BEAM Plus
New Buildings
Version 2.0 (02.2025)

HKGBC 香港綠色建築議會

BEAM 建築環保評估協會

Amendments

Version Number	Date of Issue	Credit	Details
2.0 (2019 Edition)	4 Sep 2019	-	-
2.0 (2021 Edition)	13 May 2021	-	Enhanced the clarity and streamlined the submittal requirements to facilitate the assessment through the Automated Assessment system (iBEAM) [1]. [1] Refer to Technical Circular Letter 2021.170.
2.0 (2023 Edition)	31 Oct 2023	-	Included the required supporting documents for Compliance Assessment (CA) in the Submittals Section of each credit.
		-	Removed the note “The supporting document is not required in FA if the credit is achieved in PA” from the Submittals Section of the relevant credits [2]. [2] A list of “Conclusive Credits” will be issued separately.
		-	Enhanced the clarity and readability by fixing minor issues such as typos and formatting.
		General	Incorporated FAQ #201 on the requirement of recognised Locally Qualified Professional.
		IDCM P2, 8 and 10	Incorporated FAQ #192 on the criteria on exempting Project BEAM Pro/ Construction BEAM Pro’s endorsement.
		IDCM 1 and 6	Incorporated FAQ #156 to clarify the same personnel cannot act in dual roles as Design BEAM Pro/ Affiliate and Construction BEAM Pro/ Affiliate.
		IDCM 3	Replaced with pages Annex A-1 to A-8 of Technical Circular Letter 2023.184 on the updated assessment criteria for IDCM 3b [3]. [3] FAQ #129 on the definition of "maintenance workshop for facility management” for IDCM 3c is incorporated in Technical Circular Letter 2023.184.

Version Number	Date of Issue	Credit	Details
		IDCM 7	Replaced with pages Annex A-1 to A-8 and B-1 to B-13 of Technical Circular Letter 2023.183 on the updated credit requirement and assessment criteria for IDCM 7b [4]. [4] Technical Circular Letter 2022.182 on the dust and noise monitoring requirement, FAQ #130 on EM&A Reports for designated project, FAQ #190 on specifications, FAQ #191 on the endorsement requirement, FAQ #192 on the criteria on exempting Project BEAM Pro/ Construction BEAM Pro's endorsement and FAQ #193 on the number of environmental management reports/ implementation records are incorporated in Technical Circular Letter 2023.183.
		IDCM 8	Incorporated Technical Circular Letter 2018.142 (Revision 1) on the elaboration of assessment criteria.
		IDCM 8	Incorporated FAQ #140 on the use of excavated materials for backfilling and/ or reusing/ recycling.
		IDCM 8, 9 and 10	Incorporated FAQ #190 on the requirement of specifications.
		IDCM 8 and 10	Incorporated FAQ #193 on the number of waste management reports/ implementation records.
		IDCM 10	Incorporated FAQ #191 on the endorsement requirement.
		IDCM 10	Incorporated FAQ #194 to clarify the accepted alternative evidence in lieu of quarterly report.
		IDCM 11	Incorporated FAQ #146 on the endorsement requirement of Operation & Maintenance Manual and Energy Management Manual.
		IDCM 12	Replaced with pages Annex A-1 to A-5 of Technical Circular Letter 2023.187 to clarify the assessment criteria of (b) Chemical Storage and Mixing Room [5]. [5] FAQ #147 on the requirement of chemical storage and mixing area is incorporated in Technical Circular Letter 2023.187.
		IDCM 15	Replaced with pages Annex A-1 to A-4 of Technical Circular Letter 2023.185 on the updated submittal requirements.
		IDCM 16	Incorporated FAQ #157 on the acceptable approach of the use of BIM in building performance simulation.

Version Number	Date of Issue	Credit	Details
		SS 1	Incorporated FAQ #158 to clarify the types of car parking spaces to be included in the assessment.
		SS 3	Incorporated FAQ #132 on the requirement for project with no cultural heritage within or in the vicinity of project site.
		SS 6	Incorporated FAQ #137 on the criteria for "Building Luminance" in the assessment.
		SS 8 and 9	Incorporated FAQ #49 on the exemption of validation report for recognised CFD software.
		MW P1	Replaced with pages Annex A-1 to A-4 of Technical Circular Letter 2022.177 to clarify the assessment criteria.
		MW 2 and 9	Incorporated FAQ #131 on the definition of assessment unit "surface area".
		MW 3, 5, 6, 7, 8 and 9	Incorporated FAQ #138 on the qualified personnel to endorse the calculation/ summary/ worksheet of building elements/ materials.
		MW 10	Incorporated FAQ #143 on the endorsement requirement for LCA/ embodied carbon assessment report.
		EU 2	Incorporated Technical Circular Letter 2022.179 on the update of benchmarking criteria.
		EU 2	Incorporated Technical Circular Letter 2022.180 on the updated benchmarking criteria for energy efficiency of room air-conditioners.
		EU 3	Incorporated FAQ #195 on offsetting the peak electricity demand by renewable energy.
		EU 5	Incorporated FAQ #144 on the kinds of systems/ areas to be considered in the calculation of building energy consumption.
		EU 7	Replaced with pages Annex A-1 and B-1 to B-3 of Technical Circular Letter 2023.186 on the updated assessment criteria and submittal requirement.
		WU P1 and 1	Incorporated FAQ #196 on the submission requirements of plumbing drawings.
		WU 2 and 8	Incorporated FAQ #198 on the reference year period of the monthly reference evapotranspiration (ET) for the calculation.

Version Number	Date of Issue	Credit	Details
		WU 2	Incorporated FAQ #149 on the landscaping and planting coverage for irrigation demand calculation.
		WU 3	Incorporated FAQ #199 on the requirement of “evidence” to demonstrate compliance.
		WU 4	Replaced with pages Annex A-1 to A-3 and B-1 to B-2 of Technical Circular Letter 2023.188 on the coverage of water leakage detection systems.
		WU 5	Replaced with pages Annex A-1 to A-2 of Technical Circular Letter 2023.189 on the coverage of twin tank system [6]. [6] FAQ #155 on the alternative to automatic pump control switch is incorporated in Technical Circular Letter 2023.189.
		WU 6	Incorporated FAQ #134 on the accepted parameter for the calculation of cycles of concentration.
		WU 6	Incorporated FAQ #200 on the requirement of specification.
		WU 7	Incorporated FAQ #197 on the submission requirements of plumbing/ drainage drawings.
		HWB 4	Incorporated FAQ #150 on the provision of fresh air louvre for bare shell spaces.
		HWB 8	Incorporated FAQ #159 on the space type to be considered for IAQ measurement in “not normally occupied spaces”.
2.0 (2025 Edition)	28 Feb 2025	-	Indicated the eligibility for Compliance Assessment (CA) in the Submittals Section of each credit.
		-	Indicated the credits catergorised as “Conclusive Credits” with a symbol.
		-	Enhanced the clarity and readability by fixing minor issues such as typos and formatting.
		IDCM P1, 1, 6	Replaced with pages Annex A-1 to A-3, Annex B-1 to B-3 and Annex C-1 to C-3 of Technical Circular Letter 2024.198 respectively on clarification of the period of engagement for Project BEAM Pro and Construction BEAM Pro/ Affiliate and the updated submittal requirement.
		IDCM 3	Replaced with pages Annex A-1 to A-8 of Technical Circular Letter 2024.199 on the commonly accepted operation and maintenance (O&M) features under IDCM 3c.

Version Number	Date of Issue	Credit	Details
		IDCM 4, 5, 11, 12, 13, 14 and EU (All Credits)	Replaced with pages Annex A-1 to A-112 of Technical Circular Letter 2024.216 on the updated assessment criteria and submittal requirements for IDCM 4, 5, 11 to 14 and EU P1 to 8.
		IDCM 7	Replaced with pages Annex A-1 to A-15 of Technical Circular Letter 2024.200 on the clarification of the assessment criteria of the monitoring measurement for wastewater during certain construction stage under IDCM 7c [7]. [7] Technical Circular Letter 2023.183 (Revision 1) on the updated credit requirement and assessment criteria for IDCM 7b and FAQ #215 on the clarification of the submittal requirements are incorporated in Technical Circular Letter 2024.200.
		IDCM 8	Incorporated FAQ #216 on the requirement of monthly report(s).
		IDCM 16	Replaced with pages Annex A-1 and B-1 to B-4 of Technical Circular Letter 2024.201 on the clarification of the assessment criteria for IDCM 16a and IDCM 16c, and the updated submittal requirements for IDCM 16a, IDCM 16b and IDCM 16c.
		SS P1	Replaced with pages Annex A-1 to A-3 of Technical Circular Letter 2024.202 on the updated calculation methodology for site coverage of greenery, submittal requirements and reference.
		SS 1	Replaced with pages Annex A-1 to A-11 of Technical Circular Letter 2024.203 on the updated assessment criteria on the provision of bicycle parking spaces and cycle track for SS 1c [8]. [8] Technical Circular Letter 2024.194 (Revision 1) on the updated assessment criteria for SS 1a, applicability of sub-items under the score table of the pedestrian-oriented transport planning measures for SS 1b, and assessment requirement of EV charging facilities for SS 1d, and FAQ #210 on the service frequency data at peak periods for the calculation of Accessibility Index (AI) is incorporated in Technical Circular Letter 2024.203.

Version Number	Date of Issue	Credit	Details
		SS 2	Replaced with pages Annex A-1 to A-6 of Technical Circular Letter 2024.195 on the updated assessment criteria and submittal requirements [9]. [9] FAQ #211 on the commonly accepted neighbourhood amenities and FAQ #212 on not accepting free Wi-Fi as neighbourhood amenity are incorporated in Technical Circular Letter 2024.195.
		SS 4	Replaced with pages Annex A-1 to A-4 of Technical Circular Letter 2024.197 on the simulation setting for overall external reflectance of buildings [10]. [10] FAQ #213 on the inclusion of both existing and planned buildings in the surrounding area of the project site in the Computational Fluid Dynamics (CFD) simulation model is incorporated in Technical Circular Letter 2024.197.
		SS 5	Replaced with pages Annex A-1 and B-1 to B-3 of Technical Circular Letter 2024.204 on the updated Extent of Application and assessment requirements of noise prediction/ assessment from building equipment.
		SS 7	Replaced with pages Annex A-1 and B-1 to B-6 of Technical Circular Letter 2024.196 on the updated Extent of Application for SS 7a and the updated submittal requirements for SS 7b.
		SS 8	Replaced with pages Annex A-1 to A-13 of Technical Circular Letter 2024.205 on the clarification of the assessment criteria and submittal requirements for SS 8a(2) and SS 8a(3) [11]. [11] FAQ #213 on the inclusion of both existing and planned buildings in the surrounding area of the project site in the Computational Fluid Dynamics (CFD) simulation model is incorporated in Technical Circular Letter 2024.205.
		SS 9 and 10	Incorporated FAQ #213 on the inclusion of both existing and planned buildings in the surrounding area of the project site in the Computational Fluid Dynamics (CFD) simulation model for SS 9 and SS 10b Compliance Route 1: Thermal Sensation Index (TSI).
		SS 10	Incorporated FAQ #214 on the requirements for CFD simulation for SS 10b Compliance Route 1: Thermal Sensation Index (TSI).

Version Number	Date of Issue	Credit	Details
		SS 11	Replaced with pages Annex A-1 to A-3 of Technical Circular Letter 2024.206 on the clarification of the assessment criteria of item 3 on the demonstration of stormwater management measures for SS 11.
		SS 12	Incorporated FAQ #217 on the climate change issues to be considered under SS 12.
		MW 1, 2, 3, 5, 6, 7, 8 and 9	Incorporated FAQ #218 on the qualified personnel from the contractor to endorse the calculation/ summary/ worksheet of building elements/ materials for MW 1, 2, 3, 5, 6, 7b, 8 and 9.
		MW 2	Replaced with pages Annex A-1 and B-1 to B-3 of Technical Circular Letter 2024.208 on the inclusion of Compliance Method of CFA calculation and the update of submittal requirements for MW 2 [12]. [12] FAQ #218 on the qualified personnel from the contractor to endorse the calculation/ summary/ worksheet of building elements/ materials is incorporated in Technical Circular Letter 2024.208.
		MW 4	Replaced with pages Annex A-1 to A-5 of Technical Circular Letter 2024.209 on the updated submittal requirements for MW 4.
		MW 10	Replaced with pages Annex A-1 to A-2 and B-1 to B-3 of Technical Circular Letter 2023.190 on the inclusion of Carbon Assessment Tool under iBEAM Unison Toolset as one of the accepted study tools for the assessment and the introduction of an additional BONUS credit.
		MW 7	Replaced with pages Annex A-1 and B-1 to B-6 of Technical Circular Letter 2024.210 on the updated Extent of Application, assessment criteria and submittal requirements for MW 7a.
		WU P1	Incorporated FAQ #219 on the types of water fixtures in non-residential uses required to comply with WELS requirements.
		WU P1, 1 and 7	Incorporated FAQ #220 on the alternative rate of users with disability being adopted in the annual potable water use calculation (under WU P1 & WU 1) and calculation for annual effluent discharge (under WU 7).
		WU 2 and 8	Incorporated FAQ #208 on the alternative criteria regarding the provision of rainwater collection tank storage with 10 days or more of supply (i.e. rainwater yield) and aligned the relevant submittal requirement.

Version Number	Date of Issue	Credit	Details
		WU 3	Replaced with pages Annex A-1 and B-1 to B-2 of Technical Circular Letter 2024.211 on the updated Extent of Application and submittal requirements for WU 3.
		WU 4	Replaced with pages Annex A-1 and B-1 to B-2 of Technical Circular Letter 2024.212 on the exemption of exposed/ unsheltered roof tanks, the updated assessment criteria and submittal requirements for WU 4.
		WU 5	Replaced with pages Annex A-1 to A-4 and B-1 to B-5 of Technical Circular Letter 2024.193 on the introduction of water safety control measures in the design and construction of potable water supply system to the BONUS credit requirements and the renaming of credit title for WU 5 [13]. [13] FAQ #209 on whether the requirement of twin tank applies to the transfer tanks/ intermediate tanks is incorporated in Technical Circular Letter 2024.193.
		HWB P1, 4	Replaced with pages Annex A-1 to A-7 (for HWB P1) and B-1 to B-9 (for HWB 4) of Technical Circular Letter 2024.215 on the updated assessment criteria and submittal requirements for HWB P1 and HWB 4, and clarification on acceptable references of ventilation criteria under HWB 4b [14]. [14] FAQ #202 on the alternative measurement options for projects with difficulties in taking air quality measurement at the centre of the site for HWB P1 and Technical Circular Letter 2023.191 on the clarification of the assessment scope of exhaust systems under HWB 4b are incorporated in Technical Circular Letter 2024.215.
		HWB 2	Incorporated FAQ #221 on how the locations of assessment should be chosen.
		HWB 6	Incorporated FAQ #203 on whether building services equipment installed by the future tenant should be taken into consideration in the assessment for HWB 6c.
		HWB 8	Incorporated FAQ #222 and #223 on whether the layout plans are required to be submitted in PA and the selection of sampling points for development with more than one multi-storey building respectively for HWB 8a, and FAQ #224 on the acceptable source used for the calculation of the maximum permissible pollutant concentration for HWB 8b.

Version Number	Date of Issue	Credit	Details
		HWB 10, 11	Replaced with pages Annex A-1 to A-4 (for HWB 10) and B-1 to B-3 (for HWB 11) of Technical Circular Letter 2024.213 on the clarification of the simulation setting for typical surface reflectance values of ceiling, walls and floor adopted for the computer modelling under HWB 10 and HWB 11 [15]. [15] FAQ #225 and #226 on whether all spaces are assessed under both PA and FA and whether residential units within private/ housing public developments and government quarters are assessed respectively for HWB 10 and Technical Circular Letter 2023.192 on the extension of application to other building types under HWB 11 are incorporated in Technical Circular Letter 2024.213.
		HWB 12	Replaced with pages Annex A-1 and B-1 to B-2 of Technical Circular Letter 2024.214 on the updated submittal requirements for HWB 12 [16]. [16] FAQ #204 on the design of air break along the drain pipe of AHU/ PAU for HWB 12 is incorporated in Technical Circular Letter 2024.214.

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Note:

The proponent is cautioned that the supporting information for credit claim has to be taken at the material time, which needs to be captured during the process and cannot be done retrospectively.

Conclusive Credits achieved in the PA stage typically do not require further assessment in the subsequent stage(s). The Applicant may need to provide additional documentation or clarification if there are any discrepancies, changes or outstanding issues since the PA submission.

First Issue September 2019
Second Edition May 2021
Third Edition October 2023
This Edition February 2025

1 Introduction

1.1 Overview

BEAM

Building Environmental Assessment Method (BEAM) Plus is a comprehensive environmental assessment tool for buildings which is carried out on a voluntary basis. It defines the best practice criteria for a range of sustainability issues across the whole life-cycle of buildings and projects, such as how buildings should be designed, constructed and operated, etc. Recognised as one of the world's leading green building assessment tools, it provides a comprehensive set of performance standards that can be pursued by developers and owners.

Owned and operated by the BEAM Society Limited (BSL), BEAM Plus New Buildings is one of the BEAM Plus rating tools that cover the design and construction of new buildings.

Based on the credit achievement where the standard or defined performance criteria are satisfied, the project will be graded Platinum, Gold, Silver or Bronze, to reflect the overall performance.

BEAM Plus New Buildings Version 2.0 (NB v2.0)

The upgraded BEAM Plus New Buildings Version 2.0 (NB v2.0) aims to be practical, clear and standardised in defining the key elements of green buildings including health and wellbeing, hygiene, site impacts, use of materials, water quality, energy efficiency, indoor environmental quality, etc. During the upgrade process, the following fundamentals were established:

Above Statutory Requirements – Requirements for prerequisites and credits should be set above the statutory requirements.

Adaptability – Routes for standard and bespoke building types should be established. Requirements for standard building types should be better defined with more assurance of the applicability of the criteria.

Certainty – Requirements should be clearly defined to reduce ambiguity and promote better certainty in the assessment process. Submittal requirements should be standardised as far as practicable.

Practicality – Standards should be achievable with respect to state-of-the-art of the building industry to promote wider adoption of green building practices yet pose reasonable challenges for better quality, performance and cost-effectiveness. Submittal requirements at Provisional Assessment Stage should be practicable with respect to normally available design information at the design stage in a typical project timeframe.

It is envisaged that these fundamentals form the basis of the holistic green building performance indicators which suitably integrate different green features into a user-friendly assessment tool.

BEAM Society Limited (BSL)

BEAM is owned and operated by BSL, an independent non-profit public body whose membership is drawn from many professional and interest groups in Hong Kong's building construction and real estate sectors. BSL is committed to developing and implementing the BEAM assessment tools, assessing green buildings and training professionals.

Hong Kong Green Building Council (HKGBC)

HKGBC was established in 2009 as Hong Kong's industry body that coordinates efforts towards green building. HKGBC certifies BEAM Plus projects, accredits BEAM Professional (BEAM Pro), BEAM Affiliate (BA) and BEAM Assessors (BAS).

Development of BEAM Plus NB Version 2.0

The development of BEAM Plus NB v2.0 was led by a BSL Steering Committee comprising industry practitioners and experts. Industry stakeholders have been consulted via engagement workshops for feedback and opinion on areas including but not limited to the overall framework, performance categories and their relative emphasis, assessment criteria, submission requirement and grading methodology. The Steering Committee comprises:

Convener – Sr Kenneth Chan

Members – Prof CS Poon; Ir CS Wong; Mr John Herbert; Mr KM So; Ms Susan Leung; Dr TT Chow; Mr Benny Au; Mr Alex Leung; Mr Justin Li; Mr Joel Chan Cho-sing; Ir Kim Tang Cheuk; Sr Kenneth Yun Ying Kit; Mr Tak Yip Wong; Dr Ivan Fung; Prof Jack Cheng; Dr Ren Chao; Ir Clarence Tze Ka-yan; Mr Dominic Lam; Mr Keith YUE; Mr Kevin Ng; Ir CF Leung; Prof Daniel WT Chan; Ir Dr Raymond Yau; Mr Ryan Lee; Dr Benny Chow; Mr Martin Wan; Ir Victor Cheung

Advisors – Ms Alice LF Yeung; Ms Karen Cheung; Mr Patrick Chan; Mr K.C. Lo; Dr Lau Kwok Keung; Mr Stephen Yim Yu-chau; Ms Irene Tong

Disclaimer

BEAM Plus has been prepared with the assistance and participation of many individuals and representatives from various organisations. The outcome represents a general consensus, but unanimous support from each and every organisation and individual consulted is not implied. The BEAM Plus documentation shall be revised on a regular basis and as frequently as necessary. BSL reserves the right to amend, update and change this Manual from time to time without prior notice. Where changes in regulations necessitate changes to the assessment criteria, they will be issued to all parties involved in an assessment and will be announced in the BSL's website. An appropriate transitional period shall be allowed for projects undergoing assessment process.

It should be noted that none of the parties involved in the funding of BEAM, including BSL and its members, provide any warranties or assume any liability or responsibility to the users of BEAM, or any third parties for the accuracy, completeness or use of, or reliance on, any information contained in BEAM, or from any injuries, losses, or damages arising out of such use or reliance.

As a condition of use, users covenant not to sue, and agree to waive and release BSL and its members from any and all claims, demands and causes of actions for any injuries, losses and damages that users may now or hereafter have a right to assert against such parties as a result of the use of, or reliance of BEAM.

Limitations

BSL does not endorse any self-assessed grading awarded by the use of BEAM Plus for New Buildings.

HKGBC offers a formal certification process of grading, this service provides independent third-party review of credits claimed to ensure all credits can be demonstrated to be achieved by the provision of the necessary documentary evidence. The use of BEAM Plus for New Buildings without formal certification does not entitle the user or any other party to promote any grading awarded.

Application and Eligibility

BEAM Plus NB v2.0 covers the design, construction and associated testing and commissioning of all types of new buildings, from small single building to large buildings, including but not limited to commercial, educational, government, industrial, office and residential buildings, hotels and shopping centres, etc.

The assessment needs to cover various types of premises contained within the development and may involve premises that are only a 'shell' or are fitted-out. Whatever the circumstances, assessment focuses on what the designer, builder and commissioning agent achieve. Assessment of some aspects of performance may be type dependent, or not feasible for various reasons, so the number of applicable credits and their aggregation will vary.

BEAM Plus does not assess any unauthorised or any unauthorised portions of any buildings, i.e. any buildings or building works not complying with the Buildings Ordinance. In case any non-compliance works or unauthorised portions in a building are reported, both HKGBC and BSL reserve the right to deprive the awarded rating from the Applicant.

Assessment Boundaries

The Applicant shall define the project boundary to undergo the BEAM Plus assessment. The project boundary needs not necessarily follow the site boundary of the development, which however, should be consistent throughout the project assessment.

Certification Framework

Assessment under BEAM Plus for New Buildings covers the demolition, planning, design, construction and commissioning of a building and should be initiated in the early stages of project development. BEAM Plus for New Buildings aims to reduce the environmental impacts of new buildings while improving the quality and user satisfaction, by the adoption of the best techniques available within reasonable cost.

A notable attribute of BEAM Plus for New Buildings, as compared with other mostly used schemes elsewhere, is that an assessment for new buildings is not finalised until a building is completed, ensuring that 'green' and 'sustainable' design features are actually implemented, and construction practice meets the required performance standards. Besides being in the interests of the Client and tenant in certifying the actual performance of the finished product, this approach also serves to 'dovetail' assessment with BEAM Plus Existing Buildings and Interiors. It would be expected that a building graded under BEAM Plus for New Buildings and suitably operated, maintained and renovated would achieve a similar grade under other BEAM Plus certification schemes.

Certification Process

Independent BEAM Assessors (BAS) or BSL inhouse BAS would be assigned to each project to undertake the assessment works. The Technical Review Committee (TRC) of BSL will review the assessment reports done by the BAS and endorse the assessment results, followed by the issuance of certification by the HKGBC. Detail assessment procedures can be found in the BEAM Plus Project Assessment Procedures Manual which is available in HKGBC and BSL websites.

Compliance Assessment (CA)

Under each credit head, there is a sub-section dedicated to submittals listing the required documents that the Applicant needs to provide in order to validate credit compliance. It is essential for the Applicant to ensure that the submissions, including drawings and technical data, consist of the most up-to-date documents available at the time of submission.

(A) Drawings

In the Provisional Assessment (PA) submission stage, when the detailed design is not yet finalised, drawings can be submitted as tender drawings or conceptual sketches. They should be sufficiently detailed to convey the design intent and allow for an initial assessment of compliance with the credit requirements.

For the Compliance Assessment (CA) submission, shop drawings shall be submitted. The shop drawings should at least include essential project information, such as project name, title of the

drawings, date and shall be provided by the contractor. These drawings should be clear and legible, ensuring that all changes and details are easily discernible to the reader or assessor. In the Remaining Final Assessment (RFA) submission stage, the drawings must be as-fitted versions.

(B) Technical Data

In the Provisional Assessment (PA) submission stage, technical information can be submitted in the form of specifications, catalogues, or preliminary calculations. These documents should provide a clear understanding of the proposed systems and materials, outlining their performance characteristics and compliance with the credit requirements.

For the Compliance Assessment (CA)/ Remaining Final Assessment (RFA) submission, a more concrete and detailed form of technical information is required. This includes documents such as equipment schedules, approved contractor's submission with catalogues, and simulation reports. By providing comprehensive and detailed technical data in the CA/ RFA submission stage, the Applicant can demonstrate that the design has been thoroughly developed and that all systems and materials have been selected to meet the project's performance and sustainability goals.

During the CA stage, the Applicant must submit comprehensive documentation, including shop drawings, detailed technical data, and any other relevant materials that provide a clear and thorough representation of the project's compliance with the established standards and requirements.

Once a credit is achieved and verified during the CA stage, it generally needs not to be further assessed during the RFA stage. This streamlines the approval process and reduces the repetitive effort from the Applicant.

BEAM Professional/ Affiliate

BEAM Professional (BEAM Pro)/ Affiliate mentioned in this manual should process the valid credential for BEAM Plus New Buildings version 2.0 for facilitating the certification process and to ensure the compliance of relevant credit requirements.

Site Audit

BSL shall, in due course after consultation with stakeholders, institute a random site audit mechanism as part of the verification processes. Details will be given in an Audit Manual yet to be issued. Audit will be conducted only after the official publication of the Audit Manual and formal implementation of the audit mechanism.

Documentation

The Applicant has the obligation to provide evidence to demonstrate credit compliance. In NB v2.0, only sufficient amount of material (by way of example) is required to be submitted. However, the Applicant must make sure all supporting information is timely collected and properly documented. Just in case when the BEAM assessor considers it necessary to demand additional material of the same sort for clarification, the Applicant is obligated to produce such material upon request.

Certification Fee

BEAM Plus certification fee comprises 2 parts, namely Registration Fee and Assessment Fee which are payable to HKGBC and BSL respectively. Details on the fee structure can be found in the HKGBC and BSL websites.

Credit Interpretation Request (CIR)

CIR is designed to allow project teams to obtain specific guidance on whether certain BEAM Plus credits can be fulfilled pertaining to the special design of a project. Details on CIR can be found in HKGBC and BSL websites.

Appeal	The Applicants may submit an appeal on an individual credit if they disagree to and/ or do not accept the decision made by the BSL. More details can be found in the HKGBC and BSL websites.

1.2 Framework

Credit Performance Categories

Different assessment methods assign their credits under different categories according to the preferences of the tool developer. In BEAM Plus NB v2.0, credits are grouped into the following categories:

i. Integrated Design and Construction Management (IDCM);
ii. Sustainable Site (SS);
iii. Materials and Waste (MW);
iv. Energy Use (EU);
v. Water Use (WU);
vi. Health and Wellbeing (HWB); and
vii. Innovations and Additions (IA).

While BEAM Plus NB v2.0 adopts similar categories in other BEAM Plus tools, the number and nature of credits within each category are specific to the context of Hong Kong and new building projects.

Integrated Design and Construction Management (IDCM)

IDCM focuses on the integration between design and operation, integrated design between design team members and client, and integration throughout the development process from design to construction. The core objectives of IDCM are as follows:

i. Integrated Design Process;
ii. Green Construction Practices;
iii. Smart Design and Technologies; and
iv. Design for Engagement and Education on Green Buildings.

Sustainable Site (SS)

SS focuses on the design and planning issues, and the integration of neighbourhood and site location. The core objectives of SS are as follows:

i. Neighbourhood Integration;
ii. Biodiversity Enhancement;
iii. Bioclimatic Design; and
iv. Climate Resilience and Adaptability.

Materials and Waste (MW)

MW focuses on the minimisation of operational materials and waste. The core objectives of MW are as follows:

i. Efficient Use of Materials;
ii. Selection of Materials; and
iii. Waste Reduction.

Energy Use (EU)

EU focuses on the reduction of building operation energy consumption. It is energy performance based and seeks to encourage quality passive design. The core objectives of EU are as follows:

i. Energy Use Reduction and Control;
ii. Renewable and Alternative Energy Systems; and
iii. Energy Efficient Equipment.

Water Use (WU)

WU focuses on the reduction of water consumption. The core objectives of WU are as follows:

i. Water Conservation;
ii. Effluent; and
iii. Water Harvesting and Recycling.

Health and Wellbeing (HWB)

HWB focuses on the human environmental quality. It is designed to expand the scope of previous indoor environmental quality (IEQ) category and absorb human centric design elements. The core objectives of HWB are as follows:

i. Design for Green Living;
ii. Inclusive Design; and
iii. Indoor Environmental Quality.

Innovations and Additions (IA)

IA focuses on promoting and rewarding true innovations. The core objectives of IA are as follows:

i. Innovation Techniques; and
ii. Innovation Challenges.

Credit Allocation

Credits have been broadly allocated to each assessment criterion by taking into account the other internationally recognised green building assessment tools as well as the sensitivity analysis and the comments received during the stakeholder engagement workshops.

Category Weighting

Having reviewed the local and international assessment schemes and other relevant information, a percentage of weighting for each environmental performance category has been assigned to reflect its importance and the global trends as follows:

Category	Weighting
IDCM	18%
SS	15%
MW	9%
EU	29%
WU	7%
HWB	22%

Prerequisites

The Applicant must demonstrate that all the pre-requisites are achieved. Otherwise, the project will be graded as “Prerequisite(s) Not Achieved”.

BONUS Credit & Additional BONUS Credit

The BONUS credits and additional BONUS credits in NB v2.0 are counted under the corresponding categories. A factor of 1.2 is applied in score calculation for the attainment of BONUS credits and additional BONUS credits.

Bonus credits are independent from the normal credit(s) under the same credit item. They can be achieved regardless of the success or failure in attaining the normal credit(s). Whereas the additional BONUS credits are dependent on the normal credit(s) under the same credit item. The award of normal credit(s) is the prerequisite for attaining the additional BONUS credits.

The maximum possible score under each category is 100%.

IA Credit

The IA credits in NB v2.0 are counted towards the total number of credits qualifying for an award classification. A maximum of 10 IA credits could be submitted for achieving a higher score in the assessment.

Conclusive Credit

Conclusive Credits are identified by a specialised icon, making them easily recognisable within the manual. These credits represent specific criteria that, once achieved, do not require further verification in the subsequent stage(s). If a Conclusive Credit is achieved with sufficient evidence to demonstrate compliance with the Compliance Assessment (CA) requirements during the Provisional Assessment (PA) stage, no additional supporting documents are required for the CA or Remaining Final Assessment (RFA) submissions.

To achieve a conclusive credit, the submitted evidence should include detailed reports, calculations, certifications, simulations or other relevant documentation that unequivocally prove the compliance. While credits achieved in the PA stage typically do not require further assessment in the subsequent stage(s), the Applicant may need to provide additional documentation or clarification if there are any discrepancies, changes or outstanding issues since the PA submission.

Determination of Overall Grade

The final certificate grading for projects certified under BEAM Plus NB v2.0 is subject to the following conditions:

i. Satisfying all pre-requisites;
ii. Achieving overall score required; and
iii. Obtaining minimum percentage (%) for each category listed below.

Grade	Minimum Percentage for Each Category	Total Score
Platinum	20%	≥ 75%
Gold	20%	≥ 65%
Silver	20%	≥ 55%
Bronze	20%	≥ 40%

If a project can comply with all the applicable pre-requisites but cannot reach the threshold of Bronze rating, it will be graded as “Pre-requisites Achieved”. In case the project fails to demonstrate compliance with any one of the applicable pre-requisites, it will be graded as “Pre-requisite(s) Not Achieved”.

1.3 Summary of Credits

	Section	Credit Requirement	Extent of Application	Credit
2	**Integrated Design and Construction Management (IDCM)**			**25 + 16 BONUS**
IDCM P1	Sustainability Champions - Project	Prerequisite achieved for demonstrating that an accredited BEAM Professional (BEAM Pro) with a valid credential for BEAM Plus New Buildings v2.0 is engaged as the Project BEAM Pro of the consultant team. The Project BEAM Pro shall: 1. Act as the point of contact with the Hong Kong Green Building Council and the BEAM Society Limited for administrative matters relating to BEAM Plus certification; 2. Participate as one of the key project team members in the design and construction stages, with the assistance of the Construction BEAM Pro (and Affiliates, if any) defined under IDCM 6 if any, to oversee the submission materials are in compliance with relevant requirements of the BEAM Plus Manual. The Project BEAM Pro may also assume other roles in the consultant team of the project (The Project BEAM Pro, Design BEAM Pros under IDCM 1 and Construction BEAM Pros under IDCM 6 must be different personnel); 3. Create a BEAM Plus NB Certification Checklist including project goals, performance and BEAM Plus target rating; 4. Provide guidance to the project and construction teams regarding BEAM Plus principles, structure, timing, certification process and requirements of credits; and 5. Advise the Client on relevant professionals or parties on respective tasks to address relevant BEAM Plus certification requirements.	All buildings	Required
IDCM P2	Environmental Management Plan	Prerequisite achieved for demonstrating that an Environmental Management Plan has been properly prepared.	All buildings	Required

	Section	Credit Requirement	Extent of Application	Credit
IDCM P3	Timber Used for Temporary Works	Prerequisite achieved for demonstrating that no virgin forest products are used for temporary works.	All buildings	Required
IDCM 1	Sustainability Champions - Design	1 credit for at least two (2) members from at least two (2) applicable core design disciplines shall be accredited BEAM Professionals with valid credentials for BEAM Plus New Buildings v2.0. 1 additional BONUS credit for at least one (1) additional member, from an applicable core design discipline different from the disciplines counted in the above credit, shall be an accredited BEAM Professional with valid credentials for BEAM Plus New Buildings v2.0. Alternatively, 1 additional BONUS credit for at least two (2) additional members, from an applicable core design discipline different from the disciplines counted in the above credit, shall be accredited BEAM Affiliates with valid credentials for BEAM Plus New Buildings v2.0.	All buildings	1 + 1 additional BONUS
IDCM 2	Complimentary Certification	(a) BEAM Plus Neighbourhood (ND) 1 BONUS credit where the project is certified by BEAM Plus Neighbourhood (ND) certification. (b) BEAM Plus Interiors (BI) 1 BONUS credit for preparing the Project for BEAM Plus Interiors (BI) certification. (c) BEAM Plus Existing Buildings (EB) 1 BONUS credit for preparing the project for BEAM Plus Existing Buildings (EB) certification (Comprehensive Scheme).	All buildings that are applicable for respective BEAM Plus certification tools	3 BONUS

	Section	Credit Requirement	Extent of Application	Credit
IDCM 3	Integrated Design Process	(a) Early Considerations for Integrated Building Design 1 credit for consideration of the integrated design process regarding whole-system thinking to explore the interrelationships among green building design strategies and systems in the conceptual design stage. 1 additional credit for organising at least one multi-disciplinary design charrette to formulate passive and active design strategies in the conceptual/ schematic design stages. (b) Early Design Consideration of Buildability/ Constructability 1 credit for early design consideration of buildability to ease construction and save on-site materials/ labour before completion of the design development stage. (c) Design Consideration for Operation and Maintenance 1 credit for design consideration of the long-term operation and maintenance needs of the building and its engineering services.	All buildings	4
IDCM 4	Life Cycle Costing	1 credit for conducting life cycle costing for active systems.	All buildings	1
IDCM 5	Commissioning	2 credits for the appointment of Commissioning Authority (CxA) as described in part (a) and providing a Commissioning Plan as described in part (b). 2 additional credits for conducting a Commissioning Review as described in part (c) and providing Commissioning Reports as described in part (d).	All buildings	4

	Section	Credit Requirement	Extent of Application	Credit
IDCM 6	Sustainability Champions - Construction	1 credit for at least two (2) accredited BEAM Professionals with valid credentials for BEAM Plus New Buildings v2.0 are engaged by the main/ lead contractor of the project. Alternatively, 1 credit for at least one (1) accredited BEAM Professional and two (2) accredited BEAM Affiliates, with valid credentials for BEAM Plus New Buildings v2.0 are engaged by the main/ lead contractor of the project.	All buildings	1
IDCM 7	Measures to Reduce Site Emissions	(a) Minimisation of Air Pollution 1 credit for providing adequate monitoring and mitigation measures to minimise air pollution during construction (demolition and foundation are included, if any). (b) Minimisation of Noise Pollution 1 credit for conducting Construction Noise Impact Assessment (CNIA) and providing adequate monitoring and mitigation measures based on the CNIA report to minimise noise pollution during construction (demolition and foundation are included, if any). 1 additional BONUS credit for adopting at least two (2) recognised quieter construction equipment/ methods at each construction stage (demolition and foundation are included, if any). For exemplary performance, 1 additional BONUS credit for adopting at least two (2) recognised quieter construction equipment/ methods to achieve a noise reduction of minimum 3dB(A) at each construction stage (demolition and foundation are included, if any). (c) Minimisation of Water Pollution 1 credit for providing adequate monitoring and mitigation measures to minimise water pollution during construction (demolition and foundation are included, if any).	All buildings	4 + 2 additional BONUS

	Section	Credit Requirement	Extent of Application	Credit
		(d) Minimisation of Light Pollution 1 credit for providing adequate mitigation measures to minimise light pollution during construction (demolition and foundation are included, if any).		
IDCM 8	Construction and Demolition Waste Recycling	(a) Demolition Waste Recycling 1 credit for demonstrating compliance with the Waste Management Plan and the application of proactive waste management provisions during demolition; and recycling at least 15% of demolition waste. 1 additional BONUS credit for demonstration of recycling at least 30% of demolition waste. For exemplary performance, 1 additional BONUS credit for demonstration of recycling at least 60% of demolition waste. (b) Construction Waste Recycling 1 credit for demonstrating compliance with the Waste Management Plan and the application of proactive waste management provisions during construction (foundation to be included, if any); and recycling at least 15% of construction waste (foundation waste to be included, if any). 1 additional BONUS credit for demonstration of recycling at least 30% of construction waste (foundation waste to be included, if any). For exemplary performance, 1 additional BONUS credit for demonstration of recycling at least 60% of construction waste (foundation waste to be included, if any).	IDCM 8a All buildings requiring demolition which are under the Client's control IDCM 8b All buildings	2 + 4 additional BONUS

	Section	Credit Requirement	Extent of Application	Credit
IDCM 9	Construction IAQ Management	1 credit for implementing a Construction IAQ Management Plan, undertaking a building 'flush out' or 'bake out', and replacement of all filters prior to occupancy.	All areas implementing a Construction IAQ Management Plan; and All areas with central air-conditioning and ventilation systems for undertaking a building 'flush out' or 'bake out' and replacement of all filters prior to occupancy	1
IDCM 10	Considerate Construction	1 credit for demonstrating considerate measures to the neighbourhood, passers-by and workers. Good tree protection practices where tree preservation within the project site is required, should also be carried out.	All buildings	1
IDCM 11	Building Management Manuals	1 credit for providing a fully documented Operations and Maintenance Manual and Energy Management Manual.	All buildings	1
IDCM 12	Operator Training plus Chemical Storage and Mixing Room	1 credit for providing training for operations and maintenance staff to the minimum specified; and demonstrating that adequate maintenance facilities are provided for chemical storage and mixing.	All buildings	1
IDCM 13	Digital Facility Management Interface	1 BONUS credit for providing a digital interface in addition to the project design metering provision for future facility management team to review the building operation performance.	All non-residential buildings/ portions or common areas of residential buildings/ portions	1 BONUS
IDCM 14	Occupant Engagement Platform	1 BONUS credit for providing a digital platform to engage building occupants.	All non-residential buildings	1 BONUS

	Section	Credit Requirement	Extent of Application	Credit
IDCM 15	Document Management System	(a) Project Team Document Management 1 credit for demonstrating the use of document management systems within the design and construction teams. (b) Facility Management Team Document Management 1 credit for demonstrating the use of document management platform by the building owner or building management company.	All buildings	2
IDCM 16	BIM Integration	(a) Coordinated Use of BIM within Design Teams 1 credit for the coordinated use of BIM among the design team. (b) Coordinated Use of BIM within Design and Construction Teams 1 additional BONUS credit for coordinated use of BIM among the design team and the contractors. (c) BIM for Time and Cost 1 BONUS credit for using the BIM model for scheduling, cost and quantity, schedules preparation and tracking the project budget. (d) BIM for Facility Management Use 1 BONUS credit for updating the BIM model to as-built condition.	All buildings	1 + 1 additional BONUS + 2 BONUS
IDCM 17	Design for Engagement and Education on Green Buildings	1 credit for providing any two (2) education elements from the following list of green building design measures and provisions accredited by BEAM Plus and implemented in the project. 1 additional BONUS credit for providing four (4) education elements mentioned below on green buildings. 1. Provide users with manuals for all green building design measures and provisions. 2. Provide educational signage system that is integrated with the major communal areas of the project to educate users and visitors about the benefits of the green building design measures and provisions.	All buildings	1 + 1 additional BONUS

	Section	Credit Requirement	Extent of Application	Credit
		3. Provide users a platform for sustainable living showcase demonstration, experience or sharing that are relevant to the enabling design measures and provisions in the project. e.g. websites, regular publications available to the public, newspapers or other means. 4. Additional or alternative education element(s) proposed by the Applicant with substantiation demonstrating strategies compatible with the listed strategies for achieving the credit objective.		
3	**Sustainable Site (SS)**			**20 + 19 BONUS**
SS P1	Minimum Landscaping Requirements	Prerequisite achieved for demonstrating compliance with minimum planting provisions in terms of viability and site coverage of greenery of at least 20% of the site.	All sites with site area of 1,000 m² or more	Required
SS 1	Pedestrian-oriented and Low Carbon Transport	(a) Accessibility to Public Transport 1 credit for achieving Accessibility Index of 15 or more for all buildings of a development. (b) Pedestrian-oriented Access 1 credit for achieving 50% or more of the pedestrian-oriented transport planning measures. 1 additional BONUS credit for achieving 100% of the pedestrian-oriented transport planning measures. (c) Cycling Facilities and Network Integration 1 BONUS credit for providing cycling facilities within the Site and integrating with the public cycling network if a public cycling network exists or has been planned nearby. (d) Charging Facilities for Electric Vehicle (EV) 1 BONUS credit for providing EV medium chargers for at least 50% of all car parking spaces [ ] and EV charging-enabling for all car parking spaces (including visitor car parks).	All buildings	2 + 1 additional BONUS + 2 BONUS

	Section	Credit Requirement	Extent of Application	Credit
SS 2	Neighbourhood Amenities	(a) Amenities for Building Users 1 credit where adequate amenities for building users are located within the site or 500m walking distance/ an equivalent horizontal commuting time from the site entrance(s). (b) Shared Amenities for Neighbourhood 1 credit where adequate shared amenities for the neighbourhood are provided within the site and are made available for public use.	All buildings	2
SS 3	Building Design for Sustainable Urbanism	(a) Sustainable Urban Design 1 credit for preparing a site design appraisal report demonstrating a proactive approach in achieving a people-oriented and place-making approach for sustainable site planning, and at least 30% of applicable sustainable urbanism measures are achieved. 2 credits for achieving at least 60% of applicable sustainable urbanism measures. 1 additional BONUS credit for achieving at least 90% of applicable sustainable urbanism measures. (b) Conservation of Cultural Heritage 1 BONUS credit for demonstrating that a proper heritage impact assessment mechanism and its recommendations have been implemented.	All buildings	2 + 1 additional BONUS + 1 BONUS
SS 4	Neighbourhood Daylight Access	1 credit for the designs which the access to daylight of neighbouring sensitive buildings is maintained to the prescribed levels.	All buildings	1
SS 5	Noise Control for Building Equipment	1 credit for demonstrating that the level of the intruding noise at the façade of potential noise sensitive receivers is in compliance with the criteria recommended in the Technical Memorandum for the Assessment of Noise from Places Other than Domestic Premises, Public Places or Construction Sites.	All buildings	1

	Section	Credit Requirement	Extent of Application	Credit
SS 6	Light Pollution Control	(a) Control of Obtrusive Artificial Light 1 credit for demonstrating that the obtrusive light from exterior lighting meets the specified performance for the environmental zone in which the building development is located. (b) Control of External Light Reflection from Building 1 credit for demonstrating that the sunlight reflection from external surfaces of the buildings is controlled by using materials with acceptable external light reflectance.	All buildings	2
SS 7	Biodiversity Enhancement	(a) Reduction of Ecological Impact 1 credit for demonstrating that all identified habitat types on Site are of low or negligible indicative ecological values. Alternatively**,** Demonstrate that all identified habitat types on Site of medium to high indicative ecological value are preserved intact and are either unaffected by the planned development. 1 additional BONUS credit for demonstrating that the combined girth of the retained trees, with individual girth of at least 150mm, is at least 20% of the total girth of all existing trees on site. 1 additional BONUS credit for demonstrating that the combined girth of the retained trees, with individual girth of at least 150mm, is at least 40% or more of the total girth of all existing trees on site. (b) Enhancement of Biodiversity Prepare a manual on biodiversity-friendly landscape maintenance, PLUS a biodiversity enhancement report demonstrating each of the following measures for enhancing the biodiversity of the Site: 1 BONUS credit for physical connectivity between areas with ecological values. 1 BONUS credit for increased diversity and complexity of planting.	SS 7a All sites with existing tree except brownfield sites SS 7b Sites with adjacent areas of medium or high ecological value	1 + 2 additional BONUS + 3 BONUS

	Section	Credit Requirement	Extent of Application	Credit
		1 BONUS credit for wildlife-friendly building features (e.g. windows and lighting).		
SS 8	Urban Heat Island Mitigation	For Site area <1000m^2 (a) Urban Design Guidelines Chapter 11 1 credit for implementing at least 2 site level strategies under Section 11 of Hong Kong Planning Standards and Guidelines Chapter 11 Urban Design Guidelines. For Site area ≥ 1000m^2 (a) Sustainable Building Design Measures (1) 1 credit for providing shade on at least 5% of the site area and at least 50% of non-roof impervious surfaces on the site (parking, walkways, plazas) using light coloured high-albedo materials (albedo of at least 0.4). (2) 1 credit for demonstrating compliance with prescribed requirements of the SBD Guidelines as promulgated in the PNAP APP-152. (3) 1 additional BONUS credit for demonstrating compliance with prescribed requirements of the SBD Guidelines as promulgated in the PNAP APP-152 with enhanced performances. (b) Tree Coverage 2 BONUS credits for demonstrating that at least 10% of the total Site Area is provided with tree coverage. For exemplary performance, 1 additional BONUS credit where 20% or more of the site is provided with tree coverage. (c) Air Ventilation Assessment (AVA) For conducting an AVA by wind tunnel or Computer Fluid Dynamics (CFD) according to the prevailing AVA methodology introduced by the Government demonstrating that better or equivalent ventilation performances than a baseline case: 1 credit for demonstrating annual wind condition.	All buildings	For Site area < 1000m^2: 1 For Site area ≥ 1000m^2: 4 + 2 additional BONUS + 4 BONUS

	Section	Credit Requirement	Extent of Application	Credit
		1 credit for demonstrating summer wind condition. (d) Intra Urban Heat Island Study 2 BONUS credits for conducting an Intra Urban Heat Island Study demonstrating that a maximum Intra-Urban Heat Index (difference between T_{urban} and T_{met}) in summer is less than 0.8 °C.		
SS 9	Immediate Neighbourhood Wind Environment	1 credit for demonstrating that no pedestrian areas will be subject to excessive wind velocities caused by amplification due to the site layout design and/ or building design.	All buildings	1
SS 10	Outdoor Thermal Comfort	(a) Shaded or Covered Routes 1 credit is awarded where at least one shaded or covered route, connecting the site with nearby amenities/ site main entrance/ transport hub. (b) Passive Open Spaces with Thermal Comfort 1 credit is awarded where 50% or more of the passive open spaces and pedestrian zones achieve thermal comfort. This is demonstrated on a typical summer day at 3:00 pm in Hong Kong.	All sites with site area of 1,000m² or more	2
SS 11	Stormwater Management	2 credits for demonstrating that adequate stormwater management design measures have been provided to cater the total volume of runoff for one hour corresponding to a design rainfall of at least 30mm/event for the site in its post-developed conditions. 1 additional BONUS credit for demonstrating that adequate stormwater management measures have been provided to cater the total volume of runoff corresponding to a design rainfall of at least 40mm/event for the site in its post-developed conditions.	All sites with site area of 1,000m² or more	2 + 1 additional BONUS

	Section	Credit Requirement	Extent of Application	Credit
SS 12	Design for Climate Change Adaptation	1 BONUS credit for studying the projected variation in temperature and rainfall , water level rise/ storm surge of adjacent water bodies, increased frequency of lightning strikes, occurrence of more severe tropical cyclones, etc. due to climate change and its impact on the development and prepare mitigation proposal to improve the climate resilience of the building. 1 additional BONUS credit for including quantitative calculation to support the resilience design which is technically eligible and cost effective.	All buildings	1 BONUS + 1 additional BONUS
4	**Materials and Waste (MW)**			**14 + 22 BONUS**
MW P1	Minimum Waste Handling Facilities	Prerequisite achieved for meeting the minimum provisions of waste recycle facilities for the collection, sorting, storage, recycling (recovered material) and disposal (waste).	All buildings except one-single family domestic building with not more than 3 floors, or domestic part of a composite building for one single family with not more than 3 floors, or a building not normally occupied or for transient stay (e.g. pump house, sewage treatment plant, carpark building)	Required
MW 1	Building Re-use	<u>Compliance Method 1</u> 1 BONUS credit for the reuse of 20% or more (by mass or volume) of existing structures (sub-structure and superstructure). 2 BONUS credits for the reuse of 40% or more (by mass or volume) of existing structures (sub-structure and superstructure).	All buildings	2 BONUS + 1 additional BONUS

	Section	Credit Requirement	Extent of Application	Credit
		For exemplary performance, 1 additional BONUS credit for the reuse of 90% or more (by mass or volume) of existing structures (sub-structure and superstructure). Alternatively, <u>Compliance Method 2</u> 1 BONUS credit for the reuse of 25% or more (by surface area) of superstructure elements (including at least floor, roof decking) & enclosure materials (including at least skin, framing). 2 BONUS credits for the reuse of 50% or more (by surface area) of superstructure elements (including at least floor, roof decking) & enclosure materials (including at least skin, framing). For exemplary performance, 1 additional BONUS credit for the reuse of 90% or more (by surface area) of superstructure elements (including at least floor, roof decking) & enclosure materials (including at least skin, framing).		
MW 2	Modular and Standardised Design	<u>Compliance Method 1</u> 1 credit for designing modular elements which contributed at least 50% (by mass, volume, dollar value or surface area) of the major elements and modules in the project. Alternatively, <u>Compliance Method 2</u> 1 credit for designing modular elements which contributed at least 50% by Construction Floor Area (CFA) of the development with typical floors design. For exemplary performance, 1 additional BONUS credit for designing modular elements which contributed 90% or more by: • mass, volume, dollar value or surface area of the major elements and modules in the project; or • CFA of the development with typical floors design.	All buildings except for single one-storey buildings with total floor areas not exceeding 230m²	1 + 1 additional BONUS

	Section	Credit Requirement	Extent of Application	Credit
MW 3	Prefabrication	(a) Structural Elements 1 credit when 10% of structural elements has been prefabricated off-site. 1 additional BONUS credit when 20% of structural elements have been prefabricated off-site. Alternatively**,** (b) Façade Elements 1 credit when 10% of façade elements has been prefabricated off-site. 1 additional BONUS credit when 20% of façade elements have been prefabricated off-site. Alternatively, (c) Architectural/ Internal Building Elements 1 credit when 10% of architectural/ internal building elements have been prefabricated off-site. 1 additional BONUS credit when 20% of architectural/ internal building elements has been prefabricated off-site. 1 additional BONUS credit for compliance with the requirements listed in above sub-item (a), (b) and (c), i.e. 10% or more of structural elements, façade elements and architectural/ internal building elements have been prefabricated off-site. For exemplary performance, 1 additional BONUS credit when 50% or more of the elements in sub-item (a) or (b) or (c) has been prefabricated off-site.	All buildings	1 + 3 additional BONUS
MW 4	Design for Durability and Resilience	(a) Building Material Selection Appraisal 1 credit for appraisal report demonstrating a proactive approach to evaluate the durability of the building materials with at least 3 of the relevant listed items.	All buildings	1 + 2 BONUS

	Section	Credit Requirement	Extent of Application	Credit
		(b) Protecting Vulnerable Parts of the Building from Damage 1 BONUS credit for providing suitable protective measures, or designed features or solutions to prevent damage to vulnerable parts. (c) Protecting Exposed Parts of the Building from Material Degradation 1 BONUS credit for incorporating appropriate design and specifications measures to limit material degradation due to environmental factors.		
MW 5	Sustainable Forest Products	1 credit for demonstrating at least 30% (for residential development) and 50% (for non-residential development) of all the timber and composite timber products used in the project are from sustainable sources/ recycled timber. For exemplary performance, 1 additional BONUS credit for demonstrating 90% or more of all the timber and composite timber products used in the project are from sustainable sources/ recycled timber.	All buildings, except buildings with an insignificant amount of timber products being adopted	1 + 1 Additional BONUS
MW 6	Recycled Materials	(a) Outside Surface Works and Structures 1 credit where at least 10% of all materials used for site exterior surface works, structures and features are materials with recycled content. Alternatively, (b) Building Façade and Structural Components 1 credit where at least 10% of all materials used for façade and structural components are materials with recycled content. Recycled content refers to: • the use of Pulverised Fuel Ash (PFA) as a partial cement replacement in concrete that the PFA content is not less than 25%; OR • the use of Ground Granulated Blast-furnace Slag (GGBS) as a partial cement replacement in concrete that the GGBS content is not less than 40%; OR	All buildings	1 + 2 additional BONUS

	Section	Credit Requirement	Extent of Application	Credit
		• recycled content other than steel/ glass/ PFA/ GGBS. Alternatively, (c) Interior Non-structural Components 1 credit where at least 10% of all materials used for interior non-structural components are materials with recycled content. 1 additional BONUS credit for compliance with the requirements listed in sub-item (a), (b) and (c). For exemplary performance, 1 additional BONUS credit where 50% or more of all materials used for sub-item (a) or (b) or (c) are materials with recycled content.		
MW 7	Ozone Depleting Substances	(a) Refrigerants 1 credit for the use of refrigerants with a value less than or equal to the threshold of the combined contribution to ozone depletion and global warming potentials using the specified equation. (b) Ozone Depleting Materials 1 credit for the use of products in the building fabric and services that avoid using ozone depleting substances in their manufacture, composition or use.	All buildings with newly installed air conditioning and refrigeration equipment for part (a) All buildings for part (b)	2
MW 8	Regional Materials	1 credit for the use of regional materials meeting prescribed requirement, which contributes at least 10% of all building materials used in the project. 1 additional BONUS credit for the use of regional materials meeting prescribed requirement, which contributes at least 20% of all building materials used in the project. For exemplary performance, 1 additional BONUS credit for the use of regional materials meeting prescribed requirement, which contributes 50% or above of all building materials used in the project.	All buildings	1 + 2 additional BONUS

	Section	Credit Requirement	Extent of Application	Credit
MW 9	Use of Green Products	(a) Certified Green Products 1 credit for having at least 5% of certified green products in one (1) of the listed categories (outside surface works, building façade and structures, interior non-structural components, and building services components). 2 credits for having at least 5% of certified green products in two (2) of the listed categories (outside surface works, building façade and structures, interior non-structural components, and building services components). 1 additional BONUS credit for having at least 5% of certified green products under Construction Industry Council (CIC) Green Product Certification [ ] in one (1) of the listed categories (outside surface works, building façade and structures, interior non-structural components, and building services components). For exemplary performance, 1 additional BONUS credit for having at least 25% of certified green products under CIC Green Product Certification in one (1) of the listed categories (outside surface works, building façade and structures, interior non-structural components, and building services components). (b) Rapidly Renewable Materials 1 BONUS credit for demonstrating 5% of all building materials/ products of interior non-structural components in the project are rapidly renewable materials. For exemplary performance, 1 additional BONUS credit for demonstrating 25% of all building materials/ products of interior non-structural components in the project are rapidly renewable materials.	All buildings	2 + 3 additional BONUS + 1 BONUS

	Section	Credit Requirement	Extent of Application	Credit
MW 10	Life Cycle Assessment	1 credit for demonstrating the environmental performances in the major elements of the building structure of the building has been studied and optimised through a Life Cycle Assessment (LCA). Alternatively, 1 credit for demonstrating the embodied carbon in the major elements of the building structure of the building has been studied and optimised through an embodied carbon assessment. 1 additional BONUS for demonstrating the full embodied carbon of construction materials and carbon emissions of on-site construction processes has been studied through an embodied carbon assessment.	All buildings	1 + 1 additional BONUS
MW 11	Adaptability and Deconstruction	(a) Spatial Adaptability 1 credit for designs providing spatial flexibility that can adapt spaces for different uses and allows for expansion to permit additional spatial requirements to be accommodated. Alternatively, (b) Flexible Engineering Services 1 credit for flexible design of services that can adapt to changes of layout and use. Alternatively, (c) Structural Adaptability 1 credit for designs providing flexibility through the use of building structural systems which allow for change in future use and is coordinated with interior planning modules. 1 additional BONUS credit for compliance with requirements listed in sub-items (a), (b) and (c).	All buildings	1 + 1 additional BONUS

	Section	Credit Requirement	Extent of Application	Credit
MW 12	Enhanced Waste Handling Facilities	(a) Additional Recyclables Collection 1 credit for the provision of facilities for collection, sorting, storage and disposal of 2 other recyclable streams in addition to those described in MW P1. (b) Additional Facility Provisions to Enable Enhanced Municipal Solid Waste (MSW) Charing Scheme 1 credit for additional facilities for collection, sorting, storage and disposal of recyclables in addition to those described in MW P1 and MW 12 part (a). (c) Waste Treatment Equipment 1 BONUS credit for providing at least one set of waste treatment equipment. (d) Alternatives to Recycling Facilities 1 BONUS credit for provide alternative means of waste collection systems.	All buildings except one-single family domestic building with not more than 3 floors, or domestic parts of a composite building for one-single family with not more than 3 floors, or a building not normally occupied or for transient stay (e.g. pump house, sewage treatment plant, carpark building) Part (b) is applicable only when Municipal Solid Waste Charging Scheme is activated	2 + 2 BONUS
5	**Energy Use (EU)**			**31 + 18 BONUS**
EU P1	Minimum Energy Performance	Demonstrate performance improvement against the applicable edition of Building Energy Code (BEC). For Prescribed Buildings under Buildings Energy Efficiency Ordinance (BEC Governing Buildings): Referring to the applicable edition of BEC, demonstrate that performance improvement is achieved for the project in both of the following building services systems: 1. Improve 2% of code specified minimum coefficient of performance (COP) for air-conditioning equipment and/ or minimum cooling seasonal performance factor (CSPF) for room air-conditioner; and	All buildings	Required

	Section	Credit Requirement	Extent of Application	Credit
		2. Reduce 3% of code specified maximum allowable lighting power density for lighting installation. For Buildings where Buildings Energy Efficiency Ordinance does NOT apply (Non-BEC Governing Buildings): All Non-BEC governing buildings are required to demonstrate their compliance with the applicable edition of BEC in both of the following building services systems: 1. Code specified minimum coefficient of performance (COP) for air-conditioning equipment and/ or minimum cooling seasonal performance factor (CSPF) for room air-conditioner; and 2. Code specified maximum allowable lighting power density for lighting installation. For Projects that consist of both BEC Governing Buildings and Non-BEC Governing Buildings: Each building within the Project must adhere to the respective requirements based on its governing status.		
EU 1	Low Carbon Passive Design	Passive designs that can reduce building HVAC load, facilitate natural ventilation, and maximise daylight will be rewarded in this credit under either Prescriptive Path or Performance Path. Option 1: Prescriptive Path (1-4 Credits + 1 additional BONUS) 4 credits for incorporating any 4 of the passive design strategies listed below, 1 credit for each strategy: 1. Optimum Spatial Planning 2. External Overhangs 3. Vegetated Building Envelope 4. Cross Ventilation Provision (Normally Occupied Space) 5. Cross Ventilation Provision (Not Normally Occupied Space) 6. Daylighting Provision 1 additional BONUS credit for incorporating ALL the above listed passive design strategies.	All buildings	6 + 1 additional BONUS

Section	Credit Requirement	Extent of Application	Credit
	Option 2: Performance Path (1-6 Credits) HVAC Load Reduction 1. Built Form and Orientation 1 credit for reducing building envelope load of a designed building from a hypothetic building with a different built form and/ or at least 22.5° difference in orientation with justification by simulation. 2. Optimum Spatial Planning 1 credit for demonstrating consideration of optimum spatial planning to enhance energy conservation with justification by simulation. 3. External Shading Devices 1 credit for the provision of fixed or movable horizontal/ vertical external shading devices, in the form of vertical or horizontal sun shading feature with justification by simulation. 4. Vegetated Building Envelope 1 credit for the provision of vegetated building envelope with justification by calculation. Natural Ventilation 5. Space Layout for Natural Ventilation 1 credit for demonstrating that project space (both normally occupied space and not normally occupied space) is designed to facilitate the utilisation of natural ventilation with justification by simulation. Daylight 6. Space Layout for Daylight Penetration 1 credit for demonstrating that the space is well-lit by daylight and reduce occupants' dependency on artificial lighting with justification by simulation method.		

	Section	Credit Requirement	Extent of Application	Credit
EU 2	Reduction of CO_2 Emissions	Option 1: Performance Path (1-10 Credits + 5 additional BONUS) Demonstrate a percentage of reduction in annual CO_2 emission of the proposed building performance compared with the baseline case performance. 1 to 10 credits for annual CO_2 emission reduction from 1% to 19% for project adopting BEC 2018 as benchmarking criteria; or 2 to 10 credits for annual CO_2 emission reduction from 1% to 17% for project adopting BEC 2021 as benchmarking criteria. 1 to 5 additional BONUS credits for annual CO_2 emission reduction from 21% to 29% for project adopting BEC 2018 as benchmarking criteria, or from 19% to 27% for project adopting BEC 2021 as benchmarking criteria. Option 2: Prescriptive Path (1-7 Credits + 8 additional BONUS) 1 to 7 credits plus 8 additional BONUS credits for demonstrating a prescriptive compliance in below listed items. 1. Passive Building Design Enhancement Residential buildings and non-residential buildings should follow different requirements. For buildings consist of both residential and non-residential portions, demonstrate the compliance for the corresponding requirements for residential and non-residential portions respectively as listed below. 1.1. Building Envelope 1.2. Natural Ventilation 2. Active Building Design Improvement Demonstrate further performance improvement as compared with the applicable edition of the Building Energy Codes (BEC). 2.1. Air-conditioning Installation 2.2. Lighting Installation 2.3. Lift and Escalator Installation	All buildings	10 + 8 additional BONUS

	Section	Credit Requirement	Extent of Application	Credit
EU 3	Peak Electricity Demand Reduction	Option 1: Based on EU 2 Performance Path (1-3 Credits) 1 to 3 credits for reducing the peak electricity demand by 5% to 15%. Option 2: Based on EU 2 Prescriptive Path (1-2 Credits + 1 additional BONUS) 1 credit when 4 credits are achieved in EU 2 (Prescriptive Path); 2 credits when 4 credits plus 2 additional BONUS credits are achieved in EU 2 (Prescriptive Path); or 2 credits plus 1 additional BONUS credit when 5 credits plus 4 additional BONUS credits are achieved in EU 2 (Prescriptive Path.	All buildings	3 + 1 additional BONUS
EU 4	Metering and Monitoring	(a) Fundamental Metering and Monitoring 1 credit for providing energy monitoring system for equipment and systems in spaces. 1 BONUS credit for providing performance auditing monitoring system for equipment and systems in spaces. (b) Metering for Tenanted Area 1 BONUS credit for allowing monitoring provision of tenants' energy consumption.	Part (a): All non-residential buildings/ portions or common areas of residential buildings/ portions Part (b): All non-residential buildings/ portions with tenanted areas	1 + 2 BONUS
EU 5	Renewable and Alternative Energy Systems	(a) Solar Energy Feasibility Study 1 credit for evaluating the building roof's potential for harnessing solar energy. (b) On-site Renewable Energy Application 1 to 5 credits plus 5 additional BONUS credits for using on-site renewable energy applications to offset annual building energy consumption from 0.2% to 2%.	All buildings	6 + 5 additional BONUS

	Section	Credit Requirement	Extent of Application	Credit
EU 6	Air-Conditioning Units	(a) Compliance with Manufacturer's Recommendation 1 credit for complying with manufacturer's recommended installation positions for optimal heat rejection. (b) Performance Verification 1 credit for demonstrating the operating temperatures of all variable refrigerant flow (VRF) units, window type, split-type or packaged type air-conditioning units do not exceed manufacturer's recommendation for the specified COP in the manufacturer's technical specifications via computational simulation techniques.	Part (a): All buildings using variable refrigerant flow (VRF) units, window or split-type air conditioners as major source of air conditioning Part (b): All buildings using variable refrigerant flow (VRF) units, window or split-type air conditioners as major source of air conditioning and installed by the project owner	2
EU 7	Clothes Drying Facilities	(a) Provision of Clothes Drying Facilities 1 credit for providing clothes drying facilities for all residential units under suitable location conditions. (b) Demonstration of Effectiveness 1 BONUS credit for demonstrating the effectiveness of clothes drying facilities via computational analysis.	Residential buildings, exclusively for those specified under "Assessment"	1 + 1 BONUS
EU 8	Energy Efficient Appliances	1 credit when 60% of total rated power of appliances are certified energy efficient products. 2 credits when 80% of total rated power of appliances are certified energy efficient products.	Residential buildings and hotel, exclusively for those specified under "Assessment"	2

	Section	Credit Requirement	Extent of Application	Credit
6	**Water Use (WU)**			**12 + 4 BONUS**
WU P1	Minimum Water Saving Performance	Demonstrate that the use of water efficient flow devices leads to an estimated annual saving of 10%.	All buildings	Required
WU 1	Annual Water Use	(a) Further Potable Water Saving 1 to 3 credits for annual water saving from 20% to 30% by using water efficient flow devices. (b) Exemplary Potable Water Saving 1 additional BONUS credit for demonstrating that the use of water efficient flow devices leads to an estimated annual saving of 40%.	All buildings	3 + 1 additional BONUS
WU 2	Water Efficient Irrigation	1 to 2 credits for reducing potable water consumption for irrigation from 25% to 50% in comparison with the baseline. 1 additional BONUS credit for reducing potable water consumption for irrigation by 100% in comparison with the baseline.	All buildings with permanent greenery	2 + 1 additional BONUS
WU 3	Water Efficient Appliances	1 credit for installing water efficient appliances that achieve Grade 1 under the WSD's Water Efficiency Labelling Scheme.	Residential buildings, exclusively for those specified in Clause 1 under "Assessment"	1
WU 4	Water Leakage Detection	1 credit for installing water leakage detection systems in all municipal potable water tank and/ or pump rooms.	All buildings with fresh water tank and/ or pump rooms	1
WU 5	Design for Water Supply Management	(a) Twin Tank System 1 credit for providing twin tank for potable water supply system and flushing water supply system. (b) Water Safety Control Measures 1 BONUS credit for demonstrating the application of water safety control measures in the potable water supply system.	All buildings (including buildings with centralised/ shared tank that is outside the assessment boundary) for part (a) All buildings for part (b)	1 + 1 BONUS

	Section	Credit Requirement	Extent of Application	Credit
WU 6	Cooling Tower Water	1 credit for achieving 7 or more cycles of concentration with acceptable water quality.	All buildings equipped with cooling tower using potable water as makeup water	1
WU 7	Effluent Discharge to Foul Sewers	1 credit for demonstrating a reduction in annual sewage volumes by 20% or more.	All buildings	1
WU 8	Water Harvesting and Recycling	(a) Harvested Rainwater 1 credit for harvesting of rainwater that achieve a reduction of 5% or more in the consumption of potable water. (b) Recycled Grey Water 1 credit for recycled grey water that achieve a reduction of 5% or more in the consumption of potable water. (c) Exemplary Water Recycling 1 BONUS credit where harvested rainwater, recycled grey water or a combination of both leads to a reduction of 10% or more in the consumption of potable water.	All buildings	2 + 1 BONUS
7	**Health and Wellbeing (HWB)**			**19 + 10 BONUS**
HWB P1	Minimum Ventilation Performance	(a) Measure outdoor air pollutants on-site prior to building design to understand the site conditions. (b) Demonstrate the project is in compliance with the minimum ventilation quantity with respective to its designed ventilation mode.	All buildings	Required
HWB 1	Healthy and Active Living	1 BONUS credit for providing at least 3 items of all applicable design measures for healthy and active living.	All buildings	1 BONUS

	Section	Credit Requirement	Extent of Application	Credit
HWB 2	Biophilic Design	1 BONUS credit for demonstrating visual connection with nature and/ or biophilic design features at an assessment space with Visual Quality Score of 2 or above. 1 additional BONUS credit for demonstrating visual connection with nature and/ or biophilic design features at an assessment space with Visual Quality Score of 3 or above.	All Buildings	1 BONUS + 1 additional BONUS
HWB 3	Inclusive Design	(a) Universal Accessibility 1 credit for providing at least ten (10) applicable enhanced provisions as stipulated in the "Recommended Design Requirements" of BFA 2008. (b) Weather Protection and Family Friendly Facilities 1 BONUS credit for providing prescribed weather protection and at least two (2) family friendly facilities.	All Buildings	1 + 1 BONUS
HWB 4	Enhanced Ventilation	(a) Fresh Air Provision 1.1. <u>Fresh Air Provision in Normally Occupied Spaces</u> 1 credit for demonstrating that all normally occupied spaces in the building are provided with increased ventilation. 1.2. <u>Fresh Air Provision in Not Normally Occupied Spaces</u> 1 credit for demonstrating that all not normally occupied spaces in the building are provided with adequate ventilation. 1.3. <u>On-site Measurements</u> 1 additional BONUS credit for conducting on-site measurements to verify the ventilation performance for normally occupied spaces. (b) Exhaust air 1 credit for the provision of an effective ventilation system for spaces where significant indoor pollution sources are consistently generated.	All buildings	3 + 1 additional BONUS

	Section	Credit Requirement	Extent of Application	Credit
HWB 5	Waste Odour Control	1 credit for installing odour sensor at all discharge points from enclosed waste disposal and recycling spaces.	All buildings with RCP(s), RS&MRC(s) and/or RS&MRR(s)	1
HWB 6	Acoustics and Noise	(a) Room Acoustics (1) 1 credit for demonstrating that mid-frequency reverberation time in applicable spaces of landlord's-controlled area meets the prescribed criteria of different types of premises. (2) 1 credit for demonstrating that mid-frequency reverberation time in applicable rooms of non-landlord/ tenanted spaces meets the prescribed criteria of different types of premises. (b) Noise Isolation (1) 1 credit for demonstrating airborne noise isolation between spaces fulfills the prescribed criteria. (2) 1 BONUS credit for demonstrating impact noise isolation between floors fulfills the prescribed criteria. (c) Background Noise 1 credit for demonstrating background noise levels within the prescribed criteria (including traffic noise and building services equipment that are within the project boundary).	All buildings with the spaces specified in the assessment criteria, with spaces where speech intelligibility is important, and without rooms of a special acoustical nature for parts (a) (1), (b) (1) and (c) All buildings with non-landlord/ tenanted spaces of the type(s) of premises specified in the assessment criteria, with spaces where speech intelligibility is important, and without rooms of a special acoustical nature for parts (a) (2) Residential buildings for part (b) (2)	4 + 1 BONUS
HWB 7	Indoor Vibration	1 credit for demonstrating vibration levels not exceeding the prescribed criteria.	All buildings with normally occupied spaces	1

	Section	Credit Requirement	Extent of Application	Credit
HWB 8	Indoor Air Quality	(a) Indoor Air Quality in Occupied Spaces <u>Path 1</u> 2 credits for demonstrating compliance with the prescribed limits for carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), carbon dioxide (CO_2), respirable suspended particulates (PM_{10}), total volatile organic compounds (TVOCs), formaldehyde (HCHO) and radon (Rn) in the sampled occupied spaces. 1 credit for demonstrating compliance with the prescribed limits for airborne bacteria and conduct the mould assessment in the sampled occupied spaces. <u>Path 2</u> This path is only eligible to the whole building (and all buildings, if there is more than one building within the development) which is applicable to join the IAQ Certification Scheme from the Environmental Protection Department (EPD). 3 credits for submitting a valid IAQ Certification Scheme (Good Class) certificate issued by the Environmental Protection Department (EPD) covering the whole building. 3 credits and 1 additional BONUS credit for submitting a valid IAQ Certification Scheme (Excellent Class) certificate issued by the Environmental Protection Department (EPD) covering the whole building. (b) Air Quality in Car Park 1 credit for demonstrating compliance with the pollutant concentration limits specified in ProPECC PN 2/96.	All buildings for part (a) All buildings with enclosed and/ or semi-enclosed car park of areas more than 10% of Construction Floor Area for part (b)	4 + 1 additional BONUS

	Section	Credit Requirement	Extent of Application	Credit
HWB 9	Thermal Comfort	(a) Thermal Comfort Analysis 2 credits for conducting thermal comfort analysis and demonstrate that normally occupied spaces can fulfill the thermal comfort requirements. (b) Thermal Comfort Measurement 1 additional BONUS credit for conducting on-site measurements to verify the thermal comfort performance.	All buildings	2 + 1 additional BONUS
HWB 10	Artificial Lighting	(a) Artificial Lighting in Normally Occupied Spaces 1 credit for achieving the prescribed lighting performance in normally occupied spaces. (b) Artificial Lighting in Not Normally Occupied Spaces and Unoccupied Spaces 1 credit for achieving the prescribed lighting performance in not normally occupied spaces and unoccupied spaces.	All buildings	2
HWB 11	Daylight	2 BONUS credits for demonstrating at least 55% of the total area of the studied normally occupied spaces achieves spatial Daylight Autonomy$_{300/50\%}$ ($sDA_{300/50\%}$) and no more than 10% of the same area receives Annual Sunlight Exposure$_{1000,250}$ ($ASE_{1000,\ 250}$).	All buildings	2 BONUS
HWB 12	Biological Contamination	1 credit for complying with the recommendations given in the Code of Practice for Prevention of Legionnaires' Disease 2016/ 2021 Edition in respect of Water Supply Systems, HVAC Systems and other Water Features.	All buildings	1

	Section	Credit Requirement	Extent of Application	Credit
8	**Innovations and Additions (IA)**			**Maximum 10 BONUS**
IA 1	Innovations and Additions	Present evidence of the application of new practices, technologies and/ or techniques that are (1) not described in this manual; or (2) not market mainstream implementation; or (3) multiple aspect achievement; and the associated benefits in addressing sustainability objectives for new buildings.	All buildings, for innovations that have not been addressed in the respective categories of the NB certification	Maximum 10 BONUS

2 Integrated Design and Construction Management (IDCM)

2.P Prerequisite
2.1 Integrated Design Process
2.2 Green Construction Practices
2.3 Smart Design and Technologies
2.4 Design for Engagement and Education on Green Buildings

Introduction

This section focuses on the integration design management which maximises the opportunities for integrated and cost-effective green design approaches and construction methodologies; improvement in user's health and wellbeing; smart technologies and innovative approaches for green design and construction.

2.P Prerequisite

IDCM P1 Sustainability Champions – Project
IDCM P2 Environmental Management Plan
IDCM P3 Timber Used for Temporary Works

Background

This part sets out the minimum requirements for integrated design management in terms of engaging the Project BEAM Professional (BEAM Pro) to facilitate the certification, non-virgin timber used for temporary works, Environmental Management Plan and Waste Management Plan during construction.

2.1 Integrated Design Process

IDCM 1 Sustainability Champions – Design
IDCM 2 Complimentary Certification
IDCM 3 Integrated Design Process
IDCM 4 Life Cycle Costing
IDCM 5 Commissioning

Background

An integrated process is a comprehensive approach to building systems and equipment design. With the guidance of Project BEAM Pro, the project team looks for synergies among systems and components, the mutual advantages that can help in achieving high levels of building performance for human comfort and environmental benefits. The process should involve rigorous questioning, coordination and challenge to the typical project assumptions. Team members collaborate to enhance the efficiency and effectiveness of every system.

2.2 Green Construction Practices

IDCM 6 Sustainability Champions – Construction
IDCM 7 Measures to Reduce Site Emissions
IDCM 8 Construction and Demolition Waste Recycling
IDCM 9 Construction IAQ Management
IDCM 10 Considerate Construction
IDCM 11 Building Management Manuals
IDCM 12 Operator Training plus Chemical Storage and Mixing Room

Background

Construction site activities can be the significant source of environmental degradation, unless appropriate steps are taken to reduce the emissions to air, land and water, and to reduce annoyance from construction related noise. It is the responsibility of contractors to do all in their ability to employ appropriate construction methods to reduce air, noise, water and light pollution.

2.3 Smart Design and Technologies

IDCM 13 Digital Facility Management Interface
IDCM 14 Occupant Engagement Platform
IDCM 15 Document Management System
IDCM 16 BIM Integration

Background

To encourage the use of automation, data and behavioural science to enable the building professionals to boost and maintain energy efficiency by optimising equipment and related processes for energy performance and comfort requirements.

2.4	**Design for Engagement and Education on Green Buildings**	**IDCM 17**	**Design for Engagement and Education on Green Buildings**
	Background	To encourage public education that focuses on strategies and solutions applied to the green buildings.	

2 Integrated Design and Construction Management

2.P Prerequisite

IDCM P1 Sustainability Champions – Projects

Extent of Application All buildings

Objective Facilitate the application of the BEAM Plus certification process and to ensure the compliance of relevant requirements of the BEAM Plus Manual.

Credits Attainable Prerequisite

Credit Requirement Prerequisite achieved for demonstrating that an accredited BEAM Professional (BEAM Pro) with a valid credential for BEAM Plus New Buildings v2.0 is engaged as the Project BEAM Pro of the consultant team.

The Project BEAM Pro shall:

1. Act as the point of contact with the Hong Kong Green Building Council and the BEAM Society Limited for administrative matters relating to BEAM Plus certification;

2. Participate as one of the key project team members in the design and construction stages, with the assistance of the Construction BEAM Pro (and Affiliates, if any) defined under IDCM 6 if any, to oversee the submission materials are in compliance with relevant requirements of the BEAM Plus Manual. The Project BEAM Pro may also assume other roles in the consultant team of the project (The Project BEAM Pro, Design BEAM Pros under IDCM 1 and Construction BEAM Pros under IDCM 6 must be different personnel);

3. Create a BEAM Plus NB Certification Checklist including project goals, performance and BEAM Plus target rating;

4. Provide guidance to the project and construction teams regarding BEAM Plus principles, structure, timing, certification process and requirements of credits; and

5. Advise the Client on relevant professionals or parties on respective tasks to address relevant BEAM Plus certification requirements.

Assessment

1. Complete the prescribed form with qualification details, appointment information and confirmation of appointment of the Project BEAM Pro. The appointed Project BEAM Pro should provide screen capture from HKGBC practitioner directory showing valid credentials from appointment to completion of the certification process. If more than 1 Project BEAM Pro was employed for the project, the Applicant should clearly document the works for each BEAM Pro and how the works are handed over and the timeline for their involvement.

2. The Project BEAM Pro shall be engaged at the commencement of schematic design stage and throughout from commencement of demolition and/ or construction works [i.e. if the project scope covers demolition, foundation and superstructure, the Project BEAM Pro shall be engaged before the start of demolition stage] to completion of the certification process.

3. Provide a BEAM Plus NB Certification Checklist which shall include the following:

   3.1. Determine the BEAM Plus certification level to pursue;

   3.2. Select the BEAM Plus credits to meet the targeted certification level;

   3.3. Identify the responsible parties to ensure the BEAM Plus requirements for each prerequisite and selected credits are met; and

   3.4. Record changes between PA and FA stage and submit a summary to report the changes in submission.

4. Provide a copy of the meeting minutes (date and content of the minutes will be reviewed for compliance) showing the participation of the Project BEAM Pro. Confidential or sensitive project information on the minutes is not required and could be covered:

   4.1. Introductory workshop/ meeting (at the commencement of schematic design stage)

   Highlight the attendance of Project BEAM Pro(s) and the section of providing guidance to the project team regarding BEAM Plus principles, structure, timing and certification processes. Indicate the inclusion of Design BEAM Pros (and Affiliates, if any) as defined under IDCM 1, if any;

   4.2. Kick-off meeting with main contractor

   Highlight the attendance of BEAM Pro(s) and contractor representative(s). Indicate the coordination with Construction BEAM Pro(s) (and Affiliates, if any) as defined under IDCM 6, if any. Highlight the key BEAM Plus requirements during the construction stage; and

   4.3. Review meeting(s) with main contractor

   Highlight the attendance of BEAM Pro(s) and contractor representative(s). Indicate the coordination with Construction BEAM Pro(s) (and Affiliates, if any) as defined under IDCM 6, if any. Highlight the section of providing guidance on BEAM Plus requirements to the contractor during construction.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_P1_00	BEAM Plus NB submission template for IDCM P1	✓	✓	✓
IDCM_P1_01	BEAM Plus NB Certification Checklist	✓	✓	✓
IDCM_P1_02	A copy of the meeting minutes of introductory workshop/ meeting with project team/ Design BEAM Pro(s) (and Affiliates, if any) (at the commencement of schematic design stage)	✓	✓	✓
IDCM_P1_03	A copy of the meeting minutes of kick-off meeting with main contractor/ Construction BEAM Pro(s) (and Affiliates, if any)	✓*	✓	✓

IDCM_P1_04	A copy of the meeting minutes of review meeting(s) with main contractor/ Construction BEAM Pro(s) (and Affiliates, if any)	✓*	✓	✓
IDCM_P1_05	Supporting documents showing how the works are handed over and the timeline for their involvement, if applicable (e.g. Declaration letter from the employer of the Project BEAM Pro)	✓	✓	✓
IDCM_P1_06	Screen capture from HKGBC practitioner directory showing the valid credentials of the Project BEAM Pro(s)	✓	✓	✓
* Meeting minutes shall be submitted in PA if the meeting(s) is/ are held not less than 3 months prior to PA (first submission).				

Remarks

(a) Additional Information

Hong Kong Green Building Council publishes the latest registers of BEAM Professionals and BEAM Affiliates on its website. [ONLINE]. Available at: https://app.powerbi.com/view?r=eyJrIjoiYjUxMDUwMWMtNWIzOS00YmQxLTgxYTYtMDZkMjczNDE1N2ZhIiwidCI6ImQwMTUyOGY5LTQ3NDItNGJjYS05MDVmLWU3ZjIxZTJhNmM5MiIsImMiOjEwfQ%3D%3D. [Accessed February 2025].

(b) Related Credit

IDCM 1 Sustainability Champions – Design

The related credit encourages the engagement of Design BEAM Pros and/ or Affiliates engaged by respective core design disciplines to integrate BEAM standards and practices into the planning, design and construction of the building.

IDCM 3 Integrative Design Process

The related credit encourages early consideration of integrative building design process, buildability and operational issues to support holistic and cost-effective outcomes of building performance, human health and environmental benefits.

IDCM 6 Sustainability Champions – Construction

The related credit encourages the engagement of BEAM Pros and/ or Affiliates engaged by contractors during construction to work collaboratively with the Project BEAM Pro to monitor progress against targeted construction-related BEAM Plus requirements.

2 Integrated Design and Construction Management

2.P Prerequisite

IDCM P2 Environmental Management Plan

Extent of Application All buildings

Objective Encourage a high standard of environmental management during construction.

Credits Attainable Prerequisite

Credit Requirement Prerequisite achieved for demonstrating that an Environmental Management Plan has been properly prepared.

Assessment

1. An Environmental Management Plan (EMP) shall be prepared to address potential significant environmental aspects and impacts, to propose appropriate mitigation measures, to include environmental monitoring and auditing plans and to propose a waste management system. Reference shall be made to all of the following:
   - 1.1. Environment, Transport and Works Bureau (ETWB)'s Technical Circular (Works) 19/2005, Appendix C [1];
   - 1.2. Hong Kong Construction Association (HKCA)'s Best Practice Guide for Environmental Protection on Construction Sites, Section 3.2.3 [2];
   - 1.3. Environmental Protection Department (EPD)'s Environmental Monitoring and Audit - Guidelines for Development Projects in Hong Kong, Appendix D2 [3];
   - 1.4. Buildings Department, PNAP ADV-19, Construction and Demolition Waste [4]; and
   - 1.5. Project Administration Handbook for Civil Engineering Works, Section 4.1.3, Construction and Demolition Materials [5].
2. For a project that is a Designated Project under the Environmental Impact Assessment (EIA) Ordinance, environmental measurement points agreed by EPD shall be adopted.

1 Environment, Transport and Works Bureau (ETWB), Technical Circular (Works) 19/2005, Appendix C. [ONLINE]. Available at: http://www.devb.gov.hk/filemanager/technicalcirculars/en/upload/19/1/C-2005-19-0-1.pdf. [Accessed February 2025].

2 Hong Kong Construction Association (HKCA), Best Practice Guide for Environmental Protection on Construction Sites, 3.2.3. [ONLINE]. Available at: https://s3.ap-southeast-1.amazonaws.com/hkca.com.hk/upload/doc/publication/BestPracticeGuideforEnvironmentalProtectiononConstructionSites%282013%29%28EN%29-HYD95.pdf. [Accessed February 2025].

3 Environmental Protection Department (EPD), Environmental Monitoring and Audit - Guidelines for Development Projects in Hong Kong Appendix D2. [ONLINE]. Available at: http://www.epd.gov.hk/eia/hb/materials/images/AppendixD2.pdf. [Accessed February 2025].

4 Buildings Department, PNAP ADV-19, Construction and Demolition Waste. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnap/ADV/ADV019.pdf. [Accessed February 2025].

5 Project Administration Handbook for Civil Engineering Works, Section 4.1.3, Construction and Demolition Materials. [ONLINE]. Available at: https://www.cedd.gov.hk/eng/publications/standards-spec-handbooks-cost/stan-pah/index.html. [Accessed February 2025].

3. Provide EMP(s) of construction (demolition and foundation to be included, if any) prepared by contractors and reviewed and endorsed by Construction BEAM Pro (or Construction BEAM Affiliate) defined under IDCM 6 or Project BEAM Pro defined under IDCM P1 [6].

4. Provide extracts of tender documents (e.g. contract specifications) highlighting the clause requiring contractors to prepare EMP(s), if the construction stage has not yet commenced before the submission of PA stage.

5. Provide endorsed EMP(s), if any construction stage has commenced before the submission of PA.

6. If IDCM 7 (d) is targeted, the corresponding plan and measures in achieving the credit should be included in the EMP.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_P2_00	BEAM Plus NB submission template for IDCM P2	✓	✓	✓
IDCM_P2_01	Contract specifications requiring EMP(s) [or] EMP(s) of construction (demolition and foundation to be included, if any)	✓ ✓*	**-** ✓	**-** ✓
* Evidence of compliance with prerequisite requirements for construction works started not less than 3 months prior to PA (first submission) shall be submitted in PA.				

6 If demolition/ foundation/ superstructure work was commenced before 4 September 2019 (the release of BEAM Plus New Buildings Version 2.0), the endorsement by the Construction BEAM Pro as defined under IDCM 6/ Project BEAM Pro as defined under IDCM P1 on the EMP of such stage can be exempted from the assessment of the prerequisite. Notwithstanding, these documents shall be endorsed by a suitably qualified person (e.g. contractor's representative).

Remarks

(a) Additional Information

Environmental Protection Department, Recommended Pollution Control Clauses for Construction Contracts. [ONLINE]. Available at: http://www.epd.gov.hk/epd/english/environmentinhk/eia_planning/guide_ref/rpc.html. [Accessed February 2025].

Environmental Protection Department, Quality Powered Mechanical Equipment (QPME) system. [ONLINE]. Available at: http://www.epd.gov.hk/epd/english/environmentinhk/noise/qpme/index.html. [Accessed February 2025].

Buildings Department, PNRC-17, Control of Environmental Nuisance from Construction Sites. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnrc/Pnrc17.pdf. [Accessed February 2025].

Development Bureau (ETWB)'s Technical Circular (Works) 6/2010, Trip Ticket System for Disposal of Construction & Demolition Materials. [ONLINE]. Available at: http://www.devb.gov.hk/filemanager/technicalcirculars/en/upload/308/1/C-2010-06-01.pdf. [Accessed February 2025].

(b) Related Credit

IDCM 7 Measures to Reduce Site Emissions

The related credit addresses measures to minimise air, noise, water and light pollution during construction of buildings and the infrastructure serving buildings.

IDCM 8 Construction and Demolition Waste Recycling

The related credit encourages best practices in the management of construction resources consumption, including waste reduction.

2	**Integrated Design and Construction Management**	**2.P**	**Prerequisite**
		IDCM P3	**Timber Used for Temporary Works**

Extent of Application All buildings

Objective Encourage the well-managed use of timber.

Credits Attainable Prerequisite

Credit Requirement Prerequisite achieved for demonstrating that no virgin forest products are used for temporary works.

Assessment

1. Timber used for all temporary works (falsework, formworks and hoarding works) shall originate from sustainable forestry or re-used existing material, unless exceptional circumstances occur.

2. Extracts of tender documents (e.g. contract specifications) highlighting the clause precluding the use of virgin timber in all temporary works shall be provided if the construction stage has not yet commenced at PA stage.

3. Monthly summary of timber use for temporary works which demonstrate prerequisite requirement shall be prepared and declared by representative from contractor.

4. Records (e.g. invoices and delivery notes for new timbers used/ transfer notes for reused timers) shall be provided if construction (demolition and foundation to be included, if any) has commenced before the submission of PA.

5. If timber was not used for temporary works during certain construction stage(s), provide declaration letter(s) from the site representative(s) or project developer specifying that timber was not used.

6. The reuse of timber or timber products for temporary works is acceptable. Transfer notes and site photo records should be kept and submitted to show the originating old timber source, the quantity and the date of transfer of the timber products between the despatch work site and the project site (recipient). The transfer notes should bear the detailed name and address of the work sites concerned and duly signed by both the despatch and recipient parties undertaking the transfer (i.e. site representative/ stores officer in managerial position), together with company chops.

   If the old timber products are from the same project site, a detailed usage record or inventory prepared by a site representative in respect of the timber products being used/ reused at the project site shall suffice to prove the reuse.

7. In the event the timber products are not purchased from a supplier who is an "accredited company", the following basic evidence should be produced to demonstrate the products:

   (i) conform to sustainable forestry practice guidelines;

   (ii) be accredited by recognised organisations; and

   (iii) in compliance with the specification set down by the organisation.

Provided that the timber products are sourced from a supplier already accredited by the Approval Organisations, i.e. the Forest Stewardship Council (FSC) [1], the American Forest and Paper Association (AFPA) [2], Programme for the Endorsement of Forest Certification (PEFC) [3] or other "known licensed sources" [4] according to the respective protocol (accredited company), and the timber products purchased are issued with the Certificate under the CoC (Chain of Custody) system, it is acceptable that the following documents as proof to demonstrate the timber products as purchased from the timber supplier and used in the project site are from a sustainable source:

(i) Invoice plus Delivery Note (DN) from the supplier of the timber products purchased - on the invoice & DN, it should be marked with the reference Certificate No.; a note which has the effect of confirming the products in the invoice and delivery note are certified; the pack no. of the timber products (samples are available on BSL's website [5, 6]);

(ii) A copy of the CoC Certificate of the certified timber supplier; and

(iii) Photographic evidence of the timber products.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_P3_00	BEAM Plus NB submission template for IDCM P3	✓	✓	✓
IDCM_P3_01	Summary of Timber Use for Temporary Works [Appendix A] with contractor's endorsement	✓*	✓	✓
IDCM_P3_02	Contract specifications precluding the use of virgin timber	✓	-	-
IDCM_P3_03	Declaration letter from the site representative or project developer specifying that timber was not used for temporary works	✓	✓	✓
IDCM_P3_04	Timber Product Compliance Certificate [e.g. Chain of Custody (CoC), etc.] (for the use of new timber only)	✓*	✓	✓

1 Forest Stewardship Council. [ONLINE]. Available at: http://www.fsc.org/ [Accessed February 2025].

2 American Forest and Paper Association. [ONLINE]. Available at: http://www.afandpa.org/ [Accessed February 2025].

3 Programme for the Endorsement of Forest Certification. [ONLINE]. Available at: https://www.pefc.org/ [Accessed February 2025].

4 Architectural Services Department, General Specifications for Building 2017, Section 13, Carpentry and Joinery. [ONLINE]. Available at: https://www.archsd.gov.hk/media/publications-publicity/general-specification-for-building/general_specification_for_building_2017_edition-20191223.pdf. [Accessed February 2025].

5 BEAM Society Limited. [ONLINE]. Available at: https://www.beamsociety.org.hk/files/download/20191129_FAQ_MA_Attachment_a1.pdf. [Accessed February 2025].

6 BEAM Society Limited. [ONLINE]. Available at: https://www.beamsociety.org.hk/files/download/20191129_FAQ_MA_Attachment_a2.pdf. [Accessed February 2025].

IDCM_P3_05	Invoices and delivery notes quantifying the new timber used during construction works (for the use of new timber only)	✓*	✓	✓
IDCM_P3_06	Transfer notes for timber reused from other sites during construction works (for the reuse of timber from other sites only)	✓*	✓	✓
* Evidence of compliance with prerequisite requirements for construction works started not less than 3 months prior to PA (first submission) shall be submitted in PA. Remark: Photo records of timber products shall be kept and submitted for assessment upon request.				

Remarks

(a) Additional Information

WWF, Guide to Responsible Purchasing of Forest Products. [ONLINE]. Available at: http://assets.wwf.org.uk/downloads/responsible_purchasing.pdf. [Accessed February 2025].

Buildings Department, PNAP ADV-5 Tropical Hardwood Timber, gives guidance for alternatives to the use of hardwoods in order to reduce the amount of tropical hardwood timber used in building projects. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnap/ADV/ADV005.pdf. [Accessed February 2025].

Works Bureau Technical Circular (WBTC) No. 19/2001, “Metallic Site Hoardings and Signboards” establishes the revised policy requiring the use of metallic site hoardings and signboards in order to reduce the amount of timber used on construction sites. This Circular supersedes WBTC 19/99 and shall be read in conjunction with WBTC 32/92 on “The Use of Tropical Hardwood on Construction Sites” to reduce the amount of hardwood timber used on construction sites. [ONLINE]. Available at: https://www.devb.gov.hk/filemanager/technicalcirculars/en/upload/153/1/wb1901.pdf. [Accessed February 2025].

(b) Related Credit

None

2 Integrated Design and Construction Management

2.1 Integrated Design Process

IDCM 1 Sustainability Champions – Design

Extent of Application All buildings

Objective Encourage the engagement of BEAM Professionals and/ or Affiliates to integrate BEAM Plus standards and practices into the planning and design of the building.

Credits Attainable 1 + 1 additional BONUS

Credit Requirement

1 credit for at least two (2) members from at least two (2) applicable core design disciplines shall be accredited BEAM Professionals with valid credentials for BEAM Plus New Buildings v2.0.

1 additional BONUS credit for at least one (1) additional member, from an applicable core design discipline different from the disciplines counted in the above credit, shall be an accredited BEAM Professional with valid credentials for BEAM Plus New Buildings v2.0.

Alternatively,

1 additional BONUS credit for at least two (2) additional members, from an applicable core design discipline different from the disciplines counted in the above credit, shall be accredited BEAM Affiliates with valid credentials for BEAM Plus New Buildings v2.0.

Assessment

The Design BEAM Pros (and Affiliates, if any) shall:

1. Be engaged in the applicable core design disciplines from project inception to completion of detailed design and specifications stage of the Project. Core design disciplines shall be justified by the specific nature of the Project. The following disciplines, if they are engaged in the Project, shall form the core design disciplines:
   - 1.1. Project management;
   - 1.2. Facility management;
   - 1.3. Architectural;
   - 1.4. Structural/ civil engineering;
   - 1.5. Building services engineering;
   - 1.6. Surveying;
   - 1.7. Landscaping;
   - 1.8. Sustainability/ environmental;
   - 1.9. Interior designer; and
   - 1.10. Other as proposed and justified by the specific nature of the Project.

   The Design BEAM Pros (and Affiliates, if any) should be from the design team to integrate BEAM Plus standards and practices into the planning and design of buildings and may also assume other roles in the consultant team of the Project. The personnel engaged as the Design BEAM Pro/ Affiliate shall be different from the Project BEAM Pro under IDCM P1 and the Construction BEAM Pro/ Affiliate under IDCM 6.

2. If there is any change of Design BEAM Pro/ Affiliate during the period from project inception to completion of detailed design and specifications stage of the Project, provide supporting documents to document the hand-over.

3. Participate in introductory workshop/ meeting as required under IDCM P1.

4. Participate in multi-disciplinary design charrette as required under IDCM 3a, if applicable.

5. Complete the prescribed form with qualification details, appointment information and confirmation of appointment of the Design BEAM Pros (and Affiliates, if any).

   The appointed Design BEAM Pros (and Affiliates, if any) should maintain his/ her accreditation and credentials during his/ her appointment and screen capture from HKGBC practitioner directory should be provided to show the valid credentials.

6. Provide a copy of the following meeting minutes (date and content of the minutes will be reviewed for compliance) showing the participation of the Design BEAM Pros (and Affiliates, if any) in an introductory workshop/ meeting as required under IDCM P1 and a multi-disciplinary design charrette as required under IDCM 3a (if applicable). Confidential/ sensitive project information is not required and could be covered.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_01_00	BEAM Plus NB submission template for IDCM 1	✓	✓	✓
IDCM_01_01	A copy of the meeting minutes of introductory workshop/ meeting with the Project BEAM Pro, as required under IDCM P1	✓	✓	✓
IDCM_01_02	A copy of the meeting minutes of multi- disciplinary design charrette (if any) under IDCM 3a	✓	✓	✓
IDCM_01_03	Supporting documents showing how the works are handed over and the timeline for their involvement, if applicable (e.g. Declaration letter from the employer of the Design BEAM Pro/ Affiliate)	✓	✓	✓
IDCM_01_04	Screen capture from HKGBC practitioner directory showing the valid credentials of the Design BEAM Pro/ Affiliate	✓	✓	✓

Remarks

(a) Additional Information

Hong Kong Green Building Council publishes the latest registers of BEAM Professionals and BEAM Affiliates on its website. [ONLINE]. Available at: https://app.powerbi.com/view?r=eyJrIjoiYjUxMDUwMWMtNWIzOS00YmQxLTgxYTYtMDZkMjczNDE1N2ZhIiwidCI6ImQwMTUyOGY5LTQ3NDItNGJjYS05MDVmLWU3ZjIxZTJhNmM5MiIsImMiOjEwfQ%3D%3D. [Accessed February 2025].

(b) Related Credit

IDCM P1 Sustainability Champions - Project

The related prerequisite encourages the engagement of BEAM Pro to facilitate the application for the BEAM Plus certification process and to ensure the compliance of relevant requirements of the BEAM Plus.

IDCM 3 Integrative Design Process

The related credit encourages early considerations for integrative building design process, buildability and operational issues to support holistic and cost-effective outcomes of building performance, human health and environmental benefits.

IDCM 6 Sustainability Champions – Construction

The related credit encourages the engagement of BEAM Pro(s) and/ or Affiliates engaged by contractors during construction to work collaboratively with the Project BEAM Professional to monitor progress towards the targeted construction-related BEAM Plus requirements.

2 Integrated Design and Construction Management

2.1 Integrated Design Process

IDCM 2 Complimentary Certification

Extent of Application All buildings that are applicable for respective BEAM Plus certification tools

Objective Encourage to pursue green building practices from planning, building design, construction, interior fitting-out to operation.

Credits Attainable 3 BONUS

Credit Requirement

(a) BEAM Plus Neighbourhood (ND)

1 BONUS credit where the project is certified by BEAM Plus Neighbourhood (ND) certification.

(b) BEAM Plus Interiors (BI)

1 BONUS credit for preparing the Project for BEAM Plus Interiors (BI) certification.

(c) BEAM Plus Existing Buildings (EB)

1 BONUS credit for preparing the project for BEAM Plus Existing Buildings (EB) certification (Comprehensive Scheme).

Assessment

(a) BEAM Plus Neighbourhood (ND)

1. Provide a copy of valid BEAM Plus Neighbourhood Certificate at the time of the first submission of Provisional Assessment of the BEAM Plus New Building (NB) certification.

2. Provide evidence demonstrating that site planning is aligned with and is essentially the same as the Master Plan defined in the ND certification.

(b) BEAM Plus Interiors (BI)

1. Provide justification of the extent of eligible non-domestic premises of the project. Definition of eligible premises shall refer to section 1.2.1 of BEAM Plus Interiors Manual v1.0 [1].

2. Provide a report demonstrating the prerequisite compliance for at least 50% of total Internal Floor Area (IFA) of all eligible premises in BEAM Plus BI certification.

3. Declaration letter signed by the Project Owner/ Developer in attaining the BONUS Credit(s) is accepted as an alternative to the above-mentioned evidence for Provisional Assessment.

(c) BEAM Plus Existing Buildings (EB)

1. Provide an undertaking letter signed by the Project Owner/ Developer regarding their commitment to pursue BEAM Plus EB certification (Comprehensive Scheme).

1 BEAM Society Limited – BEAM Plus Interiors Manual v1.0. [ONLINE]. Available at: https://www.beamsociety.org.hk/en/BEAM-Plus/-/media/A47F037F6F3B4A828E1C6602167E8150.ashx. [Accessed February 2025].

2. Provide a feasibility study report on BEAM Plus EB certification of the project with the following details:

   2.1. Checklist for potential credits and rating;

   2.2. Budget estimation for EB certification; and

   2.3. Roll-out plan.

   If a feasibility study is not available, declaration letter signed by the Project Owner/ Developer in attaining the BONUS credit(s) is accepted as alternative to the abovementioned evidence for Provisional Assessment.

Submittals

(a) BEAM Plus Neighbourhood (ND)

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_02a_00	BEAM Plus NB submission template for IDCM 2a	✓	✓	✓
IDCM_02a_01	BEAM Plus Neighbourhood (ND) certificate	✓	✓	✓
IDCM_02a_02	Evidence to demonstrate adaptation of the Master Plan design certified under ND	✓	✓	✓

(b) BEAM Plus Interiors (BI)

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_02b_00	BEAM Plus NB submission template for IDCM 2b	✓	✓	✓
IDCM_02b_01	Justification of the extent of eligible non-domestic premises	✓*	✓	✓
IDCM_02b_02	Report to demonstrate prerequisite compliance for BI [or] Declaration letter signed by the Project Owner/ Developer (alternative evidence)	✓* ✓	✓ -	✓ -
* Evidence of credit compliance is required if declaration letter by the Project Owner/ Developer is not available.				

(c) BEAM Plus Existing Buildings (EB)

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_02c_00	BEAM Plus NB submission template for IDCM 2c	✓	✓	✓
IDCM_02c_01	Undertaking letter signed by the Project Owner/ Developer on the commitment to pursue BEAM Plus EB certification	-	✓	✓
IDCM_02c_02	Feasibility study report, including scorecard, budget and roll-out plan [or] Declaration letter signed by the Project Owner/ Developer (alternative evidence)	✓* ✓	✓ -	✓ -
* Evidence of credit compliance is required if declaration letter signed by the Project Owner/ Developer is not available.				

Remarks

(a) Additional Information

The latest manuals of BEAM Plus Neighbourhood, BEAM Plus Interiors and BEAM Plus Existing Buildings are available on Hong Kong Green Building Council's website. [ONLINE]. Available at: https://www.hkgbc.org.hk/eng/BPRef-manuals_assessment.aspx. [Accessed February 2025].

(b) Related Credit

None

2 Integrated Design and Construction Management

2.1 Integrated Design Process

IDCM 3 Integrated Design Process

Extent of Application All buildings

Objective Encourage early consideration of the integrated building design process, buildability and operational issues to support holistic and cost-effective outcomes of building performance, human health and environmental benefits.

Credits Attainable 4

Credit Requirement

(a) Early Considerations for Integrated Building Design

1 credit for consideration of the integrated design process regarding whole-system thinking to explore the interrelationships among green building design strategies and systems in the conceptual design stage.

1 additional credit for organising at least one multi-disciplinary design charrette to formulate passive and active design strategies in the conceptual/ schematic design stages.

(b) Early Design Consideration of Buildability/ Constructability

1 credit for early design consideration of buildability to ease construction and save on-site materials/ labour before completion of the design development stage.

(c) Design Consideration for Operation and Maintenance

1 credit for design consideration of the long-term operation and maintenance needs of the building and its engineering services.

Assessment

(a) Early Considerations for Integrated Building Design

1. **<u>Exploration of interrelationships among green building design strategies and systems</u>**

1.1. Provide a design review report in comparing **preliminary** sustainable design benefits for at least one (1) baseline and one (1) alternative design option for each issue.

The report should at least have the sections below with no less than 500 words for each identified issue:

i. Executive summary

ii. Project program

iii. Workshop arranged for integrated design process (with date of workshop, number or arrangement of attendances)

iv. Selected consideration, each with:

- A baseline option, with the narrative description confirming the design has the same development potentials as the design options and would conform to the statutory requirements such as Building Ordinance and Town Planning Ordinance.

- An alternative design option with graphical support at concept stage level and board brush calculation in supporting the argument on the sustainable design benefits of baseline and alternative design options.

v. Conclusion

1.2. One or multiple design options is demonstrated to address at least two (2) issues of each of the following considerations:

Considerations	Issues
Site planning and outdoor environmental quality	- Building permeability/ air ventilation/ thermal comfort; - Landscaping/ site coverage with greenery; - Neighbourhood daylight access; - Ecological value; - Climate resilience.
Built form/ orientation and energy use/ generation	- Cooling load reduction; - Lighting load reduction; - Natural ventilation potential; - Renewable energy opportunities.
Building envelope attributes[1] and energy use	- Cooling load reduction/ OTTV/ RTTV estimation; - Lighting load reduction; - Natural ventilation potential.
Note: 1. Building envelope attributes refer to: - insulation values; - window-to-wall ratios; - glazing characteristics; - shading; - window operability.	

Strategies addressing multiple consideration and issues are acceptable.

1.3. The sustainable design benefits for respective considerations shall be demonstrated in design appraisal by either:

1.3.1. Qualitative assessment report referring to the Urban Design Guidelines of the Hong Kong Planning Standards and Guidelines Chapter 11 as appropriate:

a) Identify good design features;

b) Identify obvious problematic areas and propose some mitigation measures;

c) Define “focus” and methodologies of any further study in the schematic or design development stages;

1.3.2. Spreadsheet calculations; or

1.3.3. “Simple box” environmental/ energy modelling (simplified massing model that may not include detail of systems).

2. **Multi-disciplinary design charrette**

2.1. Provide evidence that at least one (1) multi-disciplinary design charrette has been held before the completion of schematic design stage.

2.2. The charrette shall, at minimum, address the following issues:

2.2.1. Participants:

a) Developer/ owner representative;

b) User representative (if users are known in design stage);

c) Operation and maintenance team representative (if identified in schematic design stage); and

d) Members from core design disciplines as defined in IDCM 1;

2.2.2. Introduce fundamentals of integrated design process [1]:

a) Well-defined vision, goals and objectives;

b) Collaborative team and open communication;

c) Whole-system thinking and innovative synthesis; and

d) Iterative process and feedback cycles;

2.2.3. Review and agree on following principal design strategies:

a) Key stakeholders' values, aspirations and requirements;

b) Functional programming;

c) Site planning and outdoor environmental quality;

d) Built form and orientation;

e) Building envelope attributes;

f) Key active building systems for energy saving/ generation; and

g) Other strategies to be proposed by the Applicant.

(b) Early Design Consideration of Buildability/ Constructability

1. Demonstrate early consideration of buildability to ease construction and save on-site materials/ labour before the completion of the design development stage, either by:

1.1. Engaging a construction management consultant or contractor who should be with adequate experience such as at least 10 years of experience OR at least 5 years of experience across 2 projects or more in building construction industry and should not be under the design team (e.g. the client's representative or construction team member with relevant experience);

1.2. Design optimisation of voids and complex form;

1 BC Green Building Roundtable. Roadmap for the Integrated Design Process. [ONLINE]. Available at: http://www.greenspacencr.org/events/IDProadmap.pdf. [Accessed February 2025].

1.3. Adopting at least 75% of design measures on the 3S concept (standardisation, simplification and single integrated element) as promulgated in the Development Bureau's Guidelines [2]; or

1.4. Alternative standard could be proposed by the Applicant with justification.

2. For item (b) 1.1, provide evidence demonstrating that recommendations/ inputs by the construction management consultant/ contractor have been reviewed and adopted. This shall include the following:

2.1. Appointment letter of the construction management consultant or the contractors;

2.2. Correspondence or any of the meeting minute(s) (confidential/ sensitive project information is not required and could be covered) demonstrating that the design has been reviewed and recommendations have been suggested; and

2.3. The recommendations have been adopted.

3. For item (b) 1.2, provide evidence demonstrating that design of high voids and complex forms, if any, have been optimised:

3.1. Percentage of high voids to total building height is below 15%; and

3.2. Complexity of tower-built form in terms of tilting, tapering, twisting or free form has been optimised to fulfill both requirements:

Height of building	**Maximum offset of the building measuring against the ground floor plate or any typical floor plate**	**Maximum percentage of total number of floors with offsets measured against the total number of floors of the building**
< 45m	4m	35%
≥ 45m and < 90m	3m	25%
≥ 90m and <135m	2m	15%
≥ 135m	1m	5%

4. For item (b) 1.3, provide report with completed prescribed form to demonstrate implementation of at least 75% of listed 3S concept measures.

(c) Design Consideration for Operation and Maintenance

1. Provide evidence that the design has considered the long-term operation and maintenance needs for the building and its engineering services by providing at least 5 of the following features:

1.1. Building Management System (BMS);

1.2. Davit arm/ gondola system;

1.3. External pipe duct or pipe duct in communal areas;

2 Development Bureau – Guidelines for Enhancement of Productivity of Skilled Workers in Public Works Projects. [ONLINE]. Available at: https://www.devb.gov.hk/filemanager/en/content_29/Guidelines_Enhancement_of_Productivity_(Mar_2013)_English.pdf. [Accessed February 2025].

1.4. Fall arrest system;

1.5. Maintenance platform for building services installations (e.g. wire mesh platform for chillers/ cooling towers);

1.6. Maintenance workshop for facility management (shall refer to a room designated for carrying out maintenance activities and repairing works. The maintenance workshop shall be equipped with worktable, repairing tools and any other equipment/ facilities for fulfilling the function of the space);

1.7. Movable working platform for maintenance;

1.8. Access and safety provision for external air-conditioning unit at height without use of scaffolding (e.g. external AC units to be placed on grade);

1.9. Service lift for residential or commercial building;

1.10. Non-FSI generator for commercial or industrial building;

1.11. Store room(s) for maintenance tools and equipment;

1.12. Estate/ Building Management Office to provide systematic and efficient property management services, including operation and maintenance matters for the building occupants;

1.13. Separate vehicle loading/ unloading bay that could contribute to the long-term O&M needs for the building and its engineering services;

1.14. Twin tank for cooling tower make-up tank;

1.15. Meter monitoring and digital interface to provide real time energy monitoring system for building services systems that should be located at indoor communal areas and/ or at the building main entrance/ lobby; and

1.16. Others, to be proposed by the Applicant with justification.

Examples of features that would not be accepted including:

- Features that are described in the manual (e.g. twin tanks for potable and flushing water supply system, water leakage detection system, wider common corridor/ lift lobbies, etc.);
- Essential provision for basic safety (e.g. maintenance ladder, railing, etc.); and
- Features not serving the long-term operation and maintenance needs of building and its engineering services (e.g. changing & shower rooms for staff, guard office/ booth, caretaker office, staff lavatories, staff lockers, refuse chute, etc.)

Submittals

(a) Early Considerations for Integrative Building Design

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_03a_00	BEAM Plus NB submission template for IDCM 3a	✓	✓	✓

IDCM_03a_01	Design review report on preliminary sustainable design benefits	✓	✓	✓
IDCM_03a_02	Multi-disciplinary design charrette report (if the additional credit is targeted)	✓	✓	✓

(b) Early Design Consideration of Buildability/ Constructability

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_03b_00	BEAM Plus NB submission template for IDCM 3b with Summary of Adoption of 3S Concept [Form S-A] (for Item (b) 1.3 only)	✓ ✓	✓ ✓	✓ ✓
For Item (b) 1.1, please submit the following:		**PA**	**CA**	**FA/ RFA**
IDCM_03b_01	Appointment letter of the construction management consultant or contractors; Correspondence or any of the meeting minute(s) with construction management consultant or contractors; Report on adoption of construction management consultant's (or contractors') recommendations; and CV of the construction management consultant or contractor	✓ ✓ ✓ ✓	✓ ✓ ✓ ✓	✓ ✓ ✓ ✓
For Item (b) 1.2, please submit the following:		**PA**	**CA**	**FA/ RFA**
IDCM_03b_02	Design report demonstrating optimisation of high voids and complex forms	✓	✓	✓
For Item (b) 1.3, please submit the following:		**PA**	**CA**	**FA/ RFA**
IDCM_03b_03	Report with completed prescribed form [Form S-A] to demonstrate compliance with 3S concept measures	✓	✓	✓

(c) Design Consideration for Operation and Maintenance

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_03c_00	BEAM Plus NB submission template for IDCM 3c	✓	✓	✓
IDCM_03c_01	Design report demonstrating the adoption of O&M features	✓	✓	✓
IDCM_03c_02	Dated photo records of the completed O&M features [or] Approved contractor's submission with technical information [or] Declaration letter signed by the Project Owner undertaking the provision	- - -	✓ ✓* ✓*	✓ ✓* ✓*
* Alternative supporting document is accepted ONLY if photo records of the completed O&M features are not available at the time of CA/ FA.				

Remarks

(a) Additional Information

For IDCM 3a

Buildings Department – PNAP APP-152, Sustainable Building Design Guidelines. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnap/APP/APP152.pdf. [Accessed February 2025].

Buildings Department – Codes of Practice and Design Manuals, Code of Practice for Overall Thermal Transfer Value in Buildings 1995. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/code-and-design-manuals/OTTV1995_e.pdf. [Accessed February 2025].

Buildings Department – PNAP APP-156, Design and Construction Requirements for Energy Efficiency of Residential Buildings. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnap/APP/APP156.pdf. [Accessed February 2025].

For IDCM 3c

Buildings Department – PNAP ADV-14, Facilities for External Inspection and Maintenance of Buildings. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnap/ADV/ADV014.pdf. [Accessed February 2025].

Buildings Department – Appendix A2 of PNAP ADV-33, Essential Information in Plan Submissions. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnap/ADV/ADV033.pdf. [Accessed February 2025].

Buildings Department – Circular Letter dated 23 December 2016, Guidelines for Designing Access and Safety Provisions for the Maintenance and Repair (M&R) of External Air Conditioners (ACs) at Height. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/circular/CL_GDASP2016e.pdf. [Accessed February 2025].

(b) Related Credit

IDCM 4 Life Cycle Costing

The related credit encourages the use of life cycle costing to facilitate an investigation of potential design options, specifications, operation and maintenance.

SS P1 Minimum Landscape Requirements

The related prerequisite credit encourages building development to preserve or expand urban greenery.

SS 4 Neighbourhood Daylight Access

The related credit encourages building development which is sensitive to the needs of neighbours in terms of preserving daylight and views.

SS 7 Biodiversity Enhancement

The related credit encourages strategies to preserve and/or enhance the ecological value of the site in terms of habitat and biodiversity.

SS 8 Urban Heat Island Mitigation

The related credit encourages higher overall site coverage of greenery and stipulates minimum site coverage of greenery in the Primary Zone (the 15m vertical zone of a site along the abutting street level).

SS 9 Immediate Neighbourhood Wind Environment

The credit encourages improvement in wind environments around and adjacent to the buildings and adequate considerations of wind amplification, and where appropriate, suitable mitigation measures are provided.

SS 10 Outdoor Thermal Comfort

The related credit considers the positive effect of shading by trees and the surrounding ground surface temperatures of greenery within the site.

EU 1 Low Carbon Passive Design

The related credit encourages passive building design allowing buildings to respond to the local climate; reducing the reliance on active servicing for human comfort.

EU 5 Renewable and Alternative Energy Systems

The related credit encourages the wider application of renewable energy sources in buildings.

2 Integrated Design and Construction Management

2.1 Integrated Design Process

IDCM 4 Life Cycle Costing

Extent of Application All buildings

Objective Encourage the use of life cycle costing to facilitate investigation of potential design options, specifications, operation and maintenance.

Credits Attainable 1

Credit Requirement 1 credit for conducting life cycle costing for active systems.

Assessment

1. Conduct life cycle costing analysis with design options for each of the below active system, if present in the project construction scope:
   1.1. Hot water system;
   1.2. Interior lighting system; and
   1.3. Air-conditioning system.
2. The life cycle costing exercise can be non-discounted and should include the following costs:
   2.1. Acquisition (supply and installation costs);
   2.2. Operation (utilities); and
   2.3. Maintenance (replacements, planned maintenance and management costs).

   While developing design options, the Applicant should consider different configurations and specifications, for example, initial costs, number of equipment units involved, equipment efficiency and lifespan, etc.
3. Indicate cost of each design option of active system over 20, 30, 40 and 50 years and highlight which design option will have the lowest life cycle cost at the 50th year.
4. Prepare a life cycle costing report including all the assumptions made and the results of life cycle costing.
5. Substantiate the costs with catalogues, suppliers' recommendations or quotation. Cost approximations suggested by Quantitative Surveyor are also accepted. No professional life cycle costing software is required for this study.
6. Note that the costing exercise imposes no obligation for implementation but encourages consideration of the costs of systems throughout their life cycle.
7. The Life Cycle Costing Report should include at least the below items with a minimum of 8 A4 pages:
   7.1. Executive summary;
   7.2. Project description with construction scope;
   7.3. System options to be considered;

7.4. Life cycle costing and analysis; and

7.5. Conclusion.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_04_00	BEAM Plus NB submission template for IDCM 4	✓	✓	✓
IDCM_04_01	Life Cycle Costing Report	✓	✓	✓

Remarks

(a) Additional Information

ISO 15686-5:2008 Buildings & constructed assets – Service-life planning – Part 5: Life-cycle costing

(b) Related Credit

None

2 Integrated Design and Construction Management

2.1 Integrated Design Process

IDCM 5 Commissioning

Extent of Application All buildings

Objective Ensure the building systems perform as design specified and buildings operate as design intended.

Credits Attainable 4

Credit Requirement 2 credits for the appointment of Commissioning Authority (CxA) as described in part (a) and providing a Commissioning Plan as described in part (b).

2 additional credits for conducting a Commissioning Review as described in part (c) and providing Commissioning Reports as described in part (d).

Assessment

(a) Engage Commissioning Authority (CxA)

1. Identify a Chartered Engineer, Registered Professional Engineer, Member of HKIE (under the discipline of building services, mechanical, electrical, energy or environmental), ASHRAE BCxP as the CxA.

2. The CxA should have the proper experience and credentials including adequate expertise in the commissioning of electrical and mechanical systems, equipment and components to develop and implement effective commissioning.

3. The CxA should have direct experience with at least two similar projects and must have been involved before the start of schematic design stage to countercheck that the systems will meet the design intents.

4. The CxA must not be responsible for any aspect of the project design, construction or installation of any building services installations of the project.

5. The CxA must not be an employee of the design firm.

6. The CxA must not be an employee of, or contracted through, a contractor or construction manager dealing with construction contracts. For design and build projects, the owner should directly employ the CxA.

7. The CxA may be a qualified employee or consultant of the owner.

8. The CxA shall be responsible for the following:

   8.1. Report all conditions and findings immediately and directly to the Client;

   8.2. Review and approve commissioning specifications;

   8.3. Develop a commissioning plan;

   8.4. Facilitate and ultimately oversee the commissioning process for all systems to be commissioned; and

   8.5. Document whether systems, equipment and components are functioning in accordance with the design intent and in accordance with the construction documents.

9. There can only be one CxA responsible for the testing and commissioning works for each project. If there are changes in CxA during the design and construction timeline, the Applicant should make reasonable effort in ensuring that there is a seamless transfer of testing and commissioning tasks between the old and the new CxA and to ensure that the new CxA confirms that the project complies with all testing and commissioning requirements.

   The new CxA shall fulfil the requirements as stipulated in Clause 1 to 8, except the involvement before the start of schematic design stage.

   Organisation Chart of the project team showing the involvement of the new CxA's with a brief description of the commissioning tasks; as well as CV of the new CxA to demonstrate the adequate expertise shall be submitted for review.

(b) Develop Commissioning Plan

1. Establish a preliminary Commissioning Plan by the CxA to outline the scope of commissioning and systems to be tested.

2. Project roles and responsibilities, the commissioning team's project directory, and schedule of commissioning activities should all be included in the commissioning plan.

3. The Commissioning Plan is a living document that is updated throughout the life of the project and will become the basis for the final commissioning report.

4. The Commissioning Plan should include the following contents:
   - 4.1. Goals and objectives;
   - 4.2. General project information;
   - 4.3. Systems to be commissioned;
   - 4.4. Description of the commissioning team, including team members, roles and responsibility;
   - 4.5. Description of the commissioning team's communication protocol, coordination, meetings and management;
   - 4.6. Development of functional test procedures for the following applicable system(s):
     - 4.6.1. HVAC&R system and associated controls;
     - 4.6.2. Electrical System, including light and daylighting controls;
     - 4.6.3. Plumbing and Drainage System;
     - 4.6.4. Lift and escalator system;
     - 4.6.5. Domestic hot water system (including swimming pool if heating is provided); and
     - 4.6.6. Renewable energy system;
   - 4.7. Verification of system performance;
   - 4.8. Reporting deficiencies and the resolution process; and
   - 4.9. Acceptance of the building systems.

(c) Commissioning Review

1. The CxA shall conduct commissioning reviews and confirm the following:

   1.1. Commissioning requirements of the building systems have been included in the design and incorporated into the construction documents, method statement and Testing and Commissioning (T&C) checklist; and

   1.2. Commissioning specifications have been provided to inform the contractors and/ or sub-contractors of their roles and responsibilities throughout the commissioning process.

2. A confirmation letter with endorsement from CxA shall be provided to confirm commissioning reviews have been conducted.

(d) Commissioning Report

1. After all commissioning tasks except seasonally deferred commissioning have been completed, the Commissioning Report(s) with all the approved checklists and endorsement from CxA shall be provided.

2. The Commissioning Report should include the following contents:

   2.1. Executive summary of commissioning process and results, system deficiencies identified and resolutions, outstanding issues identified.

   2.2. List of participants and their respective roles;

   2.3. Brief building description;

   2.4. Commissioning process scope;

   2.5. Installation verification checklist;

   2.6. List of systems commissioned;

   2.7. Equipment documentation;

   2.8. Functional performance tests including date and time of test, individuals present during testing, visual inspection observations, sensor checks, device checks, operating mode tests and results;

   2.9. List of outstanding commissioning issues and any testing that is scheduled on a later date; and

   2.10. All outstanding deficiencies identified during or as a result of commissioning activities should be listed and highlighted.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_05_00	BEAM Plus NB submission template for IDCM 5	✓	✓	✓
For IDCM 5a & 5b, please provide the following:		**PA**	**CA**	**FA/ RFA**
IDCM_05_01	/	/	/	/

IDCM_05_02	Organisation Chart of the project team showing CxA's involvement with a brief description of the commissioning tasks	✓	✓	✓
IDCM_05_03	CV of CxA to demonstrate adequate expertise of the CxA	✓	✓	✓
IDCM_05_04	Commissioning Plan meeting the requirements in part (b) items 4.1 to 4.9 of the assessment criteria with endorsement by CxA	✓	✓	✓
IDCM_05_08	Undertaking letter from the Project's CxA confirming his/ her involvement before the start of schematic design stage, duties and responsibilities for the testing & commissioning process	✓	✓	✓
For IDCM 5c & 5d, please provide the following:		**PA**	**CA**	**FA/ RFA**
IDCM_05_05	Commissioning Specifications • detailing the commissioning requirements for each system and equipment; and • on the provision of commissioning report meeting the requirements in part (d) items 2.1 to 2.10 of the assessment criteria	✓		-
IDCM_05_06	Confirmation letter from the Project's CxA confirming commissioning reviews have been conducted in accordance with part (c) of the assessment criteria	-		✓
IDCM_05_07	Endorsed Commissioning Report by CxA to demonstrate all commissioning tasks fulfilling part (d) of the assessment criteria	-		✓

Remarks

(a) Additional Information

Chartered Institution of Building Services Engineers (CIBSE) – CIBSE Commissioning Code A: Air distribution systems.

Chartered Institution of Building Services Engineers (CIBSE) – CIBSE Commissioning Code W: Water distribution systems.

Chartered Institution of Building Services Engineers (CIBSE) – CIBSE Commissioning Code C: Automatic controls.

Building Services Research and Information Association (BSRIA) – Commissioning Air Systems. Application procedures for buildings (AG 3/89.3).

American Society of Heating, Air-conditioning, and Refrigerating Engineers (ASHRAE) – Standard and Guidelines on Commissioning Essentials.

Architectural Services Department (ArchSD) – Testing and Commissioning Procedure. [ONLINE]. Available at: https://www.archsd.gov.hk/en/publications-publicity/testing-commissioning-procedure.html [Accessed February 2025].

(b) Related Credit

None

2 Integrated Design and Construction Management

2.2 Green Construction Practices

IDCM 6 Sustainability Champions – Construction

Extent of Application All buildings

Objective Encourage the engagement of BEAM Professionals and/or Affiliates by contractors during construction to work collaboratively with the Project BEAM Professional to monitor progress towards the targeted construction-related BEAM Plus requirements.

Credits Attainable 1

Credit Requirement 1 credit for at least two (2) accredited BEAM Professionals with valid credentials for BEAM Plus New Buildings v2.0 are engaged by the main/ lead contractor of the project.

Alternatively,

1 credit for at least one (1) accredited BEAM Professional and two (2) accredited BEAM Affiliates, with valid credentials for BEAM Plus New Buildings v2.0 are engaged by the main/ lead contractor of the project.

Assessment

1. The Construction BEAM Pro(s) (and Affiliates, if any) shall:
   - 1.1. Be engaged by main/ lead contractor of superstructure from commencement of the respective contract [i.e. if project scope covers foundation and superstructure, the Construction BEAM Pro(s) (and Affiliates, if any) shall be engaged at the start of foundation stage] to completion of the construction contract work of the Project.
   - 1.2. If there is any change of Construction BEAM Pro/ Affiliate within each construction stage (foundation or superstructure) of the Project, supporting documents should be provided to document the hand-over.
   - 1.3. Collaborate with the Project BEAM Pro to monitor the progress towards the targeted construction-related BEAM Plus requirements as defined in the BEAM Plus NB Certification Checklist.
   - 1.4. Participate in the kick-off meeting and at least 1 review meeting as required under IDCM P1.
   - 1.5. Check and ensure that the construction-related submission materials comply with requirements of attempted credits in the BEAM Plus Manual. The Construction BEAM Pro(s) (and Affiliates, if any) should be from the construction team to monitor the progress of the construction activities related to BEAM Plus requirements and may also assume other roles in the construction team of the project. The personnel engaged as the Construction BEAM Pro/ Affiliate shall be different from the Project BEAM Pro under IDCM P1 and the Design BEAM Pro/ Affiliate under IDCM 1.
2. Complete the prescribed form with qualification details, appointment information and confirmation of the appointment of the Construction BEAM Pro(s) (and Affiliates, if any).
   - 2.1. The appointed Construction BEAM Pro(s) (and Affiliates, if any) should maintain his/ her accreditation and credentials during his/her appointment and screen capture from HKGBC practitioner directory should be provided to show the valid credentials.

3. Provide extracts of tender documents (e.g. contract specifications) highlighting the clause requiring the main/ lead contractor to engage related Construction BEAM Pro(s) (and Affiliates, if any) if the construction stage has not yet commenced at PA stage.

4. Provide meeting minutes (confidential/ sensitive project information is not required and could be covered) showing the participation of the Construction BEAM Pro(s) (and Affiliates, if any) in the kick-off meeting and at least one review meeting as required under IDCM P1, which shows the checking and compliance efforts by Construction BEAM Pro(s) (and Affiliates, if any).

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_06_00	BEAM Plus NB submission template for IDCM 6	✓	✓	✓
IDCM_06_01	Contract specifications requiring engagement of Construction BEAM Pro(s) (and Affiliates, if any) (for each construction stage)	✓	-	-
IDCM_06_02	A copy of the meeting minutes of kick-off meeting with the Project BEAM Pro, as required under IDCM P1	✓*	✓	✓
IDCM_06_03	A copy of the meeting minutes of review meeting(s) with the Project BEAM Pro, as required under IDCM P1	✓*	✓	✓
IDCM_06_04	Supporting documents showing how the works are handed over and the timeline for their involvement, if applicable (e.g. Declaration letter from the employer of the Construction BEAM Pro/ Affiliate)	✓	✓	✓
IDCM_06_05	Screen capture from HKGBC practitioner directory showing the valid credentials of the Construction BEAM Pro/ Affiliate	✓	✓	✓
* Meeting minutes shall be submitted in PA if the meeting(s) is/are held not less than 3 months prior to PA (first submission).				

Remarks

(a) Additional Information

Hong Kong Green Building Council publishes the latest registers of BEAM Professionals and BEAM Affiliates on its website. [ONLINE]. Available at: https://app.powerbi.com/view?r=eyJrIjoiYjUxMDUwMWMtNWIzOS00YmQxLTgxYTYtMDZkMjczNDE1N2ZhIiwidCI6ImQwMTUyOGY5LTQ3NDItNGJjYS05MDVmLWU3ZjIxZTJhNmM5MiIsImMiOjEwfQ%3D%3D. [Accessed February 2025].

(b) Related Credit

IDCM P1 Sustainability Champions - Project

The related prerequisite encourages the engagement of BEAM Professionals to facilitate the application for the BEAM Plus certification process and to ensure the compliance of relevant requirements of the BEAM Plus.

IDCM 1 Sustainability Champions - Design

The related credit encourages the engagement of BEAM Pros and/ or Affiliates engaged by respective core design disciplines to integrate BEAM Plus standards and practices into the planning, design and construction of the building.

2 Integrated Design and Construction Management

2.2 Green Construction Practices

IDCM 7 Measures to Reduce Site Emissions

Extent of Application All buildings

Objective Minimise pollution (air, noise, water discharge and light) during the demolition (if any), construction of buildings and the infrastructure serving buildings.

Credits Attainable 4 + 2 additional BONUS

Credit Requirement

(a) Minimisation of Air Pollution

1 credit for providing adequate monitoring and mitigation measures to minimise air pollution during construction (demolition and foundation are included, if any).

(b) Minimisation of Noise Pollution

1 credit for conducting Construction Noise Impact Assessment (CNIA) and providing adequate monitoring and mitigation measures based on the CNIA report to minimise noise pollution during construction (demolition and foundation are included, if any).

1 additional BONUS credit for adopting at least two (2) recognised quieter construction equipment/ methods at each construction stage (demolition and foundation are included, if any).

For exemplary performance, 1 additional BONUS credit for adopting at least two (2) recognised quieter construction equipment/ methods to achieve a noise reduction of minimum 3dB(A) at each construction stage (demolition and foundation are included, if any).

(c) Minimisation of Water Pollution

1 credit for providing adequate monitoring and mitigation measures to minimise water pollution during construction (demolition and foundation are included, if any).

(d) Minimisation of Light Pollution

1 credit for providing adequate mitigation measures to minimise light pollution during construction (demolition and foundation are included, if any).

Note:

1) For normal credit, partial credit shall be awarded for individual construction stage (i.e. demolition, foundation and superstructure in a default ratio of 1:1:3). The Applicant may submit justification and propose an alternative ratio based on the relative pollution control extent and resource demand in various construction stages. For a project that covers all 3 stages, the partial credit attainable for demolition, foundation and superstructure are 0.2, 0.2 and 0.6 respectively. Similarly, for a project where demolition is not required or not under the Client's control, the partial credit attainable for foundation and superstructure are 0.25 and 0.75 respectively.

2) All applicable stages must be included in the partial credit calculation.

Assessment

(a) Minimisation of Air Pollution

1. Proactive dust control provisions shall be referred to Good Housekeeping Checklist in Appendix 4.1 of Hong Kong Construction Association's Best Practice Guide for Environmental Protection on Construction Sites [1]. Checklist of dust control provisions is provided in the prescribed form.

2. Provide baseline monitoring measurements for point(s) as prescribed in IDCM P2.

   Provide baseline monitoring measurement report to demonstrate the following:

   2.1. Description and locations of air sensitive receivers (ASRs);

   2.2. Details of baseline monitoring measurement period, measurement results of baseline 1-hour Total Suspended Particulates (TSP) and identification of action levels; and

   2.3. Calibration certificates of the measurement instruments.

   Provide extracts of tender documents, contract conditions and/ or specifications highlighting the clause requiring the contractors to provide baseline monitoring measurements if construction has not yet commenced at the PA stage.

3. Prepare monthly environmental management reports throughout the construction period to demonstrate the following:

   3.1. Implementation of monitoring and mitigation measures to minimise air pollution as defined in Environmental Management Plan (EMP) under IDCM P2;

   3.2. Implementation of proactive dust control provisions with the completed prescribed forms; and

   3.3. Total Suspended Particulates (TSP) levels are satisfactory according to IDCM P2, Assessment 1) 1.3. Measurement of 24-hour TSP levels is NOT required.

   The report(s) should be reviewed and endorsed by the Construction BEAM Pro (or Construction BEAM Affiliate) as defined under IDCM 6 or the Project BEAM Pro as defined under IDCM P1 [2].

4. For a project that is a designated project (DP) under the Environmental Impact Assessment (EIA) Ordinance:

   4.1. For DPs with dust monitoring requirement, the Applicants should provide the EM&A Report(s) submitted to EPD as required under the EIA Ordinance with the dust monitoring results, to replace the monthly environmental management reports as stated above.

   4.2. In case the project assessment boundary is only a part of a DP listed in the EIA Ordinance, the Applicant should highlight the relevant environmental monitoring data in the EM&A Report(s) of the DP that are related to the project assessment area for BEAM Plus assessment.

1 Hong Kong Construction Association (HKCA), Best Practice Guide for Environmental Protection on Construction Sites. [ONLINE]. Available at: https://s3.ap-southeast-1.amazonaws.com/hkca.com.hk/upload/doc/publication/BestPracticeGuideforEnvironmentalProtectiononConstructionSites%282013%29%28EN%29-HYD95.pdf [Accessed February 2025].

2 If demolition/ foundation/ superstructure work was commenced before 4 September 2019 (the release of BEAM Plus New Buildings Version 2.0), the endorsement by the Construction BEAM Pro as defined under IDCM 6/ Project BEAM Pro as defined under IDCM P1 on the monthly environmental management reports of such stage can be exempted from the assessment of the credits. Notwithstanding, these documents shall be endorsed by a suitably qualified person (e.g. contractor's representative).

4.3. For DPs with no requirement on dust monitoring, no environmental monitoring is required for BEAM Plus Assessment. Supporting documents (e.g. EM&A manual or EIA report with relevant sections highlighted) shall be provided to substantiate the claim of no requirement on dust monitoring.

5. For non-designated projects with no nearby ASR, dust monitoring is not required when the Applicant demonstrates that no existing and planned ASR is identified within 500m measured from the nearest point of the assessment boundary.

5.1. Provide a map of the project site and its surroundings, with clear illustration showing no ASR within the above-mentioned distance and a declaration letter from the Construction BEAM Pro as defined under IDCM 6 or the Project BEAM Pro as defined under IDCM P1 confirming the study.

5.2. The Applicant shall refer to relevant authoritative guidance such as EPD's "Technical Memorandum on Environmental Impact Assessment (EIA) Process" (Annex 12) when identifying the ASR(s).

5.3. If the planned ASR(s) will not be ready for occupation before the completion of construction works, it may not be necessary to consider for BEAM Plus Assessment.

6. Completed prescribed form endorsed by the Construction BEAM Pro (or Construction BEAM Affiliate) as defined under IDCM 6 or the Project BEAM Pro as defined under IDCM P1 shall be submitted for all projects to demonstrate the implementation of proactive dust control provisions.

7. Undertaking letter from the project manager of the contractor(s) shall be submitted to confirm the construction works (demolition and foundation to be included, if any) have been carried out with no convictions or justified complaints about air pollution from site, that have been upheld by the Environmental Protection Department (EPD) or Police leading to the issue of a fine or prosecution. If the construction has commenced but not yet completed prior to PA stage, the undertaking letter shall at least cover the construction period up to 3 months prior to PA (first submission).

8. Provide extracts of tender documents, contract conditions and/ or specifications highlighting the clause requiring the contractors to provide monthly environmental management/ EM&A report(s) if construction (demolition and foundation to be included, if any) has not yet commenced or has commenced but not yet completed prior to PA stage, to demonstrate the commitment to provide environmental management report/ measures implementation throughout the demolition/ foundation/ superstructure period.

(b) Minimisation of Noise Pollution

1. Proactive noise control provisions shall refer to section 6.9 of Hong Kong Construction Association's Best Practice Guide for Environmental Protection on Construction Sites. Checklist of noise control provisions are provided in the prescribed forms.

2. Conduct Construction Noise Impact Assessment (CNIA) before the commencement of the site work in each construction stage (demolition and foundation to be included, if any) to determine the resultant noise levels, and ensure the resultant noise levels will not exceed the noise criteria according to IDCM P2, Assessment 1) 1.3. Provide a CNIA report for each construction stage.

Provide extracts of tender documents, contract/ brief conditions and/ or specifications highlighting the clause requiring the consultants/ contractors to conduct CNIA before the commencement of the site work if construction (demolition and foundation to be included, if any) has not yet commenced at PA stage.

3. The cloud-based Construction Noise Management Plan (Web-CNMP) platform on the Centralised Environmental Database (https://eiaced.epd.gov.hk/) developed by EPD can be used to conduct the quantitative construction noise assessment.

4. Provide a Construction Noise Management Plan (CNMP) for each construction stage (demolition and foundation to be included, if any) to demonstrate the corresponding plan and noise mitigation measures have been updated (if necessary) based on the CNIA report (as per the latest design and site conditions).

   Provide extracts of tender documents, contract/ brief conditions and/ or specifications highlighting the clause requiring the contractors to update the corresponding plan and noise mitigation measures in the CNMP based on the CNIA report if construction (demolition and foundation to be included, if any) has not yet commenced at PA stage.

5. The CNIA report(s) and CNMP(s) shall be reviewed and endorsed by:

   - a Corporate Member of Hong Kong Institute of Acoustics; or
   - a Member of HKIE (Building Services, Mechanical or Environmental Discipline) with relevant experience in environmental noise; or
   - a Professional Member with relevant experience in environmental noise or Certified Noise Modelling Professional of Hong Kong Institute of Qualified Environmental Professional.

6. No CNIA report and CNMP is required when no existing and planned noise sensitive receiver (NSR) is identified within 300m measured from the nearest point of the assessment boundary.

7. Provide baseline monitoring measurements for point(s) as prescribed in submitted Environmental Management Plan in IDCM P2.

   Provide baseline monitoring measurement report to demonstrate the following:

   7.1. Description and locations of noise sensitive receivers (NSRs);

   7.2. Details of baseline monitoring measurement period, measurement result of baseline noise levels and identification of noise limit levels; and

   7.3. Calibration certificates of the measurement instruments.

   Provide extracts of tender documents, contract conditions and/ or specifications highlighting the clause requiring the contractors to provide baseline monitoring measurements if construction (demolition and foundation to be included, if any) has not yet commenced at PA stage.

8. Prepare monthly environmental management reports throughout the construction period to demonstrate the following:

   8.1. Implementation of monitoring and mitigation measures to minimise noise pollution as defined in the Environmental Management Plan (EMP) under IDCM P2;

8.2. Implementation of proactive noise control provisions with the completed prescribed form; and

8.3. Noise levels that complied with the noise level limitation according to IDCM P2, Assessment 1) 1.3.

The report(s) shall be reviewed and endorsed by the Construction BEAM Pro (or Construction BEAM Affiliate) as defined under IDCM 6 or the Project BEAM Pro as defined under IDCM P1 [3].

9. For a project that is a designated project (DP) under the Environmental Impact Assessment (EIA) Ordinance:

9.1. For DPs with noise monitoring requirement, the Applicants should provide the EM&A Report(s) submitted to EPD as required under the EIA Ordinance with the noise monitoring results, to replace the monthly environmental management reports as stated above.

9.2. In case the project assessment boundary is only a part of a DP listed in the EIA Ordinance, the Applicant should highlight the relevant environmental monitoring data in the EM&A Report(s) of the DP that are related to the project assessment area for BEAM Plus assessment.

9.3. For DPs with no requirement on noise monitoring, no environmental monitoring is required for BEAM Plus Assessment. Supporting documents (e.g. EM&A manual or EIA report with relevant sections highlighted) shall be provided to substantiate the claim of no requirement on noise monitoring.

10. For non-designated projects with no nearby NSR, noise monitoring is not required when the Applicant demonstrates that no existing and planned NSR is identified within 300m measured from the nearest point of the assessment boundary.

10.1. Provide a map of the project site and its surroundings, with clear illustration showing no NSR within the above-mentioned distance and a declaration letter from the Construction BEAM Pro as defined under IDCM 6 or the Project BEAM Pro as defined under IDCM P1 confirming the study.

10.2. The Applicant shall refer to relevant authoritative guidance such as EPD's "Technical Memorandum on Environmental Impact Assessment (EIA) Process" (Annex 13) when identifying the NSR(s).

10.3. If the planned NSR(s) will not be ready for occupation before the completion of construction works, it may not be necessary to consider for BEAM Plus Assessment.

11. Completed prescribed form endorsed by the Construction BEAM Pro (or Construction BEAM Affiliate) as defined under IDCM 6 or the Project BEAM Pro as defined under IDCM P1 shall be submitted for all projects to demonstrate the implementation of proactive noise control provisions.

3 If demolition/ foundation/ superstructure work was commenced before 4 September 2019 (the release of BEAM Plus New Buildings Version 2.0), the endorsement by the Construction BEAM Pro as defined under IDCM 6/ Project BEAM Pro as defined under IDCM P1 on the monthly environmental management reports of such stage can be exempted from the assessment of the credits. Notwithstanding, these documents shall be endorsed by a suitably qualified person (e.g. contractor's representative).

12. Undertaking letter from the project manager of the contractor(s) shall be submitted to confirm the construction works (demolition and foundation to be included, if any) have been carried out with no convictions or justified complaints about noise pollution from site, that have been upheld by the Environmental Protection Department (EPD) or Police leading to the issue of a fine or prosecution. If the construction has commenced but not yet completed prior to PA stage, the undertaking letter shall at least cover the construction period up to 3 months prior to PA (first submission).

13. Provide extracts of tender documents, contract conditions, and/ or specifications highlighting the clause requiring the contractors to provide monthly environmental management/ EM&A report(s) if construction (demolition and foundation to be included, if any) has not yet commenced or has commenced but not yet completed prior to PA stage, to demonstrate the commitment to provide environmental management report/ measures implementation throughout the demolition/ foundation/ superstructure period.

14. Complete a checklist to demonstrate the adoption of at least 2 recognised quieter equipment/ methods at each construction stage (demolition and foundation to be included, if any) if additional BONUS credit(s) is/ are targeted.

15. The second additional BONUS credit will be granted for providing:

    14.1. a Construction Noise Impact Assessment (CNIA) report to identify the resultant noise levels before any mitigation measure; and

    14.2. a construction noise assessment report to demonstrate a noise reduction of minimum 3dB(A) after adopting the proposed two or more recognised quieter equipment/ methods, as compared to the resultant noise levels under unmitigated scenario. The worst-affected NSR(s) for each building type shall be identified and selected for the assessment. The resultant noise levels after the mitigation measures shall not exceed the noise criteria according to IDCM P2, Assessment 1) 1.3.

    The CNIA report and construction noise assessment report shall be provided for each construction stage (demolition and foundation to be included, if any).

    In case there is no existing and planned NSR within 300m measured from the nearest point of the assessment boundary, the Applicant shall extend the study area (beyond 300m) if the second additional BONUS credit is targeted.

    The CNIA report(s) and construction noise assessment report(s) shall be reviewed and endorsed by the qualified professional as stated in IDCM 7b, Assessment (b) 5.

16. Provide extracts of tender documents, contract/ brief conditions and/ or specifications highlighting the clause requiring the contractors to adopt recognised quieter construction equipment/ methods during construction, if construction (demolition and foundation to be included, if any) has not yet commenced or has commenced but not yet completed prior to PA stage (for additional BONUS credits).

    In case the second additional BONUS credit is targeted, highlight the clause requiring a noise reduction of minimum 3dB(A) after adopting the recognised quieter equipment/ methods.

17. The requirements related to CNIA, CNMP and recognised quieter equipment/ methods as stated in IDCM 7b, Assessment (b) 2 to 6 and 14 to 16 are in effect for all projects registered [4] on or after 1 March 2024.

(c) Minimisation of Water Pollution

1. Proactive wastewater management provisions shall be referred to Environmental Protection Department's Practice Note for Professional Persons on Construction Site Drainage [5]. Checklist of wastewater management provisions is provided in the prescribed forms.

2. Provide monitoring measurements fulfilling permit requirement as prescribed in the discharge license granted under the Water Pollution Control Ordinance.

3. Prepare monthly environmental management reports throughout the construction period to demonstrate the following:

   3.1. Implementation of monitoring and mitigation measures to minimise water pollution as defined in Environmental Management Plan (EMP) under IDCM P2;

   3.2. Implementation of proactive wastewater control provisions with completed prescribed form; and

   3.3. Wastewater discharge **quantities and qualities** fulfilling permit requirements according to the discharge license. Copy of a valid discharge license issued by EPD, a summary table showing the daily measured flow rate of wastewater discharge and testing reports of the discharge water samples by HOKLAS accredited laboratory shall be provided as substantiation.

   3.4. In case the discharge license is not granted during certain construction stage (demolition and foundation to be included, if any), the Applicant shall provide the following justification:

   - Monthly summary wastewater flow rate table endorsed by contractor's representative showing there is no wastewater discharged on site during the construction stage; and
   - Narrative to describe how the wastewater generated from site (e.g. stormwater, piling, vehicle washing etc.) is handled during the construction stage to demonstrate adequate monitoring and mitigation measures to minimise site emission of water pollution.

   The report(s) shall be reviewed and endorsed by the Construction BEAM Pro (or Construction BEAM Affiliate) as defined under IDCM 6 or the Project BEAM Pro as defined under IDCM P1 [6].

4 The projects complete the BEAM Plus project registration, and the first acknowledgement letter is issued by HKGBC on or after the effective date (i.e. 1 March 2024).

5 Environmental Protection Department – Practice Note for Professional Persons ProPECC PN 1/94. Construction Site Drainage. [ONLINE]. Available at: https://www.epd.gov.hk/eia/register/report/eiareport/eia_0972004/pdf/eia2/App4-3.pdf [Accessed February 2025].

6 If demolition/ foundation/ superstructure work was commenced before 4 September 2019 (the release of BEAM Plus New Buildings Version 2.0), the endorsement by the Construction BEAM Pro as defined under IDCM 6/ Project BEAM Pro as defined under IDCM P1 on the monthly environmental management reports of such stage can be exempted from the assessment of the credits. Notwithstanding, these documents shall be endorsed by a suitably qualified person (e.g. contractor's representative).

4. Undertaking letter from the project manager of the contractor(s) shall be submitted to confirm the construction works (demolition and foundation to be included, if any) have been carried out with no convictions or justified complaints about water pollution from site, that have been upheld by the Environmental Protection Department (EPD) or Police leading to the issue of a fine or prosecution. If the construction has commenced but not yet completed prior to PA stage, the undertaking letter shall at least cover the construction period up to 3 months prior to PA (first submission).

5. Provide extracts of tender documents, contract conditions, and/ or specifications highlighting the clause requiring the contractors to provide monthly environmental management report(s) if construction (demolition and foundation to be included, if any) has not yet commenced or has commenced but not yet completed prior to PA stage, to demonstrate the commitment to provide environmental management report/ measures implementation throughout the demolition/ foundation/ superstructure period.

(d) Minimisation of Light Pollution

1. Provide evidence demonstrating that external light control measures have been implemented during construction (demolition and foundation are included, if any). External light control measures shall include all of the following:

    1.1. Operating hours for light

        1.1.1. Switch off external lighting (essential light and feature light not included) when not needed or after operating hours.

        1.1.2. Switch off feature lighting (e.g. hoarding lighting) after 11p.m.

        1.1.3. Maintain only essential light (e.g. lighting for safety and security) at the acceptable level as required.

    1.2. Automatic controls for lighting

        1.2.1. Incorporate automatic control (e.g. timer switch) to switch off the external lighting when not needed or after operating hours.

    1.3. Lighting nuisance control measures

        1.3.1. Position and aim the lighting at hoarding properly to avoid overspill of light to the outside area being lit up.

        1.3.2. For lighting up vertical structures (e.g. signs & hoarding), direct the beam to the structures and avoid overspill of light.

        1.3.3. Provide lighting with appropriate shields, baffles, louvers and cut-off features to prevent light overspill to nearby residence and into the sky, and glare from the light source.

    1.4. Prevention of glare to road users

        1.4.1. Ensure the external lighting along site boundary is appropriately positioned, aimed or shielded so that illumination of nearby roads will not be adversely affected.

2. Provide extracts of tender documents, contract conditions and/ or specification highlighting the clause requiring the contractors to provide external light control measures if construction (demolition and foundation to be included, if any) has not yet been commenced or has commenced but not yet completed prior to PA stage, to demonstrate the commitment to provide environmental management report/ measures implementation throughout the demolition/ foundation/ superstructure period.

3. Demonstrate implementation of external light control measures with the completed prescribed form.

   The implementation records with completed prescribed form shall be reviewed and endorsed by the Construction BEAM Pro (or Construction BEAM Affiliate) as defined under IDCM 6 or the Project BEAM Pro as defined under IDCM P1 [7].

Submittals

(a) Minimisation of Air Pollution

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_07a_00	BEAM Plus NB submission template for IDCM 7a	✓	✓	✓
IDCM_07a_01	Baseline monitoring measurement report [or] Extracts of tender documents, contract conditions and/ or contract specifications highlighting the clause requiring the contractors to provide baseline monitoring measurements	✓* ✓	✓ -	✓ -
IDCM_07a_02	A total of 3^ monthly environmental management/ EM&A reports at a minimum with at least 1 report for each of the construction stages with the completed prescribed form [IDCM-07-1_Form] [and/ or] Extracts of tender documents, contract conditions and/ or contract specifications highlighting the requirements of monthly environmental management/ EM&A report(s)	✓* ✓	✓ -	✓ -

7 If demolition/ foundation/ superstructure work was commenced before 4 September 2019 (the release of BEAM Plus New Buildings Version 2.0), the endorsement by the Construction BEAM Pro as defined under IDCM 6/ Project BEAM Pro as defined under IDCM P1 on the monthly implementation records of such stage can be exempted from the assessment of the credits. Notwithstanding, these documents shall be endorsed by a suitably qualified person (e.g. contractor's representative).

IDCM_07a_03	Summary of baseline and impact monitoring for construction air quality throughout the construction period [Appendix A] [or] Evidence (e.g. EM&A manual or EIA report) substantiating no requirement on dust monitoring (For designated project with no requirement on dust monitoring) [or] Map of the project site and its surroundings showing no ASR; and Declaration letter from the Construction BEAM Pro/ Project BEAM Pro (For non-designated project with no nearby ASR)	✓* ✓* ✓*	✓ ✓ ✓	✓ ✓ ✓
IDCM_07a_04	Undertaking letter from the project manager of the contractor confirming no convictions or justified complaints about air pollution from site	✓*	✓	✓
* Evidence of compliance with credit requirements for construction works started not less than 3 months prior to PA (first submission) shall be submitted in PA. ^ If there are less than 3 construction stages, a minimum total of 3 monthly reports should still be submitted, with at least 3-month interval between each report (e.g. if the first submitted report is dated September 2019, the next report to be submitted should be dated December 2019 or later). In case the whole demolition and construction programme is less than 9 months, an interval less than 3 months between each set of record is acceptable, but the Applicant shall ensure the submitted records are in a reasonable interval.				

(b) Minimisation of Noise Pollution

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_07b_00	BEAM Plus NB submission template for IDCM 7b	✓	✓	✓

IDCM_07b_01	Baseline monitoring measurement report [or] Extracts of tender documents, contract conditions and/ or contract specifications highlighting the clause requiring the contractors to provide baseline monitoring measurements	✓* ✓	✓ -	✓ -
IDCM_07b_02	A total of 3^ monthly environmental management/ EM&A reports at a minimum with at least 1 report for each of the construction stages with the completed prescribed form [IDCM-07-2_Form] [and/ or] Extracts of tender documents, contract conditions and/ or contract specifications highlighting the requirements of monthly environmental management/ EM&A report(s)	✓* ✓	✓ -	✓ -
IDCM_07b_03	Summary of baseline and impact monitoring for construction noise throughout the construction period [Appendix B] [or] Evidence (e.g. EM&A manual or EIA report) substantiating no requirement on noise monitoring (For designated project with no requirement on noise monitoring) [or] Map of the project site and its surroundings showing no NSR; and Declaration letter from the Construction BEAM Pro/ Project BEAM Pro (For non-designated project with no nearby NSR)	✓* ✓* ✓*	✓ ✓ ✓	✓ ✓ ✓
IDCM_07b_04	Examination schedule[1] for any educational institution(s) identified as noise sensitive receiver(s) (if applicable) Note: [1] Construction Noise Limit Level for School: 70 dB(A) (Normal School Days)/ 65dB(A) (Examination Period)	✓*	✓	✓

IDCM_07b_05	Endorsed Construction Noise Impact Assessment (CNIA) report and Construction Noise Management Plan (CNMP) # [or] Extracts of tender documents, contract/ brief conditions and/ or contract specifications highlighting the clause requiring the consultants/ contractors to conduct CNIA before the commencement of the site work and provide a CNMP based on the CNIA report #	✓* ✓	✓ -	✓ -
IDCM_07b_06	CV of the professional endorsing the CNIA report, CNMP and construction noise assessment report #	✓*	✓	✓
IDCM_07b_07	Checklist on the adoption of at least 2 recognised quieter construction equipment/ methods for each construction stage [Form S-A] # [and/ or] Extracts of tender documents, contract/ brief conditions and/ or contract specifications highlighting the clause requiring the contractors to adopt at least 2 recognised quieter construction equipment/ methods during each construction stage # (for additional BONUS credits only)	✓* ✓	✓ -	✓ -
IDCM_07b_08	Endorsed construction noise assessment report # [and/ or] Extracts of tender documents, contract/ brief conditions and/ or contract specifications highlighting the clause requiring the contractors to adopt at least 2 recognised quieter construction equipment/ methods during each construction stage to achieve a noise reduction of minimum 3dB(A) # (for second additional BONUS credit only)	✓* ✓*	✓ ✓	✓ ✓
IDCM_07b_09	Undertaking letter from the project manager of the contractor confirming no convictions or justified complaints about noise pollution from site	✓*	✓	✓

* Evidence of compliance with credit requirements for construction works started not less than 3 months prior to PA (first submission) shall be submitted in PA.

^ If there are less than 3 construction stages, a minimum total of 3 monthly reports should still be submitted, with at least 3-month interval between each report (e.g. if the first submitted report is dated September 2019, the next report to be submitted should be dated December 2019 or later). In case the whole demolition and construction programme is less than 9 months, an interval less than 3 months between each set of record is acceptable, but the Applicant shall ensure the submitted records are in a reasonable interval.

Supporting documents are only required under the conditions stated in IDCM 7b, Assessment (b) 17.

(c) Minimisation of Water Pollution

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_07c_00	BEAM Plus NB submission template for IDCM 7c	✓	✓	✓
IDCM_07c_01	A total of 3^ monthly environmental management reports at a minimum with at least 1 report for each of the construction stages with the completed prescribed form [IDCM-07-3_Form] [and/ or] Extracts of tender documents, contract conditions and/ or contract specifications highlighting the requirements of monthly environmental management report(s)	✓* ✓	✓ -	✓ -
IDCM_07c_02	Summary of construction wastewater discharge monitoring results showing the wastewater discharge fulfilling permit requirements throughout the construction period [Appendix C]	✓*	✓	✓
IDCM_07c_03	Undertaking letter from the project manager of the contractor confirming no convictions or justified complaints about water pollution from site	✓*	✓	✓

* Evidence of compliance with credit requirements for construction works started not less than 3 months prior to PA (first submission) shall be submitted in PA.

^ If there are less than 3 construction stages, a minimum total of 3 monthly reports should still be submitted, with at least 3-month interval between each report (e.g. if the first submitted report is dated September 2019, the next report to be submitted should be dated December 2019 or later). In case the whole demolition and construction programme is less than 9 months, an interval less than 3 months between each set of record is acceptable, but the Applicant shall ensure the submitted records are in a reasonable interval.

(d) Minimisation of Light Pollution

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_07d_00	BEAM Plus NB submission template for IDCM 7d	✓	✓	✓
IDCM_07d_01	A total of 3^ implementation records at a minimum with at least 1 set of record for each of the construction stage with completed prescribed form [Appendix D] [and/ or] Extracts of tender documents, contract conditions and/ or contract specifications highlighting the requirements of external light control measures	✓* ✓	✓ -	✓ -

* Evidence of compliance with credit requirements for construction works started not less than 3 months prior to PA (first submission) shall be submitted in PA.

^ If there are less than 3 construction stages, a minimum total of 3 monthly reports should still be submitted, with at least 3-month interval between each report (e.g. if the first submitted report is dated September 2019, the next report to be submitted should be dated December 2019 or later). In case the whole demolition and construction programme is less than 9 months, an interval less than 3 months between each set of record is acceptable, but the Applicant shall ensure the submitted records are in a reasonable interval.

Remarks

(a) Additional Information

Buildings Department. PNAP ADV-4, Control of Environmental Nuisance from Construction Sites. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnap/ADV/ADV004.pdf. [Accessed February 2025].

Environmental Protection Department. Air - Guidelines & References. [ONLINE]. Available at: http://www.epd.gov.hk/epd/english/environmentinhk/air/guide_ref/air_guidelines.html. [Accessed February 2025].

Environmental Protection Department. Noise - Guidelines & References. [ONLINE]. Available at: https://www.epd.gov.hk/epd/english/environmentinhk/noise/guide_ref/noise_guidelines.html. [Accessed February 2025].

Environmental Protection Department. Good Practices on Mitigating Construction Noise. [ONLINE]. Available at: https://www.epd.gov.hk/epd/misc/construction_noise/contents/index.php/en/index.html. [Accessed February 2025].

Environment Bureau. Guidelines on Industry Best Practices for External Lighting Installations. [ONLINE]. Available at: https://www.charteronexternallighting.gov.hk/files/guidelines/guidelines_ex_lighting_install_eng.pdf. [Accessed February 2025].

(b) Related Credit

IDCM P2 Environmental Management Plan

The related prerequisite credit encourages a high standard of environmental management during construction.

2 Integrated Design and Construction Management

2.2 Green Construction Practices

IDCM 8 Construction and Demolition Waste Recycling

Extent of Application

IDCM 8a – All buildings requiring demolition which are under the Client's control

IDCM 8b – All buildings

Objective

Encourage best practices in the management of construction resource consumption, including waste reduction.

Credits Attainable

2 + 4 additional BONUS

Credit Requirement

(a) Demolition Waste Recycling

1 credit for demonstrating compliance with the Waste Management Plan and the application of proactive waste management provisions during demolition; and recycling at least 15% of demolition waste.

1 additional BONUS credit for demonstration of recycling at least 30% of demolition waste.

For exemplary performance, 1 additional BONUS credit for demonstration of recycling at least 60% of demolition waste.

(b) Construction Waste Recycling

1 credit for demonstrating compliance with the Waste Management Plan and the application of proactive waste management provisions during construction (foundation to be included, if any); and recycling at least 15% of construction waste (foundation waste to be included, if any).

1 additional BONUS credit for demonstration of recycling at least 30% of construction waste (foundation waste to be included, if any).

For exemplary performance, 1 additional BONUS credit for demonstration of recycling at least 60% of construction waste (foundation waste to be included, if any).

Assessment

1. Proactive waste management provisions shall be referred to the Good Housekeeping Checklist in Appendix 8.2 of Hong Kong Construction Association's Best Practice Guide for Environmental Protection on Construction Sites [1]. A checklist of waste management provisions is provided in the prescribed form.

2. The disposal of inert waste to landfills, fill banks, sorting facilities, fill barging points, public fill reception facility, other construction waste disposal facilities and reuse of timber or timber products from the same site (timber or timber products under reuse are considered as resource materials and not waste) will not be considered as acceptable strategies for fulfilling the credit requirement. Waste handled by a specialist Third Party Contractor could be considered as an acceptable strategy for fulfilling this credit requirement.

1 Hong Kong Construction Association (HKCA), Best Practice Guide for Environmental Protection on Construction Sites. [ONLINE]. Available at: https://s3.ap-southeast-1.amazonaws.com/hkca.com.hk/upload/doc/publication/BestPracticeGuideforEnvironmentalProtectiononConstructionSites%282013%29%28EN%29-HYD95.pdf [Accessed February 2025].

For the inert wastes that are handled by a specialist Third Party Contractor (i.e. concrete rubbles, rocks, recycled bricks), a copy of the Contract/ Agreement, summary table and collection receipt(s) specific to the project site, detailing the project/ site name, date, estimated C&D tonnage, intended use of the C&D waste and other terms shall be submitted. The date, vehicle registration number, weight tonnage collected, and type of material collected for each collection shall be included in the summary table.

3. Backfilling with excavated materials within the site and/ or reusing/ recycling excavated materials in other sites/ facilities is accepted as an approach for reduction of demolition/ construction waste.

   The quantity of all excavated materials (including those backfilling and/ or reused/ recycled and disposed of) shall be counted in the total quantity of demolition/ construction waste generated (i.e. the denominator). The declaration letter from the contractor and calculation of the quantity of excavated materials used for backfilling and/ or reusing/ recycling shall be provided to demonstrate compliance.

(a) Demolition Waste Recycling

1. Provide the Demolition Waste Management Plan (WMP) as defined in Environmental Management Plan (EMP) under IDCM P2 prepared by the demolition contractor and reviewed and endorsed by Construction BEAM Pro (or Construction BEAM Affiliate) defined under IDCM 6 or Project BEAM Pro defined under IDCM P1 [2]. Reference shall be made to Civil Engineering and Development Department (CEDD)'s Project Administration Handbook, Chapter 4, Paragraph 4.1.3 [3].

2. Provide monthly waste management reports to show the following:

   2.1. Implementation of the Waste Management Plan (WMP) as defined in Environmental Management Plan (EMP) under IDCM P2;

   2.2. Proactive waste management provisions and the completed prescribed form;

   2.3. Waste flow tables;

   2.4. All waste and recycling records; and

   2.5. Collection organisation/ recycler information.

   In case the quantity of recycled demolition waste in certain reporting period(s) contributes to a significant waste stream for the project, the Applicant should provide the respective monthly waste management report(s) with the recycling records for review.

   Monthly waste management report(s) shall be prepared by contractors and reviewed and endorsed by Construction BEAM Pro (or Construction BEAM Affiliate) defined under IDCM 6 or Project BEAM Pro defined under IDCM P1 [2] from the commencement to completion of the demolition works.

2 If demolition work was commenced before 4 September 2019 (the release of BEAM Plus New Buildings Version 2.0), the endorsement by the Construction BEAM Pro as defined under IDCM 6/ Project BEAM Pro as defined under IDCM P1 on the WMP and waste management reports of such stage can be exempted from the assessment of the credit. Notwithstanding, these documents shall be endorsed by a suitably qualified person (e.g. contractor's representative).

3 Civil Engineering and Development Department (CEDD)'s Project Administration Handbook, Chapter 4, Paragraph 4.1.3. [ONLINE]. Available at: https://www.cedd.gov.hk/filemanager/eng/content_80/PAH%202024%20Chapter%204%20Rev%2000_Dec%202024.pdf [Accessed February 2025].

3. Provide a summary of the percentage of demolition waste recycled (either by weight or by volume) prepared and declared by contractor, Demolition waste (including broken concrete and excavated materials) that is diverted from Government public fill reception facilities and reused/ recycled in other projects/ facilities shall be included.

4. Provide extracts of tender documents, contract conditions and/ or specifications highlighting the clause requiring the contractors to carry out waste management measures and recycle demolition waste if demolition has not yet commenced or has commenced but not yet completed prior to PA stage, to demonstrate the commitment to provide waste management report/ measures implementation throughout the demolition period.

(b) Construction Waste Recycling

1. Provide the Construction Waste Management Plan (WMP) (foundation to be included, if any) as defined in the Environmental Management Plan (EMP) under IDCM P2 prepared by the contractor(s) and reviewed and endorsed by Construction BEAM Pro (or Construction BEAM Affiliate) defined under IDCM 6 or Project BEAM Pro defined under IDCM P1 [4]. Reference shall be made to Civil Engineering and Development Department (CEDD)'s Project Administration Handbook, Chapter 4, Paragraph 4.1.3 [5].

2. Provide monthly waste management reports to show the following:

   2.1. Implementation of the Waste Management Plan (WMP) as defined in Environmental Management Plan (EMP) under IDCM P2;

   2.2. Proactive waste management provisions with the completed prescribed form;

   2.3. Waste flow table;

   2.4. All waste and recycling records; and

   2.5. Collection organisation/ recycler information.

   In case the quantity of recycled construction waste in certain reporting period(s) contributes to a significant waste stream for the project, the Applicant should provide the respective monthly waste management report(s) with the recycling records for review.

   Monthly waste management report(s) shall be prepared by contractors and reviewed and endorsed by Construction BEAM Pro (or Construction BEAM Affiliate) defined under IDCM 6 or Project BEAM Pro defined under IDCM P1 [4] from the commencement to completion of all construction activities (foundation to be included, if any).

3. Provide a summary of the percentage of construction waste recycled (either by weight or by volume) prepared and declared by contractor. Construction waste (including broken concrete and excavated materials) that is diverted from Government public fill reception facilities and reused/ recycled in other projects/ facilities shall be included.

4 If foundation/ superstructure work was commenced before 4 September 2019 (the release of BEAM Plus New Buildings Version 2.0), the endorsement by the Construction BEAM Pro as defined under IDCM 6/ Project BEAM Pro as defined under IDCM P1 on the WMP and waste management reports of such stage can be exempted from the assessment of the credit. Notwithstanding, these documents shall be endorsed by a suitably qualified person (e.g. contractor's representative).

5 Civil Engineering and Development Department (CEDD)'s Project Administration Handbook, Chapter 4, Paragraph 4.1.3. [ONLINE]. Available at: https://www.cedd.gov.hk/filemanager/eng/content_80/PAH%202024%20Chapter%204%20Rev%2000_Dec%202024.pdf [Accessed February 2025].

4. Provide extracts of tender documents, contract conditions and/ or contract specifications highlighting the clause requiring the contractors to carry out waste management measures and recycle construction waste (foundation waste is to be included, if any) if construction (foundation is to be included, if any) has not yet commenced or have commenced but not yet completed prior to PA stage, to demonstrate the commitment to provide waste management report/ measures implementation throughout the foundation/ superstructure period.

Submittals

(a) Demolition Waste Recycling

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_08a_00	BEAM Plus NB submission template for IDCM 8a	✓	✓	✓
IDCM_08a_01	Contract/ Agreement, summary table, and collection receipt(s) specific to the project site, detailing the project/ site name, date, estimated C&D tonnage, intended use of the C&D waste and other terms (for waste handled by specialist Third Party Contractor)	✓*	✓	✓
IDCM_08a_02	Endorsed Demolition Waste Management Plan	✓*	✓	✓
IDCM_08a_03	Extracts of tender documents, contract conditions and/ or contract specifications highlighting the requirements of waste management measures and demolition waste recycling	✓	-	-
	[and/ or]			
IDCM_08a_04	A total of 3 monthly waste management reports with the recycling records in support of a significant reduction of waste stream for the project, with the completed prescribed form [IDCM-08-1_Form]	✓*	✓	✓
IDCM_08a_05	Waste flow table [Appendix A] summarizing the monthly disposal and recycling records throughout the demolition stage with calculation of the percentage of demolition waste recycled	✓*	✓	✓

IDCM_08a_06	Declaration letter from the contractor; and Calculation of the quantity of excavated materials used for backfilling and/ or reusing/ recycling (for backfilling with excavated materials within the site and/ or reusing/ recycling excavated materials in other sites/ facilities)	✓*	✓	✓
* Evidence of compliance with credit requirements for construction works started not less than 3 months prior to PA (first submission) shall be submitted in PA.				

(b) Construction Waste Recycling

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_08b_00	BEAM Plus NB submission template for IDCM 8b	✓	✓	✓
IDCM_08b_01	Contract/ Agreement, summary table, and collection receipt(s) specific to the project site, detailing the project/ site name, date, estimated C&D tonnage, intended use of the C&D waste and other terms (for waste handled by specialist Third Party Contractor)	✓*	✓	✓
IDCM_08b_02	Endorsed Construction Waste Management Plan	✓*	✓	✓
IDCM_08b_03 [and/ or] IDCM_08b_04	Extracts of tender documents, contract conditions and/ or contract specifications highlighting the requirements of waste management measures and construction waste recycling A total of 3^ monthly waste management reports with the recycling records in support of a significant reduction of waste stream for the project, with the completed prescribed form [IDCM-08-1_Form]	✓ ✓*	- ✓	- ✓

IDCM_08b_05	Waste flow table [Appendix A] summarizing the monthly disposal and recycling records throughout the construction stage and calculation of the percentage of construction waste recycled	✓*	✓	✓
IDCM_08b_06	Declaration letter from the contractor; and Calculation of the quantity of excavated materials used for backfilling and/ or reusing/ recycling (for backfilling with excavated materials within the site and/ or reusing/ recycling excavated materials in other sites/ facilities)	✓*	✓	✓
* Evidence of compliance with credit requirements for construction works started not less than 3 months prior to PA (first submission) shall be submitted in PA. ^ A minimum total of 3 monthly reports should be submitted, with at least 3-month interval between each report (e.g. if the first submitted report is dated September 2019, the next report to be submitted should be dated December 2019 or later). In case the whole construction programme is less than 9 months, an interval less than 3 months between each set of record is acceptable, but the Applicant shall ensure the submitted records are in a reasonable interval.				

Remarks

(a) Additional Information

Buildings Department, PNAP ADV-19, Construction and Demolition Waste. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnap/ADV/ADV019.pdf. [Accessed February 2025].

Development Bureau's Technical Circular (Works) No. 6/2010, Trip Ticket System for Disposal of Construction & Demolition Materials". [ONLINE]. Available at: https://www.devb.gov.hk/filemanager/technicalcirculars/en/upload/308/1/C-2010-06-01.pdf. [Accessed February 2025].

Environmental Protection Department. Waste Collectors and Recyclers. [ONLINE]. Available at: http://www.epd.gov.hk/epd/english/environmentinhk/waste/guide_ref/guide_ref_dwc.html. [Accessed February 2025].

(b) Related Credit

IDCM P2 Environmental Management Plan

The prerequisite encourages a high standard of environmental management and a waste management system for the sorting, recycling and the proper disposal of materials during construction (demolition and foundation are to be included, if any).

2 Integrated Design and Construction Management

2.2 Green Construction Practices

IDCM 9 Construction IAQ Management

Extent of Application

All areas implementing a Construction IAQ Management Plan; and

All areas with central air-conditioning and ventilation systems for undertaking a building 'flush out' or 'bake out' and replacement of all filters prior to occupancy

Objective

Ensure that project materials and ventilation systems are not contaminated by construction activities.

Credits Attainable

1

Credit Requirement

1 credit for implementing a Construction IAQ Management Plan, undertaking a building 'flush out' or 'bake out', and replacement of all filters prior to occupancy.

Assessment

1. Provide a Construction IAQ Management Plan that includes the following:
   - 1.1. An overview of tasks to be executed;
   - 1.2. A list of reference documents, including environmental legislation and guidelines;
   - 1.3. A list of participants in the process and their responsibilities;
   - 1.4. A plan for management, communication and documentation;
   - 1.5. Construction IAQ management plan control measures [1] on: HVAC protection, source control, pathway interruption, housekeeping, scheduling;
   - 1.6. Monitoring and auditing of implementation;
   - 1.7. Expected written work products should include checklists and worksheets; and
   - 1.8. A schedule of activities.

2. Provide copy(ies) of the monthly report(s) demonstrating the effective implementation of the Construction IAQ Management Plan during the indoor construction period. A master programme shall also be included.

   The report(s) shall be reviewed and endorsed by the Construction BEAM Pro (or BEAM Affiliate) as defined under IDCM 6 or the Project BEAM Pro as defined under IDCM P1.

   Provide extracts of tender documents (e.g. specifications) highlighting the clause which requires the contractors to carry out the measures, if indoor construction has not yet commenced or have commenced but not yet completed prior to PA stage, to demonstrate the commitment to provide monthly report/ measures implementation throughout the construction period.

3. Provide a report to demonstrate:
   - 3.1. Technical information for the filtration media used during construction and prior to occupancy;

1 Sheet Metal & Air Conditioning Contractors' National Association (SMACNA), ANSI/SMACNA 008•2008 Guidelines for Occupied Buildings Under Construction, Chapter 3. [ONLINE]. Available at: https://www.smacna.org/store/product/iaq-guidelines-for-occupied-buildings-under-construction. [Accessed February 2025].

3.2. Details of building flush-out procedures including actual dates of the flush-out;

3.3. The filtration media used had a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ANSI/ASHRAE 52.2-2012 [2] or equivalent performance specification;

3.4. A flush-out with new filtration media is being carried out after the completion of construction and prior to occupancy;

3.5. Flushing duration as defined by calculation of the fresh air required to attain the IAQ certification 'Good' class requirement;

3.6. No construction work done in the vicinity of the space during the flushing out; and

3.7. The space was protected against any recontamination after flushing out.

The report shall be reviewed and endorsed by the Construction BEAM Pro (or BEAM Affiliate) as defined under IDCM 6 or the Project BEAM Pro as defined under IDCM P1.

Provide extracts of tender documents (e.g. specifications) highlighting the clause which requires the contractors to carry out the measures, if indoor construction has not yet commenced or have commenced but not yet completed prior to PA stage, to demonstrate the commitment to provide report/ measure implementation throughout the construction period.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_09_00	BEAM Plus NB submission template for IDCM 9	✓		✓
IDCM_09_01	Construction IAQ Management Plan for indoor construction within the site	✓*		✓
IDCM_09_02	Any 3 monthly report(s) on the implementation of the Construction IAQ Management Plan during indoor construction period [or] Contract specifications highlighting the requirements for the implementation of the Construction IAQ Management Plan	✓* ✓		✓ -

2 American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE), ANSI/ASHRAE Standard 52.2-2012, Method of Testing General Ventilation Air-cleaning Devices for Removal Efficiency by Particle Size. [ONLINE]. Available at: www.ashrae.org. [Accessed February 2025].

IDCM_09_03	Report on filter replacement and flush out [or] Contract specifications highlighting the requirements for filter replacement and flush out	- ✓		✓ -
IDCM_09_04	HVAC drawings to demonstrate if any central air-conditioning and ventilation system is provided (to substantiate exemption for a building 'flush out' or 'bake out' and replacement of all filters prior to occupancy)	✓		✓
* Evidence of compliance with credit requirements for construction (superstructure) works started not less than 3 months prior to PA (first submission) shall be submitted in PA.				

Remarks

(a) Additional Information

None

(b) Related Credit

None

2 Integrated Design and Construction Management

2.2 Green Construction Practices

IDCM 10 Considerate Construction

Extent of Application All buildings

Objective Encourage care of workers, mitigate nuisances to immediate neighbours and promote good practices of tree protection during construction.

Credits Attainable 1

Credit Requirement 1 credit for demonstrating considerate measures to the neighbourhood, passers-by and workers. Good tree protection practices where tree preservation within the project site is required, should also be carried out.

Note:

1) Partial credit shall be awarded for individual construction stages (i.e. demolition, foundation and superstructure in a default ratio of 1:1:3). The Applicant may submit justification and propose an alternative ratio based on the relative pollution control extent and resource demand in various construction stages. For a project covering all 3 stages, the partial credit attainable for demolition, foundation and superstructure are 0.2, 0.2 and 0.6 respectively. Similarly, for a project where demolition is not required or not under the Client's control, the partial credit attainable for foundation and superstructure are 0.25 and 0.75 respectively.

2) All applicable stages must be included in the partial credit calculation.

Assessment

1. Considerate measures to (a) neighbourhood, passers-by and (b) workers, shall refer to the assessment criteria recommended in "Being Considerate to Neighbourhood and Passers-by" and "Care of Workers and Others" in the Considerate Contractors Site Award Scheme Guidelines [1, 2]. A checklist of considerate measures is provided in the prescribed form.

2. Good tree protection practices shall refer to the Guideline in "Tree Preservation during Development by Greening, Landscape and Tree Management Section" of Development Bureau, HKSAR Government [3]. A checklist of good tree protection practices is provided in the prescribed form.

1 Development Bureau and Construction Industry Council. Considerate Contractors Site Award Scheme Guideline for Non-Public Works Site Participation, Appendix V Scope of Assessment Criteria. [ONLINE]. Available at: https://www.devb.gov.hk/filemanager/en/content_175/32nd%20CCSAS%20Non-Public%20Works%20Guidelines_Eng_Final_(clean).pdf [Accessed February 2025].

2 Development Bureau and Construction Industry Council. Considerate Contractors Site Award Scheme Guideline for Public Works Site Participation, Appendix V Scope of Assessment Criteria. [ONLINE]. Available at: https://www.devb.gov.hk/filemanager/en/content_175/32nd%20CCSAS%20Public%20Works%20Guidelines_Eng_Final_(clean).pdf [Accessed February 2025].

3 Development Bureau - Greening, Landscape and Tree Management Section. Guideline on Tree Preservation during Development. [ONLINE]. Available at: https://www.greening.gov.hk/filemanager/greening/en/content_28/Guidelines_on_Tree_Preservation_during_Development_e.pdf [Accessed February 2025].

3. Provide quarterly report(s) with the completed prescribed form to demonstrate the implementation of considerate measures to (a) neighbourhood, passers-by, and (b) workers during construction (demolition and foundation to be included, if any); and the application of corrective actions to avoid continuous dissatisfaction/ non-compliance of any item(s).

   Provide extracts of tender documents (e.g. contract specifications) highlighting the clause which requires the contractors to carry out considerate measures, if construction (demolition and foundation to be included, if any) has not yet commenced or have commenced but not yet completed prior to PA stage, to demonstrate the commitment to providing quarterly report/ measures implementation throughout the demolition/ foundation/ superstructure period.

   Considerate Contractors Site Awards (CCSA) certificate(s) for New Works Contracts under Considerate Contractors Site Award Scheme (the CCSAS) shall be accepted as an alternative to the quarterly report(s) within the appraisal period of the submitted certificate. Supporting documents (e.g. award scheme guideline) shall be submitted to show the appraisal period of the submitted CCSA certificate.

4. Provide quarterly report(s) with the completed prescribed form to demonstrate good tree protection practices during construction (demolition and foundation to be included, if any); and the application of corrective actions to avoid continuous dissatisfaction/ non-compliance of any item(s).

   Provide extracts of tender documents (e.g. contract specifications) highlighting the clause which requires the contractors to carry out good tree protection practices, if construction (demolition and foundation to be included, if any) has not yet commenced or have commenced but not yet completed prior to PA stage, to demonstrate the commitment to providing quarterly report/ measures implementation throughout the demolition/ foundation/ superstructure period.

5. Each quarterly report shall cover 3-month period. 3 nos. of monthly reports in consecutive month with completed prescribed form would satisfy 1 no. of quarterly report. The quarterly report(s)/ monthly reports should be reviewed and endorsed by the Construction BEAM Pro (or Construction BEAM Affiliate) as defined under IDCM 6 or the Project BEAM Pro as defined under IDCM P1 [4].

6. A hybrid approach is accepted in the submission, for example:

   - provide quarterly report(s) in foundation stage and a CCSA certificate in superstructure stage; or
   - provide monthly reports in foundation stage and quarterly report(s) in superstructure stage.

4 If demolition/ foundation/ superstructure work was commenced before 4 September 2019 (the release of BEAM Plus New Buildings Version 2.0), the endorsement by the Construction BEAM Pro as defined under IDCM 6/ Project BEAM Pro as defined under IDCM P1 on the reports of such stage can be exempted from the assessment of the credit. Notwithstanding, these documents shall be endorsed by a suitably qualified person (e.g. contractor's representative).

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_10_00	BEAM Plus NB submission template for IDCM 10	✓	✓	✓
IDCM_10_01	A total of 3^ quarterly reports[#] at a minimum with at least 1 quarterly report for each of the construction stages with the completed prescribed form [IDCM-10-1_Form] to demonstrate compliance with considerate measures [and/ or] CCSA Certificate(s) for New Works Contractors under the CCSAS with supporting document (e.g. award scheme guideline) to show the appraisal period (alternative compliance path, if applicable) [and/ or] Extracts of tender documents (e.g. contract specifications) highlighting the requirements for considerate measures	✓* ✓* ✓	✓ ✓ -	✓ ✓ -
IDCM_10_02	A total of 3^ quarterly reports[#] with the completed prescribed form [IDCM-10-1_Form] to demonstrate compliance in good tree protection practices [and/ or] Extracts of tender documents (e.g. contract specifications) highlighting the requirements for good tree protection practices [or] Evidence such as site photos or aerial photos to justify no existing tree within the site, or tree survey plans and tree assessment schedules highlighting no tree to be preserved on-site	✓* ✓ ✓	✓ - ✓	✓ - ✓

* Evidence of compliance with credit requirements for construction works started not less than 3 months prior to PA (first submission) shall be submitted in PA.

^ If there are less than 3 construction stages, a minimum total of 3 quarterly reports should still be submitted, with at least 3-month interval between each report (e.g. if the first submitted quarterly report is dated September 2019, the next quarterly report to be submitted should be dated March 2020 or later). In case the whole demolition and construction programme is less than 15 months, an interval less than 3 months between each set of record is acceptable, but the Applicant shall ensure the submitted records are in a reasonable interval.

3 nos. of monthly reports in consecutive month with completed prescribed form would satisfy 1 no. of quarterly report.

Remarks

(a) Additional Information

Provision of hoardings, covered walkways and other necessary precautionary measures are statutorily required to protect the neighbourhood, passers-by and workers during construction.

Buildings Department, PNAP APP-21, Demolition Works – Measures for Public Safety. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnap/signed/APP021se.pdf. [Accessed February 2025].

Buildings Department, PNAP APP-23, Hoardings, Covered Walkways and Gantries (including Temporary Access for Construction Vehicles) Part IX of Building (Planning) Regulations. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnap/APP/APP023.pdf. [Accessed February 2025].

Development Bureau – Greening, Landscape and Tree Management Section, Guidelines on Tree Preservation during Development. [ONLINE]. Available at: https://www.greening.gov.hk/filemanager/greening/en/content_28/Guidelines_on_Tree_Preservation_during_Development_e.pdf. [Accessed February 2025].

(b) Related Credit

None.

2 Integrated Design and Construction Management

2.2 Green Construction Practices

IDCM 11 Building Management Manuals

Extent of Application All buildings

Objective Encourage the provision of a fully documented operations and maintenance manual to enable building operators to implement the design intent and a fully documented energy management manual containing instructions that enables systems to operate at a high level of energy efficiency.

Credits Attainable 1

Credit Requirement 1 credit for providing a fully documented Operations and Maintenance Manual and Energy Management Manual.

Assessment

1. Operations and Maintenance Manual (O&M Manual)

1.1. The O&M Manual shall include all of the following:

1.1.1. The design intent;

1.1.2. The basis of design; and

1.1.3. Full sequences of operation for all equipment and systems, including HVAC&R system and associated controls; electrical system including light and daylighting controls; plumbing and drainage system; lift and escalator system; domestic hot water system (including swimming pool if heating is provided), and renewable energy system, where applicable; all of which must meet the legal requirements and industry wide standards.

1.2. The description of the design intent shall include all of the following:

1.2.1. Space temperature and humidity criteria;

1.2.2. Levels operator and/ or occupant control over HVAC systems;

1.2.3. Ventilation requirements and related indoor air quality criteria;

1.2.4. Performance criteria related to energy efficiency;

1.2.5. Environmental responsiveness of the facility; and

1.2.6. Commissioning criteria.

1.3. The basis of design shall include all of the following:

1.3.1. Details of occupancy;

1.3.2. Space activity and any process requirements;

1.3.3. Applicable regulations, codes, and standards;

1.3.4. Design assumptions;

1.3.5. Performance standards and benchmarks; and

1.3.6. Control system appropriate for the skill of the operations and maintenance staff.

1.4. The O&M Manual must include for each piece of equipment and each system:

1.4.1. The name and contact information of the manufacturer or vendor and installing contractor;

1.4.2. Submittal data; and

1.4.3. Operations and maintenance instructions with the models and features for the subject site clearly marked.

1.5. The O&M Manual shall include only data for equipment that is actually installed, and include the following:

1.5.1. Instructions for installation, maintenance, replacement, start-up;

1.5.2. Special maintenance requirements and sources for replacement parts/ equipment;

1.5.3. Parts list and details of any special tooling requirements;

1.5.4. Performance data; and

1.5.5. Warranty information.

1.6. The O&M Manual shall include an as-built documentation package for controls covering all of the following:

1.6.1. Control drawings and schematics;

1.6.2. Normal operation;

1.6.3. Shutdown;

1.6.4. Unoccupied operation;

1.6.5. Seasonal changeover;

1.6.6. Manual operation;

1.6.7. Controls set-up and programming;

1.6.8. Troubleshooting;

1.6.9. Alarms; and

1.6.10. Final sequences of operation.

1.7. The O&M Manual shall be approved by the client's representative and/ or MEP consultant confirming that the manual has been finalised and accepted. Supporting documents such as approval records with the manual attached or endorsed manual shall be provided.

2. Energy Management Manual (EMM)

2.1. The EMM for all energy-related systems shall include the following:

2.1.1. Descriptions of the final design intent and basis of design, including brief descriptions of each system;

2.1.2. Final sequences of operations for all equipment;

2.1.3. Procedures for seasonal start-up and shutdown, manual and restart operation;

2.1.4. As-built control drawings;

2.1.5. For all energy-saving features and strategies, rationale description, operating instructions, and caveats about their function and maintenance relative to energy use;

2.1.6. Recommendations and brief method for appropriate accounting of energy use of the whole building;

2.1.7. Specifications of re-calibration frequency of sensors and actuators by type and use;

2.1.8. Recommendations for continuous commissioning or recommended frequency for re-commissioning by equipment type, with reference to tests conducted during initial commissioning;

2.1.9. Recommendations regarding seasonal operational issues affecting energy use;

2.1.10. List of all user-adjustable set points and reset schedules, with a discussion of the purpose of each and the range of reasonable adjustments with energy implications;

2.1.11. Schedules of frequency of reviewing the various set points and reset schedules to ensure that they are still near optimum;

2.1.12. List of time-of-day schedules and a frequency of reviewing them for relevancy and efficiency;

2.1.13. Guidelines for establishing and tracking benchmarks for building energy use and primary plant equipment efficiencies;

2.1.14. Guidelines for ensuring that future renovations and equipment upgrades will not result in decreased energy efficiency and will maintain the design intent;

2.1.15. List of diagnostic tools, with a description of their use, that will assist facility staff of the building in operating equipment more efficiently;

2.1.16. A copy of the commissioning report; and

2.1.17. Index of all commissioning documents with notation of their location.

2.2. The EMM shall be approved by the client's representative and/ or MEP consultant confirming that the manual has been finalised and accepted. Supporting documents such as approval records with the manual attached or endorsed manual shall be provided.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_11_00	BEAM Plus NB submission template for IDCM 11	✓		✓
IDCM_11_01	Owner's requirements/ specifications on provision of O&M Manual for all applicable equipment and systems	✓		-
IDCM_11_02	Operations and Maintenance Manual adequately cover the major energy consuming building services systems and equipment where the manual includes the details given in the assessment criteria; and Supporting documents such as approval records with the manual attached or endorsed manual	-		✓
IDCM_11_03	Owner's requirements/ specifications on the provision of Energy Management Manual for all energy-related systems	✓		-
IDCM_11_04	A dedicated Energy Management Manual meeting the requirements as stipulated in the assessment criteria; and Supporting documents such as approval records with the manual attached or endorsed manual	-		✓

Remarks

(a) Additional Information

American Society of Heating, Air-conditioning, and Refrigerating Engineers (ASHRAE) – ASHRAE Guideline 4-2008: Preparation of Operating and Maintenance Documentation for Building Systems.

Building Services Research and Information Association (BSRIA) – Operating and Maintenance Manuals for Building Services Installations (AG 1/87).

(b) Related Credit

None

2 Integrated Design and Construction Management

2.2 Green Construction Practices

IDCM 12 Operator Training plus Chemical Storage and Mixing Room

Extent of Application All buildings

Objective Encourage the provision of training for operations and maintenance staff to the minimum specified and demonstrate adequate maintenance facilities are provided for chemical storage and mixing.

Credits Attainable 1

Credit Requirement 1 credit for providing training for operations and maintenance staff to the minimum specified; and demonstrating that adequate maintenance facilities are provided for chemical storage and mixing.

Assessment

(a) Operator Training

1. The training should be carried out for the appointed Facilities Management Team or client representatives.

2. The training materials may cover the recommended items listed below:

   2.1. General purpose of each building system including basic theory of operation, capabilities and limitations, and modes of control and sequences of operation;

   2.2. Review of control drawings and schematics;

   2.3. Procedures for start-up, shutdown, seasonal changeover, normal operation, unoccupied operation and manual operation;

   2.4. Controls set-up and programming;

   2.5. Troubleshooting;

   2.6. Alarms;

   2.7. Interactions with other systems;

   2.8. Operational monitoring and record keeping requirements, and the use of data for analysing system performance;

   2.9. Adjustments and optimising methods for energy conservation;

   2.10. Any relevant health and safety issues;

   2.11. Inspection, service, and maintenance requirements for each system, including any need for specialised services;

   2.12. Sources for replacement parts/ equipment; and

   2.13. Any tenant interaction issues.

3. The demonstration portion of the training materials may include the following:

   3.1. Typical operation examples of each system;

   3.2. Start-up and shutdown procedures;

   3.3. Operation under all specified modes of control and sequences of operation;

   3.4. Procedures under emergency or abnormal conditions; and

3.5. Procedures for effective operational monitoring.

4. Verify that the training of the building's operations and maintenance staff was undertaken for all commissioned systems and major equipment, using the operations and maintenance manual, and the energy management manual as the basis for the training.

5. A permanent room for training is not necessary. Evidence of carrying out operator training (e.g. record of attendance) is required.

(b) Chemical Storage and Mixing Room

1. A chemical storage area and/ or a chemical mixing area should be provided for the project development, for the purpose of housekeeping and/ or mixing of chemical products that create odour during their mixing processes. Chemical products include HVAC and cleaning relates (e.g. refrigerants, cleansing chemicals) for all building's future operations and maintenance items and equipment.

2. The following table sets out the buildings required to provide chemical storage and/or chemical mixing provision;

Parts of the building	Type of A/C System	Requires Chemical Storage Area	Requires Chemical Mixing Area
Domestic[1, 2]	Window-type units	×	×
	Split-Type/ VRF system without fresh air provisions	×	×
	Split-Type/ VRF system with fresh air provisions (including DX-PAU and fresh air processing units)	×	×
Non-Domestic[3]	HVAC plant[4] installed within the assessment boundary	✓	✓
	District cooling system or chiller plant installed outside of the assessment boundary	✓	×
	Split-Type/ VRF system without fresh air provisions	✓	×
	Split-Type/ VRF system with fresh air provisions (including DX-PAU and fresh air processing units)	✓	×

Note:

[1] Domestic refers to the part of a composite building that is constructed or intended for habitation. This may include residential flats and dormitories.

[2] The requirement on chemical storage area and chemical mixing area is exempted for the domestic parts of the building given that the habitant will be responsible for the operations and maintenance of their personal domestic space.

[3] Non-domestic refers to the part of a composite building that is constructed or intended for use otherwise than for habitation. This may include clubhouses, offices, hotel rooms, shopping arcade, cinema, common entrance.

[4] HVAC plant refers to HVAC related plant for cooling and/ or heating generation (e.g. chiller plant, heat pump plant, cooling tower plant, etc.)

3. No size requirement for the chemical storage area and/ or chemical mixing area.

4. Submit details in the form of drawings and a report with ventilation calculation [1] to demonstrate the compliance of the following functional requirements of chemical storage and/ or mixing provision where applicable:

   4.1. For chemical storage area

   A lockable room for cleansing services (e.g. janitor room, cleaner's store) or a lockable cabinet within an operations and maintenance facility [2, 3]

   4.2. For chemical mixing area

   An area within an operations and maintenance facility equipped with the following building services installation:

   a) Separate outside venting or exhaust route to centralised exhaust riser with non-return damper at the branched duct for the designated room; and maintain negative pressure with respect to adjacent spaces when the doors to the room are closed;

   b) Water supply point for mixing and diluting concentrated products; and

   c) Drainage point for the appropriate disposal of liquid waste products.

5. Co-location of chemical storage area and chemical mixing area in a single operation and maintenance facility is acceptable so long if all functional requirement has been fulfilled.

1 Ventilation calculation is only required for chemical mixing area serving by both exhaust air and fresh air equipment.

2 Operations and maintenance (O&M) facility refers to an indoor area having the function compatible to workshop, store room, chiller plant room or A/C plant room. Locations such as RS&MRC; refuse room; toilet; pipe duct; and plant rooms for electrical/ ELV/ fire services are not appropriate for chemical storage.

3 For project developments which only require to provide chemical storage areas and without the O&M facility mentioned in footnote 2, the Applicant can propose other O&M facility such as plant rooms for plumbing and drainage system, maintenance office, etc.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_12_00	BEAM Plus NB submission template for IDCM 12	✓		✓
For (a) Operator Training, please provide the following:		**PA**	**CA**	**FA/ RFA**
IDCM_12_01	Owner's requirements/ specifications on the provision of training materials and records of operator training	✓		-
IDCM_12_02	Copies of training materials (e.g. presentation materials, training manual, operations and maintenance manual, energy management manual etc.) which may cover the recommended items listed in the assessment criteria	-		✓
IDCM_12_03	Evidence of operator training (e.g. sample record of attendance) verifying that training of the building's operations and maintenance staff was undertaken for all commissioned systems and major equipment, using the operations and maintenance manual, and the energy management manual as the basis for the training	-		✓
For (b) Chemical Storage and Mixing Room, please provide the following:		**PA**	**CA**	**FA/ RFA**
IDCM_12_04	Plumbing and drainage drawing(s) to show the required water supply point and drainage point are provided in the chemical mixing area (if applicable)	✓		✓
IDCM_12_05	MVAC drawing(s) and calculation demonstrating that the designated room with chemical mixing area is equipped with the required ventilation provisions (if applicable)	✓		✓
IDCM_12_06	Architectural drawing(s) to show the chemical storage area indicating the location of the lockable room/ lockable cabinet and/ or chemical mixing area (if applicable)	✓		✓

Remarks

(a) Additional Information

None

(b) Related Credit

None

2 Integrated Design and Construction Management

2.3 Smart Design and Technologies

IDCM 13 Digital Facility Management Interface

Extent of Application

All non-residential buildings/ portions or common areas of residential buildings/ portions

Objective

Encourage provision of digital interfaces to enable future facility management teams to review the building operation performance.

Credits Attainable

1 BONUS

Credit Requirement

1 BONUS credit for providing a digital interface in addition to the project design metering provision for future facility management team to review the building operation performance.

Assessment

Develop and implement a digital interface for future facility management team to review data collected by the electricity metering system installed in the building. The assessment focuses on the interface provision for providing vision regarding operation characteristics. This is for future implementation of first class (Cat I) energy management opportunities (EMOs), with reference to the Code of Practice for Building Energy Audit [1]. Metering system design and hardware quality is not assessed in this credit.

The interface should be a provisional media, providing the information below for the future facility management team to review the building operation. The format and media used for the interface is not restricted provided the credit objectives are achieved by meeting the requirements below:

1. Providing charts and summaries for **hourly** data collected. **Minimum** data required should refer to below table.

Table IDCM13-1:

System (if applicable)	Datapoint for Performance Auditing
Outdoor Condition	• Air Temperature (°C) • Humidity (RH) (%) • Daylight (Lux)
Building	• Total Energy Use Intensity (kWh/m^2) [Daily, Monthly & Annual] • Total HVAC Energy Use Intensity (kWh/m^2) [Daily, Monthly & Annual] • Total Lighting Energy Use Intensity (kWh/m^2) [Daily, Monthly & Annual]

1 Electrical and Mechanical Services Department (EMSD) – Code of Practice for Building Energy Audit

HVAC System	Each Equipment in HVAC (Water Side) - Chillers - Heat pumps - Pumps - Heat Rejection	• Electricity (kW or kWh) • Operation Hour • Supply & Return Water Temperature (°C) • Water Flow Rate (m^3/s)
	Each Equipment in HVAC (Water Side) - Absorption Chiller - Boiler	• Fuel (kW or kWh) • Operation Hour • Supply & Return Water Temperature (°C) • Water Flow Rate (m^3/s)
	Each Equipment in HVAC (Air Side) - Primary Air/ Air Handling Unit Fans - Return Air Fans - Free Cooling Fans	• Electricity (kW or kWh) • Operation Hour • Each Service Zone's Temperature (°C) • Supply & Return Air Temperature (°C) • Air Flow Rate (m^3/s)
	VRV and Unitary System	• Electricity (kW or kWh)
	Ventilation System - Carpark Ventilation - Toilet Ventilation (≥ 2.5kW each)	• Electricity (kW or kWh) • Operation Hour • CO/ NO_x Concentration Level (if applicable for carpark ventilation)
Lift and Escalator System	Each Lift and Escalator	• Electricity (kW or kWh)

2. Keeping inventories and records of the identified systems, including manuals, technical brochures indicating their configurations and characteristics.

3. Enabling a trend of total building electricity use reporting for the last 12 months.

4. Enabling a trend of total electricity costs reporting for the last 12 months.

5. As-built drawing and system schematic that shows the layouts of energy consuming equipment and systems, and drawings showing the layout of the building.

6. Providing Operations and Maintenance programmes that include the timing of major alterations, additions or replacements for the building.

Achievement of EU 4 is not required as the basic requirement in assessing this credit. The demonstration of the provision of the monitoring equipment for energy monitoring and/ or performance auditing is not required under the objective of this credit.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_13_00	BEAM Plus NB submission template for IDCM 13	✓	✓	✓
IDCM_13_01	Technical specifications of the digital interface showing that it is capable of providing the information as prescribed in items 1 to 6 of the assessment criteria	✓	-	-
IDCM_13_02	/	/	/	/
IDCM_13_03	Operation Manual or other evidence (e.g. approved contractor's submission with technical information) showing that the digital interface is capable of providing the information as prescribed in items 1 to 6 of the assessment criteria	-	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credit

This credit may act as a platform gathering and processing the data collected in EU 4 Metering and Monitoring.

In conjunction with IDCM 3c Design Consideration for Operation and Maintenance, it is recommended to consult the facility management team while specifying the document management system.

2 Integrated Design and Construction Management

2.3 Smart Design and Technologies

IDCM 14 Occupant Engagement Platform

Extent of Application All non-residential buildings

Objective Encourage the provision of digital platforms to connect building occupants and the building status to drive behaviour change.

Credits Attainable 1 BONUS

Credit Requirement 1 BONUS credit for providing a digital platform to engage building occupants.

Assessment

1. Develop a digital platform for future occupants to understand the building status. The platform shall contain information to be reviewed by the respective occupant only. The digital platform should contain data referenced to EU 4 part (a) requirement and provide the following information:
   - 1.1. Description of green measures implemented in the building;
   - 1.2. Energy consumption in the occupants' respective leased spaces;
   - 1.3. Recommendations to conserve energy use in the building; and
   - 1.4. Healthy lifestyle tips.
2. The digital platform should be in a form of one of the following:
   - 2.1. Digital displays in at least one common area(s) accessible by all occupants;
   - 2.2. Mobile applications accessible by all occupants; or
   - 2.3. Web-based applications accessible by all occupants.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_14_00	BEAM Plus NB submission template for IDCM 14	✓	✓	✓
IDCM_14_01	Technical specifications of the digital platform showing that it can provide the information as prescribed in the assessment criteria	✓	-	-
IDCM_14_02	Operation Manual or other evidence (e.g. approved contractor's submission with technical information) showing that the digital platform can provide the information as prescribed in the assessment criteria	-	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credit

This credit may act as a platform to present the data collected in EU 4 - Metering and Monitoring in a simple way for occupants to understand the building status.

2 Integrated Design and Construction Management

2.3 Smart Design and Technologies

IDCM 15 Document Management System

Extent of Application All buildings

Objective Encourage tidy and digital documentation throughout the design and construction process for the ease of handing over to facility management teams.

Credits Attainable 2

Credit Requirement

(a) Project Team Document Management

1 credit for demonstrating the use of document management systems within the design and construction teams.

(b) Facility Management Team Document Management

1 credit for demonstrating the use of document management platform by the building owner or building management company.

Assessment

(a) Project Team Document Management

1. Demonstrate coordinated use of document management system among design and construction teams which shall include the following members:
   - 1.1. Project owner;
   - 1.2. Architects/ project designers;
   - 1.3. MEP engineers;
   - 1.4. Structural engineers;
   - 1.5. Quantity surveyors; and
   - 1.6. Contractors.
2. Provide technical information of the document management system including:
   - 2.1. Naming rules for the digital documents to follow;
   - 2.2. Filing rules, in the form of hierarchy, for the digital documents to follow; and
   - 2.3. File format of digital documents.
3. The document management system should perform the following functions:
   - 3.1. Storage of documents;
   - 3.2. Spare storage for future documents;
   - 3.3. Allow update of existing documents;
   - 3.4. Accessible online;
   - 3.5. Support multiple users access and different level of access rights;
   - 3.6. Alarms and notifications; and
   - 3.7. Security protection by passwords.

4. Provide evidence (e.g. screenshots) to demonstrate the document management system should at minimum store the following documents:

   4.1. Project timeline/ programme;

   4.2. Meeting minutes;

   4.3. All documents submitted to government bodies; and

   4.4. Material submissions from contractors.

(b) Facility Management Team Document Management

1. Provide technical information of the document management platform by the building owner/ building management company including:

   1.1. Naming rules for the digital documents to follow;

   1.2. Filing rules, in the form of hierarchy, for the digital documents to follow; and

   1.3. File format of digital documents.

2. The document management platform should perform the following functions:

   2.1. Storage of documents;

   2.2. Spare storage for future documents;

   2.3. Allow update of existing documents;

   2.4. Accessible online;

   2.5. Support multiple users access and different level of access rights;

   2.6. Alarms and notifications; and

   2.7. Security protection by passwords.

3. Provide evidence (e.g. screenshots or declaration letter by the project owner/ developer or building management company) to demonstrate the use of document management platform for future facility management team.

   The document management platform should store the documents required for facility management, which at minimum should include items 3.1 to 3.4. The below list is not exhaustive and the Applicant should store the documents as required to suit their own operational needs.

   3.1. All documents specified in IDCM 11 to IDCM 14 (if credit(s) is/ are targeted);

   3.2. Approved drawings by all government departments;

   3.3. All documents submitted to government bodies;

   3.4. As-built drawings;

   3.5. Waste management manual;

   3.6. Water management manual;

   3.7. Tenant fitting out guide;

   3.8. Tenancy green guide; and

   3.9. Tenant feedback procedures notes and records.

Submittals

(a) Project Team Document Management

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_15a_00	BEAM Plus NB submission template for IDCM 15a	✓	✓	✓
IDCM_15a_01	Technical data (e.g. product catalogue, supplier's information, etc.) showing that the system can perform the functions as prescribed in part (a) items 2 and 3 of the assessment criteria	✓	✓	✓
IDCM_15a_02	Evidence (e.g. screenshots) to demonstrate the use of document management system within design and construction teams	-	✓	✓

(b) Facility Management Team Document Management

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_15b_00	BEAM Plus NB submission template for IDCM 15b	✓	✓	✓
IDCM_15b_01	Extract of tender documents, contract conditions and/or contract specifications requiring the document management platform for future facility management team	✓	-	-
IDCM_15b_02	Evidence (e.g. approved contractor's submission with technical information) showing that the platform can perform the functions as prescribed in part (b) items 1 and 2 of the assessment criteria	-	✓	✓
IDCM_15b_03	Declaration letter by the project owner/ developer/ building management company confirming that the document management platform will be used by the building owner/ building management company [or] Evidence (e.g. screenshots) to demonstrate the use of document management platform by the building owner/ building management company	-	✓	✓

Remarks

(a) Additional Information

Hong Kong Green Building Council – Hong Kong Green Office Guide. [ONLINE]. Available at: https://www.hkgbc.org.hk/eng/engagement/guidebooks/green-office-guide/index.jsp. [Accessed February 2025].

Hong Kong Green Building Council – Hong Kong Green School Guide. [ONLINE]. Available at: https://www.hkgbc.org.hk/eng/engagement/guidebooks/green-school-guide/index.jsp. [Accessed February 2025].

Hong Kong Green Building Council – Hong Kong Green Shop Guide. [ONLINE]. Available at: https://www.hkgbc.org.hk/eng/engagement/guidebooks/green-shop-guide/index.jsp. [Accessed February 2025].

Hong Kong Green Building Council – Green Tenancy Driver For Office Buildings. [ONLINE]. Available at: https://www.hkgbc.org.hk/eng/engagement/guidebooks/green-tenancy-driver/index.jsp. [Accessed February 2025].

The Hong Kong Institute of Surveyors - Green Property Management Practices. [ONLINE]. Available at: https://www.hkis.org.hk/ufiles/gpmp2015.pdf. [Accessed February 2025].

(b) Related Credit

In conjunction with IDCM 3c Design Consideration for Operation and Maintenance, it is recommended to consult the facility management team while specifying the document management system.

2 Integrated Design and Construction Management

2.3 Smart Design and Technologies

IDCM 16 BIM Integration

Extent of Application All buildings

Objective Encourage the design team to discuss and work through the design platform and deliver holistic solution using Building Information Modelling (BIM).

Credits Attainable 1 + 1 additional BONUS + 2 BONUS

Credit Requirement

(a) Coordinated Use of BIM within Design Teams

1 credit for the coordinated use of BIM among the design team.

(b) Coordinated Use of BIM within Design and Construction Teams

1 additional BONUS credit for coordinated use of BIM among the design team and the contractors.

(c) BIM for Time and Cost

1 BONUS credit for using the BIM model for scheduling, cost and quantity, schedules preparation and tracking the project budget.

(d) BIM for Facility Management Use

1 BONUS credit for updating the BIM model to as-built condition.

Assessment

(a) Coordinated Use of BIM within Design Teams

1. Prepare a project execution plan, which at minimum includes the following content:
   - 1.1. Project BIM objectives;
   - 1.2. Model Level of Information Need (LOIN);
   - 1.3. Methods of communication;
   - 1.4. Project BIM standards; and
   - 1.5. Model/ Data validation protocols.
2. Demonstrate coordinated use of BIM among design teams which shall include the following members:
   - 2.1. Architects/ project designers;
   - 2.2. MEP engineers; and
   - 2.3. Structural engineers.
3. Demonstrate the use of BIM performing the following functions:
   - 3.1. Coordinate spatial design;
   - 3.2. Clash detection; and

3.3. Building performance simulation (The conversion/ export of BIM model data for the use in other simulation software for building performance simulation such as CFD, building energy simulation, solar study, structural enhancement etc., is an acceptable approach).

4. The Level of Information Need (LOIN) of BIM model should be at least LOD 300 (both graphical presentation, LOG-G and non-graphical information, LOD-I) as defined in local or international standards such as the Hong Kong Construction Industry Council BIM Standards and Guidelines [1], ISO 19650 [2] or the American Institute of Architects (AIA) Project Building Information Modelling Protocol Form [3] for builder and MEP elements.

(b) Coordinated Use of BIM within Design and Construction Teams

1. In addition to requirements in a), provide at least one (1) representing document (e.g. clash detection report) to demonstrate use of BIM among design teams and the contractors.

(c) BIM for Time and Cost

1. Demonstrate the use of BIM in performing the following functions:

1.1. Report real time on-site construction activity;

1.2. Review construction progress against the construction programme. The comparison of immediate construction progress and the scheduled construction master programme should be performed in the same picture;

1.3. Prepare cost and quantity schedules; and

1.4. Track project budget.

Extracts of quantity schedules from BIM software for preparing cost schedule and track project budget is an acceptable approach.

(d) BIM for Facility Management Use

1. Update the BIM model to the as-built condition including fixtures, finishes and equipment data.

2. Demonstrate that the BIM will be handed over to the facility management team for facility management use.

1 The Hong Kong Construction Industry Council – CIC BIM Standards. [ONLINE]. Available at: https://www.bim.cic.hk/en/resources/publications?cate=3&keyword=. [Accessed February 2025].

2 International Standard Organization. ISO 19650, Organisation and digitisation of information about buildings and civil engineering works, including building information modelling -- Information management using building information modelling.

3 The American Institute of Architects (AIA) - The American G202™ – 2013, Project Building Information Modelling Protocol Form [ONLINE]. Available at: https://contractdocs.aia.org/PreviewFiles/Preview_G202-2013%20OmniClass.pdf. [Accessed February 2025].

Submittals

(a) Coordinated Use of BIM within Design Teams

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_16a_00	BEAM Plus NB submission template for IDCM 16a	✓	✓	✓
IDCM_16a_01	Project execution plan	✓	✓	✓
IDCM_16a_02	Project-specific Technical Specifications of BIM software	✓	✓	✓
IDCM_16a_03	Project-specific documents demonstrating the use of BIM performing the functions as prescribed in the part (a) item 3 of the assessment criteria (e.g. BIM clash detection report, screen captures of exporting data from BIM software, model simulation result in CFD, building energy simulation, solar study, structural enhancement etc.)	✓	✓	✓
IDCM_16a_04	Project-specific document (e.g. BIM clash detection reports, meeting presentation or email records showing BIM review records, etc.) demonstrating the coordinated use of BIM among design teams	✓	✓	✓

(b) Coordinated Use of BIM within Design and Construction Teams

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_16b_00	BEAM Plus NB submission template for IDCM 16b	✓	✓	✓
IDCM_16b_01	/	/	/	/
IDCM_16b_02	/	/	/	/
IDCM_16b_03	Project-specific representing document (e.g. BIM clash detection reports, meeting presentation or email records showing BIM review records, etc.) demonstrating the use of BIM among design team and construction team	✓*	✓	✓
* Evidence of compliance with credit requirements shall be submitted in PA if superstructure works are started not less than 3 months prior to PA (first submission).				

(c) BIM for Time and Cost

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_16c_00	BEAM Plus NB submission template for IDCM 16c	✓	✓	✓
IDCM_16c_01	Project execution plan	✓	✓	✓
IDCM_16c_02	Project-specific Technical Specifications of BIM software	✓	✓	✓
IDCM_16c_03	Project-specific documents demonstrating the use of BIM which performs the function as prescribed in the part (c) item 1 of the assessment criteria	✓	✓	✓

(d) BIM for Facility Management Use

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_16d_00	BEAM Plus NB submission template for IDCM 16d	✓		✓
IDCM_16d_01	Contract specifications of an as-built BIM model to be provided by contractor	✓		-
IDCM_16d_02	Contract specifications for handing over the as-built BIM model to facility management	✓		-
IDCM_16d_03	Evidence of handing over the as-built BIM model to facility management	-		✓

Remarks

(a) Additional Information

Housing Authority, Building Information Modelling. [ONLINE]. Available at: http://www.housingauthority.gov.hk/en/business-partnerships/resources/building-information-modelling/. [Accessed February 2025].

Buildings Department, Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers ADV-34. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnap/ADV/ADV034.pdf. [Accessed February 2025].

Hong Kong Construction Industry Council, CIC BIM Standards. [ONLINE]. Available at: https://www.bim.cic.hk/en/resources/publications?cate=3&keyword=. [Accessed February 2025].

(b) Related Credit

The use of BIM is a valuable add-on to IDCM 3 Integrative Design Process as it facilitates integrative design by strengthening the coordination within the project team.

2 Integrated Design and Construction Management

2.4 Design for Engagement and Education on Green Buildings

IDCM 17 Design for Engagement and Education on Green Buildings

Extent of Application

All buildings

Objective

Encourage public education that focuses on strategies and solutions applied to the green buildings.

Credits Attainable

1 + 1 additional BONUS

Credit Requirement

1 credit for providing any two (2) education elements from the following list of green building design measures and provisions accredited by BEAM Plus and implemented in the project.

1 additional BONUS credit for providing four (4) education elements mentioned below on green buildings.

1. Provide users with manuals for all green building design measures and provisions.
2. Provide educational signage system that is integrated with the major communal areas of the project to educate users and visitors about the benefits of the green building design measures and provisions.
3. Provide users a platform for sustainable living showcase demonstration, experience or sharing that are relevant to the enabling design measures and provisions in the project. e.g. websites, regular publications available to the public, newspapers or other means.
4. Additional or alternative education element(s) proposed by the Applicant with substantiation demonstrating strategies compatible with the listed strategies for achieving the credit objective.

Assessment

Present evidence of the education elements provided to the users and/ or visitors that focuses on strategies and solutions applied to the project.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IDCM_17_00	BEAM Plus NB submission template for IDCM 17	✓	✓	✓
For item 1 of the listed education elements, please provide the following:		**PA**	**CA**	**FA/ RFA**
IDCM_17_01a	Synopsis & content framework of user manual	✓	-	-
IDCM_17_01b	Completed user manual	-	✓	✓
For item 2 of the listed education elements, please provide the following:		**PA**	**CA**	**FA/ RFA**
IDCM_17_02a	Educational signage plan	✓	-	-
IDCM_17_02b	Record photos of educational signage [or] Architect's Instruction (AI) with shop drawings, approved contractor's submission with technical information, etc. (if the record photos are not available at the time of CA submission)	- -	✓ ✓	✓ -
For item 3 of the listed education elements, please provide the following:		**PA**	**CA**	**FA/ RFA**
IDCM_17_03a	Undertaking letter signed by the project owner declaring that the education platform will be provided for building users	✓	-	-
IDCM_17_03b	Supporting document of education platform(s) provided, e.g. pdf of the website or pdf of the electronic newsletter, etc.	-	✓	✓
For item 4 of the listed education elements, please provide the following:		**PA**	**CA**	**FA/ RFA**
IDCM_17_04a	Other supporting document(s) for the additional or alternative education element(s) proposed by Applicant	✓	✓	✓

IDCM_17_04b	Record photos of additional or alternative education element(s) proposed by Applicant [or] Architect's Instruction (AI) with shop drawings, approved contractor's submission with technical information, etc. (if the record photos are not available at the time of CA submission)	- -	✓ ✓	✓ -

Remarks

(a) Additional Information

None

(b) Related Credit

None

3 Sustainable Site (SS)

3.P Prerequisite
3.1 Neighbourhood Integration
3.2 Ecologically Responsible Design
3.3 Bioclimatic Design
3.4 Climate Resilience and Adaptability

Introduction

This section focuses on the planning and design to harness the sustainable design potentials of a site for its occupants and neighbours, preserve/ enhance its ecological capacity, optimise its microclimate and create better climate resilience. Site attributes and scale of development have been taken account of in the formulation of the assessment criteria.

Site locations/ Site planning and design strategies in the following aspects will be assessed for their sustainable design quality and performances:

- Building disposition, orientation and form;
- Spatial relationship of the building(s) to the immediate built and natural environment;
- Relationship of the building(s) to the site topography and ground conditions;
- Overall massing of the proposed development;
- Site coverage of greenery, choice of plant species, tree coverage/ preservation;
- View factors and ambient forces;
- Balance of built-up and landscaped/ open area;
- Environmental enhancement to the surroundings of the site; and
- Master landscaping strategy; and
- Conservation and protection of archaeological remains, historic buildings and monuments.

3.P Prerequisite

SS P1 Minimum Landscaping Requirements

Background

This part sets out the minimum requirements of greenery coverage on site and provisions for viability of planting for all buildings with site area of 1,000 m^2 or above.

3.1 Neighbourhood Integration

SS 1 Pedestrian-oriented and Low Carbon Transport
SS 2 Neighbourhood Amenities
SS 3 Building Design for Sustainable Urbanism
SS 4 Neighbourhood Daylight Access
SS 5 Noise Control for Building Equipment

Background

Integration with the neighbourhood is addressed in terms of pedestrian- oriented transport, adequacy of local amenities, sustainable urban design, daylight access for neighbouring sensitive receivers and reduction of noise from building services equipment to neighbours.

The planning and design issues which affect the environmental performance of a site and master layout planning should include:

- Disposition of individual buildings within the site;
- Spatial relationship of the building(s) to the immediate built and natural environment;
- Relationship of the building(s) to the site topography and ground conditions;
- Overall massing of the proposed development;
- Built form of the buildings;
- Orientation of buildings in relationship to view factors and ambient forces;
- Balance of built-up and landscaped/ open area;

- Environmental enhancement to the surroundings of the site;
- Master landscaping strategy; and
- Conservation and protection of archaeological remains, historic buildings and monuments.

Tall buildings can cause substantial overshadowing of neighbouring developments and amenities, affecting both direct and indirect sunlight and light from the sky. Noise emissions from equipment on and around buildings contributes to noise pollution with potential impacts on neighbouring properties. It is the responsibility of the project team to alleviate adverse effect on neighbouring properties by good design and proper installation and maintenance.

3.2 Ecologically Responsible Design

SS 6 Light Pollution Control
SS 7 Biodiversity Enhancement

Background

Habitat conservation is the most effective means to minimise development impacts on the natural environment and endangered species (if any). If an area of high biodiversity is identified in the site, it is encouraged to formulate management strategies to protect habitats and any rare or endangered species within the land under ownership.

Light pollution may be regarded as waste light from lighting schemes that produces glare, obscures the night sky, adversely effects nocturnal ecosystems and may intrude on neighbouring properties.

3.3 Bioclimatic Design

SS 8 Urban Heat Island Mitigation
SS 9 Immediate Neighbourhood Wind Environment
SS 10 Outdoor Thermal Comfort

Background

The use of non-reflective external surfaces contributes to localised elevated temperatures created when solar heat gains are absorbed and then radiated back to the surroundings. The effect may be local to pedestrian and recreational areas and contribute to urban heat islands.

Site planning, building design and landscaping strategies can enhance a site's microclimate. Elevated temperatures can be mitigated through the choice of finishes on buildings and horizontal hard surfaces that reflect heat, the application of shading or planted vegetation, and the enhancement of building permeability.

3.4 Climate Resilience and Adaptability

SS 11 Stormwater Management
SS 12 Design for Climate Change Adaptation

Background

Hong Kong is located along the common track of tropical cyclones and hence experiences very heavy rainstorms at times. In the New Territories, the area is characterised by its wide floodplain and low-lying terrain. In the past decades, rapid urbanisation has turned natural ground to hard paved impervious areas. In the old built-up areas in Kowloon and in parts of Hong Kong Island, insufficient drainage capacity and dense land development aggravate the potential for flooding in the neighbourhoods. The climate change brings further challenges such as sea level rise and increased occurrence of extreme weather.

A high standard of stormwater management can reduce the risk of flooding and promote groundwater recharge. The “Sponge City” benchmarks to control the total stormwater run-off volume in Mainland China (Shenzhen) has been taken as reference in formulating the standards. Furthermore, the impact of projected climate change scenarios on building development are also encouraged. Using available best practice of local or national industry standard of weather data, a study on the projected variations in temperature, rainfall and storm surge, that will occur based on a building life cycle of 50 years as a result of climate change, is carried out and the respective strategies on improving climate resilience are considered.

3 Sustainable Site 3.P Prerequisite

SS P1 Minimum Landscaping Requirements

Extent of Application All sites with site area of 1,000 m² or more

Objective Encourage building development to preserve or expand urban greenery.

Credits Attainable Prerequisite

Credit Requirement Prerequisite achieved for demonstrating compliance with minimum planting provisions in terms of viability and site coverage of greenery of at least 20% of the site.

Assessment

(a) Minimum Provisions for Viability of Planting

1. Submit tree survey plans and tree assessment report if there are existing trees on the project site.
2. Highlight any existing trees to be preserved on the plan.
3. Reserve vertical and horizontal soil for preserved, transplanted or added trees and all planted areas:
   - 3.1. Soil volume per tree shall be at a minimum of 12m³; and
   - 3.2. Soil depths shall be at least 1.2m, 0.6m and 0.3m for trees, shrubs and grass/ ground covers respectively.
4. Demonstrate by citing relevant literature or reference that plant species used for covered greenery are shade tolerant.
5. Provide at least a means of irrigation for planting areas.
6. Provide access for the maintenance to the planting areas.

(b) Minimum Site Coverage of Greenery

1. Provide a minimum of 20% overall site coverage of greenery (method of measurement and calculation of site coverage of greenery except otherwise stated below shall be in accordance with Buildings Department PNAP APP-152 Sustainable Building Design Guidelines [1]):
   - 1.1. The minimum site coverage of greenery in the primary zone required in the PNAP is not assessed under this prerequisite.
   - 1.2. Covered greenery areas above the primary zone (measured from 45° projected line taken from the edge of building) in communal areas accessible to the public, occupiers or visitors can be counted (50% reduction factor applies).
   - 1.3. The maximum accountable percentage of greening features stated in the PNAP Appendix D is not assessed under this prerequisite.

1 Buildings Department - PNAP APP-152 Sustainable Building Design Guidelines.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_P1_00	BEAM Plus NB submission template for SS P1	✓	✓	✓
SS_P1_01	Tree survey plans and tree assessment schedules highlighting any existing/ preserved trees (if applicable) [or] Site photos/ aerial photo showing that there is no existing tree on the project site	✓	-	-
SS_P1_02	Landscape plans and sections showing soft landscape layout, irrigation provisions, maintenance access, soil volumes/ depths of all planted areas for trees, shrubs and grass/ groundcover	✓	✓*	✓*
SS_P1_03	Extracts of relevant literature or reference demonstrating plant species with shade tolerance are used for any covered greenery	-	✓	✓
SS_P1_04	Summary for the total and breakdowns of areas and site coverage of greenery of accountable greenery areas and greening features	✓	✓*	✓*
SS_P1_05	Planting schedules highlighting the plant types and plant species with shade tolerance that are used for any covered greenery	✓	✓	✓
* When the project is undergoing CA or FA, the supporting documents showing the soft landscape layout and site coverage for greenery calculation shall be approved by relevant authority (e.g. extract of approved GBP). Evidence of approval (e.g. approval letter/ endorsement by the authority) shall be presented. In case of sites with a single family house only for which the requirement for minimum site coverage of greenery is not applicable under PNAP APP-152 such that no approval by relevant authority (i.e. Buildings Department) is required, the soft landscape layout plans and site coverage of greenery calculation shall be endorsed by the Authorized Person (AP).				

Remarks

(a) Additional Information

The Guidelines on Soil Volume for Urban Trees promulgated by the Greening, Landscape and Tree Management Section in the Development Bureau, HKSAR provides the guidance on minimum soil volume for trees.

The Greening, Landscape and Tree Management Section in the Development Bureau, HKSAR provides guidelines for proper planting practices for trees.

(b) Related Credit

SS 1 Pedestrian-oriented and Low Carbon Transport

The related credit encourages the shading of main pedestrian paths by trees. The soil space of trees shall meet the minimum standards stipulated in SS P1.

SS 8 Urban Heat Island Mitigation

The related credit encourages a higher overall site coverage of greenery and stipulates the minimum site coverage of greenery in the Primary Zone (the 15m vertical zone of a site along the abutting street level).

SS 10 Outdoor Thermal Comfort

The related credit considers the positive effect of shading by trees and the surrounding ground surface temperatures of greenery within the site.

SS 11 Stormwater Management

The related credit considers the softscape provided with the site for infiltration and detention in stormwater management.

WU 2 Water Efficient Irrigation

The related credit considers water efficient irrigation for greenery provided within the site.

HWB 2 Biophilic Design

The related credit encourages human-nature connection for building occupants.

3 Sustainable Site **3.1 Neighbourhood Integration**

SS 1 Pedestrian-oriented and Low Carbon Transport

Extent of Application All buildings

Objective Encourage the use of pedestrian-oriented, low carbon and/ or public transport, with an aim to create a safer, more sustainable and appealing environment that promotes human interaction, a sense of place as well as integration with the surrounding pedestrian transport network.

Credits Attainable 2 + 1 additional BONUS + 2 BONUS

Credit Requirement

(a) Accessibility to Public Transport

1 credit for achieving Accessibility Index of 15 or more for all buildings of a development.

(b) Pedestrian-oriented Access

1 credit for achieving 50% or more of the pedestrian-oriented transport planning measures.

1 additional BONUS credit for achieving 100% of the pedestrian-oriented transport planning measures.

(c) Cycling Facilities and Network Integration

1 BONUS credit for providing cycling facilities within the Site and integrating with the public cycling network if a public cycling network exists or has been planned nearby.

(d) Charging Facilities for Electric Vehicle (EV)

1 BONUS credit for providing EV medium chargers for at least 50% of all car parking spaces [1] and EV charging-enabling for all car parking spaces (including visitor car parks) [1].

Assessment

(a) Accessibility to Public Transport

1. Indicate the distances shown alongside unhampered walking routes within a walking distance of 1,000m from the site main entrance(s) to each public transport [2] stop or the main entrance of each station in vicinity on an A3-sized scaled drawing.

2. Provide evidence of service frequencies of the public transport.

3. Calculate the Accessibility Index (AI) [3] for all buildings of a development using the prescribed form.

   3.1. Use service frequency data at peak periods for the calculation of waiting time.

1 The “car parking spaces” in this credit shall refer to private car parking spaces and motorcycle parking spaces. The following can be excluded in the assessment: (i) Loading/ unloading bay; and (ii) Car parking space for operational vehicle such as light goods vehicle, light bus, medium/ heavy goods vehicle, coaches, etc.

2 Public transport includes railways, bus (franchised bus/ non-franchised public bus), green minibus (GMB), tram and ferry.

3 Transport for London. Public Transport Accessibility Levels. [ONLINE]. Available at: https://data.london.gov.uk/dataset/public-transport-accessibility-levels. [Accessed February 2025].

3.1.1. The Applicant shall propose any hour on a weekday as the "peak hour" for the calculation of Accessibility Index (AI). In view of different building natures (e.g. non-residential/ commercial building types such as stadium, museum, etc.), the "peak hour" may be considered as any hour on a weekend with justification. The service frequency data of the identified public transport shall be selected at the same "peak hour".

3.1.2. Considering the same proposed "peak hour', the shortest headway (in minutes) from service frequency data could be adopted for each of the identified public transports. For example, given that the service frequency of public transport is 15-20 minutes within the "peak hour", the lower bound (i.e. 15 minutes) could be adopted in the AI calculation.

3.2. Adopt a walking speed of 80m per minute for the calculation of walk time.

4. Provide evidence issued by a government agency or a quasi-government body for the targeted operation date of any future public transport services/ facilities. Future services/ facilities provisions not operable at the time of building completion will be accepted if they will be in operation no later than one year after the occupation of the proposed development.

5. For a site served by dedicated shuttle service vehicles for the development and to be considered under the AI method, provide the following:

5.1. Proposal of service provision:

5.1.1. Routes and stops of the shuttle services providing connection links to the public transport,

5.1.2. Capacity of the shuttle service vehicles,

5.1.3. Locations of the shuttle service drop-off/ pick-up points, and

5.1.4. Operating frequency of the services.

5.2. Justification for the adequacy of the service if the capacity of the shuttle service vehicles is below 16 passengers.

5.3. An undertaking letter by the developer/ property owner for the provision of the shuttle service for a minimum of 5 years.

(b) Pedestrian-oriented Access

1. Demonstrate compliance for the pedestrian-oriented transport planning measures using the following score table.

2. Complete the prescribed form to indicate whether the following sub-items are achieved or not.

3. Provide justifications for each of the achieved sub-items and descriptions with illustrations, drawings and photos of measures adopted.

Safe Environment		**Score**
a	Segregation between main pedestrian pathways and vehicular traffic for private cars/ taxis within the Site if there is no speed limit or the targeted speed is higher than 20 km/h; **OR**	1
	Vehicular traffic calming measures adopted and speed limit signs provided for a speed of no more than 20 km/h for over 50% of roads within the Site; **OR**	1
	Vehicular traffic calming measures adopted and speed limit signs provided for a speed of no more than 20 km/h for 100% of roads within the Site.	2
b	Whole length of main pedestrian pathways to be overlooked from any normally occupied spaces of buildings within or outside the Site.	1
c	Illuminance of all pedestrian pathways within the Site is at least 50 lux.	1
Convenient Environment		**Score**
d	Short and direct pathways as compared to the vehicular access/ pathways.	1
e	Minimised level changes for pathways meeting recommended design requirements of barrier-free access in Chapter 4 of BFA 2008.	1
f	Widths of the street furniture and greening zones along the main pedestrian pathways meeting recommended widths of HKPSG Chapter 8 [4].	1
g	Widths of the main pedestrian pathways meeting recommended widths of HKPSG Chapter 8 [4].	1
h	Clear and easily understood wayfinding signage is sited prominently and in predictable locations within the Site.	1
Pleasant Environment		**Score**
i	Car parking spaces not exceeding the minimum requirement from the government, excluding parking for shuttle service vehicles; **OR**	1
	No car parking is provided other than provisions intended for use by people with a disability and for shuttle service vehicles.	2
j	Planting zone of a minimum width of 1m along the main pedestrian pathways.	1
k	Main pedestrian pathways under cover or shaded by trees.	1
l	Pedestrian pathways designed with high architectural/ landscape quality, with design features intended for human delight/ celebration of culture or public art.	1
Note: Main pedestrian pathways are defined as pathways of width not less than 2m for pedestrian circulation from building main entrance(s) to site entrance(s) or amenities within the site.		

4 Planning Department. Hong Kong Planning Standards and Guidelines. Chapter 8: Internal Transport Facilities. [ONLINE]. Available at https://www.pland.gov.hk/file/tech_doc/hkpsg/full/pdf/ch8.pdf. [Accessed February 2025].

4. The following assessment requirements for car parking facilities shall be fulfilled for scoring the first point under Pleasant Environment:

    4.1. The car parking spaces not exceeding the minimum requirement from the government (lease/ engineering conditions). If no requirement is stipulated in lease/ engineering conditions, the lower bound number of any recommended range in HKPSG Chapter 8 or Transport Department (TD)'s advice shall be followed;

    4.2. Simultaneous free flow of vehicles in and out of the car park at the point of access; and

    4.3. Provisions to avoid ground contamination from oil run-off by:

        4.3.1. For covered parking spaces: Petrol interceptors, and

        4.3.2. For open parking spaces: Petrol interceptors or, if there is no open transport interchange/ vehicular servicing area, pervious paving and construction with a maximum gradient of 1:20, a depth of at least 600mm from top surface of paving to anticipated highest water table, and a permeability rate of at least 0.1mm/sec.

5. Demonstrate that the width of each horizontal screen, covered walkway or trellis over main pedestrian pathways shall be at least 2m.

6. If shading for main pedestrian pathways is provided by trees at-grade, demonstrate by an ecologist or a landscape architect that:

    6.1. The shade provided should be a continuous strip of trees planted along the pedestrian route.

    6.2. Suitable species of broadleaved trees (not palms conifers) with sufficient anticipated crown diameters are provided to offer shade.

    6.3. The tree coverage shall be measured using the estimated crown diameters of 10 years after landscape installation, with evidence of crown measurement of the species taken in similar local growing conditions.

    6.4. A shaded pedestrian route with a minimum width of 2m under the trees shall be demonstrated on plan.

(c) Cycling Facilities and Network Integration

1. Demonstrate that there is a public cycling network within 500m walking distance from the perimeter of the site, either existing or planned (to be in operation no later than one year after the occupation for the proposed Project).

2. Demonstrate that the following facilities are provided within the project site by means of layout and drawings, calculations and evidence of the installed facilities:

    2.1. Bicycle parking facilities complying with the requirements in Section 6 – Cycling of Internal Transport Facilities presented in the Chapter 8 of HKPSG or Transport Department (TD)'s requirements.

    2.2. The bicycle parking spaces shall be properly connected to the public cycling network either in form of cycle track within the Site, or a safe and convenient walking path segregated from carriageway not impeding normal pedestrian flow. If cycle track is provided within the Site, it shall comply with the following conditions:

2.2.1. The cycle track within the Site shall comply with the requirements in Section 6 – Cycling of Internal Transport Facilities presented in Chapter 8 of HKPSG; and

2.2.2. The cycling track within the Site shall have physically designated in-/ off-street cycle tracks or are integrated with roads designed for a target speed of 20 km/h or slower.

2.3. For non-residential projects or non-residential portion of mixed-use projects, shower and changing facilities of at least one shower for the first 100 regular building occupants (excluding occasional visitors) and one additional shower facility for every additional 150 regular building occupants.

(d) Charging Facilities for Electric Vehicles (EV)

1. For both Indoor parking and outdoor parking space, basic EV charging-enabling/ facilities requirements are as follows:

   Provide descriptions with illustrations, schematic drawings and photos of the EV charging-enabling for ALL the car parking spaces [5] with reference to the requirements in Technical Guidelines for Electric Vehicle (EV) Charging-enabling for Car Parks of New Building Developments [6].

2. Demonstrate that 50% of all the car parking spaces [5] are provided with EV charging facilities that meet the following requirements:

   2.1. Installation of medium chargers with output power not less than 7kW;

   2.2. Sockets provided are widely applicable for various EV brands/ types of the market;

   2.3. Medium chargers with American SAE standard, European IEC standard or China GB/T standard sockets shall be provided for all visitor car parks; and

   2.4. For **outdoor** EV chargers, safety requirement in IEC 60364- 7-722 is required with protection of at least IPX4.

5 The “car parking spaces” in this credit shall refer to private car parking spaces and motorcycle parking spaces. The following can be excluded in the assessment: (i) Loading/ unloading bay; and (ii) Car parking space for operational vehicle such as light goods vehicle, light bus, medium/ heavy goods vehicle, coaches, etc.

6 Technical Guidelines for Electric Vehicle (EV) Charging-enabling for Car Parks of New Building Developments [ONLINE]. Available at: https://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/air/prob_solutions/files/guidelines_on_enabling_eng.pdf. [Accessed February 2025].

Submittals

(a) Accessibility to Public Transport

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_01a_00	BEAM Plus NB submission template for SS 1a	✓	✓	✓
SS_01a_01	Calculation for Accessibility Index (AI) [Appendix A]	✓	✓	✓
SS_01a_02	Scaled drawing on an A3-sized sheet indicating the distances alongside unhampered walking routes from site entrance(s) to stops/ stations of public transport services	✓	✓	✓
SS_01a_03	Evidence of service frequencies of public transport at the peak hour	✓	✓	✓
SS_01a_04	/	/	/	/
For future services/ facilities provisions in operation no later than one year after the completion and occupation of the proposed development, please include the following:		**PA**	**CA**	**FA/ RFA**
SS_01a_05	Evidence issued by a government agency or a quasi-government body for the targeted operation dates of any future public transport services/ facilities	✓	✓	✓
SS_01a_06	Declaration letter by the developer/ property owner stating the targeted occupation date of the proposed development	✓	✓	✓
If shuttle service is provided, please include the following:		**PA**	**CA**	**FA/ RFA**
SS_01a_07	Scaled building layout plans for drop-off/ pick-up point(s) of shuttle service vehicles	✓	✓	✓
SS_01a_08	Proposal of shuttle service provision: - Routes and stops that provide connection links to the public transport; - Capacity of the shuttle service vehicles; - Locations of the shuttle service drop-off/ pick-up points; and - Fixed operating frequency of the services	-	✓	✓

SS_01a_09	Justification for the adequacy of services (if the capacity of shuttle service vehicles is below 16 passengers)	-	✓	✓
SS_01a_10	Undertaking letter by the developer/ property owner that the shuttle services will be provided for a minimum of 5 years	-	✓	✓
SS_01a_11	/	/	/	/
SS_01a_12	/	/	/	/

(b) Pedestrian-oriented Access

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_01b_00	BEAM Plus NB submission template for SS 1b	✓	✓	✓
SS_01b_01	Drawings and descriptions on the relevant pedestrian-oriented features	✓	✓	✓
SS_01b_02	Relevant parts of the lease conditions/ engineering conditions on the car park provisions (if applicable)	✓	✓	✓
SS_01b_03	Extracts of HKPSG's recommended minimum car park provisions, or Transport Department advice on minimum car park provisions (if applicable and there is no requirement stipulated for car park provision in the lease or engineering conditions)	✓	✓	✓
SS_01b_04	Layout plan showing the locations and types of car parking spaces (if applicable)	✓	✓	✓
SS_01b_05	Calculation of minimum car park provision (if applicable)	✓	✓	✓
SS_01b_06	Swept path diagram to show simultaneous free flow of vehicles in and out of the car park at the point of access (if applicable)	✓	✓	✓

SS_01b_07	Drawings showing the provisions in the car park to avoid ground contamination from oil run-off (if applicable)	✓	✓	✓
SS_01b_08	Plans showing a shaded pedestrian route under trees for main pedestrian pathways [and] Report on species of trees and anticipated crown diameters 10 years after landscape installation (if applicable and shading for main pedestrian pathways is provided by trees at-grade)	✓	✓	✓
SS_01b_09	Evidence of pedestrian-oriented features in project completion [or] Architect's Instruction (AI) with shop drawings, approved contractor's submission with technical information, etc. (if the evidence is not available at the time of CA submission)	- -	✓ ✓	✓ -

(c) Cycling Facilities and Network Integration

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_01c_00	BEAM Plus NB submission template for SS 1c	✓	✓	✓
SS_01c_01	Scaled drawing on an A3-sized sheet indicating the nearby public cycling network	✓	✓	✓
SS_01c_02	Drawings showing the cycling track/ walking path segregated from carriageway connecting the bicycle parking spaces within the site to the public cycling network, parking and other facilities within the site meeting stipulated requirements, and calculation of required bicycle parking spaces	✓	✓	✓
SS_01c_03	Extracts of HKPSG's recommended cycling facilities provisions (cycle track, if applicable and parking spaces), or Transport Department's advice on cycling facilities provisions	✓	✓	✓

SS_01c_04	Evidence of cycling facilities in project completion [or] Architect's Instruction (AI) with shop drawings, approved contractor's submission with technical information, etc. (if the evidence is not available at the time of CA submission)	- -	✓ ✓	✓ -
SS_01c_05	Drawings demonstrating the shower and changing facilities (for non-residential projects or non-residential portion of mixed-use projects)	✓	✓	✓
For planned public cycling network in operation no later than one year after the occupation for the proposed Project, please include the following:		**PA**	**CA**	**FA/ RFA**
SS_01c_06	Evidence issued by a government agency or a quasi-government body for the targeted operation date of planned public cycling network	✓	✓	✓
SS_01c_07	Declaration letter by the developer/ property owner stating the targeted occupation date of the proposed development	✓	✓	✓

(d) Charging Facilities for EV

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_01d_00	BEAM Plus NB submission template for SS 1d	✓	✓	✓
SS_01d_01	Drawings and description of EV charging facility provisions	✓	✓	✓
SS_01d_02	Evidence of EV charging facilities in project completion [or] Architect's Instruction (AI) with shop drawings, approved contractor's submission with technical information, etc. (if the evidence is not available at the time of CA submission)	- -	✓ ✓	✓ -

Remarks

(a) Additional Information

Recommended design requirements for barrier free access are published in the Design Manual for Barrier Free Access 2008 of the Buildings Department HKSAR.

Civil Engineering and Development Department, HKSAR publishes projects on the latest and on-going cycle track networks in its website.

Transport Department, Public Transport in Hong Kong. [ONLINE]. Available at: http://www.td.gov.hk/en/transport_in_hong_kong/public_transport/. [Accessed February 2025].

(b) Related Credit

SS P1 Minimum Landscaping Requirements

The related prerequisite requires a minimum site coverage of greenery that may contribute to the design of a pleasant environment for pedestrians.

SS 2 Neighbourhood Amenities

The related credit promotes a good pedestrian accessibility to amenities within and in the vicinity of the Site. Better integration of the surrounding pedestrian networks and pedestrian pathways within the site will achieve enhanced accessibility for building users and/ or the public.

SS 7 Biodiversity Enhancement

The related credit encourages strategies to preserve and/ or enhance the ecological value of the site in terms of habitat and biodiversity.

SS 8 Urban Heat Island Mitigation

The related credit encourages a higher overall site coverage of greenery and stipulates minimum site coverage of greenery in the Primary Zone (the 15m vertical zone of a site along the abutting street level). The enhanced greenery in the Primary Zone will contribute to a more pleasant pedestrian environment.

SS 10 Outdoor Thermal Comfort

The related credit considers the positive effect of shading by trees and the surrounding ground surface temperatures of greenery within the site.

SS 11 Stormwater Management

The related credit considers the hardscape and softscape provided with the site for infiltration and detention in stormwater management that may contribute to the design of a pleasant environment for pedestrians and the pervious construction to avoid ground contamination from oil run-off for open car park.

3 Sustainable Site **3.1 Neighbourhood Integration**

SS 2 Neighbourhood Amenities

Extent of Application All buildings

Objective Encourage building development that is integrated within, and an asset to, the immediate neighbourhood.

Credits Attainable 2

Credit Requirement

(a) Amenities for Building Users

1 credit where adequate amenities for building users are located within the site or 500m walking distance/ an equivalent horizontal commuting time from the site entrance(s).

(b) Shared Amenities for Neighbourhood

1 credit where adequate shared amenities for the neighbourhood are provided within the site and are made available for public use.

Assessment

(a) Amenities for Building Users

1. Provide a summary based on a survey of the immediate neighbourhood and the development itself to demonstrate that at least 15 amenities for building users are located within the site or 500m walking distance from the site entrance(s) to the main entrances of the amenities or the common entrance of a collective amenity (a complex comprising 2 or more amenities).

Building Amenities	**Building Types**					
	C1	C2	E1	E2	R	O
Food outlets						
Restaurants/ cafes/ food & beverage outlets	C	✓	C	C	C	✓
Community retail						
Convenience/ grocery stores	C	✓	C	C	C	✓
Supermarkets/ wet markets	✓	✓	✓	✓	✓	✓
Other retail shops	✓	✓	✓	✓	✓	✓
Services						
Banks or Automated Teller Machines	C	✓	✓	C	C	✓
Hairdressers	✓	✓	✓	✓	✓	✓
Pharmacy (with registered license and for retail purpose)	✓	✓	✓	✓	✓	✓
Laundry or dry cleaners	✓	✓	✓	✓	✓	✓

Community facilities						
Nursery classes*/ kindergartens*/ day care/ child care facilities	✓	✓		✓	✓	✓
Elderly care facilities	✓	✓	✓	✓	✓	✓
Primary/ secondary school*	✓	✓		✓	✓	✓
Arts venues*/ public entertainment [1]	✓	✓	✓	✓	✓	✓
Places of worship	✓	✓	✓	✓	✓	✓
Medical/ health facilities (including dental clinic)*	✓	✓	✓	✓	✓	✓
Libraries	✓	✓	✓	✓	✓	✓
Post offices*/ postal facilities#	✓	✓	✓	✓	✓	✓
Community hall*	✓	✓	✓	✓	✓	✓
Public toilets	✓	✓	✓	✓	✓	✓
Babycare room/ nursery room/ lactation room/ other similar amenities$^{\Delta}$	✓	✓	✓	✓	✓	✓
Recreational facilities/ open spaces						
Active recreational facilities or open spaces*	C	✓	C	C	✓	✓
Passive recreational facilities or open spaces*	✓	✓	✓	✓	C	✓

Legend:

C	Core amenity for building type
✓	Amenity relevant to building type
*	Definition referred to in HKPSG Chapter 3/ Chapter 4 [2, 3]
#	Postal facilities operated by Hongkong Post, such as permanent post offices, street posting boxes and iPostal stations; or facilities operated by other organisations/ companies which offer delivery services (i.e. sending and receiving letters, parcels and goods)
$^{\Delta}$	Other similar amenities equipped with supporting facilities enabling users to breastfeed/ express breastmilk, to bottle-feed infants and young children, or to change nappies for infants and young children in a private space with an appropriate environment

Remarks:
Free Wi-Fi is not considered as a neighbourhood amenity as Wi-Fi is not a building amenity with space provision, as compared to the listed amenities.

1 Public entertainment means any entertainment to which the general public is admitted with or without payment (ref. to Cap 172 Places of Public Entertainment Ordinance, HKSAR)

2 Planning Department. Hong Kong Planning Standards and Guidelines. Chapter 3: Community Facilities [ONLINE]. Available at: https://www.pland.gov.hk/file/tech_doc/hkpsg/full/pdf/ch3.pdf. [Accessed February 2025].

3 Planning Department. Hong Kong Planning Standards and Guidelines. Chapter 4: Recreation, Open Space and Greening. [ONLINE]. Available at: https://www.pland.gov.hk/file/tech_doc/hkpsg/full/pdf/ch4.pdf. [Accessed February 2025].

Building Types:

C1 C2	Commercial buildings	Office/ Retail/ Mixed-use Hotel
E1 E2	Educational buildings	Pre-school/ Primary/ Secondary School Tertiary/ Post-secondary Education/ Universities
R	Residential buildings	
O	Other building types	

2. Indicate lines and distances shown alongside unhampered walking routes from the site entrance(s) to the main entrance of each amenity or each collective amenity in vicinity on an A3-sized scaled drawing.

   2.1. When there are multiple site entrances in a development, the one having the least numbers of amenities complying with the credit requirements shall be demonstrated for compliance.

3. Demonstrate that the available amenities shall include at least 2 different core amenity types (core amenities are regarded as the most vital and essential basic services/ recreational facilities) referred above for:

   3.1. Office, retail or mixed-use buildings;

   3.2. Pre-school, primary or secondary school;

   3.3. Tertiary, post-secondary education or universities, and

   3.4. Residential buildings.

4. Count 2 or more amenities of the same type as 2 amenities.

   Example 1: 3 cafes and 2 ATMs shall be counted as 4 amenities.

   Example 2: 3 cafes, 2 ATMs and 3 public toilets shall be counted as 6 amenities.

5. The predominant service of the development itself could be counted as an amenity for this credit. For example, a school development itself is countable as an amenity for this credit.

(b) Shared Amenities for Neighbourhood

1. Demonstrate that at least 5 amenities referred in SS 2a are provided within the Site and will be made available for public use, and no core amenity is needed to be counted.

2. Count 2 or more amenities of the same type as 2 amenities.

   Example 1: 3 cafes and 2 ATMs shall be counted as 4 amenities.

   Example 2: 3 cafes, 2 ATMs and 3 public toilets shall be counted as 6 amenities.

3. Provide evidence that prominent and permanent public signage is provided on site or at least one notice in the public domain (websites, regular publications available to the public, newspapers or other means proposed by the Applicant) is served to notify the public about the shared amenities for neighbourhood, and any arrangement to be made for using the facilities.

4. State any restrictions or conditions of access to the amenities that will be in place. Reasonable opening time restriction and/ or fees charged for the use of the amenities by public shall be acceptable for this credit. Private clubhouses primarily for residents or building occupants of the proposed development shall not be counted in this credit requirement.

For both SS 2a and SS 2b:

1. Provide justifications to count amenities that are not listed in this credit for consideration. The justification shall be considered based on the individual merits of the amenities, basic necessity, psychological and/or physical wellbeing of the immediate neighbourhood.

2. Provide evidence of the targeted opening schedules for future amenities provisions not operable at the time of building completion. The amenities can be counted if they will be in operation no later than one year after the occupation of the proposed development.

Submittals

(a) Amenities for Building Users

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_02a_00	BEAM Plus NB submission template for SS 2a	✓	✓	✓
SS_02a_01	Scaled drawing on an A3-sized sheet indicating the distances alongside unhampered walking routes from the site's entrance(s) to amenities	✓	✓	✓
SS_02a_02	/	/	/	/
SS_02a_03	Justifications for the needs of building users/ public to count amenities that are not listed (if applicable)	✓	✓	✓
SS_02a_04	Evidence of the targeted opening schedules of future amenities provisions (if applicable)	✓	✓	✓
SS_02a_05	Declaration letter by the developer/ property owner stating the targeted occupation date of the proposed development (if future amenities with known targeted opening schedules are counted)	✓	✓	✓
SS_02a_06	Evidence of the amenities identified in the vicinity within 500m walking distance	✓	✓	✓

SS_02a_07	Declaration letter by the developer/ property owner stating the proposed amenities provided within the site for building users (if applicable)	✓	✓	✓

(b) Shared Amenities for Neighbourhood

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_02b_00	BEAM Plus NB submission template for SS 2b	✓	✓	✓
SS_02b_01	Scaled drawing on an A3-sized sheet indicating the shared amenities within the site	✓	✓	✓
SS_02b_02	Justifications for the needs of building users/ public to count amenities that are not listed	✓	✓	✓
SS_02b_03	Evidence of the targeted opening schedules of future amenities provision (if applicable)	✓	✓	✓
SS_02b_04	Declaration letter by the developer/ property owner stating the targeted occupation date of the proposed development (if future amenities with known targeted opening schedules are counted)	✓	✓	✓
SS_02b_05	Evidence of the public on-site signage or evidence of notice in the public domain for the shared amenities [or] Architect's Instruction (AI) with shop drawings, approved contractor's submission with technical information, etc. (if the evidence is not available at the time of CA submission)	- -	✓ ✓	✓ -
SS_02b_06	Declaration letter by the developer/ property owner stating the proposed amenities provided within the site for building users	✓	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credit

SS 1 Pedestrian-oriented and Low Carbon Transport

The related credit promotes good pedestrian accessibility to public transport. Better integration of the surrounding pedestrian networks and pedestrian pathways within the site will achieve enhanced accessibility for building users and/ or the public.

3 Sustainable Site **3.1 Neighbourhood Integration**

SS 3 Building Design for Sustainable Urbanism

Extent of Application All buildings

Objective Encourage a people-oriented and place-making approach for a sustainable urban design and conserve cultural heritage.

Credits Attainable 2 + 1 additional BONUS + 1 BONUS

Credit Requirement

(a) Sustainable Urban Design

Preparing a site design appraisal report demonstrating a proactive approach in achieving a people-oriented and place-making approach for a sustainable site planning.

Credit (s)	Percentage of achievement in site design appraisal report
1	at least 30% of applicable sustainable urbanism measures are achieved
2	At least 60% of applicable sustainable urbanism measures.
2 + 1 additional BONUS	At least 90% of applicable sustainable urbanism measures.

(b) Conservation of Cultural Heritage

1 BONUS credit for demonstrating that a proper heritage impact assessment mechanism and its recommendations have been implemented.

Assessment

(a) Sustainable Urban Design

1. Complete a checklist in the submission template of this credit to indicate which sub-items are achieved, not achieved or not applicable.

2. Provide a site design appraisal report demonstrating a proactive approach in achieving relevant applicable sustainable urbanism measures for public realm (interpreted as public spaces within and surrounding the site for socialisation and enjoyment by the community), providing justifications for all the achieved or not applicable sub-items of the following:

   2.1. Avoid dwarfing effect in public realm, considering visual effect of the building masses/ forms/ heights from public spaces in relation to human scale.

   2.2. Create or preserve visual corridors and prominent pedestrian linkages in public realm to less developed rural areas in urban fringe or towards adjacent public open spaces in vicinity. (This sub-item is not applicable for sites where there is no surrounding public open space or less developed rural area in vicinity.)

2.3. Create or preserve visual corridors in public realm from inland to the waterfront of the Victoria Harbour or major water bodies such as Inner Port Shelter, Junk Bay, Ma Wan, South China Sea, Tolo Harbour. (This sub-item is not applicable for inland sites where public realm has no view of the water bodies.)

2.4. Harmonise building masses/ forms/ heights with the natural environment in rural areas or urban fringe. (This sub-item is not applicable for inland urban sites where public realm has no view of the natural environment.)

2.5. Avoid monotony by diversified but yet compatible building masses/ forms/ heights in relation to topography or character of surrounding landscape/ developments.

2.6. Create stepped and compatible building height profile within the site in relation to topography, water bodies or character of surrounding landscape/ developments.

2.7. Preserve views to selected sections of ridgelines/ peaks by maintaining a 20% building free zone [1] as viewed from relevant vantage points [2] or give punctuation effects of the ridgelines by special landmark mega tower design with high quality architectural design at suitable locations [3]. (This sub-item is not applicable for inland sites that could not be seen from the afore-mentioned vantage points on both sides of Victoria Harbour.)

2.8. Preserve views to local building/ landscape features and public spaces from public realm by appropriate building masses/ forms/ heights.

2.9. Open up or preserve view from public realm to any adjacent heritage feature. Arrange massing of larger elements of the new development furthest from an adjacent heritage feature and smaller elements of the massing closer to the feature. (This sub-item is not applicable for sites where there is no adjacent heritage feature.)

2.10. Provide building set-back (at least 2m from site boundary) from street and neighbourhood amenities along street to activate public realm. (This sub-item is not applicable for sites with no street frontage.)

2.11. Create building masses/ forms as high quality architectural landmark features in public realm/ waterfront to create orientation and a sense of place.

2.12. Provide public open spaces of diverse shapes and sizes for social and cultural events with prominent pedestrian linkages.

2.13. Avoid monotony by diversified but yet compatible building façade/ streetscape design in public realm (styles/ colours/ materiality/ architectural details) in relation to surrounding developments.

2.14. Define entrance(s) and focal point(s) in public realm to create a sense of place.

1 Planning Department. Hong Kong Planning and Standards Guidelines. Chapter 11: Urban Design Guidelines. Figure 2: Building Free Zone to Preserve Views to Ridgelines. [ONLINE]. Available at: https://www.pland.gov.hk/file/tech_doc/hkpsg/full/pdf/ch11.pdf. [Accessed February 2025].

2 Planning Department. Hong Kong Planning and Standards Guidelines. Chapter 11: Urban Design Guidelines. Figure 3: Vantage Points. [ONLINE]. Available at: https://www.pland.gov.hk/file/tech_doc/hkpsg/full/pdf/ch11.pdf. [Accessed February 2025].

3 Planning Department completed the "Urban Design Guidelines for Hong Kong" (the UDG Study) in 2003 and has suggested that no additional high-rise nodes should be designated outside the southern tip of West Kowloon Reclamation and Tsim Sha Tsui area.

2.15. Provide high quality architectural design of seating, pedestrian signage, pavement surface and other street furniture in the public realm to strengthen human scale and to complement the character of the area or the adjacent developments.

2.16. Harmonise architectural design, especially in the lower floors, with an adjacent built heritage in terms of style, scale, proportion, colour and/ or materials (at least 2 of these items). (This sub-item is not applicable for sites where there is no adjacent built heritage.)

2.17. Create landscape with seasonal colour changes and scenic effect to enhance street character.

2.18. Provide suitable landscaping to minimise negative visual impact of stilted structures on sloping sites. (This sub-item is not applicable for sites where there is no stilted structure.)

(b) Conservation of Cultural Heritage

1. Compile a comprehensive inventory of cultural heritage within or in the vicinity of the site (interpreted as not more than 50m measured from the nearest point of the site boundary (inclusive of works area) in accordance with the Technical Circular (Works) No. 6/2009 for Heritage Impact Assessment Mechanism for Capital Works Projects [4]).

   1.1. Cultural heritage referred to in this credit include declared monuments/ Grade 1 to Grade 3 historic buildings confirmed by the Antiquities Advisory Board (AAB) and other sites/ historic buildings proposed to be recorded/ graded by AAB. The information of cultural heritage shall be assembled from the Antiquities and Monuments Office (AMO) [5], public libraries and archives and tertiary institutions.

   1.2. If there is any potential heritage site/ structure/ feature/ building within or in the vicinity of the site, present the latest record by AMO's grading confirmation or advice on the heritage value of the site/ structure/ feature/ building.

2. For a project with cultural heritage within or in the vicinity of the site, demonstrate that a heritage impact assessment mechanism in accordance with Development Bureau's Technical Circular (Works) No. 6/2009 "Heritage Impact Assessment Mechanism for Capital Works Projects" [4] and its recommendations have been implemented.

3. For a project with no cultural heritage confirmed by the Antiquities Advisory Board (AAB) within or in the vicinity of the project site, provide justification for the existence of potential heritage site/ structure/ feature/ building within or in the vicinity of the project site and supporting documents (e.g. the latest record by AMO's advice on the heritage value of the site/ structure/ feature/ building, heritage impact assessment report, photos, etc.) to demonstrate that a heritage impact assessment mechanism in accordance with Development Bureau's Technical Circular (Works) No. 6/2009 "Heritage Impact Assessment Mechanism for Capital Works Projects" and its recommendations have been implemented.

4 Development Bureau. Technical Circular (Works) No. 6/2009: Heritage Impact Assessment Mechanism for Capital Works Projects. [ONLINE]. Available at: https://www.devb.gov.hk/filemanager/technicalcirculars/en/upload/300/1/C-2009-06-0-1.pdf. [Accessed February 2025].

5 Antiquities and Monuments Office, Hong Kong. [ONLINE]. Available at: https://www.amo.gov.hk/en/main.php. [Accessed February 2025].

Submittals

(a) Sustainable Urban Design

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_03a_00	BEAM Plus NB submission template for SS 3a with Checklist for sustainable urbanism measures for public realm [Form S-A]	✓ ✓	✓ ✓	✓ ✓
SS_03a_01	Site design appraisal report demonstrating a proactive approach in achieving relevant applicable sustainable urbanism measures, with detailed narrative and supporting information such as existing site photos, layout plans, renderings, etc. to demonstrate compliance	✓	✓	✓

(b) Conservation of Cultural Heritage

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_03b_00	BEAM Plus NB submission template for SS 3b	✓	✓	✓
SS_03b_01	Heritage impact assessment report	✓	✓	✓
SS_03b_02	Supporting documents and photos for implementation of recommendations in heritage impact assessment report	-	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credit

SS 1 Pedestrian-oriented and Low Carbon Transport

The related credit encourages pleasant pedestrian-oriented design and may help achieve the people-oriented and vibrant streetscape.

SS 2 Neighbourhood Amenities

The related credit encourages building developments to provide neighbourhood amenities and will help activate public realm.

SS 7 Biodiversity Enhancement

The related credit encourages habitat preservation/ enhancement that may contribute to the landscape quality of the public realm.

SS 8 Urban Heat Island Mitigation

The related credit encourages greenery and building setback that may enhance the quality of the public realm.

3 Sustainable Site **3.1 Neighbourhood Integration**

SS 4 Neighbourhood Daylight Access

Extent of Application All buildings

Objective Encourage building development which is sensitive to the needs of neighbours in respect of preserving daylight and views.

Credits Attainable 1

Credit Requirement 1 credit for the designs which the access to daylight of neighbouring sensitive buildings is maintained to the prescribed levels.

Assessment

1. Demonstrate **either** by:
   - 1.1. Computational lighting simulation/ physical modelling, the Vertical Daylight Factors (VDFs) [1] on the façades of the lowest floors of the sensitive buildings most affected by the proposed development are either unchanged or are no less than 12%; **OR**
   - 1.2. Unobstructed Vision Area (UVA) Method [1], the UVAs of the windows on the lowest floors of the sensitive buildings most affected by the proposed development are unchanged.
2. For development located in an area where daylight is thought to be of no value to neighbouring properties, submit a scaled map covering the assessment area (see Section 4.1 Sensitive Buildings) to substantiate.
3. Submit a daylight access study report demonstrating compliance with the assessment criteria. The report should include:
   - 3.1. Types and locations of the sensitive buildings identified within the Site and in the vicinity on an A3-sized scale drawing;

   For VDF simulation method:
   - 3.2. Name of the simulation software used;
   - 3.3. Modelling assumptions;
   - 3.4. Screen captures of project building, surrounding building and terrain of the 3D model;
   - 3.5. Screen captures of the Sensitive Receivers' locations;
   - 3.6. Summary of sensitive receivers and VDF results;
   - 3.7. Simulation output results (raw data output files/ render images);
   - 3.8. If the simulation software is not on the list in Annex 4 of PNAP APP-130, a software validation report from the software developer should be provided to ensure the accuracy of the simulation by the software.

   For physical modeling method:
   - 3.9. General information such as site orientation, site latitude, scale of physical model, etc.;

1 Buildings Department - PNAP APP-130 Lighting and Ventilation Requirements – Performance-based Approach. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnap/APP/APP130.pdf. [Accessed February 2025].

3.10. Sensor and camera location;

3.11. Material and edge joining;

3.12. Colour and Wall Reflection Coefficient;

3.13. Modelisation of the external surfaces;

3.14. Modelisation of external obstructions;

For UVA method:

3.15. Scaled drawings showing the UVA at Sensitive Receivers before and after the proposed development;

4. The report should be endorsed by a locally qualified professional who has at least 3 years of relevant experience in natural daylight study. The Locally Qualified Professional shall attain at least one of the following local professional qualifications:

- Member of The Hong Kong Institute of Architects (MHKIA);
- Member of The Hong Kong Institution of Engineers (MHKIE);
- Member of Hong Kong Institute of Qualified Environmental Professionals Limited (MHKIQEP);
- Registered Energy Assessor (REA), under the Buildings Energy Efficiency Ordinance (Cap. 610); and
- Registered Professional Engineer (R.P.E.), under the Engineers Registration Ordinance (Cap. 409).

Except for MHKIA, the accepted disciplines of the above local professional qualifications include Building Services, Mechanical, Electrical, Energy and Environmental.

CV of the Locally Qualified Professional shall be provided to demonstrate that the Locally Qualified Professional holds the required local professional qualification(s) and with the relevant experience.

4.1. Sensitive Buildings

4.1.1. Assessment area shall be 1H (H being the building height (m) of the tallest building on the project site) or 100m away from the project site, whichever is larger;

4.1.2. All sensitive buildings (including existing buildings, buildings under construction and planned buildings) within the assessment area (excluding those within the site) shall be assessed to determine the value of daylight;

4.1.3. Sensitive buildings include:

a) Residential buildings;

b) Premises that requires daylight to enhance the lighting environment for the occupants to perform tasks, such as offices and schools;

c) Premises that require daylight for energy saving and an improved environment for the transient stage of occupation, such as the circulation area of shopping centres and indoor games halls; and

d) Premises that require daylight primarily for view, such as hotels and hospitals.

- Examples of premises that should be included: Commercial, education, shopping centre, hall, church, temple, hotel, hostel, hospitals and shops

- Temporary structures are not required to be modelled

4.2. Sensitive Receivers

4.2.1. Sensitive receivers should be placed at the glazing of the lowest floors of sensitive buildings within the assessment area.

5. The below requirements should be fulfilled in the daylight simulation:

5.1. Sky model should use CIE overcast sky (10,000 lux)

5.2. Overall external reflectance of an average of 0.2 for building (include the project development) and 0.2 for ground.

5.3. Surrounding buildings (including existing buildings, buildings under construction and planned buildings) and terrain shall be included in the model based on the GIS information from Lands Department, prevailing statutory plans from Town Planning Board Statutory Planning Portal, building records from Buildings Department's BRAVO system and/or other relevant sources available on or before 3 months prior to the date of the first revision study report.

5.4. The surrounding buildings and large structures should be included in the simulation model. The surrounding area should be at least 2H (H being the building height (m) of the tallest building on the project site) or 200m away from the project site boundary, whichever is larger. The building geometry can be simplified as blocks.

5.5. The terrain area shall be in a size of at least, 10H (H being the building height (m) of the tallest building on the project site) or 1000m × 1000m, whichever is larger, with the project placed in the centre. Where smaller terrain area is desired, the applicant should propose a terrain area with justification and the terrain area should be surrounded by a wall with a height of the average height of the surrounding buildings.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_04_00	BEAM Plus NB submission template for SS 4	✓	✓	✓
SS_04_01	CV of the professional as described in credit requirement	✓	✓	✓
SS_04_02	Site plan indicating the location of the sensitive receiver	✓	✓	✓
SS_04_03	Daylight access study report	✓	✓	✓
SS_04_04	Validation Report of the simulation software* (Simulation Path only)	✓	✓	✓
* It is required only if the simulation software is not on the list in Annex 4 of PNAP APP-130.				

Remarks

(a) Additional Information

None

(b) Related Credit

HWB 11 Daylight

This credit considers the daylight performance in indoor normally occupied spaces by considering the sufficiency of daylight illuminance and the potential risk of excessive sunlight penetration.

3 Sustainable Site **3.1 Neighbourhood Integration**

SS 5 Noise Control for Building Equipment

Extent of Application All buildings except those specified in Clause 1 under "Assessment"

Objective Encourage proactive design techniques to reduce the nuisance caused to the neighbours by noise from building services equipment.

Credits Attainable 1

Credit Requirement 1 credit for demonstrating that the level of the intruding noise at the façade of potential noise sensitive receivers is in compliance with the criteria recommended in the Technical Memorandum for the Assessment of Noise from Places Other than Domestic Premises, Public Places or Construction Sites [1].

Assessment

1. The credit is not applicable for the following projects:
   - 1.1. Projects without major noise generating equipment in place other than domestic units in a residential building of public/ private housing developments and government quarters (as defined in Clause 2.8); OR
   - 1.2. Projects without existing and planned noise sensitive receivers within 300 meters measured from the nearest point of the assessment boundary for the project site.
2. Provide a background noise measurement report with detailed monitoring records to support the background noise level of noise sensitive receivers at daytime, evening time and nighttime.
3. Provide a noise prediction/ assessment report with detailed analysis, appropriate calculations and/ or measurements to demonstrate that the levels of the intruding noise at 1m from the façades of existing or planned noise sensitive receivers comply with the following assessment criteria:
   - 3.1. On the basis of promoting good environmental design assessment, existing uses and land uses under statutory plans of Town Planning Ordinance should be examined to identify existing or planned noise sensitive developments. Where there is a piece of vacant land and no available information to verify its use, it should be assumed that it will become a noise sensitive receiver.
   - 3.2. Ideally, assessment should be made at 1m from the façade on the noise sensitive receiver. The compliance could be demonstrated by calculations and/ or measurements.

1 Environmental Protection Department - Technical Memorandum for the Assessment of Noise from Places Other than Domestic Premises, Public Places or Construction Sites. [ONLINE]. Available at: https://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/noise/guide_ref/files/tm_nondomestic.pdf. [Accessed February 2025].

3.3. If on-site measurement is opted for, compliance should be demonstrated by direct measurement of the intruding noise at the nearest location(s) of the representative noise sensitive receivers. Alternatively, under circumstances that access to the noise sensitive development is not granted for measurement, a combination of measurement at a nearby location with calculation adjustment, or a combination of sound power measurement at the intruding noise source and prediction of the noise level at the noise sensitive receivers based on the measured sound power and standard noise propagation equation, are permitted.

3.4. The noise assessments shall be conducted in accordance with the Technical Memorandum [1].

3.5. Noise sensitive receivers (NSRs) should follow the Technical Memorandum. Only buildings external to the site boundary are assessed. For determination of NSRs, only uses which rely on opened windows for ventilation should be assessed.

3.6. With reference to the Technical Memorandum and Noise Control Ordinance (NCO) (Cap. 400), noise emanating from domestic units does not fall under the purview of the Technical Memorandum, therefore, equipment in domestic units (i.e. domestic unit(s) in a residential building of the public/ private housing development and government quarters should not be included in the assessment.

3.7. All major noise generating equipment in place other than domestic units in a residential building of public/ private housing development and government quarters should be assessed.

3.7.1. For areas served by central air-conditioning and ventilation systems, the major noise sources include air-cooled chillers, water cooling towers, air-cooled heat pumps, and axial and centrifugal fans (≥2.5kW each) [2].

3.7.2. For areas served by de-centralised air-conditioning and ventilation systems, the major noise sources include outdoor air-conditioning units (with rated cooling capacity >7.1kW) and ventilating fans (i.e. axial and centrifugal fans ≥2.5kW each).

3.7.3. Only equipment provided by the developer/ owner is assessed.

3.8. All major fixed noise sources should be located and designed so that when assessed in accordance with the Technical Memorandum, the level of the intruding noise at 1m from the façade of the nearest sensitive receiver should be at least 5 dB(A) below the appropriate Acceptable Noise Levels (ANL) shown in Table 2 of the Technical Memorandum or, in the case of the background being 5 dB(A) lower than the ANL, should not be higher than the background, in accordance with paragraph 4.2.13, Chapter 9 of the Hong Kong Planning Standards and Guidelines [3]. Applicants are required to justify the selected Area Sensitivity Rating (ASR).

3.9. The noise prediction/ assessment report should at least include the following information:

3.9.1. Description of NSRs

3.9.2. Identification of ASRs and ANLs with justifications and background noise level for each NSR to support the noise criteria

2 EPD - Good Practices on Ventilation System Noise Control (April 2006)

3 Hong Kong Planning Standards and Guidelines, Chapter 9 Environment. [ONLINE]. Available at: https://www.pland.gov.hk/file/tech_doc/hkpsg/full/pdf/ch9.pdf. [Accessed February 2025].

3.9.3. Identification of major fixed noise sources

3.9.4. Assessment methodology

3.9.5. Noise calculation and/ or measurement results

3.9.6. Equipment schedule(s) and layout plan(s) of noise generating equipment with clear indication(s) showing the major fixed noise source provided by the project developer/ owner

3.9.7. Supporting documents for noise attenuation considered in the calculation, such as drawings with indication and justification for barrier/ screening correction, or technical data (e.g. datasheet, design drawings) showing the information of acoustic treatment, etc. (if applicable).

3.10. The noise prediction/ assessment report should be endorsed by:

- a Corporate Member of Hong Kong Institute of Acoustics; or
- a corporate/ certified/ full member of other international acoustic institution; or
- a member of HKIE (Building Services, Mechanical or Environmental discipline) with relevant experience in Acoustic/ Vibration Design.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_05_00	BEAM Plus NB submission template for SS 5	✓	✓	✓
SS_05_01	Layout plans indicating the location of the major noise sources and NSR's location and the corresponding shortest distance	✓	✓	✓
SS_05_02	Background Noise Measurement Report AND Endorsed noise prediction/ assessment report AND Summary of Noise Assessment Criteria and Result [SS_05_Appendix A]	✓	✓	✓
SS_05_03	Technical data (e.g. equipment catalogue) showing the sound power level of equipment	✓	✓	✓
SS_05_04	Outline zoning plan to show the planned development(s) around the project site	✓	✓	✓
SS_05_05	CV of the professional as described in credit requirement	✓	✓	✓

SS_05_06	Information (e.g. equipment schedule showing equipment type, cooling capacity/ power rating, etc.) showing no provision of major noise generating equipment as defined in Clause 2.8 [substantiation for non-applicability (Clause 1.1) only]	✓	✓	✓
SS_05_07	A map of the project site and its surroundings, with clear illustration showing no existing and planned noise sensitive receivers within 300 meters measured from the nearest point of the assessment boundary for the project site [substantiation for non-applicability (Clause 1.2) only]	✓	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credit

None

3 Sustainable Site **3.2 Ecologically Responsible Design**

SS 6 Light Pollution Control

Extent of Application All buildings

Objective Ensure that the exterior lighting and building design do not create unwanted and unnecessary light pollution.

Credits Attainable 2

Credit Requirement

(a) Control of Obtrusive Artificial Light

1 credit for demonstrating that the obtrusive light from exterior lighting meets the specified performance for the environmental zone in which the building development is located.

(b) Control of External Light Reflection from Building

1 credit for demonstrating that the sunlight reflection from external surfaces of the buildings is controlled by using materials with acceptable external light reflectance.

Assessment

(a) Control of Obtrusive Artificial Light

1. Provide a scaled map showing the immediate neighbourhood of the Site highlighting the surrounding buildings included in the assessment. Only buildings outside the site boundary are assessed.

2. Provide a schedule of all exterior lighting fixtures, including their quantities, locations and model references and compile supplier information on the performance of the light fixtures used for modelling studies.

3. Provide the exterior lighting layout plan showing types and locations of all exterior lighting fixtures.

4. Demonstrate that the relevant recommendations in the HKSAR Government's Guidelines on Industry Best Practices for External Lighting are complied with [1].

5. Meet the obtrusive light control requirements, using either the backlight-uplight-glare (BUG) method when all installed luminaires' BUG rating information is available, or the calculation method if partial exterior luminaires are not BUG rated.

1 Environment Bureau. Guidelines on Industry Best Practices for External Lighting Installations. [ONLINE]. Available at: https://www.charteronexternallighting.gov.hk/files/guidelines/guidelines_ex_lighting_install_eng.pdf. [Accessed February 2025].

Calculation Method

6. Demonstrate that the exterior lighting design complies with the maximum value for each parameter (light into windows, source intensity, sky glow and building luminance [2]), taken from Table 3, Table 4, Table 6 and Table 8 respectively in ILP Guidance Notes [3]. Provide justification for the environmental zone as defined in Table 2 of ILP Guidance Notes [3] for the project. Note that it is a district-scale consideration.

7. Prepare a light pollution calculation report for modelling studies to demonstrate compliance of the above criteria, including:

   7.1. Assumptions adopted;

   7.2. Screen capture of input parameters;

   7.3. Screen capture of modelled buildings;

   7.4. Results highlighting compliance of credit requirements.

BUG Method

8. Demonstrate that the luminaire uplight, backlight and glare ratings for the specific light source installed in the luminaire, taken from IES TM-15-11 – Addendum A [4], based on mounting location and distance from the property line (assessment boundary), do not exceed the criteria for the corresponding lighting zone as defined in Model Lighting Ordinance (MLO) [5]. Provide justification for the lighting zone adopted for the project. Note that the lighting zone is a district-scale consideration.

9. Define assessment boundary on layout.

10. BUG values are typically published by product manufacturers. If published BUG data do not address the design position of the luminaire (or are not available at all), ratings can be calculated by reviewing a luminaire's photometric test data and zonal lumen distribution and comparing the data with maximum zonal lumens for backlight, uplight, and glare established in IES TM-15-11, Addendum A. Software calculation for BUG rating is acceptable to reflect the compliance.

11. Prepare a BUG method report to demonstrate compliance of the above criteria, including:

    11.1. Highlighting manufacturer BUG rating information for installed luminaires;

    11.2. Software calculation (if applicable) for the BUG rating with all assumption adopted, screen capture of input parameters and results of BUG rating.

2 "Building Luminance" cannot be excluded from the assessment even if there is no lighting installed on the façade. If any floodlight and/ or other type of lighting is installed on-site (e.g. roof, at grade) that causes illumination of the building, "Building Luminance" shall also be applicable and hence shall be assessed.

3 The Institution of Lighting Professionals. Guidance notes for the reduction of obtrusive light, GN01:2011. [ONLINE]. Available at: https://www.theilp.org.uk/documents/obtrusive-light/. [Accessed February 2025].

4 Backlight, Uplight, and Glare (BUG) Ratings - IES TM-15-11 – Addendum A. [ONLINE]. Available at: https://www.ies.org/wp-content/uploads/2017/03/TM-15-11BUGRatingsAddendum.pdf. [Accessed February 2025].

5 Illuminating Engineering Society and International Dark-Sky Association (IES/ IDA) Model Lighting Ordinance User Guides. [ONLINE]. Available at: http://darksky.org/wp-content/uploads/bsk-pdf-manager/16_MLO_FINAL_JUNE2011.PDF. [Accessed February 2025].

* Exemptions from this credit assessment

12. The following exterior lighting is exempted from the requirements, provided that it is controlled separately from the non-exempt lighting:

    12.1. Specialised signal, directional, and marker lighting for transportation.

    12.2. Lighting for theatrical purposes for stage, film, and video performances.

(b) Control of External Light Reflection from Building

1. Demonstrate objectively that the sunlight reflection from the external surfaces of the building development is properly controlled and meets the following requirements:

External surfaces of various parts of the building development	**Total**	**Specular**
	External Light reflectance not to exceed	
Glass	20%	Nil
At least 50% (measured by surface areas) of materials (other than glass) on building façades and roof	Nil	10%

Note:

(i) Specular reflectance is the type of reflectance when light is reflected away from the reflecting surface at the same angle as it is incident.

(ii) Total external light reflectance is the sum of specular and diffuse reflectance.

2. The testing of reflectance values for any material shall be conducted by accredited laboratories in accordance with ASTM E903: Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres, or equivalent, with an integrating sphere of minimum 150mm diameter.

Submittals

(a) Control of Obtrusive Artificial Light

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_06a_00	BEAM Plus NB submission template for SS 6a	✓	✓	✓
SS_06a_01	Scaled map showing immediate neighbourhood of the site for assessment	✓	✓	✓
SS_06a_02	External lighting layout plans	✓	✓	✓
SS_06a_03	Schedule of exterior lighting fixtures and lighting catalogues with performance data	✓	✓	✓

SS_06a_04	Light pollution calculation report	✓	✓	✓
	[or] BUG method report	✓	✓	✓
SS_06a_05	Report on the compliance of Guidelines on Industry Best Practices for External Lighting	✓	✓	✓

(b) Control of External Light Reflection from Building

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_06b_00	BEAM Plus NB submission template for SS 6b	✓	✓	✓
SS_06b_01	Schedules or drawings of materials used on the external surfaces and roofs of the building development	✓	✓	✓
SS_06b_02	Technical data (e.g. reference material catalogues/ test reports) showing their specular reflectance values to demonstrate the design intent for the proposed types and finishes of the surface materials; schedule of external materials and proposed finishes treatments, and contract specifications for the specular reflectance requirement for the materials	✓	-	-
SS_06b_03	Calculations for surface areas using different materials (other than glass) to demonstrate compliance in design stage and when the building is completed respectively	✓	✓	✓
SS_06b_04	Photos of the building façade [or] Architect's Instruction (AI) with shop drawings, approved contractor's submission with technical information, etc. (if photos are not available at the time of CA submission)	- -	✓ ✓	✓ -
SS_06b_05	Technical data (e.g. approved contractor's submission with catalogues or test reports) confirming the relevant external light reflectance of materials used on the external surfaces of the building development	-	✓	✓

Remarks

(a) Additional Information

International Dark-sky Association. Information Resource. [ONLINE]. Available at: http://www.darksky.org/resources. [Accessed February 2025].

International Commission on Illumination. Guidelines for Minimising Sky Glow. Technical Report CIE 126: 1997.

(b) Related Credit

None

3 Sustainable Site **3.2 Ecologically Responsible Design**

SS 7 Biodiversity Enhancement

Extent of Application All sites with existing tree except brownfield sites for SS 7a

Sites with adjacent areas of medium or high ecological value for SS 7b

Objective Preserve and/ or enhance the biodiversity of the site.

Credits Attainable 1 + 2 additional BONUS + 3 BONUS

Credit Requirement

(a) Reduction of Ecological Impact

Credit	Requirement
1	All identified habitat types on Site are of low or negligible indicative ecological values **OR** All identified habitat types on Site of medium to high indicative ecological value are preserved intact and are unaffected or enhanced by the planned development
1 additional BONUS	The combined girth of the retained trees, with individual girth of at least 150mm, is at least 20% of the total girth of all existing trees on site.
1 additional BONUS	The combined girth of the retained trees, with individual girth of at least 150mm, is at least 40% of the total girth of all existing trees on site.

(b) Enhancement of Biodiversity

Prepare a manual on biodiversity-friendly landscape maintenance, **PLUS** a biodiversity enhancement report demonstrating each of the following measures for enhancing the biodiversity of the Site:

1. 1 BONUS credit for physical connectivity between areas with ecological values.
2. 1 BONUS credit for increased diversity and complexity of planting.
3. 1 BONUS credit for wildlife-friendly building features (e.g. windows and lighting).

Assessment

(a) Reduction of Ecological Impact

1. Provide a habitat mapping report of the Site to identify the locations, dimensions and areas of all existing habitat types within the Site and determine their corresponding indicative ecological value. The mapping of habitat types, their definition and ecological value identification shall make reference to Terrestrial Habitat Mapping and Ranking Based on Conservation Value [1]. Types of habitats and their indicative ecological values are summarised below:

1 Sustainable Development Unit, Environment Bureau, HKSAR. 2009. Terrestrial Habitat Mapping and Ranking Based on Conservation Value.

Ecological Value	Habitat Types
High Value	Fung Shui Forest; Montane Forest; Lowland Forest; Mixed Shrubland; Freshwater/ Brackish Wetland; Natural Watercourse; Seagrass Bed; and Intertidal Mudflat.
Medium Value	Shrubby Grassland (including Baeckea Shrubland); Plantation or Plantation/ Mixed Forest; Fishpond/ Gei Wai; Sandy Shore; Rocky Shore; and Cultivation.
Low Value	Bare Rock or Soil; Grassland; Modified Watercourse; Artificial Rocky/ Hard Shoreline; Golf Course/ Urban Park; and Quarry
Negligible Value	Rural industrial storage/ containers; Landfill; and Others.

2. Provide an ecological impact assessment report to demonstrate one of the following is achieved:

   2.1. All identified habitat types on Site are of low or negligible indicative ecological value; **OR**

   2.2. All identified habitat types on Site of medium to high indicative ecological value are preserved intact and are unaffected or enhanced by the planned development.

3. Retention of Trees

   3.1. Provide a detailed tree survey of all trees on Site in accordance with the Development Bureau Technical Circular (Works) No. 7/2015 of the HKSAR Government**.**

   3.2. Demonstrate the combined girth of retained trees shall be at least 20% (or 40%) of the total girth of all existing trees on site.

   3.3. The individual girth of the retained trees counting towards the 20% (or 40%) shall not be less than 150mm and shall each have no more than 25% of its crown pruned to enable construction and operation of the Project.

   3.4. Trees transplanted within the Site are not qualified as retained trees of this BONUS credit.

(b) Enhancement of Biodiversity

1. Provide a habitat mapping report of the adjacent areas to the Site to identify the locations, dimensions and areas of all existing habitat types of areas adjacent to the Site and determine their corresponding indicative ecological value. The mapping of habitat types, their definition and ecological value identification shall make reference to Terrestrial Habitat Mapping and Ranking Based on Conservation Value. Types of habitats and their indicative ecological values are summarised in the table under Part (a)(1) above.

2. Prepare a Biodiversity-friendly Landscape Maintenance Manual including the sections below for at least 20 A4 pages:
   2.1. Design objectives of biodiversity enhancement;
   2.2. Maintenance requirement; and
   2.3. Waste minimisation.

3. Prepare a Biodiversity enhancement report to indicate the measures to be implemented:
   3.1. Physical connectivity between areas with ecological values
      3.1.1. Provide planting plans and demonstrate the physical interconnectivity between new planting area and any preserved areas of medium to high ecological value within the Site or any areas of medium to high indicative ecological value adjacent to the Site (supported by a habitat map of adjacent area) [2].
      3.1.2. Physical interconnectivity refers to contiguous planting areas less than 2m wide apart, without broken by occasional footpaths, installations or other features wider than 2m.
      3.1.3. Demonstrate the total connected area is more than 5% of the total Site area.
   3.2. Increased diversity and complexity of planting
      3.2.1. Provide planting plans and demonstrate plant species type, characteristics of the species chosen (tree/ shrub/ herb/ climber), nativeness (native/ exotic), quantity and location.
      3.2.2. Demonstrate the planting scheme incorporated **ALL** elements below:
         a) Chosen diverse plant species. Reference to 10-20-30 rule for planting [3].
         b) Increase complexity of vegetation structure and provide habitats for wildlife by mixing vegetation with varied heights [4].
         c) Use >50% native or adaptive species.
   3.3. Wildlife-friendly building features
      3.3.1. Demonstrate features on design drawings that reduce bird collision:
         a) Design that avoid bird collision on windows (e.g. use pattern on glass/ façade/ shades, translucent glass) [5].

2 Sustainable Development Unit, Environment Bureau, HKSAR. 2009. Terrestrial Habitat Mapping and Ranking Based on Conservation Value.

3 Development Bureau, HKSAR, 2018 Street Tree Selection Guide “Chapter 9 – Complementary Vegetation Community Mix”.

4 Development Bureau, HKSAR, 2018 Street Tree Selection Guide “Chapter 9 – Complementary Vegetation Community Mix”.

5 Sheppard, C. 2011. Bird-Friendly Building Design. American Bird Conservancy, The Plains, VA. USA.

b) Design essential outdoor lighting only and adopt measures to minimise impacts of outdoor lighting to wildlife (e.g. use narrow-spectrum light bulbs to lower the range of species affected by light; use light sources that emit minimal UV light and avoid the white and blue wavelengths; use shields to minimise light spill) [6].

4. The biodiversity enhancement report should be endorsed by a qualified landscape architect or ecologist. Alternative measures proposed other than those listed for compliance is acceptable with justification.

Submittals

(a) Reduction of Ecological Impact

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_07a_00	BEAM Plus NB submission template for SS 7a	✓	✓	✓
SS_07a_01	Evidence such as site survey photo or aerial photo of the site condition before development	✓	✓	✓
SS_07a_02	Habitat mapping report (Site) with scaled and dimensioned drawings and photographic records of the existing site conditions for habitat types identified in the Site (if SS 7a is applicable)	✓	✓	✓
SS_07a_03	Ecological impact assessment report (if SS 7a is applicable)	✓	✓	✓
SS_07a_04	Detailed tree survey of all the trees on Site (for additional BONUS only)	✓	✓	✓
SS_07a_05	Landscape layout plans and sections showing the retained trees (for additional BONUS only)	✓	✓	✓
SS_07a_06	Summary and calculations to demonstrate the girth of retained trees shall be at least 20% (or 40%) of the total girth of all existing trees on site (for additional BONUS only)	✓	✓	✓

6 Gunnell, K. et al. 2013. Designing for Biodiversity: A Technical Guide for New and Existing Buildings. Second Edition. RIBA Publishing, London. UK.

(b) Enhancement of Biodiversity

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_07b_00	BEAM Plus NB submission template for SS 7b	✓	✓	✓
SS_07b_01	Habitat mapping report (Adjacent Area) with scaled and dimensioned drawings and photographic records of the existing conditions for habitat types identified in the areas adjacent to the Site [or] Site photo / terrestrial habitat map to justify that the adjacent areas of the Site are not of medium or high ecological value (Substantiation for non-applicability only)	✓	✓	✓
SS_07b_02	Biodiversity-friendly landscape maintenance manual (if SS 7b is applicable)	✓	✓	✓
SS_07b_03	Biodiversity enhancement report (if SS 7b is applicable)	✓	✓	✓
SS_07b_04	CV of the professional as per requirements in the assessment (if SS 7b is applicable)	✓	✓	✓

Remarks

(a) Additional Information

Development Bureau HKSAR Government, 'A Comprehensive Street Tree Management Plan for Hong Kong', Annex IV: Encouraging Biodiversity in the Urban Landscape through Planting Appropriate Tree Species in Hong Kong.

Development Bureau. Greening, Landscape and Tree Management Office (GLMTS) 2010, Guiding principles on use of native plant species in public works projects.

Beck T, Principles of ecological landscape design. Island Press, Washington, Covelo, London.

MacArthur R.H. and Wilson E.O., The theory of island biogeography, Princeton University Press, New Jersey, USA.

(b) Related Credit

SS P1 Minimum Landscaping Requirements

The related prerequisite requires minimum site coverage of greenery and minimum provisions for viability of planting, for example, the minimum soil volumes and depths for all plant areas.

SS 1 Pedestrian-oriented and Low Carbon Transport

The related credit encourages the shading of main pedestrian paths by trees. The soil space of trees shall meet the minimum standards stipulated in SA P1.

SS 8 Urban Heat Island Mitigation

The related credit encourages higher overall site coverage of greenery.

SS 10 Outdoor Thermal Comfort

The related credit considers the positive effect of shading by trees and the surrounding ground surface temperatures of greenery within the site.

SS 11 Stormwater Management

The related credit considers softscape provided with the site for infiltration and detention in stormwater management.

WU 2 Water Efficient Irrigation

The related credit considers water efficient irrigation for greenery provided within the site.

HWB 2 Biophilic Design

The related credit encourages human-nature connection for building occupants.

3 Sustainable Site **3.3 Bioclimatic Design**

SS 8 Urban Heat Island Mitigation

Extent of Application All buildings

Objective Encourage building design to adopt measures to mitigate urban heat island effect.

Credits Attainable For Site area < 1000m^2: 1

For Site area ≥ 1000m^2: 4 + 2 additional BONUS + 4 BONUS

Credit Requirement

For Site area <1000m^2

(a) Urban Design Guidelines Chapter 11

1 credit for implementing at least 2 site level strategies under Section 11 of Hong Kong Planning Standards and Guidelines Chapter 11 Urban Design Guidelines.

For Site area ≥ 1000m^2

(a) Sustainable Building Design Measures

1. 1 credit for providing shade on at least 5% of the site area and at least 50% of non-roof impervious surfaces on the site (parking, walkways, plazas) using light coloured high-albedo materials (albedo of at least 0.4).
2. 1 credit for demonstrating compliance with prescribed requirements of the SBD Guidelines as promulgated in the PNAP APP-152.
3. 1 additional BONUS credit for demonstrating compliance with prescribed requirements of the SBD Guidelines as promulgated in the PNAP APP-152 with enhanced performances.

(b) Tree Coverage

2 BONUS credits for demonstrating that at least 10% of the total Site Area is provided with tree coverage.

For exemplary performance, 1 additional BONUS credit where 20% or more of the site is provided with tree coverage.

(c) Air Ventilation Assessment (AVA)

For conducting an AVA by wind tunnel or Computer Fluid Dynamics (CFD) according to the prevailing AVA methodology introduced by the Government demonstrating that better or equivalent ventilation performances than a baseline case:

1 credit for demonstrating annual wind condition.

1 credit for demonstrating summer wind condition.

(d) Intra Urban Heat Island Study

2 BONUS credits for conducting an Intra Urban Heat Island Study demonstrating that a maximum Intra-Urban Heat Index (difference between T_{urban} and T_{met}) in summer is less than 0.8 °C.

Assessment

For Site area <1000m^2

(a) Urban Design Guidelines Chapter 11

1. Demonstrate the site planning comply with 2 strategies under Section 11 of Hong Kong Planning Standards and Guidelines Chapter 11 Urban Design Guidelines with:

1.1. Mark up on layout plan for the implemented strategies; and

1.2. Description of the implemented strategies.

For Site area ≥ 1000m^2

(a) Sustainable Building Design Measures

(1) Non-roof Impervious Surfaces Requirements

Demonstrate that shade is provided on at least 5% of the site area and at least 50% of non-roof impervious surfaces on the site (parking, walkways, plazas) using light coloured high- albedo materials (albedo of at least 0.4). (Podium roof no matter whether it is accessible or not will not be counted as non-roof surfaces).

(2) Sustainable Building Design (SBD) Guidelines Requirements

Provide evidence in the form of scaled drawings and calculations to demonstrate compliance with applicable prescriptive requirements of the SBD Guidelines as promulgated in the PNAP APP-152 [1] (i.e. Building Separation, Building Setback and Site Coverage of Greenery).

For site coverage of greenery, method of measurement and calculation shall be in accordance with Appendix D of PNAP APP-152, except otherwise stated below:

2.1. Covered greenery areas above the primary zone (measured from 45° projected line taken from the edge of building) in communal areas accessible to public, occupiers or visitors can be counted (50% reduction factor applies).

2.2. Planters on an inaccessible roof above the primary zone but within 15m vertical zone from communal areas accessible to public, occupiers or visitors can be counted (50% reduction factor applies).

2.3. Roof materials with Solar Reflectance Index (SRI) of 78 or above are acceptable as an alternative to vegetated roof. A combination of both vegetated roof and roof using materials with Solar Reflectance Index (SRI) of 78 or above is also acceptable.

(3) Enhanced Performances of Sustainable Building Design Guidelines

Further to requirements stated in SS 8a (2), provide evidence to demonstrate compliance with the following:

3.1. Sustainable Soft Landscape Requirements

Provide the landscape plans for the site and detail the landscape treatment of the development including the planting and hard finishes of all landscaped areas, slopes and retaining structures, showing:

3.1.1. Planting plans with the character and planting densities for all softworks elements;

3.1.2. Tree planting locations;

1 Buildings Department - PNAP APP-152 Sustainable Building Design Guidelines

3.1.3. Details of the species;

3.1.4. Live load calculation of roof (if planting is provided on the roof), and

3.1.5. Maintenance plan for the greenery.

3.2. Demonstrate how soft landscaping has addressed the guidelines and recommendations provided in the Hong Kong Planning Standards and Guidelines Chapter 4 Section 2: Greening, appropriate to the type and scale of the building development and the immediate surroundings.

3.3. Demonstrate that at least 50% of the plant species used for trees, shrubs and grass/ ground covers respectively in terms of quantities are drought-tolerant to minimise watering requirements.

3.4. Demonstrate that the species, density and topsoil comply with the Architectural Services Department General Specification for Building Section 25: Landscape Work, or equivalent.

3.5. Minimum Permeability:

Height (H) of the tallest building	Minimum P of buildings in each assessment zone on two projection planes			
	Site area < 20,000m^2 and with L_p < 60m	Site area < 20,000m^2 and with L_p ≥ 60m	Site area ≥ 20,000m^2	
	Each Plane	Each Plane	Plane 1	Plane 2
H ≤ 60m	20%	25%	25%	30%
H > 60m	20%	25%	25%	40%

3.6. Minimum Site Coverage of Greenery:

Site Area	Site Coverage of Greenery	
	Primary zone	Overall
< 20,000 m^2	12.5%	30%
≥ 20,000 m^2	17.5%	40%

3.7. Exemptions from requirements of Permeability and Site Coverage of Greenery specified under the SBD Guidelines are not applicable under this credit.

(b) Tree Coverage

1. Submit plan drawing or calculation for tree coverage showing the estimated crown spread 10 years after the landscape installation.

2. Tree coverage is defined as the combined plan area under all tree canopies, projected perpendicularly onto the ground/ floor surface, within the Site, where tree canopies are drawn at their estimated spread 10 years after the landscape installation.

3. Evidence of tree diameters prediction shall be provided with reference to examples of existing trees of that species planted in similar conditions in Hong Kong. In order not to overestimate tree crown diameter, the largest dimension permitted in the calculation shall be 12m in diameter for large wide spreading trees.

4. EVA shall be excluded from the total site area for the purpose of tree coverage calculation.

(c) Air Ventilation Assessment (AVA)

1. Between site velocity ratio (SVR) or local velocity ratio (LVR), show that one of these two ratios increases or remain the same in the optimal option compared to the base case, while the other ratio is not reduced.

2. The annual wind rose (wind probability table) at 400 – 600m of the site should be used. The annual or summer prevailing wind used in the simulation should have an accumulated percentage occurrence of at least 75% (accumulation starts in the order from the highest occurrence to the lowest). The baseline scheme should meet Design Requirements (1) and (2) of Building Separation under the SBD Guidelines.

3. Demonstrate credit compliance by following one of the below routes:

Compliance Route 1: CFD Simulation

4. Submit an air ventilation assessment report. The report shall also include simulation assumptions and screen capture of project building, surrounding building and terrain of the 3D model.

5. The site velocity ratio (SVR) and local velocity ratio (LVR) of all test points should be reported.

6. The modelling methodology should adopt prevailing AVA methodology introduced by the government [2], unless specified below.

7. A software validation report from the software developer should be provided to ensure the accuracy of simulation by the software.

8. The below requirements should be fulfilled in the CFD simulation:

   8.1. Surrounding buildings (including existing buildings, buildings under construction and planned buildings) and terrain shall be included in the model based on the GIS information from Lands Department, prevailing statutory plans from Town Planning Board Statutory Planning Portal, building records from Buildings Department's BRAVO system and/or other relevant sources available **on or before 3 months prior to the date of the first revision study report**.

   8.2. The surrounding area shall be at least, 2H (H being the building height (m) of the tallest building on the project site) or 200m away from the project site boundary, whichever is larger.

   8.3. The terrain area shall be in a size of at least, 10H (H being the building height (m) of the tallest building on the project site) or 1000m × 1000m, whichever is larger, with the project placed in the centre.

   8.4. For practical reasons, the geometry can be simplified to block.

9. Wind data, including wind frequency, wind rose and wind profile should be adopted from the appropriate and reliable sources, such as simulated site wind data based on appropriate mathematical models (e.g. RAMS from the Planning Department (PlanD) [3]) or experimental site wind data from wind tunnel test.

2 Technical Circular No.1/06 Annex A - Technical Guide for Air Ventilation Assessment for Developments in Hong Kong, HPLB & ETWB, the Government of HKSAR.

3 RAMS wind data. [ONLINE]. Available at: http://www.pland.gov.hk/pland_en/info_serv/site_wind/site_wind/index.html. [Accessed February 2025].

10. If the wind profile is not provided from the above sources, the Applicant can refine the ground roughness and model the wind profile using power law or log law for each wind direction, based on:

$$\text{Power Law } \left(\frac{U_z}{U_g}\right) = \left(\frac{Z_z}{Z_g}\right)^{\alpha} \qquad \text{Log Law } U_z = \frac{u^*}{\sigma}\ln\left(\frac{Z}{Z_0}\right)$$

U_z Wind speed at height z from ground
U_g Wind speed at reference height (top of wind boundary layer)
Z_z Height z from ground
Z_g Reference height (top of the wind boundary layer)
α Power law exponent
σ Von Karman constant = 0.4
Z_0 Roughness length
u^* Friction velocity
Z Height z from ground, same as Z_z in power law

Terrain crossed by approaching wind	A	Z_g	Z_0
Sea and open space	≈ 0.15	≈ 300	≈ 0.1
Suburban or mid-rise	≈ 0.35	≈ 400	≈ 1
City centre or high-rise	≈ 0.50	≈ 500	≈ 3

11. These coefficients serve as reference only [4]. The Applicant should justify the suitability of coefficients for the project.

12. Detailed Study shall be carried out if it is required under the Technical Circular No. 1/06 of Housing, Planning and Lands Bureau (HPLB) and Environment, Transport and Works Bureau (ETWB). For the Detailed Study, wind from all 16 directions and their probability of occurrences must be accounted for, and wind profiles(s) obtained from wind tunnel experiments should be used to conduct the study, and when calculating the Wind Velocity Ratio.

13. The simulation report should be endorsed by a Locally Qualified Professional with 3 years of relevant experience in CFD simulation. The Locally Qualified Professional shall attain at least one of the following local professional qualifications:

    - Member of The Hong Kong Institute of Architects (MHKIA);
    - Member of The Hong Kong Institution of Engineers (MHKIE);
    - Member of Hong Kong Institute of Qualified Environmental Professionals Limited (MHKIQEP);
    - Registered Energy Assessor (REA), under the Buildings Energy Efficiency Ordinance (Cap. 610); and
    - Registered Professional Engineer (R.P.E.), under the Engineers Registration Ordinance (Cap. 409).

    Except for MHKIA, the accepted disciplines of the above local professional qualifications include Building Services, Mechanical, Electrical, Energy and Environmental.

    CV of the Locally Qualified Professional shall be provided to demonstrate that the Locally Qualified Professional holds the required local professional qualification(s) and with the relevant experience.

Compliance Route 2: Wind Tunnel Test

14. Demonstrate compliance by submitting a wind tunnel test report.

4 Feasibility Study for Establishment of Air Ventilation Assessment System Final Report, Department of Architecture, Chinese University of Hong Kong, Nov 2005.

15. The technical standards pertaining to the execution of the current boundary layer wind tunnel studies conform to the guidelines outlined within the Hong Kong Wind Loading Code and are fully in-line with the guidelines of the Air Ventilation Assessment Technical Circular No. 1/06 for developments in Hong Kong.

16. The wind tunnel facilities should comply with the requirements of internationally recognised guides such as the guidelines of the American Society of Civil Engineers (ASCE) Manual of Practice No.67 for Wind Tunnel Studies and the Quality Assurance Manual, AWES-QAM-1-2001 by the Australasian Wind Engineering Society (AWES).

17. The wind profile can be created by the Power Law or the Log Law with appropriate coefficients.

18. Detailed Study shall be carried out if it is required under the Technical Circular No. 1/06 of Housing, Planning and Lands Bureau (HPLB) and Environment, Transport and Works Bureau (ETWB). For the Detailed Study, wind from all 16 directions and their probability of occurrences must be accounted for, and wind profiles(s) obtained from wind tunnel experiments should be used to conduct the study, and when calculating the Wind Velocity Ratio.

Test Point Locations and Focus Areas for Both Routes

19. The assessment area shall be at least, 1H (H being the building height (m) of the tallest building on the project site) or 100m away from the project site boundary, whichever is larger.

20. Test point shall be placed 2m above pedestrian level within the assessment area.

21. Perimeter test points are positioned on the project site boundary. Typically about 30 perimeter test points well-spaced out and located will suffice.

22. Overall test points are evenly distributed and positioned in the open spaces, on the streets where pedestrians frequently access. For areas that are not open to the public can be exempted. For practical reasons, around 50 test points may be adequate for typical development sites.

(d) Intra Urban Heat Island Study

1. Provide an Intra-urban Heat Island Study report demonstrating that a maximum Intra-Urban Heat Index (difference between T_{urban} and T_{met}) in summer is less than 0.8 °C through Urban Heat Island Intensity calculation.

2. Temperature calculation shall be carried out for 10 consecutive days, the 10th day temperature profile between 08:00 to 18:00 hours shall be used for current assessment.

3. The calculation should use the maximum temperature difference of T_{urban} and T_{met} between 08:00 to 18:00 hours to represent the Intra Urban Heat Index for the Site, where

$$\text{Intra Urban Heat Index} = \text{Max}\left[T(t)_{urban} - T(t)_{met} \right] < 0.8$$

$T(t)_{urban}$ = Predicted urban air temperature at the Site
$T(t)_{met}$ = Meteorological air temperature

4. In the report, provide a brief summary of the adopted methodology to calculate the Intra-Urban Heat Index.

5. Assess an individual Intra-Urban Heat Index within the Site and report under appropriate area breakdown with the maximum area of 10 ha.

6. The Intra-Urban Heat Island effect of a project is the contribution to the energy balance at a certain time, which can be quantified by Intra-Urban Heat Index. The Intra-Urban Heat Index here shall be defined by the maximum temperature difference of $T(t)_{urban}$ and $T(t)_{met}$ in the corresponding hour between 08:00 to 18:00 hours on a typical summer day. The detailed calculation methodology shall refer to relevant literature [5, 6, 7, 8].

7. In order to capture Intra-Urban Heat Island effect of the Project precisely, the proposed methodology shall address the air temperature changes due to the Intra-Urban Heat Island Effect.

8. The report shall contain detailed considerations of all the factors listed below:

    8.1. Radiation heat gain/ loss from/ to the environment;

        8.1.1. Direct and diffused solar radiation on surface;

        8.1.2. Shading effect from buildings/ trees;

        8.1.3. Radiant heat loss from urban fabric to the surrounding; and

        8.1.4. Effect of Absorptivity/ Emissivity of surfaces;

    8.2. Thermal storage effect of urban fabric;

        8.2.1. Thermal capacity in participating ground layer, building and tree surface, etc.;

    8.3. Wind environment;

        8.3.1. Convective heat transfer within urban cluster;

        8.3.2. Computational Fluid Dynamics (CFD) technique shall be used to assess the ventilation of the Project (refer to section below);

    8.4. Evaporative heat transfer;

        8.4.1. Greenery evapotranspiration;

        8.4.2. Evaporative heat transfer from water features; and

        8.4.3. Evaporative heat transfer from ground surface.

9. Calculation of $T(t)_{met}$ shall refer to reference environmental condition detailed in “Reference Environmental Conditions for Intra-Urban Heat Index Calculation” table.

10. The Applicant should use reference environmental condition in “Reference Environmental Conditions for Intra-Urban Heat Index Calculation” table except near ground wind velocity on Project Site to calculate $T(t)_{urban}$.

5 Santamouris M. 2001, ‘On the impact of urban climate on the energy consumption of buildings’, Solar Energy, vol. 70, pp. 201- 216.

6 Oke TR. 1988, ‘The urban energy balance’, Progress in Physical Geography, vol.12, pp. 471-508.

7 Shashua-Bar, L. Hoffman, M. E. 2002, ‘The Green CTTC model for predicting the air temperature in small urban wooded sites’, Building and Environment, vol. 37, pp. 1279 –1288.

8 Elnahas, M. M., Willimanson, T. J. 1997, ‘An improvement of the CTTC model for predicting urban air temperatures’, Energy and Building, vol. 25, pp. 41–49.

11. In order to calculate $T(t)_{urban}$, the wind environment of the Project shall be derived from Computational Fluid Dynamics (CFD) using wind tunnel data or RAMS data as stipulated in Air Ventilation Assessment (AVA) Technical Circular and Technical Guide [9].

12. Reference Environmental Conditions [10] for Intra-Urban Heat Index Calculation

Hours	Air Temperature Ta (°C)	Relative Humidity, RH (%)	Global Horizontal Irradiance, GHI (W/m^2)	Diffuse Horizontal Irradiance, DHI (W/m^2)	Near Ground Wind Velocity at the Weather Station, (m/s)
1	28.5	83	0	0	0.5
2	28.3	84	0	0	0.4
3	28.1	85	0	0	0.4
4	28.0	85	0	0	0.4
5	27.8	86	0	0	0.4
6	27.7	87	0	0	0.4
7	27.8	86	0	0	0.4
8	28.1	84	154	93	0.4
9	28.5	82	298	161	0.6
10	29.0	79	449	216	0.7
11	29.8	76	573	259	0.8
12	30.3	74	622	272	0.8
13	30.7	73	638	285	0.9
14	30.9	72	602	287	0.9
15	31.0	72	525	254	0.9
16	31.0	72	429	210	0.8
17	30.5	73	290	154	0.7
18	29.9	75	141	89	0.7
19	29.5	77	0	0	0.6
20	29.3	78	0	0	0.6
21	29.1	80	0	0	0.5
22	29.0	80	0	0	0.5
23	28.9	81	0	0	0.5
24	28.7	82	0	0	0.5

13. The Intra-urban Heat Island Study report should be endorsed by a Locally Qualified Professional with 3 years of relevant experience in urban heat island study. The Locally Qualified Professional shall attain at least one of the following local professional qualifications:

    - Member of The Hong Kong Institution of Engineers (MHKIE);
    - Member of Hong Kong Institute of Qualified Environmental Professionals Limited (MHKIQEP);
    - Registered Energy Assessor (REA), under the Buildings Energy Efficiency Ordinance (Cap. 610); and

9 Housing, Planning and Lands Bureau, and Environment, Transport and Works Bureau 2006, Technical Circular No. 1/06: Air Ventilation Assessments. [ONLINE]. Available at: https://www.devb.gov.hk/filemanager/en/content_679/hplb-etwb-tc-01-06.pdf. [Accessed February 2025].

10 Hong Kong Observatory (Averaged data from 2009 to 2013).

- Registered Professional Engineer (R.P.E.), under the Engineers Registration Ordinance (Cap. 409).

The accepted disciplines of the above local professional qualifications include Building Services, Mechanical, Electrical, Energy and Environmental.

CV of the Locally Qualified Professional shall be provided to demonstrate that the Locally Qualified Professional holds the required local professional qualification(s) and with the relevant experience.

Submittals

(a) Sustainable Building Design Measures

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_08a_00	BEAM Plus NB submission template for SS 8a	✓	✓	✓
For SS 8a with site area < 1000 m^2, please provide the following:		**PA**	**CA**	**FA/ RFA**
SS_08a_01	Narrative and layout plan with markup to demonstrate the site planning comply with the strategies under Section 11 of HKPSG	✓	✓	✓
For SS 8a(1) with site area ≥ 1000 m^2, please provide the following:		**PA**	**CA**	**FA/ RFA**
SS_08a_02	Scaled drawings and calculations to demonstrate compliance with the relevant prescriptive requirements for the light coloured high-albedo materials on non-roof impervious surfaces	✓	✓	✓
SS_08a_03	Technical data (e.g. approved contractor's submission with catalogues or test reports) showing the albedo values of the surface materials	-	✓	✓
SS_08a_04	A schedule of external materials, their proposed finishes treatments, and albedo requirements for the materials	✓	✓	✓
SS_08a_05	Contract specifications for the albedo requirement for the materials	✓	-	-

For SS 8a(2) & (3), please provide the following:		**PA**	**CA**	**FA/ RFA**
SS_08a_06	Scaled drawings and calculations to demonstrate compliance with applicable prescriptive requirements of the SBD Guidelines (for SS 8a(2)) and enhanced performances for permeability and site coverage of greenery (for SS 8a(3))	✓	✓*	✓*
For SS 8a(2), please provide the following:		**PA**	**CA**	**FA/ RFA**
SS_08a_07	Contract specifications for the SRI requirement for the roof materials (if applicable)	✓	-	-
SS_08a_08	Technical data (e.g. approved contractor's submission with catalogues or test reports) showing SRI values of the roof materials (if applicable)	-	✓	✓
For SS 8a(3), please provide the following:		**PA**	**CA**	**FA/ RFA**
SS_08a_09	Landscape plans, sections, planting schedules and extracts of relevant supporting documents showing soft landscape layout, planting density, tree planting locations, details of species and topsoil of all planted areas for trees, shrubs and grass/ groundcover, and percentage (in terms of quantities) of drought-tolerant plant species used for trees, shrubs and grass/ groundcovers respectively	✓		✓
SS_08a_10	Live load calculation of roof (if planting is provided on the roof)	✓		✓
SS_08a_11	Maintenance plan of the greenery	-		✓
SS_08a_12	Dated photos of the as-built soft landscape works	-		✓
* For SS 8a(2), when the project is undergoing CA or FA, the supporting documents showing the soft landscape layout and site coverage for greenery calculation shall be approved by relevant authority (e.g. extract of approved GBP). Evidence of approval (e.g. approval letter/ endorsement by the authority) shall be presented. In case of sites with a single family house only for which the requirement for minimum site coverage of greenery is not applicable under PNAP APP-152 such that no approval by relevant authority (i.e. Buildings Department) is required, the soft landscape layout plans and site coverage of greenery calculation shall be endorsed by the Authorized Person (AP).				

(b) Tree Coverage

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_08b_00	BEAM Plus NB submission template for SS 8b	✓		✓
SS_08b_01	Landscape plans, sections, planting schedules and extracts of relevant supporting documents showing the soft landscape layout of all planted areas for trees	✓		✓
SS_08b_02	Summary for the total and breakdowns of tree coverage areas and evidence of tree diameters prediction	✓		✓
SS_08b_03	Live load calculation of roof (if tree planting is provided on the roof)	✓		✓
SS_08b_04	Maintenance plan of the trees	-		✓
SS_08b_05	Dated photos of the as-built soft landscape works	-		✓

(c) Air Ventilation Assessment (AVA)

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_08c_00	BEAM Plus NB submission template for SS 8c	✓	✓	✓
For Compliance Route 1, please provide the following:		**PA**	**CA**	**FA/ RFA**
SS_08c_01	Air Ventilation Assessment Report	✓	✓	✓
SS_08c_02	Validation Report of the simulation software[#]	✓	✓	✓
SS_08c_03	CV of the professional as described in credit requirement	✓	✓	✓
For Compliance Route 2, please provide the following:		**PA**	**CA**	**FA/ RFA**
SS_08c_04	Wind Tunnel Test Report	✓	✓	✓
[#] It is required only if the simulation software is not a recognised software. Recognised software include CFX, FLUENT, PHOENICS and Star-CCM+.				

(d) Intra Urban Heat Island Study

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_08d_00	BEAM Plus NB submission template for SS 8d	✓	✓	✓
SS_08d_01	Intra-urban Heat Island Study report	✓	✓	✓
SS_08d_02	CV of the professional as per requirements in the assessment	✓	✓	✓
SS_08d_03	Landscape plans, sections planting schedules and extracts of relevant supporting documents showing soft landscape layout of all planted areas for trees	✓	✓	✓
SS_08d_04	Summary for the total and breakdowns of tree coverage areas and evidence of tree diameters prediction	✓	✓	✓
SS_08d_05	Validation Report of the simulation software[#]	✓	✓	✓
SS_08d_06	Dated photos of the as-built soft landscape works [or] Architect's Instruction (AI) with shop drawings, approved contractor's submission with technical information, etc.	- -	- ✓	✓ -
[#] It is required only if the simulation software is not a recognised software. Recognised software include CFX, FLUENT, PHOENICS and Star-CCM+.				

Remarks

(a) Additional Information

Hong Kong Herbarium on Hong Kong plant species. [ONLINE]. Available at: http://www.herbarium.gov.hk/Search_Form.aspx. [Accessed February 2025].

Hong Kong Planning Standards and Guidelines Chapter 4 Section 2: Greening.

Architectural Services Department, General Specification for Building Section 25: Landscape Work.

Buildings Department, PNAP APP-152 Sustainable Building Design Guidelines.

(b) Related Credit

SS P1 Minimum Landscaping Requirements

The related prerequisite requires minimum site coverage of greenery and minimum provisions for viability of planting, for example, the minimum soil volumes and depths for all plant areas.

SS 1 Pedestrian-oriented and Low Carbon Transport

The related credit encourages the shading of main pedestrian paths by trees. The soil space of trees shall meet the minimum standards stipulated in SS P1.

SS 7 Biodiversity Enhancement

The related credit encourages strategies to preserve and/ or enhance the ecological value of the site in terms of habitat and biodiversity.

WU 2 Water Efficient Irrigation

The related credit considers water efficient irrigation for greenery provided within the site.

HWB 2 Biophilic Design

The related credit encourages human-nature connection for building occupants.

3 Sustainable Site **3.3 Bioclimatic design**

SS 9 Immediate Neighbourhood Wind Environment

Extent of Application All buildings

Objective Ensure the wind environment around and adjacent to buildings has been adequately considered regarding wind amplification and, where appropriate, suitable mitigation measures are provided.

Credits Attainable 1

Credit Requirement 1 credit for demonstrating that no pedestrian areas will be subject to excessive wind velocities caused by amplification due to the site layout design and/ or building design.

Assessment

1. Demonstrate that no test point reported exceeds a frequency weighted wind speed of 4m/s for the annual prevailing wind condition unless it is demonstrated that the excess of 4m/s is not caused by the proposed building.

2. The annual wind rose (wind probability table) at 400 – 600m of the site should be used. The annual prevailing wind used in the simulation should have an accumulated percentage occurrence of at least 75% (accumulation starts in the order from the highest occurrence to the lowest).

3. Demonstrate credit compliance by following one of the below routes:

Compliance Route 1: CFD Simulation

4. Submit a wind environment report. The report shall also include simulation assumptions and screen captures of the project building, surrounding buildings and terrain of the 3D model.

5. A software validation report from the software developer should be provided to ensure the accuracy of simulation by the software.

6. The below requirements should be fulfilled in the CFD simulation:

    6.1. Surrounding buildings (including existing buildings, buildings under construction and planned buildings) and terrain shall be included in the model based on the GIS information from Lands Department, prevailing statutory plans from Town Planning Board Statutory Planning Portal, building records from Buildings Department's BRAVO system and/or other relevant sources available on or before 3 months prior to the date of the first revision study report.

    6.2. The surrounding area shall be at least, 2H (H being the building height (m) of the tallest building on the project site) or 200m away from the project site boundary, whichever is larger.

    6.3. The terrain area shall be in a size of at least, 10H (H being the building height (m) of the tallest building on the project site) or 1000m × 1000m, whichever is larger, with the project placed in the centre.

    6.4. For practical reasons, the geometry can be simplified to blocks.

7. Wind data, including wind frequency, wind rose and wind profile should be adopted from appropriate and reliable sources, such as simulated site wind data based on appropriate mathematical models (e.g. RAMS from the Planning Department, the Government of HKSAR [1]) or experimental site wind data from wind tunnel test.

8. If the wind profile is not provided from the above sources, the Applicant can refine the ground roughness and model the wind profile using power law or log law for each wind direction, based on:

$$\text{Power Law } \left(\frac{U_z}{U_g}\right) = \left(\frac{Z_z}{Z_g}\right)^{\alpha} \qquad \text{Log Law } U_z = \frac{u^*}{\sigma}\ln\left(\frac{Z}{Z_0}\right)$$

U_z Wind speed at height z from ground

U_g Wind speed at reference height (top of wind boundary layer)

Z_z Height z from ground

Z_g Reference height (top of the wind boundary layer)

α Power law exponent

σ Von Karman constant = 0.4

Z_0 Roughness length

u^* Friction velocity

Z Height z from ground, same as Z_z in power law

Terrain crossed by approaching wind	α	Z_g	Z_0
Sea and open space	≈ 0.15	≈ 300	≈ 0.1
Suburban or mid-rise	≈ 0.35	≈ 400	≈ 1
City centre or high-rise	≈ 0.50	≈ 500	≈ 3

9. These coefficients serve as reference only [2]. The Applicant should justify the suitability of coefficients for the project.

10. Detailed Study shall be carried out if it is required under the Technical Circular No. 1/06 of Housing, Planning and Lands Bureau (HPLB) and Environment, Transport and Works Bureau (ETWB). For the Detailed Study, wind from all 16 directions and their probability of occurrences must be accounted for, and wind profiles(s) obtained from wind tunnel experiments should be used to conduct the study, and when calculating the Wind Velocity Ratio.

11. The simulation report should be endorsed by a locally qualified professional with 3 years of relevant experience in CFD simulation. The Locally Qualified Professional shall attain at least one of the following local professional qualifications:

    - Member of The Hong Kong Institute of Architects (MHKIA);
    - Member of The Hong Kong Institution of Engineers (MHKIE);
    - Member of Hong Kong Institute of Qualified Environmental Professionals Limited (MHKIQEP);
    - Registered Energy Assessor (REA), under the Buildings Energy Efficiency Ordinance (Cap. 610); and

1 RAMS wind data. [ONLINE]. Available at: http://www.pland.gov.hk/pland_en/info_serv/site_wind/site_wind/index.html. [Accessed February 2025].

2 Feasibility Study for Establishment of Air Ventilation Assessment System Final Report, Department of Architecture, Chinese University of Hong Kong, Nov 2005.

- Registered Professional Engineer (R.P.E.), under the Engineers Registration Ordinance (Cap. 409).

Except for MHKIA, the accepted disciplines of the above local professional qualifications include Building Services, Mechanical, Electrical, Energy and Environmental.

CV of the Locally Qualified Professional shall be provided to demonstrate that the Locally Qualified Professional holds the required local professional qualification(s) and with the relevant experience.

Compliance Route 2: Wind Tunnel Test

12. Demonstrate compliance by submitting a wind tunnel test report.

13. The technical standards pertaining to the execution of the current boundary layer wind tunnel studies conform to the guidelines outlined within the Hong Kong Wind Loading Code and are fully in-line with the guidelines of the Air Ventilation Assessment Technical Circular No. 1/06 for developments in Hong Kong.

14. The wind tunnel facilities should comply with the requirements of internationally recognised guides such as the guidelines of the American Society of Civil Engineers (ASCE) Manual of Practice No.67 for Wind Tunnel Studies and the Quality Assurance Manual, AWES- QAM-1-2001 by the Australasian Wind Engineering Society (AWES).

15. The wind profile can be created by the Power Law or the Log Law with appropriate coefficients.

16. Detailed Study shall be carried out if it is required under the Technical Circular No. 1/06 of Housing, Planning and Lands Bureau (HPLB) and Environment, Transport and Works Bureau (ETWB). For the Detailed Study, wind from all 16 directions and their probability of occurrences must be accounted for, and wind profiles(s) obtained from wind tunnel experiments should be used to conduct the study, and when calculating the Wind Velocity Ratio.

Test Point Locations for Both Routes

17. The assessment area shall be at least, 1H (H being the building height (m) of the tallest building on the project site) or 100m away from the project site boundary, whichever is larger.

18. Test points shall be placed 2m above pedestrian level within the assessment area.

19. Perimeter test points are positioned on the project site boundary. Typically, about 30 perimeter test points which are well-spaced out and well located will suffice.

20. Overall test points are evenly distributed and positioned in the open spaces, on the streets where pedestrians frequently access. For areas that are not open to the public can be exempted. For practical reasons, around 50 test points may be adequate for typical development sites.

21. Additional test points shall be placed in outdoor recreational areas, open spaces and pedestrian paths within the project site.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_09_00	BEAM Plus NB submission template for SS 9	✓	✓	✓
For Compliance Route 1, please provide the following:		**PA**	**CA**	**FA/ RFA**
SS_09_01	Wind Environment Report	✓	✓	✓
SS_09_02	Validation Report of the simulation software*	✓	✓	✓
SS_09_03	CV of the professional as per requirements in the assessment	✓	✓	✓
For Compliance Route 2, please provide the following:		**PA**	**CA**	**FA/ RFA**
SS_09_04	Wind Tunnel Test Report	✓	✓	✓
* It is required only if the simulation software is not a recognised software. Recognised software include CFX, FLUENT, PHOENICS and Star-CCM+.				

Remarks

(a) Additional Information

None

(b) Related Credit

None

3 Sustainable Site **3.3 Bioclimatic Design**

SS 10 Outdoor Thermal Comfort

Extent of Application All sites with site area of 1,000 m² or more.

Objective Ensure adequate thermal comfort of outdoor environment within the Site.

Credits Attainable 2

Credit Requirement

(a) Shaded or Covered Routes

1 credit is awarded where at least one shaded or covered route, connecting the site with nearby amenities/ site main entrance/ transport hub.

(b) Passive Open Spaces with Thermal Comfort

1 credit is awarded where 50% or more of the passive open spaces and pedestrian zones achieve thermal comfort. This is demonstrated on a typical summer day at 3:00 pm in Hong Kong.

Assessment

(a) Shaded or Covered Routes

1. Demonstrate at least one pedestrian route within the site from a notional building entry point to neighbourhood amenities/ site main entrance/ transport hub with shade or cover. The provision of shade or cover is confined to the site boundary.

2. The shape of shade or cover can be justified by daylight simulation software considering building self-shading and shading by exterior buildings and trees at the summer solstice at 9:00 am and 3:00 pm in Hong Kong.

(b) Passive Open Spaces with Thermal Comfort

1. This credit applies to passive open space(s) [1] and pedestrian zone(s) within the Site Area. A pedestrian zone includes covered, but not enclosed areas such as covered walkways and covered sitting areas.

2. Submit an outdoor thermal comfort report demonstrating the anticipated thermal comfort condition. The report should include the following:

   2.1. Scaled drawing(s) depicting the building disposition; and

   2.2. Input data, picture of the 3D model, simulation assumptions

3. Relevant input data should be justified by the Applicant.

4. The report should be endorsed by a Locally Qualified Professional who has 3 years of relevant experience in outdoor thermal comfort study. The Locally Qualified Professional shall attain at least one of the following local professional qualifications:

   - Member of The Hong Kong Institution of Engineers (MHKIE);
   - Member of Hong Kong Institute of Qualified Environmental Professionals Limited (MHKIQEP);

1 Planning Department – Hong Kong Planning Standards and Guidelines Chapter 4: Recreation, Open Space and Greening.

- Registered Energy Assessor (REA), under the Buildings Energy Efficiency Ordinance (Cap. 610); and
- Registered Professional Engineer (R.P.E.), under the Engineers Registration Ordinance (Cap. 409).

The accepted disciplines of the above local professional qualifications include Building Services, Mechanical, Electrical, Energy and Environmental.

CV of the Locally Qualified Professional shall be provided to demonstrate that the Locally Qualified Professional holds the required local professional qualification(s) and with the relevant experience.

5. The assessment should be based on the following approaches:

5.1. All passive open spaces and pedestrian routes, hereafter referred to as the Focus Areas, within the Site should be included in the assessment. A demarcation plan of the Focus Areas should be provided in the report

5.2. The climatic conditions of a typical summer day should make reference to the environmental conditions in Table "Reference Environmental Conditions" below, which are based on a 5-year average from 2009 to 2013

5.3. A brief summary of the selected thermal comfort calculation methodology, together with the selected method's recommended thermal comfort range, should be clearly stated in the report

6. Reference Environmental Conditions [2]:

Time	Global Horizontal Irradiance, GHI (W/m^2)	Direct Normal Irradiance, DNI (W/m^2)	Diffuse Horizontal Irradiance, DHI (W/m^2)	Air Temp., Ta (^OC)	Relative Humidity, RH (%)
3PM	525	340	254	31.0	72

7. Demonstrate credit compliance by following one of the below routes:

Compliance Route 1: Thermal Sensation Index (TSI)

TSI [3] can be established using the following formula:

$$TSI = 1.7 + 0.118 \times T_a + 0.0019 \times SR - 0.322 \times WS - 0.0073 \times RH + 0.0054 \times ST$$

Where,

T_a = air temperature (°C)

SR = horizontal solar radiation (W/m^2)

WS = wind speed (m/s)

RH = relatively humidity (%)

ST = surrounding ground surface temperature (°C)

TSI should be based on the following:

(i) Refer to reference environmental conditions shown in Table above, which outlines solar irradiation, air temperature, and relatively humidity to assess outdoor thermal comfort;

2 Hong Kong Observatory (Averaged data from 2009 to 2013)

3 Givoni, B., M. Noguchi, H. Saaroni,O, Pocher, Y., Yaacov, N. Feller and S. Becker 2003, Outdoor comfort research issues, Energy and Buildings vol. 33, pp. 77-86.

(ii) Surrounding ground surface temperature (ST) of Air Temperature plus 3°C, (i.e. T_a + 3°C) should be used in the TSI equation.

(iii) For wind environment of the Site, use Computational Fluid Dynamics (CFD) technique to assess air velocity (m/s) of the Project. The methodology of using CFD in outdoor urban scale studies shall refer to Air Ventilation Assessment (AVA) Technical Circular and Technical Guide [4] and the following requirements:

a. Summer prevailing wind condition should be used with an accumulated percentage occurrence of at least 75% (accumulation starts in the order from the highest occurrence to the lowest) [5];

b. The below requirements for the modelling of domain and surrounding building environment shall be fulfilled in the CFD simulation [5]:

i. Surrounding buildings (including existing buildings, buildings under construction and planned buildings) and terrain shall be included in the model based on the GIS information from Lands Department, prevailing statutory plans from Town Planning Board Statutory Planning Portal, building records from Buildings Department's BRAVO system and/or other relevant sources available on or before 3 months prior to the date of the first revision study report.

ii. The surrounding area shall be at least, 2H (H being the building height (m) of the tallest building on the project site) or 200m away from the project site boundary, whichever is larger.

iii. The terrain area shall be in a size of at least, 10H (H being the building height (m) of the tallest building on the project site) or 1000m × 1000m, whichever is larger, with the project placed in the centre.

iv. For practical reasons, the geometry can be simplified to block.

(iv) Thermal comfort assessment shall consider the effect of shading from immediate surroundings, for example, trees, shading devices, self-shading from buildings; and

(v) The calculations should be based on an area breakdown in the range between 1m^2 and 100m^2.

Where it is demonstrated that 50% or more of the passive open spaces and pedestrian zones, in terms of area, have achieved thermally acceptable range on **a typical summer day at 3:00 pm**, the credit will be awarded.

4 Housing, Planning and Lands Bureau, and Environment, Transport and Works Bureau 2006, Technical Circular No. 1/06: air ventilation assessments.

5 Projects commencing the first assessment submission* on or after 22 June 2024 (i.e. 3 months from the release of BEAM Plus FAQ #214) shall follow the prescribed requirements. For projects that have already completed PA and have certain design and assessment approach approved, the Applicant may continue to adopt the same assessment criteria for subsequent assessment stage (CA or FA).

* First assessment submission refers to the date when the initial assessment is formally accepted by BSL. For example, if the project engages both PA and FA, it shall refer to the date when BSL formally accepts the project for PA submission. If the project engages only FA, it shall refer to the date when BSL formally accepts the project for FA submission.

TSI	Thermal Sensation	
1	Cold	Too Cold
2	Slightly Cold	
3	**Acceptably Cool**	**Thermally Acceptable Range**
4	**Neutral**	
5	**Acceptably Warm**	
6	Slightly Hot	Too Hot
7	Hot	

Compliance Route 2: Physiological Equivalent Temperature (PET)

PET [6] should be used to assess the outdoor thermal comfort. Mean radiant temperature, T_r (Air Temperature plus 3°C, (i.e. T_a + 3°C) shall be used.

Thermal Perception	Thermal Perceptions Classification (TPC) for Subtropical Region	Range of Thermal Comfort
Very Cold	< 14	Too Cold
Cold	≥ 14 to < 18	
Cool	≥ 18 to < 22	
Slightly Cool	**≥ 22 to < 26**	**Thermally Acceptable Range**
Neutral	**≥ 26 to < 30**	
Slightly Warm	**≥ 30 to < 34**	
Warm	≥ 34 to < 38	Too Hot
Hot	≥ 38 to < 42	
Very Hot	≥ 42	

Where it is demonstrated that 50% or more of the passive open spaces and pedestrian zones, in terms of area, have achieved the range of thermal comfort **on a typical summer day at 3:00 pm**, the credit will be awarded.

8. **Alternative Route**

8.1. The study may elect any widely accepted methodology to demonstrate that the thermal comfort is in accordance with the credit requirement.

8.2. Should any method other than the Thermal Sensation Index (TSI) or Thermal Physiological Equivalent Temperature (PET) be chosen to demonstrate thermal comfort in outdoor spaces (e.g. or equivalent indicator/ index for thermal comfort level), supplementary information on methodology, calculation and/ or simulation results should be provided. The onus is placed on the Applicant to demonstrate the appropriateness of the chosen methodology and relevant precedent(s) where the selected methodology was used and accepted by professionals in the field.

6 Hoppe, P. 1999, 'The physiological equivalent temperature—A universal index for the biometeorological assessment of the thermal environment', International Journal of Biometeorology, vol. 43, pp. 71–75.

Submittals

(a) Shaded or Covered Routes

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_10a_00	BEAM Plus NB submission template for SS 10a	✓	✓	✓
SS_10a_01	Site plan highlighting at least one shaded or covered pedestrian route	✓	✓	✓
SS_10a_02	Drawing(s) of shades or cover	✓	✓	✓
SS_10a_03	Daylight simulation results to justify shape of shades/ cover (if applicable)	✓	✓	✓

(b) Passive Open Spaces with Thermal Comfort

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_10b_00	BEAM Plus NB submission template for SS 10b	✓	✓	✓
SS_10b_01	Outdoor thermal comfort report	✓	✓	✓
SS_10b_02	CV of professional as described in credit requirement	✓	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credit

None

3 Sustainable Site **3.4 Climate Resilience and Adaptability**

SS 11 Stormwater Management

Extent of Application All sites with site area of 1,000 m² or more.

Objective Encourage a high standard of stormwater management to reduce risk of flooding and promote groundwater recharge.

Credits Attainable 2 + 1 additional BONUS

Credit Requirement 2 credits for demonstrating that adequate stormwater management design measures have been provided to cater the total volume of runoff for one hour corresponding to a design rainfall of at least 30mm/event for the site in its post-developed conditions.

1 additional BONUS credit for demonstrating that adequate stormwater management measures have been provided to cater the total volume of runoff corresponding to a design rainfall of at least 40mm/event for the site in its post-developed conditions.

Assessment

1. Calculate the stormwater detention storage volume on site required to cater the total volume of runoff for one hour using the following formula:

   $V = 10 \times H \times \sum_{\varphi} \times A / 10000$

   V: Stormwater storage volume on site required (in m^3)

   H: Rainfall intensity (30mm or 40mm for the credit/ bonus respectively) per event

   φ: Runoff coefficients of various surfaces/ substrates (please refer to the following table)

   A: Areas of various surfaces/ substrates (in m^2)

Surfaces/ substrates	**Runoff coefficients**
Water bodies	1
Flat roof/ road/ hardscape with impervious construction	0.85
Flat roof covered with pebbles	0.65
Green roof (soil depth of at least 300mm)	0.35
Earth-covered (soil depth not more than 500mm) basement	0.35
Pervious paving and construction (maximum slope of porous pavement surface to a gradient of 1:20; the minimum permeability coefficient under 15°C for permeable paving/ construction should be 1.0×10^{-2} cm/s)	0.25
At-grade softscape	0.15
Earth-covered (soil depth more than 500mm) basement	0.15

Note:

1) The above information has made reference to the design guides for stormwater management/ runoff control GB50014 and DB11/685 of PRC.

2) Alternative runoff coefficients may be proposed and justified by the Applicant which is subject to approval.

2. Calculate the volume of various designed stormwater management facilities such as detention tanks, sunken plaza/ wet ponds/ reservoirs, bioretention facilities, rainwater storage cisterns/ modules, etc.

3. Demonstrate adequate stormwater management measures to meet the credit requirements have been provided by a stormwater management report with a summary of calculations for areas of surfaces/ substrates and stormwater detention storage volume, layout drawings showing the location(s) and area(s) of surface/ substrates, drawing(s) showing the location(s) and size(s) of stormwater management facility(ies) and typical construction details/ sections of infiltration measures.

4. Stormwater detention volume will be discharged either by gravity or pumping.

5. It is required to empty the tank within a day to ensure the detention volume is daily available for potential storm event.

6. Stormwater in detention volume will be discharge after 1 hour of rainstorm.

7. For any detention facility with discharge mechanisms, control system is required for discharging the stormwater in order to maintain the daily designed detention volume.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_11_00	BEAM Plus NB submission template for SS 11	✓	✓	✓
SS_11_01	Report for stormwater management with a summary of calculations for areas of surfaces/ substrates and stormwater detention storage volume, layout drawings showing the location(s) and area(s) of surface/ substrates, drawing(s) showing the location(s) and size(s) of stormwater management facility(ies), typical construction details/ sections of infiltration measures and information of control system (for any detention facility with discharge mechanisms).	✓	✓	✓
SS_11_02	Technical data (e.g. catalogues or test reports) of surfaces/ substrates showing the runoff coefficient (if alternative runoff coefficients are used)	✓	✓	✓

Remarks

(a) Additional Information

Sponge City Construction Technical Guide by Ministry of Housing and Urban-Rural Development of PRC.

Technical Guide for On-site Stormwater Detention Tank Systems. [ONLINE]. Available at: https://www.pub.gov.sg/-/media/PUB/PDF/detentionTank.pdf. [Accessed February 2025].

Pervious Pavement. [ONLINE]. Available at: http://www.asphaltpavement.org/index.php. [Accessed February 2025]. Water Permeable Brick (JCT 945 – 2005)

Appendix 9.5 – Stormwater Detention Systems O&M Checklist

(b) Related Credit

SS P1 Minimum Landscaping Requirements

The related prerequisite requires minimum site coverage of greenery and minimum provisions for viability of planting, for example, the minimum soil volumes and depths for all plant areas.

SS 1 Pedestrian-oriented and Low Carbon Transport

The related credit encourages the shading of main pedestrian paths by trees. The soil space of trees shall meet the minimum standards stipulated in SS P1.

SS 7 Biodiversity Enhancement

The related credit encourages preservation/ enhancement of existing habitat within the site.

SS 10 Outdoor Thermal Comfort

The related credit considers the positive effect of shading by trees and the surrounding ground surface temperatures of greenery within the site.

WU 8 Water Harvesting and Recycling

The related credit considers harvesting of rainwater provided within the site. Stormwater collected under SS11 could only be discharged.

HWB 2 Biophilic Design

The related credit encourages human-nature connection for building occupants.

3 Sustainable Site **3.4 Climate Resilience and Adaptability**

SS 12 Design for Climate Change Adaptation

Extent of Application All buildings

Objective Encourage reviewing the impact of the projected climate change scenarios on the development and consider strategies to improve climate resilience.

Credits Attainable 1 BONUS + 1 additional BONUS

Credit Requirement 1 BONUS credit for studying the projected variation in temperature and rainfall, water level rise/ storm surge of adjacent water bodies, increased frequency of lightning strikes, occurrence of more severe tropical cyclones, etc. due to climate change and its impact on the development and prepare mitigation proposal to improve the climate resilience of the building.

1 additional BONUS credit for including quantitative calculation to support the resilience design which is technically eligible and cost effective.

Assessment

1. Refer to the projected annual rainfall and changes in annual temperature under the medium-low scenario (mean value) [1], water level rise/ storm surge of adjacent water bodies, increased frequency of lightning strikes, occurrence of more severe tropical cyclones, etc., suggest 3 negative issues caused by the projected variations which will have impacts on the building such as its structure, façade, outdoor area or building services system.

2. Prepare a climate resilience proposal including at least 1 strategy for each of the above-mentioned negative issues. The strategies should be supported by preliminary design description and expected outcome on resolving the respective negative issue. If necessary, assume a building life cycle of 50-years to outline the possible benefits. No simulations are required for the first BONUS credit. The additional BONUS credit is granted if it can be demonstrated that the design is cost effective.

3. Note that no obligation is required to implement the proposal.

4. Relevant measures that have been implemented in the design in other credits may be included to demonstrate compliance for this credit.

5. Climate resilience proposal should include a minimum of 10 A4 pages with sections below:

    5.1. Description of project annual climate change;

    5.2. Impact Identification;

    5.3. Proposal of the Climate Resilience Strategies;

    5.4. Effectiveness of the proposed strategies; and

    5.5. Cost effectiveness (for additional BONUS).

1 Hong Kong Observatory - Climate Projections for Hong Kong. [ONLINE]. Available at: https://www.hko.gov.hk/en/climate_change/future_climate.htm. [Accessed February 2025].

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
SS_12_00	BEAM Plus NB submission template for SS 12	✓	✓	✓
SS_12_01	Climate resilience proposal	✓	✓	✓

Remarks

(a) Additional Information

GovHK – Global Environment Climate Change. [ONLINE]. Available at: http://www.gov.hk/en/residents/environment/global/climate.htm. [Accessed February 2025].

Environment Bureau - Hong Kong Climate Change Report 2015. [ONLINE]. Available at: https://www.eeb.gov.hk/sites/default/files/pdf/ClimateChangeEng.pdf. [Accessed February 2025].

Environment and Ecology Bureau - Carbon Neutral (Adaptation and Resilience). [ONLINE]. Available at: https://cnsd.gov.hk/en/climate-ready/adaptation-and-resilience/. [Accessed February 2025].

Hong Kong Observatory - Climate Projections for Hong Kong. [ONLINE]. Available at: https://www.hko.gov.hk/en/climate_change/future_climate.htm. [Accessed February 2025].

(b) Related Credit

None

4 Materials and Waste (MW)

4.P Prerequisite
4.1 Use of Materials
4.2 Selection of Materials
4.3 Waste Reduction

Introduction

In construction, operations, maintenance and fitting-out of buildings; environmentally-sustainable natural resources should be used as materials to a significant extent. Practical considerations should include extracted raw materials, emissions and embodied energy. There are opportunities to reduce environmental impacts through improved design, choice of materials, and installation methods. The following are of concern:

- Pollutants arising from manufacturing, transportation and operation; and
- Waste generated and recycled.

There are opportunities to reduce the use of materials through modular designs allowing off-site prefabrication, lean construction methods, etc.; and to reduce waste from a life cycle perspective, including provisions of appropriately designed waste facilities for waste recycling/ recovery/ reuse.

4.P Prerequisite

MW P1 Minimum Waste Handling Facilities

Background

This part sets out the minimum requirement for materials aspects in terms of the provision of waste handling facilities.

4.1 Use of Materials

MW 1 Building Re-use
MW 2 Modular and Standardised Design
MW 3 Prefabrication
MW 4 Design for Durability and Resilience

Background

Efficiency in the use of materials can be significantly improved through reuse of building elements, such as foundations, main structures, façades, etc. Flexibility in design allows for change in the use of layout of the premises within a building development. High standards of design detailing permit off-site prefabrication of major building components allow for deconstruction, and improves durability and longevity of buildings.

4.2 Selection of Materials

MW 5 Sustainable Forest Products
MW 6 Recycled Materials
MW 7 Ozone Depleting Substances
MW 8 Regional Materials
MW 9 Use of Green Products
MW 10 Life Cycle Assessment

Background

The selection of materials that are environmentally sustainable, have significant recycled content, or otherwise have relatively low environmental impacts and result in lower embodied energy, should be considered at the earliest stages of planning and design of building developments, and carried over to the fitting-out and subsequent redecoration.

4.3 Waste Reduction

MW 11 Adaptability and Deconstruction
MW 12 Enhanced Waste Handling Facilities

Background

Designs which enable users to modify the premise layout conveniently and allow for dismantling during demolition can reduce resources consumption and waste generation significantly.

Well-managed facilities for the recycling of solid waste encourage recycling and result in reductions in the disposal at landfill sites. Buildings should be designed with the provision of facilities for effective on-site sorting, collection, and recycling/ reusing of waste.

4 Materials and Waste 4.P Prerequisite

MW P1 Minimum Waste Handling Facilities

Extent of Application

All buildings except one-single family domestic building with not more than 3 floors, or domestic part of a composite building for one single family with not more than 3 floors, or a building not normally occupied or for transient stay (e.g. pump house, sewage treatment plant, carpark building)

Objective

Reduce waste generation at source, reduce pressure on landfill sites and help to preserve non-renewable resources by promoting recycling of waste materials.

Credits Attainable

Prerequisite

Credit Requirement

Prerequisite achieved for meeting the minimum provisions of waste recycle facilities for the collection, sorting, storage, recycling (recovered material) and disposal (waste).

Assessment

The assessment shall take into account how a system of waste collection, storage, sorting, recycling and disposal can be managed for the buildings, with consideration given to the adequacy of space provisions on individual floors, within the building as a whole, and at local/ estate level. There should be opportunities for the management of different waste types, such as organic, non-recyclable and recyclable waste. Easy access to the facilities shall be provided for cleaning staff, contractors, building users and waste recycling and collection companies.

(a) Recycle & Waste Management Strategy Plan

1. Provide proposal to:

1.1. Identify and estimate the quantities of expected waste streams (organic, recyclable and non-recyclable) of the development;

1.2. Demonstrate adequate numbers of general refuse bin(s) and in particular, recycling bin(s) provided to cater for the general waste and recyclables generated from the development as per the waste stream calculation mentioned in 1.1.;

1.3. Demonstrate compliance with the space requirement of waste recycling facilities (for waste storage, sorting and recycling), including sufficient size to cope with the numbers of general refuse bins and recycling bins as listed in (b);

1.4. Elaborate the storage for recycling of, as a minimum, materials listed in (c); and

1.5. Demonstrate management plan, accessibility and hygiene. It includes the outlines of how the municipal solid waste disposal rate can be reduced by the waste management hierarchy - prevention, reuse, recycling, recovery and disposal; what is the collection and separation methodology of waste and recyclables; and how the building users dispose refuses and recyclables and janitorial staffs collect and deliver to refuse storage and material recovery chambers (RS&MRC) & Refuse Chutes.

(b) Waste Recycling Facilities

1. Refuse Storage and Material Recovery Chambers (RS&MRC) Provision

   Demonstrate RS&MRC of adequate size to cope with the waste generated. Prescribed space requirements are listed below:

Space Usage	**Factor for Calculating Minimum Space Requirement of RS&MRC**
Residential/ Domestic	1m^2 per 347m^2 UFS
Hotel	1m^2 per 347m^2 UFS
Retail/ Commercial/ Clubhouse	For UFS <39,600m^2, 2m^2 per 925m^2 UFS For UFS ≥39,600m^2, 1m^2 per 925m^2 UFS + 43m^2
Non-residential/ Non-domestic buildings other than Retail/ Commercial/ Clubhouse	1m^2 per 925m^2 UFS
Remarks: • UFS = Usable Floor Space • The provision of Refuse Storage & Material Recovery Chamber (RS&MRC) is required under "Schedule" in B(RS&MRC&RC)R. • RS&MRR shall not be included in the RS&MRC space requirement calculation. Additional areas of waste and recycling facilities provided in addition to the statutorily required RS&MRR can be counted.	

2. Refuse storage and material recovery room (RS&MRR) Provision

   i. The provision of refuse storage and material recovery room (RS&MRR) on every floor of a domestic building or the domestic part of a composite building is required under Reg.3A in B(RS&MRC&RC)R.

   ii. For a domestic building or composite building on a site of an area of not more than 250m^2 (i.e. ≤ 250m²), the provision of a RS&MRR on every domestic floor shall be exempted.

   iii. For domestic building or composite building on a site of an area >250m^2 and ≤500m^2, please refer to item 3 below.

3. Except for the building types mentioned in the Extent of Application of this prerequisite, the provision of RS&MRC and/ or RS&MRR could be exempted for buildings under any of the following conditions and an alternative proposal on the provision of waste recycling facilities should be provided:

   i. <u>RS&MRC</u>:

   - Domestic building or composite building with a total usable floor space less than 1,320m^2; or
   - Non-domestic building with a total usable floor space less than 3,960m^2; or

- Other building not required to provide RS&MRC by Building Regulations.

ii. RS&MRR:

- Domestic building or composite building on a site of an area >250m^2 and ≤500m^2; or
- Domestic building or composite building not required to provide RS&MRR by Building Regulations.

Details on the estimated waste streams and quantities from the building to justify its location and the adequate size of such provision shall be submitted. Management plan, accessibility, hygiene and fire protection factors shall also be taken into consideration. All submissions regarding the alternative proposal of the waste recycling facilities shall also demonstrate compliance with the requirements as indicated below:

a) General waste bins and recycling bins shall be provided;

b) Observe relevant government regulations such as fire and hygiene regulations; and

c) Observe the size and location of the provided waste and recycling bins shall not obstruct any means of escape.

4. For cluster of low-rise domestic houses where the RS&MRC is located at a walking distance of longer than 60m from the farthest house, intermediate waste recycling facility (IWF) shall be provided within 60m walking distance from each house unit. General waste bins and recycling bins should be provided at the IWF, which should be weatherproof with sufficient size, placed at a safe location and comply with relevant government regulations.

5. Mechanical ventilation and air purifying facilities for every RS&MRC is statutorily-required under Reg.12A of B(RS&MRC&RC)R. In addition, odour control measure shall be considered at MRR in accordance with PNAP APP-35. Correspondent assessment is under HWB 5.

(c) Minimum Types of Recyclables to be Collected

i. Metal

ii. Plastics

iii. Paper/ Cardboard, and

iv. Glass

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_P1_00	BEAM Plus NB submission template for MW P1	✓	✓	✓
MW_P1_01	Recycle & Waste Management Strategy Plan	✓	✓	✓
MW_P1_02	Drawings showing the locations of the waste handling facilities	✓	✓	✓

MW_P1_03	UFS breakdown calculation with RS&MRC area calculation	✓	✓	✓
MW_P1_04	Alternative proposal on the provision of waste recycling facilities (if applicable)	✓	✓	✓
MW_P1_05	Master layout plan or extract of relevant page(s) from the GBP to substantiate the exemption from the requirements of this prerequisite	✓	✓	✓
MW_P1_06	Purchase orders or undertaking letter from the project owner to substantiate the provision of general refuse bins and recycling bins [or] Architect's Instruction (AI), approved contractor's submission with technical information, etc. (if the purchase orders and undertaking letter are not available at the time of CA submission)	- -	✓ ✓	✓ -

Remarks

(a) Additional Information

Buildings Department. Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineer. PNAP No. APP-35 on requirements for Refuse Storage and Material Recovery Chambers, Material Recovery Chambers.

Environmental Protection Department. Waste Data & Statistics. [ONLINE]. Available at: http://www.wastereduction.gov.hk/en/assistancewizard/waste_red_sat.htm. [Accessed February 2025].

(b) Related Credit

MW 12 Enhanced Waste Handling Facilities

This credit encourages enhanced provisions for recyclables collection, recycling facilities and waste treatment equipment.

HWB 5 Waste Odour Control

This credit addresses the hygiene aspects of waste disposal.

4 Materials and Waste **4.1 Use of Materials**

MW 1 Building Re-use

Extent of Application All buildings

Objective Encourage the reuse of major elements of existing building structures, to reduce demolition waste, conserve resources and reduce environmental impacts during construction.

Credits Attainable 2 BONUS + 1 additional BONUS

Credit Requirement

Compliance Method 1

1 BONUS credit for the reuse of 20% or more (by mass or volume) of existing structures (sub-structure and superstructure).

2 BONUS credits for the reuse of 40% or more (by mass or volume) of existing structures (sub-structure and superstructure).

For exemplary performance, 1 additional BONUS credit for the reuse of 90% or more (by mass or volume) of existing structures (sub-structure and superstructure).

Alternatively,

Compliance Method 2

1 BONUS credit for the reuse of 25% or more (by surface area) of superstructure elements (including at least floor, roof decking) & enclosure materials (including at least skin, framing).

2 BONUS credits for the reuse of 50% or more (by surface area) of superstructure elements (including at least floor, roof decking) & enclosure materials (including at least skin, framing).

For exemplary performance, 1 additional BONUS credit for the reuse of 90% or more (by surface area) of superstructure elements (including at least floor, roof decking) & enclosure materials (including at least skin, framing).

Assessment

Compliance Method 1

1. Provide all of the following supporting documents:
   - 1.1. Outline the extent of reused major building elements from the existing building;
   - 1.2. Include calculations with details of pre and post construction, drawings, and supporting documentation; and
   - 1.3. Demonstrate that the quantity (by mass or volume) of the retained and reused portions of the major building elements from the existing building sub-structure and superstructure, as a percentage of the quantity (by mass or volume) of the major building elements in the new building sub-structure and superstructure. Credits will be awarded where the prescribed percentage is achieved.
2. Existing major building elements to be reused include:
   - 2.1. Sub-structure (including foundation)
   - 2.2. Superstructure

2.3. Enclosure materials (excluding windows, doors and similar assemblies)

3. The calculation showing the percentage of sub-structure and superstructure being reused shall be reviewed and endorsed by the contractor(s). The qualified personnel from the contractor(s) are:

   3.1. The contractor's quantity surveyor who possesses the following qualification:

   - A Corporate Member of The Hong Kong Institute of Surveyors (HKIS) in QS Discipline; or
   - A Chartered Member of Royal Institution of Chartered Surveyors (RICS) in QS Discipline; or
   - A Corporate/ Certified/ Full Member of other International Institute of Surveyors in QS Discipline; or

   3.2. The contractor's project manager who supervises the Project QS, monitors the use of materials, and possesses the following qualification or experience:

   - A Corporate Member of Hong Kong Institute of Construction Managers (HKICM); or
   - A Chartered Member of Chartered Institute of Building (CIOB); or
   - A Corporate/ Certified/ Full Member of other International Institute of Construction Managers in QS Discipline; or
   - At least 10 years of construction-related experience.

   CV of the personnel and organisation chart highlighting the personnel shall be submitted to demonstrate the personnel has fulfilled the above-mentioned requirements.

Compliance Method 2

1. Provide all of the following supporting documents:

   1.1. Outline the extent of reused major superstructure elements and enclosure materials from the existing building;

   1.2. Include calculations with details of pre and post construction, drawings, and supporting documentation; and

   1.3. Demonstrate that the quantity (by surface area) of the retained and reused portions of the major superstructure elements and enclosure materials from the existing building, as a percentage of the quantity (by surface area) of the major superstructure elements and enclosure materials in the new building. Credits will be awarded where the prescribed percentage is achieved.

2. Existing major superstructure elements and enclosure materials to be reused include:

   2.1. Floor,

   2.2. Roof decking,

   2.3. Skin and framing (exclude windows, doors and similar assemblies)

3. The calculation showing the percentage of superstructure elements & enclosure materials shall be reviewed and endorsed by the contractor(s). The qualified personnel from the contractor(s) are:

3.1. The contractor's quantity surveyor who possesses the following qualification:

- A Corporate Member of The Hong Kong Institute of Surveyors (HKIS) in QS Discipline; or
- A Chartered Member of Royal Institution of Chartered Surveyors (RICS) in QS Discipline; or
- A Corporate/ Certified/ Full Member of other International Institute of Surveyors in QS Discipline; or

3.2. The contractor's project manager who supervises the Project QS, monitors the use of materials, and possesses the following qualification or experience:

- A Corporate Member of Hong Kong Institute of Construction Managers (HKICM); or
- A Chartered Member of Chartered Institute of Building (CIOB); or
- A Corporate/ Certified/ Full Member of other International Institute of Construction Managers in QS Discipline; or
- At least 10 years of construction-related experience.

CV of the personnel and organisation chart highlighting the personnel shall be submitted to demonstrate the personnel has fulfilled the above-mentioned requirements.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_01_00	BEAM Plus NB submission template for MW 1	✓	✓	✓
For <u>Compliance Method 1</u>, please provide the following:		**PA**	**CA**	**FA/ RFA**
MW_01_01	Pre and post construction details, structural drawings that demonstrate the re-use of the sub-structure and superstructure	✓	✓	✓
MW_01_02	Calculation showing the percentage of sub-structure and superstructure being reused	✓	✓	✓
	with endorsement from the contractor(s); CV of the personnel; and Organisation chart highlighting the personnel	-	✓	✓

For Compliance Method 2, please provide the following:		**PA**	**CA**	**FA/ RFA**
MW_01_03	Report summarizing the extent of reused major superstructure elements and enclosure materials from existing building, with structural drawings that support the extent [or] Report summarizing the extent of reused major superstructure elements and enclosure materials from existing building, with pre and post construction information & structural drawings that demonstrate the re-use of the superstructure elements & enclosure materials	✓ - -	- ✓ -	- ✓ -
MW_01_04	Calculation showing the percentage of superstructure elements & enclosure materials	✓	✓	✓
	with endorsement from the contractor(s); CV of the personnel; and Organisation chart highlighting the personnel	- -	✓ ✓	✓ ✓

Remarks

(a) Additional Information

None

(b) Related Credit

None

4 Materials and Waste **4.1 Use of Materials**

MW 2 Modular and Standardised Design

Extent of Application All buildings except for single one-storey buildings with total floor areas not exceeding 230m²

Objective Encourage the increased use of modular and standardised components in building design in order to enhance buildability and to reduce waste.

Credits Attainable 1 + 1 additional BONUS

Credit Requirement

Compliance Method 1

1 credit for designing modular elements which contributed at least 50% (by mass, volume, dollar value or surface area) of the major elements and modules in the project.

Alternatively,

Compliance Method 2

1 credit for designing modular elements which contributed at least 50% by Construction Floor Area (CFA) of the development with typical floors design.

For exemplary performance, 1 additional BONUS credit for designing modular elements which contributed 90% or more by:

- mass, volume, dollar value or surface area of the major elements and modules in the project; or
- CFA of the development with typical floors design.

Assessment

1. Provide all of the following supporting documents:
   - 1.1. Specifications to demonstrate the extent of application of modular and standardised design of the major elements and modules;
   - 1.2. Drawings or information to highlight the extent of application of modular and standardised design of the major elements and modules; and
   - 1.3. Demonstration of the percentage of major elements and modules that are prescribed modular and standardised design elements and modules.
2. The unit may be mass/ volume/ dollar value/ surface area for Compliance Method 1 or CFA for Compliance Method 2 but shall be consistent throughout the assessment of this credit. If “surface area” is adopted as the assessment unit, only the areas of the element that are exposed to air (i.e. excluding those concealed areas) shall be counted.
3. The calculation sheet on modular and standardised design shall be reviewed and endorsed by the contractor(s). The qualified personnel from the contractor(s) are:
   - 3.1. The contractor’s quantity surveyor who possesses the following qualification:
     - A Corporate Member of The Hong Kong Institute of Surveyors (HKIS) in QS Discipline; or

- A Chartered Member of Royal Institution of Chartered Surveyors (RICS) in QS Discipline; or
- A Corporate/ Certified/ Full Member of other International Institute of Surveyors in QS Discipline; or

3.2. The contractor's project manager who supervises the Project QS, monitors the use of materials, and possesses the following qualification or experience:

- A Corporate Member of Hong Kong Institute of Construction Managers (HKICM); or
- A Chartered Member of Chartered Institute of Building (CIOB); or
- A Corporate/ Certified/ Full Member of other International Institute of Construction Managers in QS Discipline; or
- At least 10 years of construction-related experience.

CV of the personnel and organisation chart highlighting the personnel shall be submitted to demonstrate the personnel has fulfilled the above-mentioned requirements.

4. Extent of modular and standardised design checklist:

Structural Elements	• Structural beam system • Concrete slab • Concrete flooring
Façade Elements	• External wall • Cladding unit • Bay window (for residential buildings) • Utility platform/ balcony (for residential buildings)
Architectural/ Internal Building Materials	• Internal partition/ wall panels • Door sets • Staircases

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_02_00	BEAM Plus NB submission template for MW 2	✓	✓	✓
MW_02_01	Contract specifications highlighting the application of modular and standardised design	✓	-	-
MW_02_02	Drawings or information that demonstrate modular and standardised design	✓	✓	✓

MW_02_03	Calculation Sheet on modular and standardised design [Appendix A]	✓	✓	✓
	with endorsement from the contractor(s); and CV of the personnel; and Organisation chart highlighting the personnel	-	✓	✓
MW_02_04	/	-	-	-

Remarks

(a) Additional Information

International Standard Organization. ISO 1006 Building construction – Modular coordination – Basic module (1983) and ISO 2848 Building Construction – Modular coordination – Principles and rules (1984) recommend that modular components shall be designed to have size of a multiple or subdivision of the basic module.

British Standards Institution. British Standard BS 6750. Specification for Modular coordination in building (1986) provides background on the requirements for modular coordination.

Development Bureau. Standardised Components and Practices gives guidance on accessing and locating standardised components and modular components that have been successfully used in construction, and finding out the standardised practices, including standard designs, construction methods, and techniques adopted in the construction industry. This contains a standardisation database of hyperlinks which promotes the wider use of standardised and modular components in local construction, with the public sector taking the lead. [ONLINE]. Available at: http://www.devb.gov.hk/en/publications_and_press_releases/publications/standardised_components_and_practices/index.html. [Accessed February 2025].

(b) Related Credit

None

4 Materials and Waste **4.1 Use of Materials**

MW 3 Prefabrication

Extent of Application All buildings

Objective Encourage prefabrication of building elements in order to reduce wastage of materials and quantities of on-site waste.

Credits Attainable 1 + 3 additional BONUS

Credit Requirement

(a) Structural Elements

1 credit when 10% of structural elements has been prefabricated off-site.

1 additional BONUS credit when 20% of structural elements have been prefabricated off-site.

Alternatively,

(b) Façade Elements

1 credit when 10% of façade elements has been prefabricated off-site.

1 additional BONUS credit when 20% of façade elements have been prefabricated off-site.

Alternatively,

(c) Architectural/ Internal Building Elements

1 credit when 10% of architectural/ internal building elements have been prefabricated off-site.

1 additional BONUS credit when 20% of architectural/ internal building elements has been prefabricated off-site.

1 additional BONUS credit for compliance with the requirements listed in above sub-item (a), (b) and (c), i.e. 10% or more of structural elements, façade elements and architectural/ internal building elements have been prefabricated off-site.

For exemplary performance, 1 additional BONUS credit when 50% or more of the elements in sub-item (a) or (b) or (c) has been prefabricated off-site.

Assessment

(a) Structural Elements (pre-cast concrete) Checklist

Residential Buildings	**Commercial Buildings**	**Educational Buildings**	**Other Building Types**
• Slabs • Staircases	• Slabs • Staircases	• Slabs • Staircases	• Slabs • Staircases
Remarks: Additional or alternative items may be proposed at discretion of the Applicant.			

(b) Façade Elements (pre-cast concrete) Checklist

Residential Buildings	Commercial Buildings	Educational Buildings	Other Building Types
• Façade • Sun-shading fins • Balcony/ utility platform	• Façade • Sun-shading fins	• Façade • Sun-shading fins	• Façade • Sun-shading fins
Remarks: - Additional or alternative items may be proposed at the discretion of the Applicant. - Curtain wall/ windows shall be excluded from the assessment.			

(c) Architectural/ Internal Building Elements (pre-cast concrete) Checklist

Residential Buildings	Commercial Buildings	Educational Buildings	Other Building Types
• Partition walls • Balustrades/ parapets	• Partition walls • Balustrades/ parapets	• Partition walls • Balustrades/ parapets	• Partition walls • Balustrades/ parapets
Remarks: Additional or alternative items may be proposed at the discretion of the Applicant.			

1. To avoid long-distance transportation, the manufacturing factory shall be located within an 800km radius of the HKSAR by road transportation; within a 1,600km radius by rail transportation; or within a 4,000km radius by sea transportation. Travel distances within the HKSAR are ignored in calculation for simplification. Credit compliance to be demonstrated through the submission of contract specifications, drawings and other supporting documents that the quantities (by mass or volume, consistent throughout the assessment of the credit) of those building elements prefabricated off-site are in accordance with the Code of Practice for Pre-cast Concrete Construction 2016 [1].

2. The assessment shall take into account the number and quantities of building elements in the building development that was prefabricated off-site and credits will be awarded where the assessment criteria have been met. Only off-site prefabricated portion (by mass or volume) shall be counted in semi-prefabricated components for quality control and reduction of on-site waste.

3. The calculation sheet on prefabricated building elements shall be reviewed and endorsed by the contractor(s). The qualified personnel from the contractor(s) are:

   3.1. The contractor's quantity surveyor who possesses the following qualification:

   - A Corporate Member of The Hong Kong Institute of Surveyors (HKIS) in QS Discipline; or

1 Buildings Department. Code of Practice for Pre-cast Concrete Construction 2016. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/code-and-design-manuals/cppcc2016e.pdf. [Accessed February 2025].

- A Chartered Member of Royal Institution of Chartered Surveyors (RICS) in QS Discipline; or
- A Corporate/ Certified/ Full Member of other International Institute of Surveyors in QS Discipline; or

3.2. The contractor's project manager who supervises the Project QS, monitors the use of materials, and possesses the following qualification or experience:

- A Corporate Member of Hong Kong Institute of Construction Managers (HKICM); or
- A Chartered Member of Chartered Institute of Building (CIOB); or
- A Corporate/ Certified/ Full Member of other International Institute of Construction Managers in QS Discipline; or
- At least 10 years of construction-related experience.

CV of the personnel and organisation chart highlighting the personnel shall be submitted to demonstrate the personnel has fulfilled the above-mentioned requirements.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_03_00	BEAM Plus NB submission template for MW 3	✓	✓	✓
MW_03_01	Calculation Sheet on Prefabricated Building Elements [Appendix A]	✓	✓	✓
	with endorsement from the contractor(s); and CV of the personnel; and Organisation chart highlighting the personnel	-	✓	✓
MW_03_02	Contract specifications highlighting the use of prefabricated building materials	✓	-	-
MW_03_03	Structural drawings that demonstrate the adoption of the prefabrication	✓	✓	✓
MW_03_04	Map showing the distance between the manufacturing factory and the site	-	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credit

MW 8 Regional Materials

Prefabricated building elements are manufactured locally so as to reduce the environmental impacts arising from transportation.

4 Materials and Waste **4.1 Use of Materials**

MW 4 Design for Durability and Resilience

Extent of Application All buildings

Objective Encourage material selection and adequate protection of exposed building elements to minimise the frequency of replacement and maximise materials optimisation.

Credits Attainable 1 + 2 BONUS

Credit Requirement

(a) Building Material Selection Appraisal

1 credit for appraisal report demonstrating a proactive approach to evaluate the durability of the building materials with at least 3 of the relevant listed items.

(b) Protecting Vulnerable Parts of the Building from Damage

1 BONUS credit for providing suitable protective measures, or designed features or solutions to prevent damage to vulnerable parts.

(c) Protecting Exposed Parts of the Building from Material Degradation

1 BONUS credit for incorporating appropriate design and specifications measures to limit material degradation due to environmental factors.

Assessment

(a) Building Components Selection Appraisal

1. Conduct an appraisal report demonstrating a proactive approach to explain the details in building material selection with suitable durability that minimises the necessary refurbishment or renewal and prevents excessive material use.

2. The report should cover at least 3 items of the following:
   - 2.1. Timber doorsets (fire rated doors)
   - 2.2. Panel wall for partitions
   - 2.3. Cement products (for architectural uses)
   - 2.4. Tile adhesives
   - 2.5. Ceramic tiles (floor tiles and wall tiles)
   - 2.6. Aluminium windows
   - 2.7. Heat soaked tempered glass
   - 2.8. Drainage uPVC pipe and fittings
   - 2.9. Other items may be proposed at discretion of the Applicant

3. The building material shall be certified to a specified product certification scheme by a certification body with accreditation of Hong Kong Accreditation Service (HKAS) and issued with an accredited certificate bearing a Hong Kong Certification Body Accreditation Scheme (HKCAS) accreditation symbol or a statement on the certificate.

Alternatively,

4. The building material shall be compared with at least one alternative material in terms of the anticipated service life. Service life refers to the expected period of life which ends when the material or equipment breaks down or loses its required physical functions.

(b) Protecting Vulnerable Parts of the Building from Damage

1. Conduct an appraisal report demonstrating a proactive approach with suitable protective measures, or designed features or solutions to prevent damage to vulnerable parts of the internal and external building and landscaping elements. This must include at least 2 items from the following:

   1.1. Protection from the impacts of high pedestrian traffic in main entrances, public areas and thoroughfares (corridors, lifts, stairs, doors)

   1.2. Protection against any internal vehicular or trolley movement within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas

   1.3. Protection against, or prevention from, any potential vehicular collision where vehicular parking and manoeuvring occurs within 1m of the external building façade for all car parking areas and within 2m for all delivery areas.

(c) Protecting Exposed Parts of the Building from Material Degradation

1. Conduct an appraisal report demonstrating a proactive approach to explain the design measures to protect the exposed parts of the building from material degradation due to environmental factors. The report should cover at least 2 applicable building elements from the following, with the applicable environmental factors and material degradation effects.

Applicable Building Elements
• Foundation, substructure, lowest floor, retaining walls • External walls • Roof or balconies • Glazing: windows, skylight • External doors • Railings or balustrades (where exposed to the external environment) • Cladding (where exposed to the external environment) • Staircases or ramps (where exposed to the external environment) • Hard landscaping
Environmental Factors
• Environmental agents, including: - Solar radiation - Temperature variation - Water or moisture - Wind - Rain

• Extreme weather conditions, including: - High wind speeds - Flooding - Driving rain • Biological agents, including: - Vegetation - Pests, insects • Pollutants, including: - Air contaminants - Ground contaminants.
Material Degradation Effects
• Corrosion • Dimensional change, e.g. swelling or shrinkage • Fading or discolouration • Rotting • Leaching • Blistering • Abrasion
Remarks: Additional or alternative items may be proposed at the discretion of the Applicant.

Submittals

(a) Building Component Selection Appraisal

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_04a_00	BEAM Plus NB submission template for MW 4a	✓	✓	✓
MW_04a_01	Appraisal report on selection of the building materials	✓	✓	✓
MW_04a_02	Contract specifications highlighting the use of building materials with suitable durability	✓	-	-
MW_04a_03	Drawings showing the selected building materials with suitable durability	✓	✓	✓
MW_04a_04	Technical data: Certificates of the selected building materials to demonstrate the quality assurance [or] Catalogues of the selected building materials and alternative materials to demonstrate the improvement in service life of the building materials compared with alternative materials	✓	✓	✓

(b) Protecting Vulnerable Parts of the Building from Damage

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_04b_00	BEAM Plus NB submission template for MW 4b	✓	✓	✓
MW_04b_01	Appraisal report on protective measures, or designed features, or solutions	✓	✓	✓
MW_04b_02	Contract specifications highlighting the use of protective measures, or designed features, or solutions	✓	-	-
MW_04b_03	Drawings showing the vulnerable areas or parts of the building are protected from damage	✓	✓	✓

(c) Protecting Exposed Parts of the Building from Material Degradation

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_04c_00	BEAM Plus NB submission template for MW 4c	✓	✓	✓
MW_04c_01	Drawings showing the design measures applied to the applicable building elements with material degradation effects due to the environmental factors	✓	✓	✓
MW_04c_02	Appraisal report on the design measures applied to the applicable building elements with material degradation effects due to the environmental factors	✓	✓	✓
MW_04c_03	Contract specifications highlighting the use of design measures to protect exposed parts of the building from material degradation	✓	-	-

Remarks

(a) Additional Information

Hong Kong Council for Testing and Certification – Local Product Certification Schemes for Construction Materials [ONLINE]. Available at: https://www.hkctc.gov.hk/en/tcsector/ba/construction_product_cert.html. [Accessed February 2025].

Hong Kong Housing Authority - Construction Product Certification [ONLINE]. Available at: http://www.housingauthority.gov.hk/en/business-partnerships/resources/construction-product-certification/index.html. [Accessed February 2025].

(b) Related Credit

None

4 Materials and Waste **4.2 Selection of Materials**

MW 5 Sustainable Forest Products

Extent of Application All buildings, except buildings with an insignificant amount of timber products being adopted

Objective Encourage the use of timber from well-managed forests.

Credits Attainable 1 + 1 additional BONUS

Credit Requirement 1 credit for demonstrating at least 30% (for residential development) and 50% (for non-residential development) of all the timber and composite timber products used in the project are from sustainable sources/ recycled timber.

For exemplary performance, 1 additional BONUS credit for demonstrating 90% or more of all the timber and composite timber products used in the project are from sustainable sources/ recycled timber.

Assessment

1. Provide supporting documents quantifying the amount of forest products used are from sustainable source/ recycled (reused from other sites) timber, as a percentage of all the timber and composite timber products used. Timber products or accessories of an insignificant amount and not forming part of timber doors, flooring, skirting, wall panels, ceiling systems and built-in furniture can be ignored in the calculation for simplification. The unit may be mass/ volume/ dollar value but shall be consistent throughout the assessment of this credit.

   The calculation on sustainable forest product shall be reviewed and endorsed by the main contractor. The qualified personnel from the main contractor are:

   1.1. The contractor's quantity surveyor who possesses the following qualification:

   - A Corporate Member of The Hong Kong Institute of Surveyors (HKIS) in QS Discipline; or
   - A Chartered Member of Royal Institution of Chartered Surveyors (RICS) in QS Discipline; or
   - A Corporate/ Certified/ Full Member of other International Institute of Surveyors in QS Discipline; or

   1.2. The contractor's project manager who supervises the Project QS, monitors the use of materials, and possesses the following qualification or experience:

   - A Corporate Member of Hong Kong Institute of Construction Managers (HKICM); or
   - A Chartered Member of Chartered Institute of Building (CIOB); or
   - A Corporate/ Certified/ Full Member of other International Institute of Construction Managers in QS Discipline; or
   - At least 10 years of construction-related experience.

   CV of the personnel and organisation chart highlighting the personnel shall be submitted to demonstrate the personnel has fulfilled the above-mentioned requirements.

2. The timber should conform to the requirement of sustainable forestry practice guidelines and accredited by recognised organisations, such as the non-profit Forest Stewardship Council (FSC) [1] or the American Forest and Paper Association (AFPA) [2] or Programme for the Endorsement of Forest Certification (PEFC) [3] or “known licensed sources” [4]. The Client shall demonstrate compliance with the specifications for timber products with the recommended certifications (e.g. FSC, AFPA, PEFC, or other “known licensed sources”).

3. In PA, provide extracts of tender documents (e.g. contract specifications) highlighting the clause specifying the use of sustainable timber.

4. The reuse of timber or composite timber products from other sites is acceptable. Transfer notes and site photos records should be kept and submitted to show the originating old timber source, the quantity and the date of transfer of the timber products between the despatch work site and the project site (recipient). The transfer notes should bear the detailed name and address of the work sites concerned and duly signed by both the despatch and recipient parties undertaking the transfer (i.e. site representative/ stores officer in managerial position), together with company chops.

5. In the event the timber products are not purchased from a supplier who is an "accredited company”, the following basic evidence should be produced to demonstrate the products:

   (i) conform to sustainable forestry practice guidelines;

   (ii) be accredited by recognised organisations; and

   (iii) in compliance with the specifications set down by the organisation.

   Provided that the timber products are sourced from a supplier already accredited by the Approval Organisations, i.e. FSC, AFPA, PEFC or other "known licensed sources” according to the respective protocol (accredited company), and the timber products purchased are issued with the Certificate under the CoC (Chain of Custody) system, it is acceptable that the following documents as proof to demonstrate the timber products as purchased from the timber supplier and used in the project site are from a sustainable source:

   (i) Invoice plus Delivery Note (DN) from the supplier of the timber products purchased - on the invoice & DN, it should be marked with the reference Certificate No.; a note which has the effect of confirming the products in the invoice and delivery note are certified; the pack no. of the timber products (see the samples on BSL’s website [5] [6]);

   (ii) A copy of the CoC Certificate of the certified timber supplier; AND

   (iii) Photographic evidence of the timber products

1 Forest Stewardship Council. [ONLINE]. Available at: http://www.fsc.org/. [Accessed February 2025].

2 American Forest and Paper Association. [ONLINE]. Available at: http://www.afandpa.org/. [Accessed February 2025].

3 Programme for the Endorsement of Forest Certification. [ONLINE]. Available at: https://www.pefc.org/. [Accessed February 2025].

4 Architectural Services Department, General Specifications for Building 2017, Section 13, Carpentry and Joinery. [ONLINE]. Available at: https://www.archsd.gov.hk/media/publications-publicity/general-specification-for-building/general_specification_for_building_2017_edition-20191223.pdf. [Accessed February 2025].

5 BEAM Society Limited. [ONLINE]. Available at: https://www.beamsociety.org.hk/files/download/20191129_FAQ_MA_Attachment_a1.pdf. [Accessed February 2025].

6 BEAM Society Limited. [ONLINE]. Available at: https://www.beamsociety.org.hk/files/download/20191129_FAQ_MA_Attachment_a2.pdf. [Accessed February 2025].

6. For timber products made from recycled timber, supporting documents quantifying the timber and composite timber products installed in the project site such as invoices plus delivery notes should be provided. Also, certificates (e.g. FSC Recycled) (if any), declaration letter or other supporting documents should be provided to show the timber and composite timber products are made from timber recycled by recognised recyclers.

7. In the case of buildings with an insignificant amount of timber products being adopted, the material schedule or an undertaking letter from the Project Owner/ Developer should be provided to substantiate that only an insignificant amount of timber products is used in the project.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_05_00	BEAM Plus NB submission template for MW 5	✓		✓
MW_05_01	Material schedule [or] Undertaking letter from the Project Owner/ Developer confirming that only an insignificant amount of timber products will be used in the project (Substantiation for non-applicability only)	✓		✓
MW_05_02	Contract specifications highlighting the use of sustainable timber	✓		-
MW_05_03	Timber product compliance certificate (Applicable to **Timber and Composite Timber Product Type*** [b] and [c] only)	-		✓
MW_05_04	Invoices plus delivery notes quantifying the timber and composite timber products installed in the project site (Applicable to **Timber and Composite Timber Product Type*** [a], [b] and [d] only)	-		✓
MW_05_05	Chain of Custody Flow Chart [Appendix A] (Applicable to **Timber and Composite Timber Product Type*** [c] only)	-		✓

MW_05_06	Substantiation to support each step in the Chain of Custody (CoC) [e.g. invoices, delivery notes, undertaking letter, etc.] (Applicable to **Timber and Composite Timber Product Type*** [c] only)	-		✓
MW_05_07	Supporting information showing the timber and composite timber products are made from recycled timber. (e.g. certificate of FSC/PEFC Recycled, declaration letter, etc.)	-		✓
MW_05_08	Transfer notes showing the transfer of timber and composite timber products from other sites to the project site (Applicable to **Timber and Composite Timber Product Type*** [e] only)	-		✓
MW_05_09	Calculation or other supporting documents (if any) to substantiate the calculated weight or volume of timber and composite timber products, if weight or volume is used in the calculation of quantities of timber and composite timber products	-		✓
MW_05_10	Calculation on Sustainable Forest Product [Appendix B] with the endorsement from the main contractor; and CV of the personnel; and Organisation chart highlighting the personnel	-		✓

*** Timber and Composite Timber Product Types:**

[a] Timber and Composite Timber Products **NOT from Sustainable Sources nor Recycled Timber**

[b] **Sustainable** Timber and Composite Timber Products Sourced from **Supplier accredited by the Approval Organisations**

[c] **Sustainable** Timber and Composite Timber Products Sourced from **Supplier who is NOT an accredited company**

[d] Timber and Composite Timber Products made from **recycled timber**

[e] Timber and Composite Timber **Products reused from other project site(s)**

Remark: Photo records of timber products shall be kept and submitted for assessment upon request.

Remarks

(a) Additional Information

World Wildlife Fund, Guide to Responsible Purchasing of Forest Products provides guidelines, templates and implementation measures to help organisations develop purchasing policies and practices that help conserve forest resources.

Buildings Department PNAP No. ADV-5 gives guidance for alternatives to the use of hardwoods in order to reduce the amount of tropical hardwood timber used in building projects.

(b) Related Credit

IDCM P3 Timber used for Temporary Works

The prerequisite requires no virgin forest products to be used for temporary works during construction.

4 Materials and Waste **4.2 Selection of Materials**

MW 6 Recycled Materials

Extent of Application All buildings

Objective Promote the use of recycled materials in order to reduce the consumption of virgin resources.

Credits Attainable 1 + 2 additional BONUS

Credit Requirement

(a) Outside Surface Works and Structures

1 credit where at least 10% of all materials used for site exterior surface works, structures and features are materials with recycled content.

Alternatively,

(b) Building Façade and Structural Components

1 credit where at least 10% of all materials used for façade and structural components are materials with recycled content. Recycled content refers to:

- the use of Pulverised Fuel Ash (PFA) as a partial cement replacement in concrete that the PFA content is not less than 25%; OR
- the use of Ground Granulated Blast-furnace Slag (GGBS) as a partial cement replacement in concrete that the GGBS content is not less than 40%; OR
- recycled content other than steel/ glass/ PFA/ GGBS.

Alternatively,

(c) Interior Non-structural Components

1 credit where at least 10% of all materials used for interior non- structural components are materials with recycled content.

1 additional BONUS credit for compliance with the requirements listed in sub-item (a), (b) and (c).

For exemplary performance, 1 additional BONUS credit where 50% or more of all materials used for sub-item (a) or (b) or (c) are materials with recycled content.

Assessment

(a) Outside Surface Works and Structures

1. Provide all of the following supporting documents:
   1.1. List the materials/ items/ products used that contain recycled material (minerals, plastics, etc.)
   1.2. Demonstration for the target percentage of materials/ items/ products with recycled content as compared to all used for exterior surfacing works and structures
2. Exterior surfacing works and structures include paths, surfaces for recreational areas, structures such as seating, playground features, etc.

3. The unit may be mass/ volume/ dollar value but shall be consistent throughout the assessment of this credit.

(b) Building Façade and Structural Components

1. Provide all of the following supporting documents:

   1.1. List the materials/ items/ products used that contain recycled materials

   1.2. Demonstration for the target percentage of materials/ items/ products with recycled content as compared with all used for façade and structural components

2. The unit may be mass/ volume/ dollar value but shall be consistent throughout the assessment of this credit.

3. Crushed concrete aggregate complying with the quality and grading requirements of British Standard BS EN 12620 [1] or similar for use in concrete for foundations. The fills in foundations and for over-site use of recycled materials should comply with the requirements of BS 6543 [2] or similar specifications.

4. Steel and glass which normally consist of recycled content will not be considered as materials with recycled content for this credit.

(c) Interior Non-structural Components

1. Provide all of the following supporting documents:

   1.1. List the materials/ items/ products used that contain recycled materials

   1.2. Demonstration for the target percentage of materials/ items/ products with recycled content as compared with all materials used for interior non-structural components.

2. The unit may be mass/ volume/ dollar value but shall be consistent throughout the assessment of this credit.

The calculation sheet on materials used shall be reviewed and endorsed by the main contractor. The qualified personnel from the main contractor are:

i. The contractor's quantity surveyor who possesses the following qualification:

   - A Corporate Member of The Hong Kong Institute of Surveyors (HKIS) in QS Discipline; or
   - A Chartered Member of Royal Institution of Chartered Surveyors (RICS) in QS Discipline; or
   - A Corporate/ Certified/ Full Member of other International Institute of Surveyors in QS Discipline; or

ii. The contractor's project manager who supervises the Project QS, monitors the use of materials, and possesses the following qualification or experience:

   - A Corporate Member of Hong Kong Institute of Construction Managers (HKICM); or

1 British Standards Institution. Aggregates for concrete. British Standard BS EN 12620:2002+A1:2008.

2 British Standards Institution. Guide to use of industrial by-products and waste materials in building and civil engineering. British Standard BS 6543: 1985.

- A Chartered Member of Chartered Institute of Building (CIOB); or
- A Corporate/ Certified/ Full Member of other International Institute of Construction Managers in QS Discipline; or
- At least 10 years of construction-related experience.

CV of the personnel and organisation chart highlighting the personnel shall be submitted to demonstrate the personnel has fulfilled the above-mentioned requirements.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_06_00	BEAM Plus NB submission template for MW 6	✓	✓	✓
MW_06_01	Calculation Sheet on Materials Used [Appendix A]	✓	✓	✓
	with endorsement from the main contractor; and CV of the personnel; and Organisation chart highlighting the personnel	-	✓	✓
MW_06_02	Contract specifications highlighting the use of recycled materials	✓	-	-
MW_06_03	Technical data (e.g. approved contractor's submission with catalogue) of recycled material(s)	-	✓	✓
MW_06_04	Drawings that demonstrate the use of materials for outside surface works and structures, building façade and structural components and/ or interior non-structural components	✓	✓	✓
Remarks: MW 6c is not eligible for the Compliance Assessment.				

Remarks

(a) Additional Information

A list of Recycled Materials for Construction Industry is available from the Environmental Protection Department.

Buildings Department PNAP APP-129 on Use of Recycled Aggregates in Concrete sets out the technical guidelines for using recycled aggregates in prescribed mixed concrete of specified grade strength of 20P and designed mixed concrete of specified grade strengths of 25D to 35D.

CIC & HKCI's study on PFA. [ONLINE]. Available at: https://www.cic.hk/cic_data/pdf/research_and_data_analytics/cic_research_fund_application/eng/Final%20report%20-%20CICR0414.pdf. [Accessed February 2025].

CEDD study on GGBS. [ONLINE]. Available at: http://www.devb.gov.hk/filemanager/en/content_763/Part%203%20-%20H%20D%20Wong%20&%20J%20Y%20W%20Mak.pdf. [Accessed February 2025].

British Standards Institution. Aggregates for concrete. British Standard BS EN 12620:2002+A1: 2008.

British Standards Institution. Guide to use of industrial by-products and waste materials in building and civil engineering. British Standard BS 6543: 1985.

(b) Related Credit

None

4 Materials and Waste **4.2 Selection of Materials**

MW 7 Ozone Depleting Substances

Extent of Application

All buildings with newly installed air conditioning and refrigeration equipment for part (a)

All buildings for part (b)

Objective

Reduce the release of harmful ozone-depleting substances into the atmosphere.

Credits Attainable

2

Credit Requirement

(a) Refrigerants

1 credit for the use of refrigerants with a value less than or equal to the threshold of the combined contribution to ozone depletion and global warming potentials using the specified equation.

(b) Ozone Depleting Materials

1 credit for the use of products in the building fabric and services that avoid using ozone depleting substances in their manufacture, composition or use.

Assessment

(a) Refrigerants

1. The air-conditioning and refrigeration equipment shall fulfill the following equation which determines a maximum threshold for the combined contributions to ozone depletion and global warming potentials:

$$\text{LCGWP} + \text{LCODP} \times 10^5 \leq 13$$

LCGWP = [GWPr x (Lr x Life + Mr) x Rc] / Life

LCODP = [ODPr x (Lr x Life + Mr) x Rc] / Life

LCGWP = Lifecycle Global Warming Potential (kg CO_2 /kW -Yr)

LCODP = Lifecycle Ozone Depletion Potential (kg CFC 11/kW-Yr)

GWPr = Global Warming Potential of Refrigerant

ODPr = Ozone Depletion Potential of Refrigerant (0 to 0.2 kg CFC11/kg r)

Lr = Refrigerant Leakage Rate (0.5% to 2.0%; default of 2% unless otherwise demonstrated)

Mr = End-of-life Refrigerant Loss (2% to 10%; default of 10% unless otherwise demonstrated)

Rc = Refrigerant Charge

Life = Equipment Life (default based on equipment type as listed in table below, unless otherwise demonstrated)

Equipment	Default Equipment Life
Window air-conditioner, heat pump	10 years
Unitary, split, packaged air-conditioner, package heat pump	15 years
Reciprocating and scroll compressor, reciprocating chiller	20 years
Absorption chiller	23 years
Water-cooled packaged air-conditioner	24 years
Centrifugal chiller	25 years

2. For systems with different types of equipment, a weighted average of all the air-conditioning and refrigeration equipment shall be calculated using the following equation:

$$[\Sigma(\mathrm{LCGWP} + \mathrm{LCODP} \times 10^5) \times \mathrm{Q_{unit}}] / \mathrm{Q_{total}} \leq 13$$

Q_{unit} = Gross ARI rated cooling capacity of an individual air- conditioning or refrigeration unit (kW)

Q_{total} = Total gross ARI rate cooling capacity of all air- conditioning or refrigeration (kW)

3. Small air-conditioning units, defined as those containing less than 0.23 kg of refrigerant, and other equipment, such as standard refrigerators, small water coolers and any other cooling equipment that contains less than 0.23 kg of refrigerant, can be excluded from this assessment.

4. Provide calculation endorsed by Locally Qualified Professional who has at least 3 years of relevant experience in mechanical/ BS design giving details of the air-conditioning and refrigeration equipment installed; and demonstrating that the global warming potential and ozone depletion potential of the refrigerants used in equipment meets the specified requirement. Reference shall be made to refrigerant suppliers and/ or equipment manufacturer's data, etc.

   The Locally Qualified Professional shall attain at least one of the following local professional qualifications:

   - Member of The Hong Kong Institution of Engineers (MHKIE);
   - Member of Hong Kong Institute of Qualified Environmental Professionals Limited (MHKIQEP);
   - Registered Energy Assessor (REA), under the Buildings Energy Efficiency Ordinance (Cap. 610); and
   - Registered Professional Engineer (R.P.E.), under the Engineers Registration Ordinance (Cap. 409).

   The accepted disciplines of the above local professional qualifications include Building Services, Mechanical, Electrical, Energy and Environmental.

   CV of the Locally Qualified Professional shall be provided to demonstrate that the Locally Qualified Professional holds the required local professional qualification(s) and with the relevant experience.

(b) Ozone Depleting Materials

1. Provide a full description and specifications of all major thermal insulation and fire-retardant materials specified in roof constructions, walls, chilled water pipes, refrigerant pipes, ductwork, advising the presence or otherwise of ozone depleting agents.

   The ozone depleting materials worksheet shall be reviewed and endorsed by the main contractor. The qualified personnel from the main contractor are:

   1.1. The contractor's quantity surveyor who possesses the following qualification:

   - A Corporate Member of The Hong Kong Institute of Surveyors (HKIS) in QS Discipline; or
   - A Chartered Member of Royal Institution of Chartered Surveyors (RICS) in QS Discipline; or
   - A Corporate/ Certified/ Full Member of other International Institute of Surveyors in QS Discipline; or

   1.2. The contractor's project manager who supervises the Project QS, monitors the use of materials, and possesses the following qualification or experience:

   - A Corporate Member of Hong Kong Institute of Construction Managers (HKICM); or
   - A Chartered Member of Chartered Institute of Building (CIOB); or
   - A Corporate/ Certified/ Full Member of other International Institute of Construction Managers in QS Discipline; or
   - At least 10 years of construction-related experience.

   CV of the personnel and organisation chart highlighting the personnel shall be submitted to demonstrate the personnel has fulfilled the above-mentioned requirements.

2. Where there is any doubt as to the ozone depletion potential of a material or product, details shall be ascertained from the manufacturer. Credit will be awarded where demonstration of reasonable effort has been made to avoid the use of products that have significant ozone depletion potential.

Submittals

(a) Refrigerants

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_07a_00	BEAM Plus NB submission template for MW 7a	✓	✓	✓
MW_07a_01	Contract specifications highlighting the use of refrigerants	✓	-	-
MW_07a_02	Endorsed Air-conditioning and Refrigeration Equipment Worksheet [Appendix A]	✓	✓	✓

MW_07a_03	CV of the professional as per the requirements in the assessment	✓	✓	✓
MW_07a_04	Equipment schedule of HVAC&R equipment showing the refrigerants employed are free from CFC and HCFC	-	✓	✓
MW_07a_05	Technical data (e.g. approved contractor's submission with catalogue or manufacturer's information) of HVAC&R equipment highlighting the values adopted in the calculation	-	✓	✓
MW_07a_06	/	/	/	/
MW_07a_07	Drawings (e.g. schematic diagram, layout drawings) showing no newly installed air conditioning and refrigeration equipment (substantiation for non-applicability only)	✓	✓	✓

(b) Ozone Depleting Materials

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_07b_00	BEAM Plus NB submission template for MW 7b	✓	✓	✓
	Ozone Depleting Materials Worksheet [Form S-A] endorsed by the main contractor; CV of the personnel; and Organisation chart highlighting the personnel	-	✓	✓
MW_07b_01	Contract specifications highlighting the use of insulation materials	✓	-	-
MW_07b_02	Technical data (e.g. approved contractor's submission with catalogue or statement from manufacturer) of insulation materials demonstrating that the products are free from CFC and HCFC	-	✓	✓

Remarks

(a) Additional Information

The Montreal Protocol has scheduled the phasing out of controlled substances, including chemicals containing chlorine and bromine used as refrigerants, solvents, foam blowing agents, aerosol propellants, fire suppressants, and for other purposes.

Ozone Layer Protection Ordinance (Cap. 403) gives effect to Hong Kong's international obligations to control the manufacture, import and export of ozone depleting substances.

Ozone Layer Protection (Controlled Refrigerants) Regulation requires the conservation of controlled refrigerants used in large scale installations and motor vehicles.

Ozone Layer Protection (Product Containing Scheduled Substances) (Import Banning) (Amendment) Regulation passed in 2009 extends the banning of the import of controlled products (including refrigeration and air-conditioning equipment, aerosol products such as metered dosed inhalers, insulation panel and pre-polymer) containing chlorofluorocarbons (CFCs) and halons to those containing other scheduled substances including hydrochloroflurocarbons (HCFCs) by phases.

All products containing HCFCs, except dichlorotrifluoroethane (HCFC-123) have been banned since 1 January 2015. It is targeted to ban all products containing HCFCs starting from 1 January 2020.
The Amendment Regulation also bans the import of CFC-containing metered dosed inhalers and fire extinguishers containing HCFCs and bromochloromethane (BCM) from 1 January 2010.

Given that CFCs and HCFCs have been banned, except HCFC-123, HFCs offer near-zero ODP but some have comparatively high GWPs.

Refrigerant	ODP [1]	GWP [1]
Hydrofluorocarbons		
HFC-23	~0	12240
HFC-32	~0	650
HFC-134a	~0	1320
HFC-152a	~0	140
HFC-402A	~0	1680
HFC-404A	~0	3900
HFC-407C	~0	1700
HFC-410A	~0	1890
HFC-413A	~0	1774
HFC-507A	~0	3900
Hydrochlorofluorocarbons		
HCFC-123	0.02	76

[1] – Sources:
i. IPCC Second Assessment Report;
ii. "World Resources Institute (2005), World Business Council for Sustainable Development";
iii. U.S. Environmental Protection Agency.

The U.S. Environmental Protection Agency provides information on suitable substitutes for ozone depleting substances, including refrigerants for various types of air-conditioning and refrigeration equipment, fire suppression, blowing agents, solvents, etc.

CIBSE GN01 outlines the hazards of using these refrigerants and provides design guidance for refrigeration systems, thermal insulation and fire protection systems.

ASHRAE Guideline 3-1996. Reducing Emission of Halogenated Refrigerants in Refrigeration and AS recommends practices and procedures that will reduce inadvertent release of halogenated refrigerants. The practices and procedures in this guideline cover emission reduction of halogenated hydrocarbon and halogenated ether refrigerants:

(i) from stationary refrigeration, air-conditioning, and heat pump equipment and systems; and

(ii) during manufacture, installation, testing, operation, maintenance, and disposal of equipment and systems.

(b) Related Credit

None

4 Materials and Waste **4.2 Selection of Materials**

MW 8 Regional Materials

Extent of Application All buildings

Objective Encourage the use of materials originated locally so as to reduce the environmental impacts arising from transportation.

Credits Attainable 1 + 2 additional BONUS

Credit Requirement 1 credit for the use of regional materials meeting prescribed requirement, which contributes at least 10% of all building materials used in the project.

1 additional BONUS credit for the use of regional materials meeting prescribed requirement, which contributes at least 20% of all building materials used in the project.

For exemplary performance, 1 additional BONUS credit for the use of regional materials meeting prescribed requirement, which contributes 50% or above of all building materials used in the project.

Assessment

1. Provide all of the following supporting documents:
   - 1.1. In PA, extracts of tender documents (e.g. contract specifications) highlighting the clause specifying the use of regionally manufactured materials;
   - 1.2. List of the materials satisfying the requirements;
   - 1.3. Quantification for the value of materials originated locally in percentage of the total value of the materials used;
   - 1.4. Supporting documents (e.g. invoice, catalogue, etc.) listing the name of the manufacturer and the location of the manufacturing plant; and
   - 1.5. Demonstration showing the distance between the location of manufacturing factory and the site.
2. The unit may be mass/ volume/ dollar value but shall be consistent throughout the assessment of this credit.
3. The summary of regional materials from foundation works (if any) and superstructure works shall be reviewed and endorsed by the contractors. The qualified personnel from the contractors are:
   - 3.1. The contractor's quantity surveyor who possesses the following qualification:
     - A Corporate Member of The Hong Kong Institute of Surveyors (HKIS) in QS Discipline; or
     - A Chartered Member of Royal Institution of Chartered Surveyors (RICS) in QS Discipline; or
     - A Corporate/ Certified/ Full Member of other International Institute of Surveyors in QS Discipline; or
   - 3.2. The contractor's project manager who supervises the Project QS, monitors the use of materials, and possesses the following qualification or experience:
     - A Corporate Member of Hong Kong Institute of Construction Managers (HKICM); or

- A Chartered Member of Chartered Institute of Building (CIOB); or
- A Corporate/ Certified/ Full Member of other International Institute of Construction Managers in QS Discipline; or
- At least 10 years of construction-related experience.

CV of the personnel and organisation chart highlighting the personnel shall be submitted to demonstrate the personnel has fulfilled the above-mentioned requirements.

4. Raw materials (constituents) used for making the claimed building materials shall fulfill the assessment requirements.

5. In-situ concrete, which is unlikely imported outside the region, will not be considered for this credit. The quantity of in-situ concrete shall be excluded from the calculation of the total building materials for this credit.

6. Mechanical and electrical systems components are excluded in the calculation. Plumbing products however may be included at the discretion of the project team.

7. Reused and salvaged material such as furniture may also be included. The location from which they were salvaged may be used as the point of manufacture.

8. The manufacturing factory of the building materials (including raw materials) shall be located within an 800km radius of the HKSAR by road transportation; within a 1,600km radius by rail transportation; or within a 4,000km radius by sea transportation.

   The 800km radius should radiate from the default coordinates of HKSAR. For simplicity, road travel distances within HKSAR are excluded in the calculation.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_08_00	BEAM Plus NB submission template for MW 8	✓		✓
	Estimated Summary of Regional Materials from Foundation Works (if any) [Form S-A] and Superstructure Works [Form S-B]	✓		-
	Summary of Regional Materials from Foundation Works (if any) [Form S-A] and Superstructure works [Form S-B] endorsed by contractor(s); and CV of the personnel; and Organisation chart highlighting the personnel	-		✓
MW_08_01	Contract specifications highlighting the use of regionally manufactured materials	✓		-

MW_08_02	Supporting documents (e.g. invoice, catalogue, etc.) listing the name of the manufacturer and the location of the manufacturing plant	-		✓
MW_08_03	Maps showing the distance between the manufacturing factory and the site	-		✓

Remarks

(a) Additional Information

None

(b) Related Credit

None

4 Materials and Waste **4.2 Green Product/ Materials**

MW 9 Use of Green Products

Extent of Application All buildings

Objective Encourage the use of green products that have low environmental impacts.

Credits Attainable 2 + 3 additional BONUS + 1 BONUS

Credit Requirement

(a) Certified Green Products

1 credit for having at least 5% of certified green products in one (1) of the listed categories (outside surface works, building façade and structures, interior non-structural components, and building services components).

2 credits for having at least 5% of certified green products in two (2) of the listed categories (outside surface works, building façade and structures, interior non-structural components, and building services components).

1 additional BONUS credit for having at least 5% of certified green products under Construction Industry Council (CIC) Green Product Certification [1] in one (1) of the listed categories (outside surface works, building façade and structures, interior non-structural components, and building services components).

For exemplary performance, 1 additional BONUS credit for having at least 25% of certified green products under CIC Green Product Certification [1] in one (1) of the listed categories (outside surface works, building façade and structures, interior non-structural components, and building services components).

(b) Rapidly Renewable Materials

1 BONUS credit for demonstrating 5% of all building materials/ products of interior non-structural components in the project are rapidly renewable materials.

For exemplary performance, 1 additional BONUS credit for demonstrating 25% of all building materials/ products of interior non-structural components in the project are rapidly renewable materials.

Assessment

(a) Certified Green Products

1. **<u>Outside Surface Works</u>**

1.1. Use of certified green products contributing to at least 5% of all materials as listed below.

Outside surface works	i. Pavement Block ii. Stone (Natural/ Artificial) iii. Paint & Coating iv. Alternative elements proposed by the Applicant

1 The CIC Green Product Certification is previously known as the CIC Carbon Labelling Scheme/ HKGBC Green Product Accreditation and Standards.

1.2. Provide all of the following supporting documents:

1.2.1. Demonstrate the percentage calculation (by mass, volume, exposed finishing surface area or dollar value) of all the items including certified green products (If “exposed finishing surface area” is adopted as the assessment unit, only the areas of the element that are exposed to air (i.e. excluding those concealed areas) shall be counted.);

1.2.2. Include a summary table listing the product type, product name/ serial no., manufacturer, certification body, calculation and reference source;

1.2.3. Certificate(s) of the green products;

1.2.4. Record photographs.

1.3. For certified green products as specified in CIC Green Product Certification are deemed to be accepted.

1.4. For any green products, which have been certified under other internationally recognised schemes, the Applicant shall refer to the list of worldwide recognised Green Building Product Certifications and Standards under HKGBC’s Eco-Product Directory or provide the product’s technical information with justification for BSL’s consideration.

2. **Building Façade and Structures**

2.1. Use of certified green products contributing to at least 5% of all materials as listed below.

Building Façade and Structures	i. Cement ii. Concrete iii. Reinforcing bar iv. Structural steel v. Extruded aluminum product vi. Glazing vii. Alternative elements proposed by the Applicant

2.2. Provide all of the following supporting documents:

2.2.1. Demonstrate the percentage calculation (by mass, volume, area or dollar value) of all the items including certified green products;

2.2.2. Include a summary table listing the product type, product name/ serial no., manufacturer, certification body, calculation and reference source;

2.2.3. Certificate(s) of the green products; and

2.2.4. Record photographs.

2.3. For certified green products as specified in CIC Green Product Certification are deemed to be included in the calculation.

2.4. For any green products, which have been certified under other internationally recognised schemes, the Applicant shall refer to the list of worldwide recognised Green Building Product Certifications and Standards under HKGBC’s Eco-Product Directory or provide the product’s technical information with justification for BSL’s consideration.

3. **Interior Non-structural Components**

3.1. Use of certified green products contributing to at least 5% of any 5 items as listed below.

Interior Non-structural Components	i. Panel board ii. Ceramic tile iii. Plant-based fibre composite iv. Furniture v. Stone (Natural/ Artificial) vi. Wall covering vii. Paint & coating viii. Adhesive & sealant ix. Block for internal partition x. Synthetic carpet xi. Thermal insulation xii. Alternative elements proposed by the Applicant

3.2. Provide all of the following supporting documents:

3.2.1. Demonstrate the percentage calculation (by mass, volume, exposed finishing surface area or dollar value) of all the items including certified green products (If "exposed finishing surface area" is adopted as the assessment unit, only the areas of the element that are exposed to air (i.e. excluding those concealed areas) shall be counted.);

3.2.2. Include a summary table listing the product type, product name/ serial no., manufacturer, certification body, calculation and reference source;

3.2.3. Certificate(s) of the green products; and

3.2.4. Record photographs.

3.3. For certified green products as specified in CIC Green Product Certification are deemed to be included in the calculation.

3.4. For any green products, which have been certified under other internationally recognised schemes, the Applicant shall refer to the list of worldwide recognised Green Building Product Certifications and Standards under HKGBC's Eco-Product Directory or provide the product's technical information with justification for BSL's consideration.

4. **Building Services Components**

4.1. Use of certified green products contributing to at least 5% of all materials under either sub-category (a), (b) or (c) as listed below.

Building Services Components	(a) Lighting & electrical installation	i. LED lighting ii. CFL iii. Electronic ballast iv. Cable & wire v. Alternative elements proposed by the Applicant

	(b) Air-conditioning systems	i. Chiller ii. VRF split type system iii. AHU iv. FCU v. Cooling tower vi. Alternative elements proposed by the Applicant
	(c) Plumbing & drainage	i. Water pump ii. Sanitary wares-ceramic product iii. Alternative elements proposed by the Applicant

4.2. Provide all of the following supporting document:

4.2.1. Demonstrate the percentage calculation (by mass, volume, quantity or dollar value) of all the items including certified green products;

4.2.2. Include a summary table listing the product type, product name/ serial no., manufacturer, certification body, calculation and reference source;

4.2.3. Certificate(s) of the green products; and

4.2.4. Record photographs.

4.3. For certified green products as specified in CIC Sustainable Product Certification are deemed to be included in the calculation.

4.4. For any green products, which have been certified under other internationally recognised schemes, the Applicant shall refer to the list of worldwide recognised Building Product Certifications and Standards under HKGBC's Eco-Product Directory or provide the product's technical information with justification for BSL's consideration.

The calculation sheet on materials used for Outside Surface Works, Building Façade and Structures, Interior Non-structural Components and Building Services Components shall be reviewed and endorsed by the main contractor. The qualified personnel from the main contractor are:

i. The contractor's quantity surveyor who possesses the following qualification:

- A Corporate Member of The Hong Kong Institute of Surveyors (HKIS) in QS Discipline; or
- A Chartered Member of Royal Institution of Chartered Surveyors (RICS) in QS Discipline; or
- A Corporate/ Certified/ Full Member of other International Institute of Surveyors in QS Discipline; or

ii. The contractor's project manager who supervises the Project QS, monitors the use of materials, and possesses the following qualification or experience:

- A Corporate Member of Hong Kong Institute of Construction Managers (HKICM); or
- A Chartered Member of Chartered Institute of Building (CIOB); or

- A Corporate/ Certified/ Full Member of other International Institute of Construction Managers in QS Discipline; or
- At least 10 years of construction-related experience.

CV of the personnel and organisation chart highlighting the personnel shall be submitted to demonstrate the personnel has fulfilled the above-mentioned requirements.

(b) Rapidly Renewable Materials

1. Use of at least 5% of all building materials/ products of interior non-structural components under the following categories are rapidly renewable materials, such as bamboo, cork, natural linoleum, soy bean composite, strawboard, sunflower seed and wheatboard.

Interior Non-structural Components	i. Flooring ii. Panel/ partitions iii. Cabinetry/ built-in furniture iv. Insulation v. Alternative elements proposed by the Applicant

2. Provide all of the following supporting documents:

2.1. Demonstrate the percentage calculation (by mass, volume, exposed finishing surface area or dollar's value) of all the items including rapidly renewable materials;

2.1.1. Include a summary table listing the product type, product name/ serial no., rapidly renewable material content, manufacturer, calculation and reference source;

2.1.2. Supporting documents of rapidly renewable materials; and

2.1.3. Record photographs

2.2. The calculation sheet on rapidly renewable materials used for interior non-structural components shall be reviewed and endorsed by the main contractor. The qualified personnel from the main contractor are:

2.2.1. The contractor's quantity surveyor who possesses the following qualification:

- A Corporate Member of The Hong Kong Institute of Surveyors (HKIS) in QS Discipline; or
- A Chartered Member of Royal Institution of Chartered Surveyors (RICS) in QS Discipline; or
- A Corporate/ Certified/ Full Member of other International Institute of Surveyors in QS Discipline; or

2.2.2. The contractor's project manager who supervises the Project QS, monitors the use of materials, and possesses the following qualification or experience:

- A Corporate Member of Hong Kong Institute of Construction Managers (HKICM); or
- A Chartered Member of Chartered Institute of Building (CIOB); or
- A Corporate/ Certified/ Full Member of other International Institute of Construction Managers in QS Discipline; or

- At least 10 years of construction-related experience.

CV of the personnel and organisation chart highlighting the personnel shall be submitted to demonstrate the personnel has fulfilled the above-mentioned requirements.

3. No material specified shall present a fire hazard when installed.

Submittals

(a) Certified Green Products

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_09a_00	BEAM Plus NB submission template for MW 9a	✓		✓
MW_09a_01	Calculation sheet on materials used for: Outside Surface Works [Appendix A]; and/or Building Façade and Structures [Appendix B]; and/or Interior Non-structural Components [Appendix C]; and/or Building Services Components [Appendix D]	✓		✓
	with endorsement from the main contractor; and CV of the personnel; and Organisation chart highlighting the personnel	-		✓
MW_09a_02	Contract specifications highlighting the use of green products	✓		-
MW_09a_03	Drawings showing the provision	-		✓
MW_09a_04	Technical data (e.g. approved contractor's submission with catalogue and certificate) of the certified green products	-		✓
Remarks: Photo records of installed certified green products shall be kept and submitted for assessment upon request.				

(b) Rapidly Renewable Materials

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_09b_00	BEAM Plus NB submission template for MW 9b	✓		✓
MW_09b_01	Calculation sheet on rapidly renewable materials used for interior non-structural components [Appendix E]	✓		✓
	with endorsement from the main contractor; and CV of the personnel; and Organisation chart highlighting the personnel	-		✓
MW_09b_02	Contract specifications highlighting the use of rapidly renewable materials	✓		-
MW_09b_03	Drawings showing the provision	-		✓
MW_09b_04	Technical data (e.g. approved contractor's submission with catalogue) of rapidly renewable materials	-		✓
Remarks: Photo records of installed rapidly renewable materials shall be kept and submitted for assessment upon request.				

Remarks

(a) Additional Information

HKGBC's Eco-Product Directory [ONLINE]. Available at: https://epdir.hkgbc.org.hk/plisting2a.php?serial=92. [Accessed February 2025].

CIC Green Product Certification [ONLINE]. Available at: http://cicgpc.hkgbc.org.hk/. [Accessed February 2025].

(b) Related Credit

None

4 Materials and Waste **4.3 Selection of Materials**

MW 10 Life Cycle Assessment

Extent of Application All buildings

Objective Encourage the design and planning of structural elements, choice of materials and construction processes that results in lower environmental effects/ embodied carbon.

Credits Attainable 1 + 1 additional BONUS

Credit Requirement 1 credit for demonstrating the environmental performances in the major elements of the building structure of the building has been studied and optimised through a Life Cycle Assessment (LCA).

Alternatively,

1 credit for demonstrating the embodied carbon in the major elements of the building structure of the building has been studied and optimised through an embodied carbon assessment.

1 additional BONUS for demonstrating the full embodied carbon of construction materials and carbon emissions of on-site construction processes has been studied through an embodied carbon assessment.

Assessment

1. Demonstrate the reduced environmental effects/ embodied carbon by conducting a Life Cycle Assessment (LCA)/ embodied carbon assessment on a baseline case, justified by the Applicant, and the proposed case.

2. The LCA/ embodied carbon assessment should cover only the elements and materials used in the building foundations, walls, primary and secondary structures and building façade, and does not include the building services system.

3. The service life of the baseline and proposed cases should be the same and at least of 50 years. The same software tools and data sets should be used to evaluate both the baseline building and the proposed building, and report all the listed impact categories. Data sets must be compliant with ISO 14044.

4. <u>Life Cycle Assessment (LCA)</u>

   4.1. In lieu of the above requirements, the LCA tool developed by EMSD can also be used. Select at least three (3) of the following impact categories for reduction:

      i. Global warming potential (greenhouse gases), in CO_2e;

      ii. Depletion of the stratospheric ozone layer, in kg CFC-11;

      iii. Acidification of land and water sources, in moles H^+ or kg SO_2;

      iv. Eutrophication, in kg nitrogen or kg phosphate;

      v. Formation of tropospheric ozone, in kg NO_x or kg ethene; and

      vi. Depletion of non-renewable energy resources, in MJ.

5. Embodied Carbon Assessment

   5.1. Alternatively, demonstrate that the materials used for (a) permanent works-substructure and (b) permanent works - superstructure have lower embodied carbon in the proposed case than the baseline case, with the result of the study generated from the "Design Input" module of the CIC Carbon Assessment Tool or “Embodied Carbon” module of the iBEAM Unison Carbon Assessment Tool or similar assessment tool.

6. The LCA/ embodied carbon assessment should be conducted during the design stage.

   6.1. For the assessment using tools other than the iBEAM Unison Carbon Assessment Tool, the study covering the foundation components should be completed prior to the commencement of piling works, and the study covering the superstructure, structural elements of facades and other remaining components of the building structures should be completed prior to the commencement of superstructure works.

   6.2. The assessment using the iBEAM Unison Carbon Assessment Tool, which utilise the material data from structural BIM model to perform embodied carbon calculation, should be completed prior to the commencement of superstructure works.

7. The LCA report/ embodied carbon assessment report should at least include the following contents with a minimum of 6 A4 pages:

   7.1. Quantity of the building materials;

   7.2. Narrative detailing on how the design of structural elements between the baseline case and proposed case enable a reduction in environmental effects/ embodied carbon;

   7.3. Assumptions made;

   7.4. Methodologies;

   7.5. Screenshots of input parameters;

   7.6. Results; and

   7.7. Conclusions.

   The endorsement for LCA report/ embodied carbon assessment report by the Structural Engineer or Quantity Surveyor is not required in BEAM Plus New Buildings assessment.

8. The structural drawings or BIM models for the baseline scheme and proposed scheme shall be provided to illustrate the structural design.

9. Additional BONUS credit will be granted for providing a full embodied carbon assessment report inclusive of (a) permanent works – substructure, (b) permanent works – superstructure, (c) temporary works and (d) site impact using the “Construction Input” module of the CIC Carbon Assessment Tool or similar assessment modules.

   Provide extract of tender documents (e.g. contract specifications) highlighting the clause requiring the contractors to carry out the embodied carbon assessment for (c) temporary works and (d) site impact if construction (foundation to be included, if any) has not yet commenced or have commenced but not yet completed prior to PA stage, to demonstrate the commitment to conduct the study throughout the construction period.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		PA	CA	FA/ RFA
MW_10_00	BEAM Plus NB submission template for MW 10	✓	✓	✓
MW_10_01	LCA report/ embodied carbon assessment report for building structure	✓	✓	✓
MW_10_02	Structural drawings or BIM models	✓	✓	✓
MW_10_03	Embodied carbon assessment report during construction stage, with supporting information on the construction data [or] Extract of tender documents (e.g. contract specifications) highlighting the clause requiring the contractors to carry out the embodied carbon assessment during construction stage (for additional BONUS only)	✓* ✓	✓ -	✓ -
* Evidence of compliance with credit requirements for construction works started not less than 3 months prior to PA (first submission) shall be submitted in PA.				

Remarks

(a) Additional Information

None

(b) Related Credit

None

4 Materials and Waste **4.3 Waste Reduction**

MW 11 Adaptability and Deconstruction

Extent of Application All buildings

Objective Encourage the design of building interior elements and building services components that allow modifications to space layout, and to reduce waste during churning, refurbishment and deconstruction.

Credits Attainable 1 + 1 additional BONUS

Credit Requirement

(a) Spatial Adaptability

1 credit for designs providing spatial flexibility that can adapt spaces for different uses and allows for expansion to permit additional spatial requirements to be accommodated.

Alternatively,

(b) Flexible Engineering Services

1 credit for flexible design of services that can adapt to changes of layout and use.

Alternatively,

(c) Structural Adaptability

1 credit for designs providing flexibility through the use of building structural systems which allow for change in future use and is coordinated with interior planning modules.

1 additional BONUS credit for compliance with requirements listed in sub-items (a), (b) and (c).

Assessment

(a) Spatial Adaptability

1. Provide a report presenting evidence as to how and the extent to which building adaptability and deconstruction is provided. The report shall include drawings and documents including building plans and detailed specifications together with elaboration and justification of specific design strategies that provide for the intended outcome.

2. Where it can be demonstrated that applicable good practices in respect of Spatial Adaptability have been adopted whenever feasible and at least 20% for residential development and 70% for non-residential development of the listed items in the checklist could be achieved, the credit shall be awarded.

Spatial Adaptability	Residential Buildings	Commercial Buildings	Other Building Types
Use of adaptable floor plans, including large grids that can be subdivided, etc.	[●]	●	●

Spaces designed for a loose fit rather than tight fit;	[●]	●	●
Inclusion of multifunctional spaces;	[●]	●	●
Design that allows interior fitting-out to use modular and prefabricated components;	[●]	●	●
Spaces designed such that minimum disruption will be caused to occupants due to physical change;	[●]	●	●
Easy relocation of partition walls that causes minimum damage to flooring or ceiling systems;	●	●	●
Partition walls are fully salvageable;	●	●	●
Separating long-lived components from short-lived components to reduce the complexity of deconstruction and churning so as to facilitate the collection process for recycling; and	[●]	●	●
Use of interior partitions that are demountable, reusable and recyclable, etc.	[●]	●	●
Remarks: - ASTM provides guidance for various types of buildings and uses [1, 2]. - Additions to the list may be proposed at the discretion of the Applicant. [●] This item is only applicable to clubhouse/ amenity facilities of the residential development.			

(b) Flexible Engineering Services

1. Provide a report presenting evidence as to how and the extent to which building adaptability and deconstruction is provided. The report shall include drawings and documents including building plans and detailed specifications together with elaboration and justification of specific design strategies that provide for the intended outcome.

1 ASTM International. Designation E1692-95a Standard Classification for Serviceability of an Office for Change and Churn by Occupants.

2 ASTM International. Designation E1679-13 Standard Practice for Setting the Requirements for the Serviceability of a Building or Building-Related Facility and for Determining What Serviceability is Provided or Proposed.

2. Where it can be demonstrated that applicable good practices in respect of Flexible Engineering Services have been adopted whenever feasible and at least 20% for residential development and 70% for non-residential development of the listed items in the checklist could be achieved, the credit shall be awarded.

Flexible Engineering Services	**Residential Buildings**	**Commercial Buildings**	**Other Building Types**
Design that allows interior fitting-out to use modular and prefabricated components;	[●]	●	●
Luminaires, including electrical connection and mechanical fixing, are easily relocated within ceiling grid or uplighters are used;	[●]	●	●
Air diffusers on flexible ducts can be relocated at minimum cost with minimum disruption to occupants;	[●]	●	●
Exhaust air ducts for special exhausts are easy to install, and space and capacity are available in ceiling and duct shafts;	[●]	●	●
Pre-wired horizontal distribution systems in ceilings or floors, with spare capacity and easy access to accommodate change of workplace layouts; and	-	●	●
Reducing the use of embedded infrastructure for power, data and HVAC systems, etc.	[●]	●	●
Remarks: - Additions to the list may be proposed at the discretion of the Applicant. [●] This item is only applicable to clubhouse/ amenity facilities of the residential development.			

(c) Structural Adaptability

1. Provide a report presenting evidence as to how and the extent to which building adaptability and deconstruction is provided. The report shall include drawings and documents including building plans and detailed specifications together with elaboration and justification of specific design strategies that provide for the intended outcome.

2. Where it can be demonstrated that applicable good practices in respect of Structural Adaptability have been adopted whenever feasible and at least 20% for residential development and 70% for non-residential development of the listed items in the checklist could be achieved, the credit shall be awarded.

Structural Adaptability	**Residential Buildings**	**Commercial Buildings**	**Other Building Types**
Foundations allow for potential vertical expansion of the building;	-	●	●
Installation of isolation joints or other features avoid the potential for differential settlements and for progressive collapse due to accidental loading;	-	●	●
Reliance on a central core for lateral load resistance that allows for local modifications to the structure while maintaining complete structural integrity;	[●]	●	●
Wide structural grids	[●]	●	●
Lower floors allow for heavier live load;	[●]	●	●
Sufficient height to lower floors to enable a range of uses;	[●]	●	●
Building envelope is independent of the structure	[●]	●	●
Versatile envelope capable of accommodating changes to the interior space plan;	[●]	●	●
Means of access to the exterior wall system from inside the building and from outside;	[●]	●	●
Structural floor system that accommodates a number of mechanical and electrical service distribution schemes based on different occupancies; and	-	●	●
Provision of more than the minimum spatial areas and floor heights, etc.	[●]	●	●

Remarks:

- Reference may be made to various publications [3].
- Additions to the list may be proposed at the discretion of the Applicant.

[●] This item is only applicable to clubhouse/ amenity facilities of the residential development.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_11_00	BEAM Plus NB submission template for MW 11	✓		✓
MW_11_01	Contract specifications highlighting the application of spatial adaptability/ flexible engineering service/ structural adaptability strategy features	✓		-
MW_11_02	A report with detailed explanation on the fulfillment of checklist's criteria/ justification for non-applicability	✓		✓
MW_11_03	Drawing to demonstrate that the checklist's requirements are fulfilled	✓		✓

Remarks

(a) Additional Information

None

(b) Related Credit

None

3 International Energy Agency. Annex 31. Energy-Related Environmental Impact of Buildings. 2005. [ONLINE]. Available at: http://www.iisbe.org/annex31/index.html. [Accessed February 2025].

4 Materials and Waste **4.3 Waste Reduction**

MW 12 Enhanced Waste Handling Facilities

Extent of Application

All buildings except one-single family domestic building with not more than 3 floors, or domestic parts of a composite building for one-single family with not more than 3 floors, or a building not normally occupied or for transient stay (e.g. pump house, sewage treatment plant, carpark building)

Part (b) is applicable only when Municipal Solid Waste Charging Scheme is activated

Objective

Encourage integrated waste management for operational reduction at source, effective sorting and collection within the site and recycling/ reuse of waste.

Credits Attainable

2 + 2 BONUS

Credit Requirement

(a) Additional Recyclables Collection

1 credit for the provision of facilities for collection, sorting, storage and disposal of 2 other recyclable streams in addition to those described in MW P1.

(b) Additional Facility Provisions to Enable Enhanced Municipal Solid Waste (MSW) Charging Scheme

1 credit for additional facilities for collection, sorting, storage and disposal of recyclables in addition to those described in MW P1 and MW 12 part (a).

(c) Waste Treatment Equipment

1 BONUS credit for providing at least one set of waste treatment equipment.

(d) Alternatives to Recycling Facilities

1 BONUS credit for provide alternative means of waste collection systems.

Assessment

(a) Additional Recyclables Collection

1. Provide a Recycle & Waste Management Strategy Plan that demonstrates the adequacy of two (2) additional recyclables, in addition to prescribed recyclables in MW P1, to be collected, such as food waste, organic landscape waste, and other (fluorescent light tubes, electronic products etc.). The plan should include the following in addition to the items required under MW P1:
    1.1. Identify and estimate the quantities of expected waste streams for the additional recyclables of the development by waste stream calculation;
    1.2. Demonstrate with calculation that there are sufficient capacity and provision for the additional recyclables generated from the development based on the waste stream calculation;

1.3. Elaborate the management plan, accessibility and hygiene for the additional recyclables. It includes what is the collection and separation methodology of recyclables; and how the building users dispose recyclables and janitor staffs collect and deliver to refuse storage and material recovery chambers (RS&MRC) & refuse chutes.

(b) Additional Recycling Facility Provisions to Enable Municipal Solid Waste (MSW) Charging Scheme

1. Provide an Operational Waste Management Plan that includes the following:

   1.1. Proposal of additional facility that enables MSW Charging Scheme;

   1.2. The proposal should indicate the solid waste disposal rate, target reduction rate, proposed features and the management methodology.

   1.3. Demonstrate how the municipal solid waste disposal rate can be reduced by the proposal. Target reduction for 10% in weight (kg) or size (m^3).

   1.4. Demonstrate that the location and design of the facility have considered accessibility of building users, and operation and maintenance of the recycling facilities, cleaning staff/ contractors and for waste recycling and collection companies.

2. Drawing is required to indicate the additional facility for enabling municipal solid waste management.

3. Detail documents (e.g. specifications or as-built information) of the additional recycling/ design features for enabling the MSW charging scheme.

(c) Waste Treatment Equipment

1. Where the consistent generation in volume of the appropriate operational waste streams is likely to exist, e.g. large amounts of packaging or compostable waste generated by the building's use and operation, the following facilities are provided for 5% waste reduction in size (m^3):

   1.1. Static waste compactors or balers; situated in a service area or dedicated waste management space

   1.2. Vessels for composting suitable organic waste resulting from the building's daily operation and use; OR adequate space for storing segregated food waste and compostable organic material prior to collection and delivery to an alternative composting facility

   1.3. Where organic waste is to be stored or composted on site, a water outlet is provided adjacent to or within the facility for cleaning and hygiene purposes.

(d) Alternatives to Recycling Facilities

1. Automated waste collection systems and separate chutes for different waste types are accepted as a form of compliance as long as a management plan is in place, which can either be public (local authority) or private and requirements for separation are met. The plan should include the following in addition to the items required under MW P1:

1.1. Provide narrative on the alternative recycling facilities (e.g. automated waste collection systems and separate chutes);

1.2. Demonstrate with calculation that there are sufficient capacity and spaces of the alternative recycling facilities for different waste types generated in the development based on the waste stream calculation; and

1.3. Demonstrate management plan, accessibility and hygiene for the alternative recycling facilities. It includes the outlines of what is the collection and separation methodology of waste and recyclables; and how the building users dispose refuses and recyclables and janitor staffs collect and deliver to refuse storage and material recovery chambers (RS&MRC) & Refuse Chutes, if the proposed alternatives to recycling facilities are separated from the RS&MRC.

Submittals

(a) Additional Recyclables Collection

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_12a_00	BEAM Plus NB Submission template for MW 12a	✓	✓	✓
MW_12a_01	Recycle & Waste Management Strategy Plan	✓	✓	✓
MW_12a_02	Drawings showing the locations of all waste handling facilities with indications of additional recyclable collections	✓	✓	✓
MW_12a_03	Master layout plan or extract(s) of the General Building Plan to substantiate the exemption from the requirements of this credit	✓	✓	✓
MW_12a_04	Purchase orders or undertaking letter from the project owner to substantiate the provision of additional recycling bins [or] Architect's Instruction (AI), approved contractor's submission with technical information, etc. (if the purchase orders and undertaking letter are not available at the time of CA submission)	- -	✓ ✓	✓ -

(b) Additional Recycling Facility Provisions to Enable Municipal Solid Waste (MSW) Charging Scheme

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_12b_00	BEAM Plus NB Submission template for MW 12b	✓	✓	✓
MW_12b_01	Operational Waste Management Plan	✓	✓	✓
MW_12b_02	Drawings showing the locations of the additional recycling facility provision to enable MSW Charging Scheme	✓	✓	✓
MW_12b_03	Specifications of the additional recycling/ design features	✓	-	-
MW_12b_04	Technical data (e.g. approved contractor's submission with catalogue) of the additional recycling facility	-	✓	✓
MW_12b_05	Master layout plan or extract(s) of the General Building Plan to substantiate the exemption from the requirements of this credit	✓	✓	✓

(c) Waste Treatment Equipment

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_12c_00	BEAM Plus NB Submission template for MW 12c	✓	✓	✓
MW_12c_01	Operational Waste Management Plan	✓	✓	✓
MW_12c_02	Drawings showing the locations of all waste treatment equipment	✓	✓	✓
MW_12c_03	Calculation to justify the percentage of waste reduction	✓	✓	✓
MW_12c_04	Technical data (e.g. approved contractor's submission with catalogue) of the waste treatment equipment	-	✓	✓

(d) Alternatives to Recycling Facilities

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
MW_12d_00	BEAM Plus NB Submission template for MW 12d	✓	✓	✓
MW_12d_01	Operational Waste Management Plan	✓	✓	✓
MW_12d_02	Drawings showing the locations of all waste handling facilities with indications of the alternative recycling facilities	✓	✓	✓

Remarks

(a) Additional Information

Buildings Department. Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineer. PNAP No. APP-35 on requirements for Refuse Storage and Material Recovery Chambers, Material Recovery Chambers.

Environmental Protection Department. Waste Data & Statistics. [ONLINE]. Available at: http://www.wastereduction.gov.hk/en/assistancewizard/waste_red_sat.htm. [Accessed February 2025].

(b) Related Credit

MW P1 Minimum Waste Recycling Facilities

This prerequisite stipulates the minimum requirements for waste recycling facilities.

HWB 5 Waste Odour Control

This credit addresses the hygiene aspects of waste disposal.

5 Energy Use (EU)

5.P Prerequisite
5.1 Energy Use Reduction and Control
5.2 Renewable and Alternative Energy Generation
5.3 Energy Efficient Equipment

Introduction

Electricity generation accounts for around 60% of the total CO_2 emissions from energy use in Hong Kong. Buildings account for 90% of our electricity consumption. Ensuring buildings are designed for good energy performance is a key factor to the conservation of energy.

Power stations operate under licenses issued by the Director of Environmental Protection Department, requiring operators to employ the best practicable means to control the emissions to acceptable levels. However, there is a growth in demand which leads to an increasing power generation, transmission and distribution capacity, because of the use of air- conditioning where the buildings are responsible for much of the peak load in summer. Demand side management can reduce the rate of expansion of supply-side capacity.

5.P Prerequisite

EU P1 Minimum Energy Performance

Background

BEAM provides incentives to achieve energy performance better than the minimum requirements of building energy codes. Therefore, compliance with the up-to-date Building Energy Codes (BEC) is the mandatory requirement governing the energy performance of building services installations. This is taken as the energy performance prerequisite for BEAM certification.

5.1 Energy Use Reduction and Control

EU 1 Low Carbon Passive Design
EU 2 Reduction of CO_2 Emissions
EU 3 Peak Electricity Demand Reduction
EU 4 Metering and Monitoring

Background

The estimation of annual energy use and maximum electricity demand take into account the design improvements to the building envelope and the efficiency of building services systems including air-conditioning, lighting systems, electrical installations and equipment, etc. It shall cover all the aspects of energy use in buildings. BEAM Plus gives credit to additional measures that address further improvement in the building energy efficiency. Passive building design allows buildings to respond to the local climate and reduce the reliance on active means to satisfy human comfort, and therefore reduces energy consumption and the associated carbon dioxide emissions. This is particularly important for residential building and BEAM Plus has developed an alternative path to assess passive elements for residential buildings.

Through effective planning and architectural design, it is possible to improve building energy efficiency. As such, this section also assesses various strategies including building orientation, layout plan and external shading devices, etc.

Both **Prescriptive Path** and **Performance Path** are developed for EU 1, EU 2 and EU 3. Applicants can apply either path to suit the project's specific characteristics and externalities.

5.2 Renewable and Alternative Energy Generation

EU 5 Renewable and Alternative Energy Systems

Background

If energy consumption continues to increase at existing levels, projected carbon dioxide emissions generated by the year 2030 are expected to grow by more than 50% from the level in 2005. Effective use of renewable energy will reduce Hong Kong's reliance on fossil fuels and also our greenhouse gas emissions arising from the use of fossil fuels.

Although the large-scale application of renewable energy in buildings does not exist in Hong Kong, its wider use should be promoted in the interest of sustainable development. BEAM Plus credits award those meaningful installations that provide environmental benefits. The criteria for assessment have been set with reference to the percentage of the energy use in the assessed building that will be replaced by renewable sources. Furthermore, no distinction will be made on the selected means such as solar hot water systems, building integrated photovoltaic panels or wind turbines, etc. for substituting electricity or fuel by renewable energy. Hence, different or a combination of systems and equipment may be incorporated into a building.

5.3 Energy Efficient Equipment

EU 6 Air-Conditioning Units
EU 7 Clothes Drying Facilities
EU 8 Energy Efficient Appliances

Background

BEAM Plus gives credit to the designs that enhance the performance of equipment such as air-conditioning units. Likewise, the provisions of facilities/ equipment that improve energy performance are also encouraged. Provision of clothes drying facilities is a good practice for the unique high- rise and high-density urban context of Hong Kong. With the introduction of the Energy Efficiency Labelling Scheme by EMSD, it becomes easier for the developers to select energy efficient appliances in the market.

5 Energy Use 5.P Prerequisite

EU P1 Minimum Energy Performance

Extent of Application All buildings

Objective To establish the minimum level of energy performance for the building services systems.

Credits Attainable Prerequisite

Credit Requirement Demonstrate performance improvement against the applicable edition of Building Energy Code (BEC).

For Prescribed Buildings under Buildings Energy Efficiency Ordinance (BEC Governing Buildings):

Referring to the **applicable** edition of BEC [1], demonstrate that performance improvement is achieved for the project in **both** of the following building services systems**:**

1. Improve 2% of code specified minimum coefficient of performance (COP) for air-conditioning equipment and/ or minimum cooling seasonal performance factor (CSPF) for room air-conditioner; and
2. Reduce 3% of code specified maximum allowable lighting power density for lighting installation.

For Buildings where Buildings Energy Efficiency Ordinance does NOT apply (Non-BEC Governing Buildings):

All Non-BEC governing buildings are required to demonstrate their **compliance** with the **applicable** edition of BEC in both of the following building services systems:

1. Code specified minimum coefficient of performance (COP) for air-conditioning equipment and/ or minimum cooling seasonal performance factor (CSPF) for room air-conditioner; and
2. Code specified maximum allowable lighting power density for lighting installation.

For Projects that consist of both BEC Governing Buildings and Non-BEC Governing Buildings:

Each building within the Project must adhere to the respective requirements based on its governing status.

** The applicable edition of BEC for a particular project shall be determined in accordance with the latest Circular Letter issued by BEAM Society Limited.*

1 Electrical and Mechanical Services Department (EMSD) – Code of Practice for Energy Efficiency of Building Services Installation [ONLINE]. Available at: https://www.emsd.gov.hk/beeo/en/mibec_beeo_codtechguidelines.html [Accessed February 2025].

Assessment

For Prescribed Buildings under Buildings Energy Efficiency Ordinance (BEC Governing Buildings):

1. **Air-conditioning Installation**

1.1. Provide a summary table of Energy Performance for Air-conditioning Installation to demonstrate the 2% performance improvement for EACH air-conditioning equipment and EACH room air-conditioner.

1.2. For EACH air-conditioning equipment, the COP improvement shall be compared against the corresponding minimum COP at cooling and/ or heating mode(s) at full load (and at the 75% of full load for chiller deploying variable speed drive) at specific standard rating condition specified under Section 6.12 of the applicable edition of BEC [1].

1.3. For EACH room air-conditioner (i.e. single package window type and wall mounted split type), the performance improvement should be compared against the applicable edition of the Code of Practice on Energy Labelling of Products ("the CoP"), under Mandatory Energy Efficiency Labelling Scheme (MEELS), Energy Efficiency (Labelling of Products) Ordinance (Cap. 598). The applicable edition of the CoP for a particular project shall refer to the latest Circular Letter issued by BEAM Society Limited.

1.4. The equipment efficiency of room air-conditioner equivalent to the Energy Efficiency Grade 2, under Mandatory Energy Efficiency Labelling Scheme (MEELS), Energy Efficiency (Labelling of Products) Ordinance (Cap. 598), using cooling seasonal performance factor (CSPF), Fcsp, shall be used as the basis for the comparison.

The benchmarking criteria for the room air-conditioners in the below table shall be adopted.

Type of air-conditioners	**CSPF, F_{csp} (2018 CoP)**	**CSPF, F_{csp} (2020/ 2023/ 2024 CoP)**
Single Package Type (Categories 1 - 2)	2.8	3.5
Split Type (Categories 3 - 4)	3.5	

1.5. Projects using district cooling system only, or projects without any air-conditioning installation or projects without any newly installed air-conditioning system, are not assessed under these criteria.

2. **Lighting Installation**

2.1. Provide a summary table of Energy Performance for Lighting Installation to demonstrate the 3% performance improvement of electrical power consumed by the lighting installation in whole building by area-weighted method compared against the applicable edition of BEC.

2.2. The lighting power density (LPD) for various types of spaces in baseline case should follow Section 5.4 of the applicable edition of BEC.

Area-weighted method:

Design Case:

$$\left(\frac{\sum[\text{LPD}(\text{Area A}) \times \text{Area A} + \text{LPD}(\text{Area B}) \times \text{Area B} + ...]}{\sum[\text{Area A} + \text{Area B} + ...]}\right)$$

Baseline Case:

$$\left(\frac{\sum[\text{BEC LPD}(\text{Area A}) \times \text{Area A} + \text{BEC LPD}(\text{Area B}) \times \text{Area B} + ...]}{\sum[\text{Area A} + \text{Area B} + ...]}\right)$$

$$\text{Lighting power reduction percentage} = \left(1 - \frac{\text{Design case}}{\text{Baseline Case}}\right) \times 100\%$$

2.3. For spaces where the total electrical power consumed by the lighting installations is less than 70W, an energy neutral approach shall be adopted, such that the LPD in the baseline case shall be the same as that in the design case.

2.4. For spaces where a lighting system neither exists nor is specified in a space (e.g. tenant area with lighting provision for occupation permit (OP) inspection only), the LPD in the design case shall be the same as that in the baseline case. unless a legally binding agreement is provided to substantiate the designed LPD.

2.5. For spaces that are NOT governed by the BEEO or without a suitable listed space type from the BEC, the LPD in the baseline case shall be the same as that in the design case.

2.6. Exclude those lighting installations as specified in Section 5.1.2 of the applicable edition of TG-BEC [2] in the calculation.

2.7. For residential buildings that are governed by BEEO, the LPD within a dwelling unit is excluded from the calculation.

For Buildings where Buildings Energy Efficiency Ordinance does NOT apply (Non-BEC Governing Buildings):

3. **Air-conditioning Installation**

3.1. Provide a summary table of Energy Performance for Air-conditioning Installation to demonstrate the performance compliance in percentage (%) for EACH air-conditioning equipment and EACH room air-conditioner.

3.2. The assessment criteria shall follow to Clause 1.2 to 1.5.

4. **Lighting Installation**

4.1. Provide a summary table of Energy Performance for Lighting Installation to demonstrate the performance compliance in percentage (%) of electrical power consumed by the lighting installation in whole building by area-weighted method compared against the applicable edition of BEC.

4.2. The assessment criteria shall follow to Clause 2.2 to 2.6.

2 Electrical and Mechanical Services Department (EMSD) – Technical Guidelines on Code of Practice for Energy Efficiency of Building Services Installation [ONLINE]. Available at: https://www.emsd.gov.hk/beeo/en/mibec_beeo_codtechguidelines.html [Accessed February 2025].

4.3. For residential buildings that are NOT governed by BEEO, the LPD within a dwelling unit in the baseline case shall be equal to the below:

- Bedroom: 13 W/m²
- Living Room/ Dining Room: 15 W/m²
- Kitchen: 13 W/m²
- Bathroom: 13W/m²

The LPD in the design case of the dwelling unit shall be the same as that in the baseline case, unless there is a completed lighting design within the dwelling unit, or a legally binding agreement is provided to substantiate the designed LPD.

For Projects that consist of both BEC Governing Buildings and Non-BEC Governing Buildings:

Each building within the project must adhere to the respective requirements based on its governing status.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
EU_P1_00	BEAM Plus NB submission template for EU P1	✓	✓	✓
EU_P1_01	Summary of Energy Performance for Air-conditioning Installation [EU_P1&02(Path2)_Appendix B3]; [and/ or] Summary of Energy Performance for Lighting Installation [EU_P1&02(Path2)_Appendix B4]	✓	✓	✓
EU_P1_02	Equipment schedule of Air-conditioning Installation highlighting the key performance data (e.g. rated capacity, rated COP at full load and 75% load (for VSD equipment), CSPF, etc.); and MVAC air-side and water-side (if applicable) schematic drawings	✓	✓	✓
EU_P1_03	Air-conditioning equipment specifications and/ or lighting specifications, highlighting the requirement on performance improvement/ compliance	✓	-	-

EU_P1_04	Technical data (e.g. catalogue) of air-conditioning equipment highlighting the key performance data (e.g. rated capacity, rated COP at full load and 75% load (for VSD equipment), CSPF, etc.); [and/ or] Lighting schedule with luminaire showing the key design information (e.g. installation location, type of light fitting, quantity, input wattage, control gear loss, etc.)	-	✓	✓
EU_P1_05	MVAC layout drawings [and/ or] Lighting layout drawings	-	✓	✓
EU_P1_06	/	/	/	/

Remarks

(a) Additional Information

Electrical and Mechanical Services Department (EMSD) – Code of Practice on Energy Labelling of Products [ONLINE]. Available at: https://www.emsd.gov.hk/energylabel/en/cop.html. [Accessed February 2025].

(b) Related Credit

None

5 Energy Use **5.1 Energy Use Reduction and Control**

EU 1 Low Carbon Passive Design

Extent of Application All buildings

Objective Passive building design allows buildings to respond to the local climate; reducing the reliance on active means to meet human comfort. This in turn reduces energy consumption and its associated carbon dioxide emissions.

Credits Attainable 6 + 1 additional BONUS

Credit Requirement Passive designs that can reduce building HVAC load, facilitate natural ventilation, and maximise daylight will be rewarded in this credit under **either** Prescriptive Path **or** Performance Path.

Option 1: Prescriptive Path (1-4 Credits + 1 additional BONUS)

4 credits for incorporating any 4 of the passive design strategies listed below, 1 credit for each strategy:

1. Optimum Spatial Planning
2. External Overhangs
3. Vegetated Building Envelope
4. Cross Ventilation Provision (Normally Occupied Space)
5. Cross Ventilation Provision (Not Normally Occupied Space)
6. Daylighting Provision

1 additional BONUS credit for incorporating ALL the above listed passive design strategies.

Option 2: Performance Path (1-6 Credits)

HVAC Load Reduction

1. Built Form and Orientation

1 credit for reducing building envelope load of a designed building from a hypothetic building with a different built form and/ or at least 22.5° difference in orientation with justification by simulation.

2. Optimum Spatial Planning

1 credit for demonstrating consideration of optimum spatial planning to enhance energy conservation with justification by simulation.

3. External Shading Devices

1 credit for the provision of fixed or movable horizontal/ vertical external shading devices, in the form of vertical or horizontal sun shading feature with justification by simulation.

4. Vegetated Building Envelope

1 credit for the provision of vegetated building envelope with justification by calculation.

Natural Ventilation

5. Space Layout for Natural Ventilation

1 credit for demonstrating that project space (both normally occupied space and not normally occupied space) is designed to facilitate the utilisation of natural ventilation with justification by simulation.

Daylight

6. Space Layout for Daylight Penetration

1 credit for demonstrating that the space is well-lit by daylight and reduce occupants' dependency on artificial lighting with justification by simulation method.

Assessment

Option 1: Prescriptive Path

Prepare a Passive Building Design Report with calculations, building elevations and drawings to demonstrate the compliance of each selected strategy.

1. Optimum Spatial Planning

Demonstrate the space planning complying with the following requirements:

1.1. For Non-open Planned Design

Demonstrate at least 20% of external wall of the building to be occupied by non-conditioned space for buildings where the developer/ owner has direct influence over the interior fit-out work for 50% or more of the identified non-conditioned occupied space.

1.2. For Open Planned Design

Demonstrate at least 5% of external wall of the building to be occupied by non-conditioned space for buildings where developer/ owner has direct influence over the interior fit-out work for less than 50% of the identified non-conditioned occupied space.

To document this strategy, for non-open planned and open-planned designs, the Passive Building Design Report should include the following information:

a) Building floor layout with indication on complied area;

b) Measurement of the perimeter length of the typical floor layout;

c) Measurement of the non-conditioned space external wall length;

d) Calculation of non-conditioned space external wall area; and

e) Summary table showing the percentage calculation.

2. External Overhangs

Demonstrate fixed or movable overhangs provided for project complying with the following requirement:

2.1. Incorporate external overhangs with depth that are >0.3 of window height on south orientated façade.

To document this strategy, the Passive Building Design Report should include the following information:

a) Façade design drawings with highlighted external overhangs; and

b) Drawings demonstrating that the depth of external overhangs from façade zone is >0.3 of window height.

3. Vegetated Building Envelope

Demonstrate greenery are provided for project envelope:

3.1. Demonstrate that the area of vegetation is at least 50% of the roof area of conditioned spaces. Roof of non-conditioned areas (e.g. mechanical plant rooms) does not count into the total roof area; OR

3.2. Demonstrate that the area of vegetation is at least 5% of the external wall area of conditioned spaces. External wall of non-conditioned spaces (e.g. mechanical plant rooms) does not count into the total external wall area.

3.3. Only permanent plantation is considered as vegetation area.

To document this strategy, the Passive Building Design Report should include the following information:

a) Drawings with highlighted indications that substantiate the area of vegetation on the roof area (or external wall area);

b) Drawings with highlighted indications that substantiate the roof area of conditioned space (or the external wall area of conditioned space);

c) Calculation for demonstrating the percentage of compliance; and

d) Maintenance contract or undertaking statement from Project Owner committing that landscape maintenance personnel/ company will be employed for the maintenance of building envelope vegetation.

4. Cross Ventilation Provision (Normally Occupied Space)

Demonstrate each normally occupied space in project is cross ventilated:

4.1. Provide cross ventilation for each normally occupied space of the building with reference to the cross-ventilation requirement stipulated in the latest edition of the Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings [1] (For 2014 edition, refer to Part 3.2 Cross Ventilation Requirement) (for residential buildings/ portions) OR ASHRAE Standard 62.1-2016 Section 6.4.2 [2] (for non-residential buildings/ portions).

To document this strategy, the Passive Building Design Report should include the following information:

a) Drawings of typical floors (or typical spaces design sections) showing the openable windows location and the cross-ventilation path;

b) Drawings illustrating natural ventilation; and

c) Calculation for demonstrating the compliance of minimum openable window area to floor area.

5. Cross Ventilation Provision (Not Normally Occupied Space)

5.1. Provide cross ventilation for each not normally occupied space (e.g. corridor, lobby) of the building with reference to the cross-ventilation requirement stipulated on ASHRAE Standard 62.1-2016 Section 6.4.2.

1 Buildings Department – PNAP APP-156 – Design and Construction Requirements for Energy Efficiency of Residential Buildings; Guideline on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014.

2 American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) – ANSI/ASHRAE Standard 62.1-2016 Ventilation for Acceptable Indoor Air Quality

To document this strategy, the Passive Building Design Report should include the following information:

a) Drawings of typical floors (or typical spaces design sections) showing the opening location and the cross-ventilation path;

b) Drawings illustrating natural ventilation assessment; and

c) Calculation for demonstrating the compliance of minimum openable area to space area.

6. Daylighting Provision

Demonstrate each normally occupied space is daylit:

6.1. Provide window for each normally occupied space with each window height > 50% of the corresponding normally occupied space depth.

To document this strategy, the Passive Building Design Report should include the following information:

a) Drawings of typical floors sections (or typical spaces design sections);

b) Drawings highlighting the height of windows;

c) Drawings highlighting the depth of normally occupied space; and

d) Calculation for demonstrating the percentage of compliance.

Option 2: Performance Path

Prepare a Passive Building Design Report to demonstrate the achievement of each selected passive design strategy with numerical supporting.

1. Built Form and Orientation

1.1. Conduct a building total energy analysis to demonstrate that the designed building has incorporated a better built form and/ or orientation. For built form, evaluation is carried out by demonstrating that a better built form is adopted for the designed building, comparing with a hypothetic building in a different built form. For orientation, evaluation is carried out by rotating the designed building to demonstrate a better orientation design is adopted. The selected baseline condition (hypothetic building) should be at least 22.5° different from the designed building in orientation. The hypothetic building should be a practical one, which should conform to the statutory requirements such as Building Ordinance and Town Planning Ordinance, that within the project site boundary after changing the built form and/ or rotation. A Passive Building Design Report should be provided to document the analysis and result.

To document this strategy, a Passive Building Design Report should include the following information:

a) A summary of simulation result;

b) Baseline case (hypothetic building) energy consumption;

c) Design case (designed building) energy consumption;

d) Demonstration (e.g. design drawings, perspective views from simulation models) of the orientation angle difference and/ or the difference in built forms between baseline case and design case;

e) Hourly data (i.e. 8,760 hours) of building energy consumption for both the baseline case and the design case; and

f) Input and output reports generated by the simulation software.

The simulation program used for energy modelling should meet the following criteria. Compliance review for below criteria is required only if the simulation software is not listed on Table 9.6 of applicable edition of Technical Guidelines on Code of Practice for Energy Efficiency of Building Services Installation.

a) Capable to perform hourly simulation (8,760 hours per year);

b) Capable to provide hourly variations in occupancy, lighting power, miscellaneous equipment power, thermostat setpoints, and HVAC system operation;

c) Capable to model 10 or more thermal zones;

d) Capable to model and simulate the thermal behaviour of a building and the interaction of its building fabric, air-conditioning, lighting and other relevant energy consuming equipment and systems;

e) Capable to perform design load calculations to determine the required air-conditioning equipment capacities and air and water flow rates for both the design case and baseline case building;

f) Capable to model part-load performance curves for mechanical equipment;

g) Capable to model capacity and efficiency correction curves for mechanical heating and cooling equipment; and

h) Capable to model air-side economisers with integrated control.

2. Optimum Spatial Planning

2.1. Demonstrate at least 20% of irradiation of building external wall is taken up by the external wall of non-conditioned space.

To document this strategy, the Passive Building Design Report should include the following information:

a) Annual solar irradiation on each building elevation;

b) Table summarising external wall area of non-conditioned space on each orientation of building elevation;

c) Calculation for demonstrating the design case compliance in irradiation gain reduction; and

$$\frac{\sum \text{Irradiation from External Wall of Non-conditioned Space}}{\text{Overall External Wall Irradiation}} \geq 20\%$$

d) Input and output reports generated by the simulation software.

3. External Shading Devices

3.1. Demonstrate the provision of fixed or movable horizontal/ vertical external shading devices in reducing direct solar irradiation entering the building interior. Any architectural features that shade the building surfaces from direct sunlight are considered as shading devices.

3.2. Conduct an external solar irradiation simulation to demonstrate that the annual solar irradiation on the façade is at least 2% lower than the baseline (hypothetic) case without a shading device.

To document this strategy, the Passive Building Design Report should include the following information:

a) Simulation result of solar irradiation on each building elevation for both design case and hypothetic case; and

b) Drawings illustrating the solar shading design; and

c) Input and output reports generated by the simulation software.

4. Vegetated Building Envelope

4.1. Demonstrate that the U-value of roof area of conditioned spaces is reduced 50% by vegetation. Roof of non-conditioned areas (e.g. mechanical plant rooms) does not count into the total roof area; OR

4.2. Demonstrate that the U-value of external wall is reduced 5% by vegetation. External wall of non-conditioned spaces (e.g. mechanical plant rooms) does not count into the total external wall area.

4.3. Only permanent plantation is considered as vegetation area.

To document this strategy, the Passive Building Design Report should include the following information:

a) Drawings with highlighted indications that substantiate the area of vegetation on the roof area (or external wall area);

b) Drawings with highlighted indications that substantiate the roof area of conditioned space (or the external wall area of conditioned space);

c) Calculation for demonstrating the percentage of compliance;

d) Technical information that substantiates the U-value of roof materials (or external wall materials); and

e) Maintenance contract or undertaking statement from Project Owner committing that landscape maintenance personnel/ company will be employed for the maintenance of building envelope vegetation.

5. Space Layout for Natural Ventilation

5.1. Demonstrate that at least 50% of openings and openable areas in each normally occupied space has an average incoming/outgoing velocity of 0.2 m/s.

5.2. Demonstrate that at least 20% of normally occupied space, in terms of floor area, has achieved a wind velocity of 0.2 m/s at 1.2m level above the finished floor.

5.3. A CFD simulation should be conducted in accordance with the AVA methodology and assessment area of the simulation model outlined in Technical Circular No.1/06 [3] to obtain the external wind pressures at the centre of the opening area. Another model that simulates the indoor flow pattern 1.2m level above the finished floor shall also be conducted using the external wind pressures computed by previous CFD model.

5.4. For buildings with 3 stories above grade or more, at least 3 typical stories (covering high, middle and low levels of buildings) with similar interior layout should be selected and studied for each multi-storey building within the site boundary. For buildings with less than 3 stories and/ or without typical floors design, the simulation should cover all floors.

5.5. For a normally occupied space in a building with site environmental problems identified by authorities (e.g. poor air quality, poor acoustic condition), providing openable windows for the identified normally occupied space is not practical. This credit is not eligible for project with 100% normally occupied space identified as non-practical for providing openable windows.

3 Housing, Planning and Lands Bureau (HPLB) and Environment, Transport and Works Bureau (ETWB) – Technical Circular No. 1/06 [ONLINE]. Available at: https://www.devb.gov.hk/filemanager/en/content_679/hplb-etwb-tc-01-06.pdf. [Accessed February 2025].

To document this strategy, the Passive Building Design Report should include the following information:

a) The derived incoming/ outgoing velocity at the opening under 1 out of the 3 most prevailing wind directions in summer; and

b) Calculation of the Area-Weighted Average Wind Velocity (AAWV) for the complied space; and

c) Input data, picture of the 3D model and simulation assumptions.

6. Space Layout for Daylight

6.1. Demonstrate that at least 25% of the total floor area of the normally occupied spaces achieves spatial Daylight Autonomy$_{300/25\%}$ ($sDA_{300/25\%}$). In other words, at least 25% of the total floor area of the normally occupied spaces can receive at least 300 lux of sunlight for at least 25% of operating hours each year.

6.2. Compliance with the assessment criteria by demonstrating through daylight simulation satisfying the below requirements:

6.2.1. Normally occupied spaces shall be assessed (including normally occupied spaces without window);

6.2.2. Internal doors within a unit are assumed to be fully opened;

6.2.3. Calculation grids shall be no more than 0.6m^2;

6.2.4. Assessment plane shall be placed at 0.8m above F.F.L. horizontally;

6.2.5. Assessment area shall cover typical floor(s) at the lowest level(s) of each building within the site boundary. All normally occupied spaces shall be assessed if the project building without typical floors design;

6.2.6. Annual sky file referencing a local climate file, such as an EnergyPlus weather format data file (*.epw), shall be used for sky model;

6.2.7. The assessment shall cover hours between 8a.m. to 6p.m. local clock time, for a full calendar year, from January 1 to December 31;

6.2.8. Overall external reflectance of an average of 0.2 for building (include the project development) and 0.2 for ground;

6.2.9. Internal wall, floor, ceiling reflectance can make reference to Table A1.12 in CIBSE Lighting Guide LG 10: Daylighting - A Guide for Designers (2014) [4]. If the finishes in the space is not completed, use the following default surface reflectance: 0.8 for ceiling, 0.2 for floors, and 0.5 for walls. The entire floor plate, except for the core is assumed to be normally occupied space;

6.2.10. Surrounding buildings and terrain shall be included in the model based on the GIS information from Lands Department;

6.2.11. The surrounding building and large structures should be included in the simulation model. The surrounding area should be at least 2H (H being the building height (m) of the tallest building on the project site) or 200m away from the project site boundary, whichever is larger. The building geometry can be simplified as blocks; and

4 Chartered Institute of Building Services Engineers (CIBSE) – Lighting Guide LG 10: Daylighting - A Guide for Designers (2014)

6.2.12. The terrain area shall be in a size of at least, 10H (H being the building height (m) of the tallest building on the project site) or 1000m × 1000m, whichever is larger, with the project placed in the centre. Where smaller terrain area is desired, the Applicant should propose a terrain area with justification and the terrain area should be surrounded by a wall with a height same as the average height of the surrounding buildings.

To document this strategy, the Passive Building Design Report should include the following information:

a) The industrial guidance/ publications for arriving the adopted design criteria for the project;

b) Software validation report; (if the simulation software is not on the list in Annex 4 of PNAP APP-130)

c) Simulation results of the spaces which have fulfilled the daylight illuminance requirements;

d) Calculation for demonstrating the percentage of compliance; and

e) Input and output reports generated by the simulation software.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
EU_01_00	BEAM Plus NB submission template for EU 1	✓	✓	✓
EU_01_01	Passive Building Design Report	✓	✓	✓
EU_01_02	/	/	/	/

Remarks

(a) Additional Information

None

(b) Related Credit

None

5 Energy Use **5.1 Energy Use Reduction and Control**

EU 2 Reduction of CO_2 Emissions

Extent of Application All buildings

Objective Reduce the consumption of non-renewable energy and the associated carbon dioxide (CO_2) emissions to the atmosphere.

Credits Attainable 10 + 8 additional BONUS

Credit Requirement

Option 1: Performance Path (1-10 Credits + 5 additional BONUS)

Demonstrate a percentage of reduction in annual CO_2 emission of the proposed building performance compared with the baseline case performance.

1 to 10 credits plus 5 additional BONUS credits for annual CO_2 emission reduction by the following saving percentages:

Credit(s)	Percentage of reduction of annual CO_2 emission / %	
	Adopting BEC 2018 as benchmarking criteria	Adopting BEC 2021 as benchmarking criteria
1	1%	
2	3%	1%
3	5%	3%
4	7%	5%
5	9%	7%
6	11%	9%
7	13%	11%
8	15%	13%
9	17%	15%
10	19%	17%
10 + 1B	21%	19%
10 + 2B	23%	21%
10 + 3B	25%	23%
10 + 4B	27%	25%
10 + 5B	29%	27%

Option 2: Prescriptive Path (1-7 Credits + 8 additional BONUS)

1 to 7 credits plus 8 additional BONUS credits for demonstrating a prescriptive compliance in below listed items.

1. **Passive Building Design Enhancement**

   Residential buildings and non-residential buildings should follow different requirements. For buildings consist of both residential and non-residential portions, demonstrate the compliance for the corresponding requirements for residential and non-residential portions respectively as listed below.

   1.1. **Building Envelope**

   Demonstrate the performance improvement in building envelope of the applicable building portions with reference to the statutory requirements on OTTV [1] / RTTV [2].

1 Buildings Department – PNAP APP-67 – Energy Efficiency of Buildings, Building (Energy Efficiency) Regulation; Code of Practice for Overall Thermal Transfer Value in Buildings 1995.

2 Buildings Department – PNAP APP-156 - Design and Construction Requirements for Energy Efficiency of Residential Buildings; Guideline on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014

<table>
<tr><th rowspan="2">Credit</th><th colspan="2">Performance Improvement</th></tr>
<tr><th>Adopting 2014 edition RTTV & 2019 edition OTTV as benchmarking criteria</th><th>Adopting 2022 edition RTTV & 2019 edition OTTV as benchmarking criteria</th></tr>
<tr><td rowspan="4">0.5</td><td colspan="2">a) Residential Buildings/ Portions</td></tr>
<tr><td>• $RTTV_{wall}$ Reduced by 5%</td><td>• $RTTV_{wall}$ Reduced by 1%</td></tr>
<tr><td colspan="2">b) Non-residential Buildings/ Portions & Residents' Recreational Facilities (RRF)</td></tr>
<tr><td colspan="2">• $OTTV_{tower}$ Reduced by 5%
• $OTTV_{podium}$ Reduced by 20%</td></tr>
<tr><td rowspan="4">1</td><td colspan="2">a) Residential Buildings/ Portions</td></tr>
<tr><td>• $RTTV_{wall}$ Reduced by 10%
• $RTTV_{roof}$ Reduced by 20%</td><td>• $RTTV_{wall}$ Reduced by 3%
• $RTTV_{roof}$ Reduced by 10%</td></tr>
<tr><td colspan="2">b) Non-residential Buildings/ Portions & Residents' Recreational Facilities (RRF)</td></tr>
<tr><td colspan="2">• $OTTV_{tower}$ Reduced by 10%
• $OTTV_{podium}$ Reduced by 40%</td></tr>
<tr><td rowspan="4">1 + 1 additional BONUS</td><td colspan="2">a) Residential Buildings/ Portions</td></tr>
<tr><td>• $RTTV_{wall}$ Reduced by 15%
• $RTTV_{roof}$ Reduced by 20%</td><td>• $RTTV_{wall}$ Reduced by 5%
• $RTTV_{roof}$ Reduced by 10%</td></tr>
<tr><td colspan="2">b) Non-residential Buildings/ Portions & Residents' Recreational Facilities (RRF)</td></tr>
<tr><td colspan="2">• $OTTV_{tower}$ Reduced by 10%
• $OTTV_{podium}$ Reduced by 40%</td></tr>
<tr><td rowspan="4">1 + 2 additional BONUS</td><td colspan="2">a) Residential Buildings/ Portions</td></tr>
<tr><td>• $RTTV_{wall}$ Reduced by 15%
• $RTTV_{roof}$ Reduced by 30%</td><td>• $RTTV_{wall}$ Reduced by 5%
• $RTTV_{roof}$ Reduced by 20%</td></tr>
<tr><td colspan="2">b) Non-residential Buildings/ Portions & Residents' Recreational Facilities (RRF)</td></tr>
<tr><td colspan="2">• $OTTV_{tower}$ Reduced by 10%
• $OTTV_{podium}$ Reduced by 40%</td></tr>
</table>

For exemplary performance, 1 additional BONUS credit for demonstrating:

(i) the compliance of "1 + 2 additional BONUS"; and

(ii) $RTTV_{roof}$ is reduced by 50% (for Projects adopting 2014 edition RTTV requirement) or 40% (for Projects adopting 2022 edition RTTV requirement).

1.2. **Natural Ventilation**

Demonstrate the performance improvement in natural ventilation provision for normally occupied spaces of the applicable building portions.

Credit	Performance Improvement
1	a) Residential Buildings/ Portions 20% of normally occupied space (habitable space) satisfy the ventilation requirements
2	a) Residential Buildings/ Portions 40% of normally occupied space (habitable space) satisfy the ventilation requirements
2 + 1 additional BONUS	a) Residential Buildings/ Portions 40% of normally occupied space (habitable space) satisfy the ventilation requirements b) Non-residential Buildings/ Portions & Residents' Recreational Facilities (RRF) i. For normally occupied spaces that utilise natural ventilation with direct openings to outdoors, the net free unobstructed area of the opening shall be not less than 5.2% of the net occupied floor area. ii. For normally occupied spaces that utilise natural ventilation without direct openings to outdoors, and is ventilated through adjoining room, the net free unobstructed area of the opening shall be not less than 8% of the net occupied floor area of the normally occupied space or not less than 2.3m².
2 + 2 additional BONUS	a) Residential Buildings/ Portions 40% of normally occupied space (habitable space) satisfy the ventilation requirements b) Non-residential Buildings/ Portions & Residents' Recreational Facilities (RRF) i. For normally occupied spaces that utilise natural ventilation with direct openings to outdoors, the net free unobstructed area of the opening shall be not less than 6.0% of the net occupied floor area. ii. For normally occupied spaces that utilise natural ventilation without direct openings to outdoors, and is ventilated through adjoining room, the net free unobstructed area of the opening shall be not less than 8% of the net occupied floor area of the normally occupied space or not less than 2.3m².

2. **Active System Design Improvement**

Demonstrate further performance improvement as compared with the applicable edition of the Building Energy Codes (BEC) [3].

2.1. **Air-conditioning Installation**

Demonstrate the performance improvement in percentage (%) of code specified minimum coefficient of performance (COP) for EACH air-conditioning equipment and/ or minimum cooling seasonal performance factor (CSPF) for EACH room air-conditioner:

Credit	Performance Improvement
1	3%
2	6%
2 + 1 additional BONUS	25%

2.2. **Lighting Installation**

Demonstrate the performance improvement in percentage (%) of electrical power consumed by the lighting installation in whole building by area-weighted method:

Credit	Performance Improvement
0.5	5%
1	10%
1 + 1 additional BONUS	30%

2.3. **Lift and Escalator Installation**

Demonstrate the performance improvement in percentage (%) of code specified maximum allowable electrical power consumed by lift and escalator installation:

Credit	Performance Improvement
1	5%
1 + 1 additional BONUS	10%

The electrical power reduction achieved through lift regenerative braking and/ or automatic speed reduction mode of escalator can be included in the performance improvement calculation.

Regenerative braking should be provided for **ALL** lifts; and/ or switching device, that can set the escalator under automatic speed reduction mode, should be provided for **ALL** escalators within a project in order to account for the reduction in the calculation.

3 Electrical and Mechanical Services Department (EMSD) – Code of Practice for Energy Efficiency of Building Services Installation (BEC) [ONLINE]. Available at: https://www.emsd.gov.hk/beeo/en/mibec_beeo_codtechguidelines.html. [Accessed February 2025].

Assessment

Option 1: Performance Path

Whole building energy simulation should be carried out in a prescribed methodology as listed below in order to quantify the potential savings due to energy saving measures and improvements over the relevant baseline model.

Simulation Software

Simulation program used for energy modelling should meet the following criteria:

1. Tested with industry standard methods: ANSI/ASHRAE Standard 140-2017 or equivalent.
2. Capable to perform hourly analysis (i.e. 8,760 hours per year);
3. Provide hourly variations in occupancy, lighting power, miscellaneous equipment power, thermostat setpoints, and HVAC system operation;
4. Capable to model 10 or more thermal zones;
5. Capable to simulate the thermal behaviour of a building and the interaction of its building fabric, air-conditioning, interior lighting and other relevant energy consuming equipment and systems;
6. Capable to perform design load calculations to determine the required air-conditioning equipment capacities and air and water flow rates for both the proposed building and baseline building;
7. Capable to model part-load performance curves for mechanical equipment;
8. Capable to model capacity and efficiency correction curves for mechanical heating and cooling equipment; and
9. Capable to model air-side economisers with integrated control.

Baseline and Proposed Model Set-up

Develop the corresponding baseline building performance according to modelling set up guideline in Appendix 9.2 for different building types.

Exceptional Calculation Methods (ECM)

When no simulation program can adequately model a design, materials or device, an ECM can be used to demonstrate above-standard performance. Its adoption is subject to the justification (submitted by the Applicant) of its underlying principles, quantitative & qualitative techniques, assumptions, etc. in detail.

For any claim of non-regulated load saving or strategies that lead to a difference between proposed and baseline model it is required to submit a narrative and provide ECM calculation.

ECM is allowed to create a representation of that element. If the methodology of approximation has not been previously published in any technical circular or FAQ, it is the responsibility of the Applicant to submit a narrative explanation describing the simulation methodology and providing the calculations for the energy savings if necessary.

On-site Renewable Energy Application

On-site renewable energy application is included in the proposed case calculation to further reduce the whole building CO_2 emission. By providing annual energy generation estimation details in the proposed case, the percentage reduction of CO_2 emission is accounted by the percentage of reduction from baseline CO_2 emission.

Equivalent Carbon Dioxide Emissions

Electricity: 0.7kg CO_2 per kWh electricity consumed [4]

Town gas: 3.141 kg CO_2 per unit of town gas consumed

(1 unit of town gas = 48 mega-joules consumed)

Building Energy Performance Assessment Report

Prepare a Building Energy Performance Assessment Report to demonstrate the compliance. If EU 3 Option 1 (Performance Path) is attempted, a collaborative report should be provided to substantiate the compliance of both EU 2 Option 1 (Performance Path) and EU 3 Option 1 (Performance Path).

The report should include the following contents:

1. Executive summary
    1.1. Energy saving measures summary
    1.2. CO_2 emission and energy consumption reduction as compared with baseline ; and
    1.3. Peak Electricity Demand reduction as compared with baseline
    (If EU 3 Option 1 is attempted).
2. Introduction
    2.1. Methodology of energy performance assessment, including the details of the energy simulation software and ECM (if any) used; and
    2.2. Project information.
3. Description of energy saving measures
4. Modelling Parameters
    4.1. Operating schedule; and
    4.2. Input parameters summary table with reference.
5. Results and discussion
    5.1. Summarise the CO_2 emission reduction in percentage (%);
    5.2. Provide baseline and proposed case energy breakdown diagrams;
    5.3. Calculation of Peak Electricity Demand reduction in percentage (%) *(If EU 3 Option 1 is attempted)*; and
    5.4. Peak Electricity Demand breakdown diagrams for baseline and proposed cases *(If EU 3 Option 1 is attempted)*.
6. Conclusions
    6.1. Conclude the major reasons for achieving CO_2 emission reduction.

4 Environmental Protection Department (EPD) – Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, Residential or Institutional Purposes) in Hong Kong, 2010 https://www.epd.gov.hk/epd/sites/default/files/epd/english/climate_change/files/Guidelines_English_2010.pdf [Accessed February 2025].

The report shall include the supporting documents for input, based on project development status, including:

1. OTTV/ RTTV calculation sheet based on the requirements of Buildings Department for baseline and proposed case;
2. Indoor design criteria from project team highlighting indoor thermal condition, occupancy density, fresh air flow rate requirement, internal load, equipment load and ventilation rate;
3. System and equipment specifications; schedules; and technical data (e.g. catalogues):
    3.1. All air-conditioning equipment highlighting COP, cooling/ heating capacity, input power, flow rate, etc., as well as energy recovery appliance highlighting efficiency;
    3.2. All lift and escalator highlighting capacity, motor power and energy saving control system;
    3.3. All water heater (if applicable) highlighting installed power;
    3.4. All ventilation fans highlighting input power and flow rate;
    3.5. All lighting fixtures highlighting designed space-specified LPD and/ or input lighting power; and
    3.6. Other systems (e.g. renewable energy applications) highlighting the key energy performance parameters;
4. Pre-input calculation for modelling (if any), including but not limited to:
    4.1. Simplified Fan Power input; and
    4.2. Lighting Power Density;
5. Exceptional Calculation;
6. Schematics drawings for building services systems; and
7. Layout plans for building services systems (optional for PA).

The report should be endorsed by a Locally Qualified Professional who has at least 8-year of relevant experience in building energy modelling. The Locally Qualified Professional shall attain at least one of the following local professional qualifications:

- Member of The Hong Kong Institution of Engineers (MHKIE);
- Member of Hong Kong Institute of Qualified Environmental Professionals Limited (MHKIQEP);
- Registered Energy Assessor (REA), under the Buildings Energy Efficiency Ordinance (Cap. 610); and
- Registered Professional Engineer (R.P.E.), under the Engineers Registration Ordinance (Cap. 409).

The accepted disciplines of the above local professional qualifications include Building Services, Mechanical, Electrical, Energy and Environmental.

CV of the Locally Qualified Professional shall be provided to demonstrate that the Locally Qualified Professional holds the required local professional qualification(s) and with the relevant experience.

Option 2: Prescriptive Path

Prepare a Prescriptive Approach Summary Report to demonstrate the compliance of each applicable category below:

1. **Passive Building Design Enhancement**

1.1. **Building Envelope**

1.1.1. Residential Buildings/ Portions

Provide calculation sheets for **$RTTV_{wall}$** and/ or **$RTTV_{roof}$** to demonstrate the performance improvement in building envelope with reference to the statutory requirement.

1.1.2. Non-residential Buildings/ Portions & Residents' Recreational Facilities (RRF)

Provide calculation sheets for **$OTTV_{tower}$** and/ or **$OTTV_{podium}$** to demonstrate the performance improvement in building envelope with reference to the statutory requirement.

1.2. **Natural Ventilation**

1.2.1. Residential Buildings/ Portions

1. Demonstrate not less than 20% or 40% of the normally occupied space (habitable space) area satisfies with the natural ventilation requirements detailed in Appendix 9.3. The provided guidance in Appendix 9.3 can only be applied to a single residential floor. Layout of a multi-floor unit should be reviewed per each floor.
2. If a flat is designed without internal partition between normally occupied space (habitable space) and other spaces, the compliance must be demonstrated by a typical layout with partition to represent the intended design for occupancy or habitation.
3. Provide descriptions, mark-up on the normally occupied space (habitable space) drawing such as layout plan, elevation drawing and summary tables of total area with natural ventilation requirements complied according to the detailed credit requirement stated in Appendix 9.3.

1.2.2. Non-residential Buildings/ Portions & Residents' Recreational Facilities (RRF)

1. Demonstrate the provision of sufficient permanent openings for natural ventilation with the performance improvement as compared with ASHRAE Standard 62.1-2016 Section 6.4.2 [5]:
    i. For normally occupied spaces that utilise natural ventilation with direct openings to outdoors, the spaces or portions of spaces to be naturally ventilated shall be permanently open to operable wall openings directly to the outdoors. The net free unobstructed area of the opening shall be not less than 5.2% or 6.0% of the net occupied floor area.
    ii. For normally occupied spaces that utilise natural ventilation without direct openings to outdoors, and is ventilated through adjoining room, the opening between rooms shall be permanently unobstructed (Door between rooms is deemed as permanently unobstructed opening). The net free unobstructed area of the opening shall be not less than 8% of the net occupied floor area of the normally occupied space or not less than 2.3m².

5 American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) – ANSI/ASHRAE Standard 62.1-2016 – Ventilation for Acceptable Indoor Air Quality

2. Provide mark-up on drawing such as layout plan and elevation drawing to illustrate the dimensions/ area of the permanent openings on building envelope and interior zone, as well as the net occupied floor area of the normally occupied space.
3. Provide calculation to demonstrate the compliance of the openings area or the percentage of the openings area to the net occupied floor area.

2. **Active System Design Improvement**

2.1. **Air-conditioning Installation**

2.1.1. Provide a summary table of Energy Performance for Air-conditioning Installation to demonstrate the performance improvement in percentage (%) for EACH air-conditioning equipment and EACH room air-conditioner.

2.1.2. The assessment criteria shall refer to Clause 1.2 to 1.5 under EU P1.

2.2. **Lighting Installation**

2.2.1. Provide a summary table of Energy Performance for Lighting Installation to demonstrate the performance improvement in percentage (%) of electrical power consumed by the lighting installation in whole building by area-weighted method compared against the applicable edition of BEC.

2.2.2. The assessment criteria shall refer to Clause 2.2 to 2.6 under EU P1.

2.2.3. For residential buildings that are governed by BEEO, the LPD within a dwelling unit is excluded from the calculation.

2.2.4. For residential buildings that are NOT governed by BEEO, the LPD within a dwelling unit in the baseline case shall be equal to the below:

- Bedroom: 13 W/m²
- Living Room/ Dining Room: 15 W/m²
- Kitchen: 13 W/m²
- Bathroom: 13W/m²

The LPD in the design case of the dwelling unit shall be the same as that in the baseline case, unless there is a completed lighting design within the dwelling unit, or a legally binding agreement is provided to substantiate the designed LPD.

2.3. **Lift and Escalator Installation**

2.3.1. Provide a summary table of Energy Performance for Lift and Escalator Installation to demonstrate the performance improvement in percentage (%) of electrical power for whole building lift and escalator installation.

2.3.2. The maximum allowable electrical power for lift and escalator installation shall be referred to Section 8 of the applicable edition of BEC.

2.3.3. The electrical power reduction achieved through lift regenerative braking (i.e. the amount of electrical power obtained when lifts travel downwards with heavy load or travel upwards with light load) and/ or automatic speed reduction mode of escalator (i.e. the amount of electrical power reduced under automatic speed reduction mode when the traffic demand is low) can be included in the performance improvement calculation.

Regenerative braking should be provided for **ALL** lifts; and/ or switching device, that can set the escalator under automatic speed reduction mode, should be provided for **ALL** escalators within a project in order to account for the reduction in the calculation.

The report shall include the supporting documents for calculation, based on project development status, including:

1. RTTV/ OTTV calculation sheet based on the requirements of Buildings Department and the corresponding improvement;
2. Floor layout plan showing all normally occupied spaces (habitable spaces); elevation drawings highlighting the locations of openable windows; schedules of usable floor area; schedule of openable window size; and summary table of usable floor area illustrating compliance with the detailed requirements stated in Appendix 9.2 (for Residential Buildings);
3. Floor layout plan showing the occupied floor spaces; elevation and section drawings highlighting all permanent openings on envelope and interior zone; schedule of net occupied floor areas; schedule of net free unobstructed area of permanent openings of each occupied space; and summary tables of net occupied floor areas complying with the credit requirements (for Non-residential Building/ Portion and/ or Residents' Recreational Facilities);
4. MVAC air-side and water-side (if applicable) schematic drawings; and MVAC layout drawings (optional for PA) showing all air-conditioning equipment;
5. Air-conditioning equipment specifications highlighting the requirement on performance improvement; equipment schedules and technical data (e.g. catalogues) highlighting the key performance data (e.g. rated capacity, rated COP at full load and 75% load (for VSD equipment), CSPF, etc.)
6. Lighting specifications highlighting the requirement on performance improvement; and lighting schedule with luminaire showing the key design information (e.g. installation location, type of light fitting, quantity, input wattage, control gear loss, etc.);
7. Lighting layout drawings (optional for PA);
8. Lift and escalator location markup on layout drawings;
9. Lift and escalator specifications highlighting the requirement on performance improvement; equipment schedules; and technical data (e.g. catalogues) showing the key design information (e.g. equipment type, rated load, rated speed, rated power etc.); and
10. Substantiation for electrical power reduction from lift regenerative braking/ automatic speed reduction mode of escalator (e.g. technical specifications; calculation along with assumptions made; technical data (e.g. catalogues); and functional performance test result/ declaration letter from manufacturer for electrical power reduction from lift regenerative braking/ automatic speed reduction mode of escalator) (if applicable).

The report should be endorsed by a Locally Qualified Professional who has at least 5-year of relevant experience in green building services system design. The Locally Qualified Professional shall attain at least one of the following local professional qualifications:

- Member of The Hong Kong Institution of Engineers (MHKIE);
- Member of Hong Kong Institute of Qualified Environmental Professionals Limited (MHKIQEP);
- Registered Energy Assessor (REA), under the Buildings Energy Efficiency Ordinance (Cap. 610); and
- Registered Professional Engineer (R.P.E.), under the Engineers Registration Ordinance (Cap. 409).

The accepted disciplines of the above local professional qualifications include Building Services, Mechanical, Electrical, Energy and Environmental.

CV of the Locally Qualified Professional shall be provided to demonstrate that the Locally Qualified Professional holds the required local professional qualification(s) and with the relevant experience.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below*.		**PA**	**CA**	**FA/ RFA**
Option 1: Performance Path				
EU_02(Path1)_00	BEAM Plus NB submission template for EU 2 Path 1 with Input Summary and Output Result Summary [EU_02&03(Path1)_Appendix A1 – A8]	✓	✓	✓
EU_02(Path1)_01	Endorsed Building Energy Performance Assessment Report	✓	✓	✓
EU_02(Path1)_02	CV of the professional as prescribed in the assessment criteria	✓	✓	✓
EU_02(Path1)_03	Input and Output Simulation report which is generated from simulation software	✓	✓	✓
EU_02(Path1)_04	Supporting documents for input, based on project development status, as stipulated in the assessment criteria	✓	✓	✓
Option 2: Prescriptive Path				
EU_02(Path2)_00	BEAM Plus NB submission template for EU 2 Path 2 with Compliance Summary Tables [EU_02(Path2)_Appendix B1, B2, B5]; and [EU_P1&02(Path2)_Appendix B3-B4]*	✓	✓	✓
EU_02(Path2)_01	Endorsed Prescriptive Approach Summary Report	✓	✓	✓
EU_02(Path2)_02	CV of the professional as prescribed in the assessment criteria	✓	✓	✓
EU_02(Path2)_03	Supporting documents for report calculation, based on project development status, as stipulated in the assessment criteria	✓	✓	✓
* The supporting documents EU_P1&02(Path2)_Appendix B3-B4 shall be the same as those submitted under EU P1. The Applicant need not resubmit the same materials in EU 2 if they have already been submitted in EU P1				

Remarks

(a) Additional Information

None

(b) Related Credit

None

5 Energy Use **5.1 Energy Use Reduction and Control**

EU 3 Peak Electricity Demand Reduction

Extent of Application All buildings

Objective Encourage energy conservation and methods to reduce peak electricity demand.

Credits Attainable 3 + 1 additional BONUS

Credit Requirement **Option 1: Based on EU 2 Performance Path (1-3 Credits)**

1 to 3 credits for peak electricity demand reduction by the following saving percentage:

Credit	Percentage of reduction of peak electricity demand / %
1	5%
2	10%
3	15%

Option 2: Based on EU 2 Prescriptive Path (1-2 Credits + 1 additional BONUS)

Credits can be achieved when the following credit points are achieved in EU 2 Option 2 (Prescriptive Path):

Credit	Credit points achieved in EU 2 Option 2 (Prescriptive Path)
1	4 credits
2	4 credits + 2 additional BONUS
2 + 1 additional BONUS	5 credits + 4 additional BONUS

Assessment **Option 1: Based on EU 2 Performance Path:**

Use the same whole building energy analysis of baseline and proposed case buildings in EU 2 Option 1 (Performance Path).

A collaborative Building Energy Performance Assessment Report should be provided under EU 2 to substantiate the compliance of both EU 2 Option 1 (Performance Path) and EU 3 Option 1 (Performance Path). The contents and requirements of the report and supporting documents should follow EU 2 Option 1 (Performance Path) of this Manual.

The peak electricity demand reduction in percentage (%) can be calculated as follows:

$$\left(1-\frac{\text{Proposed case peak electricity demand (kW)}}{\text{Baseline case peak electricity demand (kW)}}\right)\times 100\%$$

The peak electricity demand in the baseline case and that in the proposed case do not require to be occurred in the same month.

In order to encourage the use of renewable energy application(s), offsetting the peak electricity demand of assessed building (proposed case) by the electricity generated from renewable energy application(s) is allowed. The Applicant is opted to choose the electricity generated at any hour by the renewable energy application (s) to offset the peak electricity demand of the assessed building (proposed case). Calculation/ simulation result of the hourly electricity generation with due account of the diurnal and seasonal variations shall be provided for the substantiation of the peak electricity demand reduction in proposed case.

Option 2: Based on EU 2 Prescriptive Path:

Demonstrate a minimum 4-credit achievement in EU 2 Option 2 (Prescriptive Path).

The compliance shall be demonstrated under EU 2 Option 2 (Prescriptive Path).

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
Option 1: Based on EU 2 Performance Path*				
EU_03(Path1)_00	BEAM Plus NB submission template for EU 3 Path 1	✓	✓	✓
EU_03(Path1)_01	/	/	/	/
EU_03(Path1)_02	/	/	/	/
EU_03(Path1)_03	/	/	/	/
EU_03(Path1)_04	/	/	/	/
Option 2: Based on EU 2 Prescriptive Path*				
EU_03(Path2)_00	BEAM Plus NB submission template for EU 3 Path 2	✓	✓	✓
EU_03(Path2)_01	/	/	/	/
EU_03(Path2)_02	/	/	/	/
EU_03(Path2)_03	/	/	/	/
* The supporting documents for "Option 1: Based on EU 2 Performance Path" and "Option 2: Based on EU 2 Prescriptive Path" shall be the same as the submittal requirements under EU 2. The Applicant need not resubmit the same materials in EU 3 if they have already been submitted in EU 2.				

Remarks

(a) Additional Information

None

(b) Related Credit

EU 2 Reduction of CO_2 Emissions

5 Energy Use **5.1 Energy Use Reduction and Control**

EU 4 Metering and Monitoring

Extent of Application

EU 4a: All non-residential buildings/ portions or common areas of residential buildings/ portions

EU 4b: All non-residential buildings/ portions with tenanted areas

Objective

Enable building operators to measure, monitor and develop measures to improve the performance of the building's engineering systems.

Credits Attainable

1 + 2 BONUS

Credit Requirement

(a) Fundamental Metering and Monitoring

1 credit for providing **energy** monitoring system for equipment and systems in spaces.

1 BONUS credit for providing **performance auditing** monitoring system for equipment and systems in spaces.

(b) Metering for Tenanted Area

1 BONUS credit for allowing monitoring provision of tenants' energy consumption.

Assessment

(a) Fundamental Metering and Monitoring

1. **Metering Coverage**

1.1. Energy monitoring provision covers energy consumption (in kWh) or electricity demand (in kW) of the equipment.

1.2. Performance auditing monitoring provision covers the system capacity ratings and operating characteristics.

1.3. For common areas of residential buildings/ portions, provide monitoring provision for future facility management to review occasionally the end-use consumption.

1.4. For non-residential buildings/ portions, with reference to latest edition of EMSD Code of Practice for Building Energy Audit [1], provide the monitoring system for the installations in landlord's-controlled area, where present in the project. Terminal unit is not in the assessment scope.

Requirements of monitoring coverage are summarised as below:

Table EU4-1:

System (if applicable)	Energy Monitoring	Performance Auditing Monitoring
Outdoor Condition	• N/A	• Air Temperature (°C) • Humidity (RH) (%) • Daylight (Lux)

1 Electrical and Mechanical Services Department (EMSD) – Code of Practice for Building Energy Audit (EAC) [ONLINE]. Available at: https://www.emsd.gov.hk/beeo/en/mibec_beeo_codtechguidelines.html. [Accessed February 2025].

HVAC System	Each Equipment in HVAC (Water Side) - Chillers - Heat pumps - Pumps - Heat Rejection	• Electricity (kW or kWh)	• Supply & Return Water Temperature (°C) • Water Flow Rate (m^3/s) • Water Pressure (Pa) • Capacity Rating
	Each Equipment in HVAC (Water Side) - Absorption Chiller - Boiler	• Fuel (kW or kWh)	• Supply & Return Water Temperature (°C) • Water Flow Rate (m^3/s) • Water Pressure (Pa) • Capacity Rating
	Each Equipment in HVAC (Air Side) - Primary Air/ Air Handling Unit Fans - Return Air Fans - Free Cooling Fans	• Electricity (kW or kWh)	• Supply & Return Air Temperature (°C) • Air Flow Rate (m^3/s) • Air Pressure (Pa)
	VRV and Unitary System	• Electricity (kW or kWh)	• N/A
	Ventilation System - Carpark Ventilation - Toilet Ventilation (≥2.5kW each)	• Electricity (kW or kWh)	• CO/ NO_x Concentration Level (if applicable for carpark ventilation) • Air Flow Rate (m^3/s) (Jet Fan is excluded) • Air Pressure Head (m) (Jet Fan is excluded)
Lighting System	Lighting and receptacle system	• Electricity (kW or kWh)	• N/A
Plumbing and Drainage System	Each set of pumps (duty pump(s) and standby pump(s)) in Plumbing and Drainage	• Electricity (kW or kWh)	• N/A

Lift and Escalator System	Each Lift and Escalator*	• Electricity (kW or kWh)	• N/A
		1 Credit	**1 BONUS Credit**
* A separate single meter monitoring the entire lift/ escalator system is acceptable, provided that the monitoring system can provide individual reading of each lift and escalator.			

1.5. Drawings shall be submitted to demonstrate the provision of the monitoring equipment for energy monitoring and/ or performance auditing. The drawings can be electrical schematic drawings, MCB details, chiller plant control diagram, data/ BMS point schedules, etc. The provision of the monitoring equipment shall be clearly indicated with the reference ID highlighted or annotated for substantiation.

2. **Monitoring Provision Requirement (Datapoints, Sensors or Meters)**

2.1. Electricity metering should comply with BS EN [2] accuracy class 1 or equivalent.

2.2. Sensors for performance sub-metering should meet the minimum accuracy requirements in ASHRAE Standard 114 [3] or equivalent.

3. **Interval and Recording**

3.1. Monitoring record should be at intervals of one hour or less and capable to record the item as required.

3.2. For common areas of residential buildings/ portions, all data recorded by the sub-metering system and monitoring system should be collected monthly and be kept for at least 36 months.

3.3. For non-residential buildings/ portions, all data recorded by the sub-metering system and monitoring system should be transferred to a Building Management System (BMS) or other data collection system. The BMS or other data collection system should have sufficient capacity to store for at least 36 months.

(b) Metering for Tenanted Area

Demonstrate compliance by selecting one of the following paths for <u>all</u> tenanted area:

<u>Compliance Path 1: Landlord to install monitoring provision</u>

In all tenanted areas, allows separate monitoring of electricity use by:

1. HVAC system;
2. Lighting; and
3. Small power.

All data recorded should be transferred to a Building Management System (BMS) or other forms of data collection facilities. The BMS or data collection

2 British Standard BS EN 62053-11:2003. Electricity Metering Equipment (A.C.). Particular Requirements. Electromechanical Meters for Active Energy (Classes 0.5, 1 and 2).

3 American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) – ASHRAE Standard 114-1986: Energy Management Control Systems Instrumentation, American Society of Heating, Refrigerating and Air-conditioning Engineers, Inc., USA. 1987.

facilities should have sufficient capacity to store for at least 36 months.

Drawings shall be submitted to demonstrate the provision of the monitoring equipment for energy monitoring and/ or performance auditing. The drawings can be electrical schematic drawings, MCB details, chiller plant control diagram, data/ BMS point schedules, etc. The provision of the monitoring equipment shall be clearly indicated with the reference ID highlighted or annotated for substantiation.

OR

Compliance Path 2: Tenants to install monitoring provision

Provide a contractually binding lease document signed by both the project owner and the tenants which explicitly state the requirements of obtaining electricity usage data from the tenant's meters. The tenant's meters should separately monitor HVAC system, lighting and small power.

A contractually binding lease document, with reference to HKGBC Green Tenancy Driver [4], is required to establish to ensure data could be shared between project owner and tenants, which explicitly state:

1. The aim of improving the environmental performance of the building thereof the cost reduction and indoor quality;
2. The requirements of obtaining electricity usage data from the tenant;
3. Data and relevant information to be shared between Landlord and Tenants are to be kept confidential unless for the purpose of management of the building;
4. Landlord and Tenant are agreed to work collaboratively in setting up a Green Tenancy Committee (GTC); and
5. Responsibility of the GTC at minimum:
    a) Sharing the building operation data;
    b) Review the environmental performance of the premises;
    c) Setting up a Green Office Tenancy Plan with annual sustainability targets; and
    d) Review the target and progress periodically.

For both paths, the monitoring provision should provide record at intervals of one hour or less and capable to record electricity consumption (in kWh) or electricity demand (in kW).

4 HKGBC – Green Tenancy Driver for Office Buildings [ONLINE]. Available at: https://www.hkgbc.org.hk/eng/engagement/guidebooks/green-tenancy-driver/index.jsp. [Accessed February 2025].

Submittals

(a) Fundamental Metering and Monitoring

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
EU_04a_00	BEAM Plus NB submission template for EU 4a	✓	✓	✓
For EU 4a (Normal Credit), please provide the following:		**PA**	**CA**	**FA/ RFA**
EU_04a_01	Drawing(s) as prescribed in part (a) Clause 1.5 to demonstrate the metering and monitoring provisions for energy monitoring	✓	✓	✓
EU_04a_08	Summary of Energy Monitoring [EU_04a_Appendix A]	✓	✓	✓
For EU 4a (Bonus Credit), please provide the following:		**PA**	**CA**	**FA/ RFA**
EU_04a_02	Drawing(s) as prescribed in part (a) Clause 1.5 to demonstrate the metering and monitoring provisions for performance auditing	✓	✓	✓
EU_04a_06	Operation Manual of the Monitoring System	-	✓	✓
EU_04a_09	Summary of Performance Auditing Monitoring [EU_04a_Appendix B]	✓	✓	✓
For EU 4a (both Normal Credit & Bonus Credit), please provide the following:		**PA**	**CA**	**FA/ RFA**
EU_04a_03	Technical specifications of i. metering and monitoring equipment & ii. data collection facilities (e.g. BMS) (for non-residential buildings/ portions only) [or] Technical data (e.g. catalogues) of i. metering and monitoring equipment & ii. data collection facilities (e.g. BMS) (for non-residential buildings/ portions only)	✓ -	- ✓	- ✓
EU_04a_04	/	/	/	/
EU_04a_05	/	/	/	/
EU_04a_07	/	/	/	/

(b) Metering for Tenanted Area

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
EU_04b_00	BEAM Plus NB submission template for EU 4b	✓		✓
For Compliance Path 1, please submit the following:		**PA**	**CA**	**FA/ RFA**
EU_04b_01	Drawing(s) as prescribed in part (b) Compliance Path 1 for the metering and monitoring provisions for separate monitoring of electricity use in tenanted areas	✓		✓
EU_04b_02	Technical specifications of all metering and monitoring equipment [or] Technical data (e.g. catalogues) of all metering and monitoring equipment	✓ -		- ✓
EU_04b_03	Technical specifications of data collection facilities, e.g. BMS [or] Technical data (e.g. catalogues) of data collection facilities (e.g. BMS)	✓ -		- ✓
EU_04b_04	/	/		/
EU_04b_05	Operation Manual of the Monitoring System	-		✓
For Compliance Path 2, please submit the following:		**PA**	**CA**	**FA/ RFA**
EU_04b_06	Undertaking letter from the project owner committing that a contractually binding lease document will be established	✓		-
EU_04b_07	Contractually binding lease document	-		✓

Remarks

(a) Additional Information

None

(b) Related Credit

IDCM 13 Digital Facility Management Interface

IDCM 14 Occupant Engagement Platform

While this credit assesses the electricity consumption metering and monitoring system in the building, IDCM 13 and IDCM 14 encourages processing the data collected to useful information for facility managers' and occupants' use.

5 Energy Use **5.2 Renewable and Alternative Energy Generation**

EU 5 Renewable and Alternative Energy Systems

Extent of Application All buildings

Objective Encourage the wider application of renewable energy sources in buildings.

Credits Attainable 6 + 5 additional BONUS

Credit Requirement

(a) Solar Energy Feasibility Study

1 credit for evaluating the building roof's potential for harnessing solar energy.

(b) On-site Renewable Energy Application

1 to 5 credits plus 5 additional BONUS credits for using on-site renewable energy applications to offset annual building energy consumption [1].

Credit	Percentage of annual building energy consumption
1	0.2%
2	0.4%
3	0.6%
4	0.8%
5	1%
5+1B	1.2%
5+2B	1.4%
5+3B	1.6%
5+4B	1.8%
5+5B	2%

1 The energy consumptions of the building services systems controlled or influenced by the Applicant (e.g. MVAC, lighting, lift & escalator, plumbing & drainage, service hot water system, etc.) shall be accounted. Areas to be considered shall include those under the landlord's control such as entrance lobby, lift lobbies, corridors, staircases, shopping arcade, clubhouse, car park, plant rooms, public toilets, etc.

Assessment

(a) Solar Energy Feasibility Study

Conduct a feasibility study to evaluate the potential of standalone and building-integrated installation in harnessing solar energy including photovoltaic and solar water heating and provide a Solar Energy Feasibility Study Report. The report should include the following contents in around 10 A4 pages which should suffice for the purpose (however, the 10 A4 pages is not a straight limit):

1. Consideration of PV, BIPV or solar thermal potential installation
   - 1.1. Number of potential surfaces;
   - 1.2. Potential surfaces area;
   - 1.3. Height variation between roofs;
   - 1.4. Potential shading from the surroundings including trees and adjacent buildings;
   - 1.5. Potential shading from on-site building services equipment; and
   - 1.6. Other (proposed).

   (Note:
   Supporting documents such as layout plan showing the locations and numbers of the proposed PV panels shall be provided to substantiate the feasibility study.)

2. Technical generation potential of solar energy
   - 2.1. Expected solar peak capacity;
   - 2.2. Expected annual yield; and
   - 2.3. Project building energy use intensity (Default value could be used if EU 2 – Option 1 (Performance Path) is not attempted) and the estimated percentage of reduction.

   (Note:
   Supporting documents such as technical data (e.g. catalogues) showing the rated capacity of each PV panel shall be provided to substantiate the feasibility study.

   The efficiency and loss of the proposed PV system shall be included and clearly stated with any assumption made in the study. Supporting documents are not required.)

3. Conclusions
   - 3.1. Conclude whether the harnessing of solar energy is feasible for the project.

4. Roll-out plan (if concluded to be feasible)
   - 4.1. Propose access and safety measures if solar energy is to be harnessed; and
   - 4.2. Propose recommendations to refine the roof design to maximise the usable roof space for M&E equipment.

The Solar Energy Feasibility Study Report should be endorsed by a Locally Qualified Professional who has at least 3 years of relevant experience in renewable energy. The Locally Qualified Professional shall attain at least one of the following local professional qualifications:

- Member of The Hong Kong Institution of Engineers (MHKIE);
- Member of Hong Kong Institute of Qualified Environmental Professionals Limited (MHKIQEP);

- Registered Energy Assessor (REA), under the Buildings Energy Efficiency Ordinance (Cap. 610); and
- Registered Professional Engineer (R.P.E.), under the Engineers Registration Ordinance (Cap. 409).

The accepted disciplines of the above local professional qualifications include Building Services, Mechanical, Electrical, Energy and Environmental.

CV of the Locally Qualified Professional shall be provided to demonstrate that the Locally Qualified Professional holds the required local professional qualification(s) and with the relevant experience.

Note that the feasibility study imposes no obligation for implementation but encourages consideration of solar energy harnessing.

(b) On-site Renewable Energy Application

Calculate the percentage of annual building energy consumption [1] obtained from all renewable energy applications on site with reference to the annual energy use of the proposed case building calculated in EU 2 Reduction of CO_2 Emissions.

$$\frac{\text{Annual Energy Yielded from Renewable Energy Applications on Site(kWh)}}{\text{Annual Energy Use (kWh)}}$$

1. The calculation of annual energy yielded from each renewable energy application should take into account of the following factors:

   1.1. Diurnal and seasonal variations in the external environmental conditions; and

   1.2. Energy loss by the renewable energy systems (e.g. inverter loss of solar PV system, system efficiency loss, etc.) should be discounted from the systems output.

2. The amounts of annual energy use should be derived from the proposed case as calculated in EU 2 Option 1 (Performance Path). The tenant's electrical loads, which are not controlled or influenced by the Applicant, should be excluded from the annual energy use.

3. For renewable energy applications that generate energy from renewable sources (e.g. solar PV system, wind power system), the energy generated should be counted into the "Annual Energy Yielded from Renewable Energy Applications on Site" in the above equation. If energy is required on site to convert renewable energy sources to fuel or electricity (e.g. conversion of biomass to biofuel), such energy should be counted into the "Annual Energy Use" in the above equation.

4. For building systems that obtain energy from renewable sources to provide services (e.g. pre-heating water by solar panel for hot water system, replacing normal electricity by the energy produced from a biofuel generator), which will otherwise use fuel or electricity to produce those services, the equivalent amount of energy to produce those services (e.g. the amount of energy for water heating without the application of solar hot water system; the amount of normal electricity use for the connected load without using biofuel generator) should be counted into the "Annual Energy Use" in the above equation.

1 The energy consumptions of the building services systems controlled or influenced by the Applicant (e.g. MVAC, lighting, lift & escalator, plumbing & drainage, service hot water system, etc.) shall be accounted. Areas to be considered shall include those under the landlord's control such as entrance lobby, lift lobbies, corridors, staircases, shopping arcade, clubhouse, car park, plant rooms, public toilets, etc.

5. Examples of renewable energy applications accepted in this credit include:

   5.1. Solar photovoltaic (PV) System;

   5.2. Solar water heating system;

   5.3. Wind power system;

   5.4. Bio-gas heating/ electricity generation; and

   5.5. Biofuel (on-site/ off-site generation).

6. While the biofuel generator applied on-site to replace normal electricity use, the biofuel from renewable energy sources can either be produced on-site or purchased from off-site suppliers. The amount of annual renewable energy attributed to the biofuel system should be limited to the connected load of the system. To support this, the Applicant is required to submit documentation evidence, such as electrical schematic diagrams, to demonstrate the connected load of the biofuel system. This documentation will help ensure accurate calculation and assessment of the renewable energy contribution.

7. If EU 2 Option 1 (Performance Path) is not attempted or EU 2 Option 2 (Prescriptive Path) is adopted, the annual energy use of the Project building could be estimated based on the reference figure in Table EU5-1 [2].

Table EU5-1

#	Building Type	Total Energy use kWh/m^2	Controlled by Applicant
1	Office	222	40%
2	Enclosed and strip malls	268	50%
3	Retail shop	180	50%
4	Educational	166	100%
5	Other	334	100%

8. The calculation of percentage of annual building energy consumption [3] obtained from all renewable energy applications, including the calculation of annual energy yielded from each renewable energy application, shall be endorsed by a Locally Qualified Professional who has at least 3 years of relevant experience in renewable energy. The Locally Qualified Professional shall attain at least one of the following local professional qualifications:

   - Member of The Hong Kong Institution of Engineers (MHKIE);
   - Member of Hong Kong Institute of Qualified Environmental Professionals Limited (MHKIQEP);
   - Registered Energy Assessor (REA), under the Buildings Energy Efficiency Ordinance (Cap. 610); and
   - Registered Professional Engineer (R.P.E.), under the Engineers Registration Ordinance (Cap. 409).

   The accepted disciplines of the above local professional qualifications include Building Services, Mechanical, Electrical, Energy and Environmental.

2 Commercial Buildings Energy Consumption Survey (CBECS) Building Energy Intensity Data.

3 The energy consumptions of the building services systems controlled or influenced by the Applicant (e.g. MVAC, lighting, lift & escalator, plumbing & drainage, service hot water system, etc.) shall be accounted. Areas to be considered shall include those under the landlord's control such as entrance lobby, lift lobbies, corridors, staircases, shopping arcade, clubhouse, car park, plant rooms, public toilets, etc.

CV of the Locally Qualified Professional shall be provided to demonstrate that the Locally Qualified Professional holds the required local professional qualification(s) and with the relevant experience.

Submittals

(a) Solar Energy Feasibility Study

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
EU_05a_00	BEAM Plus NB submission template for EU 5a	✓	✓	✓
EU_05a_01	Endorsed Solar Energy Feasibility Study Report demonstrating compliance with part (a) items 1 to 4 of the assessment criteria	✓	✓	✓
EU_05a_02	CV of the professional as prescribed in the assessment criteria	✓	✓	✓

(b) On-site Renewable Energy Application

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
EU_05b_00	BEAM Plus NB submission template for EU 5b	✓	✓	✓
EU_05b_01	Technical specifications of on-site renewable energy application [or] Technical data (e.g. catalogues) of on-site renewable energy application	✓ -	- ✓	- ✓
EU_05b_02	Drawings (e.g. elevation and/ or layout plan) highlighting the location of each on-site renewable energy application	✓	✓	✓
EU_05b_03	Schematic diagram of each on-site renewable energy application For the application of biofuel generator, documentation evidence (e.g. electrical schematic diagrams) to demonstrate the connected load of the biofuel system	✓	✓	✓
EU_05b_04	Endorsed Calculation of annual yield of each on-site renewable energy application and assumptions	✓	✓	✓

EU_05b_05	Endorsed Calculation of percentage of annual building energy consumption obtained from on-site renewable energy applications	✓	✓	✓
EU_05b_06	CV of the professional as prescribed in the assessment criteria	✓	✓	✓

Remarks

(a) Additional Information

Electrical and Mechanical Services Department (EMSD) – HK RE Net [ONLINE]. Available at: https://re.emsd.gov.hk/english/index.html [Accessed February 2025].

Electrical and Mechanical Services Department (EMSD) – Energy Land [ONLINE]. Available at: http://www.energyland.emsd.gov.hk/en/energy/energy_use/application.html [Accessed February 2025].

Electrical and Mechanical Services Department (EMSD) – New & Renewable Energy [ONLINE]. Available at: http://www.emsd.gov.hk/en/energy_efficiency/new_renewable_energy [Accessed February 2025].

Environment Branch, Environment and Ecology Bureau (EEB) – New Scheme of Control Agreement (SCA) with Hongkong Electric Co. Ltd. and HK Electric Investments Ltd. (1 January 2019 to 31 December 2033) [ONLINE]. Available at: https://www.eeb.gov.hk/sites/default/files/en/node66/new_HKE_SCA_eng.pdf [Accessed February 2025].

Environment Branch, Environment and Ecology Bureau (EEB) – New Scheme of Control Agreement (SCA) with CLP Power Hong Kong Ltd. and Castle Peak Power Company Ltd. (1 October 2018 to 31 December 2033) [ONLINE]. Available at: https://www.eeb.gov.hk/sites/default/files/en/node66/new_CLP_SCA_eng.pdf [Accessed February 2025].

(b) Related Credit

EU 1 Low Carbon Passive Design

EU 2 Reduction of CO_2 Emissions

BEAM Plus appreciates comprehensive energy saving measures. Thorough consideration of passive design, active design and renewable energy will help buildings achieve significant reduction in energy consumption.

5 Energy Use **5.3 Energy Efficient Equipment**

EU 6 Air-Conditioning Units

Extent of Application

EU 6a: All buildings using variable refrigerant flow (VRF) units, window or split-type air conditioners as major source of air conditioning

EU 6b: All buildings using variable refrigerant flow (VRF) units, window or split-type air conditioners as major source of air conditioning and installed by the project owner

Objective

To ensure that the installation of air-conditioning units is able to provide near optimum performance.

Credits Attainable

2

Credit Requirement

(a) Compliance with Manufacturer's Recommendation

1 credit for complying with manufacturer's recommended installation positions for optimal heat rejection.

(b) Performance Verification

1 credit for demonstrating the operating temperatures of all variable refrigerant flow (VRF) units, window type, split-type or packaged type air-conditioning units do not exceed manufacturer's recommendation for the specified COP in the manufacturer's technical specifications via computational simulation techniques.

Assessment

(a) Compliance with Manufacturer's Recommendation

1. **For Projects installing AC unit**

   Demonstrate that the locations for the installation of air-conditioning units, including variable refrigerant flow (VRF) units, window type and split type, are capable to fulfil manufacturer's recommended installation requirements on

   i. Optimal heat rejection (not maintenance access space provision) for the air-conditioning units. At minimum, the following separation criteria shall be met:

      a) Separation from wall;

      b) Separation with other units; and

      c) Separation from wall at air-intake side.

   ii. Refrigerant equivalent pipe-length of manufacturer's requirement for the specified COP in the manufacturer's technical specifications.

2. **For Projects providing AC platform but AC unit is not installed**

   Demonstrate that the air-conditioning platforms for the installation of air-conditioning units, including variable refrigerant flow (VRF) units, window type and split type, by future users are capable to fulfil the recommended installation requirements from at least one representing manufacturer on

   i. Optimal heat rejection (not maintenance access space requirement). At minimum, the following separation criteria shall be met:

      a) Separation from wall;

b) Separation with other units; and

c) Separation from wall at air-intake side.

ii. Refrigerant equivalent pipe-length for the specified COP in the manufacturers' technical specifications.

(b) Performance Verification

Demonstrate, using Computational Fluid Dynamics (CFD), that all air-conditioning units do not exceed the manufacturer's recommended operative temperature.

For outdoor installations, make the following assumptions:

1. All wall surfaces are flat and air-tight;
2. Outdoor dry bulb temperature of 35°C;
3. No external wind effect; air is driven purely by buoyancy effect;
4. The effect of solar radiation is negligible; and
5. Air-conditioning units operate at full rated capacity.

Prepare a Performance Verification Report including the following contents:

1. Objectives;
2. Building layout;
3. Information of air-conditioner installations including brand, model, dimension, cooling capacity (kW) and installed locations;
4. Modelling methodology;
5. Modelling assumptions;
6. Screen shots of all input parameters;
7. Results, including temperature of all air-conditioning units; and
8. Conclusion.

The Performance Verification Report should be endorsed by a Locally Qualified Professional with at least 3 years of relevant experience in CFD simulation. The Locally Qualified Professional shall attain at least one of the following local professional qualifications:

- Member of The Hong Kong Institution of Engineers (MHKIE);
- Member of Hong Kong Institute of Qualified Environmental Professionals Limited (MHKIQEP);
- Registered Energy Assessor (REA), under the Buildings Energy Efficiency Ordinance (Cap. 610); and
- Registered Professional Engineer (R.P.E.), under the Engineers Registration Ordinance (Cap. 409).

The accepted disciplines of the above local professional qualifications include Building Services, Mechanical, Electrical, Energy and Environmental.

CV of the Locally Qualified Professional shall be provided to demonstrate that the Locally Qualified Professional holds the required local professional qualification(s) and with the relevant experience.

Submittals

(a) Compliance with Manufacturer's Recommendation

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
EU_06a_00	BEAM Plus NB submission template for EU 6a	✓	✓	✓
For Projects installing AC unit, please provide the following:		**PA**	**CA**	**FA/ RFA**
EU_06a_01	Equipment schedules of VRF units, window and/ or split-type air-conditioners	✓	✓	✓
EU_06a_02	Drawings (e.g. schematic diagrams) showing the type(s) and locations of VRF units, window and/ or split-type air-conditioners	✓	✓	✓
EU_06a_03	Supporting documents (e.g. Declaration Letter from the Project Owner/ Developer, Tender Specifications, etc.) to demonstrate the commitment that the 3 separation criteria and refrigerant equivalent pipe length can be met	✓	-	-
EU_06a_04	/	/	/	/
EU_06a_05	Drawings (e.g. scaled layout plans and/ or elevation drawings) with highlighted indications to illustrate that the 3 separation criteria, and refrigerant equivalent pipe length requirements can be met	✓	✓	✓
EU_06a_06	Representing Technical Data (e.g. catalogue) of VRF units, window and/ or split-type air-conditioners [or] Technical Data (e.g. catalogue) of VRF units, window and/ or split-type air-conditioners	✓ -	- ✓	- ✓
EU_06a_07	Representing Manufacturer's Installation Details showing the 3 separation criteria and refrigerant equivalent pipe-length [or] Manufacturer's Installation Details showing the 3 separation criteria and refrigerant equivalent pipe-length	✓ -	- ✓	- ✓

For Projects providing AC platform but AC unit is not installed, please provide the following:		PA	CA	FA/ RFA
EU_06a_08	Drawings (e.g. typical installation details drawings) with highlighted indications to illustrate that the 3 separation criteria and refrigerant equivalent pipe length requirements can be met	✓	✓	✓
EU_06a_09	Representing Technical Data (e.g. catalogue) of VRF units, window and/ or split-type air-conditioners	✓	✓	✓
EU_06a_10	Representing Manufacturer's Installation Details showing the 3 separation criteria and refrigerant equivalent pipe-length	✓	✓	✓

(b) Performance Verification

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		PA	CA	FA/ RFA
EU_06b_00	BEAM Plus NB submission template for EU 6b	✓	✓	✓
EU_06b_01	Endorsed Performance Verification Report	✓	✓	✓
EU_06b_02	CV of the professional as prescribed in the assessment criteria	✓	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credit

None

5 Energy Use **5.3 Energy Efficient Equipment**

EU 7 Clothes Drying Facilities

Extent of Application Residential buildings, exclusively for those specified under "Assessment"

Objective Encourage wider use of natural means in lieu of gas or electricity for clothes drying purposes.

Credits Attainable 1 + 1 BONUS

Credit Requirement

(a) Provision of Clothes Drying Facilities

1 credit for providing clothes drying facilities for all residential units under suitable location conditions.

(b) Demonstration of Effectiveness

1 BONUS credit for demonstrating the effectiveness of clothes drying facilities via computational analysis.

Assessment This credit applies exclusively to residential units within private/ public housing developments and government quarters.

(a) Provision of Clothes Drying Facilities

Fulfill below requirements on the suitable location conditions of the clothes drying facilities for each dwelling unit:

1. The clothes drying facilities are protected from water droplets and debris falling from higher levels; and
2. At re-entrant location, the clothes drying facilities are required to be:
   i. 0.5m horizontal distance away from air-conditioning units; and
   ii. 1.5m horizontal distance away from kitchen exhausts

   to mitigate the potential nuisances by smoke, fumes and pollutants emitted from water heaters, cooking exhausts, discharges from air-conditioning units.

If the provision is portable clothes drying rack, supporting documents (e.g. Declaration Letter from the Project Owner/ Developer, Tender Specifications, etc.) shall be submitted to demonstrate the commitment of the provision.

(b) Demonstration of Effectiveness

Prepare a computational analysis report with the following contents:

1. Description of the surrounding environment;
2. Building orientation;
3. Locations of the clothes drying facilities;
4. Methodology of study, including but not limited to the software tools used, assumptions, calculation methods and screenshots of input parameters; and
5. Demonstration of the clothes drying facilities effectiveness by meeting one of the below requirements.

5.1. **Sunlight**

1 Hour, with 5-minute reporting interval, of direct solar exposure in winter solstice (冬至日)

5.2. **Wind**

Minimum wind velocity of 0.5m/s under winter prevailing wind with the highest wind frequency should be used.

The Computational Analysis Report should be endorsed by a Locally Qualified Professional with 3 years of relevant experience in computational simulation. The Locally Qualified Professional shall attain at least one of the following local professional qualifications:

- Member of The Hong Kong Institution of Engineers (MHKIE);
- Member of Hong Kong Institute of Qualified Environmental Professionals Limited (MHKIQEP);
- Registered Energy Assessor (REA), under the Buildings Energy Efficiency Ordinance (Cap. 610); and
- Registered Professional Engineer (R.P.E.), under the Engineers Registration Ordinance (Cap. 409).

The accepted disciplines of the above local professional qualifications include Building Services, Mechanical, Electrical, Energy and Environmental.

CV of the Locally Qualified Professional shall be provided to demonstrate that the Locally Qualified Professional holds the required local professional qualification(s) and with the relevant experience.

Submittals

(a) Provision of Clothes Drying Facilities

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
EU_07a_00	BEAM Plus NB submission template for EU 7a	✓	✓	✓
EU_07a_01	Layout plans with indications of the locations of the clothes drying facilities For re-entrant locations, the locations with respect to air conditioning units and kitchen vents shall also be indicated to demonstrate the compliance	✓	✓	✓
EU_07a_02	Drawings (e.g. elevation/ section drawings) with indications to demonstrate the falling protections for the clothes drying facilities	✓	✓	✓

EU_07a_03	Supporting documents (e.g. Declaration Letter from the Project Owner/ Developer, Tender Specifications, etc.) to demonstrate the commitment of the provision (substantiation for portable clothes drying racks only)	✓	✓	✓
EU_07a_04	/	/	/	/

(b) Demonstration of Effectiveness

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
EU_07b_00	BEAM Plus NB submission template for EU 7b	✓	✓	✓
EU_07b_01	CV of the professional as prescribed in the assessment criteria	✓	✓	✓
EU_07b_02	Endorsed Computational Analysis Report	✓	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credit

None

5 Energy Use 5.3 Energy Efficient Equipment

EU 8 Energy Efficient Appliances

Extent of Application

Residential buildings and hotel, exclusively for those specified under "Assessment"

Objective

Encourage the wider use of energy efficient appliances.

Credits Attainable

2

Credit Requirement

1 credit when 60% of total rated power of appliances are certified energy efficient products.

2 credits when 80% of total rated power of appliances are certified energy efficient products.

Assessment

This credit applies exclusively to private/ public housing developments, government quarters, dormitories, hostels, and hotel developments.

This credit assesses only the appliances provided by the developer.

The appliances covered in this credit include the following items covered by the EMSD Energy Efficiency Labelling Scheme. In other words, only appliances which are governed by the EMSD Energy Efficiency Labelling Scheme will be included in the denominator for percentage calculation.

1. Refrigerating Appliances
2. Washing Machines
3. Dehumidifiers
4. Electric Clothes Dryers
5. Storage Type Electric Water Heaters
6. Televisions
7. Electric Rice-Cookers
8. Electronic Ballasts
9. Induction Cookers
10. Microwave Ovens
11. Photocopiers
12. Fax Machines
13. Multifunction Devices
14. Printers
15. LCD Monitors
16. Computers
17. Hot/ Cold Bottled Water Dispensers
18. Gas Instantaneous Water Heaters
19. Gas Cookers

Provide a schedule of all appliances including the location, quantity, model and the rated power.

The appliances should achieve Grade 1 under the Mandatory Energy Efficiency Labelling Scheme (MEELS) [1] or Grade 1 (for appliance types with 'Grading type' Energy Label)/ "Recognition Type" Energy Label under the Voluntary Energy Efficiency Labelling Scheme (VEELS) [2].

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
EU_08_00	BEAM Plus NB submission template for EU 8	✓	✓	✓
EU_08_01	Schedule of All Appliances Provided by the Developer [EU_08_Appendix A]	✓	✓	✓
EU_08_02	Contract specifications or catalogue, together with information of EMSD Energy Efficiency Label (e.g. a copy of the EMSD Energy Efficiency Label or an extracted page of the register of MEELS/ VEELS products from EMSD's website with highlighted indication)	✓	-	-
EU_08_03	Technical data (e.g. catalogue) or sales brochure showing the as-installed appliances model(s) together with information of EMSD Energy Efficiency Label (e.g. a copy of the EMSD Energy Efficiency Label or an extracted page of the register of MEELS/ VEELS products from EMSD's website with highlighted indication)	-	✓	✓
EU_08_04	/	/	/	/

Remarks

(a) Additional Information

None

(b) Related Credit

None

1 Electrical and Mechanical Services Department (EMSD) – Mandatory Energy Efficiency Labelling Scheme [ONLINE]. Available at: https://www.emsd.gov.hk/en/energy_efficiency/mandatory_energy_efficiency_labelling_scheme/index.html. [Accessed February 2025].

2 Electrical and Mechanical Services Department (EMSD) – Voluntary Energy Efficiency Labelling Scheme [ONLINE]. Available at: https://www.emsd.gov.hk/en/energy_efficiency/voluntary_energy_efficiency_labelling_scheme/index.html. [Accessed February 2025]

6 Water Use (WU)

6.P Prerequisite
6.1 Water Quality and Conservation
6.2 Effluent
6.3 Water Harvesting/ Recycling

Introduction

Water is known to be in scarce supply in many parts of the world. Globally, water shortage is already a major issue. Hong Kong has been enjoying a reliable and economic supply of most of its fresh water needs from the Mainland.

However, with increased industrialisation of Guangdong Province there is likely to be greater competition for water supply in the pearl river region, meaning that water conservation may become a significant issue for Hong Kong in the future. Hong Kong should look into ways to improve the utilisation and conservation of water resources.

6.P Prerequisite

WU P1 Minimum Water Saving Performance

Background

In Hong Kong, WSD ensures that the quality of drinking water provided to customers complies fully with the Hong Kong Drinking Water Standards, currently being the corresponding guideline values or provisional guideline values in the fourth edition of the World Health Organization's Guidelines for Drinking-water Quality published in 2011 (WHO Guidelines). Drinking water quality, however, can be affected by the condition of a building's inside service. To safeguard tap water quality, property owners and building managers are advised to carry out proper maintenance of inside service and regular cleaning of water storage tanks. While water quality satisfying WSD's requirement is the mandatory requirement, water conservation is another focus area under water category.

6.1 Water Quality and Conservation

WU 1 Annual Water Use
WU 2 Water Efficient Irrigation
WU 3 Water Efficient Appliances
WU 4 Water Leakage Detection
WU 5 Design for Water Supply Management
WU 6 Cooling Tower Water

Background

Despite the continued decline in industrial water consumption there is an annual trend of rising consumption due to increasing domestic consumption. Based on projected population growth, the domestic and service uses, being the key components of our fresh water consumption, are expected to increase. Industrial use, for the same period, is expected to drop because of further decline in water intensive industries. Fresh Water Cooling Tower Scheme (FWCT Scheme) will contribute to consumption by the non-domestic sector.

Water from the Dongjiang River in Guangdong continues to be Hong Kong's main source of supply and accounting for about 70-80 percent of Hong Kong's needs. Hong Kong has limited options to reduce dependency on the Mainland, where water resources are becoming increasingly limited.

There is opportunity to reduce potable water use through better design, management and user awareness.

6.2 Effluent

WU 7 Effluent Discharge to Foul Sewers

Background

While 80% of users in Hong Kong are supplied with seawater for flushing purposes, there are environmental impacts associated with the treatment and delivery of seawater, and the load imposed on municipal sewage treatment plants. Measures taken to reduce volumes of effluent flows have significant environmental benefits.

6.3 Water Harvesting and Recycling

WU 8 Air-Conditioning Units

Background

There are opportunities to recycle used water and rain water in order to reduce the use of potable water. Additional benefits of potable water conservation can reduce energy use on transport and treatment of raw water.

6 Water Use 6.P Prerequisite

WU P1 Minimum Water Saving Performance

Extent of Application All buildings

Objective Reduce the consumption of potable water through the application of water saving devices with proven performance.

Credits Attainable Prerequisite

Credit Requirement Demonstrate that the use of water efficient flow devices leads to an estimated annual saving of 10%.

Assessment Prepare a Potable Water Use Report which should include the following contents:

1. Schedule including the types of fixture with the location and number of each type of fixture
2. Calculation of potable water use following the guidance below
3. Percentage of annual potable water saving

The calculation of potable water use should be based on the following methodology:

1. Users

Specify the number of users, male to female ratio according to the sanitary fitment schedule in the project General Building Plan. If no sanitary fitment schedule is available, use the assumed occupancy (9m^2/person) and male to female ratio (1:1).

For projects with accessible toilets, bathrooms and the like, it can be assumed that the rate of users with disability is 8.1% or other value from the latest survey on persons with disabilities conducted by the Census and Statistics Department (C&SD) (e.g. 7.1% from 2022's article); and the non-accessible toilets, bathrooms and the like are used by the remaining 91.9% (or 92.9% if using 2022's article) of the dedicated users [1,2].

If it is opted to adopt a rate of users with disabilities other than the above-mentioned, the chosen figure should be supported by project-specific documents (such as the project brief, owner's project requirements or the local standards) and justification.

The same number of users should be applied to both the baseline case and the project design case.

2. Operational Days

Specify the number of operational days per annum. Alternatively, assume full year operation (365 days).

The same operational days should be applied to both the baseline case and the project design case.

1 Census and Statistics Department – Hong Kong Monthly Digest of Statistics (January 2015) Feature Article – Persons with Disabilities and Chronic Diseases in Hong Kong. [ONLINE]. Available at: http://www.statistics.gov.hk/pub/B71501FB2015XXXXB0100.pdf. [Accessed February 2025].

2 Census and Statistics Department – Hong Kong Monthly Digest of Statistics (December 2022) Feature Article – The Profile of Persons with Disabilities and Chronic Diseases in Hong Kong and Characteristics of their Carers [ONLINE]. Available at: https://www.censtatd.gov.hk/en/data/stat_report/product/FA100059/att/B72212FA2022XXXXB0100.pdf. [Accessed February 2025].

3. Number of Uses, Product Flow Rate and Duration of Use

Establish a baseline case for water consumption by the assumptions outlined in the following table. The calculation should only consider the listed fixtures.

Fixture Type	Flow Rate (L/min)	Operation Time (sec)	Number of Uses per Occupant per day
Shower (hotel and residential)	12	300	1
Shower (all buildings other than hotel and residential)	12	300	0.1
Non-mixing Type Water Taps (bathrooms and toilets)	4	20	5
Mixing Type Water Taps (bathrooms and toilets)	7	20	5

Establish the project design case by applying the fixture flowrate at 5bar.

If automatic controls such as proximity sensors are used in the project to reduce the operation time, supporting documents, such as specifications and product catalogues, are required to substantiate the performance.

The same number of uses should be applied to both the baseline case and the project design case.

4. Annual Potable Water Percentage Saving

Add up the total annual potable water use for both the baseline and project design cases. The annual potable water percentage saving can be calculated as follow:

$$1 - \frac{\text{Annual potable water use (design)}}{\text{Annual potable water use (baseline)}} \times 100\%$$

For other water fixture(s) that are not listed fixtures in the calculation:

1. For non-residential uses, demonstrate that water tap(s) installed at pantries or kitchen sinks is rated Grade 1 by the WSD voluntary Water Efficiency Labelling Scheme.
2. For residential uses, demonstrate that the water tap(s) in kitchen is rated Grade 1 or 2 [3] by the WSD voluntary Water Efficiency Labelling Scheme.

3 Water Supplies Department - Voluntary Water Efficiency Labelling Scheme. [ONLINE]. Available at: https://www.wsd.gov.hk/en/plumbing-engineering/water-efficiency-labelling-scheme/index.html. [Accessed February 2025].

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
WU_P1_00	BEAM Plus NB submission template for WU P1	✓	✓	✓
WU_P1_01	Technical Information on Water Fixtures and Annual Potable Water Use Calculation [Appendix A]	✓	✓	✓
WU_P1_02	General Building Plan (GBP) highlighting the sanitary fitting schedule and the male to female ratio, together with occupancy calculation to substantiate the number of users adopted in the Annual Potable Water Use Calculation [or] Calculation of no. of users using the default occupancy density (9m^2/person), rate of users with disability and male to female ratio (1:1) to substantiate the number of users adopted in the Annual Potable Water Use Calculation	✓	✓	✓
WU_P1_03	Plumbing drawing(s) showing the types of water fixtures (e.g. mixing/ non-mixing type water taps) [or] Plumbing schematic and layout drawings (in WSD submission standard) showing the types of the as-installed water fixtures	✓ -	- ✓	- ✓
WU_P1_04	Specifications of each type of fixture counted in the calculation showing the specified flow rate at 5 bar	✓	-	-
WU_P1_05	Technical data (e.g. approved contractor's submission with catalogues) of each type of fixture counted in the calculation showing the flow rate at 5 bar	-	✓	✓

WU_P1_06	Specifications of the rated grade by the WSD Voluntary Water Efficiency Labelling Scheme for the following water fixtures: - Non-residential uses: water tap(s) installed at pantries or kitchen sinks - Residential uses: water tap(s) in kitchen [or] Technical data (e.g. approved contractor's submission with catalogues) and evidence of the rated grade by the WSD Voluntary Water Efficiency Labelling Scheme for the following water fixtures: - Non-residential uses: water tap(s) installed at pantries or kitchen sinks - Residential uses: water tap(s) in kitchen	✓ - -	- ✓ -	- ✓ -
WU_P1_07	Specifications of automatic control of water fixtures to substantiate the performance in reducing the operation time (if applicable)	✓	-	-
WU_P1_08	Technical data (e.g. approved contractor's submission with catalogues) of automatic control of water fixtures to substantiate the performance in reducing the operation time (if applicable)	-	✓	✓
WU_P1_09	Project-specific documents (such as the project brief, owner's project requirements or the local standards) to justify the chosen rate of users with disabilities other than the figures of C&SD (if applicable)	✓	✓	✓

Remarks

(a) Additional Information

‘Guide to Application for Water Supply’ and Section 7.3 and 7.4 of ‘Technical Requirements for Plumbing Works in Buildings’. [ONLINE]. Available at: https://www.wsd.gov.hk/filemanager/en/content_1805/Guide%20to%20Application%20for%20Water%20Supply%20-%20Nov%202020.pdf. [Accessed February 2025].

https://www.wsd.gov.hk/filemanager/en/content_1804/Technical%20Requirement%20for%20Plumbing%20Works%20in%20Buildings%20(November%202020)_final.pdf. [Accessed February 2025].

(b) Related Credit

WU 1 Annual Water Use awards further achievement in potable water saving.

6 Water Use

6.1 Water Quality and Conservation

WU 1 Annual Water Use

Extent of Application All buildings

Objective To reduce the consumption of potable water through the application of water saving devices that have proven performance and reliability.

Credits Attainable 3 + 1 additional BONUS

Credit Requirement

(a) Further Potable Water Saving

1 to 3 credits for annual water saving by using water efficient flow devices.

Credit(s)	Estimated annual water saving / %
1	20%
2	25%
3	30%

(b) Exemplary Potable Water Saving

1 additional BONUS credit for demonstrating that the use of water efficient flow devices leads to an estimated annual saving of 40%.

Assessment Assessment follows WU P1 Minimum Water Saving Performance.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
WU_01_00	BEAM Plus NB submission template for WU 1	✓	✓	✓
WU_01_01	Technical Information on Water Fixtures and Annual Potable Water Use Calculation [Appendix A]	✓	✓	✓
WU_01_02	General Building Plan (GBP) highlighting the sanitary fitting schedule and the male to female ratio, together with occupancy calculation to substantiate the number of users adopted in the Annual Potable Water Use Calculation [or] Calculation of no. of users using the default occupancy density ($9m^2$/person), rate of users with disability and male to female ratio (1:1) to substantiate the number of users adopted in the Annual Potable Water Use Calculation	✓	✓	✓
WU_01_03	Plumbing drawing(s) showing the types of water fixtures (e.g. mixing/ non-mixing type water taps) [or] Plumbing schematic and layout drawings (in WSD submission standard) showing the types of the as-installed water fixtures	✓ -	- ✓	- ✓
WU_01_04	Specifications of each type of fixture counted in the calculation showing the specified flow rate at 5 bar	✓	-	-
WU_01_05	Technical data (e.g. approved contractor's submission with catalogues) of each type of fixture counted in the calculation showing the flow rate at 5 bar	-	✓	✓
WU_01_06	Specifications of automation control of water fixtures to substantiate the performance in reducing the operation time (if applicable)	✓	-	-

WU_01_07	Technical data (e.g. approved contractor's submission with catalogues) of automatic control of water fixtures to substantiate the performance in reducing the operation time (if applicable)	-	✓	✓
WU_01_08	Project-specific documents (such as the project brief, owner's project requirements or the local standards) to justify the chosen rate of users with disabilities other than the figures of C&SD (if applicable)	✓	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credit

None

6 Water Use **6.1 Water Quality and Conservation**

WU 2 Water Efficient Irrigation

Extent of Application All buildings with permanent greenery

Objective Reduce the reliance on potable water for irrigation.

Credits Attainable 2 + 1 additional BONUS

Credit Requirement 1 to 2 credits for reducing potable water consumption for irrigation in comparison with the baseline.

Credit(s)	Percentage of reduction of potable water consumption for irrigation
1	25%
2	50%
2 + 1 additional BONUS	100%

Assessment

1. Specify the area of each landscape type making up the total area of greenery in the project. For each landscape type, calculate the annual irrigation demand using the following formula.

$$ID = \sum_{January}^{December} \frac{ET \times K_L \times A \times CE}{IE}$$

ID: Annual irrigation demand satisfied by using potable water (L)

ET: Monthly reference evapotranspiration (mm)

K_L: Landscape coefficient of the landscape

A: Area of the landscape type (m^2)

CE: Efficiency of controller serving the landscape

IE: Efficiency of irrigation method serving the landscape

In theory the reference evapotranspiration is correlated to crop coefficient. For calculation, the reference evapotranspiration can be assumed to be equivalent to potential evapotranspiration in Hong Kong based on the data in a 30-year period. The potential evapotranspiration can be found on the Hong Kong Observatory website [1].

Landscape coefficient indicates the volume of water lost via evapotranspiration and is dependent on landscape species, planting density and microclimate factor. For the ease of assessment, the calculation of landscape coefficient is simplified and listed in manual for calculation reference.

Justification is needed for any proposed value.

1 Hong Kong Observatory - Monthly Sea Surface Temperature Recorded at North Point and Waglan Island and Monthly Total Evaporation and Potential Evapotranspiration Recorded at King's Park. The reference year period of monthly reference evapotranspiration (ET) shall be based on the data in a 30-year period from 1991 onwards (e.g. 1991-2020). The reference year period should be consistent throughout the assessment of WU 2 and WU 8.

2. Refer to the below table for landscape coefficient. Vertical greenery type should refer to the same table per plant type:

Landscape type	Landscape coefficient (K_L)
Tree	0.5
Shrubs	0.5
Groundcovers	0.5
Mixed (Trees + Shrubs + Groundcovers)	0.6
Turfgrass	0.7
Adaptive Species (No irrigation require)	0

3. Refer to the below table for irrigation method:

Irrigation method	Irrigation efficiency (IE)
Manual	0.5
Drip – Standard	0.7
Drip – Pressure compensated	0.9
Fixed Spray	0.65
Micro Spray	0.7
Rotor	0.7

4. Calculate the total irrigation demand that uses potable water in both baseline and project design cases by the above formula. Sum up the calculated ID(s) for all landscape types. The irrigation demand should cover all permanent greenery in the project. For private garden not under the control of the building management, irrigation demand for the design case should be assumed the same as the baseline case.

   For calculation of the irrigation demand, the landscape and planting coverage shall take into account the following considerations:

   (i) All greenery within the project assessment boundary shall be considered, including but not limited to:

   - Uncovered and covered greenery areas
   - Accessible and inaccessible (e.g. inaccessible roof) greenery areas

   (ii) No reduction factor in APP-152 shall be applied.

4.1. Baseline

The composition of landscape type and area making up the permanent greenery in the project should be the same as design case.

Assume all landscape types are irrigated manually (i.e. IE = 0.5) and no controller is used (i.e. CE = 1).

Assume no reused or recycled water is used.

4.2. Design

Specify the irrigation method and controller (if used) for each landscape type and calculate the ID correspondingly.

If controllers, including weather-based and moisture sensor-based, are used, the CE should be supported by manufacturer's documentation.

If harvested rainwater or recycled grey water is used to replace potable water for irrigation, the corresponding annual amount of replaced water can be deducted from the irrigation demand. The calculation method of the amount of harvested rainwater and recycled grey water should be consistent with WU 8, and the collection tank (or retention pond) shall have sufficient capacity:

(i) Harvested rainwater: 10 days or more [2] of supply (i.e. harvested rainwater yield), considering the month with the peak rainfall (assume 30 days in a month).

Alternatively, in view of the amount of potable water replaced by harvested rainwater (i.e. reuse) is determined by comparing the total yield and the total demand (month by month), the rainwater collection tank with storage capacity of 10 days or more of reuse, considering the month with the maximum reuse of harvested rainwater (assume 30 days in a month), is acceptable, if there is difficulty in providing rainwater collection tank storage capacity with 10 days or more of supply with peak rainfall due to space availability.

(ii) Recycled grey water: 8-10 hours of storage.

5. The percentage reduction in annual irrigation demand that uses potable water can be calculated as follow:

$$1 - \frac{\text{ID (design)}}{\text{ID (baseline)}} \times 100\%$$

6. Alternatively, if self-sustained plants are used to form all permanent greenery, which do not require irrigation beyond their establishment period (maximum two years), provide justification to explain why no irrigation will be required based on local rainfall and plants' water demands. The justification should be endorsed by a professional landscape architect or ecologist. Two credits can be attained.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
WU_02_00	BEAM Plus NB submission template for WU 2	✓		✓
WU_02_01	Calculation of demand of potable water for irrigation in both baseline and project design cases and percentage reduction as detailed in the credit assessment	✓		✓

2 Water Supplies Department, Technical Specifications on Grey water reuse and Rainwater Harvesting. [ONLINE]. Available at: https://www.wsd.gov.hk/filemanager/en/content_1459/technical_spec_grey_water_reuse_rainwater_harvest.pdf. [Accessed Feb 2025].

WU_02_02	Greenery plan including the total greenery area (distinguish between communal greenery and private garden if applicable) and an area break-down according to landscape type, irrigation method and controller used [and] Supporting drawings (e.g. plumbing schematic and layout drawings, or irrigation plans, etc.), illustrating the adopted irrigation method (if irrigation method other than "manual" is adopted) and controller	✓		✓
WU_02_10	Technical data (e.g. approved contractor's submission with catalogues) of irrigation method, if irrigation method other than "manual" is adopted	-		✓
WU_02_05	Specifications of controller highlighting the efficiency of controller (if applicable)	✓		-
WU_02_06	Technical data (e.g. approved contractor's submission with catalogues) of controllers highlighting the efficiency of controller (if applicable)	-		✓
If harvested rainwater or recycled grey water is used to replace potable water for irrigation, please provide the following:				
WU_02_03	Calculation of reduction in potable water for irrigation by using harvested rainwater or recycled grey water (with breakdown of yield and demand), as well as details of input parameters/ assumptions) [and] Calculation demonstrating sufficient tank (or retention pond) storage capacity	✓		✓

WU_02_04	Plumbing schematic drawing(s) and plumbing layout drawings, highlighting the rainwater harvesting system (as well as collection downpipes from the catchment area) and/ or the grey water recycling system [and] Catchment area plan including area break-down, type of surface and surface coefficient adopted, if harvested rainwater is used	✓		✓
If the alternative approach is adopted, please provide the following:				
WU_02_07	Justification report for self-sustain plants that require no irrigation beyond their establishment period	✓		✓
WU_02_08	CV of the professional endorsing the justification report	✓		✓
If the credit is not applicable, please provide the following:				
WU_02_09	Extract of relevant page(s) from the GBP showing no permanent greenery within the Site	✓		✓

Remarks

(a) Additional Information

None

(b) Related Credit

Calculation method of amount of harvested rainwater and recycled grey water should be consistent with WU 8.

6 Water Use

6.1 Water Quality and Conservation

WU 3 Water Efficient Appliances

Extent of Application

Residential buildings, exclusively for those specified in Clause 1 under "Assessment"

Objective

Encourage the wider use of water efficient appliances.

Credits Attainable

1

Credit Requirement

1 credit for installing water efficient appliances that achieve Grade 1 under the WSD's Water Efficiency Labelling Scheme.

Assessment

1. This credit applies exclusively to residential units within private/ public housing developments and government quarters. This credit assesses only those appliances provided by the developer. No credits will be awarded if no appliances are provided by the developer.

2. Washing machines provided in all residential units should be of at least Grade 1 under the WSD Water Efficiency Labelling Scheme (WELS) [1] or other equivalent international schemes. If equivalent international scheme is adopted, justification is required to demonstrate the appliances, certified by a recognised standard, can achieve the same performance as the WELS Grade 1 label.

1 Water Supplies Department – Voluntary Water Efficiency Labelling Scheme. [ONLINE]. Available at: https://www.wsd.gov.hk/en/plumbing-engineering/water-efficiency-labelling-scheme/index.html. [Accessed February 2025].

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
WU_03_00	BEAM Plus NB submission template for WU 3	✓	✓	✓
WU_03_01	Contract specifications or technical data (e.g. catalogue), together with information of water efficiency label (e.g. a copy of the water efficiency label or an extracted page of the register of WELS products from WSD's website with highlighted indication) [or] Technical data (e.g. appliances catalogue) or sales brochure showing the as-installed appliances model(s), together with information of water efficiency label (e.g. a copy of the water efficiency label or an extracted page of the register of WELS products from WSD's website with highlighted indication)	✓ - -	- ✓ ✓	- ✓ ✓
WU_03_02	/	/	/	/
WU_03_03	Justification showing the appliances can achieve the same performance as the WELS Grade 1 label (for the washing machine to be certified with other equivalent international schemes)	✓	✓	✓

Remarks

(a) Additional Information

Water Supplies Department – Voluntary Water Efficiency Labelling Scheme. [ONLINE]. Available at: https://www.wsd.gov.hk/en/plumbing-engineering/water-efficiency-labelling-scheme/index.html. [Accessed February 2025].

(b) Related Credit

None

6 Water Use 6.1 Water Quality and Conservation

WU 4 Water Leakage Detection

Extent of Application All buildings with fresh water tank and/ or pump rooms

Objective To identify water leakage once detected for the arrangement of maintenance work, minimising fresh water wastage.

Credits Attainable 1

Credit Requirement 1 credit for installing water leakage detection systems in all municipal fresh water tank and/ or pump rooms.

Assessment

1. Demonstrate that water leakage detection systems are installed in all municipal fresh water tank and/ or pump rooms serving potable water supply system, flushing water system (if using fresh water for flushing), cleansing water system, irrigation water system, and air conditioning system (e.g. make-up water tank and/ or pump for fresh water cooling towers).

2. Water tank and/ or pump rooms serving only non-potable water system (other than irrigation and cleansing water systems) or fire services system are not assessed. All exposed/ unsheltered roof tank is not assessed.

3. Water tank and/ or pump rooms which have multiple water tanks and/ or pumps should have at least one water leakage detection system.

4. The detection systems should be capable to automatically alert the operator or the security guard and to identify the room with water leakage when water leakage occurs.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
WU_04_00	BEAM Plus NB submission template for WU 4	✓	✓	✓
WU_04_01	*For projects with fresh water tank and/ or pump rooms, please provide the following:*			
	Plumbing drawings (e.g. schematic) highlighting the location of eligible water tank and/ or pump room(s) for assessment [and] Drawings of water leakage detection systems (e.g. control schematic, BMS drawings) demonstrating that all eligible water tanks and/ or pump room(s) are provided with water leakage detection devices as well as demonstrating the capability of automatically alerting function towards the operator/ security guard to identify the room with water leakage when water leakage occurs	✓	✓	✓
	For projects without fresh water tank and/ or pump rooms (non-applicability), please provide the following:			
	Drawing(s) showing that there is no fresh water tank and/ or pump room in the building	✓	✓	✓
WU_04_02	Technical specifications of water leakage detection systems [or] Technical data (e.g. catalogue or manufacturer's information) of the water leakage detection systems	✓ -	- ✓	- ✓

Remarks

(a) Additional Information

None

(b) Related Credit

None

6 Water Use **6.1 Water Quality and Conservation**

WU 5 Design for Water Supply Management

Extent of Application

All buildings (including buildings with centralised/ shared tank that is outside the assessment boundary) for part (a)

All buildings for part (b)

Objective

To reduce the water wastage during the maintenance or cleaning of the plumbing system (e.g. water tanks) and promote design considerations on the long-term operation and maintenance needs of the plumbing system, providing an uninterrupted potable and flushing water supply to building users and facilitating the formulation and implementation of Water Safety Plan for Buildings (WSPB) by future owners' organizations and management agents.

Credits Attainable

1 + 1 BONUS

Credit Requirement

(a) Twin Tank System

1 credit for providing twin tank for potable water supply system and flushing water supply system.

(b) Water Safety Control Measures

1 BONUS credit for demonstrating the application of water safety control measures in the potable water supply system.

Assessment

(a) Twin Tank System

1. Twin tank shall be installed for potable and flushing supply water systems, which shall include:
   - All main storage tanks (regardless of capacity); and
   - Other tanks that directly supply potable/ flushing water to the points of use (e.g. transfer tanks and intermediate tanks) with capacity of 5,000 litres or above.
2. Two-compartment tank and two separate identical tanks are accepted as twin tank.
3. Each compartment/ tank of the twin tank shall be equipped with:
   3.1. A duplicated set of inlet, outlet and associated overflow and drainage pipeworks;
   3.2. A stop valve at the inlet of each tank compartment to ensure that water will not get into the compartment when it is being cleaned; and
   3.3. An automatic pump control switch at the downstream side of each sump pump to protect the up-feed system particularly when the stop valve for the tank compartment is closed.
4. For item 3.3, if other alternatives such as pressure switch and manual approach are adopted, the following supporting information shall be provided:
   4.1. Justification of the difficulty/ constraint for the project to provide an automatic pump control switch, if any;

4.2. Details of an alternative proposal; and

4.3. Evidence such as design drawings, undertaking letter from the project owner/ developer, operation manual of the project, etc.

to demonstrate how the proposed alternative could serve the same function as an automatic pump control switch to protect the up-feed system (i.e. up-feed pumps) when the stop valve for the tank compartment is closed during cleansing.

(b) Water Safety Control Measures

1. Provide a compliance summary with explanations and supporting documents (e.g. contract specifications, drawings, material approval record with information, etc.) demonstrating the application of all the applicable water safety control measures and providing justifications on all the achieved or not applicable sub-items of the following:

1.1. Prevent all dead-legs in the potable plumbing system and stagnation of water leading to stale water affecting the water quality. For the unavoidable dead-legs, justification should be given with measures for draining the dead ends.

1.2. Use of low metal leaching plumbing material [1] to avoid excessive leaching of hazardous metals (e.g. lead) to the potable water plumbing system.

1.3. Clearly differentiate potable water pipes and tanks using labels/ colours (e.g. blue).

1.4. Extra measures for enhancing drinking water safety:

(a) For indoor water tank, suitable measures and safe access should be provided to facilitate easy inspection and cleansing of potable water tank(s), by providing either:

(i) Water tank with side access with hinges;

(ii) Water tank with the cover using lightweight material(s) such as Glass Reinforced Plastic (GRP), aluminium, and stainless steel; or

(iii) Headroom of 2m for top access of water tank if the cover exceeding 10kg in weight.

For outdoor water tank(s), fixed permanent maintenance ladder with safety hoop (for ladder height> 3m) should be provided. If the difference between 2 adjacent levels at the outdoor water tank(s) exceeds 600mm, a protective barrier must be provided at the higher level.

(b) Drainage pipe and other water piping system shall not be placed above any potable water tanks to avoid unnecessary contamination.

1 Water Supplies Department. 'General Acceptance*' ('GA*') Scheme (Voluntary) promotes the adoption of low metal leaching rate metallic plumbing products in fresh water inside service system. GA plumbing products (excluding products for the non-potable fresh water system, flushing water system and fire service system) that fulfil the requirements of low metal leaching rate on the metallic surfaces in direct contact with fresh water can be applied for classification as low metal leaching rate metallic plumbing products under the GA* Scheme. Those include pipes and pipe fittings (stainless steel, copper or copper alloy), valves, strainers, and expansion / settlement / flexible. http://www.wsd.gov.hk/filemanager/common/licensed_plumbers/ga_star_scheme_e.pdf. [Accessed February 2025].

After acceptance of the application by the WSD, the GA* information of the GA product (considered as low metal leaching plumbing material) will be updated to the Directory Search of the WSD website for GA products. [ONLINE]. Available at: http://ga.wsd.gov.hk/en. [Accessed February 2025].

1.5. Suitable drainage system should be designed and constructed for draining the effluent during cleansing of sump and roof potable water tank.

In addition, for the outdoor water tank(s), rainwater drain should be provided at the top of exposed roof tank to drain surface runoff.

1.6. Incorporate in the operation and maintenance manual for the potable water plumbing system with:

(a) Enclosure of the "Guidelines for Drinking Water Safety Plans for Buildings in Hong Kong" and "Drinking Water Safety Plan Template for General Buildings in Hong Kong" [2] to encourage future property management agent (PMA) and owners' organization to adopt WSPB to maintain the potable water plumbing system and join WSD's "Quality Water Supply Scheme for Buildings – Fresh Water (Management System)" (QMS);

(b) Frequency for inspection and cleansing of potable water tanks with reference to the WSD guidelines [3, 4, 5] taking into consideration of the occupancy status and proposed schedule for regular inspection and maintenance of different components of potable water plumbing system; and

(c) Labelling/ colour system for the potable water plumbing system.

Submittals

(a) Twin Tank System

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
WU_05a_00	BEAM Plus NB submission template for WU 5	✓	✓	✓
WU_05a_01	Plumbing schematic drawing(s) and plumbing layout drawings, highlighting the provisions of the twin tank system for potable water and flushing water systems, and the associated installations as stated in items 3.1 to 3.3 in the assessment criteria	✓	✓	✓
WU_05a_02	Supporting information for the adopted alternative other than the automatic pump control switch as stated in items 4.1 to 4.3 in the assessment criteria (if applicable)	✓	✓	✓

2 Water Supplies Department. Water Safety Plan for Buildings [ONLINE]. Available at: https://www.wsd.gov.hk/en/water-safety/water-safety-in-buildings/index.html. [Accessed February 2025].

3 Water Supplies Department. Guidelines for Cleansing of Fresh Water Tanks [ONLINE]. Available at: https://www.wsd.gov.hk/filemanager/en/share/pdf/wwo497.pdf. [Accessed February 2025].

4 Water Supplies Department. Inspection and Flushing of Inside Service in New Buildings and Flats [ONLINE]. Available at: https://www.wsd.gov.hk/filemanager/common/pdf/Statistics/PR_Publications/WSD%20Leaflet%20Flushing%20inspection_EN.pdf. [Accessed February 2025].

5 Water Supplies Department. Fresh Water Plumbing Maintenance Guide (April 2023) [ONLINE]. Available at: https://www.wsd.gov.hk/filemanager/en/share/pdf/FWPMGe.pdf. [Accessed February 2025].

(b) Water Safety Control Measures

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
WU_05b_00	BEAM Plus NB submission template for WU 5	✓	✓	✓
WU_05b_01	A compliance summary with explanations demonstrating the application of all the prescribed water safety control measures and providing justifications on all the achieved or not applicable sub-items	✓	✓	✓
WU_05b_02	Supporting information for items 1.1, 1.4(a) & 1.5: Contract specifications, and drawings with indications, etc. [or] Drawings with indications, and supporting information showing the material used for tank cover (if item 1.4(a)(ii)/ (iii) is attempted), etc.	✓ -	- ✓	- ✓
WU_05b_03	Supporting information for item 1.2: Contract specifications specifying the relevant requirement [or] Plumbing materials' information showing the adopted plumbing materials are classified as low metal leaching rate metallic plumbing products under the WSD's GA* Scheme, etc.	✓ -	- ✓	- ✓
WU_05b_04	Supporting information for items 1.3 & 1.4(b): Contract specifications, and drawings (e.g. general notes, installation details) with indications, etc. [or] Drawings (e.g. general notes, installation details) with indications, etc.	✓ -	- ✓	- ✓

WU_05b_05	Supporting information for item 1.6: Contract specifications specifying the relevant requirement [or] Undertaking letter confirming the provisions of Operation and Maintenance Manual with the required items (a) to (c)	✓ -	- ✓	- ✓

Remarks

(a) Additional Information

Quality Water Supply Scheme for Buildings – Fresh Water (Management System) [ONLINE]. Available at: https://www.wsd.gov.hk/en/water-safety/fresh-water-management-system-/index.html [Accessed February 2025].

The Water Supplies Department (WSD) has launched “Quality Water Supply Scheme for Buildings – Fresh Water (Management System)” (QMS) and promoted the property owners and property management agents in developing and implementing a set of risk-management based guidelines and templates for the Water Safety Plan for Buildings (WSPB).

Property owners and property management agents who have engaged a Qualified Persons trained in WSPB and passed assessments to develop and implement WSPB according to “Guidelines for Drinking Water Safety Plans for Buildings in Hong Kong” and WSP templates can apply QMS.

(b) Related Credit

None

6 Water Use

6.1 Water Quality and Conservation

WU 6 Cooling Tower Water

Extent of Application

All buildings equipped with cooling tower using potable water as makeup water.

Objective

To reduce potable water consumption for cooling tower makeup.

Credits Attainable

1

Credit Requirement

1 credit for achieving 7 or more cycles of concentration with acceptable water quality.

Assessment

The ratio between the concentration of dissolved solids in the cooling tower water and the make-up water, or the ratio between the conductivity in the cooling tower water and the make-up water, should be 7 or more. Demonstrate that the corresponding make-up water pumps can provide sufficient flow rate and pressure to sustain the specified cycle of concentration, which is not less than 7.

All cooling tower using potable water within the assessment boundary should comply with this requirement.

Submit cooling tower water treatment proposal developed in accordance with the latest EMSD Code of Practice for Fresh Water Cooling Tower [1] to demonstrate minimum cycles of concentration of 7 or more is designed and adopted in operation.

1 Electrical and Mechanical Services Department – Code of Practice for Fresh Water Cooling Towers CoP (FWCT). [ONLINE]. Available at: http://www.emsd.gov.hk/en/energy_efficiency/fwct_scheme/publications/index.html. [Accessed February 2025].

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
WU_06_00	BEAM Plus NB submission template for WU 6	✓	✓	✓
WU_06_01	Water treatment proposal highlighting the design cycles of concentration, details of water treatment process, and design and associate control in maintaining the cycle of concentration not less than 7.	-	✓	✓
WU_06_02	Contract specifications highlighting the following requirements: (i) The minimum cycles of concentration of the cooling tower should be 7 or more; and (ii) The corresponding make-up water pumps should provide sufficient flow rate and pressure to sustain the specified cycles of concentration.	✓	-	-
WU_06_03	Technical data (e.g. catalogues) of cooling tower, water treatment equipment and make-up water pumps, to substantiate design and associate control in maintaining the cycle of concentration not less than 7	-	✓	✓
WU_06_04	MVAC schematic drawings showing: the fresh water cooling tower(s) with designation and details (e.g. water flow rate, bleed-off water rate) [or] no fresh water cooling tower is installed for the project (Substantiation for non-applicability)	✓	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credit

None

6 Water Use **6.2 Effluent**

WU 7 Effluent Discharge to Foul Sewers

Extent of Application All buildings

Objective To reduce the volumes of sewage discharged from buildings thereby reducing burdens on municipal sewage services and treatment facilities.

Credits Attainable 1

Credit Requirement 1 credit for demonstrating a reduction in annual sewage volumes by 20% or more.

Assessment Flushing water use calculation should be based on the following:

1. Occupancy

Specify the number of users, male to female ratio according to the sanitary fitment schedule in the project General Building Plan. If no sanitary fitment schedule is available, use the assumed occupancy (9m^2/person) and male to female ratio (1:1).

For projects with accessible toilets, bathrooms and the like, it can be assumed that the rate of users with disability is 8.1% or other value from the latest survey on persons with disabilities conducted by the Census and Statistics Department (C&SD) (e.g. 7.1% from 2022's article); and the non-accessible toilets, bathrooms and the like are used by the remaining 91.9% (or 92.9% if using 2022's article) of the dedicated users [1,2].

If it is opted to adopt a rate of users with disabilities other than the above-mentioned, the chosen figure should be supported by project-specific documents (such as the project brief, owner's project requirements or the local standards) and justification.

The same number of users should apply to both the baseline case and the project design case.

2. Operational days

Specify the number of operational days per annum. Alternatively, assume a full year operation (i.e. 365 days).

The same operational days should apply to both the baseline case and the project design case.

3. Number of uses

The same number of uses should apply to both the baseline case and the project design case.

1 Census and Statistics Department – Hong Kong Monthly Digest of Statistics (January 2015) Feature Article – Persons with Disabilities and Chronic Diseases in Hong Kong. [ONLINE]. Available at: http://www.statistics.gov.hk/pub/B71501FB2015XXXXB0100.pdf. [Accessed February 2025].

2 Census and Statistics Department – Hong Kong Monthly Digest of Statistics (December 2022) Feature Article – The Profile of Persons with Disabilities and Chronic Diseases in Hong Kong and Characteristics of their Carers [ONLINE]. Available at: https://www.censtatd.gov.hk/en/data/stat_report/product/FA100059/att/B72212FA2022XXXXB0100.pdf. [Accessed February 2025].

Fixture type	Number of uses per day
Urinal	4
Male Single Flush WC (Non-residential with provision of urinal)	1
Male Dual Flush WC (Non-residential with provision of urinal)	1 full flush volume
Male Single Flush WC (Non-residential without provision of urinal)	5
Male Dual Flush WC (Non-residential without provision of urinal)	1 full and 4 low volume
Female Single Flush WC (Non-residential)	5
Female Dual Flush WC (Non-residential)	1 full and 4 low volume
Unisex/ Accessible Single Flush WC (Residential/ Non-residential)	5
Unisex/ Accessible Dual Flush WC (Residential/ Non-residential)	1 full and 4 low volume

4. Flushing Volume

Based on the above, establish a baseline case for flushing water consumption by the following assumptions. While dual flush WC is used, a single flush WC baseline can be adopted.

Fixture type	Flushing volume (L / flush)
Single Flush WC	6.5
Urinal	2.5

Establish the flushing water consumption for the project design case based on the flushing volumes shown in the technical data (e.g. catalogues and specifications). Note that no pressure calculation is required if worse case condition is considered in reduction calculation.

5. Annual Effluent Discharge Reduction Percentage

The annual flushing water percentage saving can be calculated as follows:

$$1\text{-}\frac{\text{Annual flushing water use (design)}}{\text{Annual flushing water use (baseline)}}\times 100\%$$

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
WU_07_00	BEAM Plus NB submission template for WU 7	✓	✓	✓
WU_07_01	Technical Information and Calculation for Annual Effluent Discharge [Appendix A]	✓	✓	✓
WU_07_02	General Building Plan (GBP) sanitary fitting schedule and male to female ratio, together with occupancy calculation to substantiate the number of users adopted in the Calculation for Annual Effluent Discharge [or] Calculation of no. of users using the default occupancy density (9m^2/person), rate of users with disability and male to female ration (1:1) to substantiate the number of users adopted in the Calculation for Annual Effluent Discharge	✓	✓	✓
WU_07_03	Plumbing drawing(s)/ drainage drawing(s)/ an extract of sanitary fitments schedule from the GBP showing the types of water fixtures [or] Plumbing and/ or drainage schematic and layout drawings in statutory submission standard showing the types of the as-installed water fixtures	✓ -	- ✓	- ✓
WU_07_04	Specifications of each type of fixture illustrating the flush volume per flush	✓	-	-
WU_07_05	Technical data (e.g. approved contractor's submission with catalogues) of each type of fixture illustrating the flush volume per flush	-	✓	✓
WU_07_06	Project-specific documents (such as the project brief, owner's project requirements or the local standards) to justify the chosen rate of users with disabilities other than the figures of C&SD (if applicable)	✓	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credit

None

6 Water Use **6.3 Water Harvesting and Recycling**

WU 8 Water Harvesting and Recycling

Extent of Application All buildings

Objective To encourage harvesting of rainwater and recycling of grey water in order to reduce consumption of potable water.

Credits Attainable 2 + 1 BONUS

Credit Requirement

(a) Harvested Rainwater

1 credit for harvesting of rainwater that achieve a reduction of 5% or more in the consumption of potable water.

(b) Recycled Grey Water

1 credit for recycled grey water that achieve a reduction of 5% or more in the consumption of potable water.

(c) Exemplary Water Recycling

1 BONUS credit where harvested rainwater, recycled grey water or a combination of both leads to a reduction of 10% or more in the consumption of potable water.

Assessment

(a) Harvested Rainwater

1.1. Calculation of the monthly harvested rainwater yield

Accepted rainwater sources are from roofs, permeable paving, non-permeable paving and surface runoff from grass and landscaped areas [1]. For each source, calculate the monthly harvested rainwater yield throughout the year using the below formula.

$$Y_r = A_c \times R_m \times C_r$$

Y_r is the monthly average rainwater yield (litre/month)

A_c is the collection area (m^2)

R_m is the monthly mean of rainfall in Hong Kong based on the data in a 30-year period [2]

C_r is the run-off coefficient

If an in-line filter is installed to the rainwater collection system, a filter efficiency, N_f, should be incorporated into the above equation, which can be assumed to be 0.9.

1 Water Supplies Department, Technical Specifications on Grey Water Reuse and Rainwater Harvesting (2nd Edition) September 2024. [ONLINE]. Available at: https://www.wsd.gov.hk/filemanager/en/content_1459/technical_spec_grey_water_reuse_rainwater_harvest.pdf. [Accessed February 2025].

2 Hong Kong Observatory, Monthly Meteorological Normals for Hong Kong. The reference year period of the monthly mean of rainfall in Hong Kong (Rm) shall be based on the data in a 30-year period from 1991 onwards (e.g. 1991-2020). The reference year period should be consistent throughout the assessment of WU 2 and WU 8. [ONLINE]. Available at: https://www.hko.gov.hk/en/cis/normal/1991_2020/normals.htm. [Accessed February 2025].

Surfaces run off coefficients are provided in the below table. Provide supplier's product catalogue to substantiate if other values are used.

Surfaces/ substrates	**Runoff coefficients**
Water bodies	1
Flat roof/ road/ hardscape with impervious construction	0.85
Flat roof covered with pebbles	0.65
Green roof (soil depth of at least 300mm)	0.35
Earth-covered (soil depth not more than 500mm) basement	0.35
Pervious paving and construction (maximum slope of porous pavement surface to a gradient of 1:20; the minimum permeability coefficient under 15℃ for permeable paving / construction should be 1.0×10^{-2}cm/s)	0.25
At-grade softscape	0.15
Earth-covered (soil depth more than 500mm) basement	0.15

Notes:

1) The above information has made reference to the design guides for stormwater management/ runoff control GB50014 and DB11/685 of PRC.
2) Alternative runoff coefficients may be proposed and justified by Applicants which is subject to approval.

1.2. Calculation of the monthly demand for harvested rainwater

Calculate the monthly demand for harvested rainwater throughout the year which includes only the activities which originally would have used potable water but is then replaced by harvested rainwater in the project.

Accepted activities include flushing, irrigation, water features, car washing, external cleaning and industrial processes.

1.3. Comparison of yield and demand

Compare the total yield and the total demand, month by month, to calculate the amount of potable water replaced by harvested rainwater.

For months when the yield exceeds the demand (i.e. surplus), the amount of replaced potable water is equivalent to the demand. For months when the demand exceeds the yield (i.e. shortage), the amount of replaced potable water is equivalent to the yield.

1.4. Calculation of the annual amount of potable water replaced by harvested rainwater

Add up the replaced water throughout the year to show the annual amount. This is the nominator for the calculation of percentage reduction.

1.5. Calculation of the percentage reduction in potable water use replaced by harvested rainwater

The denominator should at least include the annual potable water use for irrigation and flushing (figures should be consistent with WU 2 design case and WU 7 design case respectively, without deducting any reused/ recycled water), and, only if harvested rainwater is used for the activity, the annual potable water use for water features, car washing, external cleaning and/ or industrial processes.

1.6. Sufficient tank storage capacity

Demonstrate the collection tank(s) (or retention pond) has sufficient capacity.

Harvested rainwater: 10 days or more [1] of supply (i.e. harvested rainwater yield), considering the month with the peak rainfall (assume 30 days in a month).

Alternatively, in view of the amount of potable water replaced by harvested rainwater (i.e. reuse) is determined by comparing the total yield and the total demand (month by month), the rainwater collection tank with storage capacity of 10 days or more of reuse, considering the month with the maximum reuse of harvested rainwater (assume 30 days in a month), is acceptable, if there is difficulty in providing rainwater collection tank storage capacity with 10 days or more of supply with peak rainfall due to space availability.

1.7. Water quality standards

Demonstrate the harvested rainwater, after treatment, meet the recommended water quality standards prescribed in Table 1.1 of the WSD Technical Specifications [1]. Analysis of parameters under water quality standards shall be carried out in a HOKLAS accredited laboratory.

(b) Recycled Grey Water

2.1. Calculation of the monthly recycled greywater yield

Accepted grey water sources are wash basins, baths, showers, dishwashers, laundry machines, kitchen sinks, cooling tower bleed-off water and air conditioning condense [1].

Follow the calculation method specified in Section 3.4 in WSD Technical Specifications on Grey Water Reuse and Rainwater Harvesting [1]. Provide further calculation for air conditioning condense.

2.2. Calculation of the monthly demand for recycled greywater yield

Calculate the monthly demand for recycled grey water throughout the year which includes only the activities which originally would have used potable water but is then replaced by recycled greywater in the project.

Accepted activities include flushing, irrigation, water features, car washing, external cleaning and industrial processes.

2.3. Comparison of yield and demand

Compare the yield and the demand, month by month, to calculate the amount of potable water replaced by recycled greywater.

For months when the yield exceeds the demand (i.e. surplus), the amount of replaced potable water is equivalent to the demand. For months when the demand exceeds the yield (i.e. shortage), the amount of replaced potable water is equivalent to the yield.

2.4. Calculation of the annual amount of potable water replaced by recycled greywater

Add up the replaced water throughout the year to show the annual amount. This is the nominator for the calculation of percentage reduction.

2.5. Calculation of the percentage reduction in potable water use replaced by recycled greywater

The denominator should at least include the annual potable water use for irrigation and flushing (figures should be consistent with WU 2 design case and WU 7 design case respectively, without deducting any reused/ recycled water), and, only if recycled greywater is used for the activity, the annual potable water use for water features, car washing, external cleaning and/ or industrial processes.

2.6. Sufficient tank storage capacity

Demonstrate the collection tank(s) has sufficient capacity.

Recycled grey water: 8-10 hours of storage.

2.7. Water quality standards

Demonstrate the recycled grey water, after treatment, meet the recommended water quality standards prescribed in Table 1.1 of the WSD Technical Specifications [1]. Analysis of parameters under water quality standards shall be carried out in a HOKLAS accredited laboratory.

(c) Exemplary Water Recycling

In addition to the requirements stipulated in parts (a) and (b), demonstrate that harvested rainwater, recycled grey water or a combination of both leads to a reduction of 10% or more in the consumption of potable water.

Submittals

(a) Harvested Rainwater

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
WU_08a_00	BEAM Plus NB submission template for WU 8a with: Calculation of Yield and Demand for Harvested Rainwater [Form S-A1]; Information of Collection Tanks for Rainwater Harvesting [Form S-A2]; and Water Quality Measurement for Rainwater Harvesting System [Form S-A3]	✓ ✓ ✓ -		✓ ✓ ✓ ✓
WU_08a_01	Calculation of reduction in demand of potable water from rainwater harvesting system (with breakdown of yield and demand by each end use, as well as details of input parameters/ assumptions)	✓		✓
WU_08a_02	Greenery plan including the total greenery area (distinguish between communal greenery and private garden if applicable) and area break- down according to landscape type, irrigation method and controller used	✓		✓
WU_08a_03	Catchment area plan including area break-down, type of surface and surface coefficient adopted	✓		✓
WU_08a_04	Plumbing schematic drawing(s) and plumbing layout drawings illustrating rainwater outlets and collection downpipes from the catchment area to rainwater harvesting system	✓		✓
WU_08a_05	Rainwater harvesting system schematic drawing(s) illustrating the treatment	✓		✓
WU_08a_06	Specifications for provision of water quality testing methodology, measurement and report	✓		-
WU_08a_07	Water quality measurement report	-		✓

WU_08a_08	Technical data (e.g. approved contractor's submission with product catalogue) of surfaces/ substrates to substantiate the runoff coefficient (if non-default value is used)	✓		✓
WU_08a_09	Technical data (e.g. approved contractor's submission with product catalogue) of the in-line filter highlighting the efficiency (if non-default value is used)	✓		✓
WU_08a_10	Calculation demonstrating sufficient tank (or retention pond) storage capacity for harvested rainwater	✓		✓

(b) Recycled Grey Water

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
WU_08b_00	BEAM Plus NB submission template for WU 8b with:	✓		✓
	Calculation of Yield and Demand for Recycled Grey Water [Form S-B1];	✓		✓
	Information of Collection Tanks for Recycled Grey Water [Form S-B2]; and	✓		✓
	Water Quality Measurement for Grey Water Recycling System [Form S-B3]	-		✓
WU_08b_01	Calculation of reduction in demand of potable water from grey water system (with breakdown of yield and demand by each end use as well as details of input parameters/ assumptions)	✓		✓
WU_08b_02	Plumbing schematic drawing(s) and plumbing layout drawings, highlighting the grey water recycling system	✓		✓
WU_08b_03	Specifications for provision of water quality testing methodology, measurement and report	✓		-
WU_08b_04	Water quality measurement report	-		✓

WU_08b_05	Calculation demonstrating sufficient tank storage capacity for recycled grey water	✓		✓

(c) Exemplary Water Recycling

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
WU_08c_00	BEAM Plus NB submission template for WU 8c with:	✓		✓
	Calculation of Yield and Demand for Harvested Rainwater [Form SC1] (if applicable);	✓		✓
	Calculation of Yield and Demand for Recycled Grey Water [Form SC2] (if applicable);	✓		✓
	Information of Collection Tanks for Rainwater Harvesting [Form S-C3] (if applicable);	✓		✓
	Information of Collection Tanks for Recycled Grey Water [Form S-C4] (if applicable);	✓		✓
	Water Quality Measurement for Rainwater Harvesting System [Form S-C5] (if applicable); and	-		✓
	Water Quality Measurement for Grey Water Recycling System [Form S-C6] (if applicable)	-		✓
WU_08c_01	Calculation of reduction in demand of potable water from rainwater harvesting system (with breakdown of yield and demand by each end use as well as details of input parameters/ assumptions)	✓		✓
WU_08c_02	Greenery plan including the total greenery area (distinguish between communal greenery and private garden if applicable) and area break- down according to landscape type, irrigation method and controller used	✓		✓
WU_08c_03	Catchment area plan including area break-down, type of surface and surface coefficient adopted	✓		✓

WU_08c_04	Calculation of reduction in demand of potable water from grey water system (with breakdown of yield and demand by each end use as well as details of input parameters/ assumptions)	✓		✓
WU_08c_05	Plumbing schematic drawing (s) and plumbing layout drawings, highlighting the rainwater harvesting system (as well as collection downpipes from the catchment area to rainwater harvesting system) and the grey water recycling system (if applicable)	✓		✓
WU_08c_06	Specifications for provision of water quality testing methodology, measurement and report	✓		-
WU_08c_07	Water quality measurement report	-		✓
WU_08c_08	Technical data (e.g. approved contractor's submission with product catalogues) of surfaces/ substrates to substantiate the runoff coefficient (if non-default value is used)	✓		✓
WU_08c_09	Technical data (e.g. approved contractor's submission with product catalogue) of the in-line filter for the rainwater harvesting system highlighting the efficiency (if non-default value is used)	✓		✓
WU_08c_10	Calculation demonstrating sufficient tank (or retention pond) storage capacity for harvested rainwater (if applicable)	✓		✓
WU_08c_11	Calculation demonstrating sufficient tank storage capacity for recycled grey water (if applicable)	✓		✓

Remarks

(a) Additional Information

None

(b) Related Credit

Calculation method of amount of irrigation demand should be consistent with WU 2.

Calculation method of amount of flushing water should be consistent with WU 7.

7 Health and Wellbeing (HWB)

7.P Prerequisite
7.1 Design for Green Living
7.2 Inclusive Design
7.3 Indoor Environmental Quality

Introduction

This section of BEAM Plus considers the broader perspectives of sustainable buildings as well as the building occupants' health and wellbeing. The broader sustainable issues include provisions of hygiene and amenities maintenance provided in the building, which have impact on the quality of working and living environments. Indoor environmental quality (IEQ) includes indoor air quality and ventilation provisions that safeguard health. Considerations of these issues, as well as thermal comfort, lighting, acoustics and noise, impact on well-being, comfort and productivity.

7.P Prerequisite

HWB P1 Minimum Ventilation Performance

Background

This requirement ensures that ventilation systems of the premises have been designed according to recognised procedures to provide a minimum ventilation of sufficient quality and quantity.

7.1 Design for Green Living

HWB 1 Healthy and Active Living
HWB 2 Biophilic Design

Background

Biophilic design provides users constant interaction with living things and natural surroundings to nurture the innate human-nature connection and to address human psychological need to be around life and life-like processes. Design features and amenities, e.g. pedestrian amenities and stairs promotion, can facilitate more healthy and active living.

7.2 Inclusive Design

HWB 3 Inclusive Design

Background

Designs that allow users to enjoy spaces safely, easily and with dignity, and ensure efficient services to meet their needs, etc. They enhance the quality and efficiency of built environments and thereby ensure buildings to be more sustainable.

7.3 Indoor Environmental Quality

HWB 4 Enhanced Ventilation
HWB 5 Waste Odour Control
HWB 6 Acoustics and Noise
HWB 7 Indoor Vibration
HWB 8 Indoor Air Quality
HWB 9 Thermal Comfort
HWB 10 Artificial Lighting
HWB 11 Daylight
HWB 12 Biological Contamination

Background

Given that on average people in Hong Kong spend around 85% of their time indoors, indoor environmental conditions have a significant impact on the quality of life. Buildings should provide safe, healthy, convenient and efficient indoor spaces. Poor indoor environments in commercial and institutional buildings can impact on productivity and may pose health risks to users. The design, management, operation and maintenance of buildings should seek to provide a good quality indoor environment, but with optimum use of energy and other resources.

7 Health and Wellbeing **7.P Prerequisite**

HWB P1 Minimum Ventilation Performance

Extent of Application All buildings

Objective Assess the quality of on-site outdoor air and demonstrate that a minimum quantity of outdoor air is supplied to all normally occupied spaces in the project in order to safeguard the health and comfort of building users.

Credits Attainable Prerequisite

Credit Requirement

(a) Measure outdoor air pollutants on-site prior to building design to understand the site conditions.

(b) Demonstrate the project is in compliance with the minimum ventilation quantity with respective to its designed ventilation mode.

Assessment

(a) On-site Outdoor Air Quality

Engage an IAQ Certificate Issuing Body (CIB) [1] to measure the quality of outdoor air. Measurements should be taken for the following outdoor air pollutants:

1. Carbon monoxide (CO)
2. Nitrogen dioxide (NO_2)
3. Ozone (O_3); and
4. Respirable suspended particulates (PM_{10})

Provide a CIB endorsed outdoor air quality measurement report which shall include:

- Layout plan showing the location(s) of the outdoor air quality measurement point(s);
- Description of the measuring equipment used;
- Date, time and duration of measurements;
- Measurement results;
- Calibration certificate of the measuring equipment; and
- Photos taken during measurements (at least one photo per sampling point).

One sample should be taken at the centre of the site. If emission sources, which are under operation by the time the measurement is taken, are present in the immediate surroundings of the project site, additional samples should be taking at locations facing the sources. The examples of emission sources can be found in the EPD's website [2].

1 IAQ Certificate Issuing Body Accreditation [ONLINE]. Available at: https://www.iaq.gov.hk/en/iaq-certification-scheme-iaq-service-providers/ [Accessed February 2025].

2 Environmental Protection Department – Hong Kong Air Pollutant Emission Inventory [ONLINE]. Available at: http://www.epd.gov.hk/epd/english/environmentinhk/air/data/emission_inve.html. [Accessed February 2025].

Representative locations are acceptable if there is accessibility issue. If the Applicant encounters difficulties in taking air quality measurement at the centre of the site, at least one sampling of air quality measurement taken at the potential future fresh air intake point can be accepted as an alternative. In such cases, there is not necessary to provide MVAC drawings to justify the fresh air intake position. The samples should be taken when no construction activities were on-going on the day of measurement. All parameters at one sampling location should be taken on the same day.

Prepare a narrative to benchmark the measurement results against the below acceptance limits. Note that the measurement results are not required to comply with the limits and should be served as design information only. A rectifying plan describing the design of air purification strategies is required if air quality is not achieved.

Parameter	8-hour average acceptance limit [3]
Carbon monoxide (CO)	<7,000 µg/m^3 or <6.1 ppmv
Nitrogen dioxide (NO_2)	<150 µg/m^3 or <80 ppbv Plus [1-hour] <200 µg/m^3 or <106 ppbv
Ozone (O_3)	<120 µg/m^3 or <61 ppbv
Respirable suspended particulate (PM_{10})	<100 µg/m^3

Due to site constraints, it may not be practicable to take 8-hour continuous measurement. In these circumstances, surrogate measurement (i.e. an intermittent measurement strategy based on the average of half-an-hour measurements conducted at four timeslots) is also accepted.

(b) Minimum Ventilation

Identify and categorise the spaces in the building into normally occupied and not normally occupied according to the space type matrix in Appendix 9.4 of this Manual.

Specify the system (mechanical or natural) used to ventilate the spaces.

Spaces with significant indoor air pollution sources such as toilets, car park, refuse room and plant room are excluded from the assessment. Staircases are also excluded.

Demonstrate compliance with the below criteria.

1. <u>Mechanically Ventilated Spaces</u>

Provide a fresh air calculation report with the provision of fresh air equipment demonstrating compliance with the minimum ventilation rate stipulated in ASHRAE Standard 62.1-2016 [4] in all mechanically ventilated normally occupied spaces.

<u>Projects with Bare Shell Provision</u>

It is observed that more developers have opted for the option in developing new buildings with bare shell spaces (i.e. the responsibility of providing the fresh air equipment to supply fresh air into indoor space will rest on the future users/ tenants).

3 Environmental Protection Department – IAQ Certification Scheme [ONLINE]. Available at: https://www.iaq.gov.hk/en/iaq-certification-scheme/ [Accessed February 2025].

4 American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) – ANSI/ASHRAE Standard 62.1-2016 – Ventilation for Acceptable Indoor Air Quality

To ensure projects with bare shell space meet the objective of the credit, the project proponent shall ensure that there will be adequate fresh air louvre(s) to draw outdoor air into the project's indoor space. The project proponent shall make reference to an authoritative source, such as the criteria for louvre sizing specified under ASHRAE Handbook—Fundamentals, when determining the actual number and size of louvre(s) to be provided at the façade of the development.

2. Naturally Ventilated Spaces

Select one of the following paths. The Applicant is not limited to adopt only one path for all the spaces.

2.1. Prescriptive Path

2.1.1. For Residential Buildings/ Portions:

For naturally ventilated normally occupied spaces, the total area of the windows/ primary openings provided in each space should not be less than 7% of the floor area of the space. The requirements for windows should refer to Cap. 123F Building (Planning) Regulations [5] and the definition of primary openings should make reference to PNAP APP-130 [6]. The space with notional partition(s) should be considered in the assessment, the ratio of windows/ primary openings provided in each individual habitable room should be demonstrated.

If cross ventilation is provided as per PNAP APP-130, the aggregated size of the primary openings should not be less than 2.2% of the floor area of the room; the aggregated size of the secondary openings should not be less than 2.2% of the floor area of the room.

For those naturally ventilated normally occupied spaces installed with acoustic windows, the openable window areas shall comply with the local statutory requirements which strive for the balance between sufficient ventilation and mitigation of noise. No detailed demonstrations are required and not assessed under the above criteria.

2.1.2. For Non-residential Buildings/ Portions:

Provide a report demonstrating compliance with Section 6.4.2 Location and Size of Openings stipulated in ASHRAE Standard 62.1-2016 in all naturally ventilated normally occupied spaces.

For normally occupied spaces that utilise natural ventilation with direct openings to the outdoors, the net free unobstructed area of the opening should be not less than 4% of the net occupied floor area.

For normally occupied spaces that utilise natural ventilation without direct openings to the outdoors and are ventilated through adjoining rooms, the opening between rooms shall be permanently unobstructed (Door between rooms is deemed as permanently unobstructed opening). The net free unobstructed area of the opening should be not less than 8% of the net occupied floor area of the normally occupied space or not less than 2.3m².

5 Building (Planning) Regulations Cap. 123, Hong Kong e-Legislation [ONLINE]. Available at: https://www.elegislation.gov.hk/hk/cap123F. [Accessed February 2025].

6 Buildings Department – APP-130 – Lighting and Ventilation Requirements – Performance-based Approach [ONLINE]. Available at: https:/www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnap/APP/APP130.pdf. [Accessed February 2025].

2.2. Performance Path (For projects with spaces cannot achieve through Prescriptive Path)

For naturally ventilated normally occupied spaces, the ventilation rate meets 1.7 ACH under one annual prevailing wind direction with the highest wind frequency. The annual wind rose (wind probability table) at 400 – 600m of the site should be used.

Wind data, such as wind frequency, wind rose, wind profile should be adopted from the appropriate and reliable sources, such as simulated site wind data based on appropriate mathematical models, such as RAMS from PlanD [7] or experimental site wind data from wind tunnel test.

Ventilation performance should be demonstrated using wind tunnel tests, computational fluid dynamics or approaches that range from simple single zone models to elaborate multi-zone models [8].

The below requirements should be fulfilled in the CFD simulation:

2.2.1. Surrounding buildings and terrain shall be included in the model based on the GIS information from Lands Department, the Government of HKSAR [9];

2.2.2. The surrounding area shall be at least, 2H (H being the building height (m) of the tallest building on the project site) or 200m away from the project site boundary, whichever is larger. The buildings within the surrounding area can be simplified to block;

2.2.3. The terrain area shall be in a size of at least, 10H (H being the building height (m) of the tallest building on the project site) or 1000m × 1000m, whichever is larger, with the project placed in the centre; and

2.2.4. Buoyancy and turbulence driven flows need not be considered.

Prepare a Natural Ventilation Report including the following contents:

a. Summary of naturally ventilated spaces highlighting compliance;

b. All assumptions made;

c. Methodology; and

d. Results.

7 Site Wind Availability System [ONLINE]. Available at: https://www.pland.gov.hk/pland_en/info_serv/site_wind/site_wind/index.html. [Accessed February 2025].

8 American Society for Testing Materials. ASTM E 2267-03. Specifying and Evaluating Performances of Single Family Attached and Detached Dwellings – Indoor Air Quality 2003.

9 Lands Department – Survey and Mapping Office [ONLINE]. Available at: https://www.landsd.gov.hk/en/survey-mapping.html. [Accessed February 2025].

The Natural Ventilation Report should be endorsed by a locally qualified professional who has at least 3 years of relevant experience in natural ventilation design and CFD modelling. The Locally Qualified Professional shall attain at least one of the following local professional qualifications:

- Member of The Hong Kong Institution of Engineers (MHKIE);
- Member of Hong Kong Institute of Qualified Environmental Professionals Limited (MHKIQEP);
- Registered Energy Assessor (REA), under the Buildings Energy Efficiency Ordinance (Cap. 610); and
- Registered Professional Engineer (R.P.E.), under the Engineers Registration Ordinance (Cap. 409).

The accepted disciplines of the above local professional qualifications include Building Services, Mechanical, Electrical, Energy and Environmental.

CV of the Locally Qualified Professional shall be provided to demonstrate that the Locally Qualified Professional holds the required local professional qualification(s) and with the relevant experience.

Submittals

(a) On-site Outdoor Air Quality

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_P1a_00	BEAM Plus NB submission template for HWB P1a	✓	✓	✓
HWB_P1a_01	Rectifying plan describing the design of air purification strategies if air quality is not achieved	✓	✓	✓
HWB_P1a_02	CIB endorsed outdoor air quality measurement report of all required outdoor air pollutants	✓	✓	✓

(b) Minimum Ventilation

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_P1b_00	BEAM Plus NB submission template for HWB P1b	✓	✓	✓
HWB_P1b_01	/	/	/	/
HWB_P1b_02	/	/	/	/

For Mechanically Ventilated Normally Occupied Spaces, please include the following:		**PA**	**CA**	**FA/ RFA**
HWB_P1b_03	Fresh Air Calculation Report with the provision of fresh air equipment demonstrating compliance with the minimum ventilation rate stipulated in ASHRAE Standard 62.1-2016 [HWB_P1&04a_Appendix A]	✓	✓	✓
HWB_P1b_04	MVAC fresh air equipment schedule and MVAC air-side schematics	✓	✓	✓
HWB_P1b_05	MVAC layout plan	-	✓	✓
HWB_P1b_06	Technical Data (e.g. catalogues) showing the offered fresh air flow rate of the fresh air equipment	-	✓	✓
For Projects with Bare Shell Provision (fresh air equipment is NOT provided by the project proponent for normally occupied spaces), please include the following:		**PA**	**CA**	**FA/ RFA**
HWB_P1b_07	Layout Drawing showing the location and size of the fresh air louvre(s); and Fresh Air Calculation showing the requirement on fresh air louvres [HWB_P1_Appendix B]	✓	✓	✓
HWB_P1b_08	Declaration Letter endorsed by the project proponent declaring that the project will NOT be provided with fresh air equipment and only louvre(s) for fresh air intake will be provided OR Tenant Guideline highlighting the recommended amount of fresh air to be provided into the indoor space	-	✓	✓
For Naturally Ventilated Normally Occupied Spaces by Prescriptive Path, please include the following:		**PA**	**CA**	**FA/ RFA**
HWB_P1b_09	Floor plan highlighting locations of primary openings, secondary openings (for spaces with cross ventilation) and/ or openings between rooms (for spaces in non-residential buildings without direct openings to the outdoors and are ventilated through adjoining rooms) that provided in all naturally ventilated normally occupied rooms	✓	✓	✓

HWB_P1b_10	Window and Opening Schedules showing the areas of the primary openings, secondary openings (for spaces with cross ventilation) and/ or openings between rooms (for spaces in non-residential buildings without direct openings to the outdoors and are ventilated through adjoining rooms) that provided in all naturally ventilated normally occupied rooms	✓	✓	✓
HWB_P1b_11	Calculation of ratio of the total area of the openings provided in each space to the floor area of the space [HWB_P1&04a_Appendix C]	✓	✓	✓
For Naturally Ventilated Normally Occupied Spaces by Performance Path, please include the following:		**PA**	**CA**	**FA/ RFA**
HWB_P1b_12	Endorsed Natural Ventilation Report	✓	✓	✓
HWB_P1b_13	CV of the professional as per requirements in the assessment	✓	✓	✓
HWB_P1b_14	/	/	/	/

Remarks

(a) Additional Information

Site Wind Availability System. [ONLINE]. Available at: https://www.pland.gov.hk/pland_en/info_serv/site_wind/site_wind/index.html. [Accessed February 2025].

(b) Related Credit

HWB 4 Enhanced Ventilation

The related credit awards project demonstrating enhanced ventilation performance in normally occupied spaces and not normally occupied spaces.

HWB 8 Indoor Air Quality

Carrying out on-site outdoor analysis provides useful information for the selection of ventilation means and ventilation system design in order to achieve satisfactory indoor air quality. From the measurement result, a proper design to ensure a good air quality provision could help gaining credit points in HWB 8.

7 Health and Wellbeing 7.1 Design for Green Living

HWB 1 Healthy and Active Living

Extent of Application All buildings

Objective To encourage designing building environment for healthy and active living by improving living and/ or working experience of building users and integrating physical activities in the design for an active lifestyle.

Credits Attainable 1 BONUS

Credit Requirement 1 BONUS credit for providing at least 3 items of all applicable design measures for healthy and active living.

Assessment Provide a report demonstrating compliance of at least 3 of all relevant applicable design measures for healthy and active living at communal areas of building development as listed below, item (1) to (4):

<u>Improving living and/ or working experience of communal use by building occupants</u>

1. Integration of public art in indoor communal areas at the building main entrance and core circulation lobbies at main access level to have at least one artwork respectively. The public artwork should be of scale reasonably proportional to space/ venue it locates. A narrative or infographics of the art piece should also be available for users and visitors.

<u>Integrating physical activities in the design for an active lifestyle</u>

2. Install way-finding signage and/ or info graphics at point-of-decision to encourage stair use (at least one at the building main entrance and all core circulation lobbies with lift provisions).

3. Install at least one (1) circulation stair in communal area meeting the following requirements:
   - Riser to be not more than 150mm and tread to be at least 300mm;
   - Individual flight of stair not to exceed 1800mm nor a total of more than 12 risers;
   - Placed visually before lifts upon entering the building main entrance;
   - Connecting at least three (3) storeys (for project buildings more than two (2) storeys); and
   - Stair width to be at least 1350mm.

4. Install at least one (1) provision for physical activities in communal areas, for example exercise stations, jogging tracks, cycling etc.

Additional or alternative design features may be included. Justification on achievement in credit objectives should be demonstrated.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_01_00	BEAM Plus NB submission template for HWB 1	✓	✓	✓
HWB_01_01	Contract specifications of the design measures	✓	-	-
HWB_01_02	Drawings showing design measures and/or amenity features	✓	✓	✓
HWB_01_03	Report showing justifications and details for each design measure and/ or amenity feature provided	✓	✓	✓
HWB_01_04	Photo records of each design measure and/ or amenity feature provided [or] Architect's Instruction (AI) with shop drawings, approved contractor's submission with technical information, etc. (if the document abovementioned is not available at the time of CA submission)	- -	✓ ✓	✓ -

Remarks

(a) Additional Information

None

(b) Related Credit

SS 1 Pedestrian-oriented and Low Carbon Transport

The related credit promotes providing cycling facilities within the Site and integrating with the public cycling network if a public cycling network exists or has been planned nearby. Changing/ shower facilities for non-residential buildings are required to achieve the credit.

SS 2 Neighbourhood Amenities

The related credit encourages building developments to have adequate amenities for its users within or in the vicinity of the Site. When relevant amenities are counted in SS 2a, they would not be applicable for HWB 2.

7 Health and Wellbeing 7.1 Design for Green Living

HWB 2 Biophilic Design

Extent of Application All buildings

Objective To encourage building occupants to have constant interaction with living things and natural surroundings to nurture the innate human-nature connection and to address human psychological need to be around life and life-like processes.

Credits Attainable 1 BONUS + 1 additional BONUS

Credit Requirement 1 BONUS credit for demonstrating visual connection with nature and/ or biophilic design features at an assessment space with Visual Quality Score of 2 or above.

1 additional BONUS credit for demonstrating visual connection with nature and/ or biophilic design features at an assessment space with Visual Quality Score of 3 or above.

Assessment

1. Visual Quality (VQ) can be described by identifying the inherent characteristics and attributes of the surrounding environment. This includes the identification of elements that have both positive and negative contributions.

2. The Visual Quality Study under this credit should address the visual connection with nature and/or biophilic design features at an assessment space meeting the following requirements.

3. The assessment space chosen shall be a normally occupied space with highest occupancy (i.e. the largest number of occupant) within the development. If biophilic design is not practical for the normally occupied space with the highest occupancy due to particular operational requirements, the Applicant can provide evidence to justify the difficulty and propose the use of the normally occupied space of the second highest occupancy for the assessment. For buildings with typical floors that have equal occupancy for each floor, to allow flexibility in the design for green living in buildings, the Applicant can select any floor among the typical floors with the same highest occupancy such that the occupants can enjoy satisfactory visual quality, while still providing a representative location for assessment.

4. A demarcation plan of the normally occupied spaces for assessment and the justification of the highest occupancy (or the second highest occupancy) within the development based on relevant building codes shall be provided.

5. Images taken from the viewpoints should be analysed based on a weighting factor of 1 to 5 to indicate the quality of the view. The weighting factors are listed in the following table:

Table HWB 2-1

Weighting factor	Representation	Visual connection to nature and/ or biophilic design features
5	Outstanding	Natural terrain; waterfront; extensive outdoor greenery with deciduous trees, seasonal flowers and/or native plants providing local fauna, including birds and butterflies with appropriate food sources and habitats
4	Excellent	Outdoor planting; sky
3	Good	Indoor planting
2	Fair	Biomorphic forms & patterns; nature presented by digital medium, drawings or other visual means
1	Insignificant	No visual connection to the above

6. Projection Path

The Applicant shall produce images from the viewpoints by graphical software at PA stage and produce images from single lens camera at FA stage. The specification for camera is listed in point 7.2;

OR

7. Simulation Path

The Applicant shall produce images from the viewpoints using viewpoint in 3D model at PA stage and single lens camera at FA stage. The specifications for camera or 3D model are as follows:

7.1. Viewpoint in 3D Model at PA stage:

Option 1:

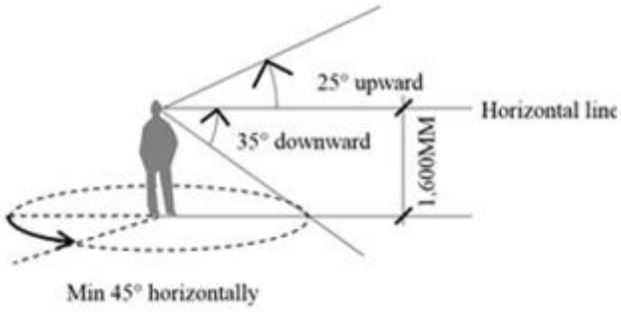
Vertical elevation of camera for viewpoints in 3D model	1,600mm above ground/ finished floor
Vertical upward angle	25^{o}
Vertical downward angle	35^{o}

Option 2:

Vertical elevation of camera for viewpoints in 3D model	1,600mm above ground/ finished floor
Equivalent lens focal length or focal length	27mm

7.2. Single Lens Camera at FA stage:

Vertical elevation of camera	1,600mm above ground/ finished floor
Equivalent lens focal length or focal length	27mm
Aspect Ratio	3:2



7.3. Important notes:

i. No fisheye or image distortion before or after picture taking; and

ii. No zooming or pan function shall be used.

7.4. Number and location of viewpoints:

i. A minimum of ONE viewpoint shall be placed within the selected assessment space, and

ii. The viewpoint should be appropriately located at the centre of the assessment space (for space of irregular shape, the space shall be subdivided into various notional portions for respective $VQS_{portion}$ calculations and the $VQS_{portion}$ of various portions shall be area-weighted based on their areas to compute the overall VQS of the assessment space).

7.5. Number of Frames:

i. A series of frames from 3 different directions at 45° interval should be taken using landscape orientation.

7.6. Methodology:

i. For each frame, assign weighting factors from 1 to 5 to different portions of the frame depending on the quality of the view;

ii. Calculate the Visual Quality Score of the frame using Area Weighting Methodology;

iii. Repeat the process for each frame; and

iv. Calculate the average Visual Quality Score for the viewpoint.

7.7. Primary Tools:

i. 3D model using any appropriate 3D visualisation software at PA stage;

ii. Physical photographs taken from the site at FA stage.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_02_00	BEAM Plus NB submission template for HWB 2	✓		✓
HWB_02_01	Visual Quality Study Report	✓		-
HWB_02_02	Visual Quality Study Report (with photographic evidence)	-		✓

Remarks

(a) Additional Information

14 Patterns of Biophilic Design. Terrapin Bright Green. [ONLINE]. Available at: https://www.terrapinbrightgreen.com/report/14-patterns/. [Accessed February 2025].

Biophilic Design Case Studies. Terrapin Bright Green. [ONLINE]. Available at: https://www.terrapinbrightgreen.com/report/biophilic-design-case-studies/. [Accessed February 2025].

Kaplan, R and Kaplan, S, 1989, “The Experience of Nature: A Psychological Perspective”, Cambridge, University Press: Cambridge, UK.

Kellert, S.R., Heerwagen, J., Mador, M., Eds., 2008, “Biophilic Design - The Theory, Science, and Practice of Bringing Buildings to Life”, Wiley: Hoboken, NJ, USA.

Wilson, E.O. 1984, “Biophilia”, Harvard University Press: Cambridge, MA, USA.

(b) Related Credit

SS P1 Minimum Landscaping Requirements

The related prerequisite requires minimum site coverage of greenery and minimum provisions for viability of planting, for example, the minimum soil volumes and depths for all plant areas.

SS 2 Neighbourhood Amenities

The related credit encourages building developments to have adequate amenities for its users within or in the vicinity of the Site. When relevant amenities are counted in SA 2a, they would not be applicable for HWB 2.

SS 7 Biodiversity Enhancement

The related credit encourages strategies to preserve and/or enhance the ecological value of the site in terms of habitat and biodiversity.

SS 8 Urban Heat Island Mitigation

The related credit encourages higher overall site coverage of greenery.

HWB 1 Healthy and Active Living

The related credit encourages urban farm as a means to improve the living and/ or working experience of building occupants.

7 Health and Wellbeing 7.2 Inclusive Design

HWB 3 Inclusive Design

Extent of Application All buildings

Objective Encourage well integrated weather protection and user-friendliness in the building design for outdoor or semi-outdoor communal/ private space design at various levels of a building.

Credits Attainable 1 + 1 BONUS

Credit Requirement

(a) Universal Accessibility

1 credit for providing at least ten (10) applicable enhanced provisions as stipulated in the "Recommended Design Requirements" of BFA 2008.

(b) Weather Protection and Family Friendly Facilities

1 BONUS credit for providing prescribed weather protection and at least two (2) family friendly facilities.

Assessment

(a) Universal Accessibility

Provide a report detailing at least ten (10) applicable enhanced provisions as stipulated in the "Recommended Design Requirements" of BFA 2008 [1].

(b) Weather Protection & Family Friendly Facilities

1. Provide weather protection features against wind-driven rain for all covered semi-outdoor communal areas within the development, allowing a minimum width of 2 m protected zone from driving rain.

   Minimum driving rain angles (MRA) from edges of rain protection features shall be calculated based on the following equation:

   $$\mathrm{MRA} = \tan^{-1}(\mathrm{u}/4.5\mathrm{I}^{0.107})$$

   Where,

   u = Hourly mean wind speed affecting the rain (m/s)

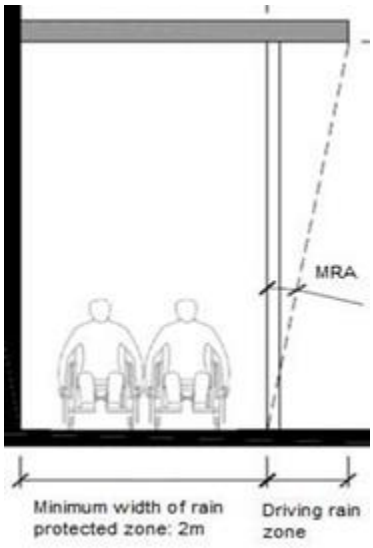
   I = Intensity of rainfall (mm/hr)

   A default figure of 30 mm/hr is taken as the hourly rainfall intensity under heavy rain conditions (Hong Kong Observatory defines "heavy rain days" as days with hourly rainfall greater than 30 mm).

   Wind speed can be determined from the wind profile diagram available at PlanD's Site Wind Data webpage [2]. For a semi-external communal space facing a certain orientation, the wind profile for that orientation at its proposed location (height above ground) shall be used.

1 Buildings Department – Design Manual - Barrier Free Access 2008 – Codes of Practice and Design Manuals. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/code-and-design-manuals/BFA2008_e.pdf. [Accessed February 2025].

2 Site Wind Availability Data. [ONLINE]. Available at: https://www.pland.gov.hk/pland_en/info_serv/site_wind/site_wind/index.html. [Accessed February 2025].



2. Family Friendly Facilities:

2.1. At least one shaded rest area with seating for care-takers near play equipment for children. This accounts for 1 inclusive design feature.

2.2. At least one water closet for children or family in each male and female or stand-alone toilet with seat height in the range of 310 mm to 380 mm for communal use. This accounts for 1 inclusive design feature.

2.3. At least one baby-care facilities/ breast feeding room in the communal areas of the building. This accounts for 1 inclusive design feature.

Additional or alternative inclusive design features may be included, which achievement in credit objectives should be demonstrated.

Submittals

(a) Universal Accessibility

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_03a_00	BEAM Plus NB submission template for HWB 3a	✓	✓	✓
HWB_03a_01	Summary of Enhanced Provisions [Appendix A]	✓	✓	✓
HWB_03a_02	Drawings showing enhanced provisions	✓	✓	✓

HWB_03a_03	Report showing justifications and details for each enhanced provision (including substantiations such as specifications and technical data (e.g. catalogues or test reports) demonstrating the static coefficient of friction, luminous contrast, etc., and simulation results showing the illumination level/ uniformity, for respective enhanced provisions as per the requirements in BFA)	✓	✓	✓
HWB_03a_04	Photo records of each enhanced provision [or] Architect's Instruction (AI) with shop drawings, approved contractor's submission with technical information, etc. (if the document abovementioned is not available at the time of CA submission)	- - 	✓ ✓ 	✓ -

(b) Weather Protection & Family Friendly Facilities

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_03b_00	BEAM Plus NB submission template for HWB 3b	✓	✓	✓
HWB_03b_01	Drawings showing design measures and/or amenity features	✓	✓	✓
HWB_03b_02	Report showing justifications and details for each design measure and/or amenity feature provided	✓	✓	✓
HWB_03b_03	Photo records of each design measure and/or amenity feature provided [or] Architect's Instruction (AI) with shop drawings, approved contractor's submission with technical information, etc. (if the document abovementioned is not available at the time of CA submission)	- - 	✓ ✓ 	✓ -

Remarks

(a) Additional Information

Chand, Bhargava, Estimation of Angle of Deflection of Rain at Driving Rain Prone Stations in India, 2005.

Sagadashvili, Methods of Processing Meteorological Observational Data for Assessment of Driving Rain Parameters, Proceedings of the Symposium on Building Climatology, Moscow, 619 - 629, 1982.

Buildings Department, PNAP ADV-32, Provision of Babycare Rooms and Lactation Rooms in Commercial Buildings. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnap/ADV/ADV032.pdf. [Accessed February 2025].

(b) Related Credit

SS 1 Pedestrian-oriented and Low Carbon Transport

The related credit promotes convenient and barrier-free pedestrian environment in site planning of the outdoor spaces.

7 Health and Wellbeing **7.3 Indoor Environmental Quality**

HWB 4 Enhanced Ventilation

Extent of Application All buildings

Objective Maintain effective ventilation and prevent exposure to concentrated indoor pollutant sources to support occupants' health and wellbeing.

Credits Attainable 3 + 1 additional BONUS

Credit Requirement

(a) Fresh Air Provision

1.1. Fresh Air Provision in Normally Occupied Spaces

1 credit for demonstrating that all normally occupied spaces in the building are provided with increased ventilation.

1.2. Fresh Air Provision in Not Normally Occupied Spaces

1 credit for demonstrating that all not normally occupied spaces in the building are provided with adequate ventilation.

1.3. On-site Measurements

1 additional BONUS credit for conducting on-site measurements to verify the ventilation performance for normally occupied spaces.

(b) Exhaust Air

1 credit for the provision of an effective ventilation system for spaces where significant indoor pollution sources are consistently generated.

Assessment

(a) Fresh Air Provision

Identify and categorise the spaces in the building into normally occupied and not normally occupied according to the space type matrix in Appendix 9.4 of this Manual.

Specify the system (mechanical or natural) used to ventilate the spaces.

Spaces with significant indoor air pollution sources such as toilets, car park, refuse room and plant room are excluded from the assessment. Staircases are also excluded.

The provision of fresh air louvre for bare shell spaces is not accepted as an approach to achieve the ventilation requirement of the credits. The ventilation requirement of the credits can only be achieved through provision of fresh air equipment (such as PAU, AHU, FAF etc.) or by natural ventilation as stated below.

1.1. Fresh Air Provision in Normally Occupied Spaces

Demonstrate compliance with the below criteria.

1.1.1. Mechanically Ventilated Spaces

Provide a fresh air calculation report with the provision of fresh air equipment demonstrating that the minimum ventilation rates stipulated in ASHRAE Standard 62.1-2016 [1] in all mechanically ventilated normally occupied spaces are exceeded by at least 30%.

1.1.2. Naturally Ventilated Spaces

Select one of the following paths. The Applicant is not limited to adopt only one path for all the spaces.

1.1.2.1. Prescriptive Path

i. For Residential Buildings/ Portions:

For naturally ventilated normally occupied spaces, the total area of the windows/ primary openings provided in each space is not less than 9% of the floor area of the space. The requirements for windows should refer to Cap. 123F Building (Planning) Regulations [2] and the definition of primary openings should make reference to PNAP APP-130 [3]. The space with notional partition(s) should be considered in the assessment, the ratio of windows/ primary openings provided in each individual habitable room should be demonstrated.

If cross ventilation is provided as per PNAP APP-130, the aggregate size of the primary openings should not be less than 2.5% of the floor area of the room; the aggregate size of the secondary openings should not be less than 2.5% of the floor area of the room.

For those naturally ventilated normally occupied spaces installed with acoustic windows, the detailed demonstrations are required and should be assessed under the above criteria. If acoustic window is installed, the window area should only refer to the openable window area. The requirements for acoustic windows and the definition of openable window area should make reference to PNAP APP-130 Appendix A – Section 6 Acoustic Window.

ii. For Non-residential Buildings/ Portions:

For normally occupied spaces that utilise natural ventilation with direct openings to the outdoors, the net free unobstructed area of the opening should be not less than 5.2% (exceed 4%, as stipulated in Section 6.4.2 Location and Size of Openings of ASHRAE Standard 62.1-2016, by 30%) of the net occupied floor area.

1 American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) – ANSI/ASHRAE Standard 62.1-2016 Ventilation for Acceptable Indoor Air Quality.

2 Building (Planning) Regulations Cap. 123, Hong Kong e-Legislation. [ONLINE]. Available at: https://www.elegislation.gov.hk/hk/cap123F. [Accessed February 2025].

3 Buildings Department – APP-130 Lighting and Ventilation Requirements – Performance-based Approach. [ONLINE]. Available at: https://www.bd.gov.hk/doc/en/resources/codes-and-references/practice-notes-and-circular-letters/pnap/APP/APP130.pdf. [Accessed February 2025].

For normally occupied spaces that utilise natural ventilation without direct openings to the outdoors and are ventilated through adjoining rooms, the opening between rooms shall be permanently unobstructed (Door between rooms is deemed as permanently unobstructed opening). The net free unobstructed area of the opening should be not less than 8% of the net occupied floor area of the normally occupied space or not less than 2.3m².

1.1.2.2. Performance Path

For naturally ventilated normally occupied spaces, the ventilation rate meets 2.2 ACH under one annual prevailing wind direction with the highest wind frequency. The annual wind rose (wind probability table) at 400 – 600m of the site should be used.

Wind data, such as wind frequency, wind rose, wind profile should be adopted from the appropriate and reliable sources, such as simulated site wind data based on appropriate mathematical models, such as RAMS from PlanD [4] or experimental site wind data from wind tunnel test.

Ventilation performance should be demonstrated using wind tunnel tests, computational fluid dynamics or approaches that range from simple single zone models to elaborate multi-zone models [5].

The below requirements should be fulfilled in the CFD simulation:

i. Surrounding buildings and terrain shall be included in the model based on the GIS information from Lands Department, the Government of HKSAR;

ii. The surrounding area shall be at least, 2H (H being the building height (m) of the tallest building on the project site) or 200m away from the project site boundary, whichever is larger. The buildings within the surrounding area can be simplified to block;

iii. The terrain area shall be in a size of at least, 10H (H being the building height (m) of the tallest building on the project site) or 1000m × 1000m, whichever is larger, with the project placed in the centre; and

iv. Buoyancy and turbulence driven flows need not be considered.

Prepare a Natural Ventilation Report including the following contents:

a. Summary of naturally ventilated spaces highlighting compliance;

b. All assumptions made;

4 Site Wind Availability System [ONLINE]. Available at: https://www.pland.gov.hk/pland_en/info_serv/site_wind/site_wind/index.html. [Accessed February 2025].

5 American Society for Testing Materials. ASTM E 2267-03. Specifying and Evaluating Performances of Single Family Attached and Detached Dwellings – Indoor Air Quality 2003.

c. Methodology; and

d. Results.

The Natural Ventilation Report should be endorsed by a locally qualified professional who has at least 3 years of relevant experience in natural ventilation design and CFD modelling. The Locally Qualified Professional shall attain at least one of the following local professional qualifications:

- Member of The Hong Kong Institution of Engineers (MHKIE);
- Member of Hong Kong Institute of Qualified Environmental Professionals Limited (MHKIQEP);
- Registered Energy Assessor (REA), under the Buildings Energy Efficiency Ordinance (Cap. 610); and
- Registered Professional Engineer (R.P.E.), under the Engineers Registration Ordinance (Cap. 409).

The accepted disciplines of the above local professional qualifications include Building Services, Mechanical, Electrical, Energy and Environmental.

CV of the Locally Qualified Professional shall be provided to demonstrate that the Locally Qualified Professional holds the required local professional qualification(s) and with the relevant experience.

1.2. Fresh Air Provision in Not Normally Occupied Spaces

The assessment for the Not Normally Occupied Spaces should only include lobbies and corridors. Other not normally occupied spaces such as toilets, staircases, pantries etc. can be excluded.

Demonstrate compliance with the below criteria.

1.2.1. Mechanically Ventilated Spaces

Provide a fresh air calculation report with the provision of fresh air equipment demonstrating compliance with the minimum ventilation rates stipulated in ASHRAE Standard 62.1-2016 in all mechanically ventilated not normally occupied spaces.

1.2.2. Naturally Ventilated Spaces

Demonstrate the ventilation rates in all naturally ventilated not normally occupied spaces meets 1.7 ACH. Methodology should follow the performance path as specified under Section 1.1.2.2. above.

1.3. On-site Measurements

Additional BONUS credit will be granted only if the credit in Part (a) (1.1) Fresh Air Provision in Normally Occupied Spaces has been achieved.

Prepare a measurement methodology which includes the proposed measurement locations and methodology. In order to ensure a comprehensive coverage of measurement, if there is more than one building within the development, the sampling points should be distributed across each building. The measurement methodology and on-site measurement report should be endorsed by contractor's representative.

1.3.1. Mechanically Ventilated Normally Occupied Spaces

Demonstrate, by measurement, the required amount of outdoor air corresponding to the design outdoor air flow rate is provided. Accepted measurement methods include the following:

i. ASHRAE Standard 111 [6]; **OR**

ii. Tracer gas techniques in accordance with ASTM E741 [7]

At least one sampling point should be present in each mechanically ventilated normally occupied space type.

If the measurement results demonstrate unmet requirement in Part (a) Section 1.1.1 (i.e. measurement results showing ventilation rate of any mechanically ventilated normally occupied space not exceeding 30% of the minimum ventilation rate), the credit in both Part (a) (1.1) and Part (a) (1.3) will not be awarded.

1.3.2. Naturally Ventilated Normally Occupied Spaces

Demonstrate, by measurement, the required amount of design ACH is provided. Tracer gas decay test in accordance with ASTM E 741 or equivalent is an accepted measurement method.

At least one sampling point should be present in each naturally ventilated normally occupied space type. For each naturally ventilated normally occupied space usage, the sampling locations should cover all orientations and high, middle and low-level zones of the buildings.

If the measurement results demonstrate unmet requirement in Part (a) Section 1.1.2 (i.e. measurement results showing ventilation rate of any naturally ventilated normally occupied space not exceeding 30% of the minimum ventilation rate), the credit in both Part (a) (1.1) and Part (a) (1.3) will not be awarded.

(b) Exhaust Air

The coverage applies to spaces that consistently produce pollutants. Examples of such areas include toilets, car parks, and refuse rooms, where indoor pollutants may accumulate. There have been concerns regarding the applicability to all plant rooms, which are primarily designed to house HVAC equipment, electrical distribution panels, water pumps and other machinery necessary to maintain the building's functionality.

Most of these rooms are equipped with exhaust air systems, which not only contribute to the smooth operation of the equipment but also play a pivotal role in promoting the safety, health, and well-being of personnel occupying the building.

For instance, ventilation in boiler rooms ensures the supply of fresh air for combustion and prevents overheating, while exhaust systems in battery rooms may be designed to disperse potential gaseous mixtures to non-hazardous levels.

A pollutant refers to any substance introduced into the environment, either intentionally or unintentionally, that has harmful or toxic effects on living organisms or the natural environment.

6 American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) – ANSI/ASHRAE Standard 111-2008 Measurement, Testing, Adjusting and Balancing of Building HVAC Systems

7 ASTM International – ASTM E471-11 Standard Test Method for Determining Air Change in a Single Zone by Means of a Tracer Gas Dilution

It is worth emphasizing that the primary objective of the credit is to address the effective elimination of indoor pollutants. Consequently, plant rooms that do not generate pollutants during normal operating conditions are exempt from the assessment process. For instance, plant rooms housing ELV equipment, lift machines, water pumps, or server appliances fall into this exemption category.

Although ventilation systems are typically incorporated into electrical plant rooms such as transformer rooms, switch-rooms, and UPS rooms, their primary function revolves around preventing heat buildup rather than removing pollutants. Hence, these rooms are excluded from the assessment.

Plant rooms housing HVAC equipment are provided with ventilation systems to ensure acceptable ambient temperature, safety and comfort of personnel. The exhaust systems also serve as a means of dispersion in the event of a major leak. However, since no pollutants are produced during normal operation, these rooms are likewise exempt from the assessment.

It is important to note that only those plant rooms that consistently generate pollutants will be included in the assessment. Examples include battery rooms, plant rooms with grease interceptor/ grease traps and plant rooms where activities like chemical mixing, filtration, and sewage treatment etc. are carried out on an ongoing basis, leading to the continuous release of pollutants into the environment.

Provide design criteria that have been adopted and the details of the ventilation system designs providing local exhaust where concentrated pollutant sources are likely to be present. ASHRAE Standard 62.1-2016, CIBSE Guide A 2021 [8], CIBSE Guide B 2005/ 2016 [9], PNAP ADM-2, PNAP APP-98 and PNAP APP-130 are accepted references for this credit. The ventilation requirements from statutory regulations, e.g. Cap. 123H, are not regarded as the accepted reference to demonstrate compliance with this credit. Justification is needed for other references.

Alternatively, project-specific ventilation design criteria outlined in the design documents and/ or contract specifications may be used if the ventilation criteria cannot be referenced from the aforementioned standards.

Submit an exhaust air calculation report with the provision of exhaust air equipment demonstrating compliance with the ventilation design criteria and equipment specifications.

Submittals

(a) Fresh Air Provision

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_04a_00	BEAM Plus NB submission template for HWB 4a	✓	✓	✓
HWB_04a_01	/	/	/	/
HWB_04a_02	/	/	/	/
HWB_04a_03	/	/	/	/

8 Chartered Institute of Building Services Engineers (CIBSE) – CIBSE Guide A Environmental Design 2021

9 Chartered Institute of Building Services Engineers (CIBSE) – CIBSE Guide B Heating, Ventilating, Air Conditioning and Refrigeration 2005/ 2016

HWB_04a_04	/	/	/	/
For Mechanically Ventilated Normally Occupied and Not Normally Occupied Spaces (applicable to Sections 1.1.1. and Section 1.2.1.), please include the following:		**PA**	**CA**	**FA/ RFA**
HWB_04a_05	Fresh Air Calculation Report with the provision of fresh air equipment demonstrating compliance with the ventilation rate stipulated in ASHRAE Standard 62.1-2016 as per requirements in the assessment [HWB_P1&04a_Appendix A]	✓	✓	✓
HWB_04a_08	MVAC fresh air equipment schedule and MVAC air-side schematics [and] Technical Data (e.g. catalogues) showing the offered fresh air flow rate of the fresh air equipment	✓ -	✓ ✓	✓ ✓
HWB_04a_09	MVAC layout plan	-	✓	✓
For Naturally Ventilated Normally Occupied and Not Normally Occupied Spaces by Performance Path (applicable to Section 1.1.2.2. and Section 1.2.2.), please include the following:		**PA**	**CA**	**FA/ RFA**
HWB_04a_06	Endorsed Natural Ventilation Report	✓	✓	✓
HWB_04a_07	CV of the professional as per requirements in the assessment	✓	✓	✓
For Naturally Ventilated Normally Occupied Spaces by Prescriptive Path (applicable to Section 1.1.2.1.), please include the following:		**PA**	**CA**	**FA/ RFA**
HWB_04a_10	Floor Plan highlighting locations of primary openings, secondary openings (for spaces with cross ventilation) and/ or openings between rooms (for spaces in non-residential buildings without direct openings to the outdoors and are ventilated through adjoining rooms) that provided in all naturally ventilated normally occupied rooms	✓	✓	✓
HWB_04a_11	Window and Opening Schedules showing the areas of the primary openings, secondary openings (for spaces with cross ventilation) and/ or openings between rooms (for spaces in non-residential buildings without direct openings to the outdoors and are ventilated through adjoining rooms) that provided in all naturally ventilated normally occupied rooms	✓	✓	✓

HWB_04a_12	Calculation of the ratio of the total area of the openings provided in each space to the floor area of the space [HWB_P1&04a_Appendix C]	✓	✓	✓
For On-Site Measurements (applicable to Section 1.3), please include the following:		**PA**	**CA**	**FA/ RFA**
HWB_04a_13	Contract specifications on provision of on-site measurement, measurement methodology and report	✓		-
HWB_04a_14	Endorsed Measurement Methodology	-		✓
HWB_04a_15	Endorsed Measurement Report	-		✓

(b) Exhaust Air

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_04b_00	BEAM Plus NB submission template for HWB 4b	✓	✓	✓
HWB_04b_01	/	/	/	/
HWB_04b_02	/	/	/	/
HWB_04b_03	/	/	/	/
HWB_04b_04	Exhaust Air Calculation Report with the provision of exhaust air equipment demonstrating compliance with the ventilation design criteria [HWB_04b_Appendix A]	✓	✓	✓
HWB_04b_05	MVAC exhaust air fan schedule and MVAC air-side schematics [and] Technical Data (e.g. catalogues) showing the offered exhaust air flow rate of the exhaust air equipment	✓ -	✓ ✓	✓ ✓
HWB_04b_06	MVAC layout plan	-	✓	✓

Remarks

(a) Additional Information

World Health Organization – Health and sustainable development – Natural Ventilation. [ONLINE]. Available at: https://www.who.int/teams/environment-climate-change-and-health/healthy-urban-environments/housing/strategies. [Accessed February 2025].

Whole Building Design Guide, National Institute of Building Sciences. Natural Ventilation. [ONLINE]. Available at: https://www.wbdg.org/resources/natural-ventilation. [Accessed February 2025].

(b) Related Credit

EU 2 Reduction CO_2 Emissions

Although enhanced ventilation rate may increase building energy consumption, the Applicant is encouraged to adopt additional energy saving strategies, for instance demand control ventilation to overcome the compromise between indoor environmental quality and energy consumption.

HWB 5 Waste Odour Control

While HWB 4 governs the exhaust rate of enclose waste and recycling facilities, HWB 5 stipulates requirements to reduce risk of odour nuisance.

HWB 8 Indoor Air Quality

Indoor air quality can be improved via dilution resulted by maintaining suitable ventilation rate.

7 Health and Wellbeing **7.3 Indoor Environmental Quality**

HWB 5 Waste Odour Control

Extent of Application All buildings with RCP(s), RS&MRC(s) and/or RS&MRR(s)

Objective To reduce nuisance caused by odour leaving enclosed waste disposal and recycling spaces.

Credits Attainable 1

Credit Requirement 1 credit for installing odour sensor at all discharge points from enclosed waste disposal and recycling spaces.

Assessment

1. Install an odour sensor at each discharge point from all enclosed waste disposal and recycling spaces including refuse collection points (RCP), refuse storage and material recovery chambers (RS&MRC) and refuse storage and material recovery rooms (RS&MRR).

   The sensors should have the capability to alert the operation station or the security station and identify the room when 5 odour units (or equivalent concentration level in ppm or mg/m^3) based on an averaging time of 20 seconds [1] is detected.

OR

2. Propose an alerting strategy (e.g. a sensing system) that could identify the room smell condition while on an averaging time of 20 seconds [1] is detected.

   The proposal should be endorsed by a Hong Kong professional institution qualified holder in mechanical or building services discipline.

   The proposal should identify minimum the below:

   2.1. Sensing system design

   2.2. Design supporting (e.g. International references, technologies)

   2.3. Layout and Schematic Drawings to outline the design, if applicable including MVAC drawing layout, MVAC schematic and control diagram

Remark: The Applicant is required to provide justification for the odourous compound(s) to be considered for odour monitoring/ identification of smell condition in the proposal.

1 Environmental Protection Department – Technical Memorandum on Environmental Impact Assessment Process. Environmental Impact Assessment Ordinance. [ONLINE]. Available at: http://www.epd.gov.hk/eia/english/legis/memorandum/annex4.html. [Accessed February 2025].

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_05_00	BEAM Plus NB submission template for HWB 5	✓	✓	✓
HWB_05_01	Drawings showing the locations of refuse rooms (RCP, RS&MRC and RS&MRR)	✓	✓	✓
HWB_05_02	MVAC drawings highlighting the odour sensor (for compliance by odour sensor provision only)	✓	✓	✓
HWB_05_03	Control Diagram for the sensors alert system (for compliance by odour sensor provision only)	✓	✓	✓
HWB_05_04	Endorsed design proposal (for compliance by alerting strategy proposal only)	✓	✓	✓
HWB_05_05	CV of the professional as described in credit requirement (for compliance by alerting strategy proposal only)	✓	✓	✓
HWB_05_06	Technical specifications for the odour sensor/ proposed equipment [or] Technical Data (e.g. catalogues) of odour sensor/ proposed equipment	✓ -	- ✓	- ✓
HWB_05_07	Extract of relevant page(s) from the GBP showing the project has no RCP, RS&MRC and RS&MRR (Substantiation for non-applicability only)	✓	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credit

MW P1 Minimum Waste Handling Facilities

While MW P1 safeguards a prerequisite requirement for the size of RS&MRC, HWB 5 stipulates requirements to reduce risk of odour nuisance.

7 Health and Wellbeing **7.3 Indoor Environmental Quality**

HWB 6 Acoustics and Noise

Extent of Application

All buildings with the spaces specified in the assessment criteria, with spaces where speech intelligibility is important, and without rooms of a special acoustical nature for parts (a) (1), (b) (1) and (c)

All buildings with non-landlord/ tenanted spaces of the type(s) of premises specified in the assessment criteria, with spaces where speech intelligibility is important, and without rooms of a special acoustical nature for parts (a) (2)

Residential buildings for part (b) (2)

Objective

Ensure the building normally occupied spaces are in comfortable acoustic environment.

Credits Attainable

4 + 1 BONUS

Credit Requirement

(a) Room Acoustics

(1) 1 credit for demonstrating that mid-frequency reverberation time in applicable spaces of landlord's-controlled area meets the prescribed criteria of different types of premises.

(2) 1 credit for demonstrating that mid-frequency reverberation time in applicable rooms of non-landlord/ tenanted spaces meets the prescribed criteria of different types of premises.

(b) Noise Isolation

(1) 1 credit for demonstrating airborne noise isolation between spaces fulfills the prescribed criteria.

(2) 1 BONUS credit for demonstrating impact noise isolation between floors fulfills the prescribed criteria.

(c) Background Noise

1 credit for demonstrating background noise levels within the prescribed criteria (including traffic noise and building services equipment that are within the project boundary).

Assessment

(a) Room Acoustics

1. Demonstrate that mid-frequency reverberation time in applicable rooms of landlord's-controlled area meets the below criteria of different types of premises.

2. Demonstrate that mid-frequency reverberation time in applicable rooms of tenanted area meets the below criteria of different types of premises.

Criteria

The average reverberation time for mid frequencies (500Hz, 1kHz and 2kHz) and noise assessment criterion, should be:

i. Office type premises: 0.4 to 0.6s

ii. Classrooms and similar premises: 0.4 to 0.6s

iii. Residential premises, hotels and apartments: 0.4 to 0.6s

iv. Indoor games halls, indoor swimming pools: 1.5 to 2s

v. Common areas in shopping malls:

- Average reverberation time for mid frequencies between 1.0 to 1.5s, or
- Noise reduction coefficient (NRC) for ceiling ≥ 0.7

Based on the nature of the building, alternative appropriate criteria with sufficient justification and evidence provided by the Applicant will be allowed. Approval is required for the alternative proposal.

Apart from the listed spaces as above, the Applicant shall review if there are other types of premises where speech intelligibility is important in the development and include in the assessment as appropriate.

Compliance should be demonstrated by (1) computer simulation, (2) detailed calculations or (3) measurements depending on the Applicant's preference. The acoustic simulation, calculation or measurement report should be endorsed by:

- a Corporate Member of Hong Kong Institute of Acoustics; or
- a corporate/ certified/ full member of other international acoustic institution; or
- a member of HKIE (Building Services Mechanical or Environmental discipline) with relevant experience in Acoustic/ Vibration Design.

The assessment shall include at least one sample of each type of occupied space. Spaces without design (e.g. finishes, system) should provide endorsed acoustic calculation to support the potential achievement in both PA and FA submission.

The reverberation time shall be assessed using Sabine's formula [1] or similar alternative taking into account the room details and appropriate assumptions about the materials in the space. Measurements during commissioning shall use the method given in ISO 3382 [2] or equivalent. Measuring equipment shall conform to the accuracy requirements given in IEC 61672-1 [3] Class 1 requirements, or equivalent.

For buildings without the abovementioned spaces and with no spaces where speech intelligibility is important, or with rooms of a special acoustical nature which can be excluded for the credit, submit a schedule of spaces present in the building and relevant justifications for this credit to become not applicable.

(b) Noise Isolation

1. Demonstrate that airborne noise isolation between spaces fulfills the prescribed criteria.

Criteria

Compliance should be demonstrated by (1) computer simulation, (2) detailed calculations, or (3) measurements depending on the Applicant's preference. The performance of the weighted Sound Reduction Index (SRI) or Level Difference should fulfill the requirements as stated in the below table. The computer simulation report, acoustic calculations or the measurement report should be

1 I.Sharland. Woods practical guide to noise control. Colchester, England

2 International Standard Organization – ISO 3382:2009 - Acoustics -- Measurement of room acoustic parameters.

3 International Electrotechnical Commission. IEC 61672-1:2013 Electroacoustic – Sound Level meters

endorsed by:

- a Corporate Member of Hong Kong Institute of Acoustics; or
- a corporate/ certified/ full member of other international acoustic institution; or
- a member of HKIE (Building Services, Mechanical or Environmental Discipline) with relevant experience in Acoustic/ Vibration Design.

For measurement, measuring equipment shall conform to the accuracy requirements given in IEC 61672-1 [4] Class 1 requirements, or equivalent.

Type of Premises	**Weighted SRI**	**Level Difference**
Between offices/ conference rooms/ retail shops	**R_w 44**	**$D_{nT,w}$ 38**
Between hotel rooms/ serviced apartments/ function rooms/ activity rooms	**R_w 52**	**$D_{nT,w}$ 46**
Between classrooms	**R_w 37**	**$D_{nT,w}$ 31**
Between bedrooms to living rooms (same unit)	**R_w 46**	**$D_{nT,w}$ 40**
Between bedroom to bedroom/ living room to living room (different units)	**R_w 52**	**$D_{nT,w}$ 46**
Between bedroom to bedroom (same unit)	**R_w 44**	**$D_{nT,w}$ 38**

Based on the nature of the building, alternative appropriate criteria with sufficient justification and evidence provided by the Applicant will be allowed.

Apart from the listed spaces as above, the Applicant shall review if there are other types of premises where speech intelligibility is important in the development and include in the assessment as appropriate.

The criteria apply to partition walls which are actually provided and potentially provided by the landlord.

For buildings without the abovementioned spaces and with no spaces where speech intelligibility is important, or with rooms of a special acoustical nature which can be excluded for the credit, submit a schedule of spaces present in the building and relevant justifications for this credit to become not applicable.

2. Demonstrate that impact noise isolation between floors fulfills the below criteria.

   Demonstrate the following by laboratory test or measurements depending on the Applicant's preference.

4 International Electrotechnical Commission. IEC 61672-1:2013 Electroacoustic – Sound Level meters

Type of Premises	Weighted Normalised Impact Sound Pressure Level (by laboratory)	Weighted Normalised Impact Sound Pressure Level (On-site measurement)
Floors separating normally occupied space	**$L_{n,w}$ 64**	**$L'_{n,w}$ 70**

For Part (1) and/ or (2), submit a schedule of the spaces in the building, the noise isolation criteria adopted, relevant partition or slab details as they impact on noise isolation, the rooms/ premises subject to laboratory/ field tests or for which detailed calculations or simulations have been made, underlying assumptions, and the results of tests of calculations or simulations demonstrating compliance with the criteria.

Laboratory Testing

Samples shall be chosen for at least one sample of each type of normally occupied space. The laboratory testing shall follow the methods give in ISO [5, 6, 7] or equivalent.

The laboratory testing report should be endorsed by:

- a Corporate Member of Hong Kong Institute of Acoustics; or
- a corporate/ certified/ full member of other international acoustic institution; or
- a member of HKIE (Building Services, Mechanical or Environmental discipline) with relevant experience in Acoustic/ Vibration Design.

On-site Measurement

The measurements shall be undertaken in at least one sample of each type of normally occupied space, and shall include the worst case circumstances likely to occur. Procedures for on-site measurement shall follow the methods given in ISO [8], ASTM [9] or equivalent.

The measurement report should be endorsed by:

- a Corporate Member of Hong Kong Institute of Acoustics; or
- a corporate/ certified/ full member of other international acoustic institution; or
- a member of HKIE (Building Services, Mechanical or Environmental discipline) with relevant experience in Acoustic/ Vibration Design.

5 International Standard Organization. ISO 10140-1, Acoustics — Laboratory measurement of sound insulation of building elements — Part 1: Application rules for specific products.

6 International Standard Organization. ISO 10140-3, Acoustics — Laboratory measurement of sound insulation of building elements — Part 3: Measurement of impact sound insulation.

7 International Standard Organization. ISO 10140-5, Acoustics — Laboratory measurement of sound insulation of building elements — Part 5: Requirements for test facilities and equipment.

8 International Standard Organization. ISO 140-7. Acoustics - Measurement of sound Insulation in buildings and of building elements. Part 7: Field measurements of impact sound insulation of floors.

9 ASTM International. Designation: E 1007 – 97. Standard test method for field measurement of tapping machine impact sound transmission through floor-ceiling assemblies and associated support structures.

(c) Background Noise

Demonstrate that the background noise levels from both external sources and building services equipment of project building are within the below criteria.

Criteria

Internal noise level (NR and NC value should be consistently used in the project):

i. Office type premises: NR/NC 40

ii. Classrooms and similar premises: NR/NC 35

iii. Residential premises, hotel and apartments: NR/NC 35

iv. Common areas in shopping malls: NR/NC 45

v. Indoor games halls & Indoor swimming pools: NR/NC 50

Based on the nature of the building, alternative appropriate criteria with sufficient justification and evidence provided by the Applicant will be allowed.

Apart from the listed spaces as above, the Applicant shall review if there are other types of premises where speech intelligibility is important in the development and include in the assessment as appropriate.

Compliance should be demonstrated by (1) computer simulation, (2) detailed calculations or (3) measurements depending on the Applicant's preference. The acoustic simulation, calculation or measurement report should be endorsed by:

- a Corporate Member of Hong Kong Institute of Acoustics; or
- a corporate/ certified/ full member of other international acoustic institution; or
- a member of HKIE (Building Services, Mechanical or Environmental discipline) with relevant experience in Acoustic/ Vibration Design.

Internal noise computer simulation, calculations or site measurements should include at least one sample of each type of occupied space, taking account into the worst case condition of exposure to noise sources external to the space, and undertaken during periods appropriate to the usage pattern for the space. Measuring equipment shall conform to the accuracy requirements given in IEC 61672-1 [10] Class 1 requirements, or equivalent.

The assessment should take into account noise from building services equipment under normal operation mode. For residential units, the assessment should only account traffic noise and chiller/ water plant equipment (window type and outdoor unit of split type AC system/ VRF system are not considered). In any case, assessment of background noise should be restricted to traffic noise and building services equipment installed by the Applicant. Equipment to be provided by the future tenant need not be taken into consideration in the assessment.

For buildings without the abovementioned spaces and with no spaces where speech intelligibility is important, or with rooms of a special acoustical nature which can be excluded for the credit, submit a schedule of spaces present in the building and relevant justifications for this credit to become not applicable.

10 International Electrotechnical Commission. IEC 61672-1:2013 Electroacoustic – Sound level meters.

Submittals

(a) Room Acoustics

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_06a_00	BEAM Plus NB submission template for HWB 6a	✓	✓	✓
HWB_06a_01	Schedule of spaces cross-referencing to the GBP showing the types of premises present in the building and demarcation of landlord-controlled areas and tenanted areas (if any)	✓	✓	✓
HWB_06a_02	Endorsed reverberation time computer simulation/ calculation report at representative locations with supporting documents of the absorption coefficients for landlord-controlled spaces (Applicable to computer simulation/ calculation route only)	✓	✓	✓
HWB_06a_03	Endorsed report on reverberation time measurement at representative locations of landlord-controlled spaces (Applicable to measurement route only)	-	✓	✓
HWB_06a_04	Endorsed reverberation time computer simulation/ calculation report at representative locations with supporting documents of the absorption coefficients for non-landlord/ tenanted spaces (Applicable to computer simulation/ calculation route only)	✓	✓	✓
HWB_06a_05	Endorsed report on reverberation time measurement at representative locations of non-landlord/ tenanted spaces (Applicable to measurement route only)	-	✓	✓
HWB_06a_06	CV of the professional as per requirements in the assessment	✓	✓	✓

(b) Noise Isolation

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below*.		**PA**	**CA**	**FA/ RFA**
HWB_06b_00	BEAM Plus NB submission template for HWB 6b	✓	✓	✓
HWB_06b_01	Schedule of spaces cross-referencing to the GBP showing the types of premises present in the building	✓	✓	✓
HWB_06b_02	Layout plan or sectional drawings showing the location of partition walls (Applicable to part (1) only)	✓	✓	✓
HWB_06b_03	Construction details of the partition walls (Applicable to part (1) calculation and simulation route only)	✓	✓	✓
HWB_06b_04	Endorsed airborne noise isolation computer simulation/ calculation report (Applicable to part (1) calculation/ simulation route only)	✓	✓	✓
HWB_06b_05	Endorsed airborne noise isolation measurement report (Applicable to measurement route for part (1) only)	-	✓	✓
HWB_06b_06	Layout plan or sectional drawings showing the location of slabs (Applicable to part (2) only)	✓	✓	✓
HWB_06b_07	Construction details of slabs (Applicable to part (2) laboratory test route only)	✓	✓	✓
HWB_06b_08	Endorsed impact noise isolation laboratory testing report (Applicable to part (2) laboratory test route only)	✓	✓	✓
HWB_06b_09	Endorsed impact noise isolation measurement report (Applicable to part (2) measurement route only)	-	✓	✓
HWB_06b_10	CV of the professional as per requirements in the assessment	✓	✓	✓

(c) Background Noise

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_06c_00	BEAM Plus NB submission template for HWB 6c	✓	✓	✓
HWB_06c_01	Schedule of spaces cross-referencing to the GBP showing the types of premises present in the building	✓	✓	✓
HWB_06c_02	Endorsed background noise computer simulation/ calculation report (Applicable to computer simulation/ calculation route only)	✓	✓	✓
HWB_06c_03	Endorsed background noise measurement report (Applicable to measurement route only)	-	✓	✓
HWB_06c_04	CV of the professional as per requirements in the assessment	✓	✓	✓

Remarks

(a) Additional Information

Acoustic windows or other attenuation may contribute to mitigate background noise problem.

Environmental Protection Department - Innovative Noise Mitigation Designs and Measures - Acoustic Window. [ONLINE]. Available at: https://www.epd.gov.hk/epd/Innovative/greeny/eng/index.html. [Accessed February 2025].

(b) Related Credit

None

7 Health and Wellbeing 7.3 Indoor Environmental Quality

HWB 7 Indoor Vibration

Extent of Application All buildings with normally occupied spaces

Objective Avoidance of excessive vibration from building services equipment and other external sources within site boundary.

Credits Attainable 1

Credit Requirement 1 credit for demonstrating vibration levels not exceeding the prescribed criteria.

Assessment Vibration generated from the building services equipment shall be in compliance with the criteria given in ISO 2631-2 [1], BS 6472-1:2008 [2], BS 6472-2:2008 [3], Department of Environment and Conservation of NSW - Assessing Vibration: a technical guideline [4] or equivalent standard.

Calculation/ Measurements should be carried out at representative normally occupied spaces. The selection of sampling points should follow the guidance given in ISO 2631-2, BS 6472-1:2008, BS 6472-2:2008, Department of Environment and Conservation of NSW - Assessing Vibration: a technical guideline or equivalent standard. Vibration from emergency generator is excluded from assessment.

The level of vibration in terms of root mean square acceleration shall be determined by calculation or on-site measurement. Root mean square acceleration requirement should be assessed with regards to the above standards or equivalent.

Vibration source identified in the report should be justified. External sources other than building services equipment that might impact a building space may include nearby railway, underground tunnel etc.

Calculation or measurement report should be endorsed by:

- a Corporate Member of Hong Kong Institute of Acoustics; or
- a corporate/ certified/ full member of other international acoustic institution; or
- a member of HKIE (Building Services, Mechanical or Environmental discipline) with relevant experience in Acoustic/ Vibration Design.

1 International Standard Organisation. ISO 2631-2. Evaluation of human exposure to whole-body vibration – Part 2: Continuous and shock-induced vibration in buildings (1 to 80Hz).

2 British Standard. BS 6472-1:2008. Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting.

3 British Standard. BS 6472-2:2008. Guide to evaluation of human exposure to vibration in buildings Part 2: Blast-induced vibration.

4 Department of Environment and Conservation of NSW, Assessing Vibration: a technical guideline or equivalent standard 2006. [ONLINE]. Available at: https://www.environment.nsw.gov.au/resources/noise/vibrationguide0643.pdf. [Accessed February 2025].

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_07_00	BEAM Plus NB submission template for HWB 7	✓	✓	✓
HWB_07_01	Summary of Indoor Vibration Assessment [Appendix A]	✓	✓	✓
HWB_07_02	Endorsed calculations on the isolation efficiency	✓	✓	✓
HWB_07_03	Layout drawings showing the location(s) of sensitive receiver(s) and vibration source(s)	✓	✓	✓
HWB_07_04	Endorsed calculation report on vibration level [or] Endorsed vibration measurement report	✓ -	✓ ✓	✓ ✓
HWB_07_05	CV of the professional endorsing the calculation/ measurement report	✓	✓	✓
HWB_07_06	Schedule of spaces cross-referencing to the GBP showing that the project has no normally occupied space (Substantiation for non-applicability only)	✓	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credit

None

7 Health and Wellbeing 7.3 Indoor Environmental Quality

HWB 8 Indoor Air Quality

Extent of Application

All buildings for part (a)

All buildings with enclosed and/ or semi-enclosed car park of areas more than 10% of Construction Floor Area for part (b).

Objective

Demonstrate that airborne contaminants do not give rise to unacceptable levels of air pollution in the building.

Credits Attainable

4 + 1 additional BONUS

Credit Requirement

(a) Indoor Air Quality in Occupied Spaces

Demonstrate compliance in one of the following paths:

Path 1

2 credits for demonstrating compliance with the prescribed limits for carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), carbon dioxide (CO_2), respirable suspended particulates (PM_{10}), total volatile organic compounds (TVOCs), formaldehyde (HCHO) and radon (Rn) in the sampled occupied spaces.

1 credit for demonstrating compliance with the prescribed limits for airborne bacteria and conduct the mould assessment in the sampled occupied spaces.

Path 2

This path is only eligible to the whole building (and all buildings, if there is more than one building within the development) which is applicable to join the IAQ Certification Scheme from the Environmental Protection Department (EPD) [1].

3 credits for submitting a valid IAQ Certification Scheme (Good Class) certificate issued by the Environmental Protection Department (EPD) covering the whole building.

1 additional BONUS if Excellent Class is achieved.

(b) Air Quality in Car Park

1 credit for demonstrating compliance with the pollutant concentration limits specified in ProPECC PN 2/96.

1 Environmental Protection Department – IAQ Certification Scheme [ONLINE]. Available at: https://www.iaq.gov.hk/en/iaq-certification-scheme/ [Accessed February 2025].

Assessment

(a) Indoor Air Quality in Occupied Spaces

Path 1

Prepare a measurement protocol prepared by a IAQ Certificate Issuing Body (CIB) [2] following guidance stated in Step 1 – Step 4 in A Guide on Indoor Air Quality Certification Scheme for Offices and Public Spaces [3].

Measurements should be taken in occupied spaces (including normally occupied spaces and not normally occupied spaces [4]) following the guidelines specified in A Guide on Indoor Air Quality Certification Scheme for Offices and Public Spaces [3] and the limits are specified below.

The minimum number of sampling points required shall be determined based on the guidelines provided in "A Guide on Indoor Air Quality Certification Scheme for Offices and Public Spaces" published by the Environmental Protection Department (EPD). The total floor area of normally occupied spaces and not normally occupied spaces (i.e. lobbies and corridors) should be considered in the calculation.

At least one sampling point should be located at each type of IAQ area as defined by the Applicant. In order to ensure a comprehensive coverage of indoor air quality measurement, the sampling points shall be included in high, middle and low-level zones of the buildings. If there is more than one building within the development, the sampling points should be distributed across each building.

For example, for a typical commercial development with 2 office towers, the Applicant shall determine the minimum number of sampling points required based on the total floor areas of normally occupied spaces and not normally occupied spaces (i.e. lobbies and corridors) for the entire development. The calculation shall be referenced from the guidelines provided in "A Guide on Indoor Air Quality Certification Scheme for Offices and Public Spaces" published by the Environmental Protection Department (EPD). Once the minimum number of sampling points is established, the Applicant shall distribute these sampling points across the high, middle and low-level zones of each office tower within the development.

Parameter	**8-hour average acceptance limit [2]**
Carbon dioxide (CO_2)	<1,800 mg/m^3 or <1,000 ppmv
Carbon monoxide (CO)	<7,000 µg/m^3 or <6.1 ppmv
Nitrogen dioxide (NO_2)	<150 µg/m^3 or <80 ppbv Plus [1 hour] <200 µg/m^3 or <106 ppbv
Ozone (O_3)	<120 µg/m^3 or <61 ppbv
Respirable suspended particulate (PM_{10})	<100 µg/m^3
Total volatile organic compounds (TVOC)	<600 µg/m^3 or <261 ppbv

2 Indoor Air Quality Information Centre, Certificate Issuing Body Accreditation. [ONLINE]. Available at: IAQ Certification Scheme – IAQ Service Providers – IAQ Information Centre [Accessed February 2025].

3 Indoor Air Quality Management Group, A Guide on Indoor Air Quality Certification Scheme for Offices and Public Spaces 2019. [ONLINE]. Available at: https://www.iaq.gov.hk/wp-content/uploads/2021/04/new-iaq-guide_eng.pdf. [Accessed February 2025].

4 In the context of measurement of IAQ parameters for HWB 8a, "not normally occupied spaces" only include lobbies and corridors. Other "not normally occupied spaces" such as toilets, staircases, pantries etc. can be excluded from the IAQ measurement.

Formaldehyde (HCHO)	<100 µg/m^3 or <81 ppbv Plus [30 mins] <100 µg/m^3 or <81 ppbv
Radon (Rn)	<167 Bq/m^3
Airborne bacteria	<1,000 cfu/m^3
Mould	Prescriptive Checklist

Provide a CIB endorsed IAQ test report which shall include:

- Layout plan showing the locations of the air quality measurement points;
- Description of the measuring equipment used;
- Date, time and duration of measurements;
- Measurement results;
- Calibration certificate of the measuring equipment; and
- Photos taken during measurements (at least one photo per sampling point).

Given the floor plan of the building has not been changed, the sampling points agreed during Provisional Assessment will remain the same for Final Assessment. Otherwise, if the floor plan has been undergone major change, the sampling points will be re-assessed during Final Assessment.

Path 2

Submit a valid certificate issued by the Environmental Protection Department (EPD) covering the whole building. The whole building should be fully furnished.

For **Path 1** or **Path 2**, for the Provisional Assessment, the Applicant shall submit layout plans clearly highlighting the locations of air quality measurement points, together with a narrative of justifications on the selection of measurement locations and a calculation on the minimum number of sampling points required.

(b) Air Quality in Car Park

This part is only applicable to buildings with enclosed and/or semi-enclosed car park of areas more than 10% of Construction Floor Area. Area of open car park, if present in the project, should not be accounted in this percentage.

1. For mechanically ventilated car park:

Estimate the peak pollutant loading, including carbon monoxide (CO) and nitrogen dioxide (NO_2), in the car park.

Consolidate a carpark ventilation report using the below equation to calculation the ventilation rate for both CO and NO_2. The higher ventilation rate should be adopted. Demonstrate the ACH can cater the peak pollutant loading and the CO and NO_2 concentration limits specified in ProPECC PN 2/96 [5].

5 Environmental Protection Department, ProPECC PN2/96 Control of Air Pollution in Car Parks. [ONLINE]. Available at: http://www.epd.gov.hk/epd/sites/default/files/epd/english/resources_pub/publications/files/pn96_2.pdf. [Accessed February 2025].

Carbon monoxide (CO)

$$Q_F = \frac{q°CO}{3600} D_{pc} \frac{1\times10^6}{CO_{lim}} (\text{idling})$$

$$Q_F = \frac{q°CO}{3600} D_{tc} \frac{1\times10^6}{CO_{lim}} D\ (\text{traveling})$$

Nitrogen dioxide (NO_2)

$$Q_F = \frac{q°NO_2}{3600} D_{pc} \frac{1\times10^6}{NO_{2\,lim}} (\text{idling})$$

$$Q_F = \frac{q°NO_2}{3600} D_{tc} \frac{1\times10^6}{NO_{2\,lim}} D\ (\text{traveling})$$

Q_F = required air quantity per second (m^3 /s)

q^oCO = basic value of CO emission per vehicle (assumed to be 120 g/hr,veh if no reference information)

q^oNO_2 = basic value of NO_2 emission per vehicle (assumed to be 24 g/hr,veh if no reference information)

CO_{lim} = maximum permissible CO concentration (µg/m^3 CO)

NO_{2lim} = maximum permissible NO_2 concentration (µg/m^3 NO_2)

The maximum permissible pollutant concentration is the difference between the outdoor air pollutant concentration and the maximum allowed concentration. The outdoor air pollutant concentration can be found on EPD's website [6]. Alternatively, the Applicant may refer to the project-specific outdoor air quality measurement report submitted in HWB P1 (i.e. the on-site outdoor air measurement results for CO and NO_2) for determining the "outdoor air pollutant concentration". If there are multiple sampling points taken for the HWB P1 measurement, the Applicant shall use the average values of all the measurement points to determine the outdoor air pollutant concentration.

D_{pc} = number of idling vehicles with engine running

D_{tc} = number of travelling vehicles per km = $\frac{M_{tc}}{v}$

where M_{tc} = hourly traffic volume of travelling vehicles, and v = mean driving speed of vehicles

Assume in the peak hour, the hourly traffic volume is the full capacity of the car park. Idling time per movement is 3 minutes. The mean driving speed is 5km/hr.

D = travelling distance (km), assumed to be the longest lane in the car park.

Demonstrate the car park satisfy the provisions requirement for CO monitoring and automatic control specified in ProPECC PN 2/96.

2. <u>For naturally ventilated car park</u>

Engage an IAQ CIB accredited by HKIAS for on-site measurements to demonstrate the levels of CO and NO_2 are in compliance with ProPECC PN2/96. The measurement after the car park started operation, supported by a project owner's acknowledgment letter.

6 Environmental Protection Department, Air Quality in Hong Kong 2016 Statistical Summary. [ONLINE]. Available at: https://www.aqhi.gov.hk/common/api_history/english/report/files/AQR2016e_final.pdf. [Accessed February 2025].

Provide a CIB endorsed IAQ test report which shall include:

- Layout plan showing the locations of the air quality measurement points;
- Description of the measuring equipment used;
- Date, time and duration of measurements;
- Measurement results;
- Calibration certificate of the measuring equipment;
- Photos taken during measurements (at least one photo per sampling point); and
- Project owner's acknowledgment letter to confirm the measurement after the car park started operation.

Submittals

(a) Indoor Air Quality in Occupied Spaces

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_08a_00	BEAM Plus NB submission template for HWB 8a with Summary of Indoor Air Quality Measurement [Form S-A] (for Path 1 only)	✓ -		✓ ✓
HWB_08a_01	CIB endorsed checklist for Mould Assessment (prescribed checklist in Annex 3 of A Guide on Indoor Air Quality Certification Scheme for Offices and Public Places 2019) (for Path 1 only)	-		✓
HWB_08a_02	Contract specifications requiring a CIB to provide an endorsed IAQ measurement methodology, IAQ measurement and test reports (with layout plans highlighting the locations of air quality measurement points, a narrative of justifications on the selection of measurement locations and a calculation on the minimum number of sampling points required) (for Path 1& 2); and CIB endorsed IAQ measurement methodology (for Path 1 & 2)	✓ -		- ✓
HWB_08a_03	CIB endorsed IAQ test reports (for Path 1 & 2)	-		✓

HWB_08a_04	Valid certificate issued by the Environmental Protection Department (EPD) covering the whole building (for Path 2 only)	-		✓

(b) Air Quality in Car Park

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_08b_00	BEAM Plus NB submission template for HWB 8b	✓		✓
HWB_08b_01	Layout Plan showing the area of enclosed and/or semi-enclosed car park	✓		✓
HWB_08b_02	Summary of Air Quality in Car Park [Appendix A]	✓		✓
HWB_08b_03	Estimation of the peak pollutant loading in car park (applicable to mechanically ventilated car park)	✓		✓
HWB_08b_04	Car park ventilation report with pollution calculation (applicable to mechanically ventilated car park)	✓		✓
HWB_08b_05	MVAC layout plans for car park highlighting location of CO sensors (applicable to mechanically ventilated car park)	✓		✓
HWB_08b_06	Schematic drawing showing the control logic of car park ventilation (applicable to mechanically ventilated car park)	✓		✓
HWB_08b_07	Contract specifications requiring a CIB to provide an endorsed air quality measurement methodology, air quality measurement & test report (applicable to naturally ventilated car park) [or] CIB endorsed on-site car park air quality measurement methodology (applicable to naturally ventilated car park)	✓ -		- ✓

HWB_08b_08	CIB endorsed test reports of air quality in car park (applicable to naturally ventilated car park)	-		✓

Remarks

(a) Additional Information

US Environmental Protection Agency - A Brief Guide to Mold, Moisture and Your Home. [ONLINE]. Available at: https://www.epa.gov/mold/brief-guide-mold-moisture-and-your-home. [Accessed February 2025].

(b) Related Credit

EU 2 Reduction of CO_2 Emissions

By delinking the control of temperature and humidity using standalone or integrated dehumidification system, energy reduction may be achieved by avoiding overcooling to reach the targeted humidity.

7 Health and Wellbeing **7.3 Indoor Environmental Quality**

HWB 9 Thermal Comfort

Extent of Application All buildings

Objective Ensure that buildings and systems are tested practicable and the specified thermal comfort conditions can be achieved under conditions of normal occupancy and expected heat gains.

Credits Attainable 2 + 1 additional BONUS

Credit Requirement

(a) Thermal Comfort Analysis

2 credits for conducting thermal comfort analysis and demonstrate that normally occupied spaces can fulfill the thermal comfort requirements.

(b) Thermal Comfort Measurement

1 additional BONUS credit for conducting on-site measurements to verify the thermal comfort performance.

Assessment

(a) Thermal Comfort Analysis

Submit a Thermal Comfort Report demonstrating compliance with the assessment criteria. The report should include:

1) Scaled drawing(s) depicting the building layout and studied areas;
2) Screen capture of project building, surrounding building and terrain of the 3D model; and
3) Simulation assumptions, results of simulations (indicating output file and/ or images) and calculations for thermal comfort.

The reports should be endorsed by a Locally Qualified Professional who has at least 3 years of relevant experience in thermal comfort analysis. The Locally Qualified Professional shall attain at least one of the following local professional qualifications:

- Member of The Hong Kong Institution of Engineers (MHKIE);
- Member of Hong Kong Institute of Qualified Environmental Professionals Limited (MHKIQEP);
- Registered Energy Assessor (REA), under the Buildings Energy Efficiency Ordinance (Cap. 610); and
- Registered Professional Engineer (R.P.E.), under the Engineers Registration Ordinance (Cap. 409).

The accepted disciplines of the above local professional qualifications include Building Services, Mechanical, Electrical, Energy and Environmental.

CV of the Locally Qualified Professional shall be provided to demonstrate that the Locally Qualified Professional holds the required local professional qualification(s) and with the relevant experience.

The thermal analysis shall be undertaken using dynamic thermal modelling software. The thermal analysis should cover all normally occupied spaces immediately below all main roofs and flat roofs.

Spaces without design (e.g. finishes, system) should provide endorsed calculation to support the potential achievement in both PA and FA submission.

In addition, for each type of ventilation means (natural ventilation, mechanical ventilation and air-conditioning, if present), indicate the highest level normally occupied spaces using the respective ventilation means. The thermal analysis should also cover these spaces.

1) The modelling shall include full annual simulation using standard Hong Kong weather data [1];

2) The modelling will include the effect of installed solar control features, e.g. glazing, internal blind, internal or external shading components, fabric and infiltration specifications, and site obstructions;

3) The modelling needs not include any internal gains; and

4) Assessment can be confined to the scenarios with the highest mean monthly temperature of the hottest month only with reference to the weather data used.

1. Naturally ventilated spaces

   The spaces with natural ventilation must be equipped with operable windows/ doors that can be readily opened and adjusted by the occupants. Maintenance window is not considered as operable windows. Mechanical ventilation/ cooling equipment for the space shall not be provided.

   Demonstrate that daily average indoor operative temperatures in normally occupied space meet the 80% acceptability limits for 80% of days in the hottest month. The determination of 80% acceptability limits should refer to ASHRAE 55-2013 [2].

   The analysis can be based on the following assumptions:

   1.1. Surrounding buildings and terrain shall be included in the model based on the GIS information from Lands Department, the Government of HKSAR [3];

   1.2. The surrounding area shall be at less, 2H (H being the building height (m) of the tallest building on the project site) or 200m away from the project site boundary, whichever is larger;

   1.3. The terrain area shall be in a size of at least, 10H (H being the building height (m) of the tallest building on the project site) or 1000m × 1000m, whichever is larger, with the project placed in the centre; and

   1.4. For practical reasons, the geometry can be simplified as a simple block.

2. Mechanically ventilated spaces

   Mechanical cooling equipment for the space shall not be provided, mechanical ventilation with unconditioned air may be utilised.

1 Standard Hong Kong weather data file from Energyplus. Weather Data by Region | EnergyPlus. [ONLINE]. Available at: https://energyplus.net/weather-region/asia_wmo_region_2. [Accessed February 2025].

2 American Society of Heating Refrigeration and Air Conditioning Engineers – ANSI/ASHRAE Standard 55-2013 Thermal Environmental Conditions for Human Occupancy.

3 Lands Department - Survey and Mapping Office. [ONLINE]. Available at: https://www.landsd.gov.hk/en/survey-mapping.html. [Accessed February 2025].

Demonstrate that daily average indoor operative temperatures in normally occupied space meet the 80% acceptability limits for 80% of days in the hottest month. The determination of 80% acceptability limits should refer to ASHRAE 55-2013.

3. Air-conditioned spaces

Demonstrate that the predicted Mean Vote (PMV) in normally occupied space is between –1 and +1. The calculation of PMV should refer to ASHRAE 55-2013.

(b) Thermal Comfort Measurement

BONUS credit in part (b) will be granted only if the credits in part (a) have been achieved.

Submit a Thermal Comfort Measurement Report demonstrating compliance with the assessment criteria.

The report should include:

1) Sampling locations;

2) Measurement methodology, on-site photos of measurement, valid calibration certificate(s) for the measuring equipment and measurement results;

3) Calculations for Predicted Mean Vote (PMV) (for air-conditioned spaces); and

4) Calculations for percentage of prescribed locations meeting thermal comfort condition.

Spaces without design (e.g. finishes, system) should provide endorsed calculation to support the potential achievement in both PA and FA submission.

1. Naturally ventilated spaces

10% of the number of naturally ventilated normally occupied spaces included in the thermal comfort analysis in part (a) should be sampled.

Record the main physical parameters including outdoor air temperature, indoor air temperature, indoor mean radiant temperature and indoor wind speed. The indoor mean radiant temperature can be assumed to be indoor air temperature. The measurement should take note on the following:

1.1. The measurement should not be taken on a rainy day;

1.2. The measurements should be represented as 8-hour average in the daytime;

1.3. The measurement of indoor temperature; and

1.4. The sensors used in the measurement survey shall have an accuracy that complies with ASHRAE 55-2013 [4], ISO 7726:1998 [5] or equivalent. The sensors shall have been properly calibrated and valid calibration certificates [e.g. accredited by Hong Kong Laboratory Accreditation Scheme (HOKLAS) or under its Mutual Recognition Arrangement Partners] should be provided.

4 American Society of Heating Refrigeration and Air Conditioning Engineers – ANSI/ASHRAE Standard 55-2013 Thermal Environmental Conditions for Human Occupancy.

5 International Standard Organization – ISO 7726:1998 Ergonomics of the thermal environment — Instruments for measuring physical quantities.

Demonstrate that the naturally ventilated normally occupied space meet the 80% acceptability limits on any one day during selected hottest month from reference weather data file. The results shall demonstrate compliance with the prescribed design criteria within the prescribed limits, for a minimum of 90% of the prescribed locations.

2. Mechanically ventilated spaces

10% of the number of mechanically ventilated normally occupied spaces included in the thermal comfort analysis in part (a) should be sampled.

Record the main physical parameters including outdoor air temperature, indoor air temperature, indoor mean radiant temperature and indoor wind speed. The indoor mean radiant temperature can be assumed to be indoor air temperature. The measurement should take note on the following:

2.1. The measurement should not be taken on a rainy day;

2.2. The measurements should be represented as 8-hour average in the daytime or surrogate measurement;

2.3. The measurement of indoor temperature; and

2.4. The sensors used in the measurement survey shall have an accuracy that complies with ASHRAE 55-2013, ISO 7726:1998 or equivalent. The sensors shall have been properly calibrated and valid calibration certificates [e.g. accredited by Hong Kong Laboratory Accreditation Scheme (HOKLAS) or under its Mutual Recognition Arrangement Partners] should be provided.

Demonstrate that the mechanically ventilated normally occupied space meet the 80% acceptability limits on any one day during selected hottest month from reference weather data file. The results shall demonstrate compliance with the prescribed design criteria within the prescribed limits, for a minimum of 90% of the prescribed locations.

3. Air-conditioned spaces

10% of the number of air-conditioned normally occupied spaces included in the thermal comfort analysis in part (a) should be sampled.

Record the main physical parameters including indoor air temperature, indoor mean radiant temperature, indoor relative humidity and indoor wind speed. The indoor mean radiant temperature can be assumed to be indoor air temperature. The measurement should take note on the following:

3.1. The measurement should not be taken on a rainy day;

3.2. The measurements should be represented as 8-hour average in the daytime or surrogate measurement;

3.3. The measurement of indoor temperature and indoor relative humidity; and

3.4. The sensors used in the measurement survey shall have an accuracy that complies with ASHRAE 55-2013, ISO 7726:1998 or equivalent. The sensors shall have been properly calibrated and valid calibration certificates [e.g. accredited by Hong Kong Laboratory Accreditation Scheme (HOKLAS) or under its Mutual Recognition Arrangement Partners] should be provided.

Demonstrate that the predicted Mean Vote (PMV) in normally occupied space is between –1 and +1. The results shall demonstrate compliance with the prescribed design criteria within the prescribed limits, for a minimum of 90% of the prescribed locations.

Submittals

(a) Thermal Comfort Analysis

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below*.		**PA**	**CA**	**FA/ RFA**
HWB_09a_00	BEAM Plus NB submission template for HWB 9a	✓	✓	✓
HWB_09a_01	Endorsed Thermal Comfort Analysis Report	✓	✓	✓
HWB_09a_02	CV of the professional as per requirements in the assessment	✓	✓	✓

(b) Thermal Comfort Measurement

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_09b_00	BEAM Plus NB submission template for HWB 9b	✓		✓
HWB_09b_01	Contract specifications requiring the provision of thermal comfort measurement and report	✓		-
HWB_09b_02	Thermal Comfort Measurement Report	-		✓

Remarks

(a) Additional Information

Indoor Air Quality Management Group – A Guide on Indoor Air Quality Certification Scheme for Offices and Public Spaces 2019. [ONLINE]. Available at: https://www.iaq.gov.hk/wp-content/uploads/2021/04/new-iaq-guide_eng.pdf. [Accessed February 2025].

(b) Related Credit

None

7 Health and Wellbeing 7.3 Indoor Environmental Quality

HWB 10 Artificial Lighting

Extent of Application All buildings

Objective Promote indoor lighting design which is comfortable for occupants' indoor activities.

Credits Attainable 2

Credit Requirement

(a) Artificial Lighting in Normally Occupied Spaces

1 credit for achieving the prescribed lighting performance in normally occupied spaces.

(b) Artificial Lighting in Not Normally Occupied Spaces and Unoccupied Spaces

1 credit for achieving the prescribed lighting performance in not normally occupied spaces and unoccupied spaces.

Assessment

(a) Artificial Lighting in Normally Occupied Spaces

This credit only assesses indoor normally occupied spaces with permanently installed lighting fixtures provided by the project owner. Spaces with fixtures, which are temporarily installed for Occupation Permit (OP) inspection purposes and out of the project owner's fit-out scope, are not assessed.

Considering that the design of indoor lighting arrangement for visual comfort inside residential units within private/ public housing developments and government quarters is usually subject to change based on the preferences of future occupants, all spaces inside those residential units should be excluded from the assessment.

For development with one-single family domestic building(s), in case the lighting fixtures are provided and permanently installed by the project owner not for Occupation Permit (OP) inspection purposes, the recreational/ non-habitation spaces inside the building(s), such as gym room, play room, reading room, etc., shall be included for the assessment.

Demonstrate the achievement of the prescribed lighting performance in normally occupied spaces regarding the lighting performance criteria adopted based on The SLL Code for Lighting 2012 Section 2.2 [1] or equivalent. If the task area is unknown by the time of design, assume the entire space, with 0.5m from walls, is the task area.

In consideration that the detailed design of the lighting systems will be taken in later stages of the construction program for building projects, at least one sample of each type/ each functional use of normally occupied spaces shall be included in the Provisional Assessment.

For the Final Assessment, ALL spaces shall be considered to ensure a thorough evaluation of the lighting performance of the permanently installed lighting systems provided by the project owner across the entire building.

1 Chartered Institution of Building Services Engineers (CIBSE) – The SLL Code for Lighting 2012

Demonstrate compliance with the assessment criteria including maintained illuminance, Unified Glare Rating limit and minimum illuminance uniformity either by measurements using a standardised measurement protocol appropriate to the parameter being assessed, or by computer modelling.

For computer modelling, the following typical surface reflectance can be adopted. If different values are adopted, supporting documents (cut sheets/ catalogues/ laboratory reports) showing the corresponding information are required for justification.

Table HWB 10-1 [2]

Surfaces	Reflectance of surfaces
Ceiling	0.8
Walls	0.5
Working planes	0.2
Floor	0.2

Submit an Artificial Lighting Performance Report, including the following content:

1. Technical details of the installed lighting systems;
2. Design criteria for each room type; and
3. Results of measurements or simulation.

(b) Artificial Lighting in Not Normally Occupied Spaces and Unoccupied Spaces

This credit only assesses indoor not normally occupied spaces and unoccupied spaces with permanently installed lighting fixtures provided by the project owner. Spaces with fixtures, which are temporarily installed for Occupation Permit (OP) inspection purposes and out of the project owner's fit-out scope, are not assessed.

Considering that the design of indoor lighting arrangement for visual comfort inside residential units within private/ public housing developments and government quarters is usually subject to change based on the preferences of future occupants, all spaces inside those residential units should be excluded from the assessment.

For development with one-single family domestic building(s), in case the lighting fixtures are provided and permanently installed by the project owner not for Occupation Permit (OP) inspection purposes, the recreational/ non-habitation spaces inside the building(s), shall be included for the assessment.

Demonstrate the achievement of the prescribed lighting performance in not normally occupied spaces and unoccupied spaces regarding the lighting performance criteria adopted based on The SLL Code for Lighting 2012 Section 2.2 or equivalent.

In consideration that the detailed design of the lighting systems will be taken in later stages of the construction program for building projects, at least one sample of each type/ each functional use of not normally occupied spaces and unoccupied spaces shall be included in the Provisional Assessment.

2 Chartered Institute of Building Services Engineers (CIBSE) – Lighting Guide LG 10: Daylighting - A Guide for Designers (2014)

For the Final Assessment, ALL spaces shall be considered to ensure a thorough evaluation of the lighting performance of the permanently installed lighting systems provided by the project owner across the entire building.

Demonstrate compliance with the assessment criteria including maintained illuminance, Unified Glare Rating limit and minimum illuminance uniformity either by measurements using a standardised measurement protocol appropriate to the parameter being assessed, or by computer modelling.

For computer modelling, the following typical surface reflectance can be adopted. If different values are adopted, supporting documents (cut sheets/ catalogues/ laboratory reports) showing the corresponding information are required for justification.

Table HWB 10-2 [2]

Surfaces	Reflectance of surfaces
Ceiling	0.8
Walls	0.5
Working planes	0.2
Floor	0.2

Submit an Artificial Lighting Performance Report, including the following content:

1. Technical details of the installed lighting systems;
2. Design criteria for each room type; and
3. Results of measurements or simulation

Submittals

(a) Artificial Lighting in Normally Occupied Spaces

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_10a_00	BEAM Plus NB submission template for HWB 10a	✓	✓	✓
HWB_10a_01	Summary of Artificial Lighting in Normally Occupied Spaces [Appendix A]	✓	✓	✓
HWB_10a_02	Lighting layout plan	-	✓	✓
HWB_10a_03	Supporting documents (cut sheets/ catalogues/ laboratory reports) showing the reflectance values (for computer modelling approach and if values other than those specified in Table HWB 10-1 have been adopted)	✓	✓	✓
HWB_10a_04	Light fitting schedule	✓	✓	✓

HWB_10a_05	Artificial Lighting Performance Report	✓	✓	✓

(b) Artificial Lighting in Not Normally Occupied Spaces and Unoccupied Spaces

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_10b_00	BEAM Plus NB submission template for HWB 10b	✓	✓	✓
HWB_10b_01	Summary of Artificial Lighting in Not Normally Occupied Spaces and Unoccupied Spaces [Appendix B]	✓	✓	✓
HWB_10b_02	Lighting layout plan	-	✓	✓
HWB_10b_03	Supporting documents (cut sheets/ catalogues/ laboratory reports) showing the reflectance values (for computer modelling approach and if values other than those specified in Table HWB 10-2 have been adopted)	✓	✓	✓
HWB_10b_04	Light fitting schedule	✓	✓	✓
HWB_10b_05	Artificial Lighting Performance Report	✓	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credit

None

7 Health and Wellbeing 7.3 Indoor Environmental Quality

HWB 11 Daylight

Extent of Application All buildings

Objective To achieve satisfactory daylight performance in indoor normally occupied spaces by considering the sufficiency of daylight illuminance and the potential risk of excessive sunlight penetration.

Credits Attainable 2 BONUS

Credit Requirement 2 BONUS credits for demonstrating at least 55% of the total area of the studied normally occupied spaces achieves spatial Daylight Autonomy$_{300/50\%}$ ($sDA_{300/50\%}$) and no more than 10% of the same area receives Annual Sunlight Exposure$_{1000,250}$ ($ASE_{1000,250}$).

Assessment

1. Conduct simulations to show that at least 55% of the total area of normally occupied spaces can receive at least 300 lux of sunlight for at least 50% of operating hours each year and no more than 10% of the same area can receive more than 1,000 lux for more than 250 hours each year.

2. Follow IES LM-83-12 Approved Method: IES Spatial Daylight Autonomy (sDA) and Annual Sunlight Exposure (ASE). Annual sky file referencing a local climate file, such as an EnergyPlus weather format data file (*.epw) [1], should be used for the sky model. Surrounding buildings and terrain included in the model should be based on the GIS information from Lands Department [2]. The following simplifications are allowed:

   2.1. The presence of trees can be ignored;

   2.2. The overall external reflectance of the building can be assumed to be 0.2;

   2.3. If furniture layout is not known by the time of design, it can be assumed that no furniture is in the space or a typical furniture layout can be applied;

   2.4. Internal doors within a unit are assumed to be fully opened; and

   2.5. The surface reflectance of ceiling, walls and floor can be assumed to be 0.8, 0.5 and 0.2 respectively (based on Table HWB 10-1).

3. Submit a Daylight Analysis Report demonstrating compliance with the credit requirement. The report shall include:

   3.1. Name of simulation software used;

   3.2. Scaled drawing(s) depicting the building layout and locations of studied normally occupied space;

   3.3. Simulation assumptions, including sky model file, surface reflectance and glass transmittance, etc.;

   3.4. Screen captures of project building, surrounding building and terrain of the 3D model; and

1 Standard Hong Kong weather data file from Energyplus. Weather Data by Region | EnergyPlus. [ONLINE]. Available at: https://energyplus.net/weather-region/asia_wmo_region_2. [Accessed February 2025].

2 Lands Department - Survey and Mapping Office. [ONLINE]. Available at: https://www.landsd.gov.hk/en/survey-mapping.html. [Accessed February 2025].

3.5. Simulation results and output files/ render images.

The Daylight Analysis Report shall be endorsed by a Locally Qualified Professional who has at least 3 years of relevant experience in daylight study. The Locally Qualified Professional shall attain at least one of the following local professional qualifications:

- Member of The Hong Kong Institution of Engineers (MHKIE);
- Member of Hong Kong Institute of Qualified Environmental Professionals Limited (MHKIQEP);
- Registered Energy Assessor (REA), under the Buildings Energy Efficiency Ordinance (Cap. 610); and
- Registered Professional Engineer (R.P.E.), under the Engineers Registration Ordinance (Cap. 409).

The accepted disciplines of the above local professional qualifications include Building Services, Mechanical, Electrical, Energy and Environmental.

CV of the Locally Qualified Professional shall be provided to demonstrate that the Locally Qualified Professional holds the required local professional qualification(s) and with the relevant experience.

4. If the simulation software is not on the list in Annex 4 of PNAP APP-130, a software validation report from the software developer should be provided to ensure the accuracy of simulation by the software.

5. For buildings other than residential, office and education buildings,

5.1. Provide a comprehensive narrative explaining why daylight is beneficial in the context of sustainability for the specific building type that is submitted. The narrative should also include the positive impacts of daylight on energy efficiency, occupant well-being, energy conservation etc.; and

5.2. Ensure that the submission adheres to the assessment criteria specified in Assessment 1 - 4 for the specific building type applying for BONUS credits.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_11_00	BEAM Plus NB submission template for HWB 11	✓	✓	✓
HWB_11_01	Endorsed daylight analysis report	✓	✓	✓
HWB_11_02	CV of the professional as per requirements in the assessment	✓	✓	✓
HWB_11_03	Validation report of the simulation software*	✓	✓	✓
* It is required only if the simulation software is not on the list in Annex 4 of PNAP APP-130.				

Remarks

(a) Additional Information

Whole Building Design Guide, National Institute of Building Sciences – Daylighting. [ONLINE]. Available at: https://www.wbdg.org/resources/daylighting. [Accessed February 2025].

(b) Related Credit

EU 1 Low Carbon Passive Design

This credit considers health and wellbeing of occupants therefore stipulate requirements for drawing natural light but neither too dim nor too fierce. On the other hand, in EU 1 daylight is promoted as means to replace artificial lighting.

SS 4 Neighbourhood Daylight Access

This credit promotes building designs which allow the access to daylight of neighbouring sensitive buildings to be maintained at the prescribed levels.

7 Health and Wellbeing 7.3 Indoor Environmental Quality

HWB 12 Biological Contamination

Extent of Application All buildings

Objective To reduce the risk of biological contamination by adopting appropriate design precautions of the water supply systems, HVAC systems and other water features.

Credits Attainable 1

Credit Requirement 1 credit for complying with the recommendations given in the Code of Practice for Prevention of Legionnaires' Disease 2016/ 2021 Edition [1, 2] in respect of Water Supply Systems, HVAC Systems and other Water Features.

Assessment

1. Water Supply Systems

   Demonstrate compliance, if relevant items are present, with the following sections of the Code of Practice for Prevention of Legionnaires' Disease 2016/ 2021 Edition:

   1.1. Centralised Hot Water Supply Systems – Section 4.4.1.1

   1.2. Cold Water Supply Systems – Section 4.5.1

2. HVAC Systems

   Demonstrate compliance, if relevant items are present, with the following sections of the Code of Practice for Prevention of Legionnaires' Disease 2016/ 2021 Edition.

   2.1. Cooling Tower – Section 4.2.1;

   2.2. Air Handling Unit/ Fan Coil Unit [3] – Section 4.3.1 Items (a) – (d);

   2.3. Air Duct and Air Filters – Section 4.3.2 Items (a) – (c);

   2.4. Humidifiers – Section 4.3.3 Items (a) – (c); and

   2.5. Air Washers – Section 4.3.4 Items (a), (b) and (d).

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1 Prevention of Legionnaires' Disease Committee, Hong Kong – Code of Practice for Prevention of Legionnaires' Disease 2016 Edition [ONLINE]. Available at: http://www.emsd.gov.hk/filemanager/en/content_645/COP-PLD_2016.pdf. [Accessed February 2025].

2 Prevention of Legionnaires' Disease Committee, Hong Kong – Code of Practice for Prevention of Legionnaires' Disease 2021 Edition [ONLINE]. Available at: https://www.emsd.gov.hk/filemanager/en/content_645/COP-PLD_2021_en.pdf. [Accessed February 2025].

3 It is noticed from recent submissions that there are several misinterpretations regarding configuration of air break for the drain pipe of AHU/ PAU. For example, many Applicants falsely adopt a U trap to function as an air break. This type of condensate drain in many cases consists of a continuous pipework without any gaps connecting to condensate drainage stacks which however cannot prevent any siphoning or backflow of water.

In order to comply with the COP for Prevention of Legionnaires' Disease, it is essential that the condensate drain-pipe includes an "air break" which serves the purpose of curtailing the spread of Legionella bacteria. In this connection, the Applicant has to submit detailed drawing (e.g. installation details) clearly illustrating the design/ provision of such "air break". Applicants may refer to Figure 6 of the COP for Prevention of Legionnaires' Disease (2016/ 2021 Edition) which displays exemplary designs in this context.

3. Other Water Features

Demonstrate compliance, if relevant items are present, with the following sections of the Code of Practice for Prevention of Legionnaires' Disease 2016/ 2021 Edition:

3.1. Architectural Fountains – Section 4.6.1; and

3.2. Spa Pools (Whirlpools) – Section 4.7.2.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
HWB_12_00	BEAM Plus NB submission template for HWB 12	✓	✓	✓
HWB_12_01	/	/	/	/
HWB_12_02	Drawings (e.g. General Notes, schematic diagram, layout) of Water Supply Systems with highlights showing compliance and narratives for the non-applicability of sub-item(s)	✓	✓	✓
HWB_12_03	/	/	/	/
HWB_12_04	Drawings (e.g. General Notes, schematic diagram, layout) of HVAC Systems with highlights showing compliance and narratives for the non-applicability of sub-item(s)	✓	✓	✓
HWB_12_05	/	/	/	/
HWB_12_06	Drawings (e.g. General Notes, schematic diagram, layout) of Other Water Features with highlights showing compliance and narratives for the non-applicability of sub-item(s)	✓	✓	✓
HWB_12_07	Drawing of installation details with highlights showing compliance	✓	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credit

None

8 Innovations and Additions (IA)

8.1 Innovations and Additions

Introduction

BEAM encourages innovative and/ or new techniques that are yet to find in the mainstream application in Hong Kong addressing sustainability objectives for new buildings.

Background

Any credits gained under this heading shall be regarded as ‘BONUS’ credits, counting towards the total credits obtained, but not towards the total credits obtainable. BEAM encourages application of new practices, technologies and techniques together with the associated benefits in addressing sustainability objectives for new buildings.

8 Innovations and Additions

8.1 Innovations and Additions

IA 1 Innovations and Additions

Extent of Application

All buildings, for innovations that have not been addressed in the respective categories of the NB certification.

Objective

Encourage innovative and/ or new techniques/ practices/ design that are yet to find in the mainstream application in Hong Kong addressing sustainability objectives for new buildings.

Credits Attainable

Maximum 10 BONUS credits

Assessment

Present evidence of the application of new practices, technologies and/ or techniques that are (1) not described in this manual; or (2) not market mainstream implementation; or (3) multiple aspect achievement; and the associated benefits in addressing sustainability objectives for new buildings:

1. Identify the sustainability objectives addressed by the proposed innovative applications.
2. Detail the method and criteria evaluating the benefits and effectiveness of the applications (quantifiable performance indicators to be proposed if applicable).
3. Justify the number of BONUS credits for the proposed applications.
4. Provide evidence of the implementation of the applications.
5. Evaluate preliminary achievements and any suggestion for improvement for the applications.

The Assessor will refer the proposal to the BSL Technical Review Committee who will consider each application on its merits.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**CA**	**FA/ RFA**
IA_01_00	BEAM Plus NB submission template for IA 1	✓	✓	✓
IA_01_01	A report on the objectives, evaluating method and criteria, and proposed number of BONUS credits for the innovative techniques	✓	✓	✓
IA_01_02	A report on the evidence of implementation and evaluation of preliminary achievements/ proposed improvements for the innovative techniques	-	✓*	✓
IA_01_03	Relevant technical documents, if necessary (e.g. drawings, specifications, product catalogues, test reports, etc.)	✓	✓*	✓
* NO as-built drawings and record photos are required if the credit is attempted in CA. The Architect's Instruction (AI) with shop drawings, approved contractor's submission with technical information, etc. shall be provided in CA submission.				

Remarks

(a) Additional Information

None

(b) Related Credit

None

9 Appendices

9.1 Glossary

Air Ventilation Assessment

Air Ventilation Assessment, in accordance with ETWB Technical Circular No. 1/06, is a tool to assess the impacts of the proposal on the pedestrian wind environment.

Albedo

The proportion of incident radiation reflected by a system. A perfect reflector would have an albedo of 1, whereas a perfect absorber would have an albedo of 0.

Annual Building Energy

Annual building energy refers to the total annual building energy consumption estimated for baseline case or proposed case. Both setting could be referred to Appendix 9 of this manual.

Biophilic Design

Designing for people as a biological organism, respecting the mind-body systems as indicators of health and well-being in the context of what is locally appropriate and responsive.

Bioretention Facilities

Bioretention facilities filter rainwater that becomes polluted as it flows over hard surfaces like streets, parking lots, roofs, and driveways. The bioretention facility retains the water and filters various pollutants.

Brownfield

Brownfield refers to previously developed land, or land that contains or contained permanent structures and associated infrastructures.

Certificate Validity

Certificate Validity refers to the duration for which a BEAM Plus certificate and grading remain effective and officially recognised by the HKGBC.

Charrette

Charrette, a design workshop to quickly generate a design solution while integrating the aptitudes and interests of project team and core design disciplines, shall be held no later than design development phase and preferably during schematic design.

Commercial Building

Commercial Building means a building, or that part of the building, intended to be used for business, trade or entertainment, for example office, clubhouse and retail.

Computer Fluid Dynamics

Computational fluid dynamics (CFD) is a branch of fluid mechanics that uses numerical analysis and data structures to analyse and solve problems that involve fluid flows.

Construction Waste

It means any substance, matter or thing which is generated as a result of construction work and abandoned whether or not it has been processed or stockpiled before being abandoned. It is a mixture of surplus materials arising from site clearance, excavation, construction, refurbishment, renovation, demolition and road works.

Core Amenities

Basic services/ recreational facilities that are most vital and essential to the subject development.

Cultural Heritage

Declared monuments/ Grade 1 to Grade 3 historic buildings confirmed by the Antiquities Advisory Board (AAB) and other sites/ historic buildings proposed to be recorded/ graded by AAB.

Demolition Waste

It means all wastes (including recyclable waste) generated from deconstruction of existing buildings at the demolition stage are counted as demolition waste.

Designed for Disassembly

Materials which can be disassembled by using non-specialist tools and for reuse, recycling or reprocessing.

Educational Building

Educational Building means a building intended to be used to fulfill educational purposes, for example kindergarten, primary school, secondary school and universities.

Embodied Energy

Embodied energy is the energy used during the entire life cycle of a product, including its manufacture, transportation, and disposal, as well as the inherent energy captured within the product itself.

Environmental Management Plan (EMP)

An Environmental management plan is a plan to address the potential significant environmental aspects and impacts and to propose appropriate mitigation measures for construction works.

Environmental Monitoring and Auditing Plan (EM&A)

EM&A aims to provide systemic procedures for monitoring, auditing and minimizing environmental impacts associated with Project activities.

External Shading

External shading is a device incorporated in the building façade to limit the internal heat gain resulting from solar radiation.

Façade Zone

The projection of the curtain wall system from the outer face of the structural elements does not exceed 200 mm for a domestic building and 250 mm for a non-domestic building.

FSC Certification

A certification system for timber products which confirms that timber has been harvested in a sustainable manner.

Functional Program

A functional program describes the requirements which a building must satisfy in order to support and enhance human activities. The program also defines the character, services, scope, functions and space requirements.

Girth

Diameter of a tree trunk measured at 1.3 m above ground; or refers as Diameter at Breast Height (DBH).

Global Warming Potential

GWP provides a measure of the potential for damage that a chemical has relative to one unit of carbon dioxide, the primary greenhouse gas.

Global Warming Potential

Global Warming Potential, GWP, provides a measure of the potential for damage that a chemical has relative to one unit of carbon dioxide, the primary greenhouse gas.

Ground Granulated Blast Furnace Slag (GGBS)

GGBS is a by-product of the iron manufacturing industry that, after the molten iron is tapped off, the remaining molten slag (consisting of mainly siliceous and aluminous residue) is then water-quenched rapidly, dried and ground to the required size.

Height of Building

The height of a building refers to the delta mPD between street level and the highest top roof as recorded in statutory documents.

High Void

A high void is a space over 9m measured vertically by its clear height between building structure. Any structures inside a void and the clear vertical height between structures is over 9m, the space between structures is regarded as a high void. For multi-building development, the calculation of percentages of high voids to total building heights shall be considered for individual buildings separately.

Hotel Building

Hotel Building means a building intended to be used for habitation. The entire building is under single ownership, for example hotel, service apartment and dormitory.

Hydro-chlorofluorocarbons

HCFCs cause ozone depletion when released into the atmosphere.

Hydro-fluorocarbons

HFCs are commonly used to replace HCFC refrigerants to reduce the OPD, however HFCs refrigerants have a high GWP.

Interior General Lighting

Interior general Lighting, lighting that provides a substantially uniform level of illumination through an area. General lighting shall not include decorative lighting or lighting that provides a dissimilar level of illumination to serve a specialised application or feature within such area.

Intermediate Waste Recycling Facility

IWF means waste recycling facility located within 60m walking distance from an external entrance of a low-rise domestic house.

Intra-Urban Heat Index

The effects of intra-urban heating can be quantified by Intra-Urban Heat Index, which is defined as the temperature difference between urban and reference meteorological air temperature. Higher Intra-Urban Heat Index suggests a more severe intra-urban heating effect.

Local Velocity Ratio (LVR)

Corresponds to the average velocity ratio of **all perimeter test points and overall test points** in the assessment area.

Main Pedestrian Access Pathways

The widest pathway(s) of width not less than 2m for pedestrian circulation from building main entrance(s) to site entrance(s) or amenities within the Site.

Master Plan

The masterplan design that certified under BEAM Plus Neighbourhood certification, that has a validity of 5 years and is “scheme sensitive”.

Modular Component

Materials which are manufactured with standardised dimensions, and can be arranged or fitted together in various scenarios of design.

Multi-disciplinary Design Charrette

An intensive, multiparty workshop that brings people from different disciplines and backgrounds together to explore, generate, and collaboratively produce design options.

Non-renewable Resource

A resource does not renew itself at a sufficient rate for sustainable extraction in meaningful human time-frames.

Normally Occupied Spaces

Normally occupied spaces are enclosed areas where people normally stay more than 1 hour. Spaces which are not used daily, but will be occupied for more than one hour when used, are considered normally occupied spaces. Refer to Appendix 9.4 for examples of regularly occupied spaces.

Not Normally Occupied Spaces

Not normally occupied spaces are enclosed areas within the building where people normally stay less than 1 hour. Refer to Appendix 9.4 for examples of not normally occupied spaces.

Occupied Space (Habitable Space)

Enclosed space intended for human activities, excluding those spaces that are intended primarily for other purposes, such as storage rooms and equipment rooms, and that are only occupied occasionally and for short periods of time. Occupied spaces are further classified as regularly occupied or non-regularly occupied spaces based on the duration of the occupancy, individual or multi-occupant based on the quantity of occupants, and densely or non-densely occupied spaces based on the concentration of occupants in the space.

Open Planned Design

Open plan is the design for any floor plan which makes use of large, open spaces and minimises the use of small, enclosed rooms such as private offices.

Orientation

Orientation is the compass direction the façade faces.

Other Building Types

Other Building Types include, but not limited to, government building, industrial building, data centre, pump house, hospital, library, museum and law court.

Ozone Depleting Potential

ODP of a chemical compound is the relative amount of degradation to the ozone layer it can cause.

Permeability Coefficient

A measure of a material's capacity to transmit water. It is defined as a constant of proportionality relating the specific discharge of a porous medium under a unit hydraulic gradient. Hydraulic conductivity is another term for coefficient of permeability.

Primary Zone

The 15m vertical zone of a site along the abutting street level. The greenery in this zone is for providing visual contacts or access from a street through common parts of the building for enhancing the walkability of urban space to the public, visitors or occupiers. The top level of soil or similar base for planting should be taken as the reference level for inclusion in the Primary Zone.

Public Realm

Public spaces within and surrounding the Site for socialization and enjoyment by the community.

Pulverised Fuel Ash (PFA)

PFA is a by-product from power plant as a partial replacement for cement in concrete.

Rapidly Renewable Materials

Planted and harvested in less than a 10-year cycle, and do not result in significant biodiversity loss, increased erosion, or air quality impacts**.**

Recycle Content

With reference to ISO 14021, recycle content is defined as the proportion, by mass, of the recycled material in a product.

Regional Materials

Materials which are extracted and manufactured within an 800km radius of HKSAR by road transportation; within a 1,600km radius by rail transportation; or within a 4,000km radius by sea transportation.

Residential Building

Residential Building means a building intended to be used for habitation. The building is under multiple ownerships.

Reuse

Materials which can be used again with the same functions as their original use.

Roll-out Plan

The Rollout Plan describes the overall plan for the attaining BEAM Plus EB certification. The plan is an increment-based approach that includes specific tasks, actions, milestones, and action parties.

Runoff Coefficient

A dimensionless coefficient relating the amount of runoff to the amount of precipitation received. It is a larger value for areas with low infiltration and high runoff (pavement, steep gradient), and lower for permeable, well vegetated areas (forest, flat land).

“Simple Box” Environmental/ Energy Modelling

A simple energy analysis that informs the team about the building’s likely distribution of energy consumption and is used to evaluate potential project energy strategies. A simple box analysis uses sketches and schematic building information. Block blush calculation is expected to demonstrate the building operation pattern. Also refers as “building-massing modelling”.

Site

Site refers to the land, water, vegetation and developable area that constitute the project application site within BEAM Plus assessment boundary.

Site Velocity Ratio (SVR)

Corresponds to the average velocity ratio of the **perimeter test points on site boundary.**

Solar Reflectance Index (SRI)

The Solar Reflectance Index (SRI) is a measure of the solar reflectance and emissivity of materials that can be used as an indicator of how hot they are likely to become when solar radiation is incident on their surface. The lower the SRI, the hotter a material is likely to become in the sunshine.

South Orientated Façade

For building elevation plan that is within 15deg of true south. Building elevation plan that partly fall into the range of 15deg of true south, the entire elevation will be considered as south orientated façade.

Sub-structure

Substructure is the part of the structure which is below ground level or supporting superstructure loads, such as foundation and basement.

Superstructure

Superstructure is the part of the structure which is above ground level, and which serves the purpose of its intended use.

Sustainable Building Design (SBD) Guidelines

A guideline, promulgated by the Buildings Department, on building design which aim to enhance the quality and sustainability of the built environment in Hong Kong.

Sustainable Forestry Product

Timber or timber products are originally sourced from forestlands participating in an acceptable system or program which certifies sustainable forest management.

Tree Coverage

Area covered by crown of design trees.

Unoccupied Spaces

Unoccupied spaces are areas within the building where the primary function is not intended for human activities. These spaces are occupied by occupants for a short period of time and only occasionally. Refer to Appendix 9.4 for examples of unoccupied spaces.

Whole-systems Thinking

A method of analysis and decision-making that looks at the interrelationships of the constituent parts of a system rather than narrowly focusing on the parts themselves.

Wind Tunnel

Wind tunnels are large tubes with air moving inside. The tunnels are used to copy the potential air movement, pressure and turbulence around the object.

9 Appendices

9.2 EU 2 Path 1 (Performance Approach)

Whole Building Energy Simulation is required for Path 1 compliance. Both the baseline building model and the proposed building model must cover all building energy components listed in this appendix. The simulation models for calculating the baseline and proposed case building should be developed in accordance with the modelling methodology and the requirements per building category in the following Table-App 1 - 4.

Energy Modelling Methodology

The simulations for the proposed model and baseline model must be calculated using:

(i) the same software

(ii) the same weather data

(iii) the same operating schedules; unless justification is provided through Exceptional Calculation Method (ECM). Otherwise, default operation schedule in Table-App 4 shall be used.

(iv) the same occupancy density

(v) the same building design in terms of shape

(vi) the same outdoor and indoor design conditions, and

(vii) the same internal illuminance levels (lux) for space lightings

(viii) the same **thermal block** based on similar internal load densities, occupancy, lighting, thermal and space temperature schedules, and in combination with the following guidelines:

- Separate thermal blocks should be assumed for interior and perimeter spaces. Interior spaces should be those located greater than 5m from an exterior wall. Perimeter spaces should be those located within 5m of an exterior wall.
- Separate thermal blocks should be assumed for spaces adjacent to glazed exterior walls; a separate zone should be provided for each orientation, except that orientations that differ by less than 45 degrees may be considered to be the same orientation. Each zone should include all floor area that is 5m or less from a glazed perimeter wall, except that floor area within 5m of glazed perimeter walls having more than one orientation should be divided proportionately between zones.
- Separate thermal blocks should be assumed for spaces having floors that are in contact with the ground or exposed to ambient conditions from zones that do not share these features.
- Separate thermal blocks should be assumed for spaces having exterior ceiling or roof assemblies from zones that do not share these features.

Exceptional Calculation Method (ECM)

When no simulation program can adequately model a design, materials or device, an ECM can be used to demonstrate above-standard performance. Its adoption is subject to justification (submitted by the Applicant) of its underlying principles, quantitative & qualitative techniques, assumptions, etc. in details.

Any claim of non-regulated load saving or strategies that lead to a difference between proposed and baseline model is required to submit a narrative and provide with ECM calculation.

ECM is allowed to create a representation of that element. If the methodology of approximation has not been previously published in any technical circular or FAQ, it is the responsibility of the Applicant to submit a narrative explanation describing the calculation methodology and providing the results for energy savings if necessary.

Documentation includes the minimum:

(i) Description of software limitation;

(ii) Scope of application;

(iii) Description of calculation methodology, theoretical and empirical information to support the accuracy of the method; and

(iv) Demonstrate result and corresponding saving.

Necessary software being used in calculation other than that used for building energy assessment shall provide corresponding verification.

Table-App 1 Modeling Requirements for Calculating Proposed and Baseline Building Performance

Baseline Case	Proposed Case
Building Envelope	
a. Orientation: The baseline case shall be generated by simulating the building with its actual orientation and again after rotating the entire building 90, 180, and 270 degrees, then averaging the results. - **Exception**: for multiple buildings project Applicant could consider not implement this clause. Under this condition benefits from orientation shall be demonstrated through ECM. b. External Shading: No shading projections shall be modelled; No manual window shading devices shall be modelled. c. Infiltration[1]: - Operable window: 1L/s/m^2, pressure at 75Pa accordance with NFRC 400 or ASTM E283 - Curtain wall and glazed shop front: 0.3L/s/m^2, pressure at 75Pa accordance with NFRC 400 or ASTM E283	a. All components of the building envelope in the proposed case shall be modelled as shown on design documents (or as-built for existing building envelopes)
Residential Building & Residents' Recreational Facilities (RRF)	
a. Above grade Wall & Roof: Create baseline opaque thermal properties for assessed building that just meet the regulatory requirement [2] For projects adopting 2014 edition RTTV & 2019 edition OTTV as benchmarking criteria: - $RTTV_{wall}$: 14W/m^2; - $RTTV_{roof}$: 4W/m^2, AND if applicable - $OTTV_{RRF, tower}$: 21W/m^2; - $OTTV_{RRF, podium}$: 50W/m^2 For projects adopting 2022 edition RTTV & 2019 edition OTTV as benchmarking criteria: - $RTTV_{wall}$: 12.5W/m^2; - $RTTV_{roof}$: 3.5W/m^2, AND if applicable - $OTTV_{RRF, tower}$: 21W/m^2; - $OTTV_{RRF, podium}$: 50W/m^2	a. All components of the building envelope in the proposed case shall be modelled as shown on design documents (or as-built for existing building envelopes). This included: • Building geometry and window design • Albedo of the envelope • Thermal properties for the external walls, roof, floors, and fenestrations (vertical fenestration and skylight) • SC and VLT for fenestrations b. No manual fenestration shading devices such as blinds or shades shall be modelled. Automatically controlled fenestration shades or blinds might be modelled with creditable documentation provided. c. Permanent shading devices such as fins, overhangs and light shelves may be modeled.

1 American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) – ANSI/ASHRAE/IES Standard 90.1-2016 – Energy Standard for Buildings Except Low-Rise Residential Buildings.

2 Buildings Department – PNAP APP-156 – Design and Construction Requirements for Energy Efficiency of Residential Buildings; Guideline on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014.

Baseline Case	Proposed Case
b. Below grade Walls: Modelled identically with the proposed case. c. The baseline shall be developed from the proposed building envelope design for the above target with below steps: - Step 1: No shading projections shall be modelled; - Step 2: No manual window shading devices shall be modelled; - Step 3: Exclude roof insulation; - Step 4: Adjust the window-to-wall area ratio (WWR) to achieve the targeted RTTV/ OTTV value; - Step 5: If RTTV/ OTTV targeted value cannot be achieved under 80% WWR, relax the glazing SC value. The final SC value shall not be greater than 0.65. d. If there is existing building envelope, the model shall reflect the existing conditions prior to any revision that are part of the scope of work being evaluated.	
Commercial Buildings, Hotel Building & All Other Building Types	
a. Above grade Walls & Roof: Create a baseline that just meet the regulatory requirement [3] - $OTTV_{tower}$: 21W/m^2; - $OTTV_{podium}$: 50W/m^2 b. Below grade Walls: modelled identically with the proposed case. c. The baseline shall be developed from the proposed building envelope design for the above target with below steps: - Step 1: Exclude any external shading device; - Step 2: Exclude roof insulation; - Step 3: Adjust the window-to-wall area ratio (WWR) to achieve the targeted OTTV value; - Step 4: If OTTV targeted value cannot be achieved under 80% WWR, relax the glazing SC value. The final SC value shall not be greater than 0.65. d. Existing building envelopes shall reflect the existing conditions prior to any revision that are part of the scope of work being evaluated.	a. All components of the building envelope in the proposed case shall be modelled as shown on design documents (or as-built for existing building envelopes). This included: • Building geometry and window design • Albedo of the envelope • Thermal properties for the external walls, roof, floors and fenestrations (vertical fenestration and skylight) • SC and VLT for fenestrations b. No manual fenestration shading devices such as blinds or shades shall be modelled. Automatically controlled fenestration shades or blinds might be modelled with creditable documentation provided. c. Permanent shading devices such as fins, overhangs and light shelves may be modelled.

3 Buildings Department – PNAP APP-67 – Energy Efficiency of Buildings, Building (Energy Efficiency) Regulation; Code of Practice for Overall Thermal Transfer Value in Buildings 1995.

<table>
<tr><th>Baseline Case</th><th>Proposed Case</th></tr>
<tr><td colspan="2">Interior General Lighting System</td></tr>
<tr><td colspan="2">Lighting provides a substantially uniform level of illumination through an area. General lighting shall not include decorative lighting or lighting that provides a dissimilar level of illumination to serve a specialised application or feature within such area. All installed lighting shall be modelled in each thermal block.
1. Lighting Power shall be determined in space-by-space method with same categorization as the proposed design.
2. Lighting system power shall include all lighting system components shown or provided for on the plans for background lighting. Lighting system that solely use for emergency purpose is not in scope.
3. Lighting power shall include all power used by the luminaires, including lamps, ballasts, transformers, and control devices.
4. Any independently operating lighting systems in a space that are capable of being controlled to prevent simultaneous user operation, the installed interior lighting power shall be based solely on the lighting system with the highest wattage.
5. Lighting equipment that is additional to general lighting requirement for a space and is controlled by an independent control device is not included.
6. Lighting that is integral to equipment or instrumentation and is installed by its manufacturer is not included in this assessment methodology.
7. For spaces where the total electrical power consumed by the lighting installations is less than 70W, baseline case shall be modelled identically with the proposed case in the space.
8. Lighting installations in clauses 5.1.2 of applicable edition of BEC TG [4] are excluded.
9. Automatic lighting control shall be modelled in the baseline case in accordance with table 5.4 and clauses 5.6 of applicable edition of BEC [5]. Residential dwelling units are excluded from this requirement.
Exceptions: emergency lighting that is automatically off during normal building operation; lighting that is specially designated as required by a health or life safety statute, ordinance, or regulation.</td></tr>
<tr><td colspan="2">Residential Building</td></tr>
<tr><td>a. The lighting power density within the dwelling unit shall be set equal to the below:
• Bedroom: 13 W/m^2
• Living Room/ Dining Room: 15 W/m^2
• Kitchen: 13 W/m^2
• Bathroom: 13W/m^2
* For any other space type in the building, please refer to Table 5.4 maximum allowable Lighting Power Density (LPD) of applicable edition of BEC.
b. Lighting Control shall be included to reflect the mandatory control requirements in applicable edition of BEC for spaces other than dwelling units in a building.</td><td>a. Dwelling Unit where a complete lighting system designed (or installed) shall be consistent with design documents (or actual equipment used).
b. Dwelling Unit where a lighting system neither exists nor is specified in a space, lighting power shall be modelled identically with the baseline case, unless a legally binding agreement is provided for the future users.
c. For other spaces where a complete lighting system designed (or installed) shall be consistent with design documents (or actual equipment used).
d. For other spaces where a lighting system neither exists nor is specified in a space, lighting power shall be modelled identically with the baseline case.</td></tr>
</table>

4 Electrical and Mechanical Services Department (EMSD) – Technical Guidelines on Code of Practice for Energy Efficiency of Building Services Installation [ONLINE]. Available at: https://www.emsd.gov.hk/beeo/en/mibec_beeo_codtechguidelines.html. [Accessed February 2025].

5 Electrical and Mechanical Services Department (EMSD) – Code of Practice for Energy Efficiency of Building Services Installation [ONLINE]. Available at: https://www.emsd.gov.hk/beeo/en/mibec_beeo_codtechguidelines.html. [Accessed February 2025].

Baseline Case	Proposed Case
c. Daylight responsive control shall be modelled for the space (other than dwelling units) with fenestration area exceeding $5m^2$ and with lighting electrical consumption at 150W and above. The control should be able to shut off orreduce the lighting zone's lighting power automatically to 50% or less in response to the available daylight. d. Automatic lighting control (occupancy sensor) for space (other than dwelling unit) with lighting electrical consumption at 150W and above. The control should be able to shut off or reduce the general lighting power by at least 50% automatically of the lighting zone being controlled.	e. For automatic lighting controls in addition to those mandatory requirements in applicable edition of BEC, Exceptional Calculation Method (ECM) is required to justify the modification of lighting schedules uses for the proposed case. Credible technical documentation for the modification shall be provided.
Commercial Buildings, Hotels and Other Building Types	
a. Lighting power shall be modelled with reference to the maximum allowable LPD in Table 5.4 of applicable edition of BEC . b. For space that that cannot be determined from the Table 5.4 of applicable edition of BEC , LPD could be advised by professional, and justification shall be provided for advanced approval. c. Daylight responsive control shall be modelled for the space with fenestration area exceeding $5m^2$ and with lighting electrical consumption at 150W and above. The control should be able to shut off or reduce the lighting zone's lighting power automatically to 50% or less in response to the available daylight. d. Automatic lighting control (occupancy sensor) for space with lighting electrical consumption at 150W and above. The control should be able to shut off or reduce the general lighting power by at least 50% automatically of the lighting zone being controlled.	a. For spaces where a complete lighting system designed (or installed) shall be consistent with design documents (or actual equipment used). b. For spaces where a lighting system neither exists nor is specified in a space, lighting power shall be modelled identically with the baseline case, unless a legally binding document for future use is provided to justify the input. c. For automatic lighting controls in addition to those mandatory requirements in applicable edition of BEC, ECM is required to justify the modification of lighting schedules uses for the proposed case. Credible technical documentation for the modification shall be provided.

<table>
<tr><th>Baseline Case</th><th>Proposed Case</th></tr>
<tr><td colspan="2">Receptacle and Other Loads</td></tr>
<tr><td colspan="2">Energy for receptacle and other loads (unregulated load) [a] shall be modelled with respect to building type. These loads shall be input as per design information to reflect the expected energy consumption. Justification shall be provided by the Applicant through ECM. If no information could be provided, default power density shall be used for the below space type:
• Office: 25W/m^2
• Retail: 15W/m^2
• Chinese Restaurant: 20W per person [b]
• Western Restaurant: 20W per person [b]
• Coffee shop/ Bar/ Lounge: 10W/m^2
• Canteen/ Food Plaza: 20W per person [b]
• Grocery Store: 27W/m^2
• Residential Unit, Habitable Area in Hostel/ Dormitory: 0.25W/m^2
• Hotel Guest Room: 900W/room
• Classroom/ Lecture theatre: 10W/m^2
• Data Centre (Data Hall): 900W/m^2
Notes:
[a] The load resulting from the consumption or release of energy consumed in support of a manufacturing, industrial or commercial process other than conditioning spaces and maintaining comfort and amenities for the occupants of the building (i.e. process load) could be excluded from the energy assessment. The Applicant shall provide supporting information and justification (e.g. calculation) for the portion of energy load being accounted in/ discounted from the energy assessment.
[b] 10W per person for sensible heat and 10W per person for latent heat.</td></tr>
<tr><td>a. Receptacle and other loads shall be estimated based on the building type or space type category and shall be assumed to be identical in the proposed and baseline case, unless a narrative and calculation by ECM is provided.</td><td>a. Receptacle and other loads shall be input as design information with supporting through ECM; if no information could be provided, default value shall be used.
b. Both baseline and proposed case shall be modelled identically, including power, schedule and control.
c. If both cases are not identical, submission of a narrative and calculation by ECM is required for justification.</td></tr>
<tr><td colspan="2">Miscellaneous</td></tr>
<tr><td colspan="2">Miscellaneous energy uses are defined as those that may be treated separately since they have little or no interaction with the conditioned thermal blocks or the HVAC systems that serve them.
• Exterior Lighting System
• Service Hot Water System
• Lift & Escalator System
• Irrigation, Plumbing and Drainage, Fire Services</td></tr>
</table>

Baseline Case	Proposed Case
Exterior Lighting System	
a. Where exterior lighting system has been specified (or installed) in the proposed case, the system shall be modelled identically with the proposed case. b. Where no exterior lighting has been specified in proposed case, no exterior lighting shall be modelled.	a. When exterior lighting system has been specified (or installed) in the proposed case, the system shall be modelled consistent with design documents (or actual system information). b. Where no exterior lighting has been specified in proposed case, no exterior lighting shall be modelled.
Service Hot Water System For a combination of equipment and auxiliary devices (e.g. controls, accessories, interconnecting means and terminal elements) by which energy is transformed so it heats up water for domestic or commercial purpose other than space heating and process requirements.	
a. Where service hot-water system has been specified (or installed) in the proposed case, the system shall be sized identical to the proposed case, where energy source shall be electrical heater. Efficiency of the water heater shall be 80%. b. Where no service hot water system has been specified but the building will have service hot-water loads, a service water system using electrical heater shall be used. Efficiency of the water heater shall be 80%. c. For buildings that will have no service hot-water loads, no service hot-water heating shall be modelled. d. Service hot-water energy consumption shall be calculated explicitly based upon the volume of service hot water required and the entering makeup water and the leaving service hot-water temperatures. Leaving temperature shall be based upon the end-use requirements in proposed case. e. Service water loads and usage shall be the same for both the baseline case and the proposed case.	a. Where a service hot-water system has been specified (or installed) in the proposed case, the system shall be modelled consistent with design documents (or actual system information). b. Where no service hot water system has been specified but the building will have service hot water loads, a service water system shall be modelled identical to the baseline case. c. For building that will have no service hot-water loads, no service hot-water heating shall be modelled.
Lift and Escalator System	
a. With reference to proposed design equipment rank, input by identifying each corresponding maximum allowable electrical power according to Section 8.4 in applicable edition of BEC. b. Lift regenerative braking control shall be modelled in the baseline case in accordance with clauses 8.5.5 of applicable edition of BEC.	a. Where lift and escalator system has been specified (or installed), the system shall be modelled consistent with design documents (or actual system information). b. For controls in addition to those mandatory requirements in applicable edition of BEC, ECM is required to justify the modification of lift schedules uses for the proposed case. Credible technical documentation for the modification shall be provided.
Irrigation, Plumbing and Drainage, Fire Services	
a. No system to be modelled.	a. No system to be modelled.

<table>
<tr><th>Baseline Case</th><th>Proposed Case</th></tr>
<tr><td colspan="2">On-site Renewable Energy Application</td></tr>
<tr><td>a. No renewable energy application to be modelled.</td><td>a. Where a renewable energy application has been specified (or installed) in the proposed case, the system shall be modelled consistent with design documents (or actual system information).</td></tr>
<tr><td colspan="2">HVAC System</td></tr>
<tr><td colspan="2">1. General
- Outdoor condition to be used for both baseline and proposed case sizing shall reference to Table 6.4 of applicable edition of BEC.
- Indoor condition(s) to be used for both baseline and proposed case shall be identical. Justification shall be provided else value in Table 6.4 of applicable edition of BEC shall be used.
2. The HVAC system(s) in baseline building design shall be of the type and description specified in Table-App 2 “Baseline HVAC System Setting Summary”.
3. Equipment Efficiencies
All HVAC equipment in the baseline case shall be modelled at the minimum efficiency levels, both part load and full load, in accordance with Table 6.12a (Part 1) and Table 6.12b of applicable edition of BEC .
All HVAC equipment in the proposed case shall be modelled consistent with design documents (or actual installed equipment information).
In both baseline and proposed case, for package type system the descriptor shall be broken down into its components so that supply fan energy can be modelled separately.
4. Equipment Capacities
The equipment capacities for the baseline case shall be based on sizing run and shall be oversized by 15% for cooling.
5. Minimum outdoor air ventilation rate shall be modelled identical in both baseline and proposed case.</td></tr>
<tr><td colspan="2">Residential Building</td></tr>
<tr><td>(i) Public housing:
a. Space: residential unit, common area and recreational facilities area (e.g. communal area) should be modelled with unitary air-conditioner – non-split type unit.
b. Space: kitchen and toilet should be modelled with mechanical ventilation only. Mechanical fans should be 1.1W/L/s of exhaust air flow rate.
* Calculation method refers to Section 6.7.6.1 in applicable edition of BEC.</td><td>(i) Public housing:
a. Space where complete HVAC system has been designed (or installed), the model shall be consistent with design documents (or actual system type used).
b. Space where no HVAC system has been designed (or installed) but AC platform is designed for future provision, the HVAC system should be identical to the system modelled in baseline (unitary air-conditioner – non-split type unit).
c. Space where no HVAC system has been designed (or installed) and no AC platform is designed for future provision, no HVAC system has to be modelled for both baseline and proposed cases.</td></tr>
</table>

Baseline Case	Proposed Case
(ii) Private housing: a. Space: residential flat, common area and recreational facilities area (e.g. club house) should be modelled with unitary air-conditioner – split type unit. b. Space: kitchen and toilet should be modelled with mechanical ventilation only. Mechanical fans should be 1.1W/L/s of exhaust air flow rate. * Calculation method refers to Section 6.7.6.1 in applicable edition of BEC.	(ii) Private housing: a. Space where complete HVAC system has been designed (or installed), the model shall be consistent with design documents (or actual system type used). b. Space where no HVAC system has been designed (or installed) but AC platform is designed for future provision, the HVAC system should be identical to the system modelled in baseline (unitary air-conditioner – split type unit). c. Space where no HVAC system has been designed (or installed) and no AC platform is designed for future provision, no HVAC system has to be modelled for both baseline and proposed cases.
Commercial, Hotels, Educational and Other Building Types	
(iii) Commercial, hotels, educational and other buildings with air-conditioned floor area < 14,000m^2. a. Conditioned space should be modelled with unitary air-conditioner – split type unit. b. Non-conditioned space should be modelled with mechanical ventilation only, Mechanical fans should be 1.1W/L/s of exhaust air flow rate. * Calculation method refers to Section 6.7.6.1 in applicable edition of BEC.	(iii) Commercial, hotels, educational and other buildings with air-conditioned floor area < 14,000m^2. a. Space where complete HVAC system has been designed (or installed), the model shall be consistent with design documents (or actual system type used). b. Space where no HVAC system has been designed (or installed) but AC platform is designed for future provision, the HVAC system should be identical to the system modelled in baseline (unitary air-conditioner – split type unit). c. Space where no HVAC system has been designed (or installed) and no AC platform is designed for future provision, no HVAC system has to be modelled for both baseline and proposed cases.

Baseline Case	Proposed Case
(iv) Commercial, hotels, educational and other buildings with air-conditioned floor area ≥ 14,000m^2. a. Conditioned space should be modelled with VAV system with reheat. b. Supply fan system shall be 2.1W/L/s. * Calculation method based on description stated in Section 6.7.3 and 6.7.5 in applicable edition of BEC. c. Non-conditioned space should be modelled with mechanical ventilation only, Mechanical fans should be 1.1W/L/s of exhaust air flow rate. * Calculation method refers to Section 6.7.6.1 in applicable edition of BEC. d. Chiller configuration shall meet the specific requirements in Table-App 3.	(iv) Commercial, hotels, educational and other buildings with air-conditioned floor area ≥ 14,000m^2. a. Space where complete HVAC system has been designed (or installed), the model shall be consistent with design documents (or actual system type used). b. Space where no HVAC system has been designed (or installed) but AC platform is designed for future provision, the HVAC system should be identical to the system modelled in baseline (Chiller, VAV system with reheat). c. Space where no HVAC system has been designed (or installed) and no AC platform is designed for future provision, no HVAC system has to be modelled for both baseline and proposed cases.
District Cooling System (If Applicable)	
a. Set-up a virtual main plant based on building cooling load: **< 2000kW:** 2 water cooled centrifugal chillers with same capacity **2000≤ cooling load< 9000kW:** no chiller larger than 1000kW & all sized equally **≥ 9000kW**: no chiller larger than 3000kW & all sized equally b. Performance of individual components refer to Table 6.12b of applicable edition of BEC. c. Virtual primary variable pumping system shall be included.	a. Based on actual efficiency performance; or b. If project team cannot obtain actual performance data for main plant, it is permissible to use the following default average performance values: DCS cooling plant – COP of 4.4 for total cooling plant average efficiency (including cooling towers and primary pumps) c. Seasonal thermal distribution losses – including minor leaks and condensate losses (but not pumping energy, which must be accounted for separately where it applies): chilled water district cooling: 5%.
Carpark Ventilation System	
Carpark ventilation (if applicable) shall be operated with staging of fans, provide down to 50% less of the design capacity. * Calculation method based on description stated in Section 6.10.7 in applicable edition of BEC.	Carpark ventilation shall be consistent with design documents (or actual system installed).

Table-App 2 Baseline HVAC System Setting Summary

	Residential		Commercial, Hotels, Educational and Other Building Types		Any Building Types that used District Cooling System (DCS)
	Public Housing	Private Housing	Air-conditioned Floor Area < 14,000m^2	Air-conditioned Floor Area ≥ 14,000m^2	
Cooling Generation	Unitary air-conditioner – non-split type	Unitary air-conditioner – split type	Unitary air-conditioner – split type	Chiller	District Chiller Plants
Heating Generation	Unitary air-conditioner – non-split type	Unitary air-conditioner – split type	Unitary air-conditioner – split type	Electric Resistance	Electric Resistance
Performance of Individual Components Guideline	Table 6.12a (Part 1) in applicable edition of BEC	Table 6.12a (Part 1) in applicable edition of BEC	Table 6.12a (Part 1) in applicable edition of BEC	Table 6.12b in applicable edition of BEC	Table 6.12b in applicable edition of BEC
Terminal Type	N/A	N/A	N/A	VAV with reheat	VAV with reheat
Heat Rejection	Air-cooled	Air-cooled	Air-cooled	Water-cooled*	Water-cooled

* For Projects not under Fresh Water Cooling Towers (FWCT) Scheme or when there is a strong supporting evidence to prove inappropriate of such baseline (e.g. hygiene requirement in hospitals), air-cooled chiller is allowed in baseline setting.

Table-App 3 - Baseline Chiller configuration

Buildings with Air-conditioned Floor Area	**Number and Type of Chiller(s)**
< 20,000m^2	2 water-cooled screw chillers sized equally
≥ 20,000m^2	2 water-cooled centrifugal chillers minimum with chillers added so that no chiller larger than 2,800kW, all sized equally
All types	Primary/ secondary systems with variable speed drives on secondary pumping loop

Table-App 4 Default Operation Schedule for Calculation [6]

Assembly Occupancy

Hour of Day (Time)		Schedule for Occupancy			Schedule for Lighting System			Schedule for HVAC System			Schedule for Service Hot Water System			Schedule for Elevator (Lift & Escalator System)			Schedule for Receptacle Load		
		Percentage of Maximum Load			Percentage of Maximum Load						Percentage of Maximum Load			Percentage of Maximum Load			Percentage of Maximum Load		
		Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1	(12am - 1am)	0	0	0	5	5	5	Off	Off	Off	0	0	0	0	0	0	5	5	5
2	(1am - 2am)	0	0	0	5	5	5	Off	Off	Off	0	0	0	0	0	0	5	5	5
3	(2am - 3am)	0	0	0	5	5	5	Off	Off	Off	0	0	0	0	0	0	5	5	5
4	(3am - 4am)	0	0	0	5	5	5	Off	Off	Off	0	0	0	0	0	0	5	5	5
5	(4am - 5am)	0	0	0	5	5	5	Off	Off	Off	0	0	0	0	0	0	5	5	5
6	(5am - 6am)	0	0	0	5	5	5	On	Off	Off	0	0	0	0	0	0	5	5	5
7	(6am - 7am)	0	0	0	35	5	5	On	On	On	0	0	0	0	0	0	40	5	5
8	(7am - 8am)	0	0	0	35	30	30	On	On	On	0	0	0	0	0	0	40	30	30
9	(8am - 9am)	20	20	10	35	30	30	On	On	On	0	0	0	0	0	0	40	30	30
10	(9am - 10am)	20	20	10	65	40	30	On	On	On	5	5	5	0	0	0	75	50	30
11	(10am - 11am)	20	20	10	65	40	30	On	On	On	5	5	5	0	0	0	75	50	30
12	(11am - 12nn)	80	60	10	65	40	30	On	On	On	35	20	10	0	0	0	75	50	30
13	(12nn - 1pm)	80	60	10	65	40	55	On	On	On	5	0	0	0	0	0	75	50	65
14	(1pm - 2pm)	80	60	70	65	40	55	On	On	On	5	0	0	0	0	0	75	50	65
15	(2pm - 3pm)	80	60	70	65	40	55	On	On	On	5	0	0	0	0	0	75	50	65
16	(3pm - 4pm)	80	60	70	65	40	55	On	On	On	5	0	0	0	0	0	75	50	65
17	(4pm - 5pm)	80	60	70	65	40	55	On	On	On	5	0	0	0	0	0	75	50	65
18	(5pm - 6pm)	80	60	70	65	40	55	On	On	On	0	0	0	0	0	0	75	50	65
19	(6pm - 7pm)	20	60	70	65	40	55	On	On	On	0	0	0	0	0	0	75	50	65
20	(7pm - 8pm)	20	60	70	65	40	55	On	On	On	0	65	65	0	0	0	75	50	65
21	(8pm - 9pm)	20	60	70	65	40	55	On	On	On	0	30	30	0	0	0	75	50	65
22	(9pm - 10pm)	20	80	70	65	40	55	On	On	On	0	0	0	0	0	0	75	50	65
23	(10pm - 1pm)	10	10	20	25	40	5	On	On	On	0	0	0	0	0	0	25	50	5
24	(11pm - 12am)	0	0	0	5	5	5	Off	Off	Off	0	0	0	0	0	0	5	5	5
Total Hours/ Day		7.10	7.50	7.00	10.10	6.60	7.45	18.00	17.00	17.00	0.70	1.25	1.15	0.00	0.00	0.00	11.55	8.00	8.45
Total Hours/ Week		50.00			64.55			124.00			5.90			0.00			74.20		
Total Hours/ Year		2,607.14			3,365.82			6,465.71			307.64			0.00			3,869.00		

Wk = Weekday

1. Elevator schedules, except for restaurants, are from the U.S. Department of Energy Standard Evaluation Techniques, except they have been changed to 0% when occupancy is 0%. These values may be used only if actual schedules are not known.
2. Lighting profiles are modified to reflect the requirement for occupancy sensors in space.

6 Washington State Building Code Council – 2021 Washington State Energy Code - Commercial Provisions - Appendix B Default Internal Load Values and Schedules - B103 Default Schedules [ONLINE]. Available at: https://sbcc.wa.gov/sites/default/files/2024-01/2021_WSEC_C_2ndEd_012824.pdf [Accessed February 2025].

Office Occupancy

Hour of Day (Time)	Schedule for Occupancy			Schedule for Lighting/ Receptacle			Schedule for HVAC System			Schedule for Service Hot Water			Schedule for Elevator		
	Percent of Maximum Load			Percent of Maximum Load						Percent of Maximum Load			Percent of Maximum Load		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1 (12am - 1am)	0	0	0	5	5	5	Off	Off	Off	5	5	4	0	0	0
2 (1am - 2am)	0	0	0	5	5	5	Off	Off	Off	5	5	4	0	0	0
3 (2am - 3am)	0	0	0	5	5	5	Off	Off	Off	5	5	4	0	0	0
4 (3am - 4am)	0	0	0	5	5	5	Off	Off	Off	5	5	4	0	0	0
5 (4am - 5am)	0	0	0	5	5	5	Off	Off	Off	5	5	4	0	0	0
6 (5am - 6am)	0	0	0	10	5	5	Off	Off	Off	8	8	7	0	0	0
7 (6am - 7am)	10	10	5	10	10	5	On	On	Off	7	7	4	0	0	0
8 (7am - 8am)	20	10	5	30	10	5	On	On	Off	19	11	4	35	16	0
9 (8am - 9am)	95	30	5	65/90	30	5	On	On	Off	35	15	4	69	14	0
10 (9am - 10am)	95	30	5	65/90	30	5	On	On	Off	38	21	4	43	21	0
11 (10am - 1am)	95	30	5	65/90	30	5	On	On	Off	39	19	4	37	18	0
12 (11am - 12pm)	95	30	5	65/90	30	5	On	On	Off	47	23	6	43	25	0
13 (12pm - 1pm)	50	10	5	55/80	15	5	On	On	Off	57	20	6	58	21	0
14 (1pm - 2pm)	95	10	5	65/90	15	5	On	On	Off	54	19	9	48	13	0
15 (2pm - 3pm)	95	10	5	65/90	15	5	On	On	Off	34	15	6	37	8	0
16 (3pm - 4pm)	95	10	5	65/90	15	5	On	On	Off	33	12	4	37	4	0
17 (4pm - 5pm)	95	10	5	65/90	15	5	On	On	Off	44	14	4	46	5	0
18 (5pm - 6pm)	30	5	5	35/50	5	5	On	On	Off	26	7	4	62	6	0
19 (6pm - 7pm)	10	5	0	30	5	5	On	Off	Off	21	7	4	20	0	0
20 (7pm - 8pm)	10	0	0	30	5	5	On	Off	Off	15	7	4	12	0	0
21 (8pm - 9pm)	10	0	0	20	5	5	On	Off	Off	17	7	4	4	0	0
22 (9pm - 10pm)	10	0	0	20	5	5	On	Off	Off	8	9	7	4	0	0
23 (10pm - 1pm)	5	0	0	10	5	5	Off	Off	Off	5	5	4	0	0	0
24 (11pm - 12am)	5	0	0	5	5	5	Off	Off	Off	5	5	4	0	0	0
Total/Day	920	200	60	800/1040	280	120	1600	1200	0	537	256	113	555	151	0
Total/Week	48.60 hours			44.00/56.00 hours			124 hours			30.54 hours			29.26 hours		
Total/Year	2534 hours			2288/2920 hours			6465 hours			1592 hours			1526 hours		

Wk = Weekday

1. Elevator schedules, except for restaurants, are from the U.S. Department of Energy Standard Evaluation Techniques, except they have been changed to 0% when occupancy is 0%. These values may be used only if actual schedules are not known.
2. Lighting profiles are modified to reflect the requirement for occupancy sensors in space.

Hotel Building Occupancy

Hour of Day (Time)	Schedule for Occupancy			Schedule for Lighting/ Receptacle			Schedule for HVAC System			Schedule for Service Hot Water			Schedule for Elevator		
	Percent of Maximum Load			Percent of Maximum Load									Percent of Maximum Load		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Use %	Sup Stp	Htg Stp	Wk	Sat	Sun
1 (12am - 1am)	90	90	70	20	20	30	On	On	On	20	20	25	40	44	55
2 (1am - 2am)	90	90	70	15	20	30	On	On	On	15	15	20	33	35	55
3 (2am - 3am)	90	90	70	10	10	20	On	On	On	15	15	20	33	35	43
4 (3am - 4am)	90	90	70	10	10	20	On	On	On	15	15	20	33	35	43
5 (4am - 5am)	90	90	70	10	10	20	On	On	On	20	20	20	33	35	43
6 (5am - 6am)	90	90	70	20	10	20	On	On	On	25	25	30	33	35	43
7 (6am - 7am)	70	70	70	40	30	30	On	On	On	50	40	50	42	40	52
8 (7am - 8am)	40	50	70	50	30	40	On	On	On	60	50	50	42	32	52
9 (8am - 9am)	40	50	50	40	40	40	On	On	On	55	50	50	52	45	65
10 (9am - 10am)	20	30	50	40	40	30	On	On	On	45	50	55	52	45	65
11 (10am - 1am)	20	30	50	25	30	30	On	On	On	40	45	50	40	42	53
12 (11am - 12pm)	20	30	30	25	25	30	On	On	On	45	50	50	51	60	60
13 (12pm - 1pm)	20	30	30	25	25	30	On	On	On	40	50	40	51	65	53
14 (1pm - 2pm)	20	30	20	25	25	20	On	On	On	35	45	40	51	65	51
15 (2pm - 3pm)	20	30	20	25	25	20	On	On	On	30	40	30	51	65	50
16 (3pm - 4pm)	30	30	20	25	25	20	On	On	On	30	40	30	51	65	44
17 (4pm - 5pm)	50	30	30	25	25	20	On	On	On	30	35	30	63	65	64
18 (5pm - 6pm)	50	50	40	25	25	20	On	On	On	40	40	40	80	75	62
19 (6pm - 7pm)	50	60	40	60	60	50	On	On	On	55	55	50	86	80	65
20 (7pm - 8pm)	70	60	60	80	70	70	On	On	On	60	55	50	70	80	63
21 (8pm - 9pm)	70	60	60	90	70	80	On	On	On	50	50	40	70	75	63
22 (9pm - 10pm)	80	70	80	80	70	60	On	On	On	55	55	50	70	75	63
23 (10pm - 1pm)	90	70	80	60	60	50	On	On	On	45	40	40	45	55	40
24 (11pm - 12am)	90	70	80	30	30	30	On	On	On	25	30	20	45	55	40

Wk = Weekday

1. Elevator schedules, except for restaurants, are from the U.S. Department of Energy Standard Evaluation Techniques, except they have been changed to 0% when occupancy is 0%. These values may be used only if actual schedules are not known.
2. Lighting profiles are modified to reflect the requirement for occupancy sensors in space.

Residential Occupancy

Hour of Day (Time)	Schedule for Occupancy			Schedule for Lighting/ Receptacle			Schedule for HVAC System			Schedule for Service Hot Water			Schedule for Elevator		
	Percent of Maximum Load			Percent of Maximum Load									Percent of Maximum Load		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Use %	Sup Stp	Htg Stp	Wk	Sat	Sun
1 (12am - 1am)	100	100	100	7	7	7	On	On	On	8	43	60	0	0	0
2 (1am - 2am)	100	100	100	7	7	7	On	On	On	4	43	60	0	0	0
3 (2am - 3am)	100	100	100	7	7	7	On	On	On	1	43	60	0	0	0
4 (3am - 4am)	100	100	100	7	7	7	On	On	On	1	43	60	0	0	0
5 (4am - 5am)	100	100	100	19	19	19	On	On	On	4	43	60	0	0	0
6 (5am - 6am)	100	100	100	39	39	39	On	On	On	27	43	60	0	0	0
7 (6am - 7am)	100	100	100	44	44	44	On	On	On	94	43	60	0	0	0
8 (7am - 8am)	85	85	85	39	39	39	On	On	On	1	43	60	35	16	0
9 (8am - 9am)	39	39	39	17	17	17	On	On	On	96	43	60	69	14	0
10 (9am - 10am)	25	25	25	12	12	12	On	On	On	84	43	60	43	21	0
11 (10am - 1am)	25	25	25	12	12	12	On	On	On	76	43	60	37	18	0
12 (11am - 12pm)	25	25	25	12	12	12	On	On	On	61	43	60	43	25	0
13 (12pm - 1pm)	25	25	25	12	12	12	On	On	On	53	43	60	58	21	0
14 (1pm - 2pm)	25	25	25	12	12	12	On	On	On	47	43	60	48	13	0
15 (2pm - 3pm)	25	25	25	12	12	12	On	On	On	41	43	60	37	8	0
16 (3pm - 4pm)	25	25	25	21	21	21	On	On	On	47	43	60	37	4	0
17 (4pm - 5pm)	30	30	30	44	44	44	On	On	On	55	43	60	46	5	0
18 (5pm - 6pm)	52	52	52	62	62	62	On	On	On	73	43	60	62	6	0
19 (6pm - 7pm)	87	87	87	83	83	83	On	On	On	86	43	60	20	0	0
20 (7pm - 8pm)	87	87	87	99	99	99	On	On	On	82	43	60	12	0	0
21 (8pm - 9pm)	87	87	87	100	100	100	On	On	On	75	43	60	4	0	0
22 (9pm - 10pm)	100	100	100	69	69	69	On	On	On	61	43	60	4	0	0
23 (10pm - 1pm)	100	100	100	38	38	38	On	On	On	53	43	60	0	0	0
24 (11pm - 12am)	100	100	100	16	16	16	On	On	On	29	43	60	0	0	0

Wk = Weekday

Schedule is referenced to U.S. Department of Energy Commercial Reference Building Models of the National Building Stock NREL/TP-5500-46861 February 2011 – Table B-6 Midrise Apartment Hourly Operation Schedules.

Parking Garage Occupancy

Hour of Day (Time)	Schedule for Occupancy			Schedule for Lighting/ Receptacle			Schedule for HVAC System			Schedule for Service Hot Water			Schedule for Elevator		
	Percent of Maximum Load			Percent of Maximum Load						Percent of Maximum Load			Percent of Maximum Load		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1 (12am - 1am)				50/100	50/100	50/100									
2 (1am - 2am)				50/100	50/100	50/100									
3 (2am - 3am)				50/100	50/100	50/100									
4 (3am - 4am)				50/100	50/100	50/100									
5 (4am - 5am)				50/100	50/100	50/100									
6 (5am - 6am)				50/100	50/100	50/100									
7 (6am - 7am)				100	100	50/100									
8 (7am - 8am)				100	100	50/100									
9 (8am - 9am)				100	100	50/100									
10 (9am - 10am)				100	100	50/100									
11 (10am - 1am)				100	100	50/100	Based on likely use						Included with other occupancies		
12 (11am - 12pm)		NA		100	100	50/100					NA				
13 (12pm - 1pm)				100	100	50/100									
14 (1pm - 2pm)				100	100	50/100									
15 (2pm - 3pm)				100	100	50/100									
16 (3pm - 4pm)				100	100	50/100									
17 (4pm - 5pm)				100	100	50/100									
18 (5pm - 6pm)				100	50/100	50/100									
19 (6pm - 7pm)				100	50/100	50/100									
20 (7pm - 8pm)				100	50/100	50/100									
21 (8pm - 9pm)				100	50/100	50/100									
22 (9pm - 10pm)				100	50/100	50/100									
23 (10pm - 1pm)				50/100	50/100	50/100									
24 (11pm - 12am)				50/100	50/100	50/100									
Total/Day				2000/2400	1750/2400	1200/2400									
Total/Week				129.50/168 hours											
Total/Year				6734/8760 hours											

Wk = Weekday

1. Elevator schedules, except for restaurants, are from the U.S. Department of Energy Standard Evaluation Techniques, except they have been changed to 0% when occupancy is 0%. These values may be used only if actual schedules are not known.

2. Lighting profiles are modified to reflect the requirement for occupancy sensors in space. For parking garage lighting, the schedule has been revised to accompany the office schedule: the lighting in the parking garage is set to be on at 100% for all hours when the building occupancy is 10% or greater, but reduced to 50% for all hours when the building occupancy is less than 10%. For other uses, it is acceptable to modify the parking garage schedule to parallel that use.

Restaurant Occupancy

Hour of Day (Time)	Schedule for Occupancy			Schedule for Lighting/ Receptacle			Schedule for HVAC System			Schedule for Service Hot Water			Schedule for Elevator		
	Percent of Maximum Load			Percent of Maximum Load						Percent of Maximum Load			Percent of Maximum Load		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1 (12am - 1am)	15	30	20	15	20	20	On	On	On	20	20	25	0	0	0
2 (1am - 2am)	15	25	20	15	15	15	On	On	On	15	15	20	0	0	0
3 (2am - 3am)	5	5	5	15	15	15	On	On	On	15	15	20	0	0	0
4 (3am - 4am)	0	0	0	15	15	15	Off	Off	Off	0	0	0	0	0	0
5 (4am - 5am)	0	0	0	15	15	15	Off	Off	Off	0	0	0	0	0	0
6 (5am - 6am)	0	0	0	20	15	15	Off	Off	Off	0	0	0	0	0	0
7 (6am - 7am)	0	0	0	35/40	30	30	Off	Off	Off	0	0	0	0	0	0
8 (7am - 8am)	5	0	0	35/40	30	30	On	Off	Off	60	0	0	0	0	0
9 (8am - 9am)	5	0	0	55/60	55/60	45/50	On	Off	Off	55	0	0	0	0	0
10 (9am - 10am)	5	5	0	55/60	55/60	45/50	On	On	Off	45	50	0	0	0	0
11 (10am - 1am)	20	20	10	85/90	75/80	65/70	On	On	On	40	45	50	0	0	0
12 (11am - 12pm)	50	45	20	85/90	75/80	65/70	On	On	On	45	50	50	0	0	0
13 (12pm - 1pm)	80	50	25	85/90	75/80	65/70	On	On	On	40	50	40	0	0	0
14 (1pm - 2pm)	70	50	25	85/90	75/80	65/70	On	On	On	35	45	40	0	0	0
15 (2pm - 3pm)	40	35	15	85/90	75/80	65/70	On	On	On	30	40	30	0	0	0
16 (3pm - 4pm)	20	30	20	85/90	75/80	65/70	On	On	On	30	40	30	0	0	0
17 (4pm - 5pm)	25	30	25	85/90	75/80	55/60	On	On	On	30	35	30	0	0	0
18 (5pm - 6pm)	50	30	35	85/90	85/90	55/60	On	On	On	40	40	40	0	0	0
19 (6pm - 7pm)	80	70	55	85/90	85/90	55/60	On	On	On	55	55	50	0	0	0
20 (7pm - 8pm)	80	90	65	85/90	85/90	55/60	On	On	On	60	55	50	0	0	0
21 (8pm - 9pm)	80	70	70	85/90	85/90	55/60	On	On	On	50	50	40	0	0	0
22 (9pm - 10pm)	50	65	35	85/90	85/90	55/60	On	On	On	55	55	50	0	0	0
23 (10pm - 1pm)	35	55	20	45/50	45/50	45/50	On	On	On	45	40	40	0	0	0
24 (11pm - 12am)	20	35	20	30	30	30	On	On	On	25	30	20	0	0	0
Total/Day	750	740	485	1370/1455	1290/1365	1040/1155	0	0	0	790	730	625	0	0	0
Total/Week	49.75 hours			91.80/97.55 hours			135 hours			53.05 hours			0 hours		
Total/Year	2594 hours			4774/5086 hours			7039 hours			2766 hours			0 hours		

Wk = Weekday

1. Elevator schedules, except for restaurants, are from the U.S. Department of Energy Standard Evaluation Techniques, except they have been changed to 0% when occupancy is 0%. These values may be used only if actual schedules are not known.

2. Lighting profiles are modified to reflect the requirement for occupancy sensors in space.

Retail Occupancy

Hour of Day (Time)	Schedule for Occupancy			Schedule for Lighting/ Receptacle			Schedule for HVAC System			Schedule for Service Hot Water			Schedule for Elevator		
	Percent of Maximum Load			Percent of Maximum Load						Percent of Maximum Load			Percent of Maximum Load		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1 (12am - 1am)	0	0	0	5	5	5	Off	Off	Off	4	11	7	0	0	0
2 (1am - 2am)	0	0	0	5	5	5	Off	Off	Off	5	10	7	0	0	0
3 (2am - 3am)	0	0	0	5	5	5	Off	Off	Off	5	8	7	0	0	0
4 (3am - 4am)	0	0	0	5	5	5	Off	Off	Off	4	6	6	0	0	0
5 (4am - 5am)	0	0	0	5	5	5	Off	Off	Off	4	6	6	0	0	0
6 (5am - 6am)	0	0	0	5	5	5	Off	Off	Off	4	6	6	0	0	0
7 (6am - 7am)	0	0	0	5	5	5	On	On	Off	4	7	7	0	0	0
8 (7am - 8am)	10	10	0	20	10	5	On	On	Off	15	20	10	12	9	0
9 (8am - 9am)	20	20	0	50	30	10	On	On	On	23	24	12	22	21	0
10 (9am - 10am)	50	50	10	85/90	55/60	10	On	On	On	32	27	14	64	56	11
11 (10am - 1am)	50	60	20	85/90	85/90	40	On	On	On	41	42	29	74	66	13
12 (11am - 12pm)	70	80	20	85/90	85/90	40	On	On	On	57	54	31	68	68	35
13 (12pm - 1pm)	70	80	40	85/90	85/90	55/60	On	On	On	62	59	36	68	68	37
14 (1pm - 2pm)	70	80	40	85/90	85/90	55/60	On	On	On	61	60	36	71	69	37
15 (2pm - 3pm)	70	80	40	85/90	85/90	55/60	On	On	On	50	49	34	72	70	39
16 (3pm - 4pm)	80	80	40	85/90	85/90	55/60	On	On	On	45	48	35	72	69	41
17 (4pm - 5pm)	70	80	40	85/90	85/90	55/60	On	On	On	46	47	37	73	66	38
18 (5pm - 6pm)	50	60	20	85/90	85/90	40	On	On	Off	47	46	34	68	58	34
19 (6pm - 7pm)	50	20	10	55/60	50	20	On	On	Off	42	44	25	68	47	3
20 (7pm - 8pm)	30	20	0	55/60	30	5	On	On	Off	34	36	27	58	43	0
21 (8pm - 9pm)	30	20	0	50	30	5	On	On	Off	33	29	21	54	43	0
22 (9pm - 10pm)	0	10	0	20	10	5	Off	On	Off	23	22	16	0	8	0
23 (10pm - 1pm)	0	0	0	5	5	5	Off	Off	Off	13	16	10	0	0	0
24 (11pm - 12am)	0	0	0	5	5	5	Off	Off	Off	8	13	6	0	0	0
Total/Day	720	750	280	1060/1115	940/985	500/525	1500	1600	900	662	690	459	844	761	288
Total/Week	46.30 hours			67.40/70.85 hours			100 hours			44.59 hours			52.69 hours		
Total/Year	2414 hours			3505/3694 hours			5214 hours			2325 hours			2747 hours		

Wk = Weekday

1. Elevator schedules, except for restaurants, are from the U.S. Department of Energy Standard Evaluation Techniques, except they have been changed to 0% when occupancy is 0%. These values may be used only if actual schedules are not known.

2. Lighting profiles are modified to reflect the requirement for occupancy sensors in space.

School Occupancy

Hour of Day (Time)	Schedule for Occupancy			Schedule for Lighting/ Receptacle			Schedule for HVAC System			Schedule for Service Hot Water			Schedule for Elevator		
	Percent of Maximum Load			Percent of Maximum Load						Percent of Maximum Load			Percent of Maximum Load		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1 (12am - 1am)	0	0	0	5	5	5	Off	Off	Off	5	3	3	0	0	0
2 (1am - 2am)	0	0	0	5	5	5	Off	Off	Off	5	3	3	0	0	0
3 (2am - 3am)	0	0	0	5	5	5	Off	Off	Off	5	3	3	0	0	0
4 (3am - 4am)	0	0	0	5	5	5	Off	Off	Off	5	3	3	0	0	0
5 (4am - 5am)	0	0	0	5	5	5	Off	Off	Off	5	3	3	0	0	0
6 (5am - 6am)	0	0	0	5	5	5	Off	Off	Off	5	3	3	0	0	0
7 (6am - 7am)	0	0	0	5	5	5	Off	Off	Off	5	3	3	0	0	0
8 (7am - 8am)	5	0	0	30	5	5	On	Off	Off	10	3	3	0	0	0
9 (8am - 9am)	75	10	0	60/85	15	5	On	On	Off	34	3	5	30	0	0
10 (9am - 10am)	90	10	0	65/95	15	5	On	On	Off	60	5	5	30	0	0
11 (10am - 1am)	90	10	0	65/95	15	5	On	On	Off	63	5	5	30	0	0
12 (11am - 12pm)	80	10	0	65/95	15	5	On	On	Off	72	5	5	30	0	0
13 (12pm - 1pm)	80	10	0	55/80	15	5	On	On	Off	79	5	5	30	0	0
14 (1pm - 2pm)	80	0	0	55/80	5	5	On	Off	Off	83	3	5	30	0	0
15 (2pm - 3pm)	80	0	0	55/80	5	5	On	Off	Off	61	3	3	30	0	0
16 (3pm - 4pm)	45	0	0	50/70	5	5	On	Off	Off	65	3	3	15	0	0
17 (4pm - 5pm)	15	0	0	35/50	5	5	On	Off	Off	10	3	3	0	0	0
18 (5pm - 6pm)	5	0	0	35/50	5	5	On	Off	Off	10	3	3	0	0	0
19 (6pm - 7pm)	15	0	0	35	5	5	On	Off	Off	19	3	3	0	0	0
20 (7pm - 8pm)	20	0	0	35	5	5	On	Off	Off	25	3	3	0	0	0
21 (8pm - 9pm)	20	0	0	35	5	5	On	Off	Off	22	3	3	0	0	0
22 (9pm - 10pm)	10	0	0	30	5	5	On	Off	Off	22	3	3	0	0	0
23 (10pm - 1pm)	0	0	0	5	5	5	Off	Off	Off	12	3	3	0	0	0
24 (11pm - 12am)	0	0	0	5	5	5	Off	Off	Off	9	3	3	0	0	0
Total/Day	710	50	0	750/990	170	120	1500	500	0	691	80	84	285	0	0
Total/Week	36.00 hours			40.40/52.40 hours			80.00 hours			36.19 hours			14.25 hours		
Total/Year	1877 hours			2101/2732 hours			4171 hours			1887 hours			743 hours		

Wk = Weekday

1. Elevator schedules, except for restaurants, are from the U.S. Department of Energy Standard Evaluation Techniques, except they have been changed to 0% when occupancy is 0%. These values may be used only if actual schedules are not known.
2. Lighting profiles are modified to reflect the requirement for occupancy sensors in space.

9 Appendices

9.3 EU 2 Path 2 (Prescriptive Approach)

When outdoor conditions are suitable, natural ventilation, as opposed to mechanical cooling, can be used to remove heat gains and pollutants from buildings. This reduces energy consumption.

The wind availability at a window is determined by site massing and neighbourhood massing which are addressed elsewhere in this guidance. It is not the intention of this credit to assess the natural ventilation potential in a specific wind environment, simply to give designers a tool to optimise window design and spatial to achieve good natural ventilation.

Acoustic windows calculation should be accounted with reference to PNAP APP-130 (2/2015) Section 6.

Cross Ventilation Requirements

Units can be considered to have good cross ventilation when the air flow path between façade openings is relatively unobstructed.

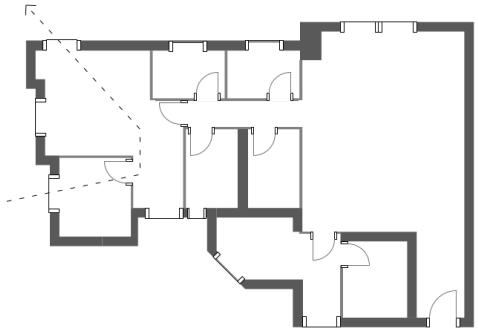
Design should demonstrate cross ventilation enhancement consideration by below design principle:

Openable windows can be located in different habitable areas, e.g. living room and bedroom or on differently orientated façades of the same habitable area.

The cross ventilation path between openings should be one turn only, from the middle of one window to another; (Figure 1 & 3)

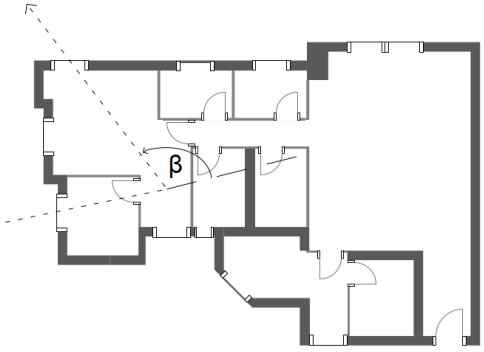
The angle of turn for the cross ventilation path at the joint of the two lines should not be greater than 90°; (Figure 2 & 3)

Cross ventilation path should not be more than 12m in length for each habitable area. (Figure 3)



✖ No More Than One Turn Is Allowed

Figure 1 Cross Ventilation Path between Openings



✖ Angle of Turn, β, Should Not Be Greater Than 90°

Figure 2 Angle of Turn for the Cross Ventilation Path at the Joint of the Two Lines

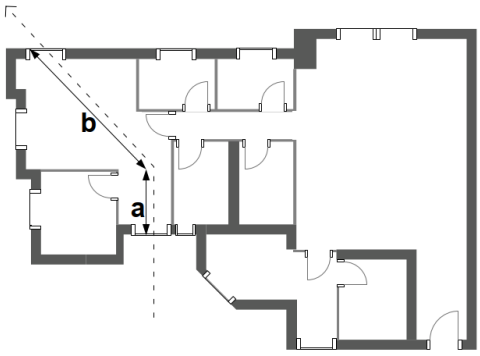


Figure 3 Cross Ventilation Path for Each Habitable Area

In each habitable area, total physical openings area (i.e. not aerodynamic free area) should be double of that of the statutory requirement (i.e.1/8 of openable window area to usable floor area);

When considering a single room, the openable window size located at each wall should be at least 1/16 of the usable floor area;

To ensure cross ventilation can affect the majority of the habitable space, it is required to have the windows a reasonable distance apart. To assess this, draw the smallest box possible that covers the habitable area and divide into equal halves through the longest side. The windows shall lie in different halves of the habitable area. (Figure 4)

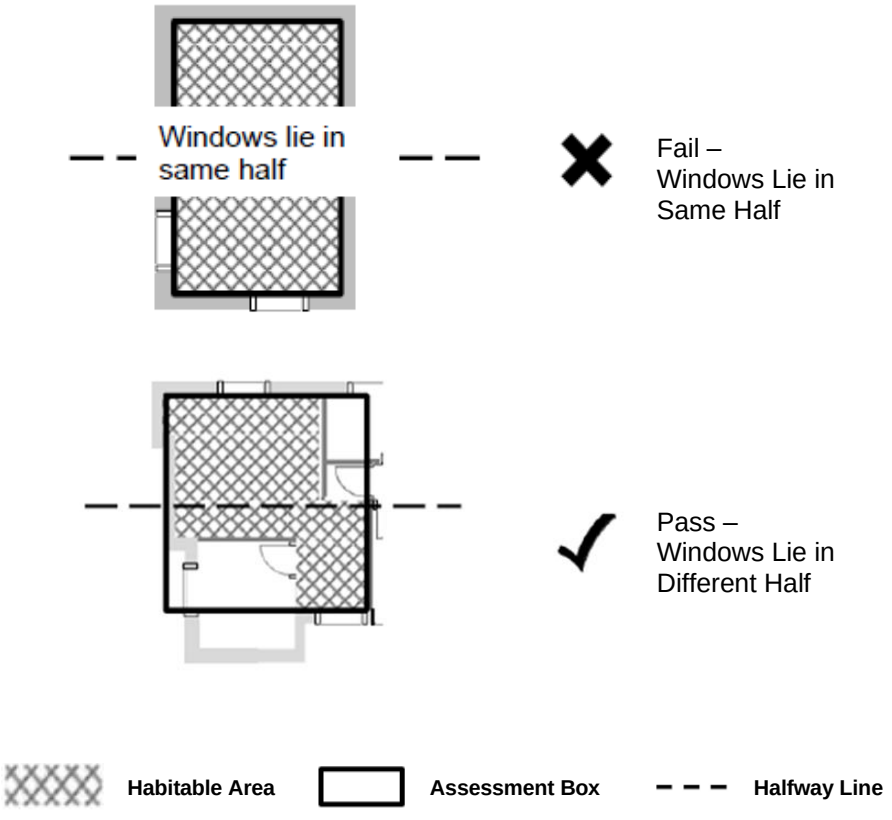


Figure 4 Allowable Locations of Windows in a Zone

For Windows Located within Re-entrants

Concave areas of buildings with width greater than 4.5m will typically have similar flow characteristics to the free-stream. Hence, for the purpose of ventilation, a re-entrant begins when a concaved area has width less than 4.5m. This can be defined graphically by a plane of 4.5m wide (referred to as the External Plane, (ExP), extending from infinity towards a concave area: the re-entrant begins where such a plane can no longer pass through.

A secondary opening located in the re-entrant may still achieve satisfactory cross-ventilation performance provided that the re-entrant is sufficiently wide and the window is located relatively close to the beginning of the re- entrant. Such an acceptable window can be defined by connecting a plane of 2.3m width and 4.5m length (referred to as Secondary Window Plane, (SWP) to ExP. Windows that can be reached by SWP are considered acceptable secondary windows.

For the purpose of this assessment, the effective area of an apartment can be extended by the concept of a “notional” area. Such a notional area can be defined by connecting a Notional Plane (NP) of 1.5m width from SWP to a secondary window. The conditions for demonstrating cross ventilation explained above now cover NOT only the actual residential unit, but also the notional area together, i.e. the ventilation path is measured from the primary window to the SWP, See Figure 5.

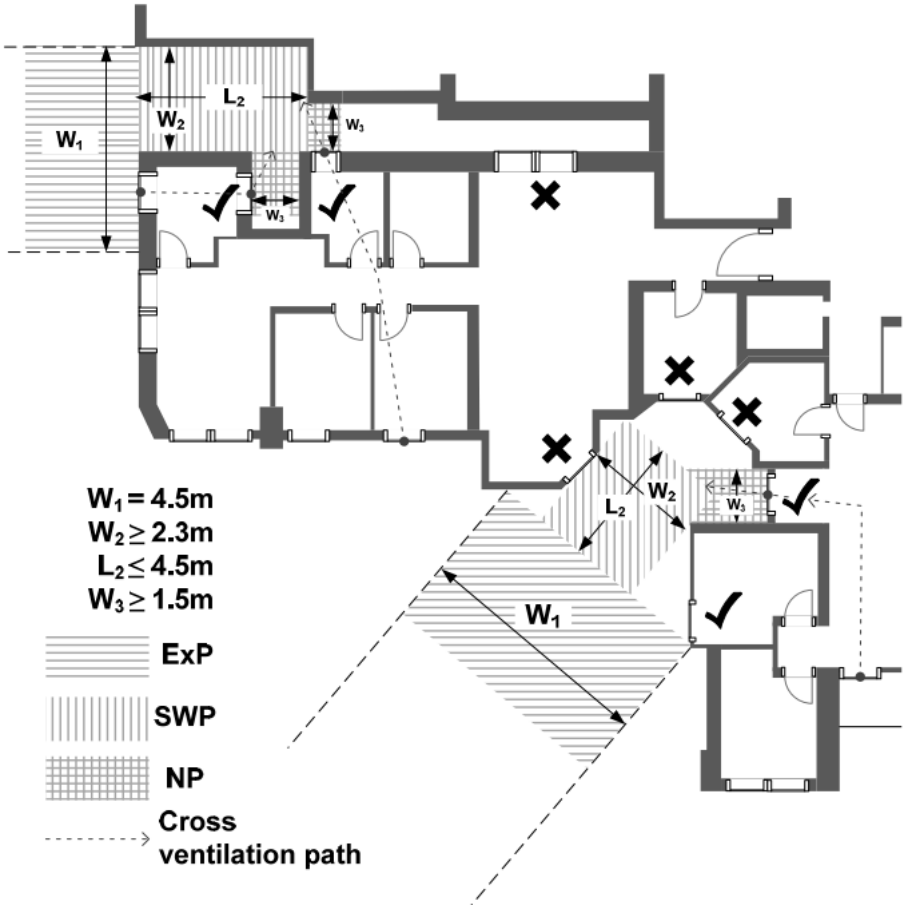


Figure 5 Allowable Locations of Windows in Re-entrants

Single Side Ventilation Requirements

Units can be considered to have good single sided ventilation when the ventilated space is sufficiently small to allow for air exchanges resulting from turbulent fluctuations in the wind which induce pressure differentials across openings or stack effects. The following criteria set out guidelines to achieve single side ventilation requirements.

The window will ventilate up to 4.5m from opening area, the area under question shall be contained within this zone. (Figure 6)

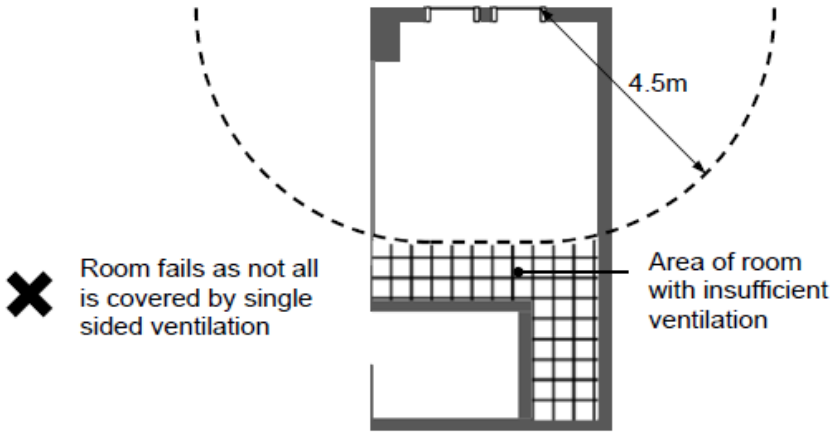


Figure 6 Room Ventilation Zone

At least two separated openable window panes should be located at same wall or different walls for single sided ventilation; and

The total physical openings area (i.e. not aerodynamic free area) in each habitable area shall be at least 1/5 openable window of the usable floor area.

9 Appendices

9.4 Space Type

BEAM Plus considers indoor environmental quality (IEQ) as a key to sustain occupants' health and wellbeing. To assist the Applicant design more thorough and satisfactory IEQ strategies, BEAM Plus imposes high requirements for indoor environmental quality covering ventilation, air quality, acoustics and lighting.

As the impacts of IEQ are dependent on the level of interaction between the occupants and the indoor spaces where they spend their time in, it is crucial for the Applicant to understand and identify the level of usage of each indoor space. To facilitate assessment, the Applicant should prepare a schedule including all spaces present within the building and their respective location. The spaces should be categorised into the following three space type (refer to Glossary for definitions):

- Normally occupied spaces
- Not normally occupied spaces
- Unoccupied spaces

Listed below are some examples of each space type. These examples are not exhaustive. If a space present in the Applicant's building is not included below, the Applicant should identify similar examples or categorise the space type according to the definition. Justification is required should the Applicant believe a space cannot be categorised according to the space type definitions.

Space Usage of normally occupied spaces

- Auditorium
- Concourse
- Conference room
- Dining (commercial and residential)
- Food and beverage dining area
- Front desk
- Gallery area
- Gymnasium
- Hospital patient rooms
- Hotel guest room
- Hotel entrance lobby
- Information desk
- Kitchens (commercial)
- Lecture hall
- Meeting room
- Open office
- Private office
- Reception
- Residential bedroom
- Residential dining room
- Residential living room
- Retails
- School classroom
- Shipping and receiving
- Shopping arcade

Space Usage of not normally occupied spaces

- Break room
- Copy rooms
- Corridor
- Entrance lobby (other than hotel)
- Staircases
- Main lift lobby
- Lift lobby
- Pantry
- Toilet
- Residential kitchen

Space Usage of Unoccupied spaces

- Emergency exit corridor
- Mechanical and electrical rooms
- Car park
- Store room
- Warehouse
- Data Centre/Server room

9 Appendices

9.5 Stormwater Detention Systems O&M Checklist (For Reference Only)

Operations and maintenance checklist for stormwater detention system:

#	DESCRIPTIONS	Y/ N/ NA	Findings/ Follow Up actions
1	**Monthly/ after significant storm event**		
a	No stagnant water in tank		
b	No residual water at inlet/outlet structures		
c	No mosquito breeding		
d	No pest infestation within the system		
e	No clogging at inlet/outlet structures/ trash racks		
f	No excessive sediment builds up in tanks		
g	Inspect, lubricate and conduct routine test to check reliability of pump(s)		
h	Check condition and conduct function test of all pump starters and their controls including level control systems		
i	Standby generator load test		
j	Structural integrity of tank and features are not compromised (check for crack/ leaks)		
k	No obstruction of maintenance access/ openings		
l	Access into the detention tank system is secure (out of bounds to public and unauthorised personnel)		
2	**Yearly/ as required (before year-end monsoon season)**		
a	Desilting detention tank has been carried out, trash screens have been cleaned		
b	Inspect, service, replace, lubricate and test performance of pump(s)		

c	Inspect protective devices such as overload, earth fault, residual current relays		
d	Check condition and conduct function test of all pump starters and controls including level control systems. Replace faulty and worn out parts if required		

