BEAM Plus
Existing Data Centres

Version 1.0 (Beta 0)
03.2020

HKGBC
香港綠色建築議會

BEAM
建築環保評估協會

Disclaimers of BEAM Plus Existing Data Centres V1.0 (Beta 0)

The BEAM Plus Existing Data Centres V1.0 (Beta 0) is released as a beta version for pilot use. This must not be taken as an official launch of the final version which is subject to changes in due course.

In no circumstances shall a reader rely on this version for any purpose other than treating this as a beta version for pilot use.

BEAM Society Limited, its commissioned consultant, participants of Steering Committee and all individuals involved in the development of BEAM Plus Existing Data Centres accept no liability for any loss or damage arising from any use or misuse of or reliance on any information in this manual.

Table of Contents

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 Existing Data Centres (DCs) is one of the BEAM Plus rating tools that cover the design and construction of existing DCs.

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 Existing Data Centres Version 1.0 (Existing DCs V1.0)

The BEAM Plus Existing Data Centres Version 1.0 (Existing DCs V1.0) aims to be practical, clear and standardised in defining the key elements of green DCs including health and wellbeing, hygiene, site impacts, use of materials, water quality, energy efficiency, indoor environmental quality, etc. During the development process, the following fundamentals were established:

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

Adaptability – The development of BEAM Plus DCs is formulated with specific requirement for DCs, including both the building system performance of the DCs

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 DCs practices yet pose reasonable challenges for better quality, performance and cost-effectiveness.

BEAM Plus Existing DCs V1.0 aims to embrace more participation in "Green" Existing DCs, encourage more energy saving towards Energy Saving Plan Target, and educate and induce behavioural change. The BEMA Plus Existing DCs is introduced to encourage existing data centres to consider holistic green enhancements for more energy efficient operation.

The framework of BEAM Plus Existing DCs V1.0 include the following features:

i. Take into account of the local climate and ecosystems (e.g. the limited space in most local existing data centres);
ii. Take into consideration the latest advancements in data centre technology such as aisle containment for cooling (and hence encourage existing data centres to adopt);
iii. Credit criteria are set to encourage the use of energy efficient and environmentally friendly systems and equipment;
iv. Credits are awarded to encourage change in behaviour to sustain green

operation;
v. Echoes the government environmental policy such as the Energy Saving Plan; and
vi. Existing data centre can seek different options to be certified, e.g. to address with priority the most urgent business needs;

There are two (2) major schemes under BEAM Plus Existing DCs Version 1.0, i.e. BEAM Plus Existing DCs and BEAM Plus Existing DCs (Individual Category). BEAM Plus Existing DCs adopts the 'Plan-Do-Check-Act' approach for the continual improvement while BEAM Plus Existing DCs (Individual Category) embraces the 'Better than yesterday' principal to recognise the enhancement efforts to be made by the DC management of existing DCs.

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 Existing DCs Version 1.0

The development of BEAM Plus Existing DCs V1.0 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, assessment criteria, performance categories and their relative importance, submission requirement and grading methodology. The Steering Committee comprises:

Convener – Ir Victor Cheung

Members – Ir Colin Chung; Mr KM So; Ir Sr Martin Wan; Mr MK Leung; Ms Yvonne Ieong; Ir Alvin Lo; Ir Sr Jonathan Lee; Ir Kenneth Li; Mr Ho Wing Hung; Dr Benny Chow; Mr Keith Chung; Mr Charles Lee; Mr Paul Chong; Ms Grace Kwok; Ms Carmen KM Wong; Ir Kim Tang Cheuk; Sr Kenneth Yun; Mr Herbert Chan; Mr Taylor Man; Mr Martin Chan; Dr Anthony Lo; Ir Raymond Choi; Dr Luo Xiaowei; Prof Wang Shengwei; Ir Michael Waye; Mr Ben Tam

Advisors – Mr KC Mak; Ms Pelene Ng; Mr Alvin Lo; Ir Ernest Yeung; Mr Patrick KK Chan

Disclaimer

BEAM Plus Existing DCs 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 Existing DCs 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 this manual, including BSL and its members, provide any warranties or assume any liability or responsibility to the users of this manual, or any third parties for the accuracy, completeness or use of, or reliance on, any information contained in this manual, 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, its members, participants of Steering Committee and all individuals involved in the development of BEAM Plus Existing DCs 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 this manual.

Limitations

BSL does not endorse any self-assessed grading awarded by the use of BEAM Plus Existing DCs.

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 Existing DCs without formal certification does not entitle the user or any other party to promote any grading awarded.

Application and Eligibility

Assessed DC must with area not less than 500 m^2. Typically, DC refers to any space containing banks of data storage equipment, i.e. servers, data storage, etc., plus any supporting spaces (e.g. switch rooms, UPS rooms, battery rooms). The primary function of the DC must be for housing physical or virtual storage, management, and dissemination of data and information as generally perceived and accepted by the industry. The data halls and any related plant space should make up a significant majority of the floor area of the assessed DCs

Assessed DC associated function areas must not larger than 25% of floor area under assessment. The DC associated function areas refer to the building functions/spaces that are provided for the use of staff running the facility:

i. Reception and waiting areas;
ii. Office areas (including meeting and training rooms);
iii. Building management offices;
iv. Staff restaurant and/or kitchen facilities;
v. Pantry;
vi. Staff gym;
vii. Restrooms, WCs and changing facilities;
viii. Circulation areas;
ix. Guard/ Security room;
x. Staging rooms; and
xi. Command centres, etc.

The above list is not exhaustive, but serves to indicate the type of areas covered by the scope of this BEAM Plus DCs

DC certification area must be separable from other mixed-use elements of the buildings.

Existing DCs with at least ONE year (i.e. counted from the completion of Test and Commissioning) of operation data.

BEAM Plus Existing DCs V1.0 covers the management, operation, maintenance, etc., of all types of existing DCs installations, including DCs occupied a whole building or DCs installed in part of a building.

DCs with BEAM 4/04 or BEAM Plus certificate are encouraged to renew their certificates by participating in this Scheme.

Newly completed DCs that have not been certified by BEAM Plus are also encouraged to participate in this Scheme. However, it is essential for the building and DC management to have at least one-year operational data (i.e. counted from the completion of Test and Commissioning) of the DC before registration.

DCs with building services upgrades or minor renovations without changing the use of the building can also be assessed under this Scheme.

DCs undergone major renovation with structural alternations (such as the revitalisation of the entire industrial buildings, change of building use or the types of Alterations and additions (A&A) works) cannot be assessed by this Scheme.

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, and hence BEMA Plus Existing DCs, 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 Existing DCs assessment. The project boundary needs not necessarily follow the site boundary of the premises, which however, should be consistent throughout the project assessment.

Under normal circumstances, BEAM Plus Existing DCs V1.0 only assesses those areas which are under the control of the Applicant. It is understood that the involvement of tenants also plays an important role in improving the building's environmental performance. Therefore, additional or bonus credits could be awarded when the Applicant can demonstrate that their tenants are also getting involved in the assessment. Details can be referred to the assessment criteria of individual credit criteria.

Certification Framework

BEAM Plus Existing DCs V1.0provides Applicants with more flexibility to participate in this green assessment to suit their program, budget and technical capability. An assessment framework with 2 Schemes are designed and presented in Figure 1.1, including:

i. BEAM Plus Existing DCs (One-step approach)

   All aspects under this methodology are assessed in one-go and one full certificate is offered if the requirements are fulfilled.

ii. BEAM Plus Existing DCs (Two-step approach)

   Combination of aspects assessment is allowed. Intermediate result(s) for the assessed aspect(s) will be issued. The Applicant is required to update the necessary information of the assessed aspect(s) and submit

the remaining aspect(s) within 2 years of the issuance of first intermediate result. Those documentation required to be updated are marked with [#] in the BEMA Plus Existing DCs Manual. Please note that MAN and EU aspects under the Manual must be assessed first at the first stage for the Intermediate results.

An example of submission timeline is illustrated in Figure 1.2

Two-step approach is designed for DCs that need to be upgraded in order to achieve BEMA Plus Existing DCs certification. DC owners management may not have the full budget and sufficient time to upgrade all the systems in one go. The intermediate certificate can recognise their effort in improving their DC performance in certain area before the final full certification. DCs will be assessed and graded with the same standard under One-step approach.

iii. BEAM Plus Existing DCs (Individual Category)

It is an individual aspect assessment approach, and certificate will be issued for each individual assessed aspect. In view of the importance of energy efficient and on-going management for an existing DC, BEAM Plus Existing DCs (Individual Category) specifies EU and MAN aspects are the mandatory aspect to be assessed for each of individual project, and the two aspects must be assessed at the same time. Should the same project completed the assessment of all 6 aspects, “Record of Achievement” may be issued upon request by Applicant to document the result of each aspect assessed.

Existing DC owners may choose to apply BEAM Plus Existing DC (Individual Category) certification if they do not intend to achieve the performance requirements for all aspects via Comprehensive Scheme. DCs will be assessed and graded with the same standard under One- and two-step approaches.

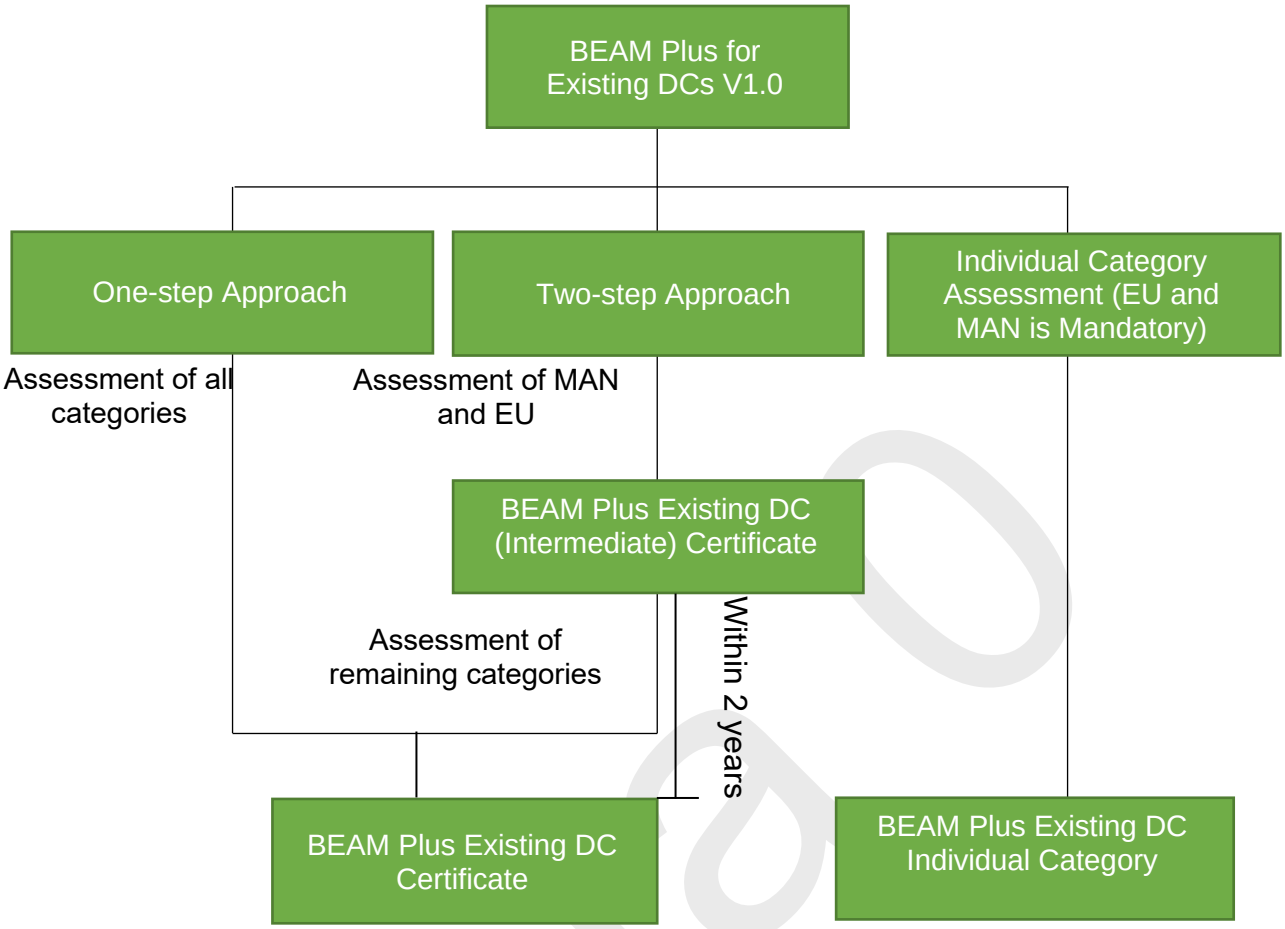

Figure 1.1 Assessment Flowchart of BEAM Plus Existing DCs Version 1.0.

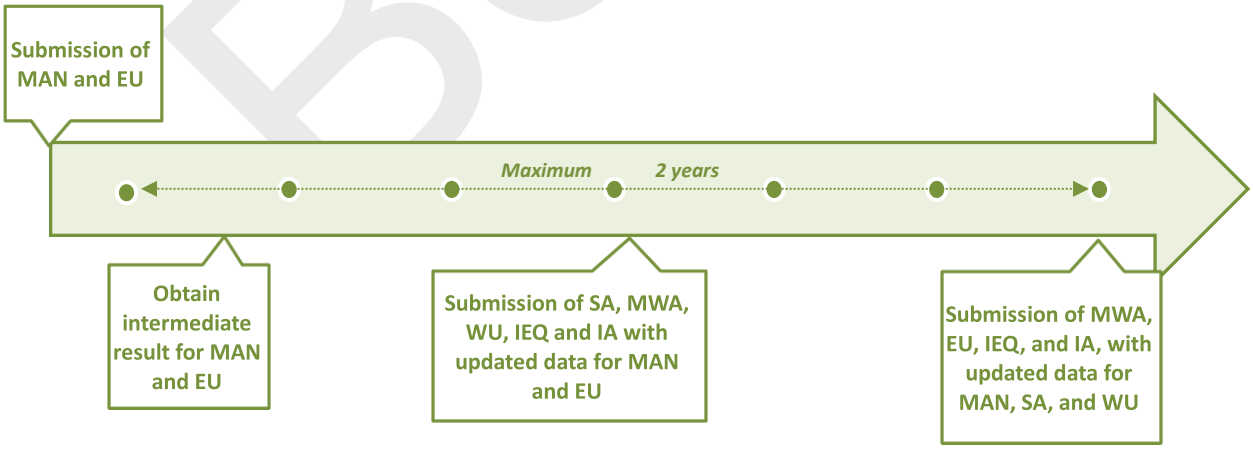

Figure 1.2 Example of submission timeline for BEAM Plus Existing DCs – Two-step Approach

Certification Process	Independent BEAM Assessors (BAS) or BSL in-house 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.
BEAM Professional/ Affiliate	BEAM Professional (BEAM Pro)/ Affiliate mentioned in this manual should process the valid credential for BEAM Plus Existing DCs V1.0for facilitating the certification process and to ensure the compliance of relevant credit requirements.
Documentation	The Applicant has the obligation to provide evidence to demonstrate credit compliance. In Existing DCs V1.0, 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 Existing DCs certification fee comprises 2 parts, namely Registration Fee and Assessment Fee which are payable to HKGBC and BSL respectively. Certification fees for BEAM Plus Existing DCs V1.0 Comprehensive Scheme depend on the size and complexity of the project as determined by the HKGBC and BSL. Submission of credit interpretation request (CIR) and Appeals are subject to separate published charges. 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 Existing DCs V1.0, credits are grouped into the following categories:

i. Management (MAN);
ii. Site Aspects (SA);
iii. Materials and Waste Aspects (MWA);
iv. Energy Use (EU);
v. Water Use (WU);
vi. Indoor Environmental Quality (IEQ); and
vii. Innovations and Additions (IA).

While BEAM Plus Existing DCs V1.0 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 existing DCs projects.

Management (MAN)

MAN assesses the policies, procedures and strategies implemented to ensure DCs are operated in a sustainable manner:

i. Green procurement;
ii. Environmental, Health and Safety (EHS), and energy management;
iii. Environmental, social and governance (ESG) disclosure;
iv. Staff training;
v. Operation and maintenance; and
vi. IAQ management for renovation.

Site Aspects (SA)

In general, the location of the DCs determines the extent of its environmental aspects. SA include:

i. Site location;
ii. Emissions from the site;
iii. Bioclimatic architecture; and
iv. Site amenities.

Materials and Waste Aspects (MWA)

MWA focuses on materials in (green purchasing) and out (waste disposal) of the DCs. MWA include:

i. Selection of materials; and
ii. Waste management and reduction.

Energy Use (EU)

Assessments of EU in a DC contain variety of uses, energy sources and building services systems or equipment, which are complex processes given the number of influencing variables. By comparing with the benchmarks derived from audits of similar type of buildings, and/or a computational approach, the energy uses, in addition to features known to have impact on overall performance will be determined. EU includes:

i. Energy performance;
ii. Energy management and analysis;
iii. Commissioning;
iv. Energy efficient improvement; and
v. Enhancement.

Water Use (WU)

Assessments under WU include quality and features that improve the utilisation and reduce effluent. WU includes:

i. Water conservation;
ii. Water management; and
iii. Effluent.

Indoor Environmental Quality (IEQ)

Indoor environmental issues include those aspects of building performance that impact on the health, comfort, or well-being of the occupants, as well as aspects of performance that improve quality and functionality. IEQ includes:

i. Ventilation performance;
ii. Thermal comfort;
iii. Hygiene;
iv. Indoor air quality;
v. Lighting quality; and
vi. Acoustics and noise.

Innovations and Additions (IA)

In this section, Applicants are encouraged to submit proposals for BSL consideration where the project:

i. introduces innovative designs, construction or operational provisions that enhance performance and are not hitherto found in Hong Kong; or
ii. achieves performance enhancements that greatly exceed the prevailing requirements in BEAM Plus Existing Buildings.

In such cases Applicants can submit proposals that:

i. detail the proposed technology/ practice;
ii. demonstrate how the technology/ practice is implemented; and
iii. quantify the environmental benefits.

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 determined to reflect its importance as follows:

Category	Weighting
MAN	20%
SA	10%
MWA	10%
EU	40%
WU	10%
IEQ	10%

Extent of Application

Extent of Applications specify the applicable credit to different types of DC installation, i.e. Whole building DCs or DCs installed in part of the building

Prerequisites

The Applicant must demonstrate that all the pre-requisites are achieved. Otherwise, the project will be graded as "Prerequisite(s) Not Achieved". In addition, when an assessed issue becomes subject to legislation, it will no longer count for the award of credits

BONUS Credit & Additional Bonus Credit

The bonus credits and additional bonus credits, as applicable in Existing DCs V1.0, 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 Existing DCs V1.0 are counted towards the total number of credits qualifying for an award classification. A maximum of 12 IA credits could be submitted for achieving a higher score in the assessment.

Determination of Overall Grade

The final certificate grading awarded to projects certified under BEAM Plus Existing DCs V1.0 for One-step, Two-step and Individual Category Assessment is subject to the following conditions:

BEAM Plus Existing DCs (One-step and two-step approach)

i.
ii.
iii.

To be announced later.

Grade	Minimum Percentage for each Category	Total Score Percentage
Platinum	To be announced later.	
Gold		
Silver		
Bronze		

BEAM Plus Existing DCs (Two-step approach)

The intermediate results for projects certified under BEAM Plus Existing DCs V1.0 (Two-step approach) is subject to the following conditions:

i.
ii.

To be announced later.

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".

BEAM Plus Existing DCs (Individual Category)

i.
ii.

To be announced later.

Grade	Overall percentage (%) of credits achieved in the assessed category
To be announced later.	

1.3 Summary of Credits

Section		Credit Requirement	Extent of Application	Credit
2	**Management (MAN)**			**19 + 4B**
MAN P1	Green Purchasing Plan	Demonstrate that green purchasing plan and procedures (including both materials and services) either follow their internal company guideline or other international standards, shall be in place.	All DCs	Required
MAN 1	EHS And Energy Management System	1 credit where the DC management operates an Environmental Management System (EMS) certified to ISO 14001. 1 credit where the DC management operates an Occupational Health and Safety System (OHSAS). 1 credit where the DC management operates an Energy Management System (EnMS). 1 BONUS credit where DC management operates an OHSAS certified to BS OHSAS 18001. 1 BONUS credit where the DC management operates an EnMS certified to ISO 50001.	All DCs	3 + 2 BONUS
MAN 2	Environmental, Social and Governance (ESG) Disclosure	1 credit where the DC Owner/ DC Management Company discloses sustainability policy and targets to the public. 1 BONUS credit where the Building Owner/ Building Management Company follows Global Reporting Initiative™ (GRI) Sustainability Reporting Guidelines and discloses the G4 sustainability report to the public.	All DCs	1 + 1 BONUS
MAN 3	BEAM Professional	1 credit for at least 2 members from the Building Management Company are certified BEAM Professional with DC credential. Alternatively 1 credit for at least 1 key member from the Building Management Company is a certified BEAM Professional with DC credential and at least 1 member is a certified BEAM Affiliate. 1 additional credit for the building-in-charge being a certified BEAM Professional with DC credential and with at least 1 professional corporate membership qualification (e.g. HKIH, HKIA, HKIE, HKIS (BS/PFM), RICS (BS/FM), IFMA, HKIFM, BSOMES, or equivalent).	All DCs	2
MAN 4	Staff Training and Resources	(a) Staff and Technical Resources 1 credit for having adequate staff and technical resources to meet the O&M requirements of the	All DCs	2

Section		Credit Requirement	Extent of Application	Credit
		building. (b) Staff Training 1 credit for providing adequate and periodic training for the staff responsible for the O&M of the building.		
MAN 5	Building and Site Operation and Maintenance	(a) Building Maintenance 1 credit for demonstrating the operation of a planned programme of regular inspection, cleaning and maintenance of the building's fabric and structure under the control of the Applicant. (b) External Areas and Facilities 1 credit for demonstrating the operation of a planned programme of regular inspection, cleaning and maintenance of external areas and facilities.	Except DCs not under control of Applicants All DCs with external areas of facilities	2
MAN 6	Building Services Operation and Maintenance	(a) Central Heating Ventilation and Air-Conditioning (HVAC) Plant 2 credits for demonstrating the operation of a planned programme of regular inspection and maintenance of the central HVAC plant. (b) Other Engineering Systems Maximum 4 credits for demonstrating the operation of a planned programme of regular inspection and maintenance of the following listed systems. i. Air-conditioning system except central HVAC plant; ii. Electrical system; iii. Lighting system; and iv. Plumbing and drainage system (c) Assessment of Operation & Maintenance Practice 1 credit for having undertaken an audit of the effectiveness of the O&M practices for all building services engineering systems.	Except Building does not have a central HVAC plant, or the HVAC plant not controlled by the applicant. Except system(s) that is(are) not controlled by the applicant. All DCs.	7
MAN 7	Electronic Operation and Maintenance Platform	1 BONUS credit for operating an electronic O&M platform by the DC Owner/ DC Management Company.	All DCs.	1 BONUS

	Section	Credit Requirement	Extent of Application	Credit
MAN 8	IAQ Management for Renovation	1 credit for providing a Construction Indoor Air Quality (IAQ) Management Plan. 1 credit for providing records that the Construction IAQ Management Plan has been implemented by the DC Owner/ DC Management Company/ tenants during renovation.	All DCs.	2
3	**Site Aspects (SA)**			**12+ 3 BONUS**
SA 1	Green Building Attributes	Maximum 5 credits for the host building that has been certified under BEAM Plus / BEAM certification: i. 5 credits for Platinum grade; ii. 4 credits for Gold grade; and iii. 3 credits for any other grade. Alternatively, Maximum 3 credits for an uncertified building that meets the listed performance characteristics, 1 credit for each sub-item: i. Parking capacity must not exceed the minimum requirement from Government; ii. Public transport shall be within 800m walking distance from building main entrance(s); iii. At least 5 different amenities are located within 800m walking distance from building main entrance; iv. Using pervious materials for a minimum of 50% of hard landscaped areas; v. Enhancement of the biodiversity within the site boundary when compared with the time of building completion; vi. Ensuring the vertical daylight factor is above 12% for neighbouring sensitive buildings; vii. Provision of adequate active and passive security measures to suit the operation need; and viii. Providing EV charging-enabling facilities for all carparking spaces (including visitor car parks).	All DCs.	5

	Section	Credit Requirement	Extent of Application	Credit
SA 2	Noise Pollution	(a) Provision of Acoustic Treatment 1 credit for providing adequate acoustic treatment to the following building services equipment: chillers, cooling towers, ventilation fans with Sound Power Level (SWL) higher than 80 dB(A). (b) Demonstration of Compliance with HKPSG Criteria 1 credit for demonstrating that the level of the intruding noise at the façade of the potential Noise Sensitive Receivers (NSRs) is in compliance with the criteria recommended in the Hong Kong Planning Standards and Guidelines (HKPSG).	Except the listed buildings services equipment not controlled by the applicant	2
SA 3	Light Pollution	Compliance Path 1 2 credits if there are no external lightings installed for the building. Alternatively, Compliance Path 2 2 credits for switching off the DC Owner's/ DC Management Company's/ tenants' (if any) external lightings from 23:00 to 07:00	All DCs	2
SA 4	Heat Island Reduction	1 BONUS credit for demonstrating the implementation of any combination of the following strategies for a minimum of 10% of the external non-roof area (i.e. ground floor and podium with less than 15m in height): i. Greenery; ii. Water feature; iii. Green wall or vertical greening; iv. Shading device; and/or v. Paving materials with solar reflectance (SR) of 0.33. 2 BONUS credits for more than 20% of the external non-roof area covered with the aforesaid features. 1 BONUS credit for providing green roof and/or organic farm for at least 20% of the available main roof area.	Whole Building DC Development	3 BONUS
SA 5	Amenities for Operation And Maintenance	(a) Amenities for DC Building Users 1 credit for providing 3 of the following listed amenities that improve the operation and maintenance of the building and its engineering services: i. Art Galley; ii. Canteen; iii. Guard counter/ caretaker's counter/ information counter/ service counter; iv. Mail delivery room (not mail boxes areas); v. Noise Barrier; vi. Video display in lift car;	All DCs	2

	Section	Credit Requirement	Extent of Application	Credit
		vii. Wider common corridor/lift lobbies (For Front of House); viii. Rest room for Operators; ix. Baby-care room; x. Breast feeding room; and xii. Others to be proposed by the Applicant. (b) O&M Amenities for DC Maintenance Staffs 1 credit for providing 3 of the following listed amenities that improve the operation and maintenance of the building and its engineering services: i. Aerial working platform; ii. Building Management System (BMS); iii. Cat ladder; iv. Davit arm system; v. External pipe duct; vi. Fall arrest system; vii. Gondola system; viii. Guard room; ix. Maintenance platform; x. Maintenance workshop; xi. Movable platform, and xii. Others to be proposed by the Applicant.		
SS 6	Barrier Free Access	1 credit for providing 3 enhanced barrier free access provisions as per the latest version of the Design Manual of Barrier Free Access.	All DCs	1
4	**Materials and Waste Aspects (MWA)**			**10 + 3 BONUS**
MWA P1	Waste Recycling Facilities	<u>For Whole Buildings DC Developments:</u> Providing spaces for collection, sorting, storage and disposal of waste and recovered materials. <u>For DC Developments located in part of building:</u> Providing storage facilities at prominent location for the collection of paper, plastic and metal waste.	All DCs	Required
MWA P2	Materials Purchasing Plan	Demonstrating that the plan of material procurement (sub-section under MAN P1 Green Purchasing Plan) and its procedures for both on-going consumables and durable goods either following the internal company guideline or other international standards are in place.	All DCs	Required

	Section	Credit Requirement	Extent of Application	Credit
MWA 1	Materials Purchasing Practices	1 credit for demonstrating at least 50% of purchased on-going consumables are environmentally friendly products for the past 12 months as minimum. 1 credit for demonstrating at least 50% of purchased durable goods are environmentally friendly products for the past 12 months as minimum. 1 credit for demonstrating at least 70% of purchased both on-going consumables and durable goods are environmentally friendly products for the past 12 months. 1 Bonus credit for demonstrating at least 70% of purchased both on-going consumables and durable goods are environmentally friendly products for the past 24 months.	All DCs	3 + 1 BONUS
MWA 2	Use Of Certified Green Products	Maximum 2 BONUS credits for purchasing green products certified by Construction Industry Council (CIC) Carbon Labelling Scheme/ HKGBC Green Product Accreditation and Standards (HK G-PASS) or other internationally recognised schemes.	All DCs	2 BONUS
MWA 3	Ozone Depleting Substances	(a) Newly and Existing Installed Equipment using Refrigerants 1 credit for all the equipment (both newly purchased and existing) using the refrigerants with Global Warming Potential (GWP) less than 1,900. Alternatively, For equipment with refrigerant GWP value > 1,900, credit can be achieved when the Applicant can demonstrate a phased programme of refrigerant replacement. 1 credit for using refrigerants with a combined value less than or equal to the threshold for the combined contributions to ozone depletion and global warming potentials for all new and existing HVAC&R equipment that under the control of Applicant. (b) Fire Suppression and Other Materials 1 credit for using the fire suppression and other materials that avoids the use of ozone depleting substances in their manufacture, composition or use.	Except the installed equipment using refrigerants, and fire suppression and other materials not controlled by the applicant	3

	Section	Credit Requirement	Extent of Application	Credit
MWA 4	Enhanced Waste Management	a) Waste Management Plan 1 credit for developing a waste management plan. b) Enhanced Waste Handling Facilities 1 credit for providing at least 3 of the following listed on-site recycling facilities and implementing the recyclable materials collection arrangement: i. IT related waste such as, electronic equipment; ii. Plastic recyclable; iii. Metal recyclable; iv. Glass recyclable; v. Paper recyclable; and vi. Beverage carton recyclable.	All DCs	2
MWA 5	Waste Management for Renovation	a) Construction Waste Management Plan 1 credit for developing a waste management plan for renovation. b) Construction Waste Recycling 1 credit for demonstrating compliance with the Construction Waste Management Plan and the application of proactive waste management provisions during construction (demolition and construction); and recycling of at least 15% of construction waste (demolition and construction).	All DCs	2
5	**Energy Use (EU)**			**34 + 9 BONUS**
EU P1	Minimum Energy Performance	Conducting energy audit in accordance with the Building Energy Efficiency Ordinance (Cap 610) requirements for existing buildings.	All DCs	Required
EU 1	Energy Management	a) Energy Management Policy 1 credit for an energy management policy endorsed by top management. b) Energy Management Plan 1 credit for energy management plan covering less than 3 years. 2 credits for energy management plan covering 3 years or more. c) Appointment of Energy Warden 1 credit for appointing an Energy Warden in the DC Management Company.	All DCs All DCs All DCs	4
EU 2	Energy Analysis	a) Data Collection Facilities 1 credit for sub-metering systems for the following electrical loads where applicable: i. Water side; ii. Air side; and iii. Lighting. 1 credit for having Building Management	Except Buildings compulsorily complying with BEC 2012 or later version	10

Section		Credit Requirement	Extent of Application	Credit
		System (BMS) to log operation data (e.g. pressure, temperature, flow rate, on/off status) for monitoring operation and function of the system including the following as a minimum: i. Air side; ii. Water side; iii. Cooling load; and iv. Lighting control. 1 credit for energy metering to provide total facility power and energy usage and total IT equipment power and energy at each output of Power Distribution Unit (PDU) for determining instantaneous and average Power Usage Effectiveness (PUE) data. b) Data Collection Record 1 credit for providing energy consumption data record of at least 1 year for major electrical loads. 1 credit for providing energy consumption data record of more than 3 years for major electrical loads. c) Data Analysis 1 credit for calculating the EUI of the following services in data analysis: i. Air-conditioning system; and ii. Lighting. 1 credit for calculating and recording the PUE for 1 year. d) Energy Audit Report 2 credits for filling up the entire Template 1 on Additional Information to Executive Summary of Energy Audit Report to EMSD. e) Carbon Audit Report 1 credit for conducting carbon audit in accordance with the requirements as stipulated in the guideline issued by the Authority.	All DCs All DCs All DCs All DCs All DCs	
EU 3	Commissioning	(a) Action Plan 1 credit for action plan covering less than 3 years. 2 credits for action plan covering 3 years or more. (b) Commissioning 1 credit for providing original/ retro-commissioning (RetroCx) for electrical services systems. For DCs with chiller system: 1 credit for providing original/ retro-commissioning (RetroCx) for water side	All DCs Except Electrical system/ HVAC system not controlled by the applicant	10

Section		Credit Requirement	Extent of Application	Credit
		equipment of central air-conditioning system. 1 credit for providing original/ retro-commissioning (RetroCx) for air side equipment of central air-conditioning system. For DCs without chiller system: 1 credit for providing original/ retro-commissioning (RetroCx) for air-conditioning system. (c) On-going Commissioning 1 credit for providing an ongoing commissioning plan detailing the works and person-in-charge for electrical services if on-going commissioning have been conducted for electrical system and/or for Heating, Ventilating, and Air-Conditioning (HVAC) system if on-going commissioning have been conducted for HVAC system. 1 credit for the execution of any 2 of the following measures for power quality management regularly. 2 credits for the execution of any 4 of the following measures for power quality management regularly. i. Power factor monitoring & correction; ii. 3-phase Load Balancing; iii. Maximum demand monitoring; iv. Demand Side Management (DSM); v. Total Harmonic Distortion (THD); and vi. Thermal Scan on electrical distribution system. For DCs with chiller system: 1 credit for ongoing commissioning for water side equipment of central air-conditioning system. 1 credit for ongoing commissioning for air side equipment of central air-conditioning system. For buildings without chiller system: 1 credit for ongoing commissioning for all HVAC equipment.	Except Electrical system/ HVAC system not controlled by the applicant	
EU 4	Energy Benchmarking and Management	(a) Benchmarking Credit(s) can be achieved based on the Operating PUE value No. of Credits: 1 | 2 | 4 | 6 | 8 | 1 BONUS | 2 BONUS PUE: 2.0 | 1.9 | 1.8 | 1.7 | 1.6 | 1.5 | ≤1.4 b) Air Management System 1 credit for demonstrating the total air flow efficiency in all data hall, from supply to return,	All DCs	10 + 2 BONUS

Section		Credit Requirement	Extent of Application	Credit
		is of 0.9 kW/m^3/s. 1 credit for demonstrating the data hall supply air temperature for 24 °C and above.		
EU 5	Enhancement	Maximum of 1 BONUS credit for each energy conservation approach is allowed but the award of credit is subject to the final approval of BEAM Society Limited (BSL)'s Technical Review Committee (TRC) based on the estimated energy reduction, justification and/or the innovation of the proposed approaches. Note: Energy saving measures that rely on building user's behaviour or manual control (such as, turning up the set temperature manually for air-conditioning; turning off lighting by hand in accordance to staff energy management manual) will not be considered energy saving features in this section. Some of the prescriptive approaches include: a) Research and Development in Energy 1 BONUS credit for conducting research and development or participating in competition with published paper related to energy aspects for DCs. b) Compliance with the BEC Maximum 4 BONUS credits for compliance with the latest version of the following listed BEC (This BONUS credit does not apply to those buildings that are required to comply with the latest version of the BEC): Energy Efficiency Requirements for Air-Conditioning Installations; Energy Efficiency Requirements for Electrical Installations; Energy Efficiency Requirements for Lighting Installations; and/or Energy Efficiency Requirements for Lift and Escalator Installations. c) Renewable Energy System 1 BONUS credit where at least 0.2% of building energy consumption in communal area is obtained from renewable energy sources. d) Separate Energy Charges	All DCs	7 BONUS

<table>
<tr><th></th><th>Section</th><th>Credit Requirement</th><th>Extent of Application</th><th>Credit</th></tr>
<tr><td></td><td></td><td>1 BONUS credit where separate charges are made for energy use.

e) Other Approaches
Maximum 7 BONUS credits for adopting other energy conservation
approach not prescribed above.</td><td></td><td></td></tr>
<tr><td>6</td><td>Water Use (WU)</td><td></td><td></td><td>13 + 4 BONUS</td></tr>
<tr><td>WU 1</td><td>Water Efficient Devices</td><td>Credit(s) can be achieved based on the estimated aggregate annual saving by the use of water efficient devices.

<table><tr><td>No. of Credit(s)</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Estimated aggregate annual fresh water saving</td><td>10%</td><td>15%</td><td>20%</td><td>25%</td></tr></table></td><td>Except water devices not under the control of the applicant</td><td>4</td></tr>
<tr><td>WU 2</td><td>Cooling Tower Water</td><td>1 to 2 credits for reducing fresh water consumption by installing water treatment system which can achieve minimum 7 cycles or 8 or more cycles of concentration with acceptable water quality.</td><td>Except DCs without cooling tower or cooling tower with salt water</td><td>2</td></tr>
<tr><td>WU 3</td><td>Water Recycling</td><td>1 BONUS credit for harvesting rainwater and/or recycling grey water that leads to a reduction of at least 2.5% in the consumption of fresh water.

1 additional BONUS credit if the reduction can achieve 5% or above.</td><td>All DCs</td><td>2 BONUS</td></tr>
<tr><td>WU 4</td><td>Water Saving Performance</td><td>Credit(s) can be achieved based on the reduction percentage by comparing water bill/ metering data. (Reference year can be any year in the past 5 years).

<table><tr><td>No. of Credits</td><td>1</td><td>2</td><td>3</td><td>4</td><td>BONUS</td></tr><tr><td>Annual fresh water use reduction</td><td>3%</td><td>6%</td><td>9%</td><td>12%</td><td>15%</td></tr></table></td><td>All DCs</td><td>4 + 1 BONUS</td></tr>
<tr><td>WU 5</td><td>Water Metering</td><td>1 credit for demonstrating provision of permanent smart water metering for cooling towers water use and Indoor plumbing fixtures and fitting, and at least two (2) of the other water systems, which able to display metered data, treading of water consumption and relevant parameters.:

i. Irrigation (if applicable);
ii. Cleansing;
iii. Water features/ pools; and
v. Other process water.

1 BONUS credit for installation of devices for detecting water leakage at the communal water</td><td>Except when less than 2 water sub-systems are under the control of applicant</td><td>1 + 1 BONUS</td></tr>
</table>

	Section	Credit Requirement	Extent of Application	Credit
		supply system within the building lot, i.e. underground buried pipes and all fresh water pump rooms.		
WU 6	Water Efficient Flushing System	1 credit for installing dual flush for the water closets under the control of the Applicant. 1 credit for installing urinal with WELS Grade 2 or above.	Except Flushing system not under the control of applicant	2
7	**Indoor Environmental Quality (IEQ)**			**12 + 2 BONUS**
IEQ P1	Minimum Ventilation Performance	Demonstrate that the project is in compliance with the minimum requirements of ANSI/ASHRAE 62.1-2013 in respect of Outdoor Air Quality and Minimum Ventilation Rate. Alternatively, In case of the minimum ventilation rate of ANSI/ASHRAE 62.1-2013 is not complied due to the physical constraints of the existing ventilation system, demonstrate that the system is operated at maximum outdoor air delivery rate and provide not less than 5 l/s per person of combined outdoor air rate.	Except Naturally ventilated spaces	Required
IEQ 1	Ventilation in Common Areas	<u>Compliance Path 1</u> 1 credit for providing adequate ventilation for 90% of mechanically ventilated common areas in a building. Alternatively, <u>Compliance Path 2</u> For naturally ventilated premises, 1 credit for demonstrating that 80% of the common areas in a building are provided by natural ventilation.	All DCs.	1
IEQ 2	Localised Ventilation	1 credit for providing adequate ventilation for rooms/ areas with significant indoor pollution sources.	All DCs	1
IEQ 3	Thermal Comfort in Air-conditioned Premises	1 credit for sustaining the air temperature at the design value within ±1.5°C when the air side system is operating at steady state under normal operation periods. 1 credit for demonstrating an appropriate temperature (i.e. <25.5°C), relative humidity (i.e. <70%) and air velocity (<0.3 m/s) in	All DCs	2

	Section	Credit Requirement	Extent of Application	Credit
		normally occupied area.		
IEQ 4	Biological Contamination	1 credit for complying with the recommendations given in the Code of Practice - Prevention of Legionnaires Disease, in respect of air-conditioning and ventilation systems and water systems.	Except the systems that are not controlled by Landlord.	1
IEQ 5	IAQ Monitoring	1 credit for the whole building is certified by the Good Class of 'Indoor Air Quality Certification Scheme for Office and Public Place'. 2 credits for the whole building is certified by the Excellent Class of 'Indoor Air Quality Certification Scheme for Office and Public Place'.	All DCs	2
IEQ 6	Interior Lighting In Normally Occupied Areas	1 credit for achieving the prescribed lighting performance in each type of premises, regarding the illuminance and lighting quality as listed below: i. Maintained illuminance and illuminance uniformity; ii. Achieving the limiting unified glare rating; and iii. Light sources with an appropriate colour rendering index.	All DCs	1
IEQ 7	Interior Lighting In Areas Nor Normally Occupied	1 credit for achieving the prescribed lighting performance in data hall and each type of premises, regarding the illuminance and lighting quality as listed below: i. Maintained illuminance; ii. Achieving the limiting unified glare rating; and iii. Light sources with an appropriate colour rendering index.	All DCs	1
IEQ 8	Room Acoustics	a) Data Hall Noise Control 1 credit for demonstrating the internal noise level at data hall area are maintained at an appropriate level. b) Reverberation time 1 credit for demonstrating that the mid-frequency reverberation time in applicable rooms meets the prescribed criteria of different types of premises.	All DCs	2

	Section	Credit Requirement	Extent of Application	Credit
IEQ 9	Noise Isolation	1 credit for demonstrating airborne noise isolation between rooms, spaces and premises fulfils the prescribed criteria.	All DCs	1
IEQ 10	Vibration	1 BONUS credit for ensuring that vibration levels do not exceed the prescribed criteria.	All DCs	1 BONUS
8	**Innovations and Additions (IA)**			**6 BONUS**
IA 1	Innovative Techniques	Maximum 5 BONUS credits for implementation of each innovative technique which provides environmental benefits in addition to those already covered in this Manual.	All DCs	5 BONUS (total of IA 1 and IA 2)
IA 2	Performance Enhancements	Maximum 5 BONUS credits for having exemplary performance in fulfilling the requirements stipulated in this Manual.	All DCs	
IA 3	Provision of Electrical Vehicle Charging Stations	1 BONUS credit for providing quick charger(s) for Electric Vehicles for 50% of the total parking capacity of the site.	Whole building DC development	1 BONUS

Management (MAN)	**2.P Prerequisite** **2.1 Environmental, Health and Safety (EHS), and Energy Management** **2.2 Environmental, Social and Governance (ESG) Disclosure** **2.3 Staff Training** **2.4 Operation and Maintenance** **2.5 IAQ Management for Renovation**	
Background		An effective management of DC operations and maintenance is the key factor for better environmental performance of the building, especially for existing DCs. The 'Management' category assesses the overarching management system, policies and procedures put in place, staffing and resources to ensure DCs are operating in their maximum sustainable potential.
2.P	**Prerequisite**	**MAN P1 Green Purchasing Plan**
Background		It is encouraged to investigate the products that are purchased for the building and to replace them with environmentally friendly alternatives. A purchasing plan or practice shall be formulated to use green products whenever possible.
2.1	**EHS and Energy Management**	**MAN 1 EHS and Energy Management System**
Background		Regardless the age and condition of a DC, there are initiatives that the management can undertake to improve the quality and performance of a DC. The Applicant is expected to carry out programmes to enhance health and safety, and reduce environmental impacts in the DC operation.
2.2	**ESG disclosure**	**MAN 2 Environmental, Social and Governance (ESG) Disclosure**
Background		ESG reporting helps a company to better understand the impacts of their activities, set goals, measure performance and mitigate risks and identify opportunities of certain environmental and social issues.
2.3	**Staff Training**	**MAN 3 BEAM Professional** **MAN 4 Staff Training and Resources**
Background		Staff skills and experience are important factors in improving building performance. The qualifications and experience of the management, operation and maintenance staff should be commensurate with the engineering systems, size and complexity of the buildings.
2.4	**Operation and Maintenance**	**MAN 5 Building and Site Operation and Maintenance** **MAN 6 Building Services Operation and Maintenance** **MAN 7 Electronic Operation and Maintenance Platform**
Background		Effective operation and maintenance of the building, systems and equipment significantly impact on the building performance. Proper O&M can also extend the life of building structure and equipment, avoid wastage of resources for premature refurbishment or replacements.
2.5	**IAQ Management for renovation**	**MAN 8 IAQ Management for Renovation**
Background		Dust and odours generated by various renovation, fit-out and decoration activities can cause air pollution. Good management practices reduce the impacts of air pollution on the workers and adjacent neighbours, and protect the HVAC&R systems in the building.

2 Management **2.P Prerequisite**

MAN P1 Green Purchasing Plan

Extent of Application All DCs

Objective To encourage the purchase of products used in the Operation and Maintenance (O&M) of DCs with reducing environmental impacts through the formulation of procedures or plans.

Credits Attainable Prerequisite

Credit Requirement Demonstrate that green purchasing plan and procedures (including both materials and services) either follow their internal company guideline or other international standards, shall be in place.

Assessment The Applicant shall provide documentary evidence that purchasing plans and procedures endorsed by top management are in place for governing the procurement of materials, products and equipment, which shall have no significant negative impacts on the environment and the safety and health of employees and building users.

The green purchasing plan may include the procurement of:

i. Durable goods, products and equipment; materials with low embodied energy;
ii. Locally produced materials where available;
iii. Wood products from well-managed sources;
iv. Products which do not use CFCs, HCFCs, halons;
v. Salvaged materials and components;
vi. Rapidly renewable materials;
vii. Durable materials;
viii. Finishes; paints, adhesives, etc., with low levels of emissions;
ix. Minimal packaging and/or recyclable packaging;
x. Products having high recyclable content;
xi. Products that are recyclable;
xii. Energy efficient appliances and equipment; and
xiii. Water efficient appliances, etc.

The above list is not exhaustive and it is not necessary to include all abovementioned items in their own green purchasing plan. The Applicant shall compose their green purchasing plan which adequately covers the materials with respect to their own operational needs.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MAN_P1_00	BEAM Plus Existing DCs submission template for MAN P1	✓	✓
MAN_P1_01	Green purchasing plan endorsed by top management	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credits

MWA P2 Materials Purchasing Plan
The related credit encourages purchasing practices which aim at reducing the environmental impacts of products used through formulating the purchasing procedure or plan into a more environmentally friendly way.

MWA 1 Materials Purchasing Practices
The related credit encourages purchasing practices which reduce the environmental impacts of products used by implementing Materials Purchasing Plan.

MWA 2 Use of Certified Green Products
The related credit encourages the purchase of certified green products that have low environmental impacts.

MWA 3 Ozone Depleting Substances
The related credit encourages the avoidance of releasing ozone depletion substances into the atmosphere.

2 Management

2.1 EHS and Energy Management

MAN 1 EHS and Energy Management System

Extent of Application

All DCs

Objective

To encourage the building management to implement systematic management systems that embrace quality, environmental, health, safety, and energy.

Credits Attainable

3 + 2 BONUS

Credit Requirement

1 credit where the DC management operates an Environmental Management System (EMS) certified to ISO 14001.

1 credit where the DC management operates an Occupational Health and Safety System (OHSAS).

1 credit where the DC management operates an Energy Management System (EnMS).

1 Bonus credit where DC management operates an OHSAS certified to BS OHSAS 18001.

1 Bonus credit where the DC management operates an EnMS certified to ISO 50001.

Assessment

The Applicant shall provide the documentation such as the manuals, operation procedures, policies and audit records to demonstrate that the DC Management Company is operating the EMS, OHSAS and EnMS.

Note: Only internal audit records for the OHSAS and EnMS are required when the Applicant does not intend to attempt the BONUS credits.

BONUS can be achieved when the Applicant can provide the BS OHSAS 18001 and ISO 50001 certificates. The name of the building should be stated in the certificates. Credits will not be granted if only the head office operation of the Building Management Company is awarded with the certificates.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MAN_01_00	BEAM Plus Existing DCs submission template for MAN 1	✓	✓
MAN_01_01	A valid ISO 14001 certificate of the building [#]	✓	✓
MAN_01_02	Internal audit records of the OHSAS and EnMS system of the building (for the Applicant who cannot present the BS OHSAS 18001 and ISO 50001 certificate) [#]	✓	✓
MAN_01_03	A valid BS OHSAS 18001 certificate of the building [#]	✓	✓
MAN_01_04	A valid ISO 50001 certificate of the building [#]	✓	✓
* If the Applicant has provided the BS OHSAS 18001 and ISO 50001 certificate, it is not necessary for the Applicant to provide the documentations MAN_01_02 above.			

Remarks

(a) Additional Information

International Organization for Standardization. ISO 14000 Environmental Management. Retrieved 2 January 2020, from http://www.iso.org/iso/home/standards/management-standards/iso14000.htm

BSI Group. Getting Started with BS OHSAS 18001 Occupational Health and Safety Management. Retrieved 2 January 2020, from http://www.bsigroup.com/en-GB/ohsas-18001-occupational-health-and-safety/Introduction-to-BS-OHSAS-18001

International Organization for Standardization. ISO 50001 - Energy management. Retrieved 1 March 2016, from http://www.iso.org/iso/home/standards/management-standards/iso50001.htm

(b) Related Credits

EU 1 Energy Management
The related credit encourages high level management to involve in the improvement of energy efficiency and conservation.

2 Management **2.2 ESG Disclosure**

MAN 2 Environmental, Social and Governance (ESG) Disclosure

Extent of Application All DCs

Objective To encourage DCs Owner/ DCs Management Company to have ESG reporting and disclose its operational performance to the public.

Credits Attainable 1 + 1 BONUS

Credit Requirement 1 credit where the DC Owner/ DC Management Company discloses sustainability policy and targets to the public.

1 BONUS credit where the Building Owner/ Building Management Company follows Global Reporting Initiative™ (GRI) Sustainability Reporting Guidelines and discloses the G4 sustainability report to the public.

Assessment

(a) Disclosure of Sustainability Policy and Targets

The Applicant shall provide the sustainability policy and targets of the Building Owner/ Building Management Company. The scope of the sustainability policy is not regulated but it should cover at least the environmental issues.

(b) ESG Reporting

The ESG report shall be composed under the Reporting Principles and either "Core" or "Comprehensive" in accordance options of the GRI G4 guidelines.

Submittals

(a) Disclosure of Sustainability Policy and Targets

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MAN_02_00	BEAM Plus Existing DCs submission template for MAN 2	✓	✓
MAN_02a_01	Sustainability policy and targets and evidence showing such information is disclosed to public	✓	✓

(b) ESG Reporting

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MAN_02_00	BEAM Plus Existing DCs submission template for MAN 2	✓	✓
MAN_02b_01	The ESG report of the Building Owner/ Building Management Company that follows the GRI G4 requirements [#]	✓	✓
MAN_02b_02	Evidence showing the ESG report is publicly available	✓	✓

Remarks

(a) Additional Information

Business Environment Council Handbook: Understanding Materiality for Environmental, Social and Governance Reporting. Retrieved 2 January 2020, from http://bec.org.hk/files/images/BEC_advisorygroups/BEC_ESG_Handbook_web.pdf

Global Reporting Initiative. G4 Sustainability Reporting Guidelines. Retrieved 2 January 2020, from https://www.globalreporting.org/STANDARDS/G4/Pages/default.aspx

(b) Related Credits

None

2 Management **2.3 Staff Training**

MAN 3 BEAM Professional

Extent of Application All DCs

Objective To facilitate the application for the BEAM Plus certification process and ensure the operation of the DC complies with the BEAM Plus DC requirements.

Credits Attainable 2

Credit Requirement 1 credit for at least 2 members from the Building Management Company are certified BEAM Professional with DC credential.

Alternatively

1 credit for at least 1 key member from the Building Management Company is a certified BEAM Professional with DC credential and at least 1 member is a certified BEAM Affiliate.

1 additional credit for the building-in-charge being a certified BEAM Professional with DC credential and with at least 1 professional corporate membership qualification (e.g. HKIH, HKIA, HKIE, HKIS (BS/PFM), RICS (BS/FM), IFMA, HKIFM, BSOMES, or equivalent).

Assessment The Applicant shall provide evidence that at least 2 members from the Building Management Company are BEAM Professionals with DC credential. Alternatively, at least 1 key member from the Building Management Company is a certified BEAM Professional with DC credential and at least 1 member is a certified BEAM Affiliate.

The involved personal shall meet the following requirements:

i. He/ she has been working at that Building Management Company for at least 6 months at the time of submission;
ii. He/ she is accredited as BEAM Professional with DC credential/ BEAM Affiliate at the time of submission;
iii. He/ she shall not be in the BEAM Professional/ BEAM Affiliate suspension list throughout the entire BEAM Plus DC certification period; and
iv. For the 'building-in-charge', he/ she shall have obtained the BEAM Professional with DC credential and professional corporate membership qualification at least 12 months at the time of submission.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MAN_03_00	BEAM Plus Existing DCs submission template for MAN 3	✓	✓
MAN_03_01	The organisation chart of the Building Management Company	✓	✓
MAN_03_02	Documents such as meeting minutes, memo, internal emails etc. showing the involved personal has been working in the Building Management Company for at least 6 months	✓	✓
MAN_03_03	The BEAM Professional/ BEAM Affiliate certificate	✓	✓
MAN_03_04	The CV and professional certificate of the "building-in-charge"	✓	✓

Remarks

(a) Additional information

Hong Kong Green Building Council Limited. BEAM Professionals. Retrieved 2 January 2020, from https://www.practitioner.hkgbc.org.hk/beam-professional

Hong Kong Green Building Council Limited. BEAM Affiliate. Retrieved 2 January 2020, from https://www.practitioner.hkgbc.org.hk/beam-affiliate

(b) Related Credits

None

2 Management 2.3 Staff Training

MAN 4 Staff Training and Resources

Extent of Application All DCs

Objective To ensure the staff training and technical resources are adequate for the Operation and Maintenance (O&M) of the building.

Credits Attainable 2

Credit Requirement

(a) Staff and Technical Resources

1 credit for having adequate staff and technical resources to meet the O&M requirements of the building.

(b) Staff Training

1 credit for providing adequate and periodic training for the staff responsible for the O&M of the building.

Assessment

(a) Staff and Technical Resources

The Applicant shall provide the organisation chart (O-chart) clearly indicating the responsibility and job duties of each building management staff for the O&M of the building. If the O&M of a certain system is outsourced, the Applicant shall provide the tender/ contract documents requiring the sub-contractor to have sufficient resources for the works. The building-in-charge shall also provide a statement stating the staffing and resources are adequate for the O&M of the building.

(b) Staff Training

The Applicant shall provide the training records for the staff members responsible for O&M for the past 12 months. The topics of the training are not regulated but the training shall be related to the operation of the building. The minimum training requirements are 15 hours and 6 hours per year for the building-in-charge and other staff respectively.

Only staff members of the Building Management Company are included in the assessment. Staff members of sub-contractors are excluded from the assessment.

Submittals

(a) Staff and Technical Resources

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MAN_04_00	BEAM Plus Existing DCs submission template for MAN 4	✓	✓
MAN_04a_01	Tender/ contract documents requiring the sub-contractor to have sufficient resources for the O&M works (if any)	✓	✓
MAN_04a_02	Statement stating the staffing and resources are adequate for the O&M of the building	✓	✓
MAN_04a_03	Job duties and responsibilities of the staff responsible for O&M	✓	✓

(b) Staff Training

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MAN_04_00	BEAM Plus Existing DCs submission template for MAN 4	✓	✓
MAN_04b_01	Staff training records for the past 12 months [#]	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credits

None

2 Management 2.4 Operation and Maintenance

MAN 5 Building and Site Operation and Maintenance

Extent of Application

MAN 5a - Except DCs not under control of Applicants.
MAN 5b - All DCs with external areas and facilities.

Objective

To encourage planned inspection, maintenance and repairing of the building fabric, structure, and external areas in order to enhance safety and reduce environmental impacts.

Credits Attainable

2

Credit Requirement

(a) Building Maintenance

1 credit for demonstrating the operation of a planned programme of regular inspection, cleaning and maintenance of the building's fabric and structure under the control of the Applicant.

(b) External Areas and Facilities

1 credit for demonstrating the operation of a planned programme of regular inspection, cleaning and maintenance of external areas and facilities.

Assessment

(a) Building Maintenance

The Applicant shall provide documentation to demonstrate that the system of inspections, cleaning, maintenance and general repairs to the building fabric and structural elements are effective in maintaining reliability and prolonging service life of the building. Building fabric and structure shall include:

i. Building façade;
ii. Curtain wall; and
iii. External cladding.

(b) External Areas and Facilities

The following external areas and facilities which are under the control of the Applicant shall be assessed:

i. Roads and pavements
ii. Hard and soft landscape areas;
iii. Stairs and ramps; and
iv. Recreational facilities.

The Applicant shall provide the planned programme of regular inspection, cleaning and maintenance of the external areas and facilities. The frequency of these activities is not regulated and it is subject to the Applicant's operation requirement. The Applicant shall provide the undertaking letter signed by the building-in-charge stating that the frequency for inspection, cleaning and maintenance is sufficient.

Submittals

(a) Building Maintenance

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MAN_05_00	BEAM Plus Existing DCs submission template for MAN 5	✓	✓
MAN_05a_01	A list of all the elements of the building fabric and structure subject to regular inspection, cleaning and maintenance	✓	✓
MAN_05a_02	Maintenance procedures of the elements	✓	✓
MAN_05a_03	Personnel that are responsible for the inspection, cleaning and maintenance	✓	✓
MAN_05a_04	Records of inspection, maintenance and repairs for the past 12 months [#]	✓	✓
MAN_05a_05	The planned inspection, maintenance and repairs programme for the next 12 months	✓	✓
MAN_05a_06	Undertaking letter signed by the building-in-charge	✓	✓

(b) External Areas and Facilities

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MAN_05_00	BEAM Plus Existing DCs submission template for MAN 5	✓	✓
MAN_05b_01	A list of all the elements of the external areas and facilities subject to regular inspection, cleaning and maintenance	✓	✓
MAN_05b_02	Maintenance procedures of the elements	✓	✓
MAN_05b_03	Personnel that are responsible for the inspection, cleaning and maintenance	✓	✓
MAN_05b_04	Records of inspection, maintenance and repairs for the past 12 months [#]	✓	✓
MAN_05b_05	The planned inspection, maintenance and repairs programme for the next 12 months	✓	✓
MAN_05b_06	Undertaking letter signed by the building-in-charge	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credits

None.

2 Management **2.4 Operation and maintenance**

MAN 6 Building Services Operation and Maintenance

Extent of Application

MAN 6a - Except Buildings without a central HVA plant, or the HVAC plant is not controlled by the applicant
MAN 6b - Except systems that are not controlled by the applicant
MAN 6c - All DCs

Objective

To encourage proper and efficient operation of the engineering systems by operation and maintenance programme.

Credits Attainable

7

Credit Requirement

(a) Central Heating Ventilation and Air-Conditioning (HVAC) Plant

2 credits for demonstrating the operation of a planned programme of regular inspection and maintenance of the central HVAC plant.

(b) Other Engineering Systems

Maximum 4 credits for demonstrating the operation of a planned programme of regular inspection and maintenance of the following listed systems.

i. Air-conditioning system except HVAC plant;
ii. Electrical system;
iii. Lighting system; and
iv. Plumbing and drainage system.

(c) Assessment of Operation & Maintenance Practice

1 credit for having undertaken an audit of the effectiveness of the O&M practices for all building services engineering systems.

Assessment

(a) Central Heating Ventilation and Air-Conditioning (HVAC) Plant

The Applicant shall provide the planned programme for regular inspection and maintenance of the central HVAC plant. The frequency of these activities is not regulated and subject to the Applicant's operation requirement. The Applicant shall provide the undertaking letter stating that the frequency for inspection and maintenance is sufficient

(b) Other Engineering Systems

1 credit can be achieved for demonstrating the operation of a planned programme for each of the above listed items.

The Applicant shall provide the planned programme of regular inspection and maintenance of the air-conditioning (except central HVAC plant), electrical, lighting and plumbing & drainage system. The frequency of these activities is not regulated and it is subject to the Applicant's operation requirement. The Applicant shall provide the undertaking letter stating that the frequency for inspection and maintenance is sufficient

(c) Assessment of Operation & Maintenance Practice

The Applicant shall provide a report detailing the steps taken, outcomes and actions taken or planned (with appropriate budget information) for

improvements in the building services operation and maintenance practices. The audit approach should follow the details in BSRIA's guide or similar equivalent approaches. The effectiveness audit shall be conducted every 5 years.

Submittals

(a) Central Heating Ventilation and Air-Conditioning (HVAC) Plant

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MAN_06_00	BEAM Plus Existing DCs submission template for MAN 6	✓	✓
MAN_06a_01	Frequencies of cleaning and inspection of the applicable system(s)	✓	✓
MAN_06a_02	Maintenance procedures of the central HVAC plant	✓	✓
MAN_06a_03	Personnel that are responsible for the inspection, cleaning and maintenance	✓	✓
MAN_06a_04	Records of inspection, maintenance and repairs for the past 12 months [#]	✓	✓
MAN_06a_05	The planned inspection, maintenance and repairs programme for the next 12 months	✓	✓

(b) Other Engineering Systems

Air-conditioning system except HVAC plant

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MAN_06_00	BEAM Plus Existing DCs submission template for MAN 6	✓	✓
MAN_06bi_01	Frequencies of cleaning and inspection of the applicable system(s)	✓	✓
MAN_06bi_02	Maintenance procedures of the air-conditioning system except HVAC plant	✓	✓
MAN_06bi_03	Personnel that are responsible for the inspection, cleaning and maintenance	✓	✓
MAN_06bi_04	Records of inspection, maintenance and repairs for the past 12 months [#]	✓	✓
MAN_06_00	BEAM Plus Existing DCs submission template for MAN 6	✓	✓

Electrical system

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MAN_06_00	BEAM Plus Existing DCs submission template for MAN 6	✓	✓
MAN_06bii_01	Frequencies of cleaning and inspection of the applicable system(s)	✓	✓
MAN_06bii_02	Maintenance procedures of the electrical system	✓	✓
MAN_06bii_03	Personnel that are responsible for the inspection, cleaning and maintenance	✓	✓
MAN_06bii_04	Records of inspection, maintenance and repairs for the past 12 months [#]	✓	✓
MAN_06bii_05	The planned inspection, maintenance and repairs programme for the next 12 months	✓	✓

Lighting system

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MAN_06_00	BEAM Plus Existing DCs submission template for MAN 6	✓	✓
MAN_06biii_01	Frequencies of cleaning and inspection of the applicable system(s)	✓	✓
MAN_06biii_02	Maintenance procedures of the lighting system	✓	✓
MAN_06biii_03	Personnel that are responsible for the inspection, cleaning and maintenance	✓	✓
MAN_06biii_04	Records of inspection, maintenance and repairs for the past 12 months [#]	✓	✓
MAN_06biii_05	The planned inspection, maintenance and repairs programme for the next 12 months	✓	✓

Plumbing and drainage system

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MAN_06_00	BEAM Plus Existing DCs submission template for MAN 6	✓	✓
MAN_06biv_01	Frequencies of cleaning and inspection of the applicable system(s)	✓	✓
MAN_06biv_02	Maintenance procedures of the plumbing and drainage system	✓	✓
MAN_06biv_03	Personnel that are responsible for the inspection, cleaning and maintenance	✓	✓
MAN_06biv_04	Records of inspection, maintenance and repairs for the past 12 months [#]	✓	✓
MAN_06biv_05	The planned inspection, maintenance and repairs programme for the next 12 months	✓	✓

(c) Assessment of Operation & Maintenance Practice

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MAN_06_00	BEAM Plus Existing DCs submission template for MAN 6	✓	✓
MAN_06c_01	Audit report showing the effectiveness of the O&M practice	✓	✓

Remarks

(a) Additional **Information**

Building Services Research and Information Association. BG 24/2012 Asset Management and Maintenance Audits. BSRIA 2012.

(b) Related Credits

None

2 Management **2.4 Operation and Maintenance**

MAN 7 Electronic Operation and Maintenance Platform

Extent of Application All DCs

Objective 1 BONUS credit for operating an electronic O&M platform by the Building Owner/ Building Management Company.

Credits Attainable 1 BONUS

Credit Requirement 1 BONUS credit for operating an electronic O&M platform by the DC Owner/ DC Management Company.

Assessment The Applicant shall demonstrate an electronic O&M platform is adopted by the Building Management Company. Screenshots shall be provided to justify that the following documents are already uploaded to the platform:

i. Building layout drawings;
ii. Air-side and water-side schematic diagrams;
iii. Equipment schedules of the MVAC, plumbing & drainage, electrical and lift & escalator systems (if any); and
iv. O&M manuals of the aforesaid systems.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MAN_07_00	BEAM Plus Existing DCs submission template for MAN 7	✓	✓
MAN_07_01	Description of the electronic O&M platform	✓	✓
MAN_07_02	Screenshots showing the required documentations are uploaded to the O&M platform	✓	✓

Remarks

(a) Additional Information
None

(b) Related Credit
None

2 Management

2.5 IAQ Management for Renovation

MAN 8 IAQ Management for Renovation

Extent of Application All DCs

Objective To reduce the potential for having indoor air quality problems caused by renovation, fit-out and decoration and where applicable demolition, with the consideration of the benefit of workers and adjacent neighbours.

Credits Attainable 2

Credit Requirement 1 credit for providing a Construction Indoor Air Quality (IAQ) Management Plan.

1 credit for providing records that the Construction IAQ Management Plan has been implemented by the DC Owner/ DC Management Company/ tenants during renovation.

Assessment The Applicant shall provide a Construction IAQ Management Plan including but not limited to the following items:

i. Procedures adopted in enhancing the IAQ during renovation, fit-out or decoration and occupancy stage;
ii. Measures to avoid contamination of adjacent normally occupied areas and common areas;
iii. Contaminant source controls;
iv. Provision of adequate outside air during installation of materials and finishes;
v. Measures to protect the air ducts, on-site storage or protection of installed absorptive materials;
vi. Measures to protect the IT equipment;
vii. Cleaning procedures to be employed;
viii. Procedures for building flush-out; and
ix. Replacement of filtration media used on permanent MVAC equipment at completion of work.

The Applicant shall also provide site records to demonstrate the Construction IAQ Management Plan is properly implemented.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MAN_08_00	BEAM Plus Existing DCs submission template for MAN 8	✓	✓
MAN_08_01	Construction IAQ Management Plan	✓	✓
MAN_08_02	Records showing the Construction IAQ Management Plan is properly implemented during renovation, fit-out and decoration [#]	✓	✓

Remarks

(a) Additional Information
None

(b) Related Credits
None

3 Site Aspects

3.1 Site Location
3.2 Emissions from the Site
3.3 Bioclimatic Architecture
3.4 Site Amenities

Introduction

The assessment criteria in this category focus on the location of the DC, emissions from the site, microclimate enhancement to the surroundings and amenities provisions. Site location is important with regard to adequacy of local amenities and public transport provisions, reduction of travel needs and reliance on private vehicles. There is often an opportunity to enhance the quality of buildings through more thoughtful 'greening' and other features. The impacts on neighbouring developments and various discharges and emissions from the site can be significant throughout a building's lifetime.

3.1 Site location

SA 1 Green Building Attributes

Background

DC location is important in respect of adequacy of local amenities and public transport provisions in order to reduce travel needs and reliance on private vehicles. It would be an advantage if an existing DC certified under BEAM or BEAM Plus in the past.

3.2 Emissions from the site

SA 2 Noise Pollution
SA 3 Light Pollution

Background

Various emissions from the site can have a negative impact on neighbouring properties. Certain emissions are within control of the building management and efforts should be made to minimise any potential negative impacts on neighbours and anyone passing by the development.

Discharges and emissions from the site should be considered over a building's lifetime. Noise pollution and light pollution arising from the building engineering systems and equipment is of concern, all of these can be alleviated by good design and proper installation and maintenance.

3.3 Bioclimatic Architecture

SA 4 Heat Island Reduction

Background

It is important to adequately consider the microclimate in the surrounding during the construction and operation of the building. In cities with high building density like Hong Kong, 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, and the application of shading or planted vegetation.

3.4 Site Amenities

SA 5 Amenities Features
SA 6 Barrier Free Access

Background

In recent years, the HKSAR Government has sought to encourage better building designs through various 'green and innovative' features that can enhance the quality of buildings, and has put in place a number of incentives to encourage the adoption of such features. Measures which aim at improving accessibility for users, creating more enjoyable living and working spaces and ensuring efficient services cater the needs of users, etc. are example that enhance the quality and efficiency of built environments and thereby ensure buildings are sustainable.

3 Site Aspects **3.1 Site Location**

SA 1 Green Building Attributes

Extent of Application All DCs

Objective To encourage the buildings to employ best practices in design and/or construction in order to enhance green performance.

Credits Attainable 5

Credit Requirement Maximum 5 credits for the host building that has been certified under BEAM Plus / BEAM certification:

i. 5 credits for Platinum grade;
ii. 4 credits for Gold grade; and
iii. 3 credits for any other grade.

Alternatively,

Maximum 3 credits for an uncertified building that meets the listed performance characteristics, 1 credit for each sub-item:

i. Parking capacity must not exceed the minimum requirement from Government;
ii. Public transport shall be within 800m walking distance from building main entrance(s);
iii. At least 5 different amenities are located within 800m walking distance from building main entrance;
iv. Using pervious materials for a minimum of 50% of hard landscaped areas;
v. Enhancement of the biodiversity within the site boundary when compared with the time of building completion;
vi. Ensuring the vertical daylight factor is above 12% for neighbouring sensitive buildings;
vii. Provision of adequate active and passive security measures to suit the operation need; and
viii. Providing EV charging-enabling facilities for all carparking spaces (including visitor car parks).

Assessment Only buildings with a valid BEAM/ BEAM Plus or other internationally recognised standards certificate are eligible to achieve the credits via the first path. For BEAM 4/04 and 5/04 certified buildings, the certificates shall only be considered as valid when the projects were awarded less than 5 years ago at the time of submission.

For item iii, the building amenities shall include the following:

a) Restaurants/ cafes/ food & beverage outlets;
b) Vending machines for snacks and drinks;
c) Banks or Automated Teller Machines (ATM);
d) Medical/ health facilities (including dental clinic);
e) Place for worship;
f) Active recreational facilities or open spaces; and
g) Passive recreational facilities or open spaces

Submittals

For Certified Buildings

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
SA_01_00	BEAM Plus Existing DCs submission template for SA 1	✓	✓
SA_01a_01	Valid Certificate	✓	✓

For Uncertified Buildings

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
SA_01_00	BEAM Plus Existing DCs submission template for SA 1	✓	✓
SA_01b_01	Summary table showing the quantities and locations of the facilities/ services with description	✓	✓
SA_01b_02	Calculation/ technical reports	✓	✓
SA_01b_03	Equipment catalogues and technical sheets	✓	✓
SA_01b_04	Layouts/ building services drawings to indicate the facilities/ installations	✓	✓
SA_01b_05	Record photographs	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credits

None

3 Site Aspects **3.2 Emissions from the site**

SA 2 Noise Pollution

Extent of Application Except the listed buildings services equipment not controlled by the applicant

Objective To reduce the noise nuisance to neighbours caused by building services equipment

Credits Attainable 2

Credit Requirement

(a) Provision of Acoustic Treatment

1 credit for providing adequate acoustic treatment to the following building services equipment: chillers, cooling towers, ventilation fans with Sound Power Level (SWL) higher than 80 dB(A).

(b) Demonstration of Compliance with HKPSG Criteria

1 credit for demonstrating that the level of the intruding noise at the façade of the potential Noise Sensitive Receivers (NSRs) is in compliance with the criteria recommended in the Hong Kong Planning Standards and Guidelines (HKPSG).

Assessment

(a) Provision of Acoustic Treatment

Credit can be achieved for the provision of adequate acoustic treatment to chillers, cooling towers, ventilation fans with SWL higher than 80 dB(A). For examples:

i. Chillers are being enclosed in an acoustic enclosure or plantroom or are installed with discharge/ intake silencer;
ii. Erection of a barrier or installation of silencer for cooling tower; and
iii. Installation of silencer at major fan discharge outlets (for exhaust fans) or at air inlets (for intake fans).

Alternatively, in case of no acoustic treatment is required and the Applicant can demonstrate the Acceptable Noise Levels (ANLs) at the nearest NSRs can comply with the statutory requirements, this credit can be excluded. If the Applicant can demonstrate the ANLs are at least 1 dB(A) lower than the statutory requirements, the credit is also achieved.

(b) Demonstration of Compliance with HKPSG Criteria

Credit can be achieved by demonstrating that the level of the intruding noise at the façade of the potential NSRs is in compliance with the criteria recommended in HKPSG.

Assessment shall be made at the façade of the potential NSRs.

When assessed in accordance with the Technical Memorandum, the level of the intruding noise at the façade of the NSR shall be at least 5 dB(A) below the appropriate ANL shown in Table 3 of the Technical Memorandum or, in the case of the background being 5 dB(A) lower than the ANL, shall not be higher than the background, in accordance with paragraph 4.2.13, Chapter 9 of the Hong Kong Planning and Standards Guidelines. The

Applicant shall provide evidence in form of detailed analysis, appropriate calculations and/or measurements supporting that the building complies with the assessment criteria. In cases where a Noise Abatement Notice has been served, evidence of full compliance with the required remedial action shall also be presented.

Submittals

(a) Provision of Acoustic Treatment

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
SA_02_00	BEAM Plus Existing DCs submission template for SA 2	✓	✓
SA_02a_01	Equipment catalogues (with SWLs), operation schedule, drawings showing the provision of acoustic treatment for chillers, cooling towers, ventilation fans with SWL larger than 80 dB(A)	✓	✓
SA_02a_02	Record photographs of the acoustic treatment.	✓	✓

(b) Demonstration of Compliance with HKPSG Criteria

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
SS_02_00	BEAM Plus Existing DCs submission template for SA 2	✓	✓
SA_02b_01	Summary table listing the nearest NSRs, building equipment sound level, quantities, ANL and noise level at the façade of the nearest NSRs	✓	✓
SA_02b_02	Location plan to indicate the positions of the NSRs and building equipment	✓	✓
SA_02b_03	Equipment catalogues	✓	✓
SA_02b_04	Calculation or measurement	✓	✓

Remarks

(a) Additional Information

Planning Department. Hong Kong Planning and Standards Guidelines, Chapter 9 Environment. Retrieved 2 January 2020, from http://www.pland.gov.hk/pland_en/tech_doc/hkpsg/full/ch9/ch9_text.htm

British Standards Institution. Method for rating industrial noise affecting mixed residential and industrial areas. British Standard BS 4142:1997. London, BSI. 1997.

International Standards Organisation. ISO 9613-2. Attenuation of Sound During Propagation Outdoors Part 2. General Method of Calculation 1st ed. 1996.

Environmental Protection Department. Good practices on pumping system noise control.
Retrieved 2 January 2020, from
http://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/noise/guide_ref/files/Pump_sys_E-06.pdf

Environmental Protection Department. Good practices on ventilation system noise control.
Retrieved 2 January 2020, from
http://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/noise/guide_ref/files/Vent_sys_E-06.pdf

(b) Related Credits

None

3 Site Aspects **3.2 Emissions from the site**

SA 3 Light Pollution

Extent of Application All DCs

Objective To minimise light pollution caused by external lighting.

Credits Attainable 2

Credit Requirement

Compliance Path 1
2 credits if there are no external lightings installed for the building.

Alternatively,

Compliance Path 2
2 credits for switching off the DC Owner, DC Management Company's and tenants' (if any) external lightings from 23:00 to 07:00.

Assessment

Compliance Path 1
2 credits can be achieved if there are no external lightings, including advertisement boards, façade lightings and video walls, installed on exterior of the building.

Alternatively,

Compliance Path 2
2 credits for switching off the DC Owner, DC Management Company's and tenants' (if any) external lightings from 23:00 to 07:00.

External light management policy endorsed by top management is required. The scope and exemption is made reference to the Document for Engaging Stakeholders and the Public set up by the Task Force on External Lighting clauses 38 to 43.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
SA_03_00	BEAM Plus Existing DCs submission template for SA 3	✓	✓
For compliance path 1, please provide the followings:		PA	FA
SA_03_01	Record photographs of external area and exterior of the building	✓	✓
SA_03_02	Layouts/ building services drawings demonstrating that there are no external lightings installed for the building	✓	✓
For compliance path 2, please provide the followings:		PA	FA
SA_03_03	Summary table listing the quantities and operation schedule of all external lightings	✓	✓
SA_03_04	Location plan to indicate the external lightings	✓	✓
SA_03_05	External light management policy endorsed by top management	✓	✓

	Signed agreement between Building Owner/ Building Management Company and tenants for switching off the external light (if any)	✓	✓
SA_03_06	Record photographs of Building Owner/ Building Management Company's and tenants' external lighting in both switch-on and switch-off state	✓	✓

Remarks

(a) Additional Information

Task Force on External Lighting. Document for Engaging Stakeholders and the Public. Retrieved 2 January 2020, from http://www.enb.gov.hk/sites/default/files/pdf/ExternalLightingEng.pdf

(b) Related Credits

None

3 Site Aspects **3.3 Bioclimatic Design**

SA 4 Heat Island Reduction

Extent of Application Whole building DC developments

Objective To ensure the microclimate has been adequately considered, and where appropriate, suitable mitigation measures are provided.

Credits Attainable 3 BONUS

Credit Requirement 1 BONUS credit for demonstrating the implementation of any combination of the following strategies for a minimum of 10% of the external non-roof area (i.e. ground floor and podium with less than 15m in height):

i. Greenery;
ii. Water feature;
iii. Green wall or vertical greening;
iv. Shading device; and/or
v. Paving materials with solar reflectance (SR) of 0.33.

2 BONUS credits for more than 20% of the external non-roof area covered with the aforesaid features.

1 BONUS credit for providing green roof and/or organic farm for at least 20% of the available main roof area.

Assessment 1 BONUS credit can be achieved for using any combination of the listed strategies (in terms of area) for a minimum of 10% of the external non-roof area, including both ground floor and podium with less than 15m in height.

All greenery areas shall be measured based on the soil areas as shown on the drawings. Greenery in movable pots shall not be accounted. Reduction factor is not necessary for water feature.

2 BONUS credits can be achieved for having more than 20% of the total external non-roof area covered with the aforesaid features.

Green roof and/or organic farm shall cover at least 20% of available main roof area. Areas occupied by mechanical equipment shall be excluded from total main roof area.

1 BONUS credit can be achieved for providing green roof and/or organic farm for at least 20% of the available main roof area. All green roof and/or organic farm areas shall be measured horizontally based on the soil areas as shown on the plan. Greenery in movable pots shall not be accounted.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
SA_04_00	BEAM Plus Existing DCs submission template for SA 4	✓	✓
SA_04_01	Narrative of the strategies and the combination (if any);	✓	✓
SA_04_02	Layouts and calculations	✓	✓
SA_04_03	Record photographs of green walls, vertical greenings, green roof/ organic farm or shading devices	✓	✓
SA_04_04	Catalogue or laboratory test reports on solar reflectance (SR) of paving materials	✓	✓

Remarks

(a) Additional Information

Agriculture, Fisheries and Conservation Department. Organic Farming. Retrieved 2 January 2020, from https://www.afcd.gov.hk/english/agriculture/agr_orgfarm/agr_orgfarm.html

Buildings Department. CEPAS for Buildings, Operation Stage. Retrieved 2 January 2020, from http://www.bd.gov.hk/english/documents/code/cepas/OperationStageE.pdf

Development Bureau. Greening, Landscape and Tree Management Section. Retrieved 2 January 2020, from http://www.greening.gov.hk/en/home/index.html

Green Power. Report on Urban Heat Island Effect in Hong Kong. Retrieved 2 January 2020, from http://www.greenpower.org.hk/html/download/concern/gp_urban_heat_island_report_2012.pdf

USGBC. LEED v4 for Building Operations and Maintenance.

(b) Related Credits

None

3 Site Aspects **3.4 Site Amenities**

SA 5 Amenities Features

Extent of Application All DCs

Objective To facilitate the DC building users and maintenance staff in carrying out operation and maintenance of the building and its engineering services.

Credits Attainable 2

Credit Requirement (a) Amenities for DC Building Users
1 credit for providing 3 of the following listed amenities that improve the operation and maintenance of the building and its engineering services:

i. Art Galley;
ii. Canteen;
iii. Guard counter/caretaker's counter/information counter/service counter;
iv. Mail delivery room (not mail boxes areas);
v. Noise Barrier;
vi. Video display in lift car;
vii. Wider common corridor/lift lobbies (For Front of House);
viii. Rest room for Operators;
ix. Baby-care room;
x. Breast feeding room; and
xii. Others to be proposed by the Applicant.

(b) O&M Amenities for DC Maintenance Staffs
1 credit for providing 3 of the following listed amenities that improve the operation and maintenance of the building and its engineering services:

i. Aerial working platform;
ii. Building Management System (BMS);
iii. Cat ladder;
iv. Davit arm system;
v. External pipe duct;
vi. Fall arrest system;
vii. Gondola system;
viii. Guard room;
ix. Maintenance platform;
x. Maintenance workshop;
xi. Movable platform, and
xii. Others to be proposed by the Applicant.

Assessment (a) Amenities for DC Users

1 credit can be achieved for providing each of the above listed items. Same type of amenity in multiple locations can only be counted once.

(b) O&M Amenities for DC Maintenance Staffs

1 credit can be achieved for providing each of the above listed items. Same type of amenity in multiple locations can only be counted once

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
SA_05_00	BEAM Plus Existing DCs submission template for SA 5	✓	✓
SA_05_01	Summary report listing each type of amenities and their locations	✓	✓
SA_05_02	Record photographs	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credits

None

3 Site Aspects **3.4 Site Amenities**

SA 6 Barrier Free Access

Extent of Application All DCs

Objective To ensure full access to pertinent building facilities for persons with disability.

Credits Attainable 1

Credit Requirement 1 credit for providing 3 enhanced barrier free access provisions as per the latest version of the Design Manual of Barrier Free Access.

Assessment 1 credit can be achieved for the provision of each of the enhanced provisions as stipulated in the "Recommended Design Requirements" of The Code of Practice for Barrier Free Access 2008. Same type of provision in multiple locations can only be counted once.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
SA_06_00	BEAM Plus Existing DCs submission template for SA 6	✓	✓
SA_06_01	Summary table listing the enhanced provisions, and their locations	✓	✓
SA_06_02	Location plan to indicate the facilities/ services	✓	✓
SA_06_03	Record photographs	✓	✓

Remarks

(a) Additional Information

Buildings Department. Design Manual - Barrier Free Access 2008. Retrieved 2 January 2020, from http://www.bd.gov.hk/english/documents/code/e_bfa2008.htm

(b) Related Credits

None

4	**Materials and Waste Aspects**	**4.P Prerequisite** **4.1 Selection of Materials** **4.2 Waste Management and Reduction**
	Introduction	The amount and the types of materials used and the waste generated in the operation and maintenance and fitting-out of buildings represents a significant use of natural resources. There are opportunities to reduce environmental impacts through interior design methods and choice of materials and products, in terms of extracted raw materials, emissions, and the embodied energy. Discussion on waste management in Hong Kong is more critical than before. It is important to encourage the stakeholders to recognise the importance of the waste management for existing DCs in Hong Kong.
4.P	**Prerequisite**	**MWA P1 Waste Recycling Facilities** **MWA P2 Materials Purchasing Plan**
	Background	This part is to set out the minimum requirement for materials and waste aspects in terms of provision of waste recycling facilities, and the plan of environmentally friendly material procurement.
4.1	**Selection of Materials**	**MWA 1 Materials Purchasing Practices** **MWA 2 Use of Certified Green Products** **MWA 3 Ozone Depleting Substances**
	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.
4.2	**Waste Management**	**MWA 4 Waste Management** **MWA 5 Waste Management for Renovation**
	Background	Hong Kong is running out of land for waste disposal, and if no action is taken sooner, the existing landfill sites will be filled up in the next 3 to 5 years. To tackle the problem, much effort has been put in reducing waste generation and identifying outlets for reusing recycled materials. With adequate provisions for waste collection and sorting, and a proactive approach in seeking opportunities for recycling, the management of waste from buildings can be improved significantly.

4 Materials and Waste Aspects

4.P Prerequisite

MWA P1 Waste Recycling Facilities

Extent of Application

All DCs.

Objective

To reduce pressure on landfill sites and help to preserve non-renewable resources by promoting recycling of waste materials.

Credits Attainable

Prerequisite

Credit Requirement

For Whole Buildings DC Developments:
Providing spaces for collection, sorting, storage and disposal of waste and recovered materials.

For DC Developments located in part of building:
Providing storage facilities at prominent location for the collection of paper, plastic and metal waste.

Assessment

For Whole Buildings DC Developments:
Criteria

Scenario 1 – If the Project is assessed under BEAM Plus New Buildings in any version, this prerequisite is automatically fulfilled. Certification under BEAM 4/04 or any other versions shall not be deemed as fulfilling the requirement and should follow Scenarios 2 or 3.

Alternatively

Scenario 2 – Otherwise, the Project shall comply with the prevailing regulation in respect of refuse collection chamber and/or material recovery room at the time of building completion. (Note: It is not necessary to comply with the latest version of PNAP APP-35).

Alternatively

Scenario 3 – For aged buildings which are not required to provide any refuse collection chamber and/or material recovery room as per Government's requirements, storage facilities shall be provided at prominent locations (i.e. cannot be located in car park or other non-occupied areas) for the collection of paper, plastic and metal waste for recycling. Collection agreement is required.

For DC Developments located in part of building:

The Applicant shall provide at least one (1) storage facility with the capacity for paper, plastic and metal materials. The facility shall be placed in prominent location (i.e. cannot be located in a car park or other non-occupied areas), but not necessary within the project space. The storage facility size, and collection frequency are not regulated.

A waste collection firm employed by either Applicant or property management company shall collect all materials. Where the host building provides such a facility at prominent location, the Applicant is not required

to duplicate it, if the host building management provides the required information for Assessment

Minimum types of recyclables to be collected should include Metal, Plastics, Paper/ Cardboard and Glass.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MWA_P1_00	BEAM Plus Existing DCs submission template for MWA P1	✓	✓
For Whole Building DC Developments, please provide the followings:			
For Scenario 1			
MWA_P1_01	BEAM Plus New Buildings certificate or assessment result	✓	✓
MWA_P1_02	Photographs of the as-built recycling facilities and refuse collection room(s)	✓	✓
For Scenario 2			
MWA_P1_03	Latest location plan, equipment details and record photographs to illustrate the compliance with the prevailing regulation at the time of building completion	✓	✓
For Scenario 3			
MWA_P1_04	Latest location plan, equipment details and record photographs to illustrate the compliance with the prevailing regulation at the time of building completion	✓	✓
MWA_P1_05	Summary table listing the quantities of various waste type and locations of the recycling facilities	✓	✓
MWA_P1_06	Location plan to indicate the recycling facilities	✓	✓
MWA_P1_07	Record photographs	✓	✓
MWA_P1_08	Collection organisation/ recycler information, including: a. Company name and address; b. Collection frequency; and c. Collection agreement, signed by Building Owner/ Building Management Company.	✓	✓
For DC Developments located in part of building, please provide the followings:			
MWA_P1_09	Information of responsible person	✓	✓
MWA_P1_10	Drawings showing the locations of the waste handling facilities in host building	✓	✓
MWA_P1_11	As-fitted drawings	✓	✓

MWA_P1_12	Record photographs	✓	✓
MWA_P1_13	Collection organisation/ recycler information, including: a. Company name, address and contact information; b. Collection frequency; and c. Collection agreement signed by the Recycling firm and Applicant. Where the Applicant adopts the host building facility, the host building Collection Agreement (or an equivalent letter by the Property Manages organisation)	✓	✓

Remarks

(a) Additional Information

Buildings Department. Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineer. PNAP 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 August 2019]

(b) Related Credits

MWA 4 Enhanced Waste Handling Facilities
This credit encourages enhanced provisions for recyclables collection, recycling facilities and waste treatment equipment.

4 Materials and Waste Aspect

4.1 Prerequisite

MWA P2 Materials Purchasing Plan

Extent of Application All DCs

Objective To encourage purchasing practices which aim at reducing the environmental impacts of products used through formulating the purchasing procedure or plan into a more environmentally friendly way.

Credits Attainable Required

Credit Requirement Demonstrating that the plan of material procurement (sub-section under MAN P1 Green Purchasing Plan) and its procedures for both on-going consumables and durable goods either following the internal company guideline or other international standards are in place.

Assessment The Applicant shall provide a materials purchasing plan including but not limited to the following items:

i. Endorsed policy;
ii. Objectives;
iii. Short term (3 years) and long term (5 years) targets;
iv. Responsibility;
v. 5R principles (rethink, reduce, reuse, replace and recycle);
vi. Environmental attributes;
vii. Specified on-going consumables;
viii. Specified durable goods; and
ix. Monitoring and checking.

The plan shall be endorsed by top management of DC Owner/ DC Management Company and reviewed regularly.

This prerequisite only assesses the procurement plan for materials/ products, where procurement for services is assessed under section MAN P1 Green Purchasing plan. The implementation of materials procurement practice is not necessary for fulfilling this prerequisite. The performance of implementation is assessed under section MWA 1 Green Product Procurement Practices.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MWA_P2_00	BEAM Plus Existing DCs submission template for MWA P2	✓	✓
MWA_P2_01	Materials purchasing plan endorsed by top management.	✓	✓

Remarks

(a) Additional Information

Environmental Protection Department. Green Procurement. Retrieved 2 January 2020, from http://www.epd.gov.hk/epd/english/how_help/green_procure/green_procure.html

(b) Related Credits

MWA 1 Materials Purchasing Practices
The related credit encourages purchasing practices which reduce the environmental impacts of products used by implementing Materials Purchasing Plan.

MWA 2 Use of Certified Green Products
The related credit encourages the purchase of certified green products that have low environmental impacts.

4 Materials and Waste Aspects

4.1 Selection of Materials

MWA 1 Materials Purchasing Practices

Extent of Application All DCs

Objective To encourage purchasing practices which reduce the environmental impact of products used by implementing Materials Purchasing Plan.

Credits Attainable 3 + 1 BONUS

Credit Requirement 1 credit for demonstrating at least 50% of purchased on-going consumables are environmentally friendly products for the past 12 months as minimum.

1 credit for demonstrating at least 50% of purchased durable goods are environmentally friendly products for the past 12 months as minimum.

1 credit for demonstrating at least 70% of purchased both on-going consumables and durable goods are environmentally friendly products for the past 12 months.

1 Bonus credit for demonstrating at least 70% of purchased both on-going consumables and durable goods are environmentally friendly products for the past 24 months.

Assessment The Applicant shall quantify the procurement in dollar values. The items of environmentally friendly on-going consumables/ durable goods shall be listed in the endorsed materials purchasing plan under section MWA P2.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MWA_01_00	BEAM Plus Existing DCs submission template for MWA 1	✓	✓
MWA_01_01	Summary table listing the product type, manufacturer, quantities, and environmental attribute [#]	✓	✓
MWA_01_02	Calculations [#]	✓	✓
MWA_01_03	Documents showing the environmental attributes [#]	✓	✓
MWA_01_04	Purchase records [#]	✓	✓
MWA_01_05	Record photographs [#]	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credits

MWA P2 Materials Purchasing Plan

The related credit encourages purchasing practices which aim at reducing the environmental impacts of products used through formulating

the purchasing procedure or plan into a more environmentally friendly way.

MWA 2 Use of Certified Green Products
The related credit encourages the purchase of certified green products that have low environmental impacts.

4 Materials and Waste Aspects

4.1 Selection of Materials

MWA 2 Use of Certified Green Products

Extent of Application All DCs

Objective To encourage the purchase of certified green products that have low environmental impacts.

Credits Attainable 2 BONUS

Credit Requirement Maximum 2 BONUS credits for purchasing green products certified by Construction Industry Council (CIC) Carbon Labelling Scheme/ HKGBC Green Product Accreditation and Standards (HK G-PASS) or other internationally recognised schemes.

Assessment 1 BONUS credit of having 5% of the green products in any one of the product categories as specified in CIC Carbon Labelling Scheme/ HK G-PASS or other internationally recognised schemes.

2 BONUS credits for having 5% of certified green products for at least 3 product categories (each category should have at least 5%) as specified in CIC Carbon Labelling Scheme/ HK G-PASS or other internationally recognised schemes.

The percentage calculation can be in mass, volume, quantity, area or dollar's value. All items including existing and newly purchased items shall be included in the calculation.

For any green products which have been certified under other internationally recognised schemes, the Applicant shall provide the technical information of the product with justification for TRC consideration.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MWA_02_00	BEAM Plus Existing DCs submission template for MWA 2	✓	✓
MWA_02_01	Summary table listing the product type, manufacturer, certification body, environmental attribute [#]	✓	✓
MWA_02_02	Calculations [#]	✓	✓
MWA_02_03	Certificate(s) of the green products [#]	✓	✓
MWA_02_04	Purchase records [#]	✓	✓
MWA_02_05	Record photographs [#]	✓	✓

Remarks

(a) Additional Information

Construction Industry Council. Carbon Labelling Scheme. Retrieved 2 January 2020, from http://zcb.hkcic.org/Eng/CarbonLabelling/AboutScheme/Overview.aspx

Hong Kong Green Building Council Limited. Green Product Accreditation and Standards. Retrieved 2 January 2020, from http://hkgpass.hkgbc.org.hk/nindex.php

(b) Related Credits

MWA P2 Materials Purchasing Plan
The related credit encourages purchasing practices which aim at reducing the environmental impacts of products used through formulating the purchasing procedure or plan into a more environmentally friendly way.

MWA 1 Materials Purchasing Practices
The related credit encourages purchasing practices which reduce the environmental impacts of products used by implementing Materials Purchasing Plan.

4 Materials and Waste Aspects

4.1 Selection of Materials

MWA 3 Ozone Depleting Substances

Extent of Application

Except the installed equipment using refrigerants, and fire suppression and other materials not controlled by the applicant

Objective

To reduce the release of harmful ozone-depleting substances into the atmosphere

Credits Attainable

3

Credit Requirement

(a) Newly Installed and Existing Equipment using Refrigerants
1 credit for all the equipment (both newly purchased and existing) using the refrigerants with Global Warming Potential (GWP) less than 1,900.

Alternatively,

For equipment with refrigerant GWP value > 1,900, credit can be achieved when the Applicant can demonstrate a phased programme of refrigerant replacement.

1 credit for using refrigerants with a combined value less than or equal to the threshold for the combined contributions to ozone depletion and global warming potentials for all new and existing HVAC&R equipment that under the control of Applicant.

(b) Fire Suppression and Other Materials
1 credit for using the fire suppression and other materials that avoids the use of ozone depleting substances in their manufacture, composition or use.

Assessment

(a) Newly Installed and Existing Equipment using Refrigerants
1 credit can be achieved for newly and existing installed equipment using refrigerants with GWP less than 1,900. For equipment with refrigerant GWP value > 1,900, credit can be achieved if the Applicant can demonstrate that a phased programme of refrigerant replacement is planned with budget reserved for implementation.

1 credit can be achieved if the newly and existing installed equipment using refrigerants do not exceed the maximum threshold for the combined contributions to ozone depletion and global warming potentials. The threshold can be determined using the following formula:

LCGWP + LCODP x 105 ≤ 13, where:

LCGWP	=	[GWPr x (Lr x Life + Mr) x Rc] / Life
LCODP	=	[ODPr x (Lr x Life + Mr) x Rc] / Life
GWPr	=	Global Warming Potential of Refrigerant (0 to 12,000kg CO_2/kg r)
ODPr	=	Ozone Depletion Potential of Refrigerant (0 to 0.2kg CFC 11/kg r)
Lr	=	Refrigerant Leakage Rate (2.0%)
Mr	=	End-of-life Refrigerant Loss (10%)
Rc	=	Refrigerant Charge (0.065 to 0.65kg of refrigerant per kW of AHRI rated or Eurovent Certified cooling capacity.)
Life	=	Equipment Life (10 years; default based on equipment type, unless otherwise demonstrated.)

(b) Fire Suppression and Other Materials

All portable fire extinguishers shall avoid the use of ozone depleting substances (ODS) in their manufacturing process, composition or use. For permanent system/ equipment (e.g. replacement of fire suppressants, thermal insulations, and other applications), only newly installed materials would be assessed.

For all sections

The newly installed equipment is defined as the equipment that is installed within the past 12 months.

Submittals

(a) Newly Installed and Existing Equipment using Refrigerants

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MWA_03_00	BEAM Plus Existing DCs submission template for MWA 3	✓	✓
MWA_03a_01	Summary table listing the newly and existing installed equipment, type, model number and refrigerant type [#] **[or]** Phased programme of refrigerant replacement	✓ ✓	✓ ✓
MWA_03a_02	Calculation [#]	✓	✓
MWA_03a_03	Equipment catalogue/ technical sheets [#]	✓	✓
MWA_03a_04	Record photographs [#]	✓	✓

(b) Fire Suppression and Other Materials

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MWA_03_00	BEAM Plus Existing DCs submission template for MWA 3	✓	✓
MWA_03b_01	Summary table listing the quantity and types of portable fire extinguishers and fixed fire protection system [#]	✓	✓
MWA_03b_02	Equipment catalogue/ technical sheets [#]	✓	✓
MWA_03b_03	Phase out plan (for intermediate stage only)	✓	✓

Remarks

(a) Additional Information

Environmental Protection Department. A Concise Guide to the Ozone Layer Protection Ordinance. Retrieved 2 January 2020, from http://www.epd.gov.hk/epd/english/laws_regulations/comp_guides/files/cgto_olpo_eng.pdf

Environmental Protection Department. A Concise Guide to the Ozone Layer Protection (Controlled Refrigerants) Regulation. Retrieved 2 January 2020, from http://www.epd.gov.hk/epd/english/laws_regulations/comp_guides/files/cgt_olp_cr_eng.pdf

Environmental Protection Department. Ozone Layer Protection. Retrieved 2 January 2020, from http://www.epd.gov.hk/epd/english/environmentinhk/air/ozone_layer_protection/wn6_info.html

Environmental Protection Department. Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, Residential or Institutional Purposes) in Hong Kong. Retrieved 2 January 2020, from http://www.epd.gov.hk/epd/sites/default/files/epd/english/climate_change/files/Guidelines_English_2010.pdf

USGBC. LEED v4 for Building Operations and Maintenance.

(b) Related Credits

None

4 Materials and Waste Aspects

4.2 Waste Management and Reduction

MWA 4 Enhanced Waste Management

Extent of Application All DCs

Objective To encourage best practice for the management of waste, including sorting, recycling and disposal of waste

Credits Attainable 2

Credit Requirement

a) Waste Management Plan
1 credit for developing a waste management plan.

b) Enhanced Waste Handling Facilities
1 credit for providing at least 3 of the following listed on-site recycling facilities and implementing the recyclable materials collection arrangement:

i. IT related waste such as, electronic equipment;
ii. Plastic recyclable;
iii. Metal recyclable;
iv. Glass recyclable;
v. Paper recyclable; and
vi. Beverage carton recyclable.

Assessment

a) Waste Management Plan

The Applicant shall provide a waste management plan including but not limited to the following items:

i. Objectives;
ii. Responsibility;
iii. Waste minimisation programme;
iv. Waste recycle/ reuse programme;
v. Waste data collection system;
vi. Influence on building users (e.g. training/ workshop/ campaign);
vii. Resource allocation;
viii. Training for staff; and
ix. Reporting to top management.

The plan shall be endorsed by top management of Building Owner/ Building Management Company and reviewed regularly.

The Applicant shall evaluate the implementation of the waste management plan and it is not necessary to complete all targeted actions. Regular review and recommendation for continual improvement are required.

b) Enhanced Waste Handling Facilities

In-house recycling facilities should be provided for the storage of the above listed recyclables. Same type of provision in multiple locations can only be counted once.

For each waste stream, provide at least one storage bin/ storage area for recycling. The recycling facilities shall be located at prominent locations(s)

(i.e. cannot be located in car park or other non-occupied areas). The size and collection frequency are not regulated.
The collection organisation/ recycler shall be employed by either DC Owner or DC Management Company.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MWA_04_00	BEAM Plus Existing DCs submission template for MWA 4	✓	✓
MWA_04_01	Endorsed Waste Management Plan	✓	✓
MWA_04_02	Documents substantiating the compliance (e.g. records, record photographs etc.) [#]	✓	✓
MWA_04_03	Regular review and recommendation for continual improvement	✓	✓
MWA_04_04	Summary table to illustrate the quantities and locations of facilities	✓	✓
MWA_04_05	Drawings showing the locations of the waste handling facilities	✓	✓
MWA_04_06	As-fitted drawings	✓	✓
MWA_04_07	Record photographs	✓	✓
MWA_04_08	Collection organisation/ recycler information, including: i. Company name, address and contact information; ii. List of recycled material; iii. Collection frequency; and iv. Collection agreement signed by the Recycling firm and Applicant. Where the Applicant adopts the host building facility, the host building Collection Agreement (or an equivalent letter by the Property Manages organisation)	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credits

MWA P1 Minimum Waste Handling Facilities
The Prerequisite requires the minimum provisions of waste recycle facilities for the collection, sorting, storage, recycling (recovered material) and disposal (waste).

4 Materials and Waste Aspects

4.2 Waste Management and Reduction

MWA 5 Waste Management for Renovation

Extent of Application	All DCs
Objective	To promote and encourage construction waste reduction during DCs Renovation
Credits Attainable	2
Credit Requirement	a) Construction Waste Management Plan 1 credit for developing a waste management plan for renovation. b) Construction Waste Recycling 1 credit for demonstrating compliance with the Construction Waste Management Plan and the application of proactive waste management provisions during construction (demolition and construction); and recycling of at least 15% of construction waste (demolition and construction).
Assessment	a) Construction Waste Management Plan To provide a Construction Waste Management plan including but not limited to the following items: i. Objectives; ii. Responsibility; iii. Construction waste minimisation programme; iv. Construction Waste recycle/ reuse programme; v. Policy on addressing safe storage, collection, recycling and diversion of waste associated with renovation activities; vi. Procedure for creating an individual plan for each project; vii. Communication channel; and viii. Reporting to top management. For each renovation project, specific waste diversion goals, target five materials for diversion, approximate the volume of waste anticipated and identify waste diversion strategies to be used should be included in the plan. The plan shall be endorsed by top management of Building Owner/ Building Management Company and reviewed regularly. b) Construction Waste Recycling Provide reports and records to demonstration the implementation of the Construction Waste Management Plan under MWA 5 and proactive waste management provision. Provide summary report demonstrating recycling of at least 30% of construction waste (demolition and construction). Furniture and furnishings that pose human health concerns (e.g., mold) as well as components not considered base building elements; mechanical,

electrical, and plumbing components; and specialty items, such as elevators should be excluded.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
MWA_05_00	BEAM Plus Existing DCs submission template for MWA 5	✓	✓
MWA_04_01	Endorsed Construction Waste Management Plan	✓	✓
MWA_04_02	Documents substantiating the compliance (e.g. records, record photographs etc.) [#]	✓	✓
MWA_04_03	Waste flow table for each renovation project	✓	✓
MWA_04_04	Summary calculation of the percentage of construction waste recycled	✓	✓
MWA_04_05	All waste and recycling record for each renovation project	✓	✓
MWA_04_06	Collection organisation/ recycler information	✓	✓

Remarks

(c) Additional Information

None

(d) Related Credits

None

5	**Energy Use**	**5.P Prerequisite** **5.1 Energy Use Reduction and Control** **5.2 Renewable and Alternative Energy Systems** **5.3 Energy Efficient Equipment**
	Introduction	The Information and Communication Technology (ICT) sector including DCs generates up to 2% of the global CO2 emissions and data centres are estimated to have the fastest growing carbon footprint from across the whole ICT sector, mainly due to new business such as cloud computing and the rapid growth of the use of Internet services. An objective of BEAM Plus DCs is to encourage thorough evaluation of the performance of DC and services system designs, and greater investments into measures that will help to improve the energy performance of existing DCs, so as to reduce energy consumption and the associated environmental impacts, and to reduce summer peak electricity demand. The assessment of the building and engineering systems is performance based as far as possible, but credits are also given for features which have proven to contribute to energy efficiency and conservation. Credits are given where management, operation and maintenance practices are such as to seek continual improvements in energy performance
5.P	**Prerequisite**	**EU P1 Minimum Energy Performance**
	Background	This section sets the minimum requirement on regular energy audit, which can provide a proactive building energy management by identifying the types, quantities, and effectiveness of energy used, and thus the room for improvements.
5.1	**Energy Management and Analysis**	**EU 1 Energy Management** **EU 2 Energy Analysis**
	Background	The management and operation of a DC and the way that the tenants use the DC can have a major impact on its energy consumption. Energy management should be fully integrated into the organisation's management systems; have monitoring and targeting systems in place based on sub-metering of the energy used; include regular reports and reviews of the monitored data; set targets for energy efficiency improvements supported by an action plan.
5.2	**Commissioning**	**EU 3 Commissioning**
	Background	One of the major reasons why DCs fail to meet performance expectations is the lack of adequate commissioning of systems and equipment, and the inadequacy of operations and maintenance, commissioning data, and as-installed equipment data and drawings. Successful commissioning shall help systems to properly operate and maintain throughout their life cycle.
5.3	**Energy efficient improvement**	**EU 4 Energy Benchmarking and System Improvement**
	Background	To further encourage energy efficiency and improvement, this section requires not only benchmarking the overall DCs energy performance, but also the component systems efficiency in order to identify areas of improvement in the data centre operations, since overall DC energy efficiency shall be corroborated by overall system design.
5.4	**Energy efficient improvement**	**EU 5 Enhancement**
	Background	Whilst the estimation of annual energy use and maximum electricity demand takes into account improvements to the efficiency of air-conditioning and lighting systems and equipment it does not embrace all aspects of energy

use in DCs. Therefore, BEAM credits additional measures, new technologies and techniques that can improve the energy performance of DCs.

5 Energy Use **5.P Prerequisite**

EU P1 Minimum Energy Performance

Extent of Application All DCs

Objective To establish the minimum level of energy performance for the data centre.

Credits Attainable Prerequisite

Credit Requirement Conducting energy audit in accordance with the Buildings Energy Efficiency Ordinance (Cap 610) requirements for existing buildings.

Assessment The Applicant shall provide an energy audit report confirming that an energy audit has been completed in accordance with the Buildings Energy Efficiency Ordinance (Cap 610) requirements for existing buildings.

The energy audit report shall meet the following requirements:

i. Conducted within the past 5 years from the date of submission;
ii. Endorsed by a Registered Energy Assessor (REA) with REA registration number stated in the report; and
iii. Include all elements as stipulated in the Code of Practice for Building Energy Audit issued by Electrical and Mechanical Services Department (EMSD).

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
EU_P1_00	BEAM Plus Existing DCs submission template for EU P1	✓	✓
EU_P1_01	An energy audit report fulfilling the criteria stated above	✓	✓

5 Energy Use **5.1 Energy Use Reduction and Control**

EU 1 Energy Management

Extent of Application All DCs

Objective To encourage high level management to involve in the improvement of energy efficiency and conservation.

Credits Attainable 4

Credit Requirement a) Energy Management Policy

1 credit for an energy management policy endorsed by top management.

b) Energy Management Plan

1 credit for energy management plan covering less than 3 years.
2 credits for energy management plan covering 3 years or more.

c) Appointment of Energy Warden

1 credit for appointing an Energy Warden in the DC Management Company.

Assessment a) Energy Management Policy

To provide an energy management policy endorsed by the top management of Building Owner/ Building Management Company to demonstrate the commitment.

b) Energy Management Plan

To provide an energy management plan containing the following elements as a minimum:

i. Objective and Target; and
ii. Reporting to top management on progress.

c) Appointment of Energy Warden

To provide evidence of appointment of at least one Energy Warden as key member in the building management team for the building. The scope of work for the energy warden shall also be indicated.

The energy warden shall meet all of the following requirements:

i. An employee of the Building Management Company; and
ii. Participated in more than 80% of the property management meetings.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
EU_1_00	BEAM Plus Existing DCs submission template for EU 1	✓	✓
EU_1_01	An energy management policy endorsed by the top management of Building Owner/ Building Management Company.	✓	✓
EU_1_02	An energy management plan endorsed by the top management of Building Owner/ Building Management Company [#].	✓	✓
EU_1_03	Appointment of Energy Warden: i. Scope of the work for the energy warden(s); ii. Resume of energy warden(s); and iii. Meeting minutes showing the attendance and/or action items by the appointed energy warden [#].	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credits

None

5 Energy Use **5.1 Energy Use Reduction and Control**

EU 2 Energy Analysis

Extent of Application Part a): Except Buildings compulsorily complying with BEC 2012 or later version.
Parts b to e): All DCs

Objective To enable and encourage building operators to measure, record, monitor and analyse energy performance of the building's engineering systems, particularly concerning energy use.

Credits Attainable 10

Credit Requirement a) Data Collection Facilities

1 credit for sub-metering systems for the following electrical loads where applicable:

i. Water Side;
ii. Air Side; and
iii. Lighting.

1 credit for having Building Management System (BMS) to log operation data (e.g. pressure, temperature, flow rate, on/off status) for monitoring operation and function of the system including the following as a minimum:

i. Air side;
ii. Water side;
iii. Cooling load; and
iv. Lighting control.

1 credit for energy metering to provide total facility power and energy usage and total IT equipment power and energy at each output of Power Distribution Unit (PDU) for determining instantaneous and average Power Usage Effectiveness (PUE) data.

b) Data Collection Record

1 credit for providing energy consumption data record of at least 1 year for major electrical loads.

1 credit for providing energy consumption data record of more than 3 years for major electrical loads.

c) Data Analysis

1 credit for calculating the EUI of the following services in data analysis:

i. Air-conditioning system; and
ii. Lighting.

1 credit for calculating and recording the PUE (Level 2) for 1 year.

d) Energy Audit Report

2 credits for filling up the entire Template 1 on Additional Information to Executive Summary of Energy Audit Report to EMSD.

e) Carbon Audit Report
1 credit for conducting carbon audit in accordance with the requirements as stipulated in the guideline issued by the Authority.

Assessment

a) Data Collection Facilities

To provide the description of the sub-metering system and/or BMS installed and data record sample, in order to demonstrate that electricity use pattern and/or operation data for 3 or more major systems can be adequately monitored for audit purposes.

Metering shall provide record at intervals of one hour or less and capable to record both consumption and demand (i.e. kW, kVA, kWh). The whole facilities (i.e. meters, BMS, computer) are capable to store all meter data for at least 36 months.

Monitoring system for central chiller plant shall allow the overall performance of the plant and individual chillers to be determined for all operating modes and range of operating conditions. As a minimum, temperature, flow rate and pressure measurements shall be monitored.

Energy metering should be provide to monito and record total facility power and energy usage and total IT equipment power and energy at each output of Power Distribution Unit (PDU) for determining instantaneous and average Power Usage Effectiveness (PUE) data.

b) Data Collection Record

The Applicant shall provide record of energy consumption data for major electrical loads in order to demonstrate that proper record keeping practice has been implemented. It is a good practice to have energy consumption data record separately for different system types of major electrical load. However, this is not an assessment criterion for this credit (i.e. one electrical meter that records several different system types of major electrical load can be accepted in this credit.).

c) Data Analysis

To provide EUI data for the air-conditioning system, and lighting system. If energy consumption for the systems required cannot be provided separately according to system types due to lack of sub-metering provision, then calculation based on technical data (e.g. manufacturer technical specification, testing and commissioning records, measured power, power calculated based on measured voltage, ampere, flow rate, pressure drop, etc.) can be accepted for this credit.

To calculating and recording the monthly PUE (Level 2) for 1 year.

The IT equipment energy shall be measured at Power Distribution Unit (PDU) Output, i.e. PUE Level 2.

d) Energy Audit Report

To complete entire Template 1 on Additional Information to Executive Summary of Energy Audit Report to EMSD. Relevant calculation and/or measured data as supporting to the filled data in Template 1 should also be provided. The report shall be endorsed by a Registered Energy Assessor (REA).

e) Carbon Audit Report

The Applicant shall provide a carbon audit or Greenhouse Gas (GHG) Emissions audit report in accordance with the latest version Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, Residential or Intuitional Purposes) in Hong Kong, issued by Electrical & Mechanical Services Department (EMSD) and Environmental Protection Department (EPD). The report shall be endorsed by a Qualified Service Provider (QSP).

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
EU_2_00	BEAM Plus Existing DCs submission template for EU 2	✓	✓
EU 2a Data Collection Facilities - For Sub-metering System			
EU_2a_01	Drawings, as-built electrical schematic	✓	✓
EU_2a_02	Manufacturer technical specification, technical data sheets for meter, transducers, and sensors	✓	✓
EU_2a_03	Operation manual	✓	✓
EU_2a_04	Testing and commissioning records	✓	✓
EU_2a_05	Data record samples	✓	✓
EU_2a_06	Record photographs	✓	✓
EU 2a Data Collection Facilities - For BMS			
EU_2a_07	Drawings, as-built schematic, point schedule	✓	✓
EU_2a_08	Manufacturer technical specification, technical data sheets for meter, transducers, and sensors	✓	✓
EU_2a_09	Operation manual	✓	✓
EU_2a_10	Record photographs	✓	✓

EU_2b_01	Energy consumption data record for major electrical loads (e.g. BMS log data, metering log data, manually recorded data) [#]	✓	✓
EU_2b_02	Spreadsheet summarising the energy consumption data according to major systems with monthly bar chart plotted [#]	✓	✓
EU_2c_01	Spreadsheet summarising EUI for the required systems	✓	✓
EU_2c_02	Calculation and/or measured data as supporting to the EUI	✓	✓
EU_2c_03	Spreadsheet summarising PUE	✓	✓
EU_2c_04	Calculation and/or measured data as supporting to the PUE	✓	✓
EU_2d_01	An energy audit report endorsed by REA	✓	✓
EU_2d_02	Completed Template 1 on Additional Information to Executive Summary of Energy Audit Report and submission record to EMSD	✓	✓
EU_2d_03	Calculation and/or measured data as supporting to the data filled in the template 1	✓	✓
EU_2e_01	A carbon audit or GHG emission audit report endorsed by a QSP	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credits

None

5 Energy Use **5.1 Energy Use Reduction and Control**

EU 3 Commissioning

Extent of Application
EU 3a - All DCs.
EU 3b - Except Electrical system/ HVAC system not controlled by the applicant
EU 3c - Except Electrical system/ HVAC system not controlled by the applicant

Objective
To establish action plan for management team to follow and to use the commissioning process to improve building energy performance.

Credits Attainable
10

Credit Requirement
(a) Action Plan
1 credit for action plan covering less than 3 years.

2 credits for action plan covering 3 years or more.

(b) Commissioning
1 credit for providing original/ retro-commissioning (RetroCx) for electrical services systems.

For DCs with chiller system:
1 credit for providing original/ retro-commissioning (RetroCx) for water side equipment of central air-conditioning system.

1 credit for providing original/ retro-commissioning (RetroCx) for air side equipment of central air-conditioning system.

For DCs without chiller system:
1 credit for providing original/ retro-commissioning (RetroCx) for air-conditioning system.

(c) On-going Commissioning
1 credit for providing an ongoing commissioning plan detailing the works and person-in-charge for electrical services if on-going commissioning have been conducted for electrical system and/or for Heating, Ventilating, and Air-Conditioning (HVAC) system if on-going commissioning have been conducted for HVAC system.

1 credit for the execution of any 2 of the following measures for power quality management regularly.

2 credits for the execution of any 4 of the following measures for power quality management regularly.

i. Power factor monitoring & correction;
ii. 3-phase Load Balancing;
iii. Maximum demand monitoring;
iv. Demand Side Management (DSM);
v. Total Harmonic Distortion (THD); and
vi. Thermal Scan on electrical distribution system.

For DCs with chiller system:

1 credit for ongoing commissioning for water side equipment of central air-conditioning system.

1 credit for ongoing commissioning for air side equipment of central air-conditioning system.

For buildings without chiller system:

1 credit for ongoing commissioning for all HVAC equipment.

Assessment

a) Action Plan

To provide action plan for energy performance improvement including the following as a minimum:

I. Budget;
II. Upgrading/ retrofitting works;
III. Projected saving and payback;
IV. Target implementation date; and
V. Monitoring & Verification on completed works.

Records (e.g. delivery order, contract, record photographs) shall also be provided to demonstrate the implementation of improvement works covering the claimed periods.

b) Commissioning

To provide copies of original commissioning/ retro-commissioning (RetroCx) records and/or testing and commissioning records following changes to systems and equipment, the procedures of the testing and commissioning and the personnel involved.

c) On-going Commissioning

To provide ongoing commissioning plan and records for electrical system and/or HVAC system for at least the past 12 months detailing:

I. Person-in-charge;
II. Monitoring requirements (type of measurement, measurement device, monitoring frequency and duration, and acceptable values);
III. Record of measured parameters; and
IV. References used to evaluate performance.

In order to demonstrate the implementation of power quality management, the work records showing listed measures have been carried out regularly (at least once in every 5 years) shall be provided. Specific works required for the listed measures of power quality management are shown below:

i. Power factor monitoring & correction
- Measure current power factor;
- Actions taken to correct power factor; and
- Measure corrected power factor to verify (if action is needed).

ii. 3-phase load balancing
- Measure power for all three-phases;

- Actions taken to balance the loads; and
- Measure the corrected loads.

iii. Maximum demand monitoring
- Monitor the major equipment's power in interval of 5 minutes for one selected week in the hottest month; and
- Major equipment shall include: chiller, cooling tower (if any), HVAC pumps, air-conditioning units, fan motors, plumbing and drainage, lift and escalator and tenant's plug loads.

iv. Demand Side Management (DSM)
- Based on the data collected from demand monitoring, identify potential activities to reduce the maximum demand;
- Potential activities include but not limited to: energy reduction programmes (e.g. upgrade/ adjust to more efficient equipment, power factor correction), load management programmes (e.g. changing the load pattern such as by frequency sensitive relays triggering circuit breakers (ripple control), by timer, or by using special tariffs to influence building user's behaviour); and
- Monitor (if activities implemented) the demand to verify the effect.

v. Total Harmonic Distortion (THD)
- Measure harmonics for all circuits exceeding 400A current rating based on circuit protective device;
- Actions taken to lower the THD; and
- Measure the corrected THD.

vi. Thermal scan on electrical distribution system
- All major electrical distribution system, such as switchgears, low voltage switchboards, cables and busbars, if any, managed by the Building Owner/ Building Management Company, shall be covered by thermal scan.

The work records required to demonstrate the annual implementation of ongoing commissioning for HVAC system shall follow the ongoing commissioning plan.

Submittals

(a) Fundamental Metering and Monitoring

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
EU_3_00	BEAM Plus Existing DCs submission template for EU 3	✓	✓
EU_3a_01	An action plan	✓	✓
EU_3a_02	Implementation records [#]	✓	✓
EU_3b_01	Original commissioning/ retro-commissioning (RetroCx) records	✓	✓

EU_3b_02	Testing and commissioning records following changes to systems and equipment (if any) [#]	✓	✓
EU_3c_01	Undertaking letter endorsed by top management of Building Owner/ Building Management Company showing the commitment of carrying out on-going commissioning within the next 5 years	✓	✓
EU_3c_02	On-going commissioning plan	✓	✓
EU_3c_03	On-going commissioning records in the form of reports, measured data, record photographs, etc. showing works taken [#]	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credits

None

5 Energy Use **5.2 Renewable and Alternative Energy Generation**

EU 4 Energy Benchmarking and Management

Extent of Application All DCs

Objective To reduce the consumption of non-renewable energy resources and the consequent harmful emissions of carbon dioxide (CO_2) to the atmosphere and encourage energy conservation and methods to reduce peak electricity demand.

Credits Attainable 10 + 2 BONUS

Credit Requirement (a) Benchmarking

Credit(s) can be achieved based on the Operating PUE value

No. of Credits	1	2	4	6	8	1 BONUS	2 BONUS
PUE	2.0	1.9	1.8	1.7	1.6	1.5	≤1.4

(b) Air Management System

1 credit for demonstrating the total air flow efficiency in all data hall, from supply to return, is of 0.9 kW/m^3/s.

1 credit for demonstrating the data hall supply air temperature for 24 °C and above.

Assessment a) Benchmarking

The DC shall provide the operating PUE and Operating IT load using 12 months of tread-logged data.

$$Opearting\ PUE = \frac{\text{Annual facility energy consumption, kWh}}{\text{Annual IT equipment energy consumption, kWh}}$$

Total facility energy should include all kinds of energy used by the assessed DC and IT equipment energy should be measured at Power Distribution Unit (PDU) Output (PUE Level 2)

Total facility energy consumption, IT equipment energy consumption and operating PUE for the past 12 months should be submitted.

(b) Air Management System

Measurement of the total fan power and total fan airflow at each data hall should be provided.

The calculation air flow efficiency should include both the supply and return air flows serving each data hall, and expressed in the following:

$$Airflow\ efficiency = \frac{\text{Total fan power (supply and return), kW}}{\text{Total fan airflow, (supply and return), } m^3/s}$$

Measurement of supply air temperature at each data hall should be provided.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
EU_4_00	BEAM Plus Existing DCs submission template for EU 4	✓	✓
EU_4a_01	Detail Calculation of the Operating PUE	✓	✓
EU_4a_02	PUE value for the past 12 months	✓	✓
EU_4b_01	Endorsed air flow and fan power Measurement report	✓	✓
EU_4b_02	Detail Calculation for the air flow efficiency	✓	✓
EU_4b_03	Endorsed data hall supply air temperature Measurement report	✓	✓

Remarks

(a) Additional Information

EMSD – HK RE Net

http://re.emsd.gov.hk/english/gen/overview/over_intro.html

EMSD – Energy Land

http://www.energyland.emsd.gov.hk/en/energy/energy_use/application.html

EMSD – New & Renewable Energy

http://www.emsd.gov.hk/en/energy_efficiency/new_renewable_energy/GovHK – Renewable Energy

http://www.gov.hk/en/residents/environment/energy/renewableenergy.htm

Scheme of Control

Hongkong Electric Co. Ltd. and HK Electric Investments Ltd.(PDF version) (1 January 2019 to 31 December 2033)
http://www.enb.gov.hk/sites/default/files/en/node66/new_HKE_SCA_eng.pdf

CLP Power Hong Kong Ltd. and Castle Peak Power Company Ltd.(PDF version) (1 October 2018 to 31 December 2033)
http://www.enb.gov.hk/sites/default/files/en/node66/new_CLP_SCA_eng.pdf

(b) Related Credits

None

5 Energy Use **5.3 Energy Efficient Equipment**

EU 5 Enhancement

Extent of Application All DCs

Objective To encourage adoption of practices, new technologies and techniques that have yet to find application in Hong Kong or provision for performance enhancements over and above stated performance criteria in BEAM Plus Existing DCs.

Credits Attainable 7 BONUS

Credit Requirement Maximum of 1 BONUS credit for each energy conservation approach is allowed but the award of credit is subject to the final approval of BEAM Society Limited (BSL)'s Technical Review Committee (TRC) based on the estimated energy reduction, justification and/or the innovation of the proposed approaches.

Note: Energy saving measures that rely on building user's behaviour or manual control (such as, turning up the set temperature manually for air-conditioning; turning off lighting by hand in accordance to staff energy management manual) will not be considered energy saving features in this section.

Some of the prescriptive approaches include:

a) Research and Development in Energy
1 BONUS credit for conducting research and development or participating in competition with published paper related to energy aspects for DCs.

b) Compliance with the BEC
Maximum 4 BONUS credits for compliance with the latest version of the following listed BEC (This BONUS credit does not apply to those buildings that are required to comply with the latest version of the BEC):

Energy Efficiency Requirements for Air-Conditioning Installations;
Energy Efficiency Requirements for Electrical Installations;
Energy Efficiency Requirements for Lighting Installations; and/or
Energy Efficiency Requirements for Lift and Escalator Installations.

c) Renewable Energy System
1 BONUS credit where at least 0.2% of building energy consumption in communal area is obtained from renewable energy sources.

d) Separate Energy Charges
1 BONUS credit where separate charges are made for energy use.

e) Other Approaches
Maximum 7 BONUS credits for adopting other energy conservation approach not prescribed above.

Assessment

a) Research and Development in Energy

The Applicant shall provide brief description of how the published paper has positive impact on building energy aspect, a copy of the published paper and evidence showing the paper is published in one of the recognised channels. Recognised channels include but not limited to: CPD events organised by professional institutes (conference, seminar, workshop, competition, etc.), World Sustainable Building Conference, professional institute journal (e.g. HKIE monthly journal), educational journal (e.g. Building and Environment Journal).

b) Compliance with the BEC

1 BONUS credit can be achieved for the compliance with each of the above listed codes.

The Applicant shall provide Form of Compliance (FOC) issued by EMSD to demonstrate compliance with the latest version of the BEC.

c) Renewable Energy System

The Applicant shall provide the narrative of the renewable energy system. In order to demonstrate the amount of energy generation or energy reduction from renewable energy sources, calculation shall be provided for system operate less than 1 year; or measurement shall be provided for system operate for more than 1 year.

In the case of systems that generate electricity from renewable sources (e.g. photovoltaic panels), the estimated amount of electricity that will be generated by the system for use by equipment in the building, either instantaneously or from an associated storage system.

In the case of using systems that produce services directly from renewable sources, which will otherwise require the use of fuel or electricity to produce those services (e.g. hot water supply from solar panels or chilled water supply from absorption chillers powered by solar heat), the equivalent amount of electricity use that will be avoided.

The calculation/ measurement shall take due account of the diurnal and seasonal variations in the external environmental conditions (e.g. solar intensity and wind speed and direction) and in the demand for the electricity and/or services generated by the systems. Any energy use and losses by the systems shall be discounted from their output. The total building energy consumption in communal areas (i.e. in charged by the Applicant) shall be referenced to the electricity bills and Towngas bills (if applicable) in any one selected year over the past 5 years.

d) Separate Energy Charges

The Applicant shall provide evidence to demonstrate that building users pay for their own energy consumption cost within their spaces, including air-conditioning, lighting, small power, etc.

e) Other Approaches

1 BONUS credit can be achieved for adopting each other energy conservation approach not prescribed above

Despite the listed approaches above, BEAM Plus also encourages the Applicant to adopt other types of approach that can improve the energy performance of the subject building or advance the industry's knowledge or movement.

In order to demonstrate substantial environmental benefits by the adoption of the claimed approach, the Applicant shall provide evidence of the application of new practices, technologies and techniques and the associated benefits. The benefits related to lower energy use, support of new technology, are all encouraged.

The Applicant shall also provide calculation showing the estimated energy saving achieved by the adoption of each or all the proposed approaches. In the case of non-quantifiable benefit resulted from the approach, justification should be provided.

The Applicant's submission shall identify the intent of the proposed innovative approach, the proposed criteria for assessing compliance, and the assessment criteria. The Assessor shall refer the proposal to BSL TRC who will consider each application on its merit.

BONUS credit in this section shall be granted at the sole discretion of BSL TRC.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
EU_5_00	BEAM Plus Existing DCs submission template for EU 6b	✓	✓
EU_5a_01	Brief description of how the published paper has positive impact on building energy aspect	✓	✓
EU_5a_02	A copy of the published paper	✓	✓
EU_5a_03	Evidence to demonstrate the publication (e.g. letter from editor of the journal, copy of the publication)	✓	✓
EU_5b_01	FOC issued by EMSD	✓	✓
EU_5c_01	Manufacturer specification/ catalogue, as-built drawings, record photographs of the renewable energy system, etc.	✓	✓

EU_5c_02	Results of calculated/ measured energy generation or energy reduction	✓	✓
EU_5c_03	Electricity bills and Towngas bills (if applicable)	✓	✓
EU_5d_01	As-built electrical schematic, as-built MVAC water side schematic, location layouts	✓	✓
EU_5d_02	Consumption records, meter readings, logbook or printed output (sensitive information can be blacked out if needed, such as tenant's name)	✓	✓
EU_5d_03	Payment records showing that building users pay for their own energy consumption within their spaces	✓	✓
EU_5d_04	Manufacturer's technical specification, technical data sheets for the tenant electricity meters and/or thermal energy meters for chilled water sub-metering	✓	✓
EU_5d_05	Record photographs showing meter installation	✓	✓
EU_5e_01	Description and intent of the approach	✓	✓
EU_5e_02	Proposed criteria for assessing compliance and the assessment criteria	✓	✓
EU_5e_03	Quantified environmental benefits	✓	✓
EU_5e_04	Other types of supporting (e.g. manufacturer specification/ catalogue, laboratory report, calculation, published papers, project reference, etc.)	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credits

None

6 Water Use

6.1 Water conservation
6.2 Water management
6.3 Effluent

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.

6.1 Water Conservation

WU 1 Water Efficient Devices
WU 2 Cooling Tower Water
WU 3 Water Recycling
WU 4 Water Saving Performance

Background

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 Water management

WU 5 Water Metering

Background

Water metering can help to reduce water consumption and keep tracking the water consumption, promote and implement water conservation measures and practices.

6.3 Effluent

WU 6 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 Water Use

6.1 Water Conservation

WU 1 Water Efficient Devices

Extent of Application

Except Water devices not under the control of applicant can be excluded from the assessment

Objective

To reduce the consumption of fresh water through the application of water saving devices that have proven performance and reliability.

Credits Attainable

4

Credit Requirement

Credit(s) can be achieved based on the estimated aggregate annual saving by the use of water efficient devices.

No. of Credit(s)	1	2	3	4
Estimated aggregate annual fresh water saving	10%	15%	20%	25%

Assessment

Calculation shall be provided to determine the annual fresh water saving at the locations under the control of the Applicant is at least 5% lower than the BEAM Plus baseline value. The calculation shall take into account the number of persons, the number of operational days per annum, operating pressure and limited to the water usage from the water taps and shower heads (if any).

In case the flow rate of the water fixture is unavailable, on-site measurement data shall also be accepted in evaluating the actual performance.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
WU_01_00	BEAM Plus Existing DCs submission template for WU 1	✓	✓
WU_01_01	Schedule of water taps and shower heads for bathing (if any) installed at the locations under the control of the Applicant	✓	✓
WU_01_02	Manufacturer specification or catalogues of water taps and shower heads for bathing (if any) **[or]** On-site measurement data	✓ ✓	✓ ✓
WU_01_03	Annual water saving calculations (baseline values can be found in Appendix 9) which take into account of the water pressure	✓	✓
WU_01_04	On site photographs of the water fixtures	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credits

WU 4 Water Saving Performance

The related credit encourages continual improvements in reducing fresh water consumption.

6 Water Use **6.1 Water Conservation**

WU 2 Cooling Tower Water

Extent of Application Except DCs without cooling tower or cooling tower with salt water

Objective To reduce the fresh water consumption for cooling tower makeup.

Credits Attainable 2

Credit Requirement 1 to 2 credits for reducing fresh water consumption by installing water treatment system which can achieve minimum 7 cycles **or** 8 or more cycles of concentration with acceptable water quality.

Assessment The Applicant shall install the water treatment system and conduct the water sampling. Where the ratio between the concentration of dissolved solids in the cooling water and the make-up water is larger than 7 (for 1 credit) or equal to 8 or more (for 2 credits), the assessment criteria are fulfilled.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
WU_02_00	BEAM Plus Existing DCs submission template for WU 2	✓	✓
WU_02_01	Narrative and on-site photographs of the water treatment system	✓	✓
WU_02_02	Water sampling records [#]	✓	✓
WU_02_03	Calculations	✓	✓

Remarks

(a) Additional information

None

(b) Related credits

None

6 Water Use **6.1 Water Conservation**

WU 3 Water Recycling

Extent of Application All DCs

Objective To encourage harvesting of rainwater and recycling of grey water to reduce the consumption of fresh water.

Credits Attainable 2 BONUS

Credit Requirement 1 BONUS credit for harvesting rainwater and/or recycling grey water that leads to a reduction of at least 2.5% in the consumption of fresh water.

1 additional BONUS credit if the reduction can achieve 5% or above.

Assessment The Applicant shall provide details on the rainwater harvesting and/or grey water systems including the drawings showing the general arrangement and the schematic diagrams. The calculation of the expected fresh water saving shall also be provided.

Where it can be demonstrated that the savings in fresh water use is at least 2.5% or more of the total amount of fresh water consumption, the BONUS credit(s) is/are achieved.

The percentage of fresh water saving can be determined by the amount of rainwater and/or grey water recycled and reused per year (m^3) divided by the amount of fresh water meter reading from the building per year (m^3).

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
WU_03_00	BEAM Plus Existing DCs submission template for WU 3	✓	✓
WU_03_01	Drawing and schematic diagrams of the rainwater harvesting and/or grey water recycling systems	✓	✓
WU_03_02	Calculation on the fresh water saving	✓	✓
WU_03_03	On-site photographs of the water recycling system(s)	✓	✓

Remarks

(a) Additional Information
None

(b) Related Credits
None

6 Water Use **6.1 Water Conservation**

WU 4 Water Saving Performance

Extent of Application All DCs.

Objective To encourage continual improvements in reducing fresh water consumption.

Credits Attainable 4 + 1 BONUS

Credit Requirement Credit(s) can be achieved based on the reduction percentage by comparing water bill/ metering data. (Reference year can be any year in the past 5 years).

No. of Credits	1	2	3	4	BONUS
Annual fresh water use reduction	3%	6%	9%	12%	15%

Assessment The Applicant shall compute the reduction of water consumption by the water bills or metering data. The numerator shall be the water consumption to be compared against the baseline year and it has to be the current year data. The denominator could be any years within 5 years at the time of submission.

A ratio indicator by a certain operational measuring unit (such as the number of building users) could be applied to allow for such comparison.

The Applicant shall also demonstrate what management initiatives (rather than changes in occupancy or use) or hardware upgrade have been implemented to reduce the water consumption.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
WU_04_00	BEAM Plus Existing DCs submission template for WU 4	✓	✓
WU_04_01	Water bills/ metering data for the baseline year and current year [#]	✓	✓
WU_04_02	Water reduction calculation	✓	✓
WU_04_03	Narratives on the management initiatives or evidence of hardware upgrade in reducing fresh water consumption	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credits

WU 1 Water Efficient Devices

The related credit encourages the application of water saving devices that have proven performance and reliability to reduce the consumption of fresh water.

6 Water Use **6.2 Water management**

WU 5 Water Metering

Extent of Application Except when less than 2 water sub-systems are under the control of the applicant

Objective To provide opportunity to reduce the water use by tracking the water consumption records on different water systems.

Credits Attainable 1 + 1 BONUS

Credit Requirement 1 credit for demonstrating provision of permanent smart water meter for cooling towers water use and Indoor plumbing fixtures and fitting, and at least two (2) of the other water systems, which able to display metered data, treading of water consumption and relevant parameters.:

i. Irrigation (if applicable);
ii. Cleansing;
iii. Water features/ pools; and
v. Other process water.

1 BONUS credit for installation of devices for detecting water leakage at the communal water supply system within the building lot, i.e. underground buried pipes and all fresh water pump rooms.

Assessment To provide permanently installed smart water meters so that the water usage for different systems can be tracked.

The smart meters should be able to display metered data, trending of water consumption and relevant parameters, and with data logging capability/ connected to Building Management System (BMS)

For the BONUS credit, the applicant shall install water leakage detectors such as infra-red or moisture detectors for the communal water supply pipes at underground and/or fresh water pump rooms and all data halls to demonstrate compliance.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
WU_05_00	BEAM Plus Existing DCs submission template for WU 5	✓	✓
WU_05a_01	Narrative of the water sub-metering system	✓	✓
WU_05a_02	Plumbing schematic diagrams or layout drawings showing the provisions of the water metering for at least two water sub-systems	✓	✓
WU_05a_03	Data logging records [#]	✓	✓
WU_05a_04	On-site photographs of the water meters	✓	✓
WU_05b_01	System description of the water leakage system		
WU_05b_02	Plumbing schematic diagrams or layout drawings showing the provisions of the water leakage detectors		

WU_05b_03	Equipment catalogues of the water leakage detectors		
WU_05b_04	On-site photographs of the water leakage detectors (if any)		

Remarks

(a) Additional Information

None

(b) Related Credits

None

6 Water Use **6.3 Water Harvesting and Recycling**

WU 6 Water Efficient Flushing System

Extent of Application Except Flushing system not under the control of the applicant

Objective To reduce the volumes of sewage discharged from buildings thereby reducing burdens on municipal sewage supply and treatment facilities.

Credits Attainable 2

Credit Requirement 1 credit for installing dual flush for the water closets under the control of the Applicant.

1 credit for installing urinal with WELS Grade 2 or above.

Assessment The Applicant shall demonstrate that the flushing systems are water efficient with the following criteria:

i. 80% of toilets are furnished with dual flush system; and
ii. 80% of the urinals are certified with Water Efficiency Labelling Scheme Grade 2 or above. Alternatively, if the urinals are not certified by WELS, the Applicant can provide a calculation to demonstrate the installed urinals have equivalent performance with the WELS Grade 2 certified products.

Submittals **For the first credit**

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
WU_06_00	BEAM Plus Existing DCs submission template for WU 6	✓	✓
WU_06a_01	Schedule of the water closets and urinals installed	✓	✓
WU_06a_02	Catalogues of the dual flush system and the urinals with flow rate data indicated (if any)	✓	✓
WU_06a_03	On-site photographs of the water efficient flushing system	✓	✓

For the second credit

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
WU_06_00	BEAM Plus Existing DCs submission template for WU 6	✓	✓
WU_06b_01	Schedule of the water closets and urinals installed	✓	✓
WU_06b_02	The WELS certificate	✓	✓
WU_06b_03	On-site photographs of the flushing system with WELS Grade 2 or above	✓	✓

Remarks

(a) Additional Information
None

(b) Related Credits
None

7	**Indoor Environmental Quality**	**7.P Prerequisite** **7.1 Ventilation** **7.2 Thermal comfort** **7.3 Hygiene** **7.4 Indoor air quality** **7.5 Lighting quality** **7.6 Acoustics and noise**
	Background	This section considers some of the broader issues of sustainable buildings as well as the most significant indoor performance issues. 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. 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 and comfortable 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.P	**Prerequisites**	**IEQ P1 Minimum Ventilation Performance**
	Background	This requirement ensures that ventilation systems of the air-conditioned premises have been designed according to recognised procedures to provide a minimum ventilation rate of sufficient quality and quantity.
7.1	**Ventilation**	**IEQ 1 Ventilation in Common Areas** **IEQ 2 Localised Ventilation**
	Background	It is not possible to use CO_2 as a measure of satisfactory performance in unoccupied areas but it is possible to determine if ventilation will be satisfactory through measurement of ventilation rate and ventilation effectiveness. There are three basic requirements for ventilation of occupied rooms and rooms used for habitation; background ventilation, local exhaust, and source control. Background ventilation is intended to dilute the unavoidable contaminant emissions from people and materials. Background ventilation should be provided for control of radon levels in occupied and habitable rooms, and reduces possibility of mould growth under conditions of high humidity. Local exhaust is intended to remove contaminants from those specific rooms in which concentrated sources are expected.
7.2	**Thermal comfort**	**IEQ 3 Thermal Comfort in Air-Conditioned Premises**
	Background	BEAM Plus seeks to ensure that buildings and systems are tested as far as practicable and the specified thermal comfort conditions can be achieved under conditions of normal occupancy.
7.3	**Hygiene**	**IEQ 4 Biological Contamination**

Background

Post-SARS, a lot more attention has been paid to building hygiene. Clearly, certain features of building and building services design, e.g. plumbing and drainage systems, are likely to contribute to health problems. Proper provisions for inspection, cleaning and maintenance allows for comprehensive management of hygiene in buildings.

7.4 Indoor air quality

IEQ 5 IAQ Monitoring

Background

Indoor air quality (IAQ) is defined by a list of the constituents, in both solid and gaseous states, in air. A key factor in determining appropriate standards for IAQ is the duration of exposure. Exposure to indoor pollutants for a matter of hours or over a working day will be different for most parameters depending on dose and response.

7.5 Lighting quality

IEQ 6 Interior Lighting in Normally Occupied Areas

IEQ 7 Interior Lighting in Areas Not Normally Occupied

Background

A consequence of poor lighting in work places is discomfort and loss of working efficiency. Although interior lighting in workplaces is one of the most challenging design tasks, unfortunately often relatively little attention is given to design for work spaces where productive and creative activities take place. To focus only on luminance level on the horizontal plane is insufficient.

The quality of an interior lighting scheme cannot be specified or demonstrated through measurement of light sources and outputs alone, but needs to consider the relationship of the light sources to the nature of the space being illuminated, and visual tasks of users in the space.

7.6 Acoustics and noise

IEQ 8 Room Acoustics

IEQ 9 Noise Isolation

IEQ 10 Vibration

Background

When indoor noise is above a certain level, it can cause discomfort, irritation and interference with workplace activities. In addition, poor acoustics in certain premises will interfere with speech intelligibility. Noise inside DCs comes from a number of sources, including noise produced from IT equipment and building services system. Noise and vibration should be limited to a level which are suitable for the use of the premises in a DC.

The selection and erection of building services systems and equipment can influence the background noise levels in certain locations, and may also induce unwanted vibration. The sound insulation properties of floors and internal walls are crucial in controlling noise propagation inside a DC. It is also necessary to consider how the design of premises affects speech intelligibility.

7	**Indoor Environmental Quality**	**7.P**	**Prerequisite**

IEQ P1 Minimum Ventilation Performance

Extent of Application

Except naturally ventilated spaces.

Objective

To ensure that a minimum quality and quantity of outdoor air is supplied to spaces in the project in order to support the well-being and comfort of building users.

Credits Attainable

Prerequisite

Credit Requirement

Demonstrate that the project is in compliance with the minimum requirements of ANSI/ASHRAE 62.1-2013 in respect of Outdoor Air Quality and Minimum Ventilation Rate.

Alternatively,

In case of the minimum ventilation rate of ANSI/ASHRAE 62.1-2013 is not complied due to the physical constraints of the existing ventilation system, demonstrate that the system is operated at maximum outdoor air delivery rate and provide not less than 5 l/s per person of combined outdoor air rate.

Assessment

Compliance Path 1

The Applicant shall conduct the air measurement at the intake location to check whether the outdoor air pollutants carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3) and respirable suspended particulates (RSP) conform to the Indoor Air Quality (IAQ) Certification Scheme Good Air Quality level.

The Applicant shall demonstrate that the ventilation rates at normally occupied areas comply with ANSI/ASHRAE 62.1-2013's requirement. Normally occupied areas are enclosed areas where people will stay more than 1 hour there. Examples of normally occupied area can be found in Appendix 9 Glossary.

Alternatively,

Compliance Path 2

In case of the minimum ventilation rate of ANSI/ASHRAE 62.1-2013 is not complied due to the physical constraints of the existing ventilation system, a report endorsed by a Registered Professional Engineer (R.P.E.) in Building Services, Environmental or Mechanical discipline shall be submitted to provide the details of the system's maximum ventilation rate, and demonstrate that the system is operated at maximum capacity to deliver outdoor air into the space and provide not less than 5 l/s per person of combined outdoor air rate.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
IEQ_P1_00	BEAM Plus Existing DCs submission template for IEQ P1	✓	✓
For compliance path 1, please provide the followings:			
IEQ_P1_01	Measurement report of CO, NO_2, O_3 and RSP at the outdoor air intake location	✓	✓
IEQ_P1_02	A report identifying each of the ventilation zones, the space types, occupant densities, and the ventilation rates; demonstrating compliance with the minimum ventilation rate(s)	✓	✓
For compliance path 2, please provide the followings:			
IEQ_P1_03	A report endorsed by a R.P.E	✓	✓

Remarks

(a) Additional Information

ANSI/ASHRAE 62.1-2013. Ventilation for Acceptable Indoor Air Quality. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

(b) Related Credits

IEQ 5 IAQ Monitoring

Carrying out on-site outdoor analysis provides useful information for the operation of ventilation system to ensure a good air quality provision.

7 Indoor Environmental Quality

7.1 Ventilation

IEQ 1 Ventilation in Common Areas

Extent of Application

All DCs

Objective

To ensure adequate ventilation in enclosed common areas and circulation routes within the building and to avoid cross-contamination between areas.

Credits Attainable

1

Credit Requirement

Compliance Path 1

1 credit for providing adequate ventilation for 90% of mechanically ventilated common areas in a building.

Alternatively,

Compliance Path 2

For naturally ventilated premises, 1 credit for demonstrating that 80% of the common areas in a building are provided by natural ventilation.

Assessment

Enclosed common areas include corridors, lift lobbies, entrance lobbies, circulation areas etc. Rooms/ areas with significant indoor pollution sources such as toilets, carpark, refuse room, plantroom, etc. and staircases shall be excluded from the assessment.

For mechanical ventilated common areas, the design ventilation rates shall comply with recommendations from recognised authorities, e.g. ANSI/ASHRAE 62.1-2013 or equivalent. Compliance shall be demonstrated by calculations, or measurements on a representative sample of each type of space.

For naturally ventilated enclosed common areas, the Applicant shall demonstrate that the ventilation rate (ACH of higher than 0.5) is achieved under average wind conditions in at least 80% of the common areas, aggregated by floor area. Compliance may be demonstrated by suitable commissioning measurements such as a tracer gas test on a representative sample of spaces, including worst cases, or by appropriate modelling techniques, such as wind tunnel test and Computational Fluid Dynamics (CFD) study.

When modelling approach is adopted, the model shall include building and surrounding large structures within radius of 2 building heights. A minimum percentage occurrence of prevailing winds of 75% annual is required. At least 8 of the prevailing wind directions shall be tested.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
IEQ_01_00	BEAM Plus Existing DCs submission template for IEQ 1	✓	✓
IEQ_01_01	The design criteria adopted for each type of common areas (compliance path 1 and 2)	✓	✓
IEQ_01_02	The report of methodology and results of calculations, simulations and/or measurements in the specified sample of spaces to demonstrate compliance with the assessment criteria (compliance path 1 and 2)	✓	✓

Remarks

(a) Additional Information

ANSI/ASHRAE 62.1-2013. Ventilation for Acceptable Indoor Air Quality. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

ASTM International. E 741-11. Standard Test Method for Determining Air Change in a Single Zone by Means of a Tracer Gas Dilution.

(b) Related Credits

IEQ 5 IAQ Monitoring
Indoor air quality can be improved via dilution resulted by maintaining suitable ventilation rate.

7 Indoor Environmental Quality

7.1 Ventilation

IEQ 2 Localised Ventilation

Extent of Application All DCs

Objective To prevent exposure of building users to concentrated indoor sources of pollutants

Credits Attainable 1

Credit Requirement 1 credit for providing adequate ventilation for rooms/ areas with significant indoor pollution sources.

Assessment The Applicant shall provide sufficient local exhaust for rooms/ areas under Building Owner/ Building Management Company's control where concentrated pollutant sources are likely to be present. The design exhaust rates shall comply with recommendations from recognised international standards such as ANSI/ASHRAE 62.1-2013 or local regulation requirements.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
IEQ_02_00	BEAM Plus Existing DCs submission template for IEQ 2	✓	✓
IEQ_02_01	A summary table detailing the design criteria and the ventilation system designs providing local exhaust	✓	✓
IEQ_02_02	Drawings showing the locations with significant indoor pollution sources and associated ventilation system layouts	✓	✓
IEQ_02_03	Calculation indicating that the exhaust rate is achieved	✓	✓
IEQ_02_04	Photographs or drawings showing the location of the exhaust point	✓	✓

Remarks

(a) Additional Information

None

(b) Related Credits

None

7 Indoor Environmental Quality

7.2 Thermal Comfort

IEQ 3 Thermal Comfort in Air-Conditioned Premises

Extent of Application

All DCs

Objective

To ensure the thermal comfort of the building users.

Credits Attainable

2

Credit Requirement

1 credit for sustaining the air temperature at the design value within ±1.5°C when the air side system is operating at steady state under normal operation periods.

1 credit for demonstrating an appropriate temperature (i.e. <25.5°C), relative humidity (i.e. <70%) and air velocity (<0.3 m/s) in normally occupied area.

Assessment

The measurement report shall be prepared and endorsed by Indoor Air Quality Certificate Issuing Bodies (CIB). The measurement protocols such as the equipment used, measurement methodologies, number of points required and the contents of the report shall in accordance with the Guidance Notes for the Management of Indoor Air Quality in Offices and Public Places issued by the Government of the Hong Kong Special Administrative Region.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
IEQ_03_00	BEAM Plus Existing DCs submission template for IEQ 3	✓	✓
IEQ_03_01	Measurement report endorsed by a CIB	✓	✓
IEQ_03_02	Drawings showing the location of measurement locations and ventilation system layouts	✓	✓

Remarks

(a) Additional Information

Indoor Air Quality Management Group, the Government of the Hong Kong Special Administrative Region. Guidance Notes for the Management of Indoor Air Quality in Offices and Public Places. Retrieved 2 January 2020, from https://www.iaq.gov.hk/media/65346/new-iaq-guide_eng.pdf

(b) Related Credits

None

7 Indoor Environmental Quality

7.3 Hygiene

IEQ 4 Biological Contamination

Extent of Application Except the systems that are not controlled by the Landlord

Objective To reduce the risk of biological contamination from the operation of the HVAC and water systems.

Credits Attainable 1

Credit Requirement 1 credit for complying with the recommendations given in the Code of Practice - Prevention of Legionnaires Disease, in respect of air-conditioning and ventilation systems and water systems.

Assessment The Applicant shall provide document detailing how the design and installation of the HVAC and water systems meet with the requirements and recommendation contained in the Code of Practice - Prevention of Legionnaires Disease. The report shall also detail how water supply, particularly hot water supply, and water use in features such as spas, fountains, etc., are designed and installed in compliance with the Code of Practice.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
IEQ_04_00	BEAM Plus Existing DCs submission template for IEQ 4	✓	✓
IEQ_04_01	The design and justification on fulfilling the credit requirement [#]	✓	✓

Remarks

(a) Additional Information

Prevention of Legionnaires' Disease Committee, EMSD. Code of Practice for the Prevention of Legionnaires' Disease in Hong Kong 2016 Edition. Retrieved 2 January 2019, from https://www.emsd.gov.hk/filemanager/en/content_645/COP-PLD_2016_a0119_en.pdf

(b) Related Credits

None

7 Indoor Environmental Quality

7.4 Indoor Environmental Quality

IEQ 5 IAQ Monitoring

Extent of Application All DCs

Objective To ensure good IAQ level in normally occupied spaces.

Credits Attainable 2

Credit Requirement 1 credit for the whole building is certified by the Good Class of 'Indoor Air Quality Certification Scheme for Office and Public Place'.

2 credits for the whole building is certified by the Excellent Class of 'Indoor Air Quality Certification Scheme for Office and Public Place'.

Assessment Credit(s) compliance shall be demonstrated by measurements by a IAQ Certificate Issuing Body (CIB). The measurement protocol, i.e. the measuring equipment used, duration of measurements, number of the sampling points, shall be made with reference to the latest version of the Environmental Protection Department (EPD)'s IAQ Certification Scheme.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
IEQ_05_00	BEAM Plus Existing DCs submission template for IEQ 5	✓	✓
IEQ_05_01	Valid IAQ Certificate covering the whole building issued by EPD	✓	✓

Remarks

(a) Additional Information

Indoor Air Quality Management Group, the Government of the Hong Kong Special Administrative Region. Guidance Notes for the Management of Indoor Air Quality in Offices and Public Places. Retrieved 2 January 2020, from https://www.iaq.gov.hk/media/65346/new-iaq-guide_eng.pdf

(b) Related Credits

None

7 Indoor Environmental Quality

7.5 Lighting Quality

IEQ 6 Interior Lighting in Normally Occupied Areas

Extent of Application

All DCs

Objective

To ensure the adequacy and maintenance of visual comfort conditions achieved by the electric lighting provisions in occupied areas

Credits Attainable

1

Credit Requirement

1 credit for achieving the prescribed lighting performance in each type of premises, regarding the illuminance and lighting quality as listed below:

i. Maintained illuminance and illuminance uniformity;
ii. Achieving the limiting unified glare rating; and
iii. Light sources with an appropriate colour rendering index.

Assessment

Normally occupied areas are enclosed areas where people will stay more than 1 hour there. Examples of normally occupied area can be found in Appendix 9.3.

The lighting performance criteria adopted shall be based on authoritative guidance, such as CIE or CIBSE publications, or equivalent. Compliance with the assessment criteria shall be demonstrated either by measurements using a standardised measurement protocol appropriate to the parameter being assessed, and/or by modelling (calculation), providing the calculation method or software used is based on a standardised method, and uses data/ assumptions appropriate to the circumstances

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
IEQ_06_00	BEAM Plus Existing DCs submission template for IEQ 6	✓	✓
IEQ_06_01	The layout plan showing all the normally occupied areas	✓	✓
IEQ_06_02	A summary table indicating the uniformity, unified glare rating and colour rendering index (by measurements or simulations) at each zone of the normally occupied areas	✓	✓
IEQ_06_03	Catalogues or other supporting documents showing that the colour rendering index of the lighting system	✓	✓

Remarks

(a) Additional Information

Commission Internationale de l'Eclairage (CIE). Lighting of Indoor Work Places. CIE Standard S 008/E.

Commission Internationale de l'Eclairage (CIE). Discomfort Glare in Interior Lighting. CIE 117-1995.

Commission Internationale de l'Eclairage (CIE). Calculation and Presentation of Unified Glare Rating Tables for Indoor Lighting Luminaires. CIE 190-2010.

The Chartered Institution of Building Services Engineers. Code for Lighting. London. CIBSE.

(b) Related Credits

IEQ 7 Interior Lighting in Areas Not Normally Occupied
The related credit ensures the adequacy of artificial lighting provisions in common areas and service areas.

7 Indoor Environmental Quality

7.5 Lighting Quality

IEQ 7 Interior Lighting in Data Hall and Areas Not Normally Occupied

Extent of Application All DCs

Objective To ensure the adequacy of artificial lighting provisions in common areas and service areas.

Credits Attainable 1

Credit Requirement 1 credit for achieving the prescribed lighting performance in data hall and each type of premises, regarding the illuminance and lighting quality as listed below:

i. Maintained illuminance;
ii. Achieving the limiting unified glare rating; and
iii. Light sources with an appropriate colour rendering index.

Assessment Not normally occupied areas are enclosed areas where people normally stay less than 1 hour there. Examples of not normally occupied area can be found in Appendix 9.2 Glossary.

Compliance with the assessment criteria shall be demonstrated either by measurements using a standardised measurement protocol appropriate to the parameter being assessed, and/or by modelling (calculation), providing the calculation method or software used is based on a standardised method, and uses data/ assumptions appropriate to the circumstances.

Reference should be made to Section IEQ 6 for further information on measurements and modelling on interior lighting systems.

Submittals **(a) Artificial lighting in *normally occupied spaces***

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
IEQ_07_00	BEAM Plus Existing DCs submission template for IEQ 7	✓	✓
IEQ_07_01	The layout plan showing all common areas or service space	✓	✓
IEQ_07_02	A summary table indicating the illuminance level, unified glare rating and colour rendering index (by measurements or simulations) at each of the common areas or service space	✓	✓
IEQ_07_03	Catalogues or other supporting documents showing that the colour rendering index of the lighting system	✓	✓

Remarks **(a) Additional Information**

Indoor Air Quality Management Group, the Government of the Hong Kong Special Administrative Region. Guidance Notes for the

Management of Indoor Air Quality in Offices and Public Places. Retrieved 2 January 2020, from https://www.iaq.gov.hk/media/65346/new-iaq-guide_eng.pdf

(b) Related Credits

None

7 Indoor Environmental Quality

7.6 Acoustics and noise

IEQ 8 Room Acoustics

Extent of Application All DCs

Objective To improve the acoustical properties of rooms in which speech intelligibility is important.

Credits Attainable 2

Credit Requirement

a) Data Hall Noise Control
1 credit for demonstrating the internal noise level at data hall area are maintained at an appropriate level.

b) Reverberation time
1 credit for demonstrating that the mid-frequency reverberation time in applicable rooms meets the prescribed criteria of different types of premises.

Assessment

a) Data Hall Noise Control

Demonstrate that the internal noise level at data hall area are maintained at an appropriate level and meets the below criteria.

Criteria

5 dB(A) better than First Action Level a daily personal noise exposure (LEP, d) [1] of 85 dB(A).

Compliance should be demonstrated by measurements depending on the applicant's preference. The acoustic measurement report should be endorsed by a Corporate Member of Hong Kong Institute of Acoustics or equivalent.

Site measurements should include all data halls, taking account into the worst case condition of exposure to noise sources to the space, and undertaken during periods appropriate to the usage pattern for the data hall.

Measurements during commissioning shall use the method given in ISO 3382 [2] or equivalent. The measurements locations should be evenly distributed within the data hall. Data hall without design (e.g. finishes, system) should provide endorsed acoustic calculation to support the potential achievement in both PA and FA submission.

The assessment should take into account noise from all IT equipment and building services equipment installed in data hall, under normal operation mode.

1 Labour Department. Guidance Notes on Factories and Industrial Undertakings (Noise at Work) Regulation. [ONLINE] Available at: https://www.labour.gov.hk/eng/public/os/C/FIUNR.pdf

2 International Standard Organization – ISO 3382:2009 - Acoustics -- Measurement of room acoustic parameters.

b) Reverberation time
The average reverberation time for mid frequencies (500Hz, 1kHz and 2kHz), shall be 0.4 to 0.6s.

In case where criteria appropriate to the type and use of premises/ spaces are not stated herein, the Applicant shall provide evidence as to the suitability of the criteria adopted.

Compliance shall be demonstrated by detailed calculations or measurements depending on the Applicant's preference. The measurement report and/or acoustic calculations shall be endorsed by a Corporate Member of Hong Kong Institute of Acoustics or equivalent.

The reverberation time shall be assessed using Sabine's formula 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 or equal equivalent. The assessment shall include at least one sample of each type of occupied space.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
IEQ_08_00	BEAM Plus Existing DCs submission template for IEQ 8	✓	✓
IEQ_08a_01	Data hall noise measurement report at representative locations with supporting documents including noise data of the installed IT equipment and Building Service Equipment in data hall	✓	✓
IEQ_08a_02	Data hall noise measurement protocol	✓	✓
IEQ_08a_03	Valid calibration certificate of sound level meters	✓	✓
IEQ_08b_01	Reverberation time measurement or calculation at representative locations with supporting documents of the absorption coefficients	✓	✓

Remarks

(a) Additional Information
None

(b) Related Credits
IEQ 9 Noise Isolation
The related credit improves the noise isolation of normally occupied premises/ rooms to reduce impact of noise nuisance and enhance speech privacy.

Indoor Environmental Quality

7.6 Acoustics and noise

IEQ 9 Noise Isolation

Extent of Application All DCs

Objective To improve the noise isolation of normally occupied premises/ rooms to reduce impact of noise nuisance and enhance speech privacy.

Credits Attainable 1

Credit Requirement 1 credit for demonstrating airborne noise isolation between rooms, spaces and premises fulfils the prescribed criteria.

Assessment Compliance shall be demonstrated by computer simulation, detailed calculations, or measurements depending on the Applicant's preference. The performance of the weighted Sound Reduction Index (SRI)/ Level Difference shall fulfil the requirements as stated in below table. The measurement report and/or acoustic calculations shall be endorsed by a Corporate Member of Hong Kong Institute of Acoustics or equivalent.

Type of Premises	Weighted SRI	Level Difference
Between offices/ conference rooms	R_w 44	$D_{nT,w}$ 38

In case where criteria appropriate to the type and use of premises/ spaces are not stated herein, the Applicant shall provide evidence as to the suitability of the criteria adopted.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
IEQ_09_00	BEAM Plus Existing DCs submission template for IEQ 9	✓	✓
IEQ_09_01	Layout plan/ elevation drawings showing the location of the partition walls	✓	✓
IEQ_09_02	Construction details of the partition walls	✓	✓
IEQ_09_03	Calculations/ Computer simulation results/ Field test measurement report endorsed by a Corporate Member of Hong Kong Institute of Acoustics or equivalent	✓	✓

Remarks

(a) Additional Information

British Standards Institution BS 8233 – Sound insulation and noise reduction for buildings – Code of Practice.

(b) Related Credits

IEQ 8 Room Acoustics

The related credit improves the acoustical properties of rooms in which speech intelligibility is important.

Indoor Environmental Quality

7.6 Acoustics and noise

IEQ 10 Vibration

Extent of Application All DCs

Objective To avoid excessive vibration from building services equipment.

Credits Attainable 1 BONUS

Credit Requirement 1 BONUS credit for ensuring that vibration levels do not exceed the prescribed criteria.

Assessment Vibration generated from the building services system and IT equipment shall be in compliance with the criteria given in ISO 2631-2. The level of vibration in terms of root mean square acceleration shall be determined by on-site measurement. The vibration measurement report shall be endorsed by a Corporate Member of Hong Kong Institute of Acoustics or equivalent.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
IEQ_10_00	BEAM Plus Existing DCs submission template for IEQ 10	✓	✓
IEQ_10_01	Vibration measurement report with valid calibration certificate of instrumentations to demonstrate compliance	✓	✓

Remarks

(a) Additional Information

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).

(b) Related Credits

None

8 Innovations and Additions

IA.1 Innovations and Additions
IA 2 Performance Enhancements
IA 3 Provision of Electrical Vehicle Charging Stations

Introduction

BEAM Encourage innovative and/ or new techniques that are yet to find in the mainstream application in Hong Kong addressing sustainability objectives for existing DCs.

Background

This section allows the Applicant to submit for consideration for the award of BONUS credits on any innovative techniques or performance enhancements which the Applicant deems to provide environmental benefits additional to those already covered in this Manual.

The Applicant shall be solely responsible to submit quantitative evidence for BSL TRC review and approval.

Generally the submission materials shall comprehensively detail the benefits, environmental impact averted, or exemplary performance achieved compared to existing criteria.

Important Note: The Applicant shall expressly state the full extent, scope, and coverage of the intended Innovation submission.

8 Innovations and Additions

8.1 Innovations and Additions

IA 1 Innovative Techniques

Extent of Application All DCs

Objective To encourage adoption of practices, new technologies and techniques that have yet to find application in Hong Kong

Credits Attainable 5 BONUS (total IA 1 and IA 2)

Assessment The BONUS credit(s) will be on the Applicant to present evidence of the application of new practices, technologies and techniques and the associated benefits. The benefits may be considered in relation to sustainable living, energy use, materials use, improved comfort, reduced pollution, etc. The Assessor will refer the proposal to the TRC of BSL who will consider each aspect on its merits and award credit(s) accordingly.

The Applicant shall make a submission for granting additional credit(s) that identifies the intent of the proposed innovative technique, the proposed criteria for assessing compliance, and the assessment criteria. The weighting (number of credits) proposed would be considered in the light of existing weightings under the various environmental impacts categorised in BEAM Plus Existing DCs, i.e. a technique which can demonstrate a resource saving or reduced environmental loading would be compared to existing criteria deemed to achieve similar levels of benefit.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
IA_01_00	BEAM Plus Existing DCs submission template for IA 1	✓	✓
IA_01_01	Narrative to indicate the innovative techniques	✓	✓
IA_01_02	Calculation quantifying environmental benefits through application of proposed innovation technique	✓	✓
IA_02_03	Record photographs	✓	✓

Remarks

(a) Additional Information
None

(b) Related Credits
None

8 Innovations and Additions

8.1 Innovations and Additions

IA 2 Performance Enhancements

Extent of Application All DCs

Objective To encourage adoption of practices, technologies and techniques that provide for performance enhancements over and above stated performance criteria in this Manual.

Credits Attainable 5 BONUS (total IA 1 and IA 2)

Assessment The BONUS credit(s) will be on the Applicant to present evidence of the performance gains as compared to existing criteria. The Assessor will refer the proposal to the TRC of BSL who will consider each aspect on its merits and award credit(s) accordingly.

The Applicant shall make a submission for granting BONUS credit(s) which identifies the level of enhancement in performance in any environmental aspect. The weighting (number of credits) proposed would be considered in the light of existing weightings provided under the various environmental impacts categorised in BEAM Plus, i.e. a demonstrated resource saving would be compared to existing criteria on a pro-rata basis to determine the BONUS credit(s) to be achieved.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
IA_02_00	BEAM Plus Existing DCs submission template for IA 2	✓	✓
IA_02_01	Calculation quantifying exemplary performance over and above the criteria identified in any aspect of the BEAM Plus Existing DCs through proposed application	✓	✓
IA_02_02	Record photographs	✓	✓

Remarks

(a) Additional Information
None

(b) Related Credits
None

8 Innovations and Additions

8.1 Innovations and Additions

IA 3 Provision of Electrical Vehicle Charging Stations

Extent of Application Whole building DC development

Objective To promote the use of Electric Vehicles

Credits Attainable 1 BONUS

Credit Requirement 1 BONUS credit for providing quick charger(s) for Electric Vehicles (EVs) for 50% of the total parking capacity of the site.

Assessment Provide quick EV charger(s) for at least half of the car parking spaces (including visitor car parks) within the site. Such charging provision shall be above the legislative requirement.

Submittals

Supporting Documents *Please provide softcopies with filename prefix as indicated on the leftmost column below.*		**PA**	**FA**
IA_03_00	BEAM Plus Existing DCs submission template for IA 3	✓	✓
IA_03_01	Calculation and layout showing the quantities and locations of the quick charging station	✓	✓
IA_03_02	System drawing and equipment catalogue/ technical sheet of the charging facilities	✓	✓
IA_03_02	Record photographs	✓	✓

Remarks

(a) Additional Information
None

(b) Related Credits
None

9 Appendices

9.1 Glossary

Alternative Assessment Method

Proposed criteria and assessment method submitted by Applicant when seeking alternative means of compliance with a particular credit.

Appeals

The process whereby Applicant's may appeal, a separate published charge, the allocation of individual credits, with First Appeal submissions reviewed by the BSL TRC and Final Appeal handled by HKGBC.

Applicant

The party authorised to seek BEAM Plus certification of the project (typically the client, occupier, tenant or representative therefore) whose will form a contractual relationship with HKGBC and BSL in the certification process.

Baseline

A line serving as the basis for comparison in Performance-based approach.

BEAM Assessors

A person engaged to conduct an independent assessment of the Project submissions on behalf of BSL and validated by BSL TRC.

BEAM Plus Category

In BEAM Plus Existing DCs, BEAM Plus Section refers to assessment sections such as MAN P1 Green Purchasing Plan, MWA P1 Waste Recycling Facilities, etc.

BEAM Plus Framework

The rating systems, assessment standards, credit criteria, training and examination processes applied to certification and accreditation under BEAM Plus New Buildings, Existing Buildings and Interiors.

BEAM Plus Grading

The outcome of a certification assessment of a building expressed as a performance level of Bronze (above average), Silver (good), Gold (very good) or Platinum (excellent).

BEAM Pro

A trained professional to help integrate sustainability measures into the project and facilitate information submissions for assessment.

BEAM Affiliate

A BEAM Affiliate is a person accredited by the HKGBC as being competent to support green building design, construction and operations. The credential provides an individual who cannot yet meet the BEAM Pro requirement with an alternative route to become a BEAM Pro.

BEAM Society Limited

The independent, not-for-profit, member-based organisation that owns and operates BEAM Plus and undertakes assessments, training and examinations as a basis for certification and accreditation by HKGBC.

BSL Coordinator

An officer of the BSL that maintains day-to-day liaisons between the Applicant, the BSL, and the assigned BAS for the project.

Building Management System

BMS uses computer-based monitoring to coordinate, organise, and optimise building control subsystems, including HVAC, lighting, equipment scheduling, and alarm reporting. Sometimes known as Building Automation System.

Certificate Validity

The duration for which a BEAM Plus certificate and grading remain effective and officially recognised by the BSL.

Certification Scope

The construction floor area of the project, defined by the footprint or boundary of the space being leased or occupied, and its associated interfaces with its surroundings.

Chloro-fluorocarbons

CFCs cause ozone depletion when released into the atmosphere.

Commissioning

The process of putting Building Services systems into active service. This includes testing and adjusting HVAC, electrical, plumbing and other systems to assure proper balancing and adherence to design criteria, and instructing building representatives in their use.

Compliance

Demonstration of fulfilment of a particular credit requirement under BEAM Plus, furnished through the provision of information as specified in the relevant grading system and submission template.

Credit

In BEAM Plus Existing DCs, Credit refers to credit(s) allocated for each BEAM Plus Section and credits are used to determine the category grade and overall grade according to the number of credits achieved.

Credit Interpretation Request

The process whereby Applicants can seek technical and administrative guidance from BSL TRC on the application of BEAM Plus credits to their projects.

FSC Certification

A certification system for timber products which confirms that timber has been harvested in a sustainable manner.

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

Hong Kong Green Building Council Limited

The industry body established in 2009 to coordinate efforts towards green building in Hong Kong. HKGBC certifies BEAM Plus projects and accredits BEAM Pro and BAS.

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.

Infiltration

Infiltration is uncontrolled air leakage into conditioned spaces through unintentional openings in ceilings, floors, and walls from unconditioned spaces or the outdoors.

MVAC

Mechanical ventilation and air-conditioning installations.

Normally Occupied Areas

Normally occupied areas are enclosed areas where people normally stay more than 1 hour there. Examples include activity room, auditorium, classroom, conference room, exhibition hall, hotel guest room, hotel lobby, indoor sport hall, lecture theatre, library, office, restaurant, retail shop etc.

Not Normally Occupied Areas

Not normally occupied areas are enclosed areas where people normally stay less than 1 hour there. Examples include corridors, entrance and lift lobby, locker room, plantroom etc.

Ozone Depleting Potential

ODP of a chemical compound is the relative amount of degradation to the ozone layer it can cause.

Performance Categories

The areas into which BEAM Plus criteria are divided based on their influence on the sustainability performance of a project (site, design and construction management, materials, energy use, water use, indoor environmental quality, innovations and performance enhancements).

Potable Water

Water that is safe enough to be consumed by humans, or used with low risk of immediate or long-term harm. Although the quality of water supplied to buildings in Hong Kong is strictly controlled, the quality of water drawn from consumers' taps may sometimes be affected by the condition of the inside plumbing such as discolouration from rusty pipes. Consumers are responsible for proper maintenance of internal plumbing and are required to engage a licensed plumber if the water quality is found to be affected due to defects in the inside plumbing.

Pre-requisite

Assigned credits, either legal requirements or key performance aspects (relating to management, materials aspects and water use), that must be satisfied to start the BEAM Plus assessment and obtain the certification.

Registration/ Registered Projects

The first step in seeking formal certification under BEAM Plus. Registered projects, subject to payment of a specified fee, are listed within the BSL projects database for public information.

Submissions Documents

Documentation (including drawings, specifications, photographs, reports, signed confirmations, etc., as specified under each BEAM Plus credit) required by the BSL to conduct the certification assessment of a project.

Technical Review Committee

The committee within the BSL that oversees the implementation and progress monitoring of BEAM Plus certification assessments, and resolves technical issues and Credit Interpretation Request.

Variable refrigerant flow

Variable refrigerant volume flow in a unitary air-conditioner where the cooling supply to the conditioned space is adjusted by modulating the flow of refrigerant.

Variable speed drive

A motor drive that controls the motor speed over a continuous range. This usually refers to the motor drive for HVAC's fans or pumps

9 Appendices

9.2 Assumptions and Baselines for Water Consumption

The following details the default assumptions for the calculation of the reduction in water use of the project building when compared with an equivalent baseline building.

Number of Working or Operational Days

The number of operational days per annum (Nop) should be obtained from the design brief or OPR.

The number of non-operational days is equal to 365 - Nop.

The same values of operational and non-operational days will be used for both the project building and the baseline building.

Occupancy Considerations

The number of occupants shall be taken from the design brief, or OPR. If the data is not obtainable then, in the absence of any other data, the occupant space allowance should be taken as $9m^2$/person. [1]

The male to female ratio should be determined from the design brief or OPR. If the data is not available then the default assumptions shall refer to the latest version of PNAP ADV-28 [2].

The percentage of the disable persons inside the building can make reference to the latest data available from the Census and Statistics Department [3].

The same occupancy load shall apply to the project building and the baseline building.

Flow Rate Considerations

For the baseline value, the flow rate of the water appliance should be read as an absolute figure irrespective of the working pressure in predicting the water consumption. For the as-built case, working pressure should be considered when determining the flow rate of the water fixtures.

Hand Washing in Rest Rooms

i. Number of hand wash operations per occupant per day = 5
ii. Hand washing time = 10 seconds

1 Buildings Department. Code of Practice for Fire Safety in Buildings. 2011
2 Buildings Department. Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers. PNAP ADV-28 Provision of Sanitary Fitments in Offices, Shopping Arcades, Department Stores, Places of Public Entertainment, Cinemas and Other Public Places.
3 Census and Statistics Department. Social data Collected via the General Household Survey: Special Topics Report - Report No.62. Persons with disabilities and chronic diseases. Retrieved 1 March 2016, from http://www.censtatd.gov.hk/hkstat/sub/sp380.jsp?productCode=C0000055

For the baseline value, the tap flow rate is 6 litres/min.

Note that to obtain significant savings the project building would need to install automatic controls such as proximity sensors to reduce the tap operation time to less than the default assumption of 10 seconds per hand washing operation.

Water Use in Pantries/ Kitchen

i. Number of pantry tap operations per occupant per day = 1
ii. Baseline faucet flow rate for non-mixer taps shall be 6 litres/min
iii. Baseline faucet flow rate for mixing taps shall be 9 litres/min
iv. Duration of use = 15 seconds
v. Utensil washing operation carried out by hand = 6 litres of water per operation

Showers

i. Number of use of shower per occupant per day = 0.1
ii. The baseline shower flow rate = 9.5 litres/min
iii. The baseline bath pillar tap/ bath mixer tap flow rate = 15 litres/min
iv. Shower duration = 5 minutes (300 seconds)

Other Appliances/ Equipment

Justification for capacities of appliance/ equipment used in the benchmark building shall be provided by making reference to regulations, standards, guides and other publication published by relevant authorities.

The format of water saving calculation shall align with example below:

Device (Reference catalogue[(A)])	Duration of each operation (seconds)	Daily number of uses per occupant	Rated flow rate (litres/minute)		Estimated daily consumption per occupant (litres)	
			Baseline	As-built	Baseline	As-built
Toilet Tap (Model 123)	10	5	6	5	5	4.2
Pantry Mixing Tap (Model 456)	15	1	9	6	2.3	1.5
Estimated total daily consumption per occupant (litres)					7.3	5.7
Number of occupants[(B)]					30	
Number of day					365	
Estimated total annual consumption (litres)					79,388	62,050
% of water saving:					21.8%	
Credit Anticipated:					3 credits	

Note:

(A) Reference catalogues or manufacturer specification should show device type, model number, flow rate and WELS label (if provided) as substantiation to the information filled in the calculation, where important information in the reference catalogues or manufacturer specification shall be highlighted or circled for easy identification.

(B) The number of occupants shall be taken from the design brief or OPR. If this data is not obtainable then, in the absence of any other data, the occupant space allowance should be reference to the Occupancy Considerations as shown above.

In the calculation, each type of water using device shall be listed and all data used shall be referenced to the source. The calculation shall include water taps for basin, pantry, kitchen, bath and also shower heads

but exclude water closet, urinal, water features, appliance and irrigation. There should be separate entries for water use in male and female facilities.

9 Appendices

9.3 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 example of each space type. These examples are not exhaustive. If a space present in the applicant's DC 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
- Kitchens (commercial)
- Food and beverage dining area
- Front desk
- Gymnasium
- Meeting room
- Open office
- Private office
- Reception
- Gallery area
- Information desk

Space Usage of *not normally occupied spaces*

- Break room
- Copy rooms
- Corridor
- Entrance lobby (other than hotel)
- Staircases
- Lift lobby
- Pantry
- Toilet

Space Usage of *Unoccupied spaces*

- Emergency exit corridor
- Mechanical and electrical rooms
- Car park
- Store room
- Warehouse