Appendix 5 Noise Baseline and Model

A5. 1 Monitoring Result of Noise Baseline

Two points in Xinxiu Village and Qiaoshe, respectively, was monitored for the noise baseline during 18-19 January, 1999. The results are shown in Table A5. 1.

Table A5. 1 **Monitoring Results of Noise Baseline**

	Xinxiu Village				Qiaoshe			
	Leq	L_{10}	L_{50}	L_{90}	Leq	L_{10}	L_{50}	L_{90}
16:00	60. 0	62. 3	52. 0	50. 5	60. 7	59. 6	57. 8	56. 8
17:00	52. 4	54. 2	51. 8	50. 5	58. 5	58. 0	56. 3	55. 2
18:00	52. 3	53. 6	52. 0	50. 9	62. 7	58. 2	55. 8	54. 7
19:00	50. 6	51. 8	50. 4	48. 9	58. 7	60. 1	56. 6	55. 0
20:00	50. 4	51. 9	50. 2	48. 3	57. 6	59. 2	56. 0	54. 8
21:00	47. 8	50. 1	46. 4	45. 4	59. 1	57. 0	54. 6	53. 4
22:00	46. 7	47. 5	45. 4	44. 6	54. 9	56. 0	54. 0	53. 0
23:00	46. 6	48. 1	45. 7	44. 6	53. 2	54. 6	52. 3	51. 11
0:00	46. 7	48. 9	45. 8	44. 2	53. 0	53. 9	53. 0	50. 8
1:00	46. 0	47. 9	45. 1	43. 7	49. 8	50. 5	49. 5	48. 9
2:00	45. 7	47. 3	44. 9	43. 7	49. 8	57. 0	49. 4	48. 7
3:00	45. 6	47. 0	45. 1	43. 7	50. 6	51. 6	50. 2	49. 6
4:00	45. 8	47. 0	45. 4	44. 2	50. 4	51. 2	50. 1	49. 6
5:00	47. 6	49. 7	46. 7	44. 7	51. 9	53. 1	51. 5	50. 1
6:00	51. 8	53. 0	51. 1	49. 6	55. 5	57. 0	54. 0	51. 8
7:00	51. 8	53. 6	51. 2	49. 4	59. 6	57. 3	55. 4	54. 2
8:00	49. 2	50. 9	48. 5	47. 4	57. 7	58. 3	56. 2	55. 1
9:00	52. 6	54. 4	52. 1	48. 8	58. 9	59. 9	57. 3	55. 9
10:00	52. 1	53. 5	51. 4	49. 9	59. 5	60. 9	57. 7	56. 3
11:00	50. 0	51. 4	49. 5	48. 0	59. 4	59. 8	57. 1	55. 9
12:00	51. 0	52. 4	50. 0	48. 5	58. 0	58. 0	56. 0	55. 0
13:00	50. 5	51. 9	50. 0	48. 6	59. 3	59. 9	58. 3	55. 9
14:00	49. 9	51. 3	49. 2	47. 9	60. 4	61. 7	58. 3	56. 1
15:00	50. 7	52. 3	49. 7	48. 2	59. 7	60. 9	58. 7	56. 9

A5. 2 Noise Model

Noise from construction and traffic during the construction period is considered in this study.

A5. 2. 1 Construction Noise

Noise from Construction mechanism

The procedure to survey and assess the construction noise is as follows:

1)Identify the location of "Noise Sensitive Receiver"

2)Determine regional sensitivity grade

3)Determine the regional noise background value.

4)Correct the duration of "Construction Noise Permit"

5)Correct the multiple sources phase.

6)Determine the acceptable noise level

7)Locate the construction mechanical equipment.

8)Determine the sound power level of the mechanical equipment.

9)Determine the variation of noise level with distance.

10)Correct the effect of the obstruction.

11)Correct the effect of the acoustic reflection.

12)Determine noise level at place of "Noise Sensitive Receiver".

Sound Power Level of the equipment is determined referring to the Table 3 in *Technology Memorandum on Noise from Construction Work other than Percussive Piling*. The data lacking in the Table 3 refer to standard issued by UK (BS5228).

The sound attenuation can be calculated by the following formula if the distance is more than 300 m:

$$(dB) = 20logD + B$$

Where: (dB)—Sound attenuation value with distance

D—Distance between the receiver and the noise source

Noise from percussive piling:

Impact on "Noise Sensitive Receiver" caused by piling noise is assessed according to following procedure:

1)Determine the location of "Noise Sensitive Receiver";

2)Determine the acceptable noise level at place of "Noise Sensitive Receiver";

3)Determine the sound power level of percussive piling;

4)Add all noise level;

5)Correct the result based on distance;

6)Correct the effect of the obstruction. ;

7)Correct the acoustic reflection;.

8)Calculate noise level at place of "Noise Sensitive Receiver";

9)Determine the time of allowing construction.

A5. 2. 2 Noise from Construction Traffic

Construction traffic can be divided into two types: traffic in the construction area and out of the construction area (Including noise from mechanical vehicle transportation and noise from shipping).

(1) Traffic noise from the construction area

The noise level produced by mechanical vehicle running on country road can be described by following formula:

$$L_{AQ}=L_{WA}-33+10lgQ-10lgV-10lgd$$

Where: Lwa—Sound power level of mechanical vehicle (dB)

Q—Hourly quantity of mechanical vehicle

V—Average vehicle velocity (km/h)

d—Distance from the midline of the road to the receiver (m)

The noise level at place of "Noise Sensitive Receiver" can be determined through integrating shield reflection effect, the percentage of construction activity taking up the assessing duration, and the noise level calculated with the above formula.

(2) Traffic noise from out of the construction area

Traffic noise of the mechanical vehicle

The Calculation of Road Traffic Noise(1980) issued by the UK Department of Transport is used to calculate the traffic noise from out of the construction area. This methodology can be used to calculate traffic noise levels at places of different distance to the highway. Factors such as parameters of different vehicle, ground pavement, road configuration and the sampling point distribution are considered in calculation. Though it could offer better calculation technology, some traffic instances may be beyond the prediction condition, and. then, on-the-spot measurement has to be carried out.

The Calculation of Road Traffic Noise is used to forecast the noise level of affected point near the road system, the procedure is shown as follows:

1)Divide the road into some sections, in one of which noise has little change.

2)Calculate noise background level of referring points at 10 m away from the inner edge of the roadway.

3)Calculate noise level at place of receiver caused by traffic in each section, on consideration of the range attenuation and the shield effect on the noise source.

4)Correct noise level at place of receiver on the basis of the character of point arrangement, such as the reflex of building and other plane and length of section as noise source.

5)Obtain forecasted result of noise level at place of receiver from the whole road system by adding all the calculation results.

Noise from shipping

Noise impact on surrounding area caused by transport ship is calculated on the basis

of the methodology summarized in *Technology memorandum on noise from construction work other than percussive piling issued by* Hong Kong. The procedure to survey and assess is summarized as follows:

1)Identify the location of "Noise Sensitive Receiver".

2)Determine regional sensitivity grade

3)Determine the regional noise background value.

4)Determine the acceptable noise level

5)Determine the sound power level of the noise sources (transport ship)

6)Determine noise level variation with distance.

7)Correct the effect of obstruction

8)Correct the noise reflection

9)Calculate the corrected noise level at place of "Noise Sensitive Receiver"

The sound attenuation can be calculated by the following formula if the distance is more than 300 m:

$$(dB)=20logD+B$$

Where: (dB)—Sound attenuation value with distance

D—Distance between the receiver and the noise source.