Ridge Rd. Day, Input

```
2030;Clover Ridge;Day
1 3
2 2
NorthBOUND LANES
'CARS'   1330   45
'MT'       13   45
'HT'       13   45
'L'/
'N1'   -2000  -20  0          0
'N2'    2000  -20  0          0
'L'/
SouthBOUND LANES
'CARS'   137   45
'MT'       1   45
'HT'       1   45
'L'/
'S1'   -2000   -33  0          0
'S2'    2000   -33  0          0
'L'/
5 12
Clover Ridge Receptors
'R1'   0      0   5
'R2'   0     50   5
'R3'   0    100   5
'R4'   0    150   5
'R5'   0    200   5
'R6'   0    300   5
'R7'   0    400   5
'R8'   0    600   5
'R9'   0    800   5
'R10'  0   1000   5
'R11'  0   1200   5
'R12'  0   1500   5
6 1
```

```
ALPHA VALUES
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
6 2
SHIELDING VALUES
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
7/
```

Table B5.1 b: Projected 2030 Clover Ridge Rd. Day, Output

```
          * MINNOISE Ver 0.2 BASED ON STAMINA 2.0/BCR  *
          * FHWA VERSION (MARCH 1982). A TRAFFIC NOISE *
          * PREDICTION MODEL DEVELOPED UNDER CONTRACT  *
          * BY BBN.                                    *
          **********************************************


          ( INPUT UNITS- ENGLISH , OUTPUT UNITS- ENGLISH )


 2030;Clover Ridge;Day
 PROGRAM INITIALIZATION PARAMETERS

   HEIGHT   CODE    DESCRIPTION
    0.00      1  RECEIVER HEIGHT ADJUSTMENT
    1.00      2  A-WEIGHTED SOUND LEVEL ONLY
    0.00      3  HEIGHT ADJUSTMENT FOR PASSENGER CARS (CARS)
    8.00      4  HEIGHT ADJUSTMENT FOR HEAVY TRUCKS   (HT)
    2.30      5  HEIGHT ADJUSTMENT FOR MEDIUM TRUCKS  (MT)


 ROADWAY   1     NorthBOUND LANES


                VEHICLE TYPE   VEHICLES/HOUR    SPEED
                   CARS          1330.        45.
                   HT             13.         45.
                   MT             13.         45.
                  ------------COORDINATES-------------
                     X          Y          Z      GRADE
 N1                 -2000.0     -20.0       0.0      0
 N2                  2000.0     -20.0       0.0      0

 ROADWAY   2     SouthBOUND LANES


                VEHICLE TYPE   VEHICLES/HOUR    SPEED
                   CARS          137.         45.
                   HT             1.          45.
                   MT             1.          45.
                  ------------COORDINATES-------------
                     X          Y          Z      GRADE
 S1                 -2000.0     -33.0       0.0      0
 S2                  2000.0     -33.0       0.0      0
 Clover Ridge Receptors
                  ------------COORDINATES-------------
                     X          Y          Z
 R1                    0.0        0.0        5.0
 R2                    0.0       50.0        5.0
 R3                    0.0      100.0        5.0
 R4                    0.0      150.0        5.0
 R5                    0.0      200.0        5.0
 R6                    0.0      300.0        5.0
 R7                    0.0      400.0        5.0
 R8                    0.0      600.0        5.0
 R9                    0.0      800.0        5.0
 R10                   0.0     1000.0        5.0
 R11                   0.0     1200.0        5.0
 R12                   0.0     1500.0        5.0


  ALPHA FACTORS - ROADWAY ACROSS,RECEIVER DOWN

  1 * 0.5 0.5
  2 * 0.5 0.5
  3 * 0.5 0.5
  4 * 0.5 0.5
  5 * 0.5 0.5
  6 * 0.5 0.5
  7 * 0.5 0.5
  8 * 0.5 0.5
  9 * 0.5 0.5
 10 * 0.5 0.5
 11 * 0.5 0.5
 12 * 0.5 0.5


  SHIELDING FACTORS - ROADWAY ACROSS,RECEIVER DOWN

  1 * 0.0 0.0
  2 * 0.0 0.0
  3 * 0.0 0.0
  4 * 0.0 0.0
  5 * 0.0 0.0
  6 * 0.0 0.0
  7 * 0.0 0.0
  8 * 0.0 0.0
  9 * 0.0 0.0
 10 * 0.0 0.0
 11 * 0.0 0.0
 12 * 0.0 0.0


 2030;Clover Ridge;Day
 RECEIVER    LEQ(H)   SIG   L10    L50    L90

 R1           73.2    6.5   76.7   68.3   59.9
 R2           66.0    5.4   69.6   62.7   55.8
 R3           62.5    4.6   66.0   60.1   54.1
 R4           60.2    4.2   63.6   58.2   52.9
 R5           58.5    3.8   61.7   56.8   51.9
 R6           55.9    3.4   59.0   54.6   50.3
 R7           54.0    3.1   56.9   52.9   49.0
 R8           51.2    2.7   53.9   50.4   46.9
 R9           49.1    2.5   51.6   48.3   45.1
 R10          47.3    2.4   49.7   46.7   43.6
 R11          45.8    2.3   48.2   45.2   42.2
 R12          43.8    2.2   46.1   43.3   40.4
```

Table B5.2 a: Projected 2030 Clover Ridge Rd. Night, Input

```
2030;Clover Ridge;Night
1 3
2 2
NorthBOUND LANES
'CARS'    853   45
'MT'        9   45
'HT'        9   45
'L'/
'N1'   -2000  -20  0          0
'N2'    2000  -20  0          0
'L'/
SouthBOUND LANES
'CARS'   137   45
'MT'       1   45
'HT'       1   45
'L'/
'S1'   -2000   -33  0          0
'S2'    2000   -33  0          0
'L'/
5 12
Clover Ridge Receptors
'R1'   0      0   5
'R2'   0     50   5
'R3'   0    100   5
'R4'   0    150   5
'R5'   0    200   5
'R6'   0    300   5
'R7'   0    400   5
'R8'   0    600   5
'R9'   0    800   5
'R10'  0   1000   5
'R11'  0   1200   5
'R12'  0   1500   5
6 1
ALPHA VALUES
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
2*.5
6 2
SHIELDING VALUES
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
2*0
7/
```

Table B5.2 b: Projected 2030 Clover Ridge Rd. Night, Output

```
          * MINNOISE Ver 0.2 BASED ON STAMINA
2.0/BCR  *
          * FHWA VERSION (MARCH 1982). A
TRAFFIC NOISE *
          * PREDICTION MODEL DEVELOPED
UNDER CONTRACT  *
          * BY BBN.                        *
          ************************************************


          ( INPUT UNITS- ENGLISH , OUTPUT
UNITS- ENGLISH )


 2030;Clover Ridge;Night
 PROGRAM INITIALIZATION PARAMETERS

   HEIGHT   CODE    DESCRIPTION
    0.00      1  RECEIVER HEIGHT ADJUSTMENT
    1.00      2  A-WEIGHTED SOUND LEVEL ONLY
    0.00      3  HEIGHT ADJUSTMENT FOR
PASSENGER CARS (CARS)
    8.00      4  HEIGHT ADJUSTMENT FOR HEAVY
TRUCKS   (HT)
    2.30      5  HEIGHT ADJUSTMENT FOR MEDIUM
TRUCKS  (MT)


 ROADWAY   1     NorthBOUND LANES


                VEHICLE TYPE   VEHICLES/HOUR
SPEED
                   CARS           853.        45.
                   HT              9.         45.
                   MT              9.         45.
                  ------------COORDINATES-------------
                      X          Y          Z      GRADE
 N1                  -2000.0     -20.0       0.0      0
 N2                   2000.0     -20.0       0.0      0


 ROADWAY   2     SouthBOUND LANES


                VEHICLE TYPE   VEHICLES/HOUR
SPEED
                   CARS           137.        45.
                   HT              1.         45.
                   MT              1.         45.
                  ------------COORDINATES-------------
                      X          Y          Z      GRADE
 S1                  -2000.0     -33.0       0.0      0
 S2                   2000.0     -33.0       0.0      0
 Clover Ridge Receptors
                  ------------COORDINATES-------------
                      X          Y          Z
 R1                     0.0        0.0        5.0
 R2                     0.0       50.0        5.0
 R3                     0.0      100.0        5.0
 R4                     0.0      150.0        5.0
 R5                     0.0      200.0        5.0
 R6                     0.0      300.0        5.0
 R7                     0.0      400.0        5.0
 R8                     0.0      600.0        5.0
 R9                     0.0      800.0        5.0
 R10                    0.0     1000.0        5.0
 R11                    0.0     1200.0        5.0
 R12                    0.0     1500.0        5.0

  ALPHA FACTORS - ROADWAY
ACROSS,RECEIVER DOWN

  1 * 0.5 0.5
  2 * 0.5 0.5
  3 * 0.5 0.5
  4 * 0.5 0.5
  5 * 0.5 0.5
  6 * 0.5 0.5
  7 * 0.5 0.5
  8 * 0.5 0.5
  9 * 0.5 0.5
 10 * 0.5 0.5
 11 * 0.5 0.5
 12 * 0.5 0.5

  SHIELDING FACTORS - ROADWAY
ACROSS,RECEIVER DOWN

  1 * 0.0 0.0
  2 * 0.0 0.0
  3 * 0.0 0.0
  4 * 0.0 0.0
  5 * 0.0 0.0
  6 * 0.0 0.0
  7 * 0.0 0.0
  8 * 0.0 0.0
  9 * 0.0 0.0
 10 * 0.0 0.0
 11 * 0.0 0.0
 12 * 0.0 0.0

 2030;Clover Ridge;Night
 RECEIVER    LEQ(H)   SIG   L10    L50    L90

 R1          71.5    7.1   74.8   65.7   56.7
 R2          64.3    5.9   67.9   60.3   52.7
 R3          60.8    5.2   64.4   57.7   51.1
 R4          58.6    4.7   62.0   56.0   49.9
 R5          56.8    4.4   60.2   54.6   49.0
 R6          54.3    3.9   57.5   52.5   47.5
 R7          52.4    3.6   55.5   50.9   46.3
 R8          49.6    3.2   52.5   48.4   44.2
 R9          47.4    3.0   50.2   46.4   42.6
 R10         45.7    2.9   48.4   44.7   41.1
 R11         44.2    2.8   46.8   43.3   39.8
 R12         42.2    2.7   44.8   41.4   38.0
```

Appendix C

Ambient Sound Pressure Level Monitoring
Statistical Summary

Contents:

Table C1: Site 1 (140 ft. from near ROW) Ambient Nighttime Sound Pressure Level Monitoring—Statistical Summary

Percent	dB(A)	Percent	dB(A)	Percent	dB(A)	Percent	dB(A)
1	80.3	26	62.5	51	59.6	76	56.6
2	73.6	27	62.4	52	59.4	77	56.5
3	70.8	28	62.3	53	59.3	78	56.3
4	68.8	29	62.1	54	59.2	79	56.1
5	67.4	30	62	55	59.1	80	55.9
6	66.5	31	61.9	56	59	81	55.8
7	66	32	61.8	57	58.9	82	55.6
8	65.6	33	61.6	58	58.8	83	55.4
9	65.3	34	61.5	59	58.7	84	55.2
10	65	35	61.4	60	58.5	85	54.9
11	64.8	36	61.3	61	58.4	86	54.7
12	64.6	37	61.2	62	58.3	87	54.5
13	64.4	38	61.1	63	58.2	88	54.2
14	64.2	39	60.9	64	58.1	89	54
15	64.1	40	60.8	65	58	90	53.6
16	63.9	41	60.7	66	57.9	91	53.3
17	63.7	42	60.6	67	57.7	92	52.9
18	63.6	43	60.5	68	57.6	93	52.5
19	63.5	44	60.4	69	57.5	94	52.1
20	63.3	45	60.3	70	57.4	95	51.6
21	63.2	46	60.1	71	57.3	96	51.1
22	63	47	60	72	57.1	97	50.4
23	62.9	48	59.9	73	57	98	49.8
24	62.8	49	59.8	74	56.9	99	48.9
25	62.6	50	59.7	75	56.7	100	45.4

Table C2: Site 2 (268 ft. from near ROW) Ambient Nighttime Sound Pressure Level Monitoring—Statistical Summary

Percent	dB(A)	Percent	dB(A)	Percent	dB(A)	Percent	dB(A)
1	78.4	26	61.8	51	59.2	76	55.9
2	70.6	27	61.7	52	59.1	77	55.7
3	66.1	28	61.6	53	59	78	55.5
4	65.4	29	61.5	54	58.9	79	55.3
5	65	30	61.4	55	58.8	80	55.1
6	64.7	31	61.3	56	58.7	81	54.9
7	64.5	32	61.2	57	58.6	82	54.7
8	64.2	33	61.1	58	58.5	83	54.5
9	64	34	61	59	58.4	84	54.3
10	63.8	35	60.9	60	58.3	85	54
11	63.7	36	60.8	61	58.1	86	53.8
12	63.5	37	60.7	62	58	87	53.5
13	63.4	38	60.6	63	57.9	88	53.2
14	63.2	39	60.5	64	57.8	89	52.9
15	63.1	40	60.4	65	57.6	90	52.5
16	63	41	60.3	66	57.5	91	52.2
17	62.9	42	60.1	67	57.4	92	51.8
18	62.7	43	60	68	57.2	93	51.4
19	62.6	44	59.9	69	57.1	94	51
20	62.5	45	59.8	70	56.9	95	50.6
21	62.4	46	59.7	71	56.7	96	50.1
22	62.3	47	59.6	72	56.6	97	49.3
23	62.2	48	59.5	73	56.4	98	48.4
24	62	49	59.4	74	56.2	99	47.4
25	61.9	50	59.3	75	56.1	100	43.3