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IOWA STATE HIGHWAY COMMISSION

**DATA PROCESSING
SYSTEMS MANUAL**

HIGHWAY NOISE PREDICTION



17-H53DP
5:H537
1972

HIGHWAY NOISE PREDICTION

Program developed by Transportation Systems Center,
Department of Transportation. Distributed to the State
by Federal Highway Administration.

Program revised to change data input method and print out
data card comments by Data Processing Department of Iowa
State Highway Commission.

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Data Processing Department
Iowa State Highway Commission

December, 1972

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User's Manual (FHWA Supplied)	
Programmer's Manual (FHWA Supplied)	

No pages 2, 4, or 6

NOTE: The User's and Programmers Manuals supplied by FHWA were in limited supply and are not included in all of the systems manuals. These manuals are available for examination in the following offices.

- Data Processing Systems, ISHC
- Environmental Section, Planning and Programming Dept., ISHC
- Location Section, Road Design Dept., ISHC

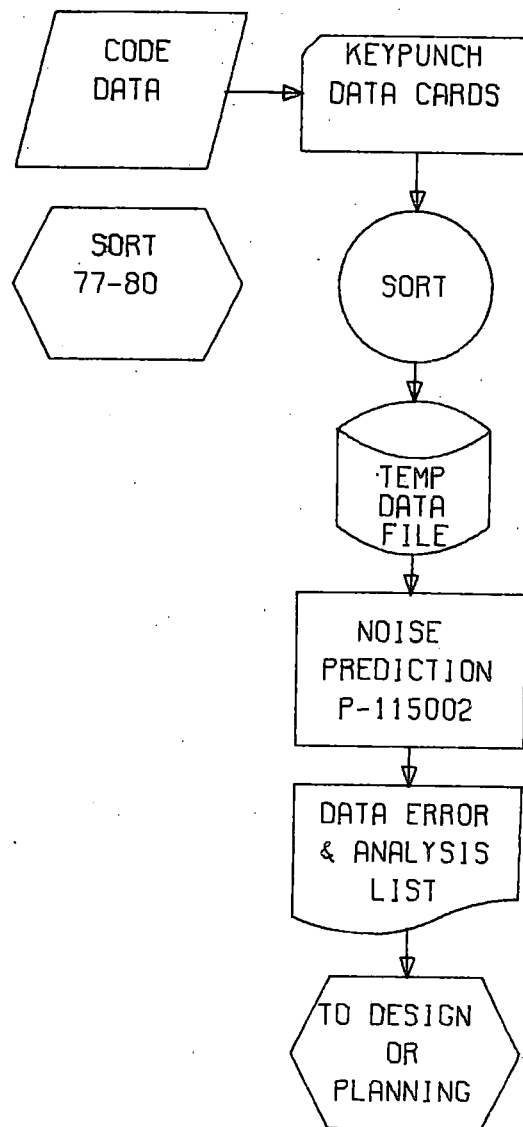
HIGHWAY NOISE PREDICTION

Traffic on the nation's highways creates noise. As the traffic volumes and speeds increase on new or improved highways the level of noise increases and becomes obnoxious to persons occupying improvements adjacent to the highway. At times the noise can reach levels that are definite health and environmental hazards. The highway departments are responsible for providing facilities which reduce or limit noise levels from the highways. An environmental impact statement (EIS) must be a part of each highway project. The EIS must include data and a statement relative to the noise levels anticipated to be generated by the traffic and the methods used to limit the noise levels.

Several methods have been developed which will identify possible high noise level locations on highways. Identifying these locations makes it possible to change designs or provide for some type of noise barrier. One of the methods developed is a numerical analysis of the roadway, using a computer program. This program was developed by the Transportation Systems Center for the Department of Transportation and provided to ISHC by FHWA. This program uses data identifying traffic volumes and speeds, highway geometry, noise barriers, ground cover and noise receivers to simulate and determine the noise levels which can be expected.

The Data Processing Department of ISHC has developed coding forms to be used for the data to be entered into the program. The Highway Planning and Programming and the Design Departments are responsible for coding and submitting the necessary data forms to Data Processing for the noise prediction on the highway sections.

This program has been modified to include an internal sort on the data cards, store the cards in a disk file, and read the data into the program from the disk file. Comments may be coded in the cards and these will be printed with the output list.



IOWA STATE HIGHWAY COMMISSION
PROGRAM ABSTRACT
(DATA PROCESSING DEPARTMENT)

Page 1 of 1

Program No. P115002

Title: HIGHWAY NOISE PREDICTION

Programmer: TSC of DOT for FHWA. Modified by Ia. Hwy. Comm. Date: 12-5-72

- | | | | |
|--------------|--------------------|-----------------|-----------------------|
| 1. Purpose | 3. Configuration | 5. Limitations | 7. Additional Remarks |
| 2. Procedure | 4. Source Language | 6. Running Time | 8. Subroutines |

1. To predict traffic generated noise levels on highway sections.
3. IBM 370/145, 96K, OS/MVT, reader, disk, printer.
4. FORTRAN IV G
5. Maximum of:
 - 10 roadways with 10 sections each
 - 10 barriers with 10 sections each
 - 10 ground strips
 - 15 receivers
 - 5 speed groups each for cars, trucks, and new vehicles on each roadway
 - 9 problems in a run.
6. 15-30 seconds per problem.
7. End of file and job routine inserted to replace the FORTRAN default to error 217 at EOJ.

Step 1 sort precedes the program. Data stored on disk and retrieved by program from the temporary disk file instead of the card reader.

All data cards may have comments in cols. 32-76. These comments are printed with the output.

DATA PROCESSING
COMPUTER SETUP SHEET
IBM 360 OPERATING SYSTEM (MVT)

PAGE 1 OF 1

PROGRAM NO. P1115002 JOB CLASS A DATE December, 1972 CHARGE 223810 STEP 1 OF 1
 PROGRAM NAME Highway Noise Prediction NAME Burr McFarland TEST PRODUCTION
 FREQUENCY OF RUN on request REGION 96K PRIORITY _____ SOURCE LANGUAGE FORTRAN IV CPU _____
 JCL AND/OR PROGRAM IN DRAWER NO. _____ USAGE PERCENTAGE I/O _____ CPU _____ RUN TIME PRINT _____

DESCRIPTION OF JOB	DATA PREPARATION

PRINTER USED: YES NO

PUNCH USED: YES NO

FORM CODE	CLASS	FORM NAME	ALIGNMENT	CARTRIDGE TAPE		CARD TYPE
				NAME	NO.	
STW1	A	1 pt. std. wd	STD			

DATA SETS

DDNAME	DSNAME	T/D/C	ACCESS	IN	OUT	TAPE DISP	VOLUME NUMBER
SORTIN		C		X			
SORTOUT	&&NOISE	D			X	Pass	
FTO4F001	&&NOISE	D		X		Rel.	

REMARKS: SORTOUT passed to main program.

Disk file is a temporary data set.

PROGRAM COMPLETION MESSAGE:

*** PROGRAM P115002 COMPLETED ***

PROGRAM NO P115002

ERROR & WARNING MESSAGES

CONSOLE

PRINTER

MESSAGE - ILLEGAL BARRIER INTERSECTS ROADWAY

CAUSE - Barrier coded to intersect roadway

ACTION - Program continues to next case

MESSAGE - ILLEGAL GROUND STRIP INTERSECTS ROADWAY

CAUSE - Ground strip coded to intersect roadway

ACTION - Program continues to next case.

MESSAGE - TOO MANY REFLECTIONS

CAUSE - Number of noise reflections to a receiver exceeds 10

ACTION - Program continues to next receiver data analysis

MESSAGE - CONTROL CARD MISSING OR INCORRECT

CAUSE - Column 6 not = 1 thru 6

ACTION - User correct & re-submit problem

PROGRAM NO P115002

ERROR & WARNING MESSAGES

CONSOLE

PRINTER

MESSAGE - STOP 15002

CAUSE - Normal end of program

ACTION - None

MESSAGE -

CAUSE -

ACTION -

MESSAGE -

CAUSE -

ACTION -

MESSAGE -

CAUSE -

ACTION -

PL15002 HIGHWAY NOISE PREDICTION CODING INSTRUCTIONS

There are five (5) coding forms on which the various data items are to be coded for entry into this program. Each form is identified for coding specific items such as Initialization Parameters, Barriers, etc., and is set up to conform to the coding instructions contained on pages 17-24 in the User's Manual provided by FHWA.

All data items are not required for any one problem, however, the following data items are required for the first problem of a set.

1. Title card (Form #1)
2. Initialization parameters. Parameters 1 thru 6 if 'new vehicle' option is not used and parameters 1 thru 8 plus the A-weighted noise level data if the option is used. (Form #1)
3. Parameter control cards for each type of data coded (Form #1)
4. End of Data Control card (Form #1)
5. Traffic and Roadway Parameters (Form #2)
6. Receiver Parameters (Form #5)

Any problems following the first problem of a set may have any of the above data in addition to any Barrier (Form #3) or Ground Cover (Form #4) data. All data from problem #1 of a set will remain and be used for all following problems of a set unless it is changed or zeroed. All problems following the problem #1 must have a Title card, parameter control cards for parameters entered and an End of Data Control card.

The following instructions pertain to the five (5) coding forms as adopted by ISHC for submitting data to the Data Processing Department for keypunching and running in the computer.

Coding Form #'s 1 thru 5:

Each problem of a set will be numbered beginning with

1. Code the problem number in column 77 of each title, parameter and control card to be used in this problem.

Cols. 32-76: Code any alphanumeric data desired to describe the traffic or roadway section.

Coding Form #1: If any of the Initialization parameter cards or parameter control cards are not used for a problem then draw a red line all the way through that particular coding line. This refers to card numbers 002-011, 100, 700, 900, and 950 only.

Coding Form #2:

Cols. 78-80: Code the 3 digit card number for the Traffic and Roadway data cards. Start with number 101, followed by 102, 103, etc., to the end of this data block.

Coding Form #3:

Cols. 78-80: Code the 3 digit card number for the Barrier data cards. Start with number 701, followed by 702, 703, etc., to the end of this data block.

NOTE: The problem number and card number required in cols. 77-80 of each card is for the purpose of sorting the cards to get them in the proper sequence for entry into the program. The sorting will be done in the computer and then the data will be sorted on a disk file. The program will access this file for the data as necessary.

DATE: _____ HIGHWAY NOISE PREDICTION CODING FORM NO. 1 P-115002
 CODED BY: _____ PROJECT NO. _____ STATIONING, etc. PAGE 1 of 1 22-380

TITLE CARD: Road Section Description, Project No., Stationing, etc.		CARD NO.
1		77
2		78
3		79
4		80
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
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80		

PARAMETERS (left justify)	INITIALIZATION PARAMETER NAMES	CARD NO.
1	RECEIVER HEIGHT ADJUSTMENT	003
2	NUMBER OF FREQUENCY BANDS	004
3	STANDARD DEVIATION OF NOISE LEVEL PASS. CARS	005
4	SOURCE HEIGHT ADJUSTMENT FOR PASS. CARS	006
5	STANDARD DEVIATION OF NOISE LEVEL TRUCKS	007
6	SOURCE HEIGHT ADJUSTMENT FOR TRUCKS	008
7	STANDARD DEVIATION OF NOISE LEVEL NEW VEHICLES	009
8	SOURCE HEIGHT ADJUSTMENT FOR NEW VEHICLES	010

A-WEIGHTED OCTAVE BAND NOISE LEVELS	REQUIRED FOR NEW VEHICLE OPTION	CARD NO.
1		77
2		78
3		79
4		80
5		
6		
7		
8		

A-Weighted New Veh. Noise Level	PARAMETER CONTROL CARDS	CARD NO.
1		77
2		78
3		79
4		80
5		
6		
7		
8		
9		
10		
11		
12		
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15		
16		
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76		
77		
78		
79		
80		

INITIALIZATION PARAMETERS FOLLOW 6 OR 9 CDS. VEHICLE & ROAD GEOMETRY. CODE NO. OF ROADWAYS BARRIERS. CODE NO. OF BARRIERS. GROUND COVER. CODE NO. OF ABSORPTIVE STRIPS. RECEIVERS. CODE NO. OF RECEIVERS. END OF DATA FOR THIS PROBLEM NUMBER.

KEYPUNCH INSTRUCTIONS

JOB NAME HIGHWAY NOISE PREDICTION

INPUT DOCUMENT HNP Coding Form #1 CHARGE CODE 22-380

CARD 5081 COLOR White

CARD COLUMNS	FIELD NAME	NUMERIC	ALPHA-NUMERIC
Card #001	Title Card		
1	Skip		
2 - 60	Road Section Description		X
61 - 76	Skip		
77 - 80	Problem & Card Number	X	
Card #'s 003-			
010	Initialization Parameters		
1 - 10	Parameter Values		X
11 - 14	Skip		
15	Parameter Number	X	
16 - 19	Skip		
20	Last Card Indicator (blank or 'L')		X
21 - 31	Skip		
32 - 76	Parameter Names		X
77 - 80	Problem & Card Number	X	
Card #011	Additional Octave Band Noise Levels		
1 - 5	New Vehicle A-Weighted Noise Level		X
6 - 10	A-Weighted Octave Band		X
11 - 15	A-Weighted Octave Band		X
16 - 20	A-Weighted Octave Band		X
21 - 25	A-Weighted Octave Band		X
26 - 30	A-Weighted Octave Band		X
31 - 35	A-Weighted Octave Band		X
36 - 40	A-Weighted Octave Band		X
41 - 45	A-Weighted Octave Band		X
Card #'s 002,	Parameter Control Cards		
100, 700, 900, 950, 999			
1 - 4	Skip		
5	Control Number	X	
6 - 8	Skip		
9 - 10	Number of Roadways, Barriers, etc. (Skip if blank)	X	
11 - 31	Skip		
32 - 76	Control Names		X
77 - 80	Problem & Card Number	X	

SPECIAL INSTRUCTIONS:

Do not punch any lines which are lined out.

KEYPUNCH INSTRUCTIONS

JOB NAME HIGHWAY NOISE PREDICTION

INPUT DOCUMENT HNP Coding Form #2 CHARGE CODE 22-380

CARD 5081 COLOR White

CARD COLUMNS	FIELD NAME	NUMERIC	ALPHA- NUMERIC
	Traffic & Roadway Parameters		
1 - 10	Hourly Traffic or Road X coord.		X
11 - 20	Operating Speed or Road Y coord.		X
21 - 30	Road Z coord.		X
25	Vehicle Type (1, 2 or 3 if coded)	X	
31	Last card indicator (blank or 'L')		X
32 - 76	Comments		X
77 - 80	Problem & Card Number	X	

SPECIAL INSTRUCTIONS:

KEYPUNCH INSTRUCTIONS

JOB NAME HIGHWAY NOISE PREDICTION

INPUT DOCUMENT HNP Coding Form #3 CHARGE CODE 22-380

CARD 5081 COLOR White

CARD COLUMNS	FIELD NAME	NUMERIC	ALPHA- NUMERIC
	Barrier Parameters		
1 - 10	X coordinate		X
11 - 20	Y coordinate		X
21 - 30	Z coordinate		X
31	Barrier Type (blank, 'A' or 'R')		X
32 - 76	Comments		X
77 - 80	Problem & Card Number	X	

SPECIAL INSTRUCTIONS:

HIGHWAY NOISE PREDICTION GROUND COVER STRIPS

CODING FORM NO. 4

P - 115002
22-380

DATE: _____

CODED BY: _____

PROJECT NO. _____ PAGE _____ OF _____

GROUND COVER DATA (Maximum of 10 Strips = 20 Cards)																																																																												Problem No.	Card No.				
CENTERLINE END POINT COORDINATES (Left Justify)																														RECTANGLE WIDTH (Left Justify)				LOCATION (Station No., side, material, etc.)																																															
X										Y										Z										31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76						
																																																																												90	1				
																																																																												G or T				90	2
																																																																												G or T				90	3
																																																																												G or T				90	4
																																																																												G or T				90	5
																																																																												G or T				90	6
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KEYPUNCH INSTRUCTIONS

JOB NAME HIGHWAY NOISE PREDICTION

INPUT DOCUMENT HNP Coding Form #4 CHARGE CODE 22-380

CARD 5081 COLOR White

CARD COLUMNS	FIELD NAME	NUMERIC	ALPHA- NUMERIC
1 - 10 11 - 20 21 - 30 31 - 40 41 - 76 77 - 80	Ground Cover Strips X coordinate Y coordinate Z coordinate Rectangle Width or Cover Type Comments Problem & Card Number	X	X X X X X

SPECIAL INSTRUCTIONS:

KEYPUNCH INSTRUCTIONS

JOB NAME HIGHWAY NOISE PREDICTION

INPUT DOCUMENT HNP Coding Form #5 CHARGE CODE 22-380

CARD 5081 COLOR White

CARD COLUMNS	FIELD NAME	NUMERIC	ALPHA-NUMERIC
1 - 10	Receivers		
11 - 20	X coordinate		X
21 - 30	Y coordinate		X
31 - 76	Z coordinate		X
77 - 80	Comments		X
	Problem & Card Number	X	

SPECIAL INSTRUCTIONS:

TRAFFIC NOISE PREDICTION

SAMPLE PROBLEM 1 XXXXXXXXXXXX

PROGRAM INITIALIZATION PARAMETERS

0.50000E 01	1	RECEIVER HEIGHT ADJUSTMENT	1003
0.90000E 01	2	NUMBER OF FREQUENCY BANDS	1004
0.25000E 01	3	STANDARD DEVIATION OF PASSENGER CARS	1005
0.0	4	SOURCE HEIGHT ADJUSTMENT FOR PASSENGER CARS	1006
0.35000E 01	5	STANDARD DEVIATION OF NOISE LEVELS OF TRUCKS	1007
0.80000E 01	6	SOURCE HEIGHT ADJUSTMENT FOR TRUCKS	1008
0.35000E 01	7	STANDARD DEVIATION OF 'NEW VEHICLES'	1009
0.0	8	SOURCE NOISE SPECTRUM FOR 'NEW VEHICLES'	1010

OPTIONAL NOISE SPECTRUM

77.0 52.0 62.0 68.0 72.0 72.0 76.0 64.0 50.0

1011

ROADWAY 1

NUMBER OF TYPE 1 VEH	VEH/H	MPH
1	0.1350E 04	0.5000E 02

NUMBER OF TYPE 2 VEH	VEH/H	MPH
1	0.7500E 02	0.5000E 02
SOURCE COORD IN FT		

NUMBER	X	Y	Z
1	0.0	0.6000E 01	0.0
2	0.1000E 05	0.6000E 01	0.0

ROADWAY 2

NUMBER OF TYPE 1 VEH	VEH/H	MPH
1	0.1250E 04	0.5000E 02

NUMBER OF TYPE 2 VEH	VEH/H	MPH
1	0.5000E 02	0.5000E 02
SOURCE COORD IN FT		

NUMBER	X	Y	Z
1	-0.1000E 05	0.6000E 01	0.0
2	0.0	0.6000E 01	0.0

ROADWAY 3

NUMBER OF TYPE 1 VEH	VEH/H	MPH
1	0.1500E 03	0.4500E 02

NUMBER OF TYPE 2 VEH	VEH/H	MPH
1	0.2500E 02	0.4500E 02
SOURCE COORD IN FT		

NUMBER	X	Y	Z
1	-0.1000E 05	0.5000E 04	0.0
2	0.0	0.6000E 01	0.0

ROADWAY 4

NUMBER OF TYPE 1 VEH	VEH/H	MPH
1	0.5000E 03	0.6000E 02

NUMBER OF TYPE 2 VEH	VEH/H	MPH
1	0.5000E 02	0.6000E 02
SOURCE COORD IN FT		

NUMBER	X	Y	Z
1	-0.1000E 05	-0.6000E 01	0.0
2	0.1000E 05	-0.6000E 01	0.0

BARRIER 1 (R) BARRIER COORD IN FT

NUMBER	X	Y	Z
1	-0.1000E 03	-0.2000E 02	0.2000E 02
2	0.2000E 03	-0.2000E 02	0.2000E 02

BARRIER 2 (A) BARRIER COORD IN FT

NUMBER	X	Y	Z
1	0.1000E 03	0.2000E 02	0.6000E 01
2	0.1000E 05	0.2000E 02	0.6000E 01

ABSORBING STRIP 1 (T)

PT	X	Y	Z	WIDTH
1	0.0	0.5000E 02	0.0	0.5000E 02
2	-0.2000E 03	0.1500E 03	0.0	

RECEIVER RECEIVER COORD IN FT

NUMBER	X	Y	Z
1	0.0	0.1000E 03	0.5000E 01
2	0.5000E 02	0.1000E 03	0.5000E 01
3	0.1000E 03	0.1000E 03	0.5000E 01
4	0.1500E 03	0.1000E 03	0.5000E 01
5	0.2000E 03	0.1000E 03	0.5000E 01

SAMPLE PROBLEM 1

XXXXXXXXXX

RECEIVER	XRC	YRC	ZRC
1	0.0	100.0	5.0

OCTAVE BAND LEVELS (A)

63	125	250	500	1000	2000	4000	8000
49.0	61.2	66.0	70.9	70.4	68.0	61.4	51.6
LE(A)	LNP	L90	L50	L10			
75.6	91.2	63.6	71.4	79.1			

RECEIVER	XRC	YRC	ZRC
2	50.0	100.0	5.0

OCTAVE BAND LEVELS (A)

63	125	250	500	1000	2000	4000	8000
48.7	60.8	65.6	70.6	70.1	67.7	61.2	51.4
LE(A)	LNP	L90	L50	L10			
75.3	88.2	65.9	72.4	78.8			

RECEIVER	XRC	YRC	ZRC
3	100.0	100.0	5.0

OCTAVE BAND LEVELS (A)

63	125	250	500	1000	2000	4000	8000
47.9	60.3	64.9	69.8	69.3	66.9	60.4	50.7
LE(A)	LNP	L90	L50	L10			
74.5	89.5	63.1	70.6	78.1			

RECEIVER	XRC	YRC	ZRC
4	150.0	100.0	5.0

OCTAVE BAND LEVELS (A)

63	125	250	500	1000	2000	4000	8000
46.8	58.9	63.8	68.7	68.1	65.5	59.0	49.1
LE(A)	LNP	L90	L50	L10			
73.3	90.2	59.9	68.3	76.8			

RECEIVER	XRC	YRC	ZRC
5	200.0	100.0	5.0

OCTAVE BAND LEVELS (A)

63	125	250	500	1000	2000	4000	8000
45.8	58.3	62.8	67.7	67.0	64.2	57.8	47.9
LE(A)	LNP	L90	L50	L10			
72.3	89.9	58.1	66.9	75.7			

TRAFFIC NOISE PREDICTION

SAMPLE PROBLEM 2

ROADWAY 1

NUMBER OF TYPE 1 VEH	VEH/H	MPH
1	0.1350E 04	0.5000E 02

NUMBER OF TYPE 2 VEH	VEH/H	MPH
1	0.7500E 02	0.5000E 02
SOURCE COORD		IN FT

NUMBER	X	Y	Z
1	0.0	0.6000E 01	0.0
2	0.1000E 05	0.6000E 01	0.0

ROADWAY 2

NUMBER OF TYPE 1 VEH	VEH/H	MPH
1	0.1250E 04	0.5000E 02

NUMBER OF TYPE 2 VEH	VEH/H	MPH
1	0.5000E 02	0.5000E 02
SOURCE COORD		IN FT

NUMBER	X	Y	Z
1	-0.1000E 05	0.6000E 01	0.0
2	0.0	0.6000E 01	0.0

ROADWAY 3

NUMBER OF TYPE 1 VEH	VEH/H	MPH
1	0.1000E 03	0.4500E 02

NUMBER OF TYPE 2 VEH	VEH/H	MPH
1	0.2500E 02	0.4500E 02
SOURCE COORD		IN FT

NUMBER	X	Y	Z
1	-0.1000E 05	0.5000E 04	0.0
2	0.0	0.6000E 01	0.0

ROADWAY 4

NUMBER OF TYPE 1 VEH	VEH/H	MPH
1	0.5000E 03	0.6000E 02

NUMBER OF TYPE 2 VEH	VEH/H	MPH
1	0.5000E 02	0.6000E 02
SOURCE COORD		IN FT

NUMBER	X	Y	Z
1	-0.1000E 05	-0.6000E 01	0.0
2	0.1000E 05	-0.6000E 01	0.0

BARRIER 1 (A) BARRIER COORD IN FT

NUMBER	X	Y	Z
1	0.1000E 03	0.2000E 02	0.6000E 01
2	0.1000E 05	0.2000E 02	0.6000E 01

ABSORBING STRIP 1 (T)

PT	X	Y	Z	WIDTH
1	0.0	0.5000E 02	0.0	0.5000E 02
2	-0.2000E 03	0.1500E 03	0.0	

RECEIVER NUMBER	X	Y	Z
1	0.0	0.1000E 03	0.5000E 01
2	0.5000E 02	0.1000E 03	0.5000E 01
3	0.1000E 03	0.1000E 03	0.5000E 01
4	0.1500E 03	0.1000E 03	0.5000E 01
5	0.2000E 03	0.1000E 03	0.5000E 01

SAMPLE PROBLEM 2

RECEIVER	XRC	YRC	ZRC
1	0.0	100.0	5.0

OCTAVE BAND LEVELS (A)

	63	125	250	500	1000	2000	4000	8000
	47.5	59.7	64.5	69.4	68.9	66.4	59.9	50.2
LE(A)	74.1	LNP 89.8	L90 61.9	L50 69.8	L10 77.6			

RECEIVER	XRC	YRC	ZRC
2	50.0	100.0	5.0

OCTAVE BAND LEVELS (A)

	63	125	250	500	1000	2000	4000	8000
	47.1	59.2	64.0	68.9	68.5	66.1	59.6	49.7
LE(A)	73.7	LNP 86.9	L90 64.0	L50 70.6	L10 77.2			

RECEIVER	XRC	YRC	ZRC
3	100.0	100.0	5.0

OCTAVE BAND LEVELS (A)

	63	125	250	500	1000	2000	4000	8000
	46.3	58.4	63.3	68.2	67.7	65.3	58.9	49.2
LE(A)	72.9	LNP 87.8	L90 61.6	L50 69.1	L10 76.5			

RECEIVER	XRC	YRC	ZRC
4	150.0	100.0	5.0

OCTAVE BAND LEVELS (A)

	63	125	250	500	1000	2000	4000	8000
	45.3	57.5	62.4	67.3	66.7	64.1	57.8	48.3
LE(A)	71.9	LNP 88.2	L90 59.2	L50 67.3	L10 75.4			

RECEIVER	XRC	YRC	ZRC
5	200.0	100.0	5.0

OCTAVE BAND LEVELS (A)

	63	125	250	500	1000	2000	4000	8000
	44.7	56.8	61.7	66.6	65.9	63.2	57.0	47.6
LE(A)	71.2	LNP 87.9	L90 57.9	L50 66.3	L10 74.6			

TRAFFIC NOISE PREDICTION

SAMPLE PROBLEM 3

ROADWAY 1

NUMBER OF TYPE 1 VEH	VEH/H	MPH
1	0.1350E 04	0.5000E 02

NUMBER OF TYPE 2 VEH	VEH/H	MPH
1	0.7500E 02	0.5000E 02

SOURCE COORD IN FT

NUMBER	X	Y	Z
1	0.0	0.6000E 01	0.0
2	0.1000E 05	0.6000E 01	0.0

ROADWAY 2

NUMBER OF TYPE 1 VEH	VEH/H	MPH
1	0.1250E 04	0.5000E 02

NUMBER OF TYPE 2 VEH	VEH/H	MPH
1	0.5000E 02	0.5000E 02

SOURCE COORD IN FT

NUMBER	X	Y	Z
1	-0.1000E 05	0.6000E 01	0.0
2	0.0	0.6000E 01	0.0

ROADWAY 3

NUMBER OF TYPE 1 VEH	VEH/H	MPH
1	0.1000E 03	0.4500E 02

NUMBER OF TYPE 2 VEH	VEH/H	MPH
1	0.2500E 02	0.4500E 02

SOURCE COORD IN FT

NUMBER	X	Y	Z
1	-0.1000E 05	0.5000E 04	0.0
2	0.0	0.6000E 01	0.0

ROADWAY 4

NUMBER OF TYPE 1 VEH	VEH/H	MPH
1	0.5000E 03	0.6000E 02

NUMBER OF TYPE 2 VEH	VEH/H	MPH
1	0.5000E 02	0.6000E 02

SOURCE COORD IN FT

NUMBER	X	Y	Z
1	-0.1000E 05	-0.6000E 01	0.0
2	0.1000E 05	-0.6000E 01	0.0

BARRIER 1 (A) BARRIER COORD IN FT

NUMBER	X	Y	Z
1	0.1000E 03	0.2000E 02	0.6000E 01
2	0.1000E 05	0.2000E 02	0.6000E 01

RECEIVER NUMBER	X	Y	Z
1	0.0	0.1000E 03	0.5000E 01
2	0.5000E 02	0.1000E 03	0.5000E 01
3	0.1000E 03	0.1000E 03	0.5000E 01
4	0.1500E 03	0.1000E 03	0.5000E 01
5	0.2000E 03	0.1000E 03	0.5000E 01

SAMPLE PROBLEM 3

RECEIVER	XRC	YRC	ZRC
1	0.0	100.0	5.0

OCTAVE BAND LEVELS (A)

	125	250	500	1000	2000	4000	8000
b3	125	250	500	1000	2000	4000	8000
47.8	65.0	64.9	64.9	64.6	67.3	61.0	51.5
LE(A)	LNP	L90	L50	L10			
74.8	89.8	63.2	70.8	78.3			

RECEIVER	XRC	YRC	ZRC
2	50.0	100.0	5.0

OCTAVE BAND LEVELS (A)

	125	250	500	1000	2000	4000	8000
b3	125	250	500	1000	2000	4000	8000
47.3	59.5	64.3	64.4	64.0	66.7	60.4	50.8
LE(A)	LNP	L90	L50	L10			
74.2	88.2	63.7	70.7	77.7			

RECEIVER	XRC	YRC	ZRC
3	100.0	100.0	5.0

OCTAVE BAND LEVELS (A)

	125	250	500	1000	2000	4000	8000
b3	125	250	500	1000	2000	4000	8000
46.4	58.6	63.5	68.5	68.1	65.7	59.5	50.0
LE(A)	LNP	L90	L50	L10			
73.3	88.6	61.5	69.2	76.8			

RECEIVER	XRC	YRC	ZRC
4	150.0	100.0	5.0

OCTAVE BAND LEVELS (A)

	125	250	500	1000	2000	4000	8000
b3	125	250	500	1000	2000	4000	8000
45.5	57.7	62.5	67.5	67.0	64.5	58.4	48.9
LE(A)	LNP	L90	L50	L10			
72.2	88.7	59.2	67.5	75.7			

RECEIVER	XRC	YRC	ZRC
5	200.0	100.0	5.0

OCTAVE BAND LEVELS (A)

	125	250	500	1000	2000	4000	8000
b3	125	250	500	1000	2000	4000	8000
44.8	57.0	61.8	66.8	66.2	63.6	57.5	48.0
LE(A)	LNP	L90	L50	L10			
71.4	88.4	57.9	66.4	74.9			

TRAFFIC NOISE PREDICTION

SAMPLE PROBLEM 4

ROADWAY 1

NUMBER OF TYPE 1 VEH	VEH/H	MPH
1	0.1350E 04	0.5000E 02

NUMBER OF TYPE 3 VEH	VEH/H	MPH
1	0.7500E 02	0.5000E 02
	SOURCE COORD	IN FT

NUMBER	X	Y	Z
1	0.0	0.6000E 01	0.0
2	0.1000E 05	0.6000E 01	0.0

ROADWAY 2

NUMBER OF TYPE 1 VEH	VEH/H	MPH
1	0.1250E 04	0.5000E 02

NUMBER OF TYPE 3 VEH	VEH/H	MPH
1	0.5000E 02	0.5000E 02
	SOURCE COORD	IN FT

NUMBER	X	Y	Z
1	-0.1000E 05	0.6000E 01	0.0
2	0.0	0.6000E 01	0.0

ROADWAY 3

NUMBER OF TYPE 1 VEH	VEH/H	MPH
1	0.1000E 03	0.4500E 02

NUMBER OF TYPE 3 VEH	VEH/H	MPH
1	0.2500E 02	0.4500E 02
	SOURCE COORD	IN FT

NUMBER	X	Y	Z
1	-0.1000E 05	0.5000E 04	0.0
2	0.0	0.6000E 01	0.0

ROADWAY 4

NUMBER OF TYPE 1 VEH	VEH/H	MPH
1	0.5000E 03	0.6000E 02

NUMBER OF TYPE 3 VEH	VEH/H	MPH
1	0.5000E 02	0.6000E 02
	SOURCE COORD	IN FT

NUMBER	X	Y	Z
1	-0.1000E 05	-0.6000E 01	0.0
2	0.1000E 05	-0.6000E 01	0.0

BARRIER 1 (A) BARRIER COORD IN FT

NUMBER	X	Y	Z
1	0.1000E 03	0.2000E 02	0.6000E 01
2	0.1000E 05	0.2000E 02	0.6000E 01

RECEIVER NUMBER	X	Y	Z
1	0.0	0.1000E 03	0.5000E 01
2	0.5000E 02	0.1000E 03	0.5000E 01
3	0.1000E 03	0.1000E 03	0.5000E 01
4	0.1500E 03	0.1000E 03	0.5000E 01
5	0.2000E 03	0.1000E 03	0.5000E 01

SAMPLE PROBLEM 4

RECEIVER	XRC	YRC	ZRC
1	0.0	100.0	5.0

OCTAVE BAND LEVELS (A)

b3	125	250	500	1000	2000	4000	8000
43.6	52.5	57.3	61.9	64.3	63.8	55.9	46.7
LE(A)	LNP	L90	L50	L10			
68.9	77.9	63.0	67.5	72.0			

RECEIVER	XRC	YRC	ZRC
2	50.0	100.0	5.0

OCTAVE BAND LEVELS (A)

b3	125	250	500	1000	2000	4000	8000
43.0	51.9	56.7	61.3	63.6	63.1	55.1	45.9
LE(A)	LNP	L90	L50	L10			
68.3	76.4	63.0	67.1	71.2			

RECEIVER	XRC	YRC	ZRC
3	100.0	100.0	5.0

OCTAVE BAND LEVELS (A)

b3	125	250	500	1000	2000	4000	8000
42.1	50.9	55.6	60.1	62.4	61.8	53.8	44.3
LE(A)	LNP	L90	L50	L10			
67.0	76.7	60.5	65.4	70.2			

RECEIVER	XRC	YRC	ZRC
4	150.0	100.0	5.0

OCTAVE BAND LEVELS (A)

b3	125	250	500	1000	2000	4000	8000
41.0	49.6	54.2	58.5	60.6	59.9	51.7	41.7
LE(A)	LNP	L90	L50	L10			
65.3	77.4	56.6	62.7	68.8			

RECEIVER	XRC	YRC	ZRC
5	200.0	100.0	5.0

OCTAVE BAND LEVELS (A)

b3	125	250	500	1000	2000	4000	8000
40.2	48.7	53.1	57.2	59.1	58.2	49.7	38.8
LE(A)	LNP	L90	L50	L10			
63.8	77.4	53.7	60.5	67.4			

INPUT DATA FOR SAMPLE PROBLEM 1 XXXXXXXXXXX

CONTROL CARD: 1 INITIALIZATION PARAMETERS CONTROL CARD 1102

CONTROL CARD: 2 4 ROAD & VEHICLE PARAMETERS CONTROL CARD 1100

HOURLY TRAFFIC	SPEED	VEH TYPE	PROB #1 - DESC 1	1101
0.1350E 04	0.5000E 02	1	PROB #1 - DESC 2	1102
0.7500E 02	0.5000E 02	2		

ROADWAY SECTION COORDINATES	X	Y	Z	PROB #1 - DESC 3	1103
0.0	0.6000E 01	0.0	PROB #1 - DESC 4	1104	
0.1000E 05	0.5000E 01	0.0			

HOURLY TRAFFIC	SPEED	VEH TYPE	PROB #1 - DESC 5	1105
0.1250E 04	0.5000E 02	1	PROB #1 - DESC 6	1106
0.5000E 02	0.5000E 02	2		

ROADWAY SECTION COORDINATES	X	Y	Z	PROB #1 - DESC 7	1107
-0.1000E 05	0.6000E 01	0.0	PROB #1 - DESC 8	1108	
0.0	0.6000E 01	0.0			

HOURLY TRAFFIC	SPEED	VEH TYPE	PROB #1 - DESC 9	1109
0.1000E 03	0.4500E 02	1	PROB #1 - DESC 10	1110
0.2500E 02	0.4500E 02	2		

ROADWAY SECTION COORDINATES	X	Y	Z	PROB #1 - DESC 11	1111
-0.1000E 05	0.5000E 04	0.0	PROB #1 - DESC 12	1112	
0.0	0.6000E 01	0.0			

HOURLY TRAFFIC	SPEED	VEH TYPE	PROB #1 - DESC 13	1113
0.5000E 03	0.6000E 02	1	PROB #1 - DESC 14	1114
0.5000E 02	0.6000E 02	2		

ROADWAY SECTION COORDINATES	X	Y	Z	PROB #1 - DESC 15	1115
-0.1000E 05	-0.6000E 01	0.0	PROB #1 - DESC 16	1116	
0.1000E 05	-0.6000E 01	0.0			

CONTROL CARD: 3 2 BARRIER PARAMETERS CONTROL CARD 1700

BARRIER COORDINATES	X	Y	Z	PROB #1 - BARRIER #1(1)	1701
-0.1000E 03	-0.2000E 02	0.2000E 02	PROB #1 - BARRIER #1(2)	1702	
0.2000E 03	-0.2000E 02	0.2000E 02	PROB #1 - BARRIER #2(1)	1703	
0.1000E 03	0.2000E 02	0.6000E 01	PROB #1 - BARRIER #2(2)	1704	
0.1000E 05	0.2000E 02	0.6000E 01			

CONTROL CARD: 4 1 GROUND COVER PARAMETERS CONTROL CARD 1900

GROUND COVER COORDINATES	X	Y	Z	PROB #1 - GROUND COVER #1(1)	1901
0.0	0.5000E 02	0.0	PROB #1 - GROUND COVER #1(2)	1902	
-0.2000E 03	0.1500E 03	0.0			

CONTROL CARD: 5 5 RECEIVER PARAMETER CONTROL CARD 1950

RECEIVER COORDINATES	X	Y	Z	ROB #1 - RECEIVER #1	1951
0.0	0.1000E 03	0.0	ROB #1 - RECEIVER #2	1952	
0.5000E 02	0.1000E 03	0.0	ROB #1 - RECEIVER #3	1953	
0.1000E 03	0.1000E 03	0.0	ROB #1 - RECEIVER #4	1954	
0.1500E 03	0.1000E 03	0.0	ROB #1 - RECEIVER #5	1955	
0.2000E 03	0.1000E 03	0.0			

CONTROL CARD: 6 END OF DATA CONTROL CARD 1999

INPUT DATA FOR SAMPLE PROBLEM 2

CONTROL CARD: 3 1

BARRIER PARAMETERS CONTROL CARD

2700

BARRIER COORDINATES

X Y Z
0.1000E 03 0.2000E 02 0.6000E 01
0.1000E 05 0.2000E 02 0.6000E 01 A

2701
2702

CONTROL CARD: 6

END OF DATA CONTROL CARD

2999

INPUT DATA FOR SAMPLE PROBLEM 3

CONTROL CARD: 4 3

GROUND COVER PARAMETERS CONTROL CARD

3900

CONTROL CARD: 5

END OF DATA CONTROL CARD

3999

INPUT DATA FOR SAMPLE PROBLEM 4

CONTROL CARD:			ROAD & VEHICLE PARAMETERS CONTROL CARD		4100
HOURLY TRAFFIC	SPEED	VEH TYPE			
0.1350E 04	0.5000E 02	1	ROAD #1 - CARS		4101
0.7500E 02	0.5000E 02	3	ROAD #1 - TRUCKS		4102
ROADWAY SECTION COORDINATES					
X	Y	Z			
0.0	0.6000E 01	0.0	ROAD #1 - X1,Y1,Z1		4103
0.1000E 05	0.6000E 01	0.0	ROAD #1 - X2,Y2,Z2		4104
HOURLY TRAFFIC	SPEED	VEH TYPE			
0.1250E 04	0.5000E 02	1	ROAD #2 - CARS		4105
0.5000E 02	0.5000E 02	3	ROAD #2 - TRUCKS		4106
ROADWAY SECTION COORDINATES					
X	Y	Z			
-0.1000E 05	0.6000E 01	0.0	ROAD #2 - X1,Y1,Z1		4107
0.0	0.6000E 01	0.0	ROAD #2 - X2,Y2,Z2		4108
HOURLY TRAFFIC	SPEED	VEH TYPE			
0.1000E 03	0.4500E 02	1	ROAD #3 - CARS		4109
0.2500E 02	0.4500E 02	3	ROAD #3 - TRUCKS		4110
ROADWAY SECTION COORDINATES					
X	Y	Z			
-0.1000E 05	0.5000E 04	0.0	ROAD #3 - X1,Y1,Z1		4111
0.0	0.6000E 01	0.0	ROAD #3 - X2,Y2,Z2		4112
HOURLY TRAFFIC	SPEED	VEH TYPE			
0.5000E 03	0.6000E 02	1	ROAD #4 - CARS		4113
0.5000E 02	0.6000E 02	3	ROAD #4 - TRUCKS		4114
ROADWAY SECTION COORDINATES					
X	Y	Z			
-0.1000E 05	-0.6000E 01	0.0	ROAD #4 - X1,Y1,Z1		4115
0.1000E 05	-0.6000E 01	0.0	ROAD #4 - X2,Y2,Z2		4116
CONTROL CARD:	6	END OF DATA CONTROL CARD		4999	