

This Technical Memorandum was published under section 11(1) of the Noise Control Ordinance in Special Supplement No. 5 to Gazette No. 22 Vol.5 on 1 June 2001, and has come into operation since 5 July 2001.

TECHNICAL MEMORANDUM ON NOISE FROM CONSTRUCTION WORK IN DESIGNATED AREAS

First Edition : March 1996
Second Edition : July 2001

Environmental Protection Department
Noise Control Authority

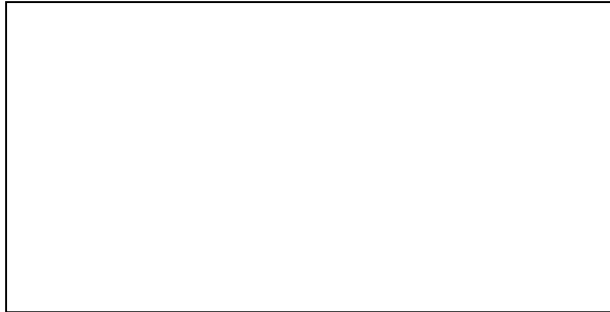


TABLE OF CONTENTS

	Page
1. PRELIMINARY	
1.1 Citation and Commencement	5
1.2 Application and Scope	5
1.3 Interpretation	5
2. THE USE OF SPECIFIED POWERED MECHANICAL EQUIPMENT (SPME) FOR THE PURPOSE OF CARRYING OUT CONSTRUCTION WORK OTHER THAN PERCUSSIVE PILING AND/OR THE CARRYING OUT OF PRESCRIBED CONSTRUCTION WORK (PCW) WITHIN A DESIGNATED AREA	7
3. DESIGNATED AREAS	7
4. CONSTRUCTION NOISE PERMIT (CNP)	7
5. PROVISIONS FOR SPECIAL CASES	
5.1 Unavoidable Constraints on Working Hours	8
5.2 Construction Work Having Important Social Implications	9
5.3 Quiet Working Methods or Other Special Factors for the Use of SPME	9
5.4 Quiet Working Methods or Other Special Factors for the Carrying Out of PCW	9
6. TESTING FOR COMPLIANCE WITH CONSTRUCTION NOISE PERMIT RELATING TO MAXIMUM NOISE LEVELS	10
ANNEX A – ASSESSMENT OF NOISE FROM CONSTRUCTION WORK INVOLVING THE USE OF SPECIFIED POWERED MECHANICAL EQUIPMENT (SPME) OTHER THAN PERCUSSIVE PILING WITHIN A DESIGNATED AREA.....	11
ANNEX B – PRESCRIBED CONSTRUCTION WORK (PCW).....	19
ANNEX C – QUIET WORKING METHODS FOR PCW.....	19
ANNEX D – GENERAL CALIBRATION AND MEASUREMENT PROCEDURES	19

LIST OF TABLES

	Page
Table A.1 Area Sensitivity Ratings (ASRs).....	16
Table A.2 Basic Noise Levels (BNLs).....	17
Table A.3 Sound Power Levels for Items of Specified Powered Mechanical Equipment (SPME).....	17
Table A.4 Summation of Noise Levels	17
Table A.5 Correction Factors to Obtain the Predicted Noise Level (PNL) from Sound Power Levels at Given Distances	18

**TECHNICAL MEMORANDUM
ON NOISE FROM CONSTRUCTION WORK
IN DESIGNATED AREAS**

1. PRELIMINARY

1.1 *Citation and Commencement*

This Technical Memorandum on Noise from Construction Site within a Designated Area which is generated from the Use of Specified Powered Mechanical Equipment (SPME) to carry out construction work other than Percussive Piling and/or the Carrying Out of Prescribed Construction Work (PCW) is issued pursuant to section 9 of the Noise Control Ordinance and may be cited as the Technical Memorandum on Noise from Construction Work in Designated Areas. This Technical Memorandum replaces the Technical Memorandum published in Special Supplement No. 5 to Gazette No. 6 Vol. CXXXVIII on 9 February 1996. This Technical Memorandum shall come into operation in accordance with section 12 of the Noise Control Ordinance.

1.2 *Application and Scope*

This Technical Memorandum details the procedures that should generally be adopted by the Authority for construction work to be conducted on or after 1 November 1996:

for the assessment of noise from construction work within a designated area involving the use of SPME other than percussive piling and/or the carrying out of PCW;

for the issuing of Construction Noise Permits for construction work within a designated area involving the use of SPME other than percussive piling and/or the carrying out of PCW pursuant to sections 8 & 8A of the Ordinance; and,

for determining whether or not any such Construction Noise Permit is being complied with.

In areas, other than a designated area, or when the construction work does not involve the use of SPME nor the carrying out of PCW, the procedures governing the issuing of Construction Noise Permits shall be in accordance with the Technical Memorandum on Noise from Construction Work other than Percussive Piling.

1.3 *Interpretation*

In this Technical Memorandum, unless the context otherwise requires, the following definitions apply:

"Authority" has the same meaning as in the Ordinance;

"Construction Noise Permit" has the same meaning as in the Ordinance;

"construction site" has the same meaning as in the Ordinance;

"construction work" has the same meaning as in the Ordinance;

"designated area" has the same meaning as in the Ordinance;

"formwork" means any type of metallic, wooden or fibreglass construction including any structural support designed to enable concrete, cement or other material poured in a fluid state to assume a particular shape upon setting;

"hammering" means to strike repeatedly any object, instrument or surface with any other object, instrument or surface;

"Noise Sensitive Receiver" means any domestic premises, hotel, hostel, temporary housing accommodation, hospital, medical clinic, educational institution, place of public worship, library, court of law or performing arts centre. Any other premises or place, not being in the nature of either industrial or commercial premises, which is considered by the Authority to have a similar sensitivity to noise as the premises and places above shall also be considered to be a Noise Sensitive Receiver. Any premises or place shall, however, be considered to be a Noise Sensitive Receiver only when it is in use for its intended purpose.

"Ordinance" means the Noise Control Ordinance;

"powered mechanical equipment" has the same meaning as in the Ordinance;

"prescribed construction work" means the construction work prescribed for the purpose of section 6(2) of the Ordinance. The Noise Control (Construction Work) Regulation stipulates the type of construction work being prescribed for control;

"restricted hours" means the time between 1900 and 0700 hours and any time on a general holiday, including Sunday;

"rubble" means any kind of debris or superfluous material arising from construction work including bricks, concrete, metal, glass, wood, plastic, earth, rock, bamboo or fibreglass;

"scaffolding" means any type of construction made of metal, wood or bamboo whose purpose is to enable temporary access to a part or parts of another structure or building whether completed or not;

"Secretary" has the same meaning as in the Ordinance;

"specified powered mechanical equipment" means those items of powered mechanical equipment as specified in Table A.3 of Annex A in this Technical Memorandum; and

"site boundary" means the boundary of a construction site as specified in a Construction Noise Permit.

Standard acoustical terminology is used throughout this Technical Memorandum. Other terms are as defined in the Ordinance or in the text of this Technical Memorandum.

2. THE USE OF SPECIFIED POWERED MECHANICAL EQUIPMENT (SPME) FOR THE PURPOSE OF CARRYING OUT CONSTRUCTION WORK OTHER THAN PERCUSSIVE PILING AND/OR THE CARRYING OUT OF PRESCRIBED CONSTRUCTION WORK (PCW) WITHIN A DESIGNATED AREA

The use of any SPME as listed in Table A.3 in Annex A and the carrying out of any PCW as listed in Annex B within a designated area during the restricted hours shall require a valid Construction Noise Permit (CNP). The considerations and procedures governing whether a CNP may be issued for the above works are described in this Technical Memorandum.

A CNP shall not generally be granted for the use of SPME during the restricted hours within a designated area unless the Corrected Noise Level (CNL) for all the SPME proposed to be used does not exceed the appropriate Acceptable Noise Level (ANL) as determined according to A.2.1 to A.2.6 in Annex A. Such CNP application shall be assessed in accordance with the procedures detailed in Annex A. Notwithstanding the above, such a permit may be granted if the application is a special case as defined in Section 5.

The Authority may refuse to grant a CNP for the use of powered mechanical equipment if the Authority has reason to believe that the equipment is to be used in conjunction with the carrying out of any PCW not being permitted under this Technical Memorandum.

A CNP shall not generally be granted for the carrying out of PCW within a designated area during the restricted hours unless the application is a special case as defined in Section 5. In this case, the applicant shall submit a method statement for the carrying out of each type of PCW to describe how and where such work is to be carried out together with the CNP application for the Authority to assess in connection with these special cases.

3. DESIGNATED AREAS

Designated areas, in which the control of SPME and PCW will apply, are established through the Noise Control (Construction Work Designated Areas) Notice made under section 8A(1) of the Ordinance.

4. CONSTRUCTION NOISE PERMIT (CNP)

The CNP issued by the Authority in the prescribed form may include such conditions as the Authority considers appropriate, such as the SPME permitted to be used and the PCW permitted to be carried out on the construction site, the hours during which the CNP is valid, the dates of commencement and

expiry of the CNP, any noise levels which may not be exceeded at specified locations during specified times and any special noise control measures that must be adopted.

A CNP may be issued for an initial period of such duration as the Authority considers appropriate, and may be renewed before or after the date of expiry for such period or periods and subject to such alterations or new conditions as the Authority considers appropriate.

A CNP may not be issued for construction work which is to be carried out on or within a building which is either:

- (a) a Noise Sensitive Receiver (NSR) either wholly or partially in use for its intended purpose at the time of the proposed construction work; or
- (b) directly adjoining a building which is a NSR,

such that the noise to be generated by the construction work would be transmitted primarily through the structural elements of the building or buildings and, in the opinion of the Authority, would be likely to cause an adverse noise impact on the NSR.

When giving consideration to the renewal of CNPs pursuant to sections 8 & 8A of the Ordinance the Authority may impose additional conditions or may refuse to renew a CNP having regard to complaints received and other relevant factors, notwithstanding the procedures and guidelines detailed in Section 2 and Annex A.

To assist in enforcement procedures the Authority may include as a condition for all CNPs a requirement for the CNP applicant to ensure that each item of SPME, which is permitted to be used, on a construction site is, at the time of its use, labelled in a legible and conspicuous manner with the appropriate identification code as shown in Table A.3 in Annex A.

5. PROVISIONS FOR SPECIAL CASES

5.1 *Unavoidable Constraints on Working Hours*

A CNP may be granted if it can be demonstrated to the satisfaction of the Authority that to carry out the construction work during restricted hours would cause less public annoyance or inconvenience than would be caused by carrying out the work during non-restricted hours.

This provision shall apply in cases such as those in which serious interruption would be caused to road, rail or other forms of transport; or to utilities such as supply of water, gas or electricity.

A CNP may also be granted for work which is governed by tidal conditions.

When a CNP is granted as a result of this provision, the Authority shall

ensure that the quietest practicable working methods are being employed. Conditions in the CNP may specify the carrying out of particularly quiet working methods, the use of specially silenced items of equipment, acoustic screens and other noise control measures, in cases where their use would have a beneficial effect in reducing noise levels and would be practicable.

Additional CNP conditions shall restrict the use of noisy road-breaking equipment and other particularly noisy construction work during certain hours. Whenever possible, the use of such equipment or the carrying out of such construction work shall not be permitted between 2100 and 0600 hours, and the loading of spoil into trucks shall not take place between 2300 and 0600 hours. Only in very exceptional circumstances shall the carrying out of such construction work be permitted after 2300 hours or the loading of spoil after midnight. If these restrictions are not possible the CNP shall state that all care shall be taken to ensure that such construction work is carried out as quickly as possible with due regard for the potential noise intrusion which may result.

5.2 *Construction Work Having Important Social Implications*

Where in the opinion of the Authority a CNP application is for construction work which, by virtue of its magnitude or purpose, may have significant social implications or where refusal to grant a CNP may not be in the public interest, or where the granting of a CNP might arouse considerable public concern, the Authority shall refer the matter for advice to the Secretary. In giving such advice the Secretary shall give due considerations to these factors. In such cases the Authority shall abide by any advice received from the Secretary.

5.3 *Quiet Working Methods or Other Special Factors for the Use of SPME*

Any particularly quiet items of SPME or any special noise control measures for the use of SPME which the CNP applicant proposes to employ on the site, or any other special factors or exceptional circumstances which the applicant considers may be relevant to his application for the use of SPME, may be given special consideration by the Authority. The applicant must demonstrate to the satisfaction of the Authority that the claimed noise reduction is achievable in the form of a report submitted together with his CNP application. The report must be prepared by a person who by reason of his training and experience is competent to carry out such noise assessment. In considering such special cases the Authority may make allowances, adjustments or corrections to any of the factors in Annex A and appropriate calculation procedures may be adopted by the Authority having regard to standard acoustical principles and practices.

Any CNP issued under this provision may include conditions such as details of the special noise control measures to be employed, acoustic performance specifications for such measures to be used, maximum noise levels at the NSR or at any other position and any other conditions which may be considered to be appropriate by the Authority.

5.4 *Quiet Working Methods or Other Special Factors for the Carrying out of PCW*

A CNP may be granted for the carrying out of PCW if quiet working methods as listed in Annex C are adopted for the execution of the PCW.

A CNP may also be granted for the carrying out of PCW if the Authority is satisfied that the location of work being carried out is screened by solid barriers, such as purpose-designed acoustic screens, buildings or topographical features. These barriers must act as useful acoustic screens to effectively protect the affected noise sensitive receivers. Detailed descriptions of such special factors shall be submitted in the CNP application and will be assessed by the Authority in accordance with standard acoustical principles and practices.

Any CNP issued under this provision may include conditions such as details of the quiet working methods, locations at which the PCW is permitted to be carried out and any other conditions which may be considered to be appropriate by the Authority.

6. TESTING FOR COMPLIANCE WITH CONSTRUCTION NOISE PERMIT RELATING TO MAXIMUM NOISE LEVELS

In cases where a maximum noise level has been specified as a condition of a CNP, measurements may be taken to determine if this condition is being complied with. Such measurements should generally be carried out in accordance with the procedures and guidelines given in Annex D.

ANNEX A - ASSESSMENT OF NOISE FROM CONSTRUCTION WORK INVOLVING THE USE OF SPECIFIED POWERED MECHANICAL EQUIPMENT (SPME) OTHER THAN PERCUSSIVE PILING WITHIN A DESIGNATED AREA

A.1. General Introduction to the Procedures

For the purpose of assessing if a Construction Noise Permit (CNP) may be issued for construction work involving the use of SPME other than percussive piling within a designated area during the restricted hours the Authority shall act in accordance with the following general procedures which are detailed in subsequent sections. The Authority shall:

- (a) identify the most affected Noise Sensitive Receiver (NSR), determine the Area Sensitivity Rating (ASR) for the area within which the NSR is located and hence determine the relevant Acceptable Noise Level (ANL) (in accordance with Sections A.2.1 to A.2.6);
- (b) calculate the Corrected Noise Level (CNL) which will be generated by the construction work at the NSR (in accordance with Sections A.2.7 to A.2.12); and
- (c) compare the CNL with the ANL to determine if a CNP may be issued (in accordance with Section A.2.13).

If the CNL is equal to or less than the ANL the CNP may be issued by the Authority in the prescribed form and may include such conditions as the Authority considers appropriate, such as the permissible items of SPME which may be used on the construction site, the hours during which the CNP is valid, the dates of commencement and expiry of the CNP, any noise levels which may not be exceeded at specified locations during specified times and any special noise control measures that must be adopted.

A.2. Calculation Procedure

A.2.1 Step 1 - Location of the Most Affected Noise Sensitive Receiver (NSR)

The NSR which will be most affected by noise from the construction work shall be identified.

A.2.2 Step 2 - Determination of the Area Sensitivity Rating (ASR)

A.2.2.1 General

The ASR is a function of the type of area within which the NSR is located and the degree of the effect on the NSR of particular Influencing Factors (IFs) as defined in Section A.2.2.3. After a careful examination of the area under consideration and the effect of any IFs, the ASR may be determined from Table A.1.

A.2.2.2 Type of area within which the Noise Sensitive Receiver (NSR) is

located

The Authority shall have regard to an area of adequate size when determining the type of area within which the NSR is located in accordance with the descriptions in Table A.1. Typically, in urban areas an area of 100 m radius around the NSR should be adequate whereas in sparsely developed areas, such as rural districts, an area of 500 m radius or even more should be considered, depending upon the circumstances. Special factors may dictate that other distances should be used at the discretion of the Authority.

A.2.2.3 Effect of Influencing Factors (IFs)

For the purpose of this Technical Memorandum any industrial area, major road or the area within the boundary of Hong Kong International Airport shall be considered to be an IF. Industrial areas and the Airport should be regarded as IFs irrespective of the time of day.

The term "industrial area" means an area which consists of a number of factories or industrial undertakings located primarily in purpose-built industrial buildings. It includes any premises, buildings or activities which the Authority deems, by virtue of their acoustical characteristics, make an area industrial in nature. The term "major road" means a road which has a heavy and generally continuous flow of vehicular traffic and, in normal circumstances, means a road with an annual average daily traffic flow in excess of 30,000. Where a major road has an unusually low traffic flow rate (less than 300 vehicles per hour) at the time of day under consideration it shall not be considered as an IF at that time.

In situations where more than one IF affects the NSR to an equal degree only one IF shall be considered.

A.2.2.4 Area Sensitivity Rating (ASR)

The Authority shall determine the appropriate ASR for the NSR under consideration from Table A.1.

A.2.3 Step 3 - Determination of the Basic Noise Level (BNL)

The appropriate BNL, in dB(A), for a given NSR may be determined from Table A.2, having regard to the appropriate ASR and the time period as specified in the Construction Noise Permit application.

A.2.4 Step 4 - Correction for the Duration of the Construction Noise Permit (CNP)

If the duration of an initial CNP, or, in the case of a renewal of a CNP, the combined duration of the initial CNP and any renewal or renewals of a CNP for associated construction work on substantially the same construction site, will be less than or equal to 14 days, a positive correction of 3 dB(A) shall be applied to the BNL.

For the purposes of this Step a CNP shall be considered to be a renewal

of a CNP if its date of commencement is less than or equal to 21 days after the expiry date of any other CNP for associated construction work on substantially the same construction site.

A.2.5 Step 5 - *Correction for Multiple Permit Situations*

If in the opinion of the Authority the NSR will be materially affected by noise from construction work associated with more than one CNP, the Authority may make such correction to the BNL as it considers appropriate having regard to standard acoustical principles and practices.

A.2.6 Step 6 - *Determination of the Acceptable Noise Level (ANL)*

The corrections obtained in Steps 4 and 5 shall be applied to the BNL obtained in Step 3 to give the ANL.

A.2.7 Step 7 - *Location of Items of Specified Powered Mechanical Equipment (SPME)*

All items of SPME should be considered to be grouped at a position mid-way between the approximate geographical centre of the construction site and its boundary nearest to the NSR. This position is referred to as the notional source position.

If the construction site is irregular in shape the geographical centre may fall outside the physical limits of the site. In such cases the notional source position shall be taken to be the position on the construction site boundary nearest to the geographical centre of the site. If two such points exist, the point nearest to the NSR shall be used.

If the construction site is linear in shape (that is, long, thin and substantially uniform in width, but not necessarily straight) with a length to width ratio exceeding 5:1, only the dominant portion of the site shall be considered for the purpose of determining the notional source position. The dominant portion is defined as the portion of the linear site closest to the NSR and having a length to width ratio of 5:1. If part of the construction site is linear in shape then such part shall be subject to a separate assessment for a separate CNP, at the discretion of the Authority.

If the construction site is large such that the notional source position would be greater than 50 m from the point on the site boundary nearest to the NSR the position shall be taken to be a point 50 m from that point on the site boundary measured along the line between the approximate geographical centre of the site and the point on the site boundary nearest to the NSR.

If in the opinion of the Authority the site is of such shape or dimensions that the procedure outlined above cannot readily be applied or if such application would lead to an inappropriate notional source position the Authority may select such a notional source position as it considers appropriate in the circumstances.

If the Authority is satisfied that any item of SPME is to remain in

substantially the same position, and the particular item and its position has been specified by the applicant, the actual position may be used in conjunction with the notional source position for all other items of SPME in the calculation of distance attenuation in Step 9.

A.2.8 Step 8 - *Sound Power Levels for Specified Powered Mechanical Equipment (SPME)*

The sound power levels in dB(A) of each of the items of SPME intended for use on the construction site shall be obtained from Table A.3.

If any item of SPME in Table A.3 intended for use on the construction site is a prescribed product under the Ordinance and is fitted with a valid noise emission label, then the sound power level on the label shall be used instead of the one in Table A.3 for the calculation of CNL.

A.2.9 Step 9 - *Distance Attenuation and Summation of Noise Levels*

A.2.9.1 General

In determining the distance from the source position to the NSR blank facades shall not be considered and the distance shall be determined to the nearest NSR facade with windows, doors or other openings. The plan distance or, where appropriate, the slant distance shall be used.

A.2.9.2 Procedure for Use with a Single Notional Source Position

If all items of SPME are assumed to be located at a single notional source position, the sound power levels obtained in Step 8 shall be summed logarithmically in accordance with Table A.4 to obtain a total sound power level.

The distance between the notional source position and the NSR shall be determined and the appropriate correction factor shall be obtained from Table A.5. This correction factor shall be subtracted from the total sound power level to give the Predicted Noise Level (PNL) at the NSR.

A.2.9.3 Procedure for Use with Actual Source Positions or a Combination of Actual and Notional Source Positions.

If in addition to a notional source position a number of actual source positions are being used, or if only actual source positions are being used, the distances between the actual source positions and the NSR shall be determined and the appropriate correction factors shall be obtained from Table A.5. These factors shall be subtracted from the individual sound power levels for each item of SPME to give the individual sound pressure levels for each item of SPME at the NSR.

Any combined sound pressure level from items of SPME assumed to be located at a notional source position shall be determined in accordance with Section A.2.9.2 and shall be added logarithmically to the individual sound pressure levels from items of SPME assumed to be at actual source positions, in accordance with Table A.4, to give the PNL at the NSR.

A.2.10 Step 10 - *Corrections for the Effect of Barriers*

In cases where the Authority considers that all items of SPME to be used on the construction site will be totally screened by a substantial barrier such that none will be visible when viewed from any window, door or other opening in any facade of the NSR, a negative correction of 10 dB(A) shall be applied to the PNL obtained in Step 9. In cases where the Authority considers a higher negative correction should be applied, the Authority shall use appropriate correction factors having regard to standard acoustical principles and practices.

Substantial barriers shall be taken to be large solid objects, such as buildings or topographical features, which will act as effective acoustic screens. Barriers which are small, lightweight, incomplete or temporary, such as site fences or hoardings, are not to be considered. The effects of purpose-built acoustic barriers may be taken into account in accordance with Section 5.3.

In cases where the Authority considers that all items of SPME to be used on the construction site other than "quiet" items of SPME will be totally screened when viewed from the NSR, a negative correction of 5 dB(A) shall be applied to the PNL obtained in Step 9. For the purpose of this section "quiet" items of SPME shall be considered to be those whose sound power level is more than 15 dB(A) below the total sound power level being generated by all items of SPME.

In cases where the NSR is a building directly adjacent to the construction site such that none of the items of SPME to be used on the construction site will be visible when viewed from any window, door or other opening in any facade of the NSR, the NSR shall be considered to be partially screened and a negative correction of 5 dB(A) shall be applied to the PNL obtained in Step 9.

A.2.11 Step 11 - *Corrections for Acoustic Reflections*

In cases where the NSR is a building, a positive correction of 3 dB(A) shall be applied to the PNL obtained in Step 9.

An additional positive correction of up to 3 dB(A) may be applied to the PNL in cases where the Authority considers that noise levels at the NSR will be increased due to the confined or reverberant nature of the immediate locality of the construction site or the NSR.

A.2.12 Step 12 - *Corrected Noise Level (CNL) at the Noise Sensitive Receiver (NSR)*

The corrections obtained in Steps 10 and 11 shall be applied to the PNL obtained in Step 9 to give the CNL at the NSR.

A.2.13 Step 13 - *Construction Noise Permit (CNP) Issuing Procedure*

The CNL at the NSR obtained in Step 12 shall be compared with the ANL obtained in Step 6. If the CNL is equal to or less than the ANL the CNP may

be issued. If the CNL is greater than the ANL the CNP shall not be issued unless the application is a special case as defined in Section 5. The procedures detailed in Section 5 shall then be followed.

Table A.1 - Area Sensitivity Ratings (ASRs)

Degree to which NSR is affected by IF Type of Area Containing NSR		Not Affected	Indirectly Affected	Directly Affected
(i)	Rural area, including country parks or village type developments	A	B	B
(ii)	Low density residential area consisting of low-rise or isolated high-rise developments	A	B	C
(iii)	Urban area	B	C	C
(iv)	Area other than those above	B	B	C

For the purpose of Table A.1, the following definitions shall apply:

"country park" means an area that is designated as a country park pursuant to section 14 of the Country Parks Ordinance;

"directly affected" means that the NSR is at such a location that noise generated by the IF is readily noticeable at the NSR and is a dominant feature of the noise climate of the NSR;

"indirectly affected" means that the NSR is at such a location that noise generated by the IF, whilst noticeable at the NSR, is not a dominant feature of the noise climate of the NSR;

"not affected" means that the NSR is at such a location that noise generated by the IF is not noticeable at the NSR; and

"urban area" means an area of high density, diverse development including a mixture of such elements as industrial activities, major trade or commercial activities and residential premises.

Table A.2 - Basic Noise Levels (BNLs)

Time Period \ ASR	A	B	C
All days during the evening (1900 to 2300 hours), and general holidays (including Sundays) during the day-time and evening (0700 to 2300 hours)	45	50	55
All days during the night-time (2300 to 0700 hours)	30	35	40

Table A.3 - Sound Power Levels for Items of Specified Powered Mechanical Equipment (SPME)

Identification Code	Description	Sound Power Level (dB(A))
CNP 023	Breaker, hand-held, mass ≤ 10 kg	108
CNP 024	Breaker, hand-held, mass > 10 kg and < 20 kg	108
CNP 025	Breaker, hand-held, mass ≥ 20 kg and ≤ 35 kg	111
CNP 026	Breaker, hand-held, mass > 35 kg	114
CNP 030	Bulldozer	115
CNP 044	Concrete lorry mixer	109
CNP 067	Dump truck	117
CNP 170	Poker, vibratory, hand-held	113

Table A.4 - Summation of Noise Levels

Difference in dB(A) between two noise levels being summed	Amount in dB(A) to add to the higher noise level
0 to 0.5	3.0
1.0 to 1.5	2.5
2.0 to 3.0	2.0
3.5 to 4.5	1.5
5.0 to 7.0	1.0
7.5 to 12.0	0.5
more than 12.0	0

When using Table A.4 noise levels should be summed in a pairwise fashion and the final total rounded to the nearest whole dB(A), with values of 0.5 or more being rounded upwards.

Table A.5 - Correction Factors to Obtain the Predicted Noise Level (PNL) from Sound Power Levels at Given Distances

Distance (m)	Correction (dB(A))	Distance (m)	Correction (dB(A))
0	8	30 to 33	38
1	8	34 to 37	39
2	14	38 to 41	40
3	18	42 to 47	41
4	20	48 to 52	42
5	22	53 to 59	43
6	24	60 to 66	44
7	25	67 to 74	45
8	26	75 to 83	46
9	27	84 to 93	47
10	28	94 to 105	48
11	29	106 to 118	49
12	30	119 to 132	50
13	30	133 to 148	51
14	31	149 to 166	52
15 to 16	32	167 to 187	53
17 to 18	33	188 to 210	54
19 to 21	34	211 to 235	55
22 to 23	35	236 to 264	56
24 to 26	36	265 to 300	57
27 to 29	37		

For the purpose of determining the correction to be used for converting from sound power level at the source to the PNL at the NSR, the distance from the source position to the NSR shall be determined to the nearest whole metre, with values of 0.5 or more being rounded upwards.

This table is only valid for distances of up to 300 m. For distances greater than 300 m the Authority shall calculate appropriate correction factors having regard to standard acoustical principles and practices.

ANNEX B - PRESCRIBED CONSTRUCTION WORK (PCW)

<u>Identification Code</u>	<u>Description of Activity</u>
PCW 001	Erection or dismantling of formwork or scaffolding.
PCW 002	Loading, unloading or handling of rubble, wooden boards, steel bars, wood or scaffolding material.
PCW 003	Hammering.

ANNEX C - QUIET WORKING METHODS FOR PCW

<u>Identification Code</u>	<u>Description of Quiet Working Method</u>
QPCW 001	Disposal of rubble through plastic chutes.

ANNEX D - GENERAL CALIBRATION AND MEASUREMENT PROCEDURES

D.1. *Instrumentation*

For the purpose of this Technical Memorandum sound level meters shall comply with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1), and other noise measuring and analysis instrumentation shall be of a comparable professional quality. Standard acoustical principles and practices shall be followed in the measurement and analysis of the noise under investigation.

D.2. *Calibration Procedures*

Immediately prior to and following each noise measurement the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration levels from before and after the noise measurement agree to within 1.0 dB.

D.3. *Measurement Procedures*

D.3.1 Assessment Point

Noise levels shall be determined by carrying out measurements at the assessment point. Where a measurement is to be carried out at a building, the assessment point shall normally be at a position 1 m from the exterior of the building facade but may be at any other point considered to be appropriate by the Authority. Where a measurement is to be made of noise being received at a place other than a building, the assessment point shall be at a position 1.2 m above the ground, at a particular point considered appropriate by the Authority.

D.3.2 Noise Units and Descriptors

Any noise measurement shall be made in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}) measured with an integrating sound level meter. Such measurement shall be made over any 5-minute period during the CNP period under consideration.

D.3.3 Rounding of Noise Levels

All noise measurements shall be rounded to the nearest whole dB(A), with values of 0.5 or more being rounded upwards.

D.3.4 Weather Conditions

Noise measurements should be made in accordance with standard acoustical principles and practices in relation to weather conditions.