ENVIRONMENTAL PROTECTION DEPARTMENT
PRACTICE NOTE FOR PROFESSIONAL PERSONS

Practice Note for the Planning of Residential Developments Against Road Traffic Noise

(This Practice Note substitutes ProPECC PN 1/97 and PN 4/93.)

Preamble

The purpose of this Practice Note (PN) is to assist project proponents, practitioners and environmental/acoustic professionals in assessing the compliance of road traffic noise standards [1] and requirements of the Hong Kong Planning Standards and Guidelines (HKPSG) at proposed residential developments[2].

2. This PN also promulgates a set of self-assessment procedures for project proponents, practitioners and environmental/acoustic professionals to facilitate and streamline the planning approval procedures.

Noise Impact Assessment

3. To ensure the road traffic noise standards can be met, requirements for the project proponents to (i) conduct a Noise Impact Assessment (hereinafter referred to as "RTNIA" (Road Traffic Noise Impact Assessment)) and (ii) provide mitigation measures to the satisfaction of the Director of Environmental Protection (DEP) or other relevant authorities, as the case may be, are often stated in the land lease conditions or in other conditions, e.g. approval conditions imposed by the Town Planning Board, for government sites of residential purposes that would be made available for sale or private housing sites that are subject to lease modifications.

4. The purpose of the RTNIA is not only to predict the road traffic noise impact but, in the process, interacts with the design of the development concerned, so that noise mitigation designs/measures, including but not limited to those listed below, would be exhausted and incorporated where necessary to meet the HKPSG's standards and requirements. For cases where the requirement of the RTNIA has been stipulated in the land lease conditions or other conditions, the project proponent shall demonstrate to the

[1] The HKPSG has specified a road traffic noise standard of 70 dB(A) L10 (1hr) for domestic premises.
[2] Including the Government, Institution and Community ("GIC") facilities provided within the residential developments. Please refer to Chapter 9 of HKPSG for the road traffic noise standard of different noise sensitive uses.

Environmental Protection Department (EPD) that all necessary mitigation measures[3], in connection with the development concerned, have been incorporated and implemented in order to form the basis for the issue of any certificate of compliance.

Noise Mitigation Designs/Measures[4]

5. Developers and architects are well aware of the HKPSG's requirements, and noise mitigation measures as specified within the HKPSG[5] are commonly incorporated in the Base Case design of the residential developments to reduce the road traffic noise impact:

- Setback of Buildings;
- Building Orientation;
- Screening by Noise Tolerant Buildings;
- Extended Podium;
- Decking Over;
- Self-Protecting Building Design and Arrangement; and
- Integrated Building-Noise Source Design.

6. Past experience indicates the following measures can also be effective:

- Acoustic Window (AW) (Baffle Type/Top-hung Type);
- Enhanced Acoustic Balcony (EAB);
- Barrier (Vertical Barrier or Canopy);
- Architectural Features (Architectural Fin, Acoustic Balcony & End Wall); and
- Treatment of Source (e.g. Low Noise Road Surface).

7. If residential units are still exposed to road traffic noise that exceeds the HKPSG's standard upon exhaustion of all practicable mitigation measures, acoustic insulation should be provided as a last resort. Acoustic insulation requires the provision of (i) suitable window types as described in **Table 1** below, and (ii) air-conditioning systems because of the warm and humid climate in Hong Kong.

[3] Reference can be made to this PN, Chapter 9 of HKPSG and other relevant guidance note(s)/practice note(s)/material(s) published by the EPD.
[4] Greater details are available on the EPD's website: https://www.epd.gov.hk/epd/Innovative/greeny/eng/introduction.html
[5] https://www.pland.gov.hk/pland_en/tech_doc/hkpsg/full/pdf/ch9.pdf

Table 1: Suitable Window Types for Noise Insulation

Suitable window type when the estimated noise level will exceed the road traffic noise standard by β value

Window Types	I	II	III
Exceedance over Standard	$\beta < 10$	$10 \leq \beta < 15$	$\beta \geq 15$
NOISE INSULATION PERFORMANCE AND WINDOW TYPES I. Openable well-gasketted double-pane window in a single frame with transmission loss (TL) of 28 dB or above in 250 Hz octave-band and sound transmission class (STC) 31 or above II. Openable well-gasketted double-pane window in a single frame with TL of 32 dB or above in 250 Hz octave-band and STC 34 or above III. Openable well-gasketted double-pane window in a single frame with TL of 33 dB or above in 250 Hz octave-band and STC 38 or above			

Streamlined Procedures

8. As developable land for housing development is scarce in Hong Kong, it is inevitable for some of the housing sites to be situated close to busy roads, where sufficient noise buffer cannot be provided. Amongst the many practicable noise mitigation measures, the application of Acoustic Window (AW) and/or Enhanced Acoustic Balcony (EAB), as a form of at-receiver mitigation measure, are found to be good solutions - offering a considerable degree of noise reduction without sacrificing any development potentials of those noise-challenging sites.

9. According to the *Practice Note on Application of INNOVATIVE NOISE MITIGATION DESIGNS in Planning Private Residential Developments against Road Traffic Noise Impact*, AW and EAB are proven to be capable of reducing the noise inside the flats by at least **6 dB(A)**[6], even in different configurations and dimensions to suit the individual needs, and at the same time allowing adequate natural ventilation. AW and EAB are becoming more and more popular in building designs as the "open window living environment" promotes sustainable living.

10. The housing demand is huge and ever-growing. To facilitate project planning and the consideration by relevant authorities, the following streamlined procedures for the planning of residential developments against road traffic noise are adopted:

[6] Based on the *Practice Note on Application of Innovative Noise Mitigation Designs in Planning Private Residential Developments against Road Traffic Noise Impact* and the findings from noise impact assessment reports prepared for private residential developments in the past.

A. For sites with maximum predicted road traffic noise level ≤ 76 dB(A) in Base Case[7] and Compliance Rate = 100% in Mitigated Case[8]

The project proponent shall ***deposit*** the completed self-assessment form (**Annex A**) and the Road Traffic Noise Impact Assessment Report (RTNIAR) to the EPD. The RTNIAR shall be prepared via the *Web-based Traffic Noise Assessment Tool* (Web-NAT) developed by the EPD and be verified by an Independent Environmental Professional (IEP), who should be a professional member of the Hong Kong Institute of Qualified Environmental Professionals Limited (HKIQEP), a corporate member of the Hong Kong Institute of Acoustics Limited (HKIOA), or a registered professional engineer (RPE) in environmental or mechanical disciplines under the Engineers Registration Ordinance (Cap. 409) with relevant noise assessment experience. The road traffic noise model adopted in the RTNIA shall also be prepared and checked by a Certified Noise Modelling Professional (CNMPro)[9] of the HKIQEP or equivalent via the Web-NAT.

B. For sites with maximum predicted road traffic noise level > 76 dB(A) in Base Case and Compliance Rate = 100% in Mitigated Case

The project proponent shall ***submit*** the completed self-assessment form and the RTNIAR to the EPD ***for vetting***. The EPD will seek advice from relevant departments and bureaux, if necessary, and consider the validity and acceptability of the application. Normally, the EPD will not object on noise grounds to the application as 100% compliance of the road traffic noise standards can be achieved. Same as the streamlined procedure A above, the RTNIAR shall be prepared via Web-NAT and be verified by an IEP, while the road traffic noise model adopted in the RTNIA shall be prepared and checked by a CNMPro via Web-NAT.

C. For sites with Compliance rate <100% in Mitigated Case

The streamlined procedure B above shall be followed. Attempt shall be made to maximize the proportion of the residential units protected. The project proponent/IEP shall demonstrate to EPD's satisfaction that all practicable noise mitigation measures, including those mentioned above, have been exhausted and incorporated into the design of the development concerned. Any technical or overriding constraints that would hinder the use of the noise mitigation measures shall be evaluated and clearly recorded in the RTNIAR. When considering the case, the EPD may invite the project proponent and the

[7] Base Case refers to the scenario when only the Self-Protecting Building Design and Arrangement and/or Integrated Building-Noise Source Design as specified in Chapter 9 of the HKPSG are considered in the RTNIA.
[8] Mitigated Case refers to the scenario when all noise mitigation designs/measures incorporated into the development are considered in the RTNIA.
[9] The project proponent is recommended to appoint the CNMPro and IEP from different organizations/companies to minimize conflicts of interest. However, should it be absolutely unavoidable to appoint the CNMPro and IEP from the same organization/company, the project proponent should ensure that the duties and responsibilities of the CNMPro and IEP would be clearly defined, such that the CNMPro would prepare the road traffic noise model and IEP to check the correctness and accuracy of the RTNIA (see **Annex B**).

IEP or other building professionals, where necessary, to attend meetings and/or produce alternative proposals for further deliberations. If there are sufficient justifications for the provision of acoustic insulation, the EPD will conclude the case and advise the project proponent and other relevant authorities of its decision.

11. Under this streamlined approach, the EPD acknowledges the professional integrity of the CNMPro and IEP, and accepts the project proponent's self-assessment form to be correct to the best of his knowledge. If questionable practices are revealed, the EPD would present its observations to relevant authorities and institutions. By completing the self-assessment form, the project proponent is deemed to undertake the implementation and maintenance of the noise mitigation measures as recommended in the RTNIAR and in no case, the Government would be held liable for providing at-source mitigation measures, e.g., roadside noise barrier/enclosure, to help reduce the road traffic noise impact on the development concerned.

12. The streamlined procedures are NOT applicable to residential developments that will be exposed to noise other than road traffic, e.g., railway, fixed sources, aircraft, or helicopters, for which the impact shall be assessed following the guidelines and criteria stipulated in Chapter 9 of the HKPSG. To facilitate the implementation of this PN, the project proponent may submit a separate NIA for these other noise sources to the EPD for vetting while following the self-assessment procedures given in Para.10 above to fulfill the requirement for conducting an NIA for road traffic noise. As for noise sources like railway and industrial premises that are controlled under the Noise Control Ordinance, reference should also be made to the "Technical Memorandum for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites".

(Samuel H.K. Chui)
Director of Environmental Protection

Environmental Protection Department
Issued: October 2023

Proposed Residential Development
Self-Assessment Form

I. General Information

Details of the Applicant (project proponent)(1)	
Name:	
Address:	
Name of Contact Person:	
Telephone:	Fax:
Email:	
Location of the Application Site	
Full address of the application site, include the lot number where appropriate:	
Road Traffic Noise Model	
Prepared by: Professional Qualification:	Membership No.:
Road Traffic Noise Impact Assessment Report (RTNIAR)	
Prepared via Web-NAT Yes ☐ No ☐ Checked by: Professional Qualification:	Membership No.:

(1) All correspondence shall be sent to the Applicant.

II. Scale of Development and Road Traffic Noise Compliance

Scale of Development	
Site Area (ha):	Zoning (Current/Proposed):
Target Completion Year:	Assessment Year:
Site Plan(1) (Figure no.):	

(1) A suitably scaled site plan (preferably 1:1000) showing the site area, the land uses, the layout of the Development, and the surrounding area shall be provided in the RTNIAR.

II. Scale of Development and Road Traffic Noise Compliance (Cont.)

Road Traffic Noise Compliance (for residential units)	
Total no. of residential units provided:	
<u>Max. Predicted Road Traffic Noise Level</u>	
Base Case (dB(A)):	Compliance Rate (%):
Mitigated Case (dB(A))[1]:	Compliance Rate (%):
Total no. of residential units provided with Acoustic Insulation (if any):	
Window Type adopted for the Acoustic Insulation[2][3]:	
Road Traffic Noise Compliance (for other noise sensitive uses, e.g., residential care home for the elderly (RCHE), child care centre, kindergarten, other social welfare facilities, etc.)[4]	
Any other noise sensitive uses provided? Yes ☐ No ☐	*If yes, please specify*:
Total no. of units provided[5]:	
<u>Max. Predicted Road Traffic Noise Level</u>	
Base Case (dB(A)):	Compliance Rate (%):
Mitigated Case (dB(A))[1]:	Compliance Rate (%):
Total no. of units provided with Acoustic Insulation (if any):	
Window Type adopted for the Acoustic Insulation[2][3]:	
Any other noise sensitive uses provided? Yes ☐ No ☐	*If yes, please specify*:
Total no. of units provided[5]:	
<u>Max. Predicted Road Traffic Noise Level</u>	
Base Case (dB(A)):	Compliance Rate (%):
Mitigated Case (dB(A))[1]:	Compliance Rate (%):
Total no. of units provided with Acoustic Insulation (if any):	
Window Type adopted for the Acoustic Insulation[2][3]:	
Any other noise sensitive uses provided? Yes ☐ No ☐	*If yes, please specify*:
Total no. of units provided[5]:	
<u>Max. Predicted Road Traffic Noise Level</u>	
Base Case (dB(A)):	Compliance Rate (%):
Mitigated Case (dB(A))[1]:	Compliance Rate (%):
Total no. of units provided with Acoustic Insulation (if any):	
Window Type adopted for the Acoustic Insulation[2][3]:	

(1) The predicted noise level in Mitigated Case refers to the equivalent noise level at 1m from the external façade after accounting all potential reduction in noise levels offered by the proposed mitigation measures, including the Relative Noise Reduction (RNR) of Acoustic Windows/Enhanced Acoustic Balconies, if any.

(2) Please refer to Table 1 of this PN for the Suitable Window Types for Noise Insulation.

(3) If more than one window type is adopted, please indicate (i) the window type used, and (ii) the max. predicted road traffic noise level at the corresponding noise sensitive receivers in this section (e.g., Type I / 73 dB(A); Type II / 81 dB(A)).

(4) Please refer to Appendix 4.1 of Chapter 9 of the Hong Kong Planning Standards and Guidelines (HKPSG) for the list of Noise Sensitive Uses.

(5) Please provide the number of units of noise-sensitive uses in this section - for example, five (5) classrooms for kindergarten, five (5) bedrooms for RCHE.

III. Noise Mitigation Design(s)/Measure(s) incorporated into the Design of the Development

Noise Mitigation Designs/Measures[1][2][3]		
Setback of Buildings	Yes ☐ No ☐	Section: Figure:
Building Orientation	Yes ☐ No ☐	Section: Figure:
Screening by Noise Tolerant Buildings	Yes ☐ No ☐	Section: Figure:
Extended Podium	Yes ☐ No ☐	Section: Figure:
Decking Over	Yes ☐ No ☐	Section: Figure:
Acoustic Window (Baffle Type)[4]	Yes ☐ No ☐	Section: Figure: Total No.: Window Configuration[5]: TL: STC:
Acoustic Window (Baffle Type) with Architectural Fin[4]	Yes ☐ No ☐	Section: Figure: Total No.: Window Configuration[5]: TL: STC:
Acoustic Window (Top Hung Type)[4]	Yes ☐ No ☐	Section: Figure: Total No.: Window Configuration[5]: TL: STC:
Enhanced Acoustic Balcony[4]	Yes ☐ No ☐	Section: Figure: Total No.: Window Configuration[5]: TL: STC:
Barrier (e.g. Canopy, Vertical Barrier)	Yes ☐ No ☐	Section: Figure:
Architectural Feature (e.g. Architectural Fin[6], Acoustic Balcony, End Wall)	Yes ☐ No ☐	Section: Figure:
Treatment of Sources (e.g. LNRS, Road-side Barrier)	Yes ☐ No ☐	Section: Figure:
Provision of Sound Absorptive Material at Re-Entrant or Semi-confined Location(s)[7]	Yes ☐ No ☐ N/A ☐	Section: Figure:

III. Noise Mitigation Design(s)/Measure(s) incorporated into the Design of the Development (Cont.)

Noise Mitigation Designs/Measures[1][2][3]		
Window Features (e.g. Fixed Glazing, Maintenance Window/Door (not for ventilation purpose), etc.)	Yes ☐ No ☐ N/A ☐	Section: Figure: Max. Predicted Road Traffic Noise Level: Total No.: Window Configuration[5]: TL: STC:
Others Please specify:	Yes ☐ No ☐ N/A ☐	Section: Figure:

(1) Suitably scaled layout plan(s) of the Development showing all of the proposed noise mitigation measure(s) shall be provided in the RTNIAR.

(2) Details on the design and application of the proposed noise mitigation measures shall be clearly shown in suitably scaled drawing(s) and be documented in the main text of the RTNIAR, respectively.

(3) For application that cannot achieve 100% compliance in the road traffic noise standard, specific reason(s) for not adopting certain mitigation measures shall be substantiated and documented in the RTNIAR.

(4) The design and application of the Acoustic Window and/or Enhanced Acoustic Balcony including their combined use with architectural fin shall follow the guidelines given in the *Practice Note on Application of INNOVATIVE NOISE MITIGATION DESIGNS in Planning Private Residential Developments against Road Traffic Noise Impact*.

(5) Please provide the Transmission Loss (TL) in 250 Hz and Sound Transmission Class (STC) of the Window Pane used.

(6) Attention should be given to the potential degradation caused by the reflection of noise, and sound absorptive material(s) should be fitted on the architectural fin at the side facing the ventilation opening(s) of the noise sensitive receiver(s) to minimize the impact unless there are justifications (e.g., other suitable mitigation measures) to prove otherwise.

(7) Attention should be given to the potential degradation caused by the multiple reflections/reverberation of noise at re-entrant/semi-confined location(s), and sound absorptive materials should be fitted on the external façades to minimize the impact unless there are justifications (e.g., other suitable mitigation measures) to prove otherwise.

IV. Noise Modelling Professional Certification

Certification by Certified Noise Modelling Professional	
I hereby attest that the Road Traffic Noise Model (RTNM) of the Road Traffic Noise Impact Assessment Report (RTNIAR) named as " *(dated)"* submitted, in connection with this form, complies with the technical requisites to produce reliable results for road traffic noise assessment.	
Signed by Certified Noise Modelling Professional Date:	
Name:	
Company:	
Position:	
Professional Qualification:	Membership No.:

V. Independent Environmental Professional Certification

Certification by Independent Environmental Professional	
I hereby attest that the information provided in this self-assessment form including the layout plan(s) and the assessment results of the RTNIAR are true and accurate.	
Signed by Independent Environmental Professional Date:	
Name:	
Company:	
Position:	
Professional Qualification:	Membership No.:

VI. Self-Attestation and Undertaking for implementation of Noise Mitigation Design(s)/Measure(s)

Undertaking by the Applicant (project proponent)

I hereby undertake the following for implementing the Noise Mitigation Measures as shown in the RTNIAR.

1. All the noise mitigation measures as shown in the RTNIAR shall be incorporated into the general building plans of the Development for the approval by the Building Authority.

2. To appoint an independent Authorized Person ("iAP")[1] to certify and inform the Director of Environmental Protection that all noise mitigation measures identified in the RTNIAR are duly implemented before the completion of the development ("Completion").

3. To be responsible for implementation and modification/rectification of all deviation from the noise mitigation measures identified in the RTNIAR before Completion, and be responsible for all associated costs.

4. To agree that Environmental Protection Department ("EPD") could disclose the content of the RTNIAR and this undertaking to any person when required.

5. All the noise mitigation measures proposed in the RTNIAR shall be designated as Noise Mitigation Measures ("NMM") in the Deed of Mutual Covenant ("DMC") with details and the locations clearly indicated. Such DMC should contain binding and enforceable conditions for the control, operation, financial support and maintenance for such measures.

6. In case of changes to the building plans that would affect the noise performance of the development or the noise mitigation measures as shown in the RTNIAR, we will seek prior agreement from the EPD and propose alternative measures with equivalent noise mitigation performance. The iAP will then check and certify the implementation of these measures accordingly before Completion.

7. To allow access for the EPD to conduct on-site inspection / noise measurement before the full occupation of the development.

Signed by Applicant

Date:

on behalf of

[1] The project proponent is recommended to appoint the iAP from a different organization/company than the project's AP to minimize conflicts of interest.

Checklist for the Self-Assessment Procedures

This Checklist is intended to guide the project proponent in determining whether the basic requirements of the self-assessment procedures have been fulfilled.

This Checklist is served for reference purposes only. The project proponent should seek advice from the EPD in case of doubt.

Certified Noise Modelling Professional (CNMPro)
☐ Prepare the Road Traffic Noise Model via Web-NAT
☐ Check that all the necessary input/assumptions, including all the factors that could affect the assessment results such as the road gradient, distance, view angle, road surface, barriers, etc., are correct and have been properly incorporated into the Road Traffic Noise Model
☐ Check that the results produced by the Road Traffic Noise Model are technically correct
☐ Sign the Self-Assessment Form

Independent Environmental Professional (IEP)
☐ Check that the Road Traffic Noise Impact Assessment Report (RTNIAR) has been prepared via Web-NAT
☐ Check that the design and application of the recommended noise mitigation measures, if any, are technically feasible and practicable to achieve the required noise reduction rate/performance
☐ Check that the road traffic noise impact assessment results shown in the RTNIAR are technically correct and accurate
☐ Check that all necessary information, including the location(s), design and application of the recommended noise mitigation measure(s), has been correctly documented and incorporated into the RTNIAR
☐ Sign the Self-Assessment Form

Project Proponent
☐ Prepare and sign the Self-Assessment Form
☐ Submit/Deposit the Self-Assessment Form and the RTNIAR to the EPD

Independent Authorized Person (iAP)
☐ Certify and inform the Director of Environmental Protection that all noise mitigation measures identified in the RTNIAR and any alternative measures proposed under Clause 6 of the Undertaking (Part VI) are duly implemented before the completion of the development