BEAM Plus Neighbourhood

Version 1.0

A rating tool for sustainable communities

(Draft Manual)

HKGBC 香港綠色建築議會

BEAM 建築環保評估協會

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1.1 INTRODUCTION

BEAM Plus is a comprehensive set of environmental assessment scheme for development projects, which defines best practices for a range of sustainability issues covering a wide spectrum of building lifecycle from the building design and construction, operations and maintenance, and finally, to the demolition stage. Recognised as one of the world's leading green building assessment systems, it provides a comprehensive set of performance standards for use and reference by developers and owners.

BEAM Plus Neighbourhood is developed by the Hong Kong Green Building Council Limited. It is the latest addition to the BEAM Plus suite of tools, designed to assess project performance of a development project and help project owners to incorporate a broader framework of urban sustainability principles at the early planning stage for subsequent project implementation.

THE LOCAL CONTEXT

Hong Kong is one of the most urbanised and densest cities in the world, with a total urban or built-up land of 268 sq. km, or 24.2% of the total land mass[1], and around 7.35 million population study, work and reside in the city[2]. While Hong Kong benefits greatly with its compact urban form, the inhabitants have to grapple with multiple challenges to their quality of life, including air and noise pollution due to a congested built environment, increased traffic flows, elevated inner city temperatures due to the urban heat island effects, the lack of Open Space and Green Space in the inner urban areas for recreation and relaxation and a hampered public realm with limited space and facilities to aspire the population towards a sustainable and healthy living.

Specially designed for Hong Kong's densely populated and high-rise development context in a sub-tropical climate, BEAM Plus has three other assessment tools with focus on buildings, namely New Buildings, Existing Buildings and Interiors. The new tool, BEAM Plus Neighbourhood, aims to fill the gap to provide a set of guiding principles and best practices in sustainability at the inception stage of a development project.

DEFINITION OF NEIGHBOURHOOD

BEAM Plus Neighbourhood takes a liberal view of what constitutes a "neighbourhood". Neighbourhood is a term more spatially bound with the physical context of a development, as compared to other terms like community. Being one of the most compact cities in the world, a neighbourhood in Hong Kong varies greatly in its physical context, it can be a stand-alone high-rise tower with several hundred households, a large development with multiple towers, or a project with a couple of low-rise village houses. BEAM Plus Neighbourhood aims to embrace different typologies and projects of different scales to undergo the assessment.

For information on target project types of BEAM Plus Neighbourhood, please refer to the subsequent section of "**Application and Eligibility**" and "**Prerequisites**".

[1] Planning Department, 2016, *Land utilization in Hong Kong 2015*, viewed 30 Oct 2016, http://www.pland.gov.hk/pland_en/info_serv/statistic/landu.html

[2] Census and Statistics Department, 2016, *Population*, viewed 30 Oct 2016, http://www.censtatd.gov.hk/hkstat/sub/so20.jsp

BEAM PLUS NEIGHBOURHOOD VERSION 1.0

BEAM Plus Neighbourhood adopts a more holistic approach to assessing the sustainability performance of a development project at its early or inception stage. The fundamental differences between BEAM Plus Neighbourhood and the building-level tools within the BEAM Plus suite lies in the intended beneficiaries. BEAM Plus Neighbourhood includes both building occupants of the development as well as its neighbours as the intended beneficiaries. In comparison, the tool has more emphasis on socio-economic performance of a development. The key features of BEAM Plus Neighbourhood can be summarised as follows:

- Introducing Community Aspects to examine the socio-economic impacts of a project on the neighbourhood;
- Encouraging community engagement in the development process and the promotion of sustainable lifestyle;
- Putting emphasis on space between buildings and the infrastructural provisions of a development;
- Advocating for diversity of housing types for the purpose of more vibrant neighbourhoods;
- Respecting existing community, local economy and cultural assets;
- Enhancing the provision and sharing of neighbourhood amenities, Open Spaces with the vicinity;
- Supporting best practices in conserving and enhancing the ecological value of a development site;
- Encouraging the adoption of passive design strategies and district energy systems to achieve greater energy efficiency;
- Advocating integrated waste management to reduce waste at source;
- Promoting better water management practices and increased resilience in stormwater management; and
- Enhancing environmental and aesthetic quality of outdoor spaces for the comfort and well-being of the occupants and neighbours.

HONG KONG GREEN BUILDING COUNCIL LIMITED

The Hong Kong Green Building Council Limited (HKGBC) is a non-profit, member led organisation established in 2009 with the vision to help save the planet and improve the wellbeing of the people of Hong Kong by transforming the city into a greener built environment. The Founding Members of the HKGBC include the Construction Industry Council (CIC), the Business Environment Council (BEC), the BEAM Society Limited (BSL) and the Professional Green Building Council (PGBC). Its mission is to lead market transformation by advocating green policies to the Government; introducing green building practices to all stakeholders; setting design, construction and management standards for the building profession; and promoting green living to the people of Hong Kong.

HKGBC is the certification body for BEAM Plus assessments and the accreditation body for BEAM Professionals and BEAM Affiliates.

To learn more about the HKGBC, please visit www.hkgbc.org.hk.

BEAM SOCIETY LIMTIED

BEAM Society Limited (BSL), owner of Building Environmental Assessment Method (BEAM), is a non-profit public body committed to developing and implementing the BEAM assessment tools (HK-BEAM &

BEAM Plus), assessing green buildings and training BEAM Professionals (BEAM Pro) and BEAM Affiliates.

BEAM Plus is a comprehensive set of assessment tools tailor-made for Hong Kong which is characterised by its high rise, high density built environment and sub-tropical climate. The Tools provide building users and developers a single performance label representing the overall quality of a building or built environment.

To learn more about BSL, please visit www.beamsociety.org.hk.

DEVELOPMENT OF BEAM PLUS NEIGHBOURHOOD VERSION 1.0

The Development of BEAM Plus Neighbourhood Version 1.0 was led by a Steering Committee formed under the auspices of Green Labelling Committee of the HKGBC. The committee comprises industry practitioners and representatives from the government, academia and professional institutes. Stakeholder engagement workshops were organised at the early stage of the tool development in order to solicit feedback from the industry and other stakeholders on the proposed framework and assessment aspects of the tool.

To ensure the practicality and applicability of the tool for typical development projects in Hong Kong, a pilot-testing was carried out with the use of real projects to test the tool prior to the final launch. The BEAM Plus Neighbourhood Version 1.0 is the recalibrated version after taking stock of the lessons learnt from the pilot-testing.

THE USE OF THE MANUAL

BEAM Plus Neighbourhood is a voluntary assessment and HKGBC encourages development projects to apply for such certification for the betterment of Hong Kong and its people.

Neither HKGBC nor BSL endorses any self-assessed rating by the use of BEAM Plus Neighbourhood manual. HKGBC is the certification body for BEAM Plus Neighbourhood. Each BEAM Plus Neighbourhood assessment has to undergo a rigorous review by an independent third party to ensure the compliance of the credits with sufficient evidence. The use of BEAM Plus Neigbourhood manual without undergoing the formal certification does not entitle the user or any other party to promote the rating achieved.

DISCLAIMER

BEAM Plus is intended for use by the Applicant and its project teams engaged in new project design, or owners and operators of existing facilities as a guide to more environmentally sustainable project design and operation. The assessment tool has been prepared with the assistance and participation of many individuals and representatives from various organisations. The final outcome represents general consensus, but unanimous support from each and every organisation and individual consulted is not implied.

This document represents HKGBC and BSL's joint efforts to develop a standard that improves the performance of the built environment using the latest techniques, practices and standards compatible with prevailing economic constraints. These are subject to changes, which will be included and disseminated through periodic updating.

It should be noted that none of the parties involved in the funding of BEAM Plus, including Hong Kong Green Building Council Limited, BEAM Society Limited and their members provide any warranties or assume any liability or responsibility to users of BEAM Plus, or any third parties for the accuracy, completeness or use of, or reliance on, any information contained in BEAM, or from any injuries, losses, or damages arising out of such use or reliance.

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

1.2 ASSESSMENT FRAMEWORK

BEAM Plus Neighbourhood Version 1.0 is primarily designed for new or planned neighbourhood developments. The tool is intended for use at the early or inception stage of a development project so that broader sustainability principles can be integrated at the beginning of the development process to facilitate the subsequent work of design and implementation stages of a project development. The following sections would detail the matters on eligibility, target project stages, certification and application procedures of BEAM Plus Neighbourhood assessment.

APPLICATION AND ELIGIBILITY

HKGBC takes the view that the term 'neighbourhood' should be defined with flexibility to encourage as many development types eligible for participation in certification as possible. In local application, there is a wide range of development types and land use typologies that could influence the definition of a 'neighbourhood'. At the minimum it refers to 'a part of a city or town where people live…' The term also has a strong notion of a residential community supported by local amenities. The definition is best interpreted through the proposed prerequisite requirements within this Manual. A neighbourhood could be located in a brownfield redevelopment site or a new greenfield location. There are also existing neighbourhoods planned for renewal and new ones to be built from scratch.

In addition, Hong Kong's compact urban form characterised by its high development intensity and typically high-rise buildings renders a set of tailor-made performance indicators necessary for application in the unique urban context and practice environment of the city. With this in mind, the eligibility is defined in a more embracing manner through the proposed prerequisite requirements for BEAM Plus Neighbourhood.

There are two **Prerequisites** for the tool, respectively CA P1 and CA P2 in the Community Aspects of this Manual.

It is the responsibility of the Applicants to check the most up-to-date prerequisite requirements (including any modification or clarification through Technical Circulars or FAQs posted on BEAM Society Limited website) before registration and to ensure that their project is eligible. When in doubt, the Applicant can request for a ruling by sending an enquiry to the BEAM Society Limited.

PROJECT STAGES

BEAM Plus Neighbourhood is a voluntary scheme which does not involve any statutory process or procedure. The tool is best applied at the site planning or masterplanning stage of a development project – whether or not it involves a statutory planning application.

In comparison with BEAM Plus building-level tools, BEAM Plus Neighbourhood has an emphasis on socio-economic elements like community engagement, conservation effort, ecology and public realm provisions etc., thereby the assessment is best made at the early stage of a development process as this stage represents the greatest potential to incorporate broader sustainability principles into a development proposal.

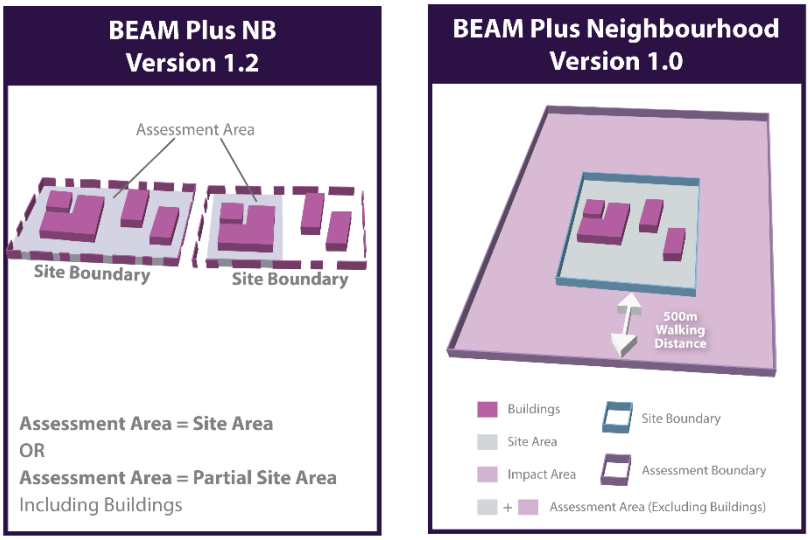
ASSESSMENT AREA

One of the key features of BEAM Plus Neighbourhood lies in the definition of Assessment Area, which comprises both the Site Area and Impact Area. The Impact Area refers to the area between Site Boundary and the parallel platted line 500m away from the Site Boundary. While a project applicant has no direct control over the Impact Area, he may have certain influence over the area adjacent to their own site by virtue of his own development. The inclusion of Site Area and Impact Area as the Assessment Area is expected to

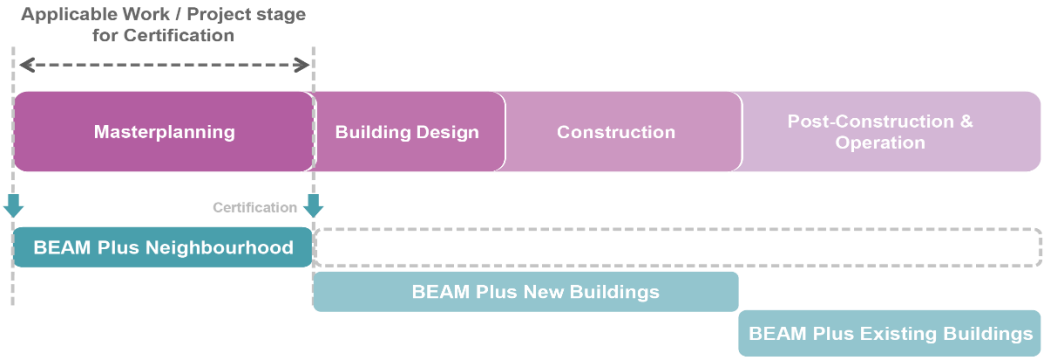
account for both positive and negative impacts of a development on building occupants as well as its neighbours in the surrounding area.

CERTIFICATION AND VALIDITY

BEAM Plus Neighbourhood is the latest addition to the BEAM Plus suite of tools. With its intended application for the planning stage of a project, it is prudent and essential to coordinate the certification stages to upkeep the clarity, integrity and operation interface of the various tools of BEAM Plus.



BEAM Plus Neighbourhood offers a single-stage certification at the end of the masterplan design stage, as defined by the project applicant. As BEAM Plus Neighbourhood does not concern itself with any statutory process, project applicants can decide the site boundary for their masterplans to undergo the assessment, the site boundary should be used consistently throughout the project assessment stage of BEAM Plus Neighbourhood.



The BEAM Plus Neighbourhood certification has a validity of 5 years for one masterplan design and is "scheme sensitive". It is expected that an average development project would complete its building design within the 5-year validity period of the certification, by then project applicants are encouraged to proceed with building-level assessment under BEAM Plus New Buildings.

To avoid overburdening workload for project teams of having to manage multiple BEAM Plus certifications for any given project at a particular time, the intention is to have no overlap in assessment stages between BEAM Plus Neighbourhood and BEAM Plus New Buildings.

If a project applicant wishes to extend the certificate validity or if changes are made to the masterplan design, a new registration for BEAM Plus Neighbourhood would be needed.

APPLICATION

To apply for BEAM Plus Neighbourhood Version 1.0 assessments, project applicants can submit the application through an online registration form on HKGBC's website.

ASSESSMENT PROCEDURES

Projects undergoing BEAM Plus Neighbourhood would undoubtedly necessitate a robust assessment review to ensure the fairness, independence and integrity of the assessment. Independent BEAM Assessor(s) would be assigned to each project to review the project submissions. The Technical Review Committee (TRC) of BSL will review the assessment report prepared by the BAS and confirm the final assessment results, followed by the issuance of certification by the HKGBC.

For details of the assessment procedures of BEAM Plus Neighbourhood, please refer to the latest "**BEAM Plus Project Assessment Procedures Manual**" on HKGBC's website.

CERTIFICATION FEES

Certification fees apply to projects undergoing BEAM Plus Neighbourhood, there are two fee categories:

- **Registration Fee**: This fee is payable to Hong Kong Green Building Council Limited upon the project registration.
- **Assessment Fee**: This fee is payable to BEAM Society Limited upon the signing of Assessment Agreement of BEAM Plus assessment.

Project Applicants should refer to the latest Fee Scale on HKGBC's website.

CREDIT INTEPRETATION REQUEST (CIR)

In case of uncertainty over the applicability of certain BEAM Plus credits to a particular project, project applicants can opt for CIR to allow project teams to seek specific guidance on whether certain BEAM Plus credits can be fulfilled pertaining to the project design. CIR would only be accepted after the completion of BEAM Plus registration with HKGBC.

For further details, please refer to BSL's website for more information.

APPEALS

Upon the completion of the assessment, project applicants can submit an appeal on individual credits should they disagree with the decision on the assessment results. There are two appeal opportunities available for BEAM Plus assessments, they are:

- **First Appeal**: Project applicants can apply for First Appeal to BSL, upon the issue of the assessment results. The TRC would be the review party for the First Appeal.
- **Final Appeal**: If the project applicant disagrees with the results of the First Appeal, they can apply to HKGBC for Final Appeal. The HKGBC would form a Final Appeal panel to review the project.

For further details on Appeal, please refer to the latest "**BEAM Plus Project Assessment Procedures Manual**" on HKGBC's website.

1.3 PERFORMANCE ASPECTS AND ASPECT WEIGHTING

The credit requirements of BEAM Plus Neighbourhood are grouped under different performance aspects. The overall score of the assessment would depend on the weighted score of each performance aspect.

COMMUNITY ASPECTS (CA)

This section focuses on the socio-economic impacts of the development to the neighbourhood. It is intended that individual project should bring some socio-economic benefits and the aggregate of changes will enhance the surrounding built environment, local character and social identity of its neighbourhood. Community Aspects include:

- Community engagement;
- Sustainable lifestyle;
- Socio-economic impacts; and
- Corporate social responsibility.

SITE ASPECTS (SA)

This section addresses site planning issues such as integration of surrounding neighbourhood for pedestrian-oriented transport, Open Space design and provisions, sharing of neighbourhood amenities, integrated landscaping and other urban design issues. Site Aspects include:

- Site location;
- Sustainable transport; and
- Site planning and design.

MATERIALS AND WASTE ASPECTS (MWA)

This section emphasises reduction of waste from a life cycle perspective, including site formation design, and provisions of appropriately designed waste facilities for waste recycling / recovery / reuse. Materials and Waste Aspects include:

- Building reuse; and
- Waste management.

ENERGY ASPECTS (EA)

This section encourages design of developments and systems, and provisions that enhance energy efficiency and energy conservation. Credits are assessed based on two levels - building level and infrastructure level. Energy Aspects include:

- Sustainable buildings and passive design; and
- Energy efficient infrastructure

WATER ASPECTS (WA)

This section focuses on site environment with respect to water use and management, including site masterplanning to conserve water bodies and reduce water consumption. Water Aspects focus on:

- Water environment;
- Stormwater management; and
- Water conservation.

OUTDOOR ENVIRONMENTAL QUALITY (OEQ)

This section includes those environmental quality aspects of performance that have impact on the health, comfort or well-being of general public, as well as aspects of performance that improve quality and functionality. Outdoor Environmental Quality includes:

- Thermal Environment;
- Daylight and Visual Quality; and

- Acoustic and Air Quality.

INNOVATION AND ADDITIONS

This section allows the Applicant to submit for consideration of regular and bonus credit points on any innovative technique or a performance enhancement which the Applicant can demonstrate the substantial environmental and social benefits as compared to the requirements specified in the manual. Innovation and Additions include:

- Innovation Techniques;
- Performance Enhancement; and
- BEAM Professional.

Whilst innovative design solutions are encouraged, they do not necessarily justify the award of credit points. Innovation must demonstrate performance gains, such as through improved efficiency and / or improvements in the built environment. Indeed, it is expected that significant performance benefits will be realised from full and proper implementation of sound design and site planning practices.

PREREQUISITES

To be eligible for assessment under BEAM Plus Neighbourhood, projects must first meet the following prerequisites:

- CA P1 – Minimum Neighbourhood Amenities, and
- CA P2 – Minimum Functional Uses.

Projects failed to achieve the above two Prerequisites would not be assessed under BEAM Plus Neighbourhood.

BONUS CREDIT POINTS

There are bonus credit points under some of the credits, and there are 5 bonus credit points under Innovations and Additions.

Bonus credit points would not count towards the total number of credit points available under each aspect, but they would count towards the overall score, by adding directly to the sum of all weighted achieved scores. A maximum of 5 bonus credit points can be added to obtain the overall score for a project.

EXCLUSIONS AND APPLICABLE CREDIT POINTS

Exclusions are allowed where an issue or a part of an assessment is not applicable to particular circumstances or a building development. The exclusion criteria are listed under each credit. The Applicants are required to submit the submission templates providing justification for exclusion. The BEAM Assessor (BAS) may reject the claim for exclusion.

Excluded credit points would not count towards the applicable credit points under each aspect. The number of applicable credit points under each aspect is calculated by deducting the excluded credit points from the total number of credit points under any given aspect.

ASPECT WEIGHTING

Having reviewed local and international assessment schemes and consulted local practitioners and stakeholders during the stakeholder engagement process, a weighting percentage for each performance aspect of BEAM Plus Neighbourhood has been assigned as follows:

Performance Aspects	Weighting (%)
Community Aspects (CA)	20
Site Aspects (SA)	25
Materials and Waste Aspects (MWA)	10
Energy Aspects (EA)	16
Water Aspects (WA)	9
Outdoor Environmental Quality (OEQ)	20
	100

SCORING METHODOLOGY

The overall score is calculated in the following steps:

1. Calculate the percentage of achieved credit points over the number of applicable credit points achieved under each aspect;
2. Multiply the percentage of achieved credit points with the respective weighting percentage to obtain the weighted achieved score under each aspect;
3. Sum up the weighted achieved score of each aspect;
4. Add the number of Innovation (IA) credit points achieved; and
5. Get the overall score.

DETERMINATION OF FINAL RATING

The final grading for projects certified under BEAM Plus Neighbourhood Version 1.0 is determined by three factors:

i. Satisfying the two prerequisites;
ii. Achieving overall score required;
iii. Achieving the required Innovation credit points; and
iv. Obtaining minimum percentage (%) for each category listed below:

	Overall Score	**CA**	**SA**	**EA**	**OEQ**	**IA**
Platinum	75	50%	70%	70%	70%	3 credit points
Gold	65	40%	60%	60%	60%	2 credit points
Silver	55	30%	50%	50%	50%	1 credit point
Bronze	40	20%	40%	40%	40%	--

Two examples are included to illustrate the determination of the final rating.

In Example 1, the overall score is 75 and all of the CA, SA, EA and OEQ aspects fulfil the minimum percentage required for the respective categories, hence the project achieves Platinum rating.

Example 1:

Aspect	Applicable credit points	Achieved credit points	% of Achieved credit points	Category weighting	Weighted achieved score	Category rating
CA	15	10	67%	20%	13.3	Platinum
SA	17	12	71%	25%	17.6	Platinum
MWA	8	5	63%	10%	6.3	--
EA	17	13	76%	16%	12.2	Platinum
WA	10	5	50%	9%	4.5	--
OEQ	14	12	86%	20%	17.1	Platinum
IA		4		100%	4	Platinum
				Overall Rating	75	Platinum

In Example 2, The overall score is 75.2, but SA aspects achieve the minimum percentage score for silver only, hence the project can only achieve Silver rating.

Example 2:

Aspect	Applicable credit points	Achieved credit points	% of Achieved credit points	Category weighting	Weighted achieved score	Category rating
CA	15	12	80%	20%	16	Platinum
SA	17	9	53%	25%	13.2	Silver
MWA	8	5	63%	10%	6.3	--
EA	17	15	88%	16%	14.1	Platinum
WA	10	5	50%	9%	4.5	--
OEQ	14	12	86%	20%	17.1	Platinum
IA		4		100%	4	Platinum
				Overall Rating	75.2	**Silver**

Important note: There is no round off for credit calculation in BEAM Plus assessments. All score is calculated on absolute figure. The credit round off in tables above is for the purpose of easy presentation only.

LIST OF ABBREVIATIONS

AVA	Air Ventilation Assessment
ArchSD	Architectural Services Department, HKSAR Government
BEAM	Building Environmental Assessment Method
BEC	Business Environment Council
BCA	Building and Construction Authority, Singapore
BSL	BEAM Society Limited
CA	Community Aspects
CFA	Construction Floor Area
CFD	Computational Fluid Dynamics
CIC	Construction Industry Council
CSR	Corporate Social Responsibility
DIA	Drainage Impact Assessment
DSD	Drainage Services Department, HKSAR Government
DO	District Open Space
DP	Designated Projects
DVS	Design Vision Statement
EA	Energy Aspects
ESD	Ecologically Sustainable Design
EIA	Environmental Impact Assessment
ESG	Environmental, social and governance
GBP	General Building Plan, defined under Hong Kong Buildings Ordinance
GFA	Gross Floor Area
GIC	Government, Institution or Community
GIS	Geographic Information System
GRI	Global Reporting Initiatives
HKGBC	Hong Kong Green Building Council Limited
HK-BEAM	Hong Kong Building Environmental Assessment Method
HKHA	Hong Kong Housing Authority, HKSAR Government
HKIA	The Hong Kong Institute of Architects

HKIE	The Hong Kong Institution of Engineers
HKIS	The Hong Kong Institute of Surveyors
HKIUD	Hong Kong Institute of Urban Design
HKIP	Hong Kong Institute of Planners
HKSAR	Hong Kong Special Administrative Region of the People's Republic of China
HKPSG	Hong Kong Planning Standards and Guidelines
IA	Innovations and Additions
LandsD	Lands Department, HKSAR Government
LEED	Leadership in Energy and Environmental Design, USA
LO	Local Open Space
MLP	Master Layout Plan, defined under the Town Planning Ordinance, for planning application under S16 of Hong Kong Town Planning Ordinance
MWA	Materials and Waste Aspects
NDAs	New Development Areas
OEQ	Outdoor Environmental Quality
OP	Occupation Permit
PET	Physiological Equivalent Temperature
PGBC	Professional Green Building Council
PlanD	Planning Department, HKSAR Government
PNAP	Practice Notes for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers
POSPD	Public Open Space in Private Developments Design and Management Guidelines
RAMS	Regional Atmospheric Modelling System
REDA	The Real Estate Developers Association of Hong Kong
SBDG	Sustainable Building Design Guidelines
SEIA	Socio-economic Impact Assessment
SQP	Suitably qualified persons
SVF	Sky view factor
TSI	Thermal Sensation Index
UBL	Urban Boundary Layer

UCL	Urban canopy layer
UHI	Urban Heat Island
USGBC	U.S. Green Building Council
VQ	Visual Quality
WA	Water Aspects
WKCDA	West Kowloon Cultural District Authority
WKCD	West Kowloon Cultural District

GLOSSARY

ASSESSMENT AREA	Assessment Area refers to the combination of the Site and the Impact Area.
ASSESSMENT BOUNDARY	Outer edge of the Impact Area.
BLACK WATER	The untreated waste water from water cistern (WC) containing urine and faecal matter. Black water is usually drained using separate system, it should be treated separately before being discharged.
BLUE ASSETS	Blue assets refer to wetlands as well as natural and man-made water bodies.
BROWNFIELD	Previously developed land, or land that contains or contained permanent structures and associated infrastructures.
BUILDING	Building includes the whole, or any part, of any domestic or non-domestic building or building which is constructed or adapted for use for public entertainment, arch, bridge, cavern adapted or constructed to be used for the storage of petroleum products, chimney, cook-house, cowshed, dock, factory, garage, hangar, hoarding, latrine, matshed, office, oil storage installation, out-house, pier, shelter, shop, stable, stairs, wall, warehouse, wharf, workshop or tower, sea-wall, breakwater, jetty, mole, quay, cavern or any underground space adapted or constructed for occupation or use for any purpose including its associated access tunnels and access shafts, pylon or other similar structure supporting an aerial ropeway and such other structures as the Building Authority may by notice in the Gazette declare to be a building; (Amended 44 of 1959 s. 2; 19 of 1976 s. 32; 16 of 1978 s. 2; 5 of 1983 s. 2; 68 of 1993 s. 2; 72 of 1995 s. 15) (As per Ch123 Buildings Ordinance interpretation)
DISTRICT COOLING SYSTEM	A District Cooling System refers to a system in which chilled water is supplied from one or more central chiller plants to user buildings through a network of pipes for air-conditioning in, or provision of other related services to, more than one (1) building, within the site.
DISTRICT ENERGY SYSTEM	A District Energy System refers to a system in which energy, in the form of cooling, heating and electricity, or combination of the above, is supplied from one or more central plants to user buildings through a network of pipes and wire to more than one (1) building with in the Site.
GREENFIELD	Land that has not been previously used for urban development.
GREEN SPACE	As defined under the Hong Kong Planning Standards and Guidelines, the main function of Green Space "is for conservation of the natural environment and for amenity and visual purposes".
GREY WATER	The untreated household waste water includes used water collected from kitchen sinks, laundry, showers and bath tubs and wash basins, but it excludes waste water from WC. It is also known as gray water.
IMPACT AREA	An impact area refers to the area extended 500m from the Site Boundary.
MASTER LAYOUT PLAN (MLP)	MLPs include plans, sketches and written statements that serve the following purposes/objectives: (i) to ensure that the nature and layout of a particular large-scale development are acceptable to Government as a Planning and Land Instrument; (ii) to ensure that the whole site is developed in an orderly and composite manner; and (iii) to enable a developer or a land grantee to submit his

	/ her proposal(s) and receive an early indication that the general nature of the development and the proposed layout thereof are acceptable.
OPEN SPACE	Open Space refers to any land with the minimum of building structure which has been reserved for either passive or active recreation and provides major or minor recreational facilities, which may be of local or district significance, which is for the use and enjoyment of the general public. It includes park and garden, playground and playing field, promenade, pavilion, sitting out area, pedestrian area and bathing beach etc.
PASSIVE OPEN SPACE	As defined under the HKPSG, passive Open Space is 'recreation Open Space which is landscaped as parks, gardens, sitting-out areas, waterfront promenades, paved areas for informal games, children's playgrounds, jogging and fitness circuits etc., where people can enjoy the surroundings in a leisurely manner. Games facilities are normally not provided.'
RECREATION OPEN SPACE	As defined under HKPSG, recreation Open Space refers to an outdoor open-air space which is used principally for active and / or passive recreational use, developed either by the public or private sector, and is counted towards the Open Space standard of provision. In this section, it is sometimes simply referred to as 'Open Space' provided at the ground level and/ or podium level.
SITE	The land, water, vegetation and developable area that constitute the project application site.
SITE AREA	Refer to the description for 'Site'.
SITE BOUNDARY	The site boundary refers to the property line of the Site defining its territorial limits or as defined by the Applicant for assessment purpose.
STREET FURNITURE	A collective term for objects and components of equipment installed on streets and Open Space for various purposes, such as, benches, taxi stands, bus shelter and public sculptures etc.
SUBSIDISED HOUSING	Subsidised housing includes public rental housing (PRH), flats sold under various subsidised schemes including Home Ownership Scheme (HOS), the Tenants Purchase Scheme (TPS), the Home Assistance Loan Scheme (HALS), Private Sector Participation Schemes (PSPS), Flat-for-Sale Scheme, Sandwich Class Housing Scheme etc.
URBAN FRINGE PARK	A term used for sites at the urban edge areas which have potential for a wider scope of recreation development within a landscape setting.

	Credits	Credit requirements	Exclusions	No. of credits points
	COMMUNITY ASPECTS (CA)			
CA P1	**MINIMUM NEIGHBOURHOOD AMENITIES**	Demonstrate the provision of a minimum of two (2) different neighbourhood amenities (basic services or recreational facilities) within the Assessment Area. AND Demonstrate the provision of a minimum of one (1) walking route of not more than 500m from a notional entrance of any major occupied building within the Site to each of the two (2) neighbourhood amenities and that such walking route is available for the public to use.	None.	Required
CA P2	**MINIMUM FUNCTIONAL USES**	Demonstrate the provision of a minimum of two (2) different functional uses within the Assessment Area.	None.	Required
CA 1	**COMMUNITY ENGAGEMENT**	1 credit point is awarded where a Community Engagement Plan is established and implemented.	None	1
		1 credit point is awarded where (i) comments received during community engagement activities are reviewed; (ii) feedback to participants is provided to report on analysis; and (iii) follow-up actions are taken.		1
		1 BONUS credit point is awarded where the masterplan of the Project is reviewed and modified in response to aspirations and comments from the community received during community engagement activities.		1B
CA 2	**SUSTAINABLE LIFESTYLE**	1 credit point is awarded where in an effort to promote sustainable lifestyle (i) the floor area and facilities are designated; and (ii) a Design Vision Statement (DVS) concerning their operation is provided.	None.	1

	Credits	Credit requirements	Exclusions	No. of credits points
COMMUNITY ASPECTS (CA)				
CA 3	**NEIGHBOURHOOD AMENITIES**	1 credit point is awarded where at least 10 different basic services are located within a 500m walking distance from a notional entrance of any major occupied building within the Site with availability of pedestrian access to such services from the Site.	None.	1
		1 credit point is awarded where at least 2 different recreational facilities are located within a 500m walking distance from a notional entrance of a (or one of the) major occupied building(s) within the Site with availability of pedestrian access to the services from the Site.	None.	1
		1 credit point is awarded where at least 2 different recreational facilities or at least 5 different basic services are located within the Site and will be made available for public use.	None.	1
		1 credit point is awarded where shaded or covered pedestrian routes to at least 5 different basic services or 2 different recreational facilities within the Site are provided.	None.	1
		1 BONUS credit point is awarded where a minimum building setback of 3.5m is provided from the Site boundary with street tree planting in the space created. The total length of the setback shall stretch for a minimum of 50% of the total length of all site boundaries bordering existing streets that are currently without continuous street tree planting.	None.	1B
CA 4	**DIVERSITY OF HOUSING TYPES**	1 credit point is awarded where diverse housing types in terms of mixed tenure or different flat sizes are provided.	Projects with no residential provisions.	1

Credits		Credit requirements	Exclusions	No. of credits points
COMMUNITY ASPECTS (CA)				
CA 5	**EXISTING COMMUNITY AND ECONOMY**	1 credit point is awarded where a Socio-Economic Study is conducted to identify local needs and opportunities at the Site and the Impact Area.	None for CA 5a and CA 5c.	1
		1 credit point is awarded where the continuation of existing community and / or local businesses is promoted.	Greenfield sites, newly reclaimed sites or sites without any existing community or business for CA 5b.	1
		1 BONUS credit point is awarded where a net gain in permanent employment within the Site is anticipated.		1B
CA 6	**PLACEMAKING AND LOCAL CHARACTER**	1 credit point is awarded where design to reinforce local identity is adopted.	None.	1
CA 7	**CONSERVATION OF CULTURAL ASSETS**	1 credit point is awarded where an assessment of cultural assets or a local culture study is conducted.	Sites on newly reclaimed land without previous land use.	1
		For any identified area with cultural assets or values, 1 credit point is awarded where over 50% of the CFA or GFA of its original functional use is maintained. OR If any identified area with cultural assets or values is located externally in open air, e.g. an outdoor bazaar or terrace, 50% of the total floor area occupied by the cultural assets shall be maintained in order to attain 1 credit point.		1

Credits		Credit requirements	Exclusions	No. of credits points
COMMUNITY ASPECTS (CA)				
		OR 1 credit point is awarded where a suitable adaptive re-use is introduced.		
		1 credit point is awarded where all identified Old and Valuable Trees, Important Trees and Fung Shui Woods are preserved intact.		1
CA 8	**CORPORATE SOCIAL RESPONSIBILITY REPORTING**	1 credit point is awarded where the Applicant's company or organisation has a Corporate Social Responsibility Policy.	Projects undertaken by a joint venture of companies or a subsidiary of a corporation, with none of the companies / parent companies have greater than 30% of ownership of the Project.	1
			Total number of CA credit points:	**15 + 3B**

	Credits	Credit requirements	Exclusions	No. of credits points
	SITE ASPECTS (SA)			
SA 1	**BROWNFIELD DEVELOPMENT**	1 BONUS credit point is awarded for conducting a site contamination assessment.	Projects on greenfield sites or sites within the landfill gas hazard zone; and sites where contamination, landfill gas hazard assessment and mitigation measures are statutory requirements.	1B
SA 2	**ACCESSIBILITY TO OPEN SPACE, GREEN SPACE AND BLUE ASSETS**	1 credit point is awarded where the two conditions are met: • The total aggregate area of Open Space, natural woodland, shrub land, grassland, wetland and water bodies within the Assessment Area (Site Area and Impact Area combined) exceeds 5% of the Assessment Area, and • There is a pedestrian access not exceeding 500m walking distance that connects the above spaces to a notional entrance of any major occupied building within the Site.	None.	1
		1 credit point is awarded where the two conditions are met: • The site provides a total aggregate area of Open Space, Green Space and blue assets exceeding 5% of the Site Area; and • The Open Space, Green Space and blue assets provide a reasonable access by the public.		1
		1 credit point is awarded where a shaded or covered pedestrian route to Open Space, Green Space and blue assets is provided within the Site.		1

	Credits	Credit requirements	Exclusions	No. of credits points
	SITE ASPECTS (SA)			
SA 3	**PEDESTRIAN-ORIENTED AND LOW CARBON TRANSPORT**	1 credit point is awarded where a convenient pedestrian access to mainstream public transport is available within a 500m walking distance, as measured from any notional entrance(s) of a major occupied building within the Site.	None for SA 3a, SA 3b, SA 3c and SA 3e; Projects with neither existing nor planned public cycling network nearby for SA 3d.	1
		1 credit point is awarded where there is at least one shaded or covered pedestrian route within the Site from a notional building entry point to the nearest or major mainstream public transport station / node.		1
		1 credit point is awarded where 50% or more of the applicable pedestrian-oriented transport planning measures are scored. OR 2 credit points are awarded where 75% or more of the applicable pedestrian-oriented transport planning measures are scored.		2
		1 BONUS credit point is awarded where 100% of the applicable pedestrian-oriented transport planning measures are scored.		1B
		1 credit point is awarded where cycling network and facilities are provided within the Site to integrate with the public cycling network if a public cycling network exists or has been planned nearby.		1
		1 credit point is awarded where all main pedestrian access points of the Project are planned to be integrated with pedestrian transport network surrounding the Site. AND 1 credit point is awarded where at least one (1) pedestrian route with a minimum width of 3m provided within the Site, is made available for public access to the surrounding neighbourhood amenities, Green Spaces, blue assets and / or a public transport node.		2

	Credits	Credit requirements	Exclusions	No. of credits points
	SITE ASPECTS (SA)			
SA 4	**SITE DESIGN APPRAISAL**	A site design appraisal report shall be submitted to demonstrate a proactive approach to achieve great integration of site planning and design issues. If the report meets 50% or more of the relevant sub-items of the Urban Design Guidelines in HKPSG, 1 credit point is awarded. OR If the report meets 75% or more of the relevant sub-items of the Urban Design Guidelines in HKPSG, 2 credit points are awarded.	None.	2
		If 100% of relevant sub-items of the Urban Design Guidelines are achieved, an additional BONUS credit point is awarded.		1B
SA 5	**ECOLOGICAL VALUE**	1 BONUS credit point is awarded in either of the conditions specified below: • All identified habitat types on Site are of low or negligible indicative ecological value; or • All identified habitat types on Site of medium to high indicative ecological value are preserved intact and are either unaffected or enhanced by the planned development.	None for SA 5a, SA 5b (Landscape Strategy and Enhanced Ecological Strategy) and SA 5c.	1B
		1 credit point is awarded where the Applicant demonstrates that the ecological value of the Site is enhanced through a preliminary landscape strategy adopted in the site planning.		1
		1 additional credit point is awarded where the ecology and biodiversity of the Site would be enhanced through an ecological enhancement strategy, based on accepted ecological principles and defined goals, prepared by a suitably qualified person.	Projects where there are no areas of medium to high	1

	Credits	Credit requirements	Exclusions	No. of credits points
	SITE ASPECTS (SA)			
		1 BONUS credit point is awarded where the site planning and building disposition are carefully designed in such a way that physical interconnectivity is provided within the Site to connect any existing preserved area of medium to high ecological value adjacent to the Site and: • Any existing preserved areas of medium to high ecological value identified within the Site; or • Any new Green Space planned within the Site; or • Any new blue asset planned within the Site; and • The total combined area of eligible interconnected areas within the Site represents not less than 5% of the total Site area.	ecological value, adjacent to (i.e. contiguous with) the site for SA 5b) Interconnectivity with Existing Area(s) with Ecological Value.	1B
		1 BONUS credit point is awarded where the existing trees are retained in situ such that the combined girth of the retained trees, with individual girth of at least 150mm, is at least 20% of the total girth of all existing trees on site.		1B
SA 6	**CULTURAL HERITAGE**	1 credit point is awarded where the Project does not have any negative impact on the cultural heritage on Site.	Sites without cultural heritage.	1
SA 7	**QUALITY OPEN SPACE**	1 credit point is awarded where a proactive approach to enhance urban liveability is demonstrated by scoring at least 50% of the applicable design measures mentioned in the Design Guidelines in Section 2 of the Public Open Space in Private Developments Design and Management Guidelines. OR 2 credit points are awarded where a proactive approach to enhance urban liveability is demonstrated by scoring at least 75% of the applicable design measures mentioned in the Design Guidelines in Section 2 of the Public Open Space in Private Developments Design and Management Guidelines.	Projects of pure residential use.	2

Credits	Credit requirements	Exclusions	No. of credits points
SITE ASPECTS (SA)			
	1 BONUS credit point is awarded where a proactive approach to enhance urban liveability is demonstrated by scoring 100% of the applicable design measures mentioned in the Design Guidelines in Section 2 of the Public Open Space in Private Developments Design and Management Guidelines.		1B
		Total number of SA credit points:	**17 + 7B**

	Credits	Credit requirements	Exclusions	No. of credits points
MATERIALS AND WASTE ASPECTS (MWA)				
MWA1	**BUILDING REUSE**	1 credit point is achieved if the Project reuses 30% or more of existing sub-structure and superstructure. OR 2 credit points are achieved of the Project reuses 60% or more of existing sub-structure and superstructure. AND 1 BONUS credit point is achieved if the project reuses 90% or more of existing sub-structure and superstructure.	Projects on reclaimed land or greenfield sites. OR Projects where building reuse process, including conservation and / or refurbishment process, for the current use falls outside timescale of the Project.	2 1B
MWA2	**MINIMISED CUT AND FILL**	1 credit point is awarded where the sum of materials transported into the Site and removed from the Site for cut and fill purpose is less than 60% of the sum of cut and fill materials. OR 2 credit points are awarded where the sum of materials brought into the Site and removed from the Site for cut and fill purpose is less than 30% of the sum of cut and fill materials. OR 3 credit points are awarded where no materials is removed from or transported into the Site for cut and fill purpose.	Sites without cut and fill as a part of site formation.	3

	Credits	Credit requirements	Exclusions	No. of credits points
MATERIALS AND WASTE ASPECTS (MWA)				
MWA3	**INTEGRATED WASTE MANAGEMENT**	1 credit point is awarded where an integrated waste management plan is put in place and sufficient waste facilities are provided to promote the reduction, reuse and recycling of waste within the Site.	None.	1
		1 credit point is awarded if there are waste processing facilities provided on site.		1
		1 credit point is awarded where a commitment to engage on-site personnel to oversee and facilitate the effective operation of the waste management facilities.		1
			Total number of MWA credit points:	**8 + 1B**

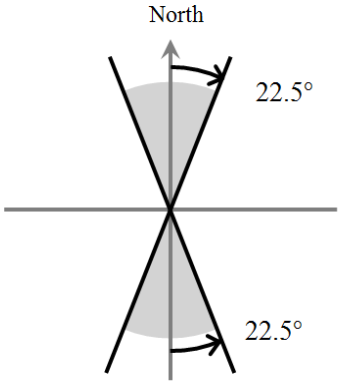
<table>
<tr><th></th><th>Credits</th><th>Credit requirements</th><th>Exclusions</th><th>No. of credits points</th></tr>
<tr><td colspan="5">ENERGY ASPECTS (EA)</td></tr>
<tr><td>EA 1</td><td>CERTIFIED SUSTAINABLE BUILDINGS</td><td>The following table outlines attainable credit points based on the percentage (%) of either CFA or GFA of a development to be certified under BEAM Plus New Buildings (NB) or Existing Buildings (EB).
<table><tr><th>Percentage of either CFA or GFA of a development to be certified Silver rating or above</th><th>Credit Points</th></tr><tr><td>Equal or greater than 10%, but less than 20%</td><td>1</td></tr><tr><td>Equal or greater than 20%, but less than 30%</td><td>2</td></tr><tr><td>Equal or greater than 30%, but less than 40%</td><td>3</td></tr><tr><td>Equal or greater than 40%, but less than 50%</td><td>4</td></tr><tr><td>Equal or greater than 50%, but less than 60%</td><td>5</td></tr><tr><td>Equal or greater than 60%</td><td>6</td></tr></table></td><td>None.</td><td>6</td></tr>
<tr><td>EA 2</td><td>PASSIVE DESIGN</td><td>1 credit point is awarded where the following requirements are fulfilled:

- The combined façade area of south and north elevations contributes to 66% of the total façade area of the building(s);
- The normal of the south and north facing façades must be within 22.5° of the geographical north / south axis; and
- At least 25% of the number of buildings within the Site fulfil the above requirements.

OR

2 credit points are awarded where the following requirements are fulfilled:

- The combined façade area of south and north elevations contributes to 66% of the total façade area of the building(s);
- The normal of the south and north facing façades must be within 22.5° of the geographical north / south axis; and
- At least 50% of the number of buildings within the Site fulfil the above requirements.</td><td>None.</td><td>2</td></tr>
</table>

Credits	Credit requirements	Exclusions	No. of credits points
ENERGY ASPECTS (EA)			
	 OR 2 credit points are awarded where the optimisation of site layout by building disposition / orientation to reduce solar radiation on the proposed building blocks within the Site is demonstrated.		
	1 credit point is awarded where the building separation requirements stipulated in Appendix B of Buildings Department - PNAP APP-152 Sustainable Building Design Guidelines are complied with. OR 2 credit points are awarded where the optimisation of site layout by disposition and separation of building blocks to enhance wind environment and no pedestrian area will be subject to wind velocity caused by amplification due to the Project.		2

	Credits	Credit requirements	Exclusions	No. of credits points
	ENERGY ASPECTS (EA)			
EA 3	**ENERGY EFFICIENT INFRASTRUCTURE**	2 credit points are awarded where the Site is connected to a district cooling or energy system, whether there is an existing system or there will be a planned one.	Projects of pure residential use; For EA 3a, public sector projects where the district energy system connection is mandated by land lease conditions or engineering conditions.	2
		1 credit point is awarded if the Applicant can demonstrate that a target annual average COP of 4.7 at full utilisation can be achieved through a continuous monitoring of the plant efficiency.		1
		1 BONUS credit point is awarded where the plant average annual efficiency (including cooling towers and primary pumps) is equal to or greater than the COP of 4.7.		1B
		1 credit point is awarded where a walkable service tunnel with adequate maintenance access for the district system is provided.		1
		1 BONUS credit point is awarded where other utilities services are combined with the district system piping route and a walkable service tunnel is provided.		1B
EA 4	**RENEWABLE ENERGY**	1 credit point is awarded under the following conditions: • The project is connected to a district or shared renewable energy system, whether it is an existing system or a newly planned one; and • If it can be demonstrated that the system can supply at least 0.25% of the annual estimated total energy demand within the Site.	None.	2

Credits	Credit requirements	Exclusions	No. of credits points
ENERGY ASPECTS (EA)			
	OR 2 credit points are awarded under the following conditions: • The project is connected to a district or shared renewable energy system, whether it is an existing system or a newly planned one, and • If it can be demonstrated that the system can supply at least 0.5% of the annual estimated total energy demand within the Site.		
	1 credit point is awarded where 100% of the annual estimated external lighting energy demand within the Site, excluding the façade lighting, is offset by renewable energy.		1
		Total number of EA credit points:	**17 + 2B**

	Credits	Credit requirements	Exclusions	No. of credits points
	WATER ASPECTS (WA)			
WA 1	**WATER ENVIRONMENT**	1 credit point is awarded where existing wetlands and water bodies within the Site are conserved.	Projects without any existing wetland or water body within the Site.	1
		1 credit point for using pervious materials for a minimum of 50% of hard landscaped areas. AND 1 credit point for providing appropriate planting on site equivalent to at least 30% of the Site Area. OR 2 credits point for providing appropriate planting on site equivalent to at least 40% of the Site Area.		3
WA 2	**STORMWATER MANAGEMENT**	Credit points are awarded based on the provision of temporary storage on site, which can be in the form of detention basins and / or storage tanks. The storage volume is calculated based on the site area: **Required storage volume per 1000m^2** / **No. of credit points** 30m^3 / 1 credit point 60m^3 / 2 credit points 90m^3 / 2 credit points + 1 BONUS credit point	None.	2 + 1B

	Credits	Credit requirements	Exclusions	No. of credits points
	WATER ASPECTS (WA)			
WA 3	**ALTERNATIVE WATER SOURCES**	1 credit point is awarded where recycled water sources are adopted.	None.	1
		1 credit point is awarded where recycled water sources are derived from recycled grey or black water.		1
		1 credit point is awarded where adopted alternative water sources lead to a reduction of at least 30% in potable water demand for irrigation after the establishment period. OR 2 credit points are awarded where adopted alternative water sources lead to a reduction of at least 40% in potable water demand for irrigation after the establishment period.		2
			Total number of WA credit points:	**10 + 1B**

	Credits	Credit requirements	Exclusions	No. of credits points
OUTDOOR ENVIRONMENTAL QUALITY (OEQ)				
		1 credit point is awarded where there is at least one shaded or covered route connecting the Site to the nearby amenities or transport hub, with the provision of a shaded or covered sitting area along the same route.		1
OEQ 1	**OUTDOOR THERMAL COMFORT**	1 credit point is awarded where it can be demonstrated that 50% or more of the passive Open Spaces and pedestrian zones achieving thermal comfort on a typical summer day at 9:00 am in Hong Kong. AND 1 credit point is awarded where it can be demonstrated that 50% or more of the passive Open Spaces and pedestrian zones achieving thermal comfort on a typical summer day at 3:00 pm in Hong Kong.	None.	2
OEQ 2	**INTRA-URBAN TEMPERATURE AND URBAN HEAT ISLAND EFFECT**	1 credit point is awarded where at least 15% of the total Site Area is provided with tree coverage in plan view. OR 2 credit points are awarded where at least 25% of the total Site Area is provided with tree coverage in plan view.	None.	2
		2 credit points are awarded where an Intra Urban Heat Island Study is conducted demonstrating that a maximum Intra-Urban Heat Index (difference between T_{urban} and T_{met}) in summer is less than 3.0 °C.	None.	2
OEQ 3	**NEIGHBOURHOOD DAYLIGHT ACCESS**	1 credit point is awarded where daylight access of neighbouring sensitive buildings is maintained to the prescribed level.	None.	1

Credits		Credit requirements	Exclusions	No. of credits points
OUTDOOR ENVIRONMENTAL QUALITY (OEQ)				
OEQ 4	**VISUAL QUALITY**	1 credit point is awarded where a Visual Quality Study Report is provided on the provision of recreation Open Space(s) within the Site.	None.	1
		1 credit point is awarded where a Solar Reflectivity Study is provided for all horizontal surfaces within the Site. If risk of glare exists, a letter of commitment, signed by an authorised signatory at director level, shall be submitted by the Applicant to outline the intention to mitigate the potential glare risks in order to secure this credit.	None.	1
OEQ 5	**AIR QUALITY OF OPEN SPACES**	1 credit point is awarded where a buffer distance between any Open Space within the Site and the nearest road or highway is maintained in the manner as outlined in Table 3.1 of HKPSG, Chapter 9.	None.	1
		1 credit point is awarded where a buffer distance between any Open Space within the Site and an industrial use in the vicinity is maintained in the manner as outlined in Table 3.1 of HKPSG, Chapter 9. Should a pollution source, a road, a highway, or industrial use be planned within the Site, the same buffer distance should be maintained with the neighbouring Open Spaces.		1
OEQ 6	**MITIGATION OF NOISE**	1 credit point is awarded where a Noise Assessment Report is provided to demonstrate a proactive approach to create an appropriate acoustic environment.	Projects that require approval under Section 16 of the Town Planning Ordinance or any other project that is required to undertake Noise Assessment.	1

	Credits	Credit requirements	Exclusions	No. of credits points
OUTDOOR ENVIRONMENTAL QUALITY (OEQ)				
OEQ 7	**UNIVERSAL ACCESS**	1 credit point is awarded where at least three (3) enhanced features are provided under the guidelines, Universal Accessibility in External Areas, Open Spaces & Green Spaces by Architectural Services Department, HKSAR Government.	None.	1
			Total number of OEQ credit points:	**14**

	Credits	Credit requirements	Exclusions	No. of credits points
	INNOVATIONS AND ADDITIONS (IA)			
IA 1	**INNOVATIVE TECHNIQUES**	Maximum 5 BONUS credit points.	None.	5B
IA 2	**PERFORMANCE ENHANCEMENT**			
IA 3	**BEAM PROFESSIONAL**	1 credit point for engaging a BEAM Professional (ND) in the project.	None.	1
			Total number of IA credit points:	**1 + 5B**

2 COMMUNITY ASPECTS

2.1 COMMUNITY ENGAGEMENT
2.2 SHARING OF AMENITIES
2.3 SUSTAINABLE LIFESTYLE
2.4 SOCIO-ECONOMIC IMPACTS
2.5 CORPORATE SOCIAL RESPONSIBILITY

INTRODUCTION

This section focuses on the socio-economic impacts of a project on its neighbourhood. Individual developments can contribute to some socio-economic benefits and the aggregate of positive changes can enhance the built environment, local character and social identity of the neighbourhood.

2.P PREREQUISITES

CA P 1 MINIMUM NEIGHBOURHOOD AMENITIES
CA P 2 MINIMUM FUNCTIONAL USES

BACKGROUND

This part sets out minimum requirement for neighbourhood amenities (basic services or recreational facilities) and functional uses proposed within the Site or located within a convenient walking distance from Site.

2.1 COMMUNITY ENGAGEMENT

CA 1 COMMUNITY ENGAGEMENT

BACKGROUND

Community engagement is essential for a sustainable and inclusive development that brings positive impact on neighbourhood, in which the local and neighbouring communities share a common vision and enjoy positive changes. Credits should be awarded when the community is engaged at an early stage of the development process, when design is reviewed based on the community's aspirations and when proper feedback is provided to the community.

2.2 SHARING OF AMENITIES

CA 2 NEIGHBOURHOOD AMENITIES

BACKGROUND

Sufficient local amenities within a convenience walking distance is important in order to reduce travel needs and create a pleasant environment for leisure and social interaction.

2.3 SUSTAINABLE LIFESTYLE

CA 3 SUSTAINABLE LIFESTYLE

BACKGROUND

In creating a sustainable neighbourhood, both the hardware and software provisions are critical. Hardware includes the design and provision of green infrastructure and facilities. Software includes the promotion and facilitation of sustainable lifestyle. This includes green and environmentally friendly lifestyle, enhanced energy efficiency, waste reduction and recycling, water conservation and even community garden and farming.

Credit should be awarded when provisions of facilities targeted at future users or occupants of the development to promote sustainable lifestyle and integration with the neighbourhood are provided.

2.4 SOCIO-ECONOMIC IMPACTS

CA 4 DIVERSITY OF HOUSING TYPES
CA 5 EXISTING COMMUNITY AND ECONOMY
CA 6 PLACEMAKING AND LOCAL CHARACTER
CA 7 CONSERVATION OF CULTURAL ASSETS

BACKGROUND

In order to contribute to a sustainable neighbourhood, an individual development should aim at not only improving the environment of the neighbourhood, but also bringing positive social and economic changes to the neighbourhood. The

planning and design efforts which affect the socio-economic attributes of a neighbourhood include:

- Providing a variety of housing mix within the Site;
- Promoting continuation of the existing local community within the Site ;
- Creating or reinforcing the local characters of the neighbourhood through the Project;
- Identifying the local culture / characteristics of the neighbourhood;
- Conserving cultural assets within the Site; and
- Assessing potential impacts on local economy and provision of job opportunities.

Planning and design of the Project should take socio-economic impacts on its neighbourhood into account and the credit is awarded for bringing positive socio-economic changes to the neighbourhood.

2.5 CORPORATE SOCIAL RESPONSIBILITY

CA 8 CORPORATE SOCIAL RESPONSIBILITY REPORTING

BACKGROUND

Policy on corporate social responsibility is considered a company's public pledge and social mission for sustainable operation in terms of its finance, impacts on environment, consumers, employees and wider communities. Credit is awarded if the Applicant has corporate social responsibility policy and annually produces corporate social responsibility report.

2 COMMUNITY ASPECTS

2.P PREREQUISITES

CA P1 MINIMUM NEIGHBOURHOOD AMENITIES

EXCLUSIONS None.

OBJECTIVE Encourage developments that are integrated within, and an asset to, the immediate neighbourhood.

REQUIREMENT Demonstrate the provision of a minimum of two (2) different neighbourhood amenities (basic services or recreational facilities) within the Assessment Area.

AND

Demonstrate the provision of a minimum of one (1) walking route of not more than 500m from a notional entrance of any major occupied building within the Site to each of the two (2) neighbourhood amenities and that such walking route is available for the public to use.

ASSESSMENT Assessment is based on the overall provisions for local residents and building users within the immediate vicinity of the building development, whether these are provided within the immediate neighbourhood, or are an additional provision within the development.

The Applicant shall submit a report based on a survey of the immediate neighbourhood and details of the development itself to demonstrate adequate provision of neighbourhood amenities. Neighbourhood amenities (basic services or recreational facilities) include:-

Basic Services	Recreational Facilities
• Restaurant • Bank (including Automated Teller Machine) • Medical Facilities • Dental Clinic • Pharmacy • Supermarket • Convenience Store • School • Kindergarten or Day Care Centre • Library • Post Box • Laundry or Dry Cleaner • Hairdresser • Retail shop • Place of Worship • Community Centre	• Shaded or Covered Sitting Area, Garden, or Park with Seating Facilities • Waterfront Promenade • Public Indoor or Outdoor Swimming Pool • Public Indoor Multi-purpose or Sports Complex • Public Outdoor Sports Facility such as football field, basketball court and tennis court, etc. • Bicycle Track

The onus is placed on the Applicant to demonstrate that neighbourhood amenities, appropriate to the needs of the intended building users and the inhabitants in the immediate neighbourhood, exist within the Site or within a reasonable walking distance.

The Applicant shall submit evidence that the neighbourhood amenities are available for public use, including details of any restrictions or conditions of access that may exist. Where the provision of the amenities is added to those available within the immediate neighbourhood with convenient pedestrian access for the public, the prerequisite requirement shall be met. Private clubhouses shall not be counted in this requirement.

Judgment as to the nature of basic services, the provision of recreational facilities and Open Space with respect to a particular building development shall be made with reference to HKPSG [1].

The Applicant should submit a map providing the following information:

- The location of the building at or near the centre of a scale drawing;
- The locations of each of the listed services / facilities identified;
- The unhampered walking route from the building's notional main entrance to the notional service entrance;
- The walking route shall be clearly marked by lines on the drawing together with the walking distance.

Future services / facilities not operable at the time of the building completion will be considered if they will be in operation no later than one year after the target date for the issue of Occupation Permit (OP) / Building Handover Certificates / Substantial Completion Dates for the proposed developments.

BACKGROUND

Provision of basic services such as shops, restaurants, clinics, etc., within the immediate vicinity of a building improves the efficiency and the quality of life. Building users can benefit from the existing provisions as well as those provided by the development.

Provision of recreational facilities and Open Space [2] are essential to the psychological and physical well-being of individuals and the community as a whole. It contributes to the quality of life of the building users.

Recreation Open Space is an outdoor open-air space used for active and / or passive recreation use. Active recreational facilities may include places for ball games, swimming pools and sports facilities, etc., while passive recreational facilities refer to parks, gardens, sitting-out areas, waterfront promenades, paved areas for informal games and children's playgrounds, etc.

The design and layout of these facilities should be of a quality and environmental standard to meet the needs of the users. To enhance the quality of a neighbourhood, a development can provide additional recreational facilities and Open Space(s) that are conveniently accessible by the public during normal operating hours.

[1] Planning Department 2010, *Hong Kong Planning Standards and Guidelines*, viewed 15 November 2016, http://www.pland.gov.hk/pland_en/tech_doc/hkpsg/full/index.htm

[2] Planning Department 2010, 'Chapter 4: recreation, Open Space and greening', *Hong Kong Planning Standards and Guidelines*, viewed 7 October 2015, http://www.pland.gov.hk/pland_en/tWhat ech_doc/hkpsg/full/ch4/ch4_text.htm

2 COMMUNITY ASPECTS

2.P PREREQUISITES

CA P2 MINIMUM FUNCTIONAL USES

EXCLUSIONS None.

OBJECTIVE Encourage the formation of mixed-use neighbourhoods for better social integration.

REQUIREMENT Demonstrate the provision of a minimum of two (2) different functional uses within the Assessment Area.

ASSESSMENT The Applicant shall submit a report based on a survey of the immediate neighbourhood and details of the Project to demonstrate the minimum mix of functional uses. Functional uses include:

- Residential;
- Office;
- Retail;
- Government facilities (including, for example, post office and library etc.);
- Institutional (including, for example, elderly / youth centre, community centre and place of worship etc.); and
- Industrial.

Note: Roads or footpaths shall not be counted as functional uses.

A map shall identify the Site at or near the centre of a scale drawing with each of the listed functional uses identified.

Future functional uses not operable at the time of building completion will be considered if they will be in operation no later than one year after the target date for the issue of Occupation Permit (OP) / Building Handover Certificates / Substantial Completion Dates for the proposed developments.

BACKGROUND Mixed-use neighbourhoods are conducive to social interaction and mingling of the community within walking distance. By having different uses in close proximity to one another, there is a higher tendency for the frequent use of sustainable and environmentally friendly mode of transport such as walking or cycling.

Economic benefits are enhanced by mixing different functional uses. Diverse uses give a place its distinct character and help create a place that is lively day and night.

2 COMMUNITY ASPECTS

2.1 COMMUNITY ENGAGEMENT

CA 1 COMMUNITY ENGAGEMENT

EXCLUSIONS None.

OBJECTIVE Encourage and recognise community engagement in planning and design stages of developments.

NO. OF CREDIT POINTS 2 + 1 BONUS credit points

PREREQUISITES None for CA 1a.

For CA 1b, projects should satisfy credit requirements of CA 1a.

For CA 1c, projects should satisfy credit requirements of CA 1a and CA 1b.

CREDIT REQUIREMENT

a) **Community Engagement Plan and Implementation**

1 credit point is awarded where a Community Engagement Plan is established and implemented.

b) Review of Comments Received and Feedback on Community Engagement

1 credit point is awarded where:-

(i) Comments received during community engagement activities are reviewed;
(ii) Feedback to participants is provided to report on analysis; and
(iii) Follow-up actions are taken.

c) Review of Masterplan Design

1 BONUS credit point is awarded where the masterplan of the Project is reviewed and modified in response to aspirations and comments from the community received during community engagement activities.

ASSESSMENT

a) Community Engagement Plan and Implementation of Community Engagement

The Applicant shall submit a Community Engagement Plan, prepared by a suitably qualified person, which should include, but not be limited to, the following:

i. Community Engagement Plan should identify a list of stakeholders for community engagement, which may include:

- Existing and / or intended occupants, including potential users, residents and / or tenants (if known); and

- Key members or stakeholders of community within the neighbourhood of 500m from the Site Boundary: such as property management companies or committee members of owners' corporation, mutual aid committee or owners' committee of neighbouring buildings and District Council member(s) of the respective constituency/ constituencies.

ii. Community Engagement Plan should clearly list out the objectives and the scope of community engagement in order to manage participants' expectations. The contents of community engagement may include, but not be limited to, the following:

- Baseline conditions of the neighbourhood;
- Development constraints and controls in statutory plans, lease, planning brief or others;
- Development parameters of the Project, including proposed use(s), development intensity, building heights etc.;
- Conceptual built form, building disposition and urban design;
- Project programme;
- Interface with the neighbourhood, including access to surrounding sites or buildings;
- Traffic and pedestrian arrangements during building construction;
- Opportunities for landscaping or green design (if any);
- Indicators of socio-economic impacts for Socio-Economic Study; and
- Identification of sites with cultural assets and proposed conservation plan.

iii. Community Engagement Plan should clearly state the timing for the engagement activities, for example, when the community would be invited to express their views, comments and concerns, and when would such views and comments be incorporated in the planning and design process of the project.

iv. Community Engagement Plan should also include the feedback mechanism to demonstrate how the Applicant intends to provide response to different stakeholders' views, comments and concerns gathered during the engagement process for greater transparency and accountability.

The Applicant shall conduct community engagement activities according to the Community Engagement Plan and provide a record, which may include, but not be limited to, the following:

- Date, venue and time of community engagement activities;
- Proof of public advertisement or notice for such engagement activities;
- Evidence of invitation to identified stakeholders with a reasonably advance notice prior to community engagement activities;

- Agenda and list of participants of community engagement activities;
- Record in the form of meeting notes which are available for access by the participants; and
- Copies of presentation and publicity materials to provide background information of the Project with text written in layman's language.

Community engagement activities should be conducted by a suitably qualified person to facilitate the process and the suitably qualified person should be responsible for conducting / overseeing the entire engagement process.

Community engagement activities should be conducted in an early stage of the Project to allow sufficient time and opportunity to incorporate views collected from the engagement activities.

Sufficient information on the Project should be given to participants prior to engagement activities to enable an informed process. This can be in the form of a newsletter, a consultation brief or digest, or an exhibition in the neighbourhood, etc.

Should there be any subsequent major change to the planning and design of the Project, the community engagement process should continue to provide an update to the community on the development of the Project.

b) Review of Comments Received and Feedback on Community Engagement

The Applicant shall evaluate comments received during the community engagement activities and provide feedback to the participants. The feedback should include but not be limited to:

- Summary of comments and recommendations received from participants;
- How comments of the community were taken into account in the review of the masterplan;
- Justifications for adopting or not adopting recommendations from the community;
- How the concerns from the community were addressed, with support of technical assessments where appropriate; and
- Feedback mechanism and communication channels.

The community engagement activities may include design charrettes or workshops, exhibitions, resident meetings or briefing sessions etc., in accordance with the established Community Engagement Plan.

The Project must satisfy CA 1a Community Engagement Plan and Implementation of Community Engagement to qualify for this credit point.

c) Review of Masterplan Design

The Applicant shall submit evidence as follows:

- How the visions established with the community, including priorities in the provision of amenities, are incorporated in the masterplan; and
- How the opinions of the community gathered during the engagement activities are taken into account in the revision of the masterplan.

The Applicant shall appoint a suitably qualified person to verify whether the opinions from community are addressed, and whether improvements to the masterplan are able to meet the community's aspirations.

Should there be any subsequent major change to the masterplan, sufficient information must be provided to keep the community informed.

The Project must satisfy the CA 1 a Community Engagement Plan and Implementation of Community Engagement and CA 1 b Review of Comments Received and Feedback on Community Engagement to qualify for this credit point.

BACKGROUND

As recognised worldwide and in Hong Kong, public participation in decision-making process is an essential element of sustainable development [1,2, and 3]. In recent years, public participation is incorporated in various planning and development projects to solicit general support. Examples include Wan Chai Development Phase II [4], Hung Hom District Study [5] and Kai Tak Planning Review [6].

Engagement of community in the neighbourhood in development process, including conducting consultation sessions, providing feedback and updates on project design and modifying design based on comments from the community, is becoming more common for development projects in Hong Kong.

[1] United Nations 1993, *United Nations Conference on Environment & Development, Rio de Janerio, Brazil, 3 to 14 June 1992: Agenda 21*, viewed 8 October 2015, http://sustainabledevelopment.un.org/content/documents/Agenda21.pdf

[2] ICLEI (International Council for Local Environmental Initiatives) 1996, *The local agenda 21 planning guide*, viewed 8 October 2015, http://web.idrc.ca/openebooks/448-2/

[3] Planning Department 2000, *SUSDEV 21 (Sustainable Development for the 21st Century)*, viewed 8 October 2015, http://www.pland.gov.hk/pland_en/p_study/comp_s/susdev/ex_summary/sum_eng.pdf

[4] Civil Engineering and Development Department 2014, *Public consultation: Wan Chai development phase II*, viewed 7 October 2015, http://www.wd2.gov.hk/eng/public_c_before.html

[5] Centre of Architectural Research for Education, Elderly, Environment and Excellence Ltd. 2008, *Public engagement programme for Hung Hom district study: Final report*, viewed 7 October 2015, http://www.pland.gov.hk/pland_en/p_study/prog_s/hungHomSite/site/PEP_Final_Report_English.pdf

[6] Planning Department 2007, *Kai Tak Planning Review*, viewed 7 October 2015, http://www.pland.gov.hk/pland_en/p_study/prog_s/sek_09/website_chib5_eng/english/index_e.html

Examples include the Central Oasis [7] and HKU Centennial Campus [8, 9].

At a neighbourhood level, community engagement in the planning and design stages of development projects can bring benefits to neighbourhood whereby communities can share a common vision and enjoy positive changes brought forward by the development.

In designing the community engagement process, reference can be made to various good practice and principles worldwide, such as:

- The Local Agenda 21 Planning Guide [2];
- IAIA Public Participation: International Best Practice Principles [10] ; or
- Guidelines on Effective Community Involvement and Consultation: RTPI Good Practice Note 1 [11].

For planning and design stage of a development project at neighbourhood level, some good practices are summarised as follows:

A community engagement plan should be prepared and engagement exercise should be conducted at an early stage of a project to incorporate aspirations, concerns, ideas and local wisdom of the community into the master-planning process. Neighbouring communities who will be affected by a project or interested in participating in the engagement activities should have access to all relevant information prepared in layman's terms.

In order to build community ownership of a project, community engagement should not be regarded as public relations activities. It should be an interactive process where the community can genuinely contribute and the developer can thoroughly review the masterplan of the development after collecting views from the community.

After the community engagement exercise, the developer should conduct reviews to ensure that aspirations, needs, ideas, knowledge of the community could be taken into account in planning and design of the development. Timely and transparent engagement process with proper feedback mechanism will facilitate sense of ownership towards the development.

In order to make a development more acceptable to the community in the neighbourhood, design review should be carried out to investigate if there are any opportunity to modify the masterplan of the development. Even if recommendations from the community are not adopted, justifications should be provided to the community so that they can understand how their inputs have been considered and assessed in the decision-making process.

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[7] Urban Renewal Authority 2011, *Central Oasis" Design Concept Roving Exhibition and Public Forum*, viewed 7 October 2015, http://www.centraloasis.org.hk/eng/CO_Roving_Exhibition.aspx

[8] Malpas J 2009, *HKU Centennial Campus*, viewed 7 October 2015, http://www.legco.gov.hk/yr08-09/chinese/panels/ed/papers/ed0112cb2-690-1-ec.pdf

[9] The University of Hong Kong 2011, *Centennial Campus*, viewed 7 October 2015 http://www4.hku.hk/cecampus/eng/news/recent.php

[10] International Association for Impact Assessment (IAIA) 2006, *Public participation: international best practice principles*, viewed 7 October 2015, http://www.iaia.org/publicdocuments/special-publications/SP4%20web.pdf

[11] The Royal Town Planning Institute (RTPI) 2005, *Guidelines on effective community involvement and consultation: RTPI Good Practice Note 1*, viewed 7 October 2015, http://www.rtpi.org.uk/media/6313/Guidlelines-on-effective-community-involvement.pdf

Community engagement should aim at promoting consensus-building rather than confrontation, therefore it should provide a platform to invite members of neighbourhood with different perspectives and values to reach a general consensus about the masterplan of the development. This will increase the transparency of community engagement and development process to encourage a collective sense of ownership towards the development, which is a key to developing a sustainable neighbourhood.

2 COMMUNITY ASPECTS

2.2 SUSTAINABLE LIFESTYLE

CA 2 SUSTAINABLE LIFESTYLE

EXCLUSIONS None.

OBJECTIVE Encourage and recognise good planning and design efforts to promote sustainable lifestyle.

NO. OF CREDIT POINTS 1 credit point

PREREQUISITES None.

CREDIT REQUIREMENT 1 credit point is awarded where in an effort to promote sustainable lifestyle,

(i) the floor area and facilities are designated; and

(ii) a Design Vision Statement (DVS) concerning their operation is provided.

(iii)

ASSESSMENT The Applicant shall submit drawings to show the Project details, including the designated floor area, location, and access to the dedicated facilities for showcasing sustainable lifestyle to the future occupants / users of the Project. The facilities can be in the form of an education centre, display area or community farm, etc.

The Applicant shall submit a Design Vision Statement (DVS), prepared by a suitably qualified person, to explain how the dedicated facilities will be operated to promote sustainable lifestyle, with a planned programme for information by future occupants / users of the Project. The DVS may include:

- Strategies to enhance energy efficiency;
- Education programmes on waste reduction and recycling culture and practices, including proper ways to use waste recycling and reduction facilities;
- Education programmes on water conservation;
- Community volunteer or collaboration programmes on managing facilities or education programmes; and
- Community farming.

Examples of education or showcasing facilities include:

- A display area (displays in common areas such as entrance lobby, clubhouse lift lobby and inside of lift cars etc.) for month-on-month and year-on-year energy use, with a user-guide about waste recycling facilities in the neighbourhood;
- Education programmes (through, for example, holding resident meetings, distribution of user guide brochures or information pamphlets) to raise public awareness of energy efficiency, waste reduction strategy and other sustainability initiatives;
- Community volunteer programmes to encourage occupants to participate in the education programme;

- A designated area for community farming facilities (including education and management programme) for occupants / users to participate in leisure or hobby farming; and
- Community collaboration programmes to involve occupants / users to participate in the planning and management of education programme or showcasing facilities.

The Design Vision Statement shall be project specific and related to other relevant facilities, such as waste reduction and recycling facilities, proposed in the Project.

The Applicant shall submit a letter of commitment, signed by an authorised signatory at director level, that the Design Vision Statement will form a part of the future management plan for the completed Project.

BACKGROUND

Promoting public awareness and shaping public behaviour are keys to promote sustainable development [1]. At neighbourhood level, it is important to encourage behavioural change of end-users, such as residents in a residential development, to adopt more sustainable lifestyle.

In this regard, both hardware (facilities) and software (e.g. education programme) should be provided in a development to facilitate integration of sustainable living strategies, such as for energy efficiency, water conservation, waste reduction and recycling, in day-to-day living.

By providing dedicated facilities with a committed management plan (such as those described in a DVS), future end-users will be given the opportunities to learn and experience sustainable lifestyle that they can practise in their daily life.

[1] United Nations 1993, United Nations Conference on Environment & Development, Rio de Janerio, Brazil, 3 to 14 June 1992: *Agenda 21*, viewed 8 October 2015, http://sustainabledevelopment.un.org/content/documents/Agenda21.pdf

2 COMMUNITY ASPECTS

2.2 SHARING OF AMENITIES

CA 3 NEIGHBOURHOOD AMENITIES

EXCLUSIONS None.

OBJECTIVE Encourage developments that are integrated within, and an asset to, the immediate neighbourhood in terms of the provisions of basic services and recreational facilities.

NO. OF CREDIT POINTS 4 + 1 BONUS credit points

PREREQUISITES None for CA 3a, CA 3b, CA 3c and CA 3e.

For CA 3d, projects should satisfy credit requirements of CA 3a and CA 3b.

CREDIT REQUIREMENT

a) Neighbourhood Basic Services

1 credit point is awarded where at least 10 different basic services are located within a 500m walking distance from a notional entrance of any major occupied building within the Site with availability of pedestrian access to such services from the Site.

b) Neighbourhood Recreational Facilities

1 credit point is awarded where at least 2 different recreational facilities are located within a 500m walking distance from a notional entrance of any major occupied building within the Site with availability of pedestrian access to the services from the Site.

c) Provision of Basic Services or Recreational Facilities for the Public

1 credit point is awarded where at least 2 different recreational facilities or at least 5 different basic services are located within the Site and will be made available for public use.

d) Shaded or Covered Pedestrian Routes to Basic Services or Recreational Facilities

1 credit point is awarded where shaded or covered pedestrian routes to at least 5 different basic services or 2 different recreational facilities within the Site are provided.

e) Building Setback to Allow Street Tree Planting

1 BONUS credit point is awarded where a minimum building setback of 3.5m is provided from the Site boundary with street tree planting in the space created. The total length of the setback shall stretch for a minimum of 50% of the total length of all site boundaries bordering existing streets that are currently without continuous street tree planting.

ASSESSMENT

Assessment is based on the overall provisions for the local residents and building users within the immediate vicinity of the building development, whether these are provided within the immediate neighbourhood, or as an additional provision within the development for the benefit of the neighbourhood.

a) Neighbourhood Basic Services

The Applicant shall submit a report based on a survey of the immediate neighbourhood and details of the development itself to demonstrate adequate provision of basic services for the building users. Basic services include:

- Restaurant;
- Bank (including Automated Teller Machine);
- Medical Facilities;
- Dental Clinic;
- Pharmacy;
- Supermarket;
- Convenience Store;
- School;
- Kindergarten or Day Care Centre;
- Library;
- Post Box;
- Laundry or Dry Cleaner;
- Hairdresser;
- Retail shop;
- Place of Worship; and
- Community Centre.

The onus is placed on the Applicant to demonstrate that basic services, appropriate to the needs of the intended building users, exist within the Site or within a 500m walking distance from a notional entrance of any major occupied building within the Site.

A basic service can be counted twice for any one type of services mentioned above.

b) Neighbourhood Recreational Facilities

The Applicant shall submit a report based on a survey of the immediate neighbourhood and details of the development itself to demonstrate adequate provision of recreational facilities for the building users. Recreational facilities include:

- Shaded or Covered Sitting Areas, Garden, or Park with Seating Facilities;
- Waterfront Promenade;
- Public Indoor or Outdoor Swimming Pool;
- Public Indoor Multi-purpose or Sports Complex;
- Public Outdoor Sports Facility such as football field, basketball court and tennis court, etc.; and
- Bicycle Track.

The onus is placed on the Applicant to demonstrate that the facilities, appropriate to the needs of the intended building users, exist within the Site or within a 500m walking distance from a notional entrance of any major occupied building within the Site.

For CA 3a and CA 3b above, a map should be submitted with the following information:

- The location of the building at or near the centre of a scale drawing:
- The locations of each of the listed services or facilities identified;
- An unhampered walking route from the building's notional main entrance to the notional service entrance;
- The walking route should be clearly marked by lines on the drawing together with the walking distance.

Future provisions of services or facilities not operable at the time of the building completion will be considered if they will be in operation no later than one year after the target date for the issue of Occupation Permit (OP) / Building Handover Certificates / Substantial Completion Dates for the proposed developments.

c) Provision of Basic Services or Recreational Facilities for the public

The Applicant shall submit evidence that on-site facilities will be made available for public use, including details of any restriction or condition of access that may be put in place.

Credit shall be awarded where the provision of basic services / recreational facilities is added to those available within the immediate neighbourhood, with convenient access for the public. Types of basic services and recreational facilities can be referred to CA 3a and CA 3b respectively.

Recreational facilities with accessible hours by the public that are less than 13 hours a day or less than the hours stipulated in the land leases or Deed of Dedication whichever is longer, should not be included in the assessment. Private clubhouses and other facilities for the exclusive use of building residents or tenants shall not be counted in this credit requirement.

Judgment as to the nature of basic services and the provision of recreational facilities with respect to a particular building development shall be made with reference to HKPSG [1].

[1] Planning Department 2010, *Hong Kong Planning Standards and Guidelines*, viewed 8 October 2015, http://www.pland.gov.hk/pland_en/tech_doc/hkpsg/index.html

d) Shaded or Covered Pedestrian Routes to Basic Services or Recreational Facilities

The Applicant shall submit details of all pedestrian routes within the Site from the notional building entry points of the Project and all neighbourhood amenities provided within the Site.

The Applicant should submit a report with layout plans, schematic sections, and information on the types and extents of shade or cover provided over the routes. The pedestrian routes shall comply with the following conditions:

i) Horizontal Screens, Covered Walkways and / or Trellises

- The width of each horizontal screen, covered walkway or trellis shall be designed by taking into consideration the population using the facilities and the size of the development. In light of the above, all shaded horizontal screens, covered walkways or trellises shall each have a minimum width of 2m.

ii) Tree-lined Shading

The Applicant shall provide a report, prepared by a suitably qualified person, with the following information:

- If the shading is provided by trees at-grade, it should be a continuous strip of trees planted along the pedestrian route. Trees may be planted within planters and / or tree pits with paving;
- The tree coverage shall be measured using estimated crown diameters 10 years after landscape installation;
- Based on the estimated crown diameters above, a shaded pedestrian route of a minimum width of 2m under the trees shall be demonstrated on plan;
- Suitable species of broadleaved trees (not palms conifers) of appropriately anticipated crown diameters shall be specified to offer shade along the pedestrian routes;
- The applicant shall provide a letter of commitment, signed by an authorised signatory at director level, to commit on providing an adequate soil volume of $12m^3$ per tree at a minimum, and ensuring that the soil is free from interference by utilities; and
- Soiling plans shall be provided to confirm that such soil areas will be of a minimum depth of 1,200mm.

Tree shading is defined as the combined plan area under all tree canopies along the pedestrian paths within the Site. The area is calculated by the tree canopies projected perpendicularly to the ground / floor surface, where the tree canopies are drawn at their estimated spread 10 years after the landscape installation [2].

In order to achieve this credit, the Project must satisfy credits CA 3a and CA 3b.

[2] Development Bureau 2012, *Technical Circular (Works) 2/2012 allocation of space for quality greening on roads*, viewed 7 October 2015, http://www.devb.gov.hk/filemanager/technicalcirculars/en/upload/317/1/c-2012-02-0-1.pdf

e) Building Setback to Allow Street Tree Planting

The Applicant shall submit plans to indicate the proposed building setback along the Site Boundary with adjacent streets in order to allow species of broadleaved tree to be planted as street trees (not palms or conifers) in the spaces created.

In order to obtain the BONUS credit point, the setback shall be a minimum of 3.5m wide, and the total length of the setback shall stretch for a minimum of 50% of the total length of all site boundaries bordering existing streets.

The building setback shall be uncovered except at the pedestrian zone where it may be covered under projecting features, provided that the clear height of the projecting features above the covered area is not less than 8 times the horizontal width of the covered area as required under the PNAP APP-152 [3].

BACKGROUND

The provision of basic services such as shops, restaurants, clinics, etc., in the immediate vicinity of a building improves efficiency and quality of life. Building users can benefit from the existing provisions as well as those provided by the development.

Provision of recreational facilities [4] is essential to psychological and physical well-being of an individual and the community as a whole. It contributes to the quality of life of the building users. Active recreational facilities include places for ball games, swimming pools and other sports facilities, etc. The design and layout of these facilities should be of a quality and environmental standard to meet the needs of the users.

To set back building façades to allow street tree planting can provide significant benefit to adjacent streets in Hong Kong's congested urban environment. Existing utilities under public footpaths often result in limited space for planting street trees, therefore, the introduction of building setback can provide opportunities for street tree planting which otherwise could not be achieved. Benefits from planting street trees resulting from building setback include creation of habitats for insects and birds, visual amenity, shade for pedestrians and alleviation of the Urban Heat Island effect.

The healthy growth of street trees is also dependent on the volume and quality of soil provided for them. The soil volume for street trees should be of a minimum of $12m^3$ (i.e. based on 5m tree spacing with a soil corridor of 2m wide and 1.2m deep which is the soil depth required for tree planting according to HKSAR Government Technical Circular [5]). The Applicant should demonstrate, by means of soiling plans, prepared by a suitably qualified person, that the minimum soil volume can be achieved for street tree planting.

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[3] Buildings Department 2011, *PNAP APP-152 - sustainable building design guidelines,* viewed 8 October 2015, http://www.bd.gov.hk/english/documents/pnap/APP/APP152.pdf

[4] Planning Department 2010, 'Chapter 4: Recreation, Open Space and Greening', *Hong Kong Planning Standards and Guidelines,* viewed 8 October 2015, http://www.pland.gov.hk/pland_en/tech_doc/hkpsg/full/ch4/ch4_text.htm

[5] Lands Department 2007, *Practice Note No. 7/2007 – Tree preservation and tree removal application for buildings development in private projects*, viewed 8 October 2015, http://www.landsd.gov.hk/en/images/doc/2007-7.pdf

2 COMMUNITY ASPECTS

2.3 SOCIO-ECONOMIC IMPACTS

CA 4 DIVERSITY OF HOUSING TYPES

EXCLUSIONS Projects with no residential provisions.

OBJECTIVE Encourage residential developments to include diversity in housing tenure and mix so as to promote cohesion and interaction.

NO. OF CREDIT POINTS 1 credit point

PREREQUISITES None.

CREDIT REQUIREMENT 1 credit point is awarded where diverse housing types in terms of mixed tenure or different flat sizes are provided.

ASSESSMENT The Project shall include diverse housing types within the Site to meet at least one of the following criteria:

- Mixed tenure such as privately owned housing with other types of accommodation such as subsidised housing, housing for young / elderly / single-person households, or dedicated housing to re-settle local residents affected / displaced by the Project; or

- A flat size variation where a Simpson Diversity Index score of 0.45 or higher is achieved.

  Simpson Diversity Index score = $1-\Sigma\ (n/N)^2$

  Where,

  n = the total number of residential units in each category of flat size
  N = the total number of residential units in the Project

  Flat Size categories are classified as follows:

  - Studio Flats;
  - Flats with 1 bedroom;
  - Flats with 2 bedrooms;
  - Flats with 3 bedrooms;
  - Flats with 4 or more bedrooms.

  Residential units shall be categorised purely based on the number of bedrooms provided. The following shall not affect the categorisation of residential units:

  - A building typology, such as multi-residential blocks, also known as apartments, or houses, whether semi-detached, detached, or townhouses;
  - Any provision or design feature such as a terrace, flat roof, roof top, garden etc.; and

- Domestic helpers' quarters shall not be included in the number of bedrooms.

Basic Demonstration

The table below shows 6 different developments with different flat mix. These developments are based on real, completed examples in Hong Kong. These are:

- A – subsidised residential development in Kowloon West;
- B – subsidised residential development in Kowloon West;
- C – private luxury development in Hong Kong Island South;
- D – private residential development in Kowloon East;
- E – private residential development in Kowloon East; and
- F – private residential development in Kowloon West.

Development	**A**	**B**	**C**	**D**	**E**	**F**
Total no. of flats	328	175	411	872	373	448
No. of Studio Flats	-	-	-	-	-	120
No. of 1-bedroom flats	1	25	23	-	66	280
No. of 2-bedroom flats	268	101	27	471	142	46
No. of 3-bedroom flats	59	49	239	401	140	2
No. of 4 or more bedroom flats		-	122	-	25	-
Simpson Diversity Index Score	**0.30**	**0.57**	**0.57**	**0.50**	**0.68**	**0.53**

For Projects B, C, D, E and F, they all scored 0.45 or higher in the Simpson Diversity Index Score, so they would secure 1 credit point under CA3.

BACKGROUND

International and local studies show that the provision of different housing tenure types and flat sizes can promote social interaction and integration, minimise social segregation and stigmatisation, and help building a sustainable neighbourhood. The reasons are as follows:-

- Providing a range of different housing types and mixed tenure encourages a community with a population mix of different income levels, social status and household structure. This will encourage casual contacts among neighbours, drive social inclusion and avoid social segregation [1,2].

[1] Atkinson, R. and Kintrea, K 2000, 'Owner-occupation, social mix and neighbourhood impacts', *Policy & Politics*, vol. 28, no. 1, pp. 93-108.

[2] Towers G 2005, *An introduction to urban housing design: At home in the city*, Routledge, London.

- Research in Hong Kong shows that a range of housing types including subsidised and private housing produces social mix of tenants and reduces social segregation [3,4].
- Mixed tenure facilitates maintenance of local kinship network and interaction between owners and tenants, enhances spatial integration, neighbourhood satisfaction and satisfaction with services / amenities [5].
- Deliberate mixing of different flat types, which enables co-location of different income groups will not only help minimise social stratification within the society but also promote social integration [6].
- Various housing types / sizes in a development allow different price range and provide a range of housing options to attract people with different income levels. A neighbourhood with a mix of housing types and tenure will be more conducive to meeting the changing needs and aspirations of residents going through changes in their life stages [7]. By encouraging residents to stay in a community for a longer period, the social ties and network of a community could also be maintained.
- Developments with mixed housing types provide variety and diversity to meet different market demands.

[3] Lau, K. Y 2004, 'Creating social stigma or a socially-mixed community: policy considerations and impacts of public housing policies for the needy in Hong Kong', *HKHA Conference*, Hong Kong, viewed 7 October 2015, http://www6.cityu.edu.hk/pol/staff/KYLau/LAU%20Kwok%20Yu%202004%20HKHA%20Conference%20paper%20on%20social%20stigma%20and%20social%20mix.pdf

[4] Monkkonen, P. and Zhang, X 2011, 'Creating mixed-income neighborhoods unintentionally: public housing residualization and socioeconomic segregation in Hong Kong', viewed 7 October 2015, http://ssrn.com/abstract=2021662

[5] Sautkina, E., Bond, L. and Kearns, A 2012, 'Mixed evidence on mixed tenure effects: findings from a systematic review of UK studies, 1995–2009', *Housing Studies*, vol. 27, no. 6, pp. 748-782.

[6] Sim, L. L., Yu, S. M., and Han, S. S 2003, 'Public housing and ethnic integration in Singapore', *Habitat International*, vol. 27, pp. 293-307.

[7] Tunstall, R. and Fenton, A 2006, *In The mix: A review of mixed income, mixed tenure and mixed community*, Housing Corporation, Joseph Rowntree Foundation and English Partnerships, London, viewed 8 October 2015, http://www.academia.edu/825799/In_the_mix_A_review_of_mixed_income_mixed_tenure_and_mixed_communities_what_do_we_know

2 COMMUNITY ASPECTS

2.3 SOCIO-ECONOMIC IMPACTS

CA 5 EXISTING COMMUNITY AND ECONOMY

EXCLUSIONS

None for CA 5a and CA 5c.

Greenfield sites, newly reclaimed sites or sites without any existing community or business for CA 5b.

OBJECTIVE

Reinforce the community's identity and provide employment opportunities through thoughtful planning and design.

NO. OF CREDIT POINTS

2 + 1 BONUS credit points

PREREQUISITES

None.

CREDIT REQUIREMENT

a) Socio-economic Study

1 credit point is awarded where a Socio-Economic Study is conducted to identify local needs and opportunities at the Site and the Impact Area.

b) Continuation of Existing Community

1 credit point is awarded where the continuation of existing community and / or local businesses is promoted.

c) Net Gain in Employment

1 BONUS credit point is awarded where a net gain in permanent employment within the Site is anticipated.

ASSESSMENT

a) Socio-economic Study

The Applicant shall engage a suitably qualified person to conduct a socio-economic study to identify local needs and opportunities within the Site and the Impact Area. It should clearly identify the following within the Site and the Impact Area:

- Historical background of the neighbourhood;
- Demographic characteristics;
- Socio-economic and cultural characteristics;
- Profile of local business activities;
- Profile of amenities, community and welfare facilities;
- Employment profile of local community and how it may be affected by the Project; and
- Special needs of the elderly, disadvantaged residents / neighbours or other cohort groups, if any.

The basic steps of a socio-economic study are as follows:

- Step 1-Scoping: To identify the affected groups, stakeholders and the potential impacts to these groups, so as to narrow down the assessment to a realistic and manageable scale. This prioritisation exercise is usually carried out by experts and in some occasions together with the affected groups such as shop owners, workers and residents.

- Step 2- Benchmarking: To establish the baseline conditions of the affected neighbourhood with respect to a set of socio-economic indicators that are defined or agreed during community engagement activities before information is collected. This step helps to establish the socio-economic profile of the neighbourhood as a reference point for future assessment.

- Step 3- Predicting potential impacts: Predictions are usually based on a longitudinal trend analysis on past data (e.g. interrupted time series analysis) on the valued aspects with the benchmarking date as a starting point for future projection, while such prediction should also aim at identifying positive and adverse impacts and the corresponding trade-offs.

- Step 4- Proposing mitigation measures: After identifying adverse effects in the previous steps, strategies, plans and programmes of mitigation measures should be proposed to avoid, reduce or manage adverse impacts.

- Step 5- Demonstrating Commitment: Applicant should submit a letter of commitment, signed by an authorised signatory at director level, to detail how to incorporate the proposed mitigation measures into the development design and project implementation as far as practicable.

b) Continuation of Existing Community

The Applicant is encouraged to make efforts to continue, create or reinforce the local physical, economic, social and cultural characteristics of the neighbourhood.

The Applicant shall submit evidence to demonstrate:

- The details and characters of the existing community and / or local businesses;
- The measures or activities to engage the existing community and / or local businesses so as to understand their needs and aspirations;
- The efforts to promote continuation of the existing community and / or local businesses. This can be in the form of allocating priority for the community groups to stay, purchase or rent existing premises or designate floor area to maintain local businesses, etc.; and

- The plans to promote continuation of the existing community and / or local businesses during construction of the Project. This can be in the form of temporary arrangement for affected community groups to continue to stay or for local business to continue to operate within or near the Site.

The Applicant should submit an assessment, prepared by a suitably qualified person, demonstrating whether measures taken for the continuation of the community are sufficient and effective.

The assessment may become a part of the socio-economic study as discussed in CA 5a.

c) Net Gain in Employment

1 BONUS credit point should be awarded for creating positive net gain in permanent employment within the Site.

Through the socio-economic study, the Applicant shall identify:

- Jobs likely to be displaced;
- Temporary and permanent job creation; and
- Efforts to promote continuation of existing community and / or local businesses, if any.

BACKGROUND

Socio-economic Study

A socio-economic study is a useful tool to understand how a proposed development or redevelopment project would affect the socio-economic and cultural well-being of a neighbourhood. Socio-economic consideration should be given more emphasis for projects at a neighbourhood scale. For example, when planning for a redevelopment, employment, local business and economy of an existing neighbourhood should be taken into account in the planning and design processes to ensure that undesirable social and economic impacts on the existing community can be minimised.

By conducting a socio-economic study, the implication for the community with regard to socio-economic attributes such as health, employment, education etc. will be identified and be taken into consideration in the overall planning and design of a development.

Theoretically, the socio-economic impact is more than simple addition of economic and social impacts on people. It is the summative assessment of the potential impacts on the lives and circumstances of the affected people, families, social networks and communities. These potential impacts are identified in their social arenas (such as changes in social relations, supportive networks, leisure and community activity participation, and even perceived quality of life) as a simultaneous effect influenced by changes in economic arenas (such as changes in employment situation, local economic development, and involvement in economic activities), and vice versa.

A socio-economic study measures not only the stand-alone economic and social impacts on people, but also the simultaneous interplay between these forces.

While there is no established and generally accepted international standard of practice for a socio-economic study, the framework for Socio-economic Impact Assessment (SEIA) or Social Impact Assessment (SIA) is often adopted to evaluate the socio-economic impacts of various types of infrastructure projects. In this regard, reference can be made to the following guidelines when developing a framework for the socio-economic study:

Guidelines and Principles for Social Impact Assessment prepared by The Interorganisational Committee on Guidelines and Principles for Social Impact Assessment [1];

- Socio-economic Impact Assessment Toolkit prepared by Australian Government Department of the Environment and Heritage [2];
- Socio-Economic Impact Assessment Guidelines prepared by Mackenzie Valley Environmental Impact Review Board [3];
- Community Guide to Development Impact Analysis prepared by Mary M. Edwards of University of Wisconsin-Madison [4].

In Hong Kong, similar studies on social and economic impacts of projects were carried out for the planning and development of Central Kowloon Route, South Island Line and Kowloon City Urban Renewal Plan [5, 6 and 7].

Continuation of Existing Community

In many development and redevelopment projects, existing communities are displaced in the development process. In this regard, the Urban Renewal Strategy Review completed in 2010 points out that the community in Hong Kong generally supports efforts in promoting in-situ relocation or rehousing. Continuation of existing or local community to maintain social ties and minimise disturbance to local and neighbouring communities in developments is the key to reinforce local character of a neighbourhood, sense of place, belonging and identity with reinforced social cohesion [8, 9, 10 and 11].

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[1] The Interorganizational Committee on Guidelines and Principles for Social Impact Assessment 1994, *Guidelines and principles for social impact assessment*, viewed 7 October 2015, http://www.st.nmfs.noaa.gov/tm/spo/spo16.pdf

[2] Australian Government Department of the Environment and Heritage 2005, *Socio-economic impact assessment toolkit*, viewed 7 October 2015, http://www.environment.gov.au/system/files/resources/27b104ce-ff21-43d8-9a7f-2c51cbe821bd/files/nrsmpa-seia.pdf

[3] Mackenzie Valley Environmental Impact Review Board 2007, *Socio-Economic impact assessment guidelines*, viewed 7 October 2015, http://www.reviewboard.ca/upload/ref_library/SEIA_Guidelines_Chapter_2.pdf

[4] Mary M. Edwards 2004, *Community guide to development impact analysis*, http://www.lic.wisc.edu/shapingdane/facilitation/all_resources/impacts/analysis_socio.htm

[5] Highways Department 2009, *Central Kowloon Route newsletter - Yau Ma Tei local culture and social impact assessment*, viewed 7 October 2015, http://ckr-hyd.hk/newsletter/23/ymt_Local_Culture_and_Social_Impact_Assessment.pdf

[6] Barron, B, Ng S, Ho, B, Chan, C 2004, , *West Island Line/South Island Line (WIL/SIL): Direct External Benefit*, The Centre of Urban Planning and Environmental Management, The University of Hong Kong, Hong Kong,

[7] Kowloon City District Urban Renewal Forum 2012 *Stage 1 Social Impact Assessment Report*, viewed 15 October 2015, http://www.durf.org.hk/klcity/pdf/Stage1SocialImpactAssessmentReport.pdf

[8] Legislative Council 2010, *Updated background brief on review of the urban renewal strategy*, viewed 7 October 2015, http://www.legco.gov.hk/yr10-11/english/panels/dev/papers/dev1026cb1-155-5-e.pdf

[9] A-World Consulting 2010, *Urban renewal strategy review consensus building stage concluding meeting discussion summary*, viewed 8 October 2015, http://www.ursreview.gov.hk/eng/doc/ConcludingMeeting_Gists_eng.pdf

[10] The Hong Kong Institute of Planners 2010, *The urban renewal strategy review: Hong Kong Institute of Planners response to the public engagement consultation*, viewed 8 October 2015, http://www.hkip.org.hk/admin/ewebeditor3.7/uploadfile/20100121165135909.pdf

[11] Hong Kong Institute of Architects 2009, *Urban renewal strategy review – public engagement stage*, viewed 8 October 2015, http://www.hkia.net/UserFiles/File/position_paper_press_release/P&L_DevB_URSR_let0912.pdf

2 COMMUNITY ASPECTS

2.3 SOCIO-ECONOMIC IMPACTS

CA 6 PLACEMAKING AND LOCAL CHARACTER

EXCLUSIONS None.

OBJECTIVE Create or reinforce the local character through careful planning and design.

NO. OF CREDIT POINTS 1 credit point

PREREQUISITES None.

CREDIT REQUIREMENT 1 credit point is awarded where design to reinforce local identity is adopted.

ASSESSMENT

The Applicant shall review the Site and its neighbourhood to identify key local characters, which can be physical, social, cultural, environmental, or a combination of the four factors.

The Applicant shall demonstrate how the local characteristics are enhanced and how the Project is in harmony with the surroundings through different design elements, which may include:

- Compatibility of built forms with the surroundings in the Impact Area;
- Choice of building materials compatible with the surroundings in the Impact Area;
- Use of contextual design approach;
- Use of vernacular architectural features;
- Use of local materials or contextually relevant plant species for landscape design; or
- Use of street furniture, public art, amenity and signs which can reflect or reinforce the local character.

The Applicant shall submit a letter of commitment, signed by an authorised signatory at director's level, on the management of the area, which should form part of the management plan.

The Applicant shall submit a report, prepared by a suitably qualified person, to demonstrate how the design of the area will reinforce the local character.

BACKGROUND

Placemaking is how a community collectively can shape the public realm to maximise its shared value. It strengthens the connection between people and places, and it promotes interactions between cultural, economic and social activities that help define a place [1]. A successful place should be an accessible, comfortable, sociable and multi-use destination [1].

[1] Project for Public Space 2009, *What is placemaking*, viewed 8 October 2015, http://www.pps.org/reference/what_is_placemaking/

Hong Kong Planning Standards and Guidelines considers that good urban design does relate to an array of issues including the total visual effect of building mass, connections with people and places, creation of space for movements, urban amenities, public realm and the integration of public art [2].

By adopting a contextual design approach that capitalises on local community's assets, wisdom and inspirations, a dedicated area in a development could become a place that responds to people's needs and aspirations, and a focal point and landmark that defines and reinforces the local character.

Public art can be in different forms, it can be a hardware or software, abstract or realistic. Research findings show that public art can express a community's value, history and local character; facilitate placemaking and act as landmark features to help people identify places [3, 4 and 5]. This in turn helps facilitate the interaction between place and people, enhance environment, and transform the landscape to promote a sense of place. Public art or art programme should be an interaction and collaboration between community, artists, operators, urban planners and designers, with a view to creating an attractive, thought-provoking and popular place.

[2] Planning Department 2006, 'Chapter 11: Urban Design Guidelines', *Hong Kong Planning Standards and Guidelines*, viewed 6 October 2015, http://www.pland.gov.hk/pland_en/tech_doc/hkpsg/full/ch10/ch10_text.htm#4

[3] McCarthy, J 2006, 'Regeneration of cultural quarters: Public art for place image or place identity?' *Journal of Urban Design*, vol.11, no.2, pp.243-262.

[4] Porch, R 2000, 'Public Art - An off the wall proposition?' *Urban Design*, vol. 76, pp. 16-19.

[5] Public Art Hong Kong 2006, *Home - What is public art? Is it only sculpture?*, viewed 8 October 2015, http://www.publicart.org.hk/home.php

2 COMMUNITY ASPECTS

2.3 SOCIO-ECONOMIC IMPACTS

CA 7 CONSERVATION OF CULTURAL ASSETS

EXCLUSIONS Sites on newly reclaimed land without previous land use.

OBJECTIVE Enhance the cultural identity of a neighbourhood by retaining the original use(s) or introducing adaptive re-use(s) within a site with cultural assets.

NO. OF CREDIT POINTS 3 credit points

PREREQUISITES For CA 7b, projects should satisfy the credit requirements of CA 7a.
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CREDIT REQUIREMENT

a) Cultural Asset Assessment or Local Culture Study

1 credit point is awarded where an assessment of cultural assets or a local culture study is conducted.

b) Retaining the Original Use(s) or Introducing an Adaptive Re-use(s)

For any identified area with cultural assets or values, 1 credit point is awarded where over 50% of the CFA or GFA of its original functional use is maintained.

OR

If any identified area with cultural assets or values is located externally in open air, e.g. an outdoor bazaar or terrace, 50% of the total floor area occupied by the cultural assets shall be maintained in order to attain 1 credit point.

OR

1 credit point is awarded where a suitable adaptive re-use is introduced.

AND

1 credit point is awarded where all identified Old and Valuable Trees, Important Trees and Fung Shui Woods are preserved intact.

ASSESSMENT

a) Cultural Asset Assessment or Local Culture Study

The Applicant shall submit an assessment of cultural assets or a local culture study prepared by a suitably qualified person. The assessment or study should incorporate local views and aspirations, and be presented following a discussion with the local during the community engagement activities. The contents should include;

- Identification of historical or cultural assets; and
- Compatibility of retaining their original uses or introducing adaptive re-use to meet community aspirations.

The Applicant is encouraged to make reference to the guidelines and criteria for the assessment of area with cultural assets from one of the following:

- Annex 19 Guidelines for Assessment of Impact on Sites of Cultural Heritage and Other Impacts of Technical Memorandum to the Environmental Impact Assessment [1];
- Chapter 10 Conservation, HKPSG [2];
- The Burra Charter and Practice Notes, Australia ICOMOS [3]; and
- Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment, English Heritage [4].

1 credit point shall be awarded where evidence in the form of an assessment of cultural assets or local culture study, with details about the suitability of retaining original use or introducing an adaptive re-use, is presented after carrying out the community engagement activities.

'Old and Valuable Trees' in the Government Register(s) of Old and Valuable Trees [5], 'Important Trees' identified according to the definition in Development Bureau 10/2013 [6 - footnote 3, p. C1, Appendix C] and Fung Shui Woodlands listed by Agriculture, Fisheries and Conservation Department [7] shall be taken into consideration as cultural assets.

b) Retaining the Original Use or Introducing an Adaptive Re-use

1 credit point shall be awarded where a scale drawing shows the following:

- More than 50% of CFA or GFA of the original functional use of the identified cultural asset is retained; or
- If an identified area with cultural assets or values is located externally in open air, at least 50% of the total floor area occupied by the cultural assets shall be maintained;
- A suitable adaptive re-use for the areas with cultural assets is introduced to meet the community aspirations; and
- All identified Old and Valuable Trees, Important Trees and Fung Shui Woods are preserved intact.

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[1] Environmental Protection Department 2011, *Technical Memorandum to the Environmental Impact Assessment*, viewed 7 October 2015, http://www.epd.gov.hk/eia/english/legis/memorandum/annex19.html

[2] Planning Department 2010, 'Chapter 10: Conservation', *Hong Kong Planning Standards and Guidelines*, viewed 7 October 2015, http://www.pland.gov.hk/pland_en/tech_doc/hkpsg/full/ch10/ch10_text.htm#4

[3] Australia ICOMOS 2015, *The Burra Charter and Practice Notes*, viewed 8 October 2015, http://australia.icomos.org/publications/charters/

[4] English Heritage 2008, *Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment*, viewed 8 October 2015, https://historicengland.org.uk/images-books/publications/conservation-principles-sustainable-management-historic-environment/

[5] Leisure and Cultural Services Department 2005, *Register of old and valuable Trees*, viewed 8 October 2015, http://ovt.lcsd.gov.hk/ovt/full_list.jsp?lang=en

[6] Development Bureau 2013, *Technical Circular No. 10/2013 Tree Preservation*, viewed 8 October 2015, http://www.devb.gov.hk/filemanager/technicalcirculars/en/upload/327/1/c-2013-10-0-1.pdf

[7] Agriculture, Fisheries and Conservation Department 2006, *List of Fung Shui Woodlands in Advisory Council for the Environment Committee Paper NCSC 9/06, viewed 12 October 2015, http://www.epd.gov.hk/epd/english/boards/advisory_council/files/ncsc-paper-06-09.pdf*

The proposed use of an area with cultural assets shall be supported by an assessment of cultural assets or a local culture study; and the proposed use of the area should receive general support from the neighbourhood during community engagement activities.

The Project must satisfy the CA 7a "Cultural Asset Assessment or Local Culture Study" to qualify for this credit point.

BACKGROUND

'Cultural heritage' and 'cultural assets' are used interchangeably in practice and literature. In this document, since the term "cultural heritage" is specifically defined in SA 6 Cultural Heritage, the term "cultural assets" is adopted in this credit to cover both tangible and intangible features of cultural significance.

As stated in HK2030, heritage helps define the cultural identity of the community and adds variety to cityscape. HK2030 sets out Hong Kong's planning strategy to preserve individual buildings and integrate them with the surrounding environment to enhance coherence, accessibility and visibility. Apart from preserving the built structures, HK2030 also identifies the need to preserve streets and other urban elements of special character for the activities they hold [8]. These cultural assets may include practices, place, expressions of community and customs that are passed down from one generation to another.

Old trees may also be considered a form of cultural assets. Leisure and Cultural Services Department has a register of Old and Valuable Trees on Government land [5, and 9]. Development Bureau Technical Circular No. 10 / 2013 "Tree Preservation" deals with tree preservation on private land and defines an "Important Tree" as one that meets any of the following criteria:

- Trees of 100 years old or above;
- Trees of cultural, historical or memorable significance, e.g. Fung Shui tree, tree as landmark of monastery or heritage monument, and trees in memory of an important person or event;
- Trees of precious or rare species;
- Trees of outstanding form (taking account of overall tree sizes and any special features), e.g. trees with curtain like aerial roots, trees growing in unusual habitat; or
- Trees with a trunk diameter equal to or exceeding 1.0m measured at 1.3m above ground level, or with height / canopy spread equal to or exceeding 25m.

Fung Shui woodlands are an important cultural feature associated with rural villages in Hong Kong and Southern China. Fung Shui woodlands are remnants of Hong Kong's low elevation broad leaved forests, found below 500m elevation and always associated with indigenous villages. They are of high ecological value, dating back over 300 years and containing tall old trees and huge vines, the Fung Shui woodlands are seldom seen in other secondary hillside forests.

[8] Planning Department 2007, '*HK2030*: *Section II chapter 4: The desired living environment*', *HK2030 Report*, viewed 8 October 2015, http://www.pland.gov.hk/pland_en/p_study/comp_s/hk2030/eng/finalreport/pdf/E_4.pdf

[9] Environment, Transport and Works Bureau 2004, *Technical Circular (Works) No. 29/2004: registration of old and valuable trees and guidelines for their preservation*, viewed 8 October 2015, http://www.devb.gov.hk/filemanager/technicalcirculars/en/upload/54/1/c-2004-29-0-1.pdf

Fung Shui woodlands are also of high cultural value as they survived the deforestation that affected most other woodlands in Hong Kong. This is due to the pious faith of the villagers in Fung Shui geomancy, as well as the perceived positive connection between trees and good fortune, therefore the villagers chose to site their villages close to the woodlands and subsequently actively protected, preserved and enhanced the woodlands. In 2002, Agriculture, Fisheries and Conservation Department undertook a territory-wide survey in which they identified 116 Fung Shui Woodlands [10, 11].

A project can conserve the cultural assets of a place by preserving built environment where cultural assets are identified. Apart from preserving physical structures, cultural, social and historical values of the identified assets could also be preserved by introducing compatible uses so that the values can be passed down to the next generation. HK2030 also encourages innovative ways of putting heritage buildings into an adaptive re-use to enhance their social, cultural and economic benefits while not diminishing their conservation value [8].

To incorporate local aspirations and wisdom in a development process, a developer can engage the local community to help identify cultural assets and formulate plans to conserve cultural assets.

Conserving cultural assets can provide an opportunity to educate the public about the significance and values of the cultural assets for all to appreciate and enjoy. Conservation of heritage, architectural and culturally significant features will enhance diversity, enrich historical continuity, increase people's cultural awareness and strengthen community bonds through recollections of shared memories of the past, and in turn nurture a sense of place and local identity [8].

[10] Agriculture, Fisheries and Conservation Department 2006, *List of Fung Shui Woodlands in Advisory Council for the Environment Committee Paper NCSC 9/06*, viewed 12 October 2015, http://www.epd.gov.hk/epd/english/boards/advisory_council/files/ncsc-paper-06-09.pdf

[11] Yip J.K.L., Ngar Y.N., Yip J.Y., Liu E.K.Y., Lai P.C.C. 2004, *Venturing Fung Shui Woods*, Agriculture, Fisheries and Conservation Department, Hong Kong, HK.

2 COMMUNITY ASPECTS

2.4 CORPORATE SOCIAL RESPONSIBILITY

CA 8 CORPORATE SOCIAL RESPONSIBILITY REPORTING

EXCLUSIONS	Projects undertaken by a joint venture of companies or a subsidiary of a corporation, with none of the companies / parent companies have greater than 30% of ownership of the Project.
OBJECTIVE	Encourage and recognise developments initiated by organisations with corporate social responsibility policy.
NO. OF CREDIT POINTS	1 credit point
PREREQUISITES	None.
CREDIT REQUIREMENT	1 credit point is awarded where the Applicant's company or organisation has a Corporate Social Responsibility Policy.
ASSESSMENT	The Applicant shall submit evidence to demonstrate the following: • A corporate social responsibility policy which is developed and implemented prior to the Project registration for BEAM Plus Neighbourhood; • An annual publication of corporate social responsibility report or other relevant reports and their availability for public access; and • The annual publication reported with reference to Global Reporting Initiatives (GRI) [1], Integrated Reporting [2] or other equivalent standards or framework with a third-party verification. At least two consecutive annual publications of corporate social responsibility reports with third party verification should be submitted to qualify for this credit. The two publications shall be of the immediate past two financial years. Should the Project involve different owners or developers up to the completion of construction and operational phases, the owners or the developers shall, at the time of BEAM Plus Neighbourhood certification, satisfy the credit requirement. If the Applicant is a joint venture of companies or a subsidiary of a corporation, all parent companies with a minimum of 30% or higher ownerships of the Project shall satisfy the above assessment criteria. Review by independent auditor or Audit Commission, in the case of government or quasi-governmental organisations, shall be accepted as having satisfied requirement for third-party verification.

[1] Global Reporting Initiative, viewed 8 October 2015, https://www.globalreporting.org/Pages/default.aspx
[2] Integrated Reporting, viewed 14 October 2015, http://integratedreporting.org/resource/international-ir-framework/

BACKGROUND

Demand for organisation transparency and public accountability is on the rise. Thus, more organisations adopt Corporate Social Responsibility (CSR) reporting as a way to disclose the efforts they have made to contribute to the environment and community.

On reporting, the company representatives engage stakeholders on core subjects of social responsibility and report the sustainability performance against globally standardised indicators. Common sustainability reporting standards are Global Reporting Initiative (GRI), Integrated Reporting, etc., where the reported information will usually be verified with third-party assurance standards, such as AA1000, ISAE3000, etc.

Since 2015, listed companies in Hong Kong Stock Exchange are required to issue Environment, Social and Governance (ESG) report annually and report the ESG information based on more stringent requirements, which is on the "comply or explain" provisions. It further holds the companies accountable for their impacts of company activities on environment and community [3 and 4].

With more detailed reporting on CSR and disclosure in sustainability data, companies can take the opportunities to communicate their sustainability approach and promote their corporate sustainability efforts to their stakeholders and the public.

[3] Hong Kong Exchange, Appendix 27 Environmental, Social and Governance Reporting Guide, available at http://en-rules.hkex.com.hk/en/display/display_main.html?rbid=4476&element_id=3841

[4] Hong Kong Exchange, Appendix 27, available at: http://en-rules.hkex.com.hk/en/display/display_main.html?rbid=4476&element_id=4579

3	**SITE ASPECTS**	**3.P**	**PREREQUISITES**
		3.1	**SUSTAINABLE USE OF LAND AND OPEN SPACES**
		3.2	**SUSTAINABLE TRANSPORT**
		3.3	**SITE PLANNING AND DESIGN**

INTRODUCTION

This section focuses on the integration of a building development with its immediate neighbourhood, sustainable use of land resources, pedestrian-oriented and low carbon transport, planning and design to take account of both beneficial and adverse impacts on its neighbours and the development itself, conservation and enhancement of ecological value.

3.1	**SUSTAINABLE USE OF LAND AND OPEN SPACES**	**SA 1**	**BROWNFIELD DEVELOPMENT**
		SA 2	**ACCESSIBILITY TO OPEN SPACE, GREEN SPACE AND BLUE ASSETS**

BACKGROUND

Due to the shortage of land in Hong Kong, the choice for building location is limited. From an environmental perspective, credits should be awarded when contaminated land and land adjacent to landfill sites are put to use, provided that appropriate steps are taken to reduce environmental hazards and health risks to users and to their neighbours.

The adequacy of Open Spaces / natural woodland / shrub land / grassland / wetland / water bodies etc. within a convenient walking distance is important in order to reduce travel needs and create a pleasant environment for leisure and social interaction.

3.2	**SUSTAINABLE TRANSPORT**	**SA 3**	**PEDESTRIAN-ORIENTED AND LOW CARBON TRANSPORT**

BACKGROUND

A walkable development with good accessibility to mainstream public transport can reduce carbon footprint and the use of private vehicle; and can improve air quality and our quality of life. A safe and convenient pedestrian environment should be provided to give priority to pedestrian-oriented transport to protect people from traffic accidents and poor air quality, to plan for better pedestrian networks with good connectivity to mainstream public transport, and to make the pedestrian environment an attractive place to walk, live and enjoy.

For building developments with either existing or planned public cycling network nearby, the provision of an integrated cycling network within the sites will facilitate short-distance travel in an environmentally friendly setting.

3.3	**SITE PLANNING AND DESIGN**	**SA 4**	**SITE DESIGN APPRAISAL**
		SA 5	**ECOLOGICAL VALUE**
		SA 6	**CULTURAL HERITAGE**
		SA 7	**QUALITY OPEN SPACE**

BACKGROUND

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

- Disposition of individual buildings;
- Spatial relationship of building(s) to the immediate built and natural environment;
- Relationship of building(s) to the site topography and ground conditions;
- Overall massing of the proposed development;
- Built forms;

- Balance of built-up and landscaped / open area;
- Environmental enhancement to the surroundings of the site; and
- Overall landscaping strategy.

Greenfield developments should seek to minimise disturbance, including the ecology of the site and impacts on cultural heritage. The aim is to ensure that appropriate landscape treatment is provided on site to ameliorate visual impacts, and conserve natural features. For brownfield sites, the emphasis should be on the enhancement of ecological value.

3 SITE ASPECTS 3.1 SUSTAINABLE USE OF LAND AND OPEN SPACES

SA 1 BROWNFIELD DEVELOPMENT

EXCLUSIONS	Projects on greenfield sites or sites within the landfill gas hazard zone; and sites where contamination, landfill gas hazard assessment and mitigation measures are statutory requirements.
OBJECTIVE	Ensure proper investigation and remediation of potentially contaminated redevelopment sites, or proper precautions for sites adjacent to landfill sites.
NO. OF CREDIT POINTS	1 BONUS credit point
PREREQUISITES	None
CREDIT REQUIREMENT	1 BONUS credit point is awarded for conducting a site contamination assessment.
ASSESSMENT	The Applicant shall submit evidence in a form of a report, prepared by a suitably qualified person, to demonstrate through a site contamination assessment that the issues and requirements outlined in Guidance Note for Contaminated Land Assessment and Remediation [1] have been addressed and that the immediate environment is free from any hazardous contamination. The report shall confirm that the site has been properly assessed and all issues and requirements outlined in ProPECC PN 3/96[2] have been adequately addressed. In order to qualify for exclusion, the Applicant shall submit a letter issued by the relevant authority confirming that the Project is not applicable to this credit requirement.
BACKGROUND	Brownfield sites generally refer to many different land uses, such as port back-up land, deserted or damaged agricultural land, industrial uses such as workshops, recycling yards and open storage facilities, etc. Derelict land and sites previously used as factories, shipyards, chemical manufacturing or processing plants, oil depots, car repair workshops, waste treatment facilities, etc., might be contaminated by hazardous substances such as oil, heavy metals and organic substances. Such land can pose risks to users, adjacent environment or even building materials, possibly undermining the integrity of the building. Special attention and rehabilitation may be required.

[1] Environmental Protection Department 2007, *Guidance note for contaminated land assessment and remediation*, viewed 8 October 2015, http://www.epd.gov.hk/epd/english/envir_standards/non_statutory/files/GN_for_land_contamination_e.pdf

[2] Environmental Protection Department 1996, *Practice Note for Professional Persons, ProPECC PN 3/96 landfill gas hazard assessment for developments adjacent to landfills*, viewed 8 October 2015, http://www.epd.gov.hk/epd/tc_chi/resources_pub/publications/files/pn96_3.pdf

Reclaimed land constructed with soil dredged from seabed or construction and demolition material may also be contaminated.

Guidance Note for Contaminated Land Assessment and Remediation sets out the requirements for proper assessment and management of potentially contaminated sites, and suggests practical remedial measures that can be adopted for the clean-up of a contaminated site. Although the requirements set out in the Guidance Note are usually incorporated through the land use planning process, either as approval conditions for planning application, or as special conditions in relevant land-title documents for cases associated with potential land contamination problems, it is still considered a good practice to carry out an investigation of site contamination on developed or reclaimed land in order to eliminate any risk or hazard arising from potential land contamination.

Technical particulars on how to conduct a detailed site assessment should be made reference to the "Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management" [3] and the "Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Station, Boatyards and Car Repair / Dismantling Workshops" [4].

It is recognised that building developments on land adjacent to landfill sites may be affected by migrating landfill gas and / or leachate unless specific precautions are taken to control the potential hazards. The Practice Note [1] sets out the conditions when a landfill gas hazard assessment may be required and provides general guidelines on how such an assessment should be undertaken.

The Guidance Note [5] describes in more detail of the process which should be followed in evaluating the risks and designing appropriate protection measures. The Guidance Note is not intended to provide comprehensive guidance on all aspects of risk assessment or design of precautionary / protection measures, but rather to give general guidance on important issues such as the factors to be considered in the process of risk assessment.

[3] Environmental Protection Department 2007, *Guidance manual for use of risk-based remediation goals for contaminated land management*, viewed 8 October 2015, http://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/waste/guide_ref/files/gme.pdf

[4] Environmental Protection Department 2014, *Guidance Notes for investigation and remediation of contaminated sites of petrol filling station, boatyards and car repair/dismantling workshops*, viewed 8 October 2015, http://www.epd.gov.hk/epd/english/environmentinhk/waste/guide_ref/guide_contamsite_2.html

[5] Environmental Protection Department 1997, *Landfill gas hazard assessment guidance note, no. EPD/TR8/97*, viewed 8 October 2015, http://www.epd.gov.hk/epd/textonly/english/environmentinhk/waste/guide_ref/guide_lgha.html

3 SITE ASPECTS **3.1 SUSTAINABLE USE OF LAND AND OPEN SPACES**

SA 2 ACCESSIBILITY TO OPEN SPACE, GREEN SPACE AND BLUE ASSETS

EXCLUSIONS None.

OBJECTIVE Encourage developments that are integrated within, and an asset to, the immediate neighbourhood in terms of the provision of Open Space, Green Space and blue assets as recreational, ecological and visual amenities.

NO. OF CREDIT POINTS 3 credit points

PREREQUISITES None.

CREDIT REQUIREMENT

a) Neighbourhood Open Space, Green Space and Blue Assets

1 credit point is awarded where the two conditions are met:

- The total aggregate area of Open Space, natural woodland, shrub land, grassland, wetland and water bodies within the Assessment Area (Site Area and Impact Area combined) exceeds 5% of the Assessment Area, and
- There is a pedestrian access not exceeding 500m walking distance that connects the above spaces to a notional entrance of any major occupied building within the Site.

b) Provision of Open Space, Green Space and Blue Assets

1 credit point is awarded where the two conditions are met:

- The site provides a total aggregate area of Open Space, Green Space and blue assets exceeding 5% of the Site Area; and
- The Open Space, Green Space and blue assets provide a reasonable access by the public.

c) Shaded or Covered Pedestrian Routes to Open Space, Green Space and Blue Assets

1 credit point is awarded where a shaded or covered pedestrian route to Open Space, Green Space and blue assets is provided within the Site.

ASSESSMENT This credit assessment shall be applicable to all projects planned by public, private or other organisations.

a) Neighbourhood Open Space, Green Space and Blue Assets

Assessment is based on the provision of accessible Open Space, Green Space and blue assets, including landscaped Open Space or natural woodland, shrub land, grassland, wetland, natural or man-made water bodies, within the immediate neighbourhood for the benefit of the neighbourhood.

The total area of Open Space, Green Space and blue assets within the Assessment Area (Site Area and Impact Area combined) may include all publicly accessible Open Space regardless of ownership - private, public or institutional, as long as it provides convenient and reasonable access to the public.

The Applicant shall submit a report, prepared by a suitably qualified person, based on a survey of the immediate neighbourhood and details of the development itself to demonstrate adequate provision of accessible Open Space, Green Space and blue assets.

If an Open Space, Green Space or blue asset is smaller than 500m^2, it should not be included in the assessment. If an Open Space, Green Space or blue asset is equal to or larger than 500m^2, but some contiguous part of it is located outside the Assessment Area, only the area within the Assessment Area, even if such portion is smaller than 500m^2 should be counted in the calculation of the total aggregate area.

If an Open Space, Green Space or blue asset has accessible hours by the public that are less than 13 hours a day or less than the hours stipulated in the land lease or Deed of Dedication, whichever is longer, it shall not be included in the assessment.

The onus is placed on the Applicant to demonstrate that the provisions are within convenient walking distances.

A map shall identify the Site at or near the centre of a scale drawing with each of the accessible Open Spaces or natural woodlands, shrub-lands, grasslands, wetlands and water bodies identified. The unhampered walking route from the notional main entrance(s) of the Site to the main entrance(s) of the provisions shall be clearly marked by lines on the drawing together with the walking distance.

Future provisions of Open Space, Green Space and blue assets not operable at the time of building completion will be considered if they will be in operation no later than one year after the target date for the issue of Occupation Permit (OP) / Building Handover Certificates / Substantial Completion Dates for the proposed developments.

b) Provision of Open Space, Green Space and Blue Assets

1 credit point shall be awarded where Open Space, Green Space and blue assets are provided within the Site, with convenient access by the public.

The Applicant shall submit scale drawing(s) and other evidence that on-site Open Space, Green Space and blue assets will be provided and made available for public use, including details of their sizes, locations and any restrictions or conditions of access that may be put in place.

If an Open Space, Green Space or blue asset has accessible hours by the public that are less than 13 hours a day or less than the hours stipulated in the land lease or Deed of Dedication, whichever is longer, it shall not be included in the assessment.

c) Shaded or Covered Pedestrian Routes to Open Space, Green Space and Blue Assets

The Applicant shall submit details of the pedestrian routes which are shaded or covered within the Site from the notional building entry points of the Project leading to the Open Space, Green Space or blue assets provided within the Site.

If there are multiple buildings in the development, at least half of the buildings should have one shaded or covered pedestrian route to one of the Open Spaces, Green Spaces or blue assets within the Site. For example, if a Project has 7 buildings with 3 Open Spaces and 5 Green Spaces, there should be at least 4 buildings with shaded or covered pedestrian route to either one of those spaces.

Alternatively, the Project may have pedestrian routes connecting buildings which allow building users to eventually reach the Open Space, Green Space or blue asset via other buildings in the Site.

The Applicant shall submit a report with a layout plan, schematic sections and information on the types and extent of shade or cover provided over the routes. The design of the pedestrian routes shall comply with the following conditions:

i) Horizontal Screens, Covered Walkways and / or Trellises

The width of each horizontal screen, covered walkway or trellis shall be designed by taking into consideration the population using the facilities and the size of the development. In light of the above, all shaded horizontal screens, covered walkways or trellises shall each have a minimum width of 2m.

ii) Tree-lined Shading

The Applicant shall provide a report, prepared by a suitably qualified person, with the following information:

- If the shading is provided by trees at-grade, it should be a continuous strip of trees planted along the pedestrian route. Trees may be planted within planters and / or tree pits with paving;
- The tree coverage shall be measured using estimated crown diameters 10 years after landscape installation;
- Based on the estimated crown diameters above, a shaded pedestrian route of a minimum width of 2m under the trees shall be demonstrated on plan;
- Suitable species of broadleaved trees (not palms conifers) of appropriately anticipated crown diameters shall be specified to offer shade along the pedestrian routes;
- The applicant shall provide a letter of commitment, signed by an authorised signatory at director level, to commit on providing an adequate soil volume of $12m^3$ per tree at a minimum, and ensuring that the soil is free from interference by utilities; and
- Soiling plans shall be provided to confirm that such soil areas will be of a minimum depth of 1,200mm.

Tree shading is defined as the combined plan area under all tree canopies along the pedestrian paths within the Site. The area is calculated by the tree canopies projected perpendicularly to the ground / floor surface, where the tree canopies are drawn at their estimated spread 10 years after the landscape installation [1].

BACKGROUND

According to the HKPSG, a minimum of 10 ha. of Local Open Space (LO) and 10 ha. of District Open Space (DO) should be provided for every 100,000 persons, which add up to a minimum of 20 ha of Open Space. The minimum size for a Local Open Space is recommended to be 500m^2. Owing to the scarce land resources in Hong Kong, it is not uncommon that some built-up districts fail to meet the minimum provision requirements of Open Space [2].

Taking into account the planned population and the minimum Open Space requirements [2], the ratios of the Open Space to areas of districts for the 12 most densely populated districts in Hong Kong range from approximately 1.4% to 11.9%, with the median percentage of approximately 5%.

12 Most Densely Populated Districts in Hong Kong [2]	**Area (ha) [3]**	**Planned Population [2]**	**Targeted OS (ha)** *(Based on HKPSG: 20ha per 100,000 p)*	**Ratio of OS to Area of District**
Kwun Tong	1,127	669,800	134	11.9%
Sham Shui Po	936	471,500	94.3	10.1%
Yau Tsim Mong	699	339,900	68	9.7%
Kowloon City	1,002	485,600	97.1	9.7%
Wong Tai Sin	930	421,000	84.2	9.1%
Eastern	1,873	581,200	116.2	6.2%
Kwai Tsing	2,334	503,300	100.7	4.3%
Central and Western	1,255	265,900	53.2	4.2%
Wanchai	999	159,200	31.8	3.2%
Sha Tin	6,927	673,500	134.7	1.9%
Southern	3940	277,600	55.5	1.4%
Tuen Mun	8,464	588,200	117.6	1.4%

Median: 5.3%

The vibrant growth of street trees is highly dependent on the volume and quality of soil provided for them as well as the absence of interference by underground utilities in the soil root-zone.

[1] Development Bureau 2012, *Technical Circular (Works) 2/2012 Allocation of space for quality greening on roads*, viewed 15 November 2016, http://www.devb.gov.hk/filemanager/technicalcirculars/en/upload/317/1/c-2012-02-0-1.pdf

[2] Planning Department 2010, *Demand and provision of Open Space*, viewed 7 October 2015, http://gia.info.gov.hk/general/201003/10/P201003100181_0181_62892.pdf

[3] Survey and Mapping Office 2014, *Area by district council*, viewed 7 October 2015, http://www.landsd.gov.hk/mapping/en/publications/district.htm

Inadequate provision of soil volume is a common problem for street trees in Hong Kong's dense urban environment. It will be highly beneficial if a commitment can be made at the planning stage of new projects to provide adequate soil volume within soil corridors without interference from underground utilities. Such soil corridors may be provided in continuance by at-grade planters, or in underground soil corridors connecting tree pits in paved areas under paving.

It is estimated that a minimum soil volume for street trees is $12m^3$, based on the 5m tree spacing with a soil corridor 2m wide and 1.2m deep [4].

[4] Lands Department 2007, *Practice Note No. 7/2007: tree preservation and tree removal application for building development in private projects*, viewed 7 October 2015, http://www.landsd.gov.hk/en/images/doc/2007-7_text.pdf

3 SITE ASPECTS **3.2 SUSTAINABLE TRANSPORT**

SA 3 PEDESTRIAN-ORIENTED AND LOW CARBON TRANSPORT

EXCLUSIONS None for SA 3a, SA 3b, SA 3c and SA 3e.

Projects with neither existing nor planned public cycling network nearby for SA 3d.

OBJECTIVE Encourage the use of pedestrian-oriented and low carbon transport, with an aim to create a safe and appealing environment that promotes human interaction, a sense of place as well as integration with surrounding pedestrian transport network.

NO. OF CREDIT POINTS 7 + 1 BONUS credit points

PREREQUISITES None

CREDIT REQUIREMENT

a) Access to Public Transport

1 credit point is awarded where a convenient pedestrian access to mainstream public transport is available within a 500m walking distance, as measured from any notional entrance(s) of a major occupied building within the Site.

b) Shaded or Covered Pedestrian Route to Public Transport

1 credit point is awarded where there is at least one shaded or covered pedestrian route within the Site from a notional building entry point to the nearest or major mainstream public transport station / node.

c) Pedestrian-oriented Transport Planning

1 credit point is awarded where 50% or more of the applicable pedestrian-oriented transport planning measures are scored.

OR

2 credit points are awarded where 75% or more of the applicable pedestrian-oriented transport planning measures are scored.

AND

1 BONUS credit point is awarded where 100% of the applicable pedestrian-oriented transport planning measures are scored.

d) Integration with Public Cycling Network

1 credit point is awarded where cycling network and facilities are provided within the Site to integrate with the public cycling network if a public cycling network exists or has been planned nearby.

e) Integration with Existing Pedestrian Transport Network

1 credit point is awarded where all main pedestrian access points of the Project are planned to be integrated with pedestrian transport network surrounding the Site.

AND

1 credit point is awarded where at least one (1) pedestrian route with a minimum width of 3m provided within the Site, is made available for public access to the surrounding neighbourhood amenities, Green Spaces, blue assets and / or a public transport node.

ASSESSMENT

a) Access to Public Transport

To obtain 1 credit point, the Applicant must demonstrate the following:

- The mass transit station or other public transport facilities outside the Site must be within a 500m walking distance from any notional main access point of a building within the Site; and
- The scheduled operating frequency of such transport system(s) must be between 07:00 to 19:00 hours at an interval of 10 minutes or less on weekdays excluding public holidays.

The Applicant shall submit evidence in the form of a survey map of the occupied building and the public transport facilities in the near vicinity. The map should include the following information:

- The locations of buildings at or near the centre of a scale drawing;
- The locations of each of the listed public transport services identified;
- The unhampered walking route from the building's notional main entrance to the main entrance/ station of each public transport node / station;
- The walking route shall be clearly marked by lines on the drawing together with the walking distance shown alongside;
- A legend shall be included in the drawing identifying the mass transit station, the walking distance; and
- Tables showing the frequency of services during 07:00 to 19:00 hours on weekdays excluding public holidays.

For sites not directly served by mainstream public transport, a provision of a shuttle bus service, connecting to a mainstream mass transport interchange operating at the above-mentioned frequency may be deemed to satisfy the criteria.

The onus is placed on the Applicant to demonstrate that:

- The service is of adequate capacity;
- The frequency will meet the needs of most building users, and
- The shuttle vehicle is or will be company-owned, or it is or will be run by a service provider with a minimum 1-year rolling contract in place.

The principle is to demonstrate an easy access for the public. The Applicant is required to measure the distance from any main access point of the Project.

Future services / facilities provisions not operable at the time of building completion will be considered if they will be in operation no later than one year after the target date for the issue of Occupation Permit (OP) / Building Handover Certificates / Substantial Completion Dates for the proposed developments.

b) Shaded or Covered Pedestrian Routes to Public Transport

To obtain 1 credit point, the Applicant shall submit details of at least one route within the Site from a notional building entry point to the nearest mainstream public transport station. The Applicant can submit a report with layout plans, schematic sections, information on the types and the extent of shade and /or cover provided over the routes, and any information on access and restrictions on use.

The shade or cover must comply with the following conditions:

i) Horizontal Screens, Covered Walkways and / or Trellises

- The width of each horizontal screen, covered walkway or trellis shall be designed by considering the population using the facilities and the size of the development. In light of the above, all shaded horizontal screens, covered walkways or trellises shall each have a minimum width of 2m.

ii) Tree-lined Shading

The Applicant shall provide a report, prepared by a suitably qualified person, with the following information:

- If the shading is provided by trees at-grade, it should be a continuous strip of trees planted along the pedestrian route. Trees may be planted within planters and / or tree pits with paving;
- The tree coverage shall be measured using estimated crown diameters 10 years after landscape installation;
- Based on the estimated crown diameters above, a shaded pedestrian route of a minimum width of 2m under the trees shall be demonstrated on plan;
- Suitable species of broadleaved trees (not palms conifers) of appropriately anticipated crown diameters shall be specified to offer shade along the pedestrian routes;
- The applicant must provide a letter of commitment, signed by an authorised signatory at director level, to commit on providing an adequate soil volume of $12m^3$ per tree at a minimum, and ensuring that the soil is free from interference by utilities; and
- Soiling plans shall be provided to confirm that such soil areas will be of a minimum depth of 1,200mm.

Tree shading is defined as the combined plan area under all tree canopies along the pedestrian paths within the Site. The area is calculated by the tree canopies projected perpendicularly to the ground / floor surface, where the tree canopies are drawn at their estimated spread 10 years after the landscape installation [1].

c) Pedestrian-Oriented Transport Planning

The Applicant shall submit a report, prepared by a suitably qualified person, which includes:

- A completed checklist of the pedestrian-oriented transport planning measures provided;
- Justifications for each checked item, and
- Details of the measures provided.

The onus is placed on the Applicant to demonstrate that the measures provided shall achieve a safe, convenient and pleasant pedestrian environment.

Where 50% or more of relevant items shall be fulfilled, 1 credit point shall be awarded.

Where 75% or more of relevant items shall be fulfilled, 2 credit points shall be awarded.

Where 100% of relevant items are achieved, an additional BONUS credit point shall be awarded.

The assessment checklist is tabulated below:

Safe Environment	**Points**
Safe speed environment (for a targeted speed of no more than 20km/h) for over 50% of roads within the Site	1
Safe speed environment (for a targeted speed of no more than 20 km/h) for over 75% of roads within the Site	1
Safe speed environment (for a targeted speed of no more than 20km/h) for 100% of roads within the Site	1
Segregated pedestrian and vehicular movement within the Site if there is no speed limit or the targeted speed is higher than 20km/h	1
Pathways overlooked from buildings	1
Convenient Environment	**Points**
Short and direct pathways	1
Minimised level changes for pathways	1

[1] Development Bureau 2012, *Technical Circular (Works) 2/2012 Allocation of space for quality greening on roads*, viewed 7 October 2015, http://www.devb.gov.hk/filemanager/technicalcirculars/en/upload/317/1/c-2012-02-0-1.pdf

Seating / street furniture zone of a minimum width of 1.5m along pathways	1
Pathways for pedestrian movement of a minimum width of 2m Appraisal of adequacy of the footpath widths shall make reference to the Table 9 of Internal Transport Facilities presented in the Chapter 8 of the Hong Kong Planning Standards and Guidelines (HKPSG)	1
Pleasant Environment	**Points**
Planting / lighting zone of a minimum width of 1m along pathways	1
Promote use of low carbon and low emissions vehicles	1
Pedestrian pathways designed as preferred space with high quality architectural and landscape design (e.g. sunken access roads, roof-over of access roads by landscaped deck, flexible use of access roads for pedestrians with physical speed reduction measures etc.)	2

The onus is placed on the Applicant to demonstrate how the Project satisfies the applicable measures. The Applicant may wish to use relevant local and international reference such as HKPSG, POSPD [2], the Universal Accessibility in External Areas, Open Spaces and Green Spaces and Design Manual – Barrier Free Access 2008 [3].

d) Integration with Public Cycling Network

The Applicant shall provide details of the proposed bicycle network and storage capacity within the Site, by means of layout plans and supplementary calculations. To obtain 1 credit point, the cycling network within the Site shall comply with the following conditions:

- A continuous cycling network within the Site shall be connected to the existing / planned public cycling network;
- The cycling network of any combination of physically designated in- / off-street cycle tracks, and / or roads designed with a target speed of 20 km/h or slower;
- The cycle tracks, the connections to existing / planned public cycling network, the segregation from carriageways and the parking areas shall comply with the requirements in Section 6 – Cycling of Internal Transport Facilities presented in the Chapter 8 of HKPSG [4].

[2] Development Bureau, 2013, Public open space in private developments design and management guidelines, viewed 27 Oct 2016, http://www.devb.gov.hk/filemanager/en/content_582/guidelines_english.pdf

[3] Architectural Services Department, Universal Accessibility f External Areas, Open Spaces and Green Spaces, viewed 15 Nov 2016, http://www.archsd.gov.hk/archsd/html/ua2/contents.html

[4] Planning Department 2010, 'Chapter 8: Internal transport facilities, section 6 cycling', *Hong Kong Planning Standards and Guidelines*, viewed 8 October 2015, http://www.pland.gov.hk/pland_en/tech_doc/hkpsg/full/ch8/ch8_text.htm#6

Future public cycling networks not operable at the time of building completion will be considered if they will be in operation no later than one year after the target date for the issue of Occupation Permit (OP) / Building Handover Certificates / Substantial Completion Dates for the proposed developments.

e) Integration with Existing Pedestrian Transport Network

The Applicant shall provide layout plans and details of all the proposed main pedestrian access points of the Project and pedestrian transport networks of immediate vicinity to the access points surrounding the Site.

To obtain 1 credit point, the main pedestrian access points of the Project shall comply with the following conditions:

- The connections between the main pedestrian access points and the surrounding pedestrian transport network shall be either segregated from vehicular traffic; or
- The connections should be subject to a safe speed environment control (with a targeted speed of no more than 20 km/h).

To obtain an additional credit point, the following requirements shall be met:

- The Applicant shall submit evidence that a pedestrian route within the Site will be made available for public use, including details of any restrictions or conditions on access that will be put in place;
- The pedestrian route shall be of at least 3m wide; and
- The main pedestrian route between the access points of the Site shall be planned to enable the public to gain convenient access to the surrounding neighbourhood amenities, Green Space, Blue Assets and / or public transport nodes.

Future pedestrian network, neighbourhood amenities, Green Space, Blue Assets or public transport nodes not operable at the time of building completion will be considered if they will be in operation no later than one year after the target date for the issue of Occupation Permit (OP) / Building Handover Certificates / Substantial Completion Dates for the proposed developments.

BACKGROUND

Hong Kong is a compact and multi-layered city in terms of development density, land use and movement. Conflicts between pedestrians and vehicular transport are frequently observed, compromising safety and the sense of place of the pedestrian environment. A comprehensive integrated pedestrian network to promote high quality at-grade pedestrian environment shall be carefully considered at the masterplanning stage of a development.

A walkable development can reduce the use of private vehicular transport, hence it can reduce carbon footprint, improve air quality and our quality of life. A safe, convenient and pleasant pedestrian environment should be provided to give priority to pedestrian-oriented transport. Planning for better pedestrian networks with good

connectivity to mainstream public transport nodes would protect pedestrians from traffic accidents and roadside pollution, promote exercise and create an attractive place for all to walk, live and enjoy.

3 SITE ASPECTS **3.3 SITE PLANNING AND DESIGN**

SA 4 SITE DESIGN APPRAISAL

EXCLUSIONS	None.
OBJECTIVE	Encourage a proactive approach in order to achieve a greater integration of site planning and design issues.
NO. OF CREDIT POINTS	2 + 1 BONUS credit points
PREREQUISITES	None.
CREDIT REQUIREMENT	A site design appraisal report shall be submitted to demonstrate a proactive approach to achieve great integration of site planning and design issues. If the report meets 50% or more of the relevant sub-items of the Urban Design Guidelines in HKPSG, 1 credit point is awarded. OR If the report meets 75% or more of the relevant sub-items of the Urban Design Guidelines in HKPSG, 2 credit points are awarded. AND If 100% of relevant sub-items of the Urban Design Guidelines are achieved, an additional BONUS credit point is awarded.
ASSESSMENT	This credit and assessment shall be applicable to all projects planned by public, private or other organisations. The onus is placed on the Applicant to demonstrate that the site planning and design have taken into full account the physical and environmental aspects of the immediate site surroundings and neighbourhood. A report, prepared by a suitably qualified person, shall be submitted to explain and detail the design team's efforts in achieving integration of the Project with its immediate surroundings in regard of the following issues: **Specific Major Urban Design Issues:** • Massing and intensity in urban fringe areas and rural areas; • Development height profile; • Waterfront sites; • Public realm; • Streetscape; • Heritage; • View Corridors; and • Stilted Structures.

Specific Major Land Uses:

For Commercial Zone:

- Project a positive, recognisable image for the district and city;
- Create safe, interesting and comfortable circulation route for pedestrians;
- Create an efficient vehicular circulation system to minimise negative impact of vehicles on pedestrians;
- Provide adequate and conveniently accessible parking facilities;
- Provide maximum air circulation whenever possible to improve air quality in commercial core area and achieve acceptable air quality; and
- Maintain a vibrant streetscape character.

For Residential Zone and Village:

- Create an appropriate size of the development;
- Minimise adverse visual impact of development height on surrounding areas;
- Create interesting built form and mass;
- Choose a suitable location for blocks / houses to enhance privacy of residents and to minimise the negative visual, noise and air quality impacts;
- Create an efficient, comfortable, safe, and convenient pedestrian circulation system throughout the neighbourhood;
- Create an efficient vehicular circulation system with minimal negative impacts on pedestrian circulation;
- Provide adequate and easily accessible parking facilities for residents' vehicles;
- Provide Open Space and / or GIC facilities which are usable, accessible and valuable to residents;
- Minimise negative impacts on surrounding natural environment;
- Create a recognisable identity;
- Establish self-contained neighbourhoods and communities to encourage residents' civic pride and sense of belonging;
- Respect topographical / landscape setting and the harmony of the village layout;
- Create a focus for village and enhance its individual identity;
- Provide efficient pedestrian and vehicular circulation system suitable for the village setting; and
- Preserve historical and cultural characteristics of indigenous villages.

For Industrial Zone

- Locate industry to ensure minimal negative impacts on surroundings;
- Create an efficient layout for internal circulation and project a positive image of the industrial area;
- Provide safe and efficient pedestrian networks to and through the industrial development; and
- Maximise available and usable Open Space for workforce.

The appraisal shall make reference to the Urban Design Guidelines presented in the Chapter 11 of HKPSG [1].

Where more than 50% or more of the relevant sub-items of the Urban Design Guidelines are fulfilled, 1 credit point shall be awarded.

Where more than 75% or more of the relevant sub-items of the Urban Design Guidelines are fulfilled, 2 credit points shall be awarded.

Where 100% of the relevant sub-items are achieved, one additional BONUS credit point shall be awarded.

BACKGROUND

BEAM Plus encourages the Applicant and the design team to adopt a more integrated and proactive approach to neighbourhood planning matters. The ratio between the building footprint and open area within the site affects wind resistance, access of daylight and pollutant concentration of a particular site. Site layout should seek to minimise any negative aspect relating to microclimate, solar heat gain, wind, and loss of natural daylight to neighbouring buildings and pubic areas, as well as the project itself.

A site design appraisal report is required to demonstrate how the various design aspects of the Site and architectural planning issues can collectively contribute to the enhancement of the Site and its surrounding neighbourhood, with a particular emphasis on the vibrancy and experience of street life and pedestrian environment.

Investigations should include:

- An assessment of the climatic conditions and topographic conditions immediate to the site;
- An examination of the orientation of buildings with respect to environmental conditions, overshadowing and views; and
- The planning of building form in response to local environmental conditions (such as variation in heights and distances among buildings) and separation between buildings to achieve better natural ventilation and daylighting.

[1] Planning Department 2010, 'Chapter 11: urban design guidelines', *Hong Kong Planning Standards and Guidelines*, viewed 7 October 2015, http://www.pland.gov.hk/pland_en/tech_doc/hkpsg/full/ch11/ch11_text.htm

3 SITE ASPECTS 3.3 SITE PLANNING AND DESIGN

SA 5 ECOLOGICAL VALUE

EXCLUSIONS

None for SA 5a, SA 5b (Landscape Strategy and Enhanced Ecological Strategy) and SA 5c.

Projects where there are no areas of medium to high ecological value, adjacent to (i.e. contiguous with) the site for SA 5b) Interconnectivity with Existing Area(s) with Ecological Value.

OBJECTIVE

Enhance and / or conserve the ecological value of a site in terms of its intactness of habitat and biodiversity.

NO. OF CREDIT POINTS

2 + 3 BONUS credit points

PREREQUISITES

For designated project (DP) as specified under the Environmental Impact Assessment Ordinance (EIAO), an Environmental Permit or an approval letter for the relevant EIA report from Environmental Protection Department shall be obtained by following the statutory process, unless exempted.

CREDIT REQUIREMENT

a) Reduction of Ecological Impact

1 BONUS credit point is awarded in either of the conditions specified below:

- All identified habitat types on Site are of low or negligible indicative ecological value; or
- All identified habitat types on Site of medium to high indicative ecological value are preserved intact and are either unaffected or enhanced by the planned development. [1].

b) Enhancement of Ecological Value

Preliminary landscape strategy

1 credit point is awarded where the Applicant demonstrates that the ecological value of the Site is enhanced through a preliminary landscape strategy adopted in the site planning.

Ecological enhancement strategy

1 credit point is awarded where the ecology and biodiversity of the Site would be enhanced through an ecological enhancement strategy, based on accepted ecological principles and defined goals, prepared by a suitably qualified person.

[1] Environmental Resources Management for Environment Bureau 2008, *2008 Terrestrial Habitat Mapping and Ranking Based on Conservation Value*, viewed 8 August 2016, http://www.enb.gov.hk/sites/default/files/susdev/html/en/su/2008habmapfinrep.pdf

Physical connectivity

1 BONUS credit point is awarded where the site planning and building disposition are carefully designed in such a way that physical interconnectivity is provided within the Site to connect any existing preserved area of medium to high ecological value adjacent to the Site and:

- Any existing preserved areas of medium to high ecological value identified within the Site; or
- Any new Green Space planned within the Site; or
- Any new Blue Asset planned within the Site; and
- The total combined total area of eligible interconnected areas within the Site represents not less than 5% of the total Site area.

c) Tree Retention

1 BONUS credit point is awarded where the existing trees are retained in situ such that the combined girth of the retained trees, with individual girth of at least 150mm, is at least 20% of the total girth of all existing trees on site.

ASSESSMENT

a) Reduction of Ecological Impact

Reducing ecological impact of a project is particularly critical for greenfield development. The HKSAR Government introduced Terrestrial Habitat Mapping and Ranking Based on Conservation Value [1]. The habitat mapping allows the identification of all habitat types existing within the Site with corresponding ecological value. This helps identify habitats that deserve better protection and become a relative priority for action.

An ecological mapping of the Site is required to ensure appropriate preventive measures are adopted and the ecological conditions of the Site are taken into account in the subsequent detailed design works.

The Applicant shall submit a report, prepared by a suitably qualified person, to demonstrate all habitat types found on Site. In order to do this, the following steps should be observed, which should be documented and submitted as part of the report;

- Ecological mapping and subsequent report should be undertaken by a suitably qualified person to identify all habitat types existing on site; and
- Ecological value of the identified habitat types shall be established with reference to *2008 Terrestrial Habitat Mapping and Ranking Based on Conservation Value* [1].

The types of habitats can be found below:

Ecological Value	Habitat Types
High Value	• Fung Shui Forest; • Montane Forest; • Lowland Forest; • Mixed Shrubland; • Freshwater / Backish Wetland; • Natural Watercourse; • Seagrass Bed; and • Intertidal Mudflat.
Medium Value	• Shrubby Grassland (including Baeckea Shrubland) • Plantation or Plantation / Mixed Forest; • Fishpond / Gei Wai; • Sandy Shore; • Rocky Shore; and • Cultivation.
Low Value	• Bare Rock or Soil; • Grassland; • Modified Watercourse; • Artificial Rocky / Hard Shoreline; • Golf Course / Urban Park; and • Quarry
Negligible Value	• Rural industrial storage / containers; • Landfill; and • Others.

Reference should be made to *2008 Terrestrial Habitat Mapping and Ranking Based on Conservation Value*, published by Sustainable Development Division of Environment Bureau in 2008, for available habitat types, its definitions and the ecological value of each habitat type [1].

The report shall include the following:

- Overall review of the Site in terms of existing conditions and habitat types;
- Mapping of the Site including the habitat types, photographs, its dimension and area, where relevant;
- Overall tally of habitat types categorised according to their ecological value, their dimension and area, where relevant; and
- Demonstrate either that all identified habitat types are of low or negligible value or that all identified habitat types of medium to high ecological value will be preserved intact and will be either unaffected or enhanced by the planned development.

b) Enhancement of Ecological Value

Preliminary landscape strategy

The Applicant should submit a preliminary landscape strategy report, prepared by a suitably qualified person, which demonstrates that the site planning and design have taken into full account to minimise human impact to the existing and new habitats. The report should include site layout plan, schematic site sections and preliminary planting palette etc. to demonstrate the compliance with the credit requirements.

Generally, quality existing trees and natural habitats within the Site should be preserved unless evidence can be provided to justify that they are incompatible with the proposed Project.

When existing trees and natural habitats are removed from the Site, justification should be made and on-site tree replacement and recreated habitats shall be proposed.

Ecological enhancement strategy

The report on the ecological enhancement strategy should be prepared by a suitably qualified person. The report shall include:

- The types of new or restored habitats;
- The design proposals, including buffer zone for protection from human activities;
- Site layout plans;
- Schematic site sections; and
- Planting schedule.

An ecological enhancement strategy based on sound ecological principles with defined goals shall be submitted to demonstrate that the ecology and biodiversity of the Site will be enhanced.

The strategy shall address the design, on-going landscape management and maintenance aspects with the view to (re)creating habitats for wildlife and supporting a viable local ecosystem by reference to leading literature regarding the interrelationship between the proposed plant species and insects, birds and fauna of conservation interest.

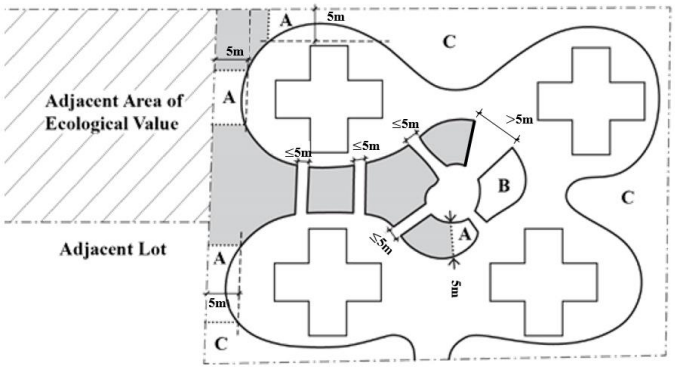
Physical interconnectivity

The Applicant shall demonstrate that the site planning and building disposition are carefully designed in such a way that physical interconnectivity is provided within the Site to connect any existing area of medium to high ecological value adjacent to the Site to:

- Any existing preserved areas of medium to high ecological value identified within the Site; or
- Any new Green Space planned within the Site; or
- Any new blue asset planned within the Site; and
- The combined total area of eligible interconnected areas within the Site represents not less than 5% of the total Site area.

This only applies if there are areas of medium to high ecological value adjacent to (i.e. contiguous with) the Site. To be eligible to obtain this BONUS credit point, the new Green Space or blue asset within the Site shall:

- Be contiguous with an area of medium to high ecological value adjacent to the Site;
- Be contiguous through areas within the Site that are not less than 5m wide;
- Not be broken by occasional footpath or other installation and features wider than 5m; and
- Constitute together a total combined eligible area that is not less than 5% of the total Site area.



Eligible Planter Area

Planter Area A – not eligible as it is less than 5m wide

Planter Area B – Not eligible as it is separated from eligible area by wider than 5m wide

Planter Area C – not eligible as it is not contiguous with adjacent areas of ecological value or eligible area

c) Tree Retention

The Applicant shall demonstrate that the girth of the retained trees shall be at least 20% of the total girth of all existing trees on site. To achieve this BONUS credit point, a detailed tree survey of all trees on Site in accordance with relevant Government Technical Circular(s) shall be prepared by a suitably qualified person.

To qualify for this BONUS credit point, retained trees counting towards the 20% girth shall each have a girth of not less than 150 mm and shall each have no more than 25% of its crown pruned to enable construction and operation of the Project. Trees transplanted within the site do not qualify as retained trees for this BONUS credit point.

BACKGROUND

Habitat conservation is the most effective means to minimise developmental impacts on the natural environment and endangered species, if any. The natural environment is a valuable asset belonging to the people of Hong Kong and our future generations. New developments may disrupt the natural environment and habitats. The complexity of the habitat types, the time and effort needed to re-create the ecosystem, and the degree of uncertainty in re-creating the habitats

within the site should be a prime concern. Hence, it is crucial to evaluate ecological value of the site at the planning stage of a development.

Hong Kong is blessed with large area of natural landscape which support a diverse assemblage of plant and animal species. However, with the continual process of urbanisation and infrastructure development, the wildlife corridors and the survival of species are under threat. Therefore, at a site level, BEAM Plus encourages the creation or retention of habitats for indigenous species to maintain / increase the local biodiversity.

Biodiversity consideration shall be included in the design or redevelopment stage to improve / maintain the biodiversity conditions. If an area of high biodiversity is identified within the site, it is essential to formulate enhancement / management strategies to protect the habitats, especially if there are any rare or endangered species within the Site. Hence, building development is generally encouraged at brownfield site due to its lower ecological value.

Appropriate planting can be adopted in a Site to promote biodiversity by using plant species that provide food and shelter for local wildlife [2] and by adopting accepted principles of ecological landscape design [3,4].

Interconnectivity among spaces of ecological value and avoidance of isolated 'islands' of Green Space or blue asset is fundamental to the promotion of biodiversity. This is related to Island Biogeography Theory [5] in which urban forests or green areas can be regarded as 'island' habitats, often surrounded by 'seas' of concrete (or hard paved areas) resulting in affecting species colonisation and its speed. As predicted by the Island Biogeography Theory, apart from plant species, the general factors affecting colonisation of urban greeneries by wild biodiversity are size of landscape planting:, (i.e. the bigger, the better), and degree of isolation from natural vegetation:, (i.e. the closer the layout, the better the connectivity).

[2] Development Bureau, 2013, 'A Comprehensive Street Tree Management Plan for Hong Kong', *Annex IV: Encouraging Biodiversity in the Urban Landscape through Planting Appropriate Tree Species in Hong Kong*, DevB, HKSAR Government.

[3] Development Bureau. Greening, Landscape and Tree Management Office (GLMTS) 2010, Guiding principles on use of native plant species in public works projects, viewed 12 October 2015, https://www.greening.gov.hk/en/knowledge/new/GuidelinesonUseofNativeSpecies-Textversionforwebsite.pdf

[4] Beck T. 2013, Principles of ecological landscape design. Island Press, Washington, Covelo, London.

[5] MacArthur R.H. and Wilson E.O. 1967, The theory of island biogeography, Princeton University Press, New Jersey, USA.

3 SITE ASPECTS 3.3 SITE PLANNING AND DESIGN

SA 6 CULTURAL HERITAGE

EXCLUSIONS Sites without cultural heritage.

OBJECTIVE Conserve and protect archaeological remains, historic buildings and monuments so as to maintain the local and regional cultural heritage.

NO. OF CREDIT POINTS 1 credit point

PREREQUISITES Compliance with the Antiquities and Monuments Ordinance, and where applicable to the Project, the Environmental Impact Assessment Ordinance.

CREDIT REQUIREMENT 1 credit point is awarded where the Project does not have any negative impact on the cultural heritage on Site.

ASSESSMENT

The Applicant shall conduct a site survey and desktop study to identify if there are any cultural heritage or elements on or in the vicinity of the Site (interpreted as not more than 50m measured from the nearest point of the site boundary (inclusive of works area) in accordance with the Technical Circular (Works) No. 6 / 2009 for Heritage Impact Assessment Mechanism for Capital Works Projects [1]).

The information of the identified sites of cultural heritage shall be assembled from the Antiquities and Monuments Office [2], public libraries and archives and tertiary institutions.

For guidelines and criteria for the assessment of sites of cultural interest:

- Annex 10 and Annex 19 of the Technical Memorandum to the Environmental Impact Assessment Process [3].

For guidelines on conservation of historical buildings:

- Chapter 10 of Hong Kong Planning Standards and Guidelines [4]

It is encouraged to preserve sites or buildings of cultural heritage, or enhance the setting of such neighbouring sites or buildings.

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[1] Development Bureau 2009, *Technical Circular (Works) No. 6/2009 for heritage impact assessment mechanism for capital works projects*, viewed 12 October 2015, http://www.heritage.gov.hk/images/impact/TC_Heritage.pdf

[2] Antiquities and Monuments Office 2014, AMO, Hong Kong, viewed 12 October 2015, http://www.lcsd.gov.hk/CE/Museum/Monument/en/index.php

[3] Environmental Protection Department 2011, *Technical Memorandum on environmental impact assessment process*, viewed 12 October 2015, http://www.epd.gov.hk/eia/english/legis/index3.html

[4] Planning Department 2010, 'Chapter 10: Conservation', *Hong Kong Planning Standards and Guidelines*, viewed 7 October 2015, http://www.pland.gov.hk/pland_en/tech_doc/hkpsg/index.html

1 credit point shall be awarded where the Applicant can provide a report, prepared by a suitably qualified person, to detail the findings and to confirm that no adverse impacts on the cultural heritage on site would be resulted from the site preparation (including reclamation work, if any) and any construction / building commissioning yet to be carried out.

BACKGROUND

Hong Kong has a long history with a rich cultural heritage resources which probably can be dated back to 6,000 years ago. The SUSDEV 21 Study defined heritage resources as sites with archaeological, historical and religious values. Cultural heritage provides a means of knowing and interpreting social, cultural and economic changes and enhancing our understanding of the past. It also provides a focus for community identity, from which a sense of belonging to Hong Kong can be fostered among the community [5].

Preservation of cultural heritage resources is important. Besides the declared monuments that are protected under the Antiquities and Monuments Ordinance and the Environmental Impact Assessment Ordinance, there are over 450 historic buildings which have been accorded a grading, at present, however, there is no statutory protection for these buildings. There remain thousands of historic buildings yet to be fully assessed and categorised, and are outside the legal protection. As such, special attention and measures must be taken to ensure that any cultural heritage feature on a site and in the vicinity are properly retained and protected to maintain our cultural sustainability [6].

The definition of sites of cultural heritage is shown in Schedule 1 of the Environmental Impact Assessment Ordinance. They generally cover archaeological sites and structures, historical buildings, paleontological sites and other cultural heritage features in a wide variety of forms (e.g. old street furniture, lime kilns, graves, trackways, salt-pans, etc.).

Relics fashioned before 1800 (and discovered after 1976) belong to the Government under the Antiquities and Monuments Ordinance. The excavation and search for such relics require a license from the Authority.

[5] Planning Department 2007, 'HK2030: Section II chapter 4: The desired living environment', *HK2030 Report*, viewed 8 October 2015, http://www.pland.gov.hk/pland_en/p_study/comp_s/hk2030/eng/finalreport/pdf/E_4.pdf

[6] Environmental Protection Department 2011, *Assessment of impact on sites of cultural heritage in environmental impact assessment studies*, viewed 7 October 2015, http://www.epd.gov.hk/eia/english/guid/index5.html

3 SITE ASPECTS **3.3 SITE PLANNING AND DESIGN**

SA 7 QUALITY OPEN SPACE

EXCLUSIONS	Projects of pure residential use.
OBJECTIVE	Encourage the provision of quality leisure and recreational Open Space to enhance urban liveability.
NO. OF CREDIT POINTS	2 + 1 BONUS credit points
PREREQUISITES	The Site should provide Open Space made accessible to the public. .
CREDIT REQUIREMENT	1 credit point is awarded where a proactive approach to enhance urban liveability is demonstrated by scoring at least 50% of the applicable design measures mentioned in the Design Guidelines in Section 2 of the Public Open Space in Private Developments Design and Management Guidelines [1]. OR 2 credit points are awarded where a proactive approach to enhance urban liveability is demonstrated by scoring at least 75% of the applicable design measures mentioned in the Design Guidelines in Section 2 of the Public Open Space in Private Developments Design and Management Guidelines [1]. AND 1 BONUS credit point is awarded where a proactive approach to enhance urban liveability is demonstrated by scoring 100% of the applicable design measures mentioned in the Design Guidelines in Section 2 of the Public Open Space in Private Developments Design and Management Guidelines [1].
ASSESSMENT	The Applicant shall submit a report demonstrating the effort to provide quality leisure and recreational outdoor space. The report should be prepared by a suitably qualified person. The report shall explain and detail the design team's proactive efforts to address the following issues as outlined in the Section 2 of the Public Open Space in Private Developments Design and Management Guidelines: <u>Spatial Issues:</u> • Shape of a suitably defined Open Space for spatial flexibility and visibility; • Maximising street frontage; • Appropriate width to length ratio of the Open Space; • Appropriate extent of major / minor space; and • Appropriate sizes or areas of Open Space that correspond to uses / contexts.

[1] Development Bureau 2011, *Public Open Space in private developments design and management guidelines, section 2: design guidelines*, viewed 8 October 2015, http://www.devb.gov.hk/filemanager/en/content_582/guidelines_english.pdf

Perceptual Issues:

- Visibility to promote a sense of openness and safety;
- Open-to-sky or outdoor air public space with appropriate extent of shading for weather protection; and
- Preferably on flat land or carefully designed for visual and spatial connections with gradient or slope with due consideration given to universal access and use and context of the Open Space.

Landscape Planning Issues:

- Appropriate planting (green coverage for the Open Space).

The design of the Open Space shall take full account of specific spatial type, use and context of the space and how the design proactively addresses the requirements that correspond to the type and design intents of the space.

Area Weighting Methodology (AWM) shall be used for calculating the compliance percentage when more than one type of Open Spaces is provided, and each of the types constitutes no less than 10% of the total area of Open Space provided.

The appraisal shall make reference to the Design Guidelines outlined in the Section 2 of the Public Open Space in Private Developments Design and Management Guidelines.

If more than 50% of the relevant items of the Guidelines are fulfilled, 1 credit point shall be awarded.

If more than 75% of the relevant items of the Guidelines are fulfilled, 2 credit points shall be awarded.

If 100% of the relevant sub-items achieved, 1 BONUS credit point shall be awarded.

BACKGROUND

BEAM Plus seeks to encourage the Applicant and design team to provide quality Open Space, especially in built-up areas, to contribute to a high degree of liveability of the neighbourhood. This is particularly important in the context of Hong Kong's high density and compact built environment, where there is often a limited amount of Open Space in the city core.

In response to public concerns for quality Open Space in built-up areas, the Development Bureau has published the Public Open Space in Private Developments Design and Management Guidelines. The Design Guidelines address generic design issues of quality Open Space which are good reference for the design of Open Space planned by public, private or other organisations. It is understood that the Design Guidelines can be applied to individual cases on their own merits with flexibility with regard to specific sites and project constraints.

4 MATERIALS AND WASTE ASPECTS

4.1 EFFICIENT USE OF MATERIALS
4.2 WASTE MANAGEMENT

INTRODUCTION

The amount and range of materials used in the construction, operation and maintenance and fitting-out of buildings represents a significant use of natural resources, in terms of extracted raw materials, emissions, and embodied energy. There are opportunities to reduce environmental impacts through improved masterplanning design of neighbourhood developments. There are opportunities to reduce material use through efficient use of materials by building reuse and improved waste management.

4.1 EFFICIENT USE OF MATERIALS

MWA 1 BUILDING REUSE

BACKGROUND

Efficiency in the use of materials can be significantly improved through the reuse of building elements, such as foundations, main structures and façades, etc.

4.2 WASTE MANAGEMENT

MWA 2 MINIMISED CUT AND FILL
MWA 3 INTEGRATED WASTE MANAGEMENT

BACKGROUND

To minimise the disposal of construction and demolition waste, cut and fill should be minimised by careful masterplanning and design for site formation works.

Integrated waste management should be encouraged to promote waste reduction at source, effective sorting and collection within the Site, and waste facilities for recycling and reuse of waste to reduce Municipal Solid Waste (MSW).

4 MATERIALS AND WASTE ASPECTS

4.1 EFFICIENT USE OF MATERIALS

MWA 1 BUILDING REUSE

EXCLUSIONS

Projects on reclaimed land or greenfield sites.

OR

Projects where building reuse process, including conservation and / or refurbishment process, for the current use falls outside timescale of the Project.

OBJECTIVE

Encourage the reuse of major elements of existing buildings, reduction in demolition waste, conservation of resources and minimisation of environmental impacts during the masterplanning stage.

NO. OF CREDIT POINTS

2 + 1 BONUS credit points

PREREQUISITES

The reuse of major elements from an existing building structure or shell shall comply with Building (Construction) Regulations Chapter 123B Regulation 90 (fire resisting construction) and other relevant building regulations.

CREDIT REQUIREMENT

1 credit point for the reuse of 30% or more of existing sub-structure and superstructure.

OR

2 credit points for the reuse of 60% or more of existing sub-structure and superstructure.

AND

1 BONUS credit point for the reuse of 90% or more of existing sub-structure and superstructure.

ASSESSMENT

The Applicant shall submit a report prepared by a suitably qualified person, with calculation details on the preliminary pre- and post-construction proposals in drawings, and supporting documentation to demonstrate the percentage of the quantity (by mass or volume) of the retained and reused portions of major building elements from the sub-structure and superstructure of the existing buildings, as to the overall quantity (by mass or volume) of the major building elements in the sub-structure and superstructure of the new development. Where the prescribed percentage is achieved, the credit point(s) shall be awarded.

BACKGROUND

With greater flexibility in site / development planning, opportunities may exist to rehabilitate existing buildings. The rehabilitation of old industrial buildings is a successful example of commercial redevelopment in many cities around the world. There is a potential to lower building costs and provide a mixture of desirable building characteristics. However, the practical reuse of existing structural elements depends on many factors, not the least fire safety, energy efficiency, and regulatory requirements, all of which need to be

critically reviewed to determine the advantages and feasibility of reuse as opposed to wholesale demolition.

4 MATERIALS AND WASTE ASPECTS

4.2 WASTE MANAGEMENT

MWA 2 MINIMISED CUT AND FILL

EXCLUSIONS	Sites without cut and fill as a part of site formation.
OBJECTIVE	Encourage reduction in the quantity of cut and fill materials removed from or transported to the site.
NO. OF CREDIT POINTS	3 credit points
PREREQUISITES	None
CREDIT REQUIREMENT	1 credit point is awarded where the sum of materials transported into the Site and removed from the Site for cut and fill purpose is less than 60% of the sum of cut and fill materials. OR 2 credit points are awarded where the sum of materials brought into the Site and removed from the Site for cut and fill purpose is less than 30% of the sum of cut and fill materials. OR 3 credit points are awarded where no material is removed from or transported into the Site for cut and fill purpose.
ASSESSMENT	The Applicant shall submit a report, prepared by a suitably qualified person, outlining the extent of cut and / or fill with reference to the existing terrain within the Site. Where it can be demonstrated that less than 60% or 30% of the sum of cut and fill materials shall be removed from or transported into the Site, one or two credit point(s) shall be awarded. 1 credit point if A is greater than 30% and equal or less than 60% of B. 2 credit points if A is greater than 0% and equal or less than 30% of B. 1 BONUS credit point if A is zero (0) for cut and fill purpose. Where, A = materials removed from and transported into the Site for cut / fill purpose B = total sum of cut and fill materials The cut and fill material shall be calculated using weight of cut material consistently throughout. Where the cut materials are deemed not suitable to be used as backfill materials on site, such as contaminated soil, marine deposit etc., the weight of unsuitable material shall be removed from all calculations.

The onus is placed on the Applicant to provide evidence, prepared by a suitably qualified person, justifying why some cut materials are not suitable to be used as backfill materials on site.

Basic Demonstration

Project D has a total of 300kg cut materials, of which:

- 100kg is not suitable to be used as backfill materials (I);
- 100kg is used on site as backfill materials (J); and
- 100kg is removed from the site (K).

Project D has a total of 500kg fill materials, of which:

- 100kg is sourced from cut materials from its own site (J); and
- 400kg is brought into the site (L).

Total weight of cut materials removed from the site, excluding those unsuitable as backfill material = 100kg (K)

Total weight of fill materials brought into the site = 400kg (L)

Total weight of materials brought in and transported out of the Site for cut and fill purpose, excluding those deemed unsuitable

K + L = 500kg (A)

Total weight of sum of cut and fill materials, excluding those deemed unsuitable

J + K + J + L = 700kg (B)

A as % of B = 71.43%

Therefore, the Project D will not achieve any credit point under MWA2.

The calculation should only include cut and fill that were undertaken or are to be undertaken after land ownership assumption, i.e. any cut and fill carried out by others under different ownership shall not be included.

When it can be demonstrated that no cut and fill materials have been removed from or transported into the Site, 3 credit points shall be awarded.

Excavated materials resulting from foundation or substructure works such as piling and basement construction shall not be included in the calculation of cut and fill materials for this credit, as these are considered building-level or project implementation activities. Excavated materials generated on site as a result of ground investigation and preliminary geotechnical studies - which are likely to take place during the planning stage of a project – are also not considered as cut and fill materials for purpose of this credit due to their temporary nature.

BACKGROUND

To minimise the depletion of public fill reception facilities [1], cut and fill in site formation works should be minimised. Balanced cut and fill reduces burden on public fill reception facilities, in turn, it helps minimise the need for haulage and save up costs in transportation needs and the associated energy consumption.

[1] Environmental Protection Department 2009, *Construction waste management*, viewed 12 October 2015, http://www.epd.gov.hk/epd/misc/cdm/management1.htm

4 MATERIALS AND WASTE ASPECTS

4.2 WASTE MANAGEMENT

MWA 3 INTEGRATED WASTE MANAGEMENT

EXCLUSIONS	None.
OBJECTIVE	Encourage the adoption of integrated waste management for managing Municipal Solid Waste (MSW) to achieve waste reduction at source and to facilitate the recycling of waste.
NO. OF CREDIT POINTS	3 credit points
PREREQUISITES	The planning and layouts of the refuse collection point / refuse storage and material recovery chamber shall meet the requirements of the Cap 123H Building (Refuse Storage and Material Recovery Chambers and Refuse Chutes) Regulations.
CREDIT REQUIREMENT	1 credit point is awarded where an integrated waste management plan is put in place and sufficient waste facilities are provided to promote the reduction, reuse and recycling of waste within the Site. AND 1 credit point is awarded if there are waste processing facilities provided on site. AND 1 credit point is awarded where a commitment to engage on-site personnel to oversee and facilitate the effective operation of the waste management facilities.
ASSESSMENT	The Applicant shall submit a report to detail the strategy on integrated waste management for waste reduction at source, through different strategies including waste sorting, waste collection within the Site and recycling or reuse of waste. The report should be prepared by a suitably qualified person, with scale drawings and other relevant supporting documents provided. <u>Integrated waste management plan</u> The integrated waste management plan shall, at a minimum, include the following information: • An integrated waste management plan outlines the details of how the MSW disposal rate can be reduced by the waste management hierarchy – prevention, reuse, recycling, recovery and disposal; • The separation of waste shall include paper products, plastic products, metal cans, glass and batteries at a minimum; • The separation of waste may also include food waste, organic landscape waste, and others (fluorescent light tubes, electronic products etc.);

- The waste facilities for waste sorting / recycling / reuse located within the Site shall be planned at suitable locations with a convenient access for pedestrian and vehicular traffic.
- The access for pedestrians from the notional entrance of any occupied building to the waste facilities for waste sorting located within the Site shall be covered for weather protection.
- The vehicular loading / unloading area of the waste facilities shall also be covered; and
- The integrated waste management plan should demonstrate that the management principles embodied in the "Guidelines of Yard Waste Reduction and Treatment" [1] have been properly considered and incorporated in the plan which should also identify the locations of adequate on-site composting facilities for the composting of a substantial proportion of the organic landscape waste generated within Site.

On-site waste processing facilities

To obtain the second credit point, the Applicant must demonstrate the provision of waste processing facilities on Site. Examples of facilities to process waste on site include:

- Compost stations;
- Waste compacting machine;
- Energy generation facilities using organic waste;
- Waste recycling stations dedicated to separation, collection and storage of recyclable materials and fixtures; and / or
- Collection stations for used materials / fixtures for reuse.

If a Project include any of the above proposed waste recycling and / or processing facilities on site, the Applicant shall submit a report prepared by a suitably qualified person, with the following information:

- Basic description of the facilities;
- Scale drawing showing the approximate location of the facilities; and
- A preliminary calculation for the processing capacity, the types of by-product and the plans for the use or treatment of the by-product.

On-site waste management personnel

To attain the additional 1 credit point concerning the commitment to employ on-site waste management personnel, the Applicant shall submit the following information prepared by a suitably qualified person:

- An additional section in the integrated waste management outlining the roles and responsibility of on-site personnel to oversee and facilitate effective operation of the facilities; and
- A letter of commitment, signed by an authorised signatory at director level, outlining the intention to engage on-site personnel for the facilities.

[1] Greening Landscape and Tree Management Section. 2014, *Guidelines on yard waste reduction and treatment*, viewed 12 October 2015, http://www.trees.gov.hk/filemanager/content/attachments/Guidelines_on_Yard_Waste_Reduction_and_Treatment.pdf

BACKGROUND

Based on the Hong Kong Blueprint for Sustainable Use of Resources 2013 – 2022 [2], Hong Kong has a comparatively large waste load compared to neighbouring cities at a similar level of development. The current per capita MSW disposal rate is 1.27 kg per day.

The Blueprint targets reduction of the MSW disposal by 20% and 40% of the current level to 1 kg per day and 0.8 kg per day by 2017 and 2022 respectively.

Maintenance of landscape areas generates organic landscape waste (variously called "Yard Waste", "Green Waste or "Garden Waste") which typically includes grass clippings, leaves, branches, tree trunks, cut flowers, bushes and shrubs, and plants used for decorations during festivals.

According to the Environment Bureau about 127 tonnes of yard waste (or 1.5% of municipal solid waste disposal) was disposed of at landfills each day in 2011 [3].

Government's strategy to deal with this waste is to promote reduction at source, encourage separation and collection, and finding the best ways to treat remaining waste. In line with this, Development Bureau has issued 'Guidelines on Yard Waste Reduction and Treatment" [4] to provide general measures on organic landscape waste reduction and treatment in various stages from planting design, maintenance and to suggest ways as to how such waste can be reduced, reused and recycled.

Part of the strategy is the promotion of composting to generate organic fertiliser which can be used in-situ, reducing reliance on inorganic fertilisers.

[2] Environment Bureau 2013, *Hong Kong blueprint for sustainable use of resources 2013 – 2022*, viewed 12 October 2015, http://www.enb.gov.hk/en/files/WastePlan-E.pdf

[3] Environment Bureau 2014, *A Food Waste & yard Waste Plan for Hong Kong 2014-2022*, viewed 12 October 2015, http://www.enb.gov.hk/en/files/FoodWastePolicyEng.pdf

5 ENERGY ASPECTS

5.1 SUSTAINABLE BUILDINGS
5.2 SUSTAINABLE INFRASTRUCTURE

INTRODUCTION

BEAM Plus encourages the design of developments, systems and provisions that enhance energy efficiency and energy conservation. Credits are awarded based on two levels: building and infrastructure level.

5.1 SUSTAINABLE BUILDINGS

EA1 CERTIFIED SUSTAINABLE BUILDINGS
EA2 PASSIVE DESIGN

BACKGROUND

The building sector is often the largest energy consumer in urban development. In 2011, buildings consumed 63% of the total energy use in Hong Kong [1]. Hence, it is important to address the environmental performance of buildings within any neighbourhood development.

The objective of this part is to encourage developments with buildings that are designed, constructed, and retrofitted using green building certification. A site layout with considerations of passive building design can allow buildings to respond positively to local climate, reduce reliance on active servicing for human comfort, as a result, reduces energy consumption and the associated greenhouse gas emission.

5.2 SUSTAINABLE INFRA-STRUCTURE

EA 3 ENERGY EFFICIENT INFRASTRUCTURE
EA 4 RENEWABLE ENERGY

BACKGROUND

The adoption of district-wide systems has become an emerging trend for new developments globally. In other parts of the world such as North European countries, Northern China and commonly Japan and Korea, district scale systems, heating, in this case, have been used by general public for their lower cost and reliability of supply.

Hong Kong has been planning and constructing a number of district cooling plants for large urban sites and urban renewal sites such as West Kowloon Cultural District and Kai Tak Area, utilising seawater as a heat rejection medium. It is anticipated that district cooling system would become more desirable means to provide reliable supply of cooling with greater energy efficiency and reduced heat rejection into the urban streets.

[1] Electrical and Mechanical Services Department 2013, *Hong Kong energy end-use data 2013*, viewed 12 October 2015, http://www.emsd.gov.hk/emsd/e_download/pee/HKEEUD2013.pdf

5 ENERGY ASPECTS 5.1 SUSTAINABLE BUILDINGS

EA 1 CERTIFIED SUSTAINABLE BUILDINGS

EXCLUSIONS None.

OBJECTIVE Encourage developments to adopt holistic green building practices to guide the design, construction, and retrofitting processes.

NO. OF CREDIT POINTS 6 credit points

PREREQUISITES None.

CREDIT REQUIREMENT The following table outlines attainable credit points based on the percentage (%) of either CFA or GFA of a development to be certified under BEAM Plus New Buildings (NB) or Existing Buildings (EB).

Percentage of either CFA or GFA of a development to be certified Silver rating or above	Credit Points
Equal or greater than 10%, but less than 20%	1
Equal or greater than 20%, but less than 30%	2
Equal or greater than 30%, but less than 40%	3
Equal or greater than 40%, but less than 50%	4
Equal or greater than 50%, but less than 60%	5
Equal or greater than 60%	6

ASSESSMENT At the time of registration for BEAM Plus Neighbourhood, the Applicant shall submit the following documents to qualify for the above credit points:

- A Commitment Letter, signed by an authorised signatory at director level, to the BEAM Society Limited to declare that the Applicant would design, build and commission buildings within the Site to achieve a BEAM Plus NB or EB rating of Silver or above;
- A masterplan area schedule, showing detailed calculations of either CFA or GFA; and
- A proof of BEAM Professional(s) having been appointed and engaged, or a letter of commitment, signed by an authorised signatory at director level, to state that BEAM Professional(s) will be appointed and engaged for future certification of buildings on site.

If the buildings on the Site have been registered under BEAM Plus, been assessed or certified at the time of BEAM Plus Neighbourhood registration, the Applicant shall submit the following documents to qualify for this credit:

- A copy of the Acknowledgement Letter;
- A valid BEAM Plus NB certificate;
- A valid EB certificate; and
- Other supporting evidence outlining the percentage of either CFA or GFA in m^2 that is subject to such certification.

Whether CFA or GFA is used, one type of floor area calculation should be used consistently throughout the submission for BEAM Plus ND under EA 1.

If the project is / will be assessed by any overseas green building / neighbourhood / district / precinct assessment tools, the Applicant is required to submit the equivalent evidence and documents as outlined above to obtain the credit points.

Should the Applicant commit to both BEAM Plus NB and EB for the same CFA or GFA, the CFA or GFA can only be counted once towards this credit.

For example, if a project consists of 40% of its CFA to be certified silver rating in both BEAM Plus NB and EB, together with another 15% of its CFA to be certified silver rating in BEAM Plus NB, the total percentage of CFA to be counted towards this credit will be 55%, hence the project will achieve 5 credit points under EA 1a.

BACKGROUND

The building sector is often the largest energy consumer in urban development. In 2011, buildings consumed 63% of the total energy use in Hong Kong [1]. Hence, it is important to address environmental performance of buildings at neighbourhood scale. In light of this, various green building assessment tools have been developed to help raise the performance standard of everyday building practice.

Since its launch in 2010, BEAM Plus for New Buildings and BEAM Plus for Existing Buildings have continued to expand its influence while gaining acceptance by the industry as well as from the general public. Owing to the established acceptance of BEAM Plus New Buildings and Existing Buildings, this credit will be awarded to projects with buildings to be certified, or has been certified under BEAM Plus New Buildings and Existing Buildings.

Recognising the fact that detailed design information of a new building is often unavailable at the masterplanning stage, a letter of commitment is required to demonstrate the Applicant's genuine desire to undertake BEAM Plus New Buildings registration and certification in future.

[1] Electrical and Mechanical Services Department 2013, *Hong Kong energy end-use data 2013*, viewed 12 October 2015, http://www.emsd.gov.hk/emsd/e_download/pee/HKEEUD2013.pdf

5 ENERGY ASPECTS **5.1 SUSTAINABLE BUILDINGS**

EA 2 PASSIVE DESIGN

EXCLUSIONS None.

OBJECTIVE Encourage developments to adopt passive design to guide the design and construction process.

NO. OF CREDIT POINTS 4 credit points

PREREQUISITES None.

CREDIT REQUIREMENT

a) Solar Orientation

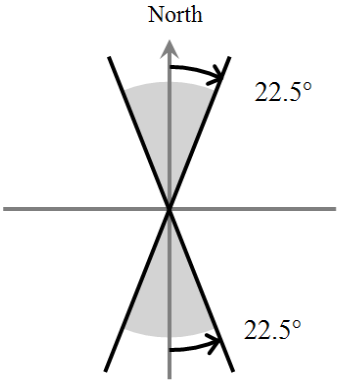
1 credit point is awarded where the following requirements are fulfilled:

- The combined façade area of south and north elevations contributes to 66% of the total façade area of the building(s);
- The normal of the south and north facing façades must be within 22.5° of the geographical north / south axis; and
- At least 25% of the number of buildings within the Site fulfil the above requirements.

OR

2 credit points are awarded where the following requirements are fulfilled:

- The combined façade area of south and north elevations contributes to 66% of the total façade area of the building(s);
- The normal of the south and north facing façades must be within 22.5° of the geographical north / south axis; and
- At least 50% of the number of buildings within the Site fulfil the above requirements.



OR

2 credit points are awarded where the optimisation of site layout by building disposition / orientation to reduce solar radiation on the proposed building blocks within the Site is demonstrated.

b) Wind Environment

1 credit point is awarded where the building separation requirements stipulated in Appendix B of Buildings Department - PNAP APP-152 Sustainable Building Design Guidelines are complied with [1].

OR

2 credit points are awarded where the optimisation of site layout by disposition and separation of building blocks to enhance wind environment and no pedestrian area will be subject to wind velocity caused by amplification due to the Project.

ASSESSMENT

a) Solar Orientation

The Applicant shall submit the following documentation to demonstrate the compliance:

- Drawings to show the existing and / or proposed street network and locations of all land lots and building blocks together with a north arrow, a suitable scale with a scale bar. The areas which comply with the requirements shall be clearly marked on the submitted drawings; and
- A façade area schedule to show the breakdown of the façade area and the orientation of all building elevations.

OR

The Applicant shall submit a report prepared by a suitably qualified person, to demonstrate the optimisation of site layout using simulations and calculations. The study should be based on the following key approaches:

- Use of dynamic thermal modelling technique to determine the fabric heat transfer and solar transmission of the proposed building blocks within the Site. Improvement measures, with a reduction in solar flux on each building block, should be included;
- Both of the original or baseline designs and improved designs should reflect the same CFA or GFA and other parameters such as building footprint, building height, setback etc.; and
- The comparison of the original and improved masterplan designs shall be included.

b) Wind Environment

To obtain 1 credit point, the Applicant shall submit a report, prepared by a suitably qualified person, explaining in detail how the building separation requirements stipulated in Appendix B of Buildings Department - PNAP APP-152 Sustainable Building Design Guidelines [1] can be met.

OR

[1] Buildings Department 2011, *PNAP APP-152 sustainable building design guidelines*, viewed 12 October 2015, http://www.bd.gov.hk/english/documents/pnap/APP/APP152.pdf

Alternatively, the Applicant can obtain the 2 credit points by optimisation of the site layout. The Applicant shall submit a report, prepared by a suitably qualified person, to demonstrate the compliance.

The assessment should be based on the following key approaches:

- For the study area of Computational Fluid Dynamics (CFD), the test points should be positioned within 1H from the Site Boundary, with H being the height of the tallest building in the Site;
- The relative wind speed through buildings shall be assessed by placing a model of the buildings and their surrounding structures within 2H, with H being the height of the tallest building on Site;
- An approximate number of suitably located test points should be positioned outside the Site within the CFD model. Particular attention should be given to building corners, gaps between buildings and building voids; and
- No test point reported should exceed an average "hourly mean wind speed" of 4 m/s.

Wind Data

- The site wind data should be adopted from the appropriate and reliable sources, such as meso-scale model Regional Atmospheric Modelling System (RAMS) from Planning Department [2];
- The wind profile from the site wind data should also be adopted as the boundary condition in the model;
- Only the wind rose to the height of around 400m to 600m shall be used;
- At least 8 of the prevailing wind directions (out of 16) should be tested. The cumulative wind frequency from the selected wind directions should exceed 75% of the time under the total wind frequency. The selection of wind directions should be placed in a descending order based on the wind frequency; and
- The study shall be carried out under annual prevailing wind conditions only.

CFD Model

- The testing model should cover the project area as well as the assessment area and the surrounding area;
- The CFD model should cover the Project Site as well as the areas surrounding the Site. The surrounding area shall include at least a perpendicular distance of 2H from the Project Boundary, with H being the height of the tallest building on Site;
- External features that would pose significant impacts on wind pattern should be included in the model, such as topography, bridge, noise barrier, building structures and bulky obstructions; and

[2] City University of Hong Kong for Planning Department 2013, *Consultancy Study on Establishment of Simulated Site Wind Availability Data for Air Ventilation Assessments in Hong Kong*, viewed 16 November 2016, http://www.pland.gov.hk/pland_en/p_study/comp_s/InceptionReport_webpage_11-12/final_report.pdf. .

- It is appropriate to simplify the modelling feature as long as it would not pose significant impact to the wind pattern; and
- To ensure an accurate simulation result, it is recommended that body-fitted grid should be used for the CFD mesh.

Assessment Criteria

- The study shall be carried out under annual prevailing wind conditions only;
- Computational Fluid Dynamics (CFD) approach is the recommended tool to simulate the wind velocity;
- CFD model shall include the Project Site as well as its surrounding area up to a perpendicular distance of H from the Project Boundary, with H being the height of the tallest building on Site;
- The test points shall be placed in the CFD model at the height of 2m above the ground and / or podium level to record the pedestrian wind speed;
- The test points shall be placed in areas which are frequently accessed by pedestrians, such as areas along the pavement, seating area, outdoor circulation area, public park, playground, podium garden and sky garden etc.;
- For those indoor space and space that are not frequently accessed by pedestrians, such as roof area, carpark, and inaccessible greenery areas, they shall not be assessed; and
- The distance between test points is recommended to be around 10m to 50m, from centre to centre, with at least one test point in each area. The area may be subdivided based on names and / or functions where appropriate.

BACKGROUND

With the view to addressing three dimensions of sustainability – economic, environmental and social – the role played by environmentally friendly buildings cannot be underestimated, especially in a compact urban environment such as Hong Kong.

Solar orientation of a building may have a significant impact on its passive design potential, especially on the solar heat gain, one of the major contributors of energy consumption for air-conditioning of buildings.

For a sub-tropical region like Hong Kong, the higher the solar heat gain, the more energy a building consumes for cooling the indoor air in order to maintain occupants' thermal comfort. Solar heat gain of a building depends on a number of parameters including building orientation, façade design and the provision of shading devices, etc.

Another important factor for passive design is the wind environment where the building is located. Hong Kong is one of the most densely populated cities in the world. In particular, the design tendency to maximise views out from internal space at a certain direction often results in congested building masses with little space between buildings. This often creates problems like stagnant air and concentrated pollutants in the urban environment.

Effective air ventilation in the outdoor environment is essential for health and comfort consideration of human well-being. It assists the dispersion of air pollutants, enhances thermal comfort, and maximises potential natural ventilation of buildings, which would help reduce the demand for mechanical cooling.

5 ENERGY ASPECTS **5.2 SUSTAINABLE INFRASTRUCTURE**

EA 3 ENERGY EFFICIENT INFRASTRUCTURE

EXCLUSIONS

Projects of pure residential use; and

For EA 3a, public sector projects where the district energy system connection is mandated by land lease conditions or engineering conditions.

OBJECTIVE

Encourage energy efficient infrastructure including district cooling and / or energy systems that reduces CO2 emissions and the environmental impact.

NO. OF CREDIT POINTS

4 + 2 BONUS credit points

PREREQUISITES

None.

CREDIT REQUIREMENT

a) Provision of District Energy System

2 credit points are awarded where the Site is connected to a district cooling or energy system, whether there is an existing system or there will be a planned one.

b) District Energy System Efficiency

1 credit point is awarded if the Applicant can demonstrate that a target annual average COP of 4.7 at full utilisation can be achieved through a continuous monitoring of the plant efficiency.

1 BONUS credit point is awarded where the plant average annual efficiency (including cooling towers and primary pumps) is equal to or greater than the COP of 4.7.

c) Supporting Infrastructure of District Energy System

1 credit point is awarded where a walkable service tunnel with adequate maintenance access for the district system is provided.

1 BONUS credit point is awarded where other utilities services are combined with the district system piping route and a walkable service tunnel is provided.

ASSESSMENT

Combined Cooling, Heating and Power (CCHP) district systems can qualify for this credit if equivalent performance as detailed above can be attained.

a) Provision of District Energy System

District energy system refers to a system in which energy, in the form of cooling, heating and electricity, or a combination of the above, is generated and supplied from one or more central plants which are

connected to user buildings through a network of pipes and cables to more than one building. The total number of central plants should be less than the total number of buildings they serve.

The district energy including CCHP would qualify for this credit if it can provide a minimum of 80% of the Project's peak cooling demand or equivalent, after deducting the demand for residential use, if any.

District energy plant may be located within the Site or outside the Site with planned or designated connection to the Site. It does not have to be owned or operated by the Applicant, as long as the actual or a planned connection to the buildings on Site can be established at the time of Project's completion.

To attain the 2 credit points, the Applicant shall submit the following:

For a district energy and / or cooling system within the Site:

- A summary of feasibility study, prepared by a suitably qualified person, demonstrating the technical and environmental viability of the district energy system for the site;
- The district plant should provide at least 80% of peak cooling energy or equivalent for the Site;
- The energy demand for residential and other existing buildings may be excluded from the calculation;
- Other implementation factors, including but not limited to, annual load profile, equipment configuration, number of buildings services and additional capacity for future connection of the system(s), if any, shall also be addressed; and
- Scale drawings to show the location(s) of district energy plant, pipe routing and other associated infrastructure.

For a district energy and / or cooling system outside the Site:

- A letter of commitment, signed by an authorised signatory at director level, shall be submitted by the owner and operator of district energy and / or cooling plant outlining the maximum cooling capacity and / or electrical capacity which will be, or is being provided by the district energy system(s) to the Site; and
- Scale drawings to show the locations of district energy plant, the pipe connection(s) to the Site for providing services, and
- The layout plan for the district energy system substation and other associated infrastructure.

b) District Energy System Efficiency

To attain 1 credit point, the Applicant shall submit the following in addition to the documents listed above for EA 3a:

- A letter of commitment, signed by an authorised signatory at director level of the district energy and / or cooling owner or operator, outlining the continuous monitoring of plant efficiency with a target annual COP of 4.7 at full utilisation.

To attain the BONUS credit point, the Applicant shall submit the following in addition to the documents listed above for EA 3a:

- A report prepared by a suitably qualified person, to demonstrate that the annual average of the overall annual average COP of the cooling plant in district energy system (including cooling towers and associated chilled water and condensing water pumps) will have a minimum COP of 4.7. The estimation of annual electricity consumption and annual cooling load shall be included in this report.

c) Supporting Infrastructure of District Energy Systems

To attain 1 credit point for providing a walkable service tunnel for the district system, the Applicant shall submit the following in addition to the documents listed above:

- The scale drawings including plans and sections of the service tunnel to show the dimensions of major pipes, passages and maintenance areas etc.

For the additional BONUS credit point, the Applicant is required to submit an operation plan to address the integration of various utilities sharing a common walkable service tunnel.

BACKGROUND

Most commercial buildings in Hong Kong have their own centralised cooling systems equipped with chillers and cooling towers, whereas most residential units are equipped with their own air-conditioners for cooling - often multiple air-conditioners per unit to cool a number of rooms. This has created scenes of many air conditioning units hanging outside the façade of residential buildings with the hazard of dripping condensate.

Serving a large area or population with different demand profiles, such as residential and commercial, generally presents an opportunity for greater utilisation of cooling equipment, resulting in reduced energy demand and more efficient use of cooling capacity.

In other countries such as Northern European countries, Northern China, Japan, as well as Korea, district scale systems, heating, in this case, are used with much popularity by the general public for their relatively low cost and reliability of supply.

More and more countries in the tropical and sub-tropical regions are introducing district scale cooling, eliminating the undesirable aesthetics and hazards caused by individual air conditioning units and concentration of emitted waste heat that further exacerbate the Urban Heat Island effect.

In recent years, Hong Kong has been planning and constructing a number of district cooling plants for large urban and renewal sites such as the West Kowloon Cultural District and Kai Tak Area utilising seawater as a cooling agent, it is anticipated that district cooling system would become a more desirable means to provide reliable supply of cooling with greater energy efficiency whilst reducing waste heat dissipating into the urban streets. The centralised plant can also reduce building construction area for plantrooms within individual buildings.

The efficiency of the district energy and / or cooling is determined by various components, including the equipment efficiency, the plant configuration, the load profile, as well as the distance between a central plant and demand. LEED-ND suggests a recommended overall district cooling efficiency of COP 4.4, which takes into account the cooling towers and primary pumps [1]; and Green Mark District uses a minimum total system efficiency of COP 4.7 for Green Mark Gold, Gold ^{PLUS} and Platinum ratings [2]. Due to the lack of such figure locally available from operating district cooling plant, the COP of 4.7 is used as the benchmark for this credit, based on the published district energy efficiency from overseas rating tools.

The adoption of walkable service tunnel eliminates the need for disruptive road excavations to access the utility services underground, which is an important consideration for ease of future maintenance.

[1] LEED 2010, *Treatment of district or campus thermal energy in LEED V2 and LEED 2009 – Design & Construction*, viewed 12 October 2015, http://www.usgbc.org/Docs/Archive/General/Docs7671.pdf

[2] Building and Construction Authority 2013, *BCA Green Mark for Districts (Version 2.0)*, viewed 12 October 2015, http://www.bca.gov.sg/greenmark/others/GM_District_V2.pdf

5 ENERGY ASPECTS **5.2 SUSTAINABLE INFRASTRUCTURE**

EA 4 RENEWABLE ENERGY

EXCLUSIONS None.

OBJECTIVE Encourage wider application of district renewable energy sources in neighbourhood development.

NO. OF CREDIT POINTS 3 credit points

PREREQUISITES None.

CREDIT REQUIREMENT

a) Shared Renewable Energy

1 credit point is awarded under the following conditions:

- The project is connected to a district or shared renewable energy system, whether it is an existing system or a newly planned one; and
- If it can be demonstrated that the system can supply at least 0.25% of the annual estimated total energy demand within the Site.

OR

2 credit points are awarded under the following conditions:

- The project is connected to a district or shared renewable energy system, whether it is an existing system or a newly planned one, and
- If it can be demonstrated that the system can supply at least 0.5% of the annual estimated total energy demand within the Site.

b) External Lighting Offset by Renewable Energy

1 credit point is awarded where 100% of the annual estimated external lighting energy demand within the Site, excluding the façade lighting, is offset by renewable energy.

ASSESSMENT

a) Shared Renewable Energy

To attain the credit points for district and or shared renewable energy system, the Applicant shall submit the following;

- A feasibility study prepared by a suitably qualified person, demonstrating the viability of a district renewable energy system in terms of technical, environmental and financial aspects;

- The district renewable energy system must supply to more than one building/ facility, whether the buildings/ facilities are within the Site or outside the Site, and it must be capable of supplying a minimum 0.25% or 0.5% of the annual estimated total energy demand within the Site;
- The report shall address other implementation factors, including, but not be limited to, the annual load profile, the construction phasing, the operation plans, the additional capacity for future connection of the system(s);
- The estimation of total energy demand within the Site shall include all foreseeable energy demand from the interior of buildings, the façade, as well as the street and external lighting. The Applicant may make reference to Energy Utilization Indexes and Benchmarks for Residential, Commercial and Transport Sectors by EMSD [1];
- A report prepared by a suitably qualified person, demonstrating strategies for reduction and substantiation for the reduction, if the Project Applicant envisages a substantial reduction against the data from Energy Utilization Indexes and Benchmarks for Residential, Commercial and Transport Sectors by EMSD [1];
- Scale drawings to show the location of the district renewable energy plant, pipe routing and other associated infrastructure. The system shall be detached from the buildings within the Site; and
- Letters of commitment, signed by an authorised signatory at director level from the building owner(s), shall be submitted to confirm the connection / utilisation of energy generated by the district renewable energy systems on-site.

The renewable energy technologies eligible for this credit are listed below:

- Photovoltaic systems;
- Solar thermal systems;
- Wind energy systems;
- Biomass thermal systems;
- Biofuel-based electrical systems;
- Geothermal heating systems;
- Geothermal electric systems;
- Hydroelectric, wave and tidal power systems;
- Waste-to-energy systems.

Renewable energy from electricity utility suppliers such as HK Electric or CLP shall not be considered in this credit.

For renewable energy to qualify for this credit, it shall:

- be produced on site using one of the above renewable energy technologies; and
- have a system to share the produced renewable energy with neighbouring buildings that are not included in this certification; or

[1] Electrical and Mechanical Services Department 2016, *Energy utilization indexes and benchmarks for residential, commercial and transport sectors*, viewed 15 November 2016, http://ecib.emsd.gov.hk/en/index.htm

- have systems to share the produced renewable energy back to main grid at times of surplus production.

The calculation of the annual estimated total energy demand within the Site shall exclude those of tenant load and load from residential units.

b) External Lighting Offset by Renewable Energy

To attain 1 credit point for external lighting, the Applicant shall submit or confirm the following :

- A letter of commitment signed by an authorised signatory at director level;
- A calculation by a suitably qualified person to demonstrate that the annual external lighting energy demand within the Site is less than or equal to the estimated on-site renewable energy production; and
- If the renewable energy facility already exists or is being planned outside the Site, such as tidal or hydroelectric power, the renewable energy facility should:
  - Be located within the Impact Area with proper permit from the relevant authority for such installation and operation;
  - Be owned by the Applicant;
  - Be constructed as a part of the Project;
  - Be primarily used to offset energy demand of the Project whether through direct and dedicated cabling or through a grid feedback system ; and
  - Be able to offset 100% of annual external lighting energy demand of the Site with no double counting of offset elsewhere.

BACKGROUND

The major types of renewable energy available in Hong Kong are solar energy, wind energy, biogas and bio-diesel. In 2014, 1,993 TJ of renewable energy was used. Biogas, which is largely used to generate electricity, produced at landfill sites and sewage treatment plants, has contributed 83% of total renewable generation in Hong Kong followed by Biodiesel (15%), Solar energy (1.5%) and wind energy (<1%) [2]. The effective use of renewable energy resources will help Hong Kong to reduce reliance on fossil fuel and hence lower the associated greenhouse gas emissions.

Most overseas rating tools use the ratio between renewable energy system capacity and total site demand as an assessment criterion for awarding credits. Considering the difficulty in applying renewable energy in a densely populated urban environment like Hong Kong, the performance criteria are already relaxed in the requirements for BEAM Plus Neighbourhood.

[2] Electrical and Mechanical Services Department 2013, *Hong Kong Energy End-Use Data 2013*, viewed 15 November 2016, http://www.emsd.gov.hk/filemanager/en/content_762/HKEEUD2016.pdf

6 WATER ASPECTS

6.1 WATER ENVIRONMENT
6.2 WATER MANAGEMENT
6.3 WATER CONSERVATION

INTRODUCTION

This section focuses on site environment with respect to water, including site masterplanning to conserve water bodies and reduce water consumption and effluent, assessment of flood risk and management of stormwater run-off.

6.1 WATER ENVIRONMENT

WA 1 WATER ENVIRONMENT

BACKGROUND

Wetlands, rivers and streams have ecological, functional and also amenity values. They should be conserved as much as possible to perform vital functions such as water storage; flood and erosion control; shore stabilisation; water purification through retention of sediments, filtering pollutants and climate stabilisation etc.

6.2 WATER MANAGEMENT

WA 2 STORMWATER MANAGEMENT

BACKGROUND

Hong Kong experiences very heavy rainstorms at times, often leading to major flooding or mudslides in vulnerable areas. In the New Territories, wide extent of floodplain, low lying terrains and turning natural ground to hard paved impervious areas through urbanisation are the major causes of the problem. In older built-up areas, insufficient drainage capacity and dense land development pose flood risk to neighbourhoods. It is recommended that flood risk is assessed and proper stormwater management strategies are implemented at the masterplanning stage.

6.3 WATER CONSERVATION

WA 3 ALTERNATIVE WATER SOURCE

BACKGROUND

Use of alternative water source, preferably recycled and reused on site means reduction in potable water related energy and alleviation of chronic water shortage issue in Hong Kong.

Neighbourhood developments often contain significant areas of soft landscaping which are likely to consume a large amount of potable water for irrigation.

Use of alternative water source such as recycled waste water and / or rainwater for irrigation could reduce demand for potable water, hence reducing environmental loading of a project.

6 WATER ASPECTS 6.1 WATER ENVIRONMENT

WA 1 WATER ENVIRONMENT

EXCLUSIONS Projects without any existing wetland or water body within the Site.

OBJECTIVE Encourage good masterplan design to conserve water bodies.

NO. OF CREDIT POINTS 1 credit point

PREREQUISITES None.

CREDIT REQUIREMENT 1 credit point is awarded where existing wetlands and water bodies within the Site are conserved.

ASSESSMENT The Applicant shall submit a report, prepared by a suitably qualified person, including survey results and detailed record of the existing conditions of water environment, to demonstrate that no planned building works will occur within existing wetlands or water bodies and a 15m buffer zone surrounding each wetland / or water body will be maintained.

Generally, the buffer distance shall be measured from the perimeter of a water body including:-

- The high-tide mark for sea; or
- The outer edge of the structure for man-made freshwater infrastructure such as a nullah, a riverbank, an open box culvert etc.

The perimeters of other water bodies, such as natural creeks, wetlands or reservoirs with seasonally or tidally fluctuating water levels, shall be determined by a suitably qualified person.

BACKGROUND Most of the wetlands in Hong Kong are found in the North West New Territories. They include streams and rivers, natural marshes, mangroves, intertidal mudflat, as well as artificial fishponds, gei wais and reservoirs. These wetlands have ecological, functional and also amenity values [1]. Wetlands perform vital functions including water storage; flood and erosion control; shore stabilisation; water purification through retention of sediments and filtering of pollutants, climate stabilisation etc.

There are hundreds of small rocky streams that flow through steep ravines in the hilly terrain of Hong Kong. However, Hong Kong's rivers are very limited in number and capacity. Only a few long meandering rivers are found in the floodplains of the Northern and North-western part of New Territories [2].

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[1] Agriculture, Fisheries and Conservation Department 2015, *General information about wetland: wetlands in Hong Kong*, viewed 12 October 2015, http://www.afcd.gov.hk/english/conservation/con_wet/con_wet_abt/con_wet_abt_gen/con_wet_abt_gen_wet.html

[2] Agriculture, Fisheries and Conservation Department 2015, *Hong Kong species: freshwater fish of Hong Kong*, viewed 12 October 2015, http://www.afcd.gov.hk/english/conservation/hkbiodiversity/speciesgroup/speciesgroup_freshwaterfish.html

6 WATER ASPECTS 6.2 WATER MANAGEMENT

WA 2 STORMWATER MANAGEMENT

EXCLUSIONS None.

OBJECTIVE To promote best practices in stormwater management, alleviate the stress of the stormwater drainage system and reduce risk of flooding.

NO. OF CREDIT POINTS 5 + 1B credit points

PREREQUISITES For residential premises with a site area larger than 1,000 m^2, it is required to demonstrate compliance with appropriate planting on site equivalent to at least 20% of the Site Area.

CREDIT REQUIREMENT

a) Stormwater Management through Infiltration

Hard landscaping

1 credit point for using pervious materials for a minimum of 50% of hard landscaped areas.

AND

Soft landscaping

1 credit point for providing appropriate planting on site equivalent to at least 30% of the Site Area.

OR

2 credit points for providing appropriate planting on site equivalent to at least 40% of the Site Area.

b) Stormwater Management through Temporary Storage

Credit points are awarded based on the provision of temporary storage on site, which can be in the form of detention basins and / or storage tanks. The storage volume is calculated based on the site area:

Required storage volume per 1000m^2	No. of credit points
30m^3	1 credit point
60m^3	2 credit points
90m^3	2 credit points + 1 BONUS credit point

ASSESSMENT

a) Stormwater Management through Infiltration

The Applicant shall provide a report prepared by a suitably qualified person. The report shall include a Preliminary Landscape Plan or an outlined Landscape Design Strategy for the site.

Hard landscaping

Where it can be demonstrated that a minimum 50% of hard landscaped area (e.g. roadways, surface parking, plazas, pathways, but excluding Emergency Vehicular Access), are pervious and measures are taken to restrict the contamination of groundwater by oil and similar contaminants, the credit points shall be awarded.

Soft landscaping

It is expected that due account shall be taken of the plant type and planter designs to minimise watering and maintenance requirements.

b) **Stormwater Management through Temporary Storage**

The Applicant shall provide a report prepared by a suitably qualified person to include the Drainage Plan for the Site with the following information:

- The Locations of the temporary storage;
- Dimensions of each temporary storage (including the design storage volume;
- Topographical information of the site for determination of the flow of surface runoff; and
- Proposed drainage networks.

The report shall detail the design of each temporary storage to demonstrate that the surface runoff of the site will be delayed from discharging into the public drainage system. If the outlet of the temporary storage is designed to be close during heavy rainfall, no surface runoff will be discharged into the public drainage system with the exception that when the storage capacity has exceeded. If the outlet of the temporary storage is designed to be open during heavy rainfall, the report shall demonstrate that the outflow rate of the storage is less than 10% of the inflow rate during am Amber Rainstorm Signal rainfall (i.e. 30mm per hour).

The goal of providing temporary storage is to detain the stormwater and hence delay the discharge to a later stage to alleviate the stress of the public drainage system during heavy rainfall events.

Understanding the unique site constraints which is common in Hong Kong, it is more efficient to combine temporary storage for stormwater management with landscape or other amenity features on site. Applicants are also encouraged to harvest the rainwater from temporary storage for other uses within the same development, e.g. plant irrigation. The storage can be in the form of:

- Detention basins;
- Storage tanks;
- Bio-retention area with depressed ground level;
- Wetlands or swales with depressed ground level;
- Rain gardens; and / or
- Sunken basketball court, skateboard ground or other amenity features.

BACKGROUND

Hong Kong is located along the common track of tropical cyclones and hence Hong Kong experiences very heavy rainstorms at times. The annual average rainfall is approximately 2400 mm, which is one of the highest among the cities in the Pacific Rim [1].

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

To tackle the above challenges, the stormwater management practices shall be enhanced to manage the rainwater at its source as far as possible. The promotion of ground infiltration can minimise the impact of urban development on natural water balance, while the provision of temporary storage can enhance the resilience of the drainage system and provide opportunities for better use of rainwater resources. The former can be achieved by increasing the landscaped areas and pervious surface on site; while the latter achieved through the provision of storage tanks or incorporation of temporary storage function into the landscaped or amenity features.

Through the concept of co-use, drainage facilities can be designed to effectively reduce the quantity of runoff, provide additional amenity values and enhance the ecological value of a site. The provision of bio-retention areas, ponds and wetlands would provide opportunities to create visually attractive landscape areas which would create a pleasant environment for people to live and work in.

[1] Drainage Services Department 2009, *Flood prevention*, viewed 16 November 2016, http://www.dsd.gov.hk/EN/Files/publications_publicity/publicity_materials/leaflets_booklets_factsheets/Flood%20Prevention.pdf

6 WATER ASPECTS **6.2 WATER MANAGEMENT**

WA 3 ALTERNATIVE WATER SOURCES

EXCLUSIONS None.

OBJECTIVE Reduce potable water demand for irrigation.

NO. OF CREDIT POINTS 4 credit points

PREREQUISITES None.

CREDIT REQUIREMENT

a) Supply of Alternative Water Sources

1 credit point is awarded where recycled water sources are adopted.

AND

1 credit point is awarded where recycled water sources are derived from recycled grey or black water.

b) Use of Alternative Water Sources

1 credit point is awarded where adopted alternative water sources lead to a reduction of at least 30% in potable water demand for irrigation after the establishment period.

OR

2 credit points are awarded where adopted alternative water sources lead to a reduction of at least 40% in potable water demand for irrigation after the establishment period.

ASSESSMENT

a) Source of Alternative Water Sources

To obtain 1 credit point, the Applicant shall submit a report, prepared by a suitably qualified person, outlining the proposal of integrated water strategies, including the source of alternative water source and the primary calculation of on-site water recycling to be incorporated into future design stages.

The alternative water sources may include:

- The use of harvested rainwater; and
- The use of air-conditioning condensate;
- The use of recycled grey water; and
- The use of recycled black water.

Filtered or recycled freshwater from rivers or seawater, whether locally or municipally supplied, shall not be considered as alternative water sources.

In order to obtain the additional credit point, the Applicant shall submit additional information about recycling of grey and / or black water, including:

- The source of the used water, such as, from washroom basins, kitchen basins, or water cisterns etc.;
- The estimated volume of used water before recycling; and
- The estimated volume of recycled water after filtering and production process.

c) Use of Alternative Water Sources

The Applicant shall submit a report, prepared by a suitably qualified person, to demonstrate how recycled water produced on site will reduce 30% or 40% of the irrigation demand after the establishment period.

In order to establish the actual irrigation demand after deducting the irrigation supplied by rainfall, the Applicant should make the following calculations:

1. Calculate the additional irrigation demand

- Plot the daily rainfall rate based on Hong Kong Observatory data [1]; and
- Compare the daily rainfall rate against the daily irrigation demand to identify the additional irrigation need either through mechanical or manual means of irrigation.

2. Estimate the production of recycled rainwater

- Estimate the production of recycled rainwater based on the size of the catchment area.

3. Calculate the percentage of recycled water

- If the production of recycled water can satisfy 30% or 40% of net irrigation demand on an annual basis, after deducting the rainfall, the Applicant can achieve 1 or 2 credit points respectively for using alternative water sources.
-

BACKGROUND

Water is a scarce resource. Historically Hong Kong had faced periods of chronic water shortage problems due to the limited natural water resources with a rapidly growing population. At present, the majority of freshwater to Hong Kong is supplied from Dongjiang River in Southern China, with the rest of the supply collected from local catchments and harvesting seawater for toilet flushing.

However, with the rapid population growth and the economic development in Southern China, there is an increasingly intense competition for water resources in the region. It is crucial for Hong Kong to enhance the resilience of water supply and WSD is advocating a six-pronged water supply structure consisting of the existing three sources, the local catchments, the freshwater from Dongjiang and the seawater for flushing, together with three new sources, the desalinated

[1] Hong Kong Observatory 2003, *Daily Normals of Meteorological Elements for Hong Kong, January 1981 – 2010*, viewed 19 August 2016, http://www.hko.gov.hk/cis/normal/1981_2010/dnormal01_e.htm

water, the reclaimed water and recycled grey water, as well as the rainwater harvesting. [2]

The use of recycled grey water and harvested rainwater on site can alleviate the demand for potable water for irrigation of landscaping and outdoor cleaning. WSD has issued guidelines for government buildings on rainwater harvesting and grey water recycling [3].

While greenery and water features are desired in congested urban areas, depending of its design, location, selected species and maintenance, they can drive up the demand for potable water. Alternative water sources with on-site collection and treatment can reduce the demand for potable water as well as the energy associated with supplying potable water for irrigation.

Consideration for water-conserving infrastructure and system should be given at the early planning stage to explore the feasibility of using alternative water source to offset irrigation demand.

[2] Water Supplies Department, *2015, 2014/15 Annual Report – Securing longer term water supply*, viewed 29 Oct 2016, http://www.wsd.gov.hk/filemanager/common/annual_report/2014_15/en/securing_longer_term_water_supply.html

[3] Water Supplies Department, 2015, *Technical Specifications on grey water reuse and rainwater harvesting (1st edition)*, viewed 29 Oct 2016, http://www.wsd.gov.hk/filemanager/en/content_1081/technical_spec_grey_water_reuse_rainwater_harvest.pdf

7	**OUTDOOR ENVIRON-MENTAL QUALITY**	**7.1**	**THERMAL ENVIRONMENT**
		7.2	**DAYLIGHT AND VISUAL QUALITY**
		7.3	**AIR QUALITY AND NOISE CONTROL**
		7.4	**QUALITY ACCESS TO EXTERNAL SPACES**

INTRODUCTION

This section of BEAM Plus includes environmental performance aspects which have impact on health, comfort or well-being of the general public, as well as performance aspects that can improve quality and functionality of our built environment. These include:

- Thermal Environment
- Daylight and Visual Quality
- Acoustics and Air Quality
- Quality Access to External Spaces

7.1	**THERMAL ENVIRONMENT**	**OEQ 1**	**OUTDOOR THERMAL COMFORT**
		OEQ 2	**INTRA-URBAN TEMPERATURE AND URBAN HEAT ISLAND EFFECT**

BACKGROUND

This part assesses the thermal environment of the development of the site and its surrounding areas. An onsite thermal environment refers to the outdoor thermal comfort within the Site for pedestrians. The objective is to ensure that thermal comfort is achieved in recreation Open Spaces and pedestrian zones.

Given the compact development pattern in Hong Kong, many suffer from the adverse impact of Urban Heat Island effect. The combination of heat rejection from individual air conditioning units and vehicle engines, together with stagnant air in deep crevasses of buildings packed in the urban areas, have resulted in a further temperature rise during hot and humid conditions in summer. Therefore, the potential Urban Heat Island effect of the new development is also addressed.

7.2	**DAYLIGHT AND VISUAL QUALITY**	**OEQ 3**	**NEIGHBOURHOOD DAYLIGHT ACCESS**
		OEQ 4	**VISUAL QUALITY**

BACKGROUND

Tall buildings cause substantial overshadowing of neighbouring developments and amenities, affecting both direct and indirect sunlight. The physical profile of a building and its layout with respect to neighbouring buildings have impact on beneficial views, such as towards a harbour, mountains or Open Spaces, as well as natural breezeways around the development. BEAM Plus rewards designs that embrace the concept of 'good neighbour buildings', where the impact of a new building on all existing or planned neighbouring buildings is assessed. Good design to promote visual quality of the Open Spaces within the Site is also rewarded.

7.3	**ACOUSTICS AND AIR QUALITY**	**OEQ 5**	**AIR QUALITY OF OPEN SPACE**
		OEQ 6	**MITIGATION OF NOISE**

BACKGROUND

Air quality is affected by various factors including the emission rate of air pollutants, the distance between an emission source and a receptor, topography, building forms and climatology.

Noise pollution is a common type of pollution in densely populated cities.

The purpose of these credits is to (i) promote improved air quality in outdoor spaces by providing adequate separation between an Open Space and a pollution source and (ii) to embrace good design that can reduce exposure to noise.

7.4 QUALITY ACCESS TO EXTERNAL SPACES

OEQ 7 UNIVERSAL ACCESS

BACKGROUND

In order to enhance social integration, disabled persons should have the same rights as any other individual. Under Disability Discrimination Ordinance, discrimination against persons with a disability by failing to provide means of access to any premise that the public is entitled to enter or use is unlawful. BEAM Plus Neighbourhood rewards designs that provide dignified access for persons with disability.

7 OUTDOOR ENVIRONMENTAL QUALITY

7.1 THERMAL ENVIRONMENT

OEQ 1 OUTDOOR THERMAL COMFORT

EXCLUSIONS None.

OBJECTIVE Ensure adequate thermal comfort in recreation Open Spaces and pedestrian zones within the Site.

NO. OF CREDIT POINTS 3 credit points

PREREQUISITES None.

CREDIT REQUIREMENT

a) Shaded or Covered Pedestrian Routes with Outdoor Sitting

1 credit point is awarded where there is at least one shaded or covered route connecting the Site to the nearby amenities or transport hub, with the provision of a shaded or covered sitting area along the same route.

b) Passive Open Spaces with Thermal Comfort

1 credit point is awarded where it can be demonstrated that 50% or more of the passive Open Spaces and pedestrian zones achieving thermal comfort on a typical summer day at 9:00 am in Hong Kong.

AND

1 credit point is awarded where it can be demonstrated that 50% or more of the passive Open Spaces and pedestrian zones achieving thermal comfort on a typical summer day at 3:00 pm in Hong Kong.

ASSESSMENT

a) Shaded or Covered Pedestrian Routes with Outdoor Sitting

The Applicant shall submit details of the following:

- A minimum of one pedestrian route within the Site;
- The pedestrian route connects the notional entrance of any occupied building within the Site to the neighbourhood amenities or transport hub;
- The cover or extent of shade along the pedestrian route; and
- The shaded or covered sitting area(s) along the same pedestrian route.

To attain 1 credit point, the forms of evidence include:

- Layout plans;
- Locations of shaded or covered seating area;
- Schematic sections;
- Information about the types and extents of shade or cover provided over the sitting area; and
- Any restriction on their access and use.

b) Passive Open Spaces with Thermal Comfort

This credit applies to passive Open Space(s) and pedestrian zone(s) within the Site Area.

According to HKPSG, passive Open Space refers to recreation Open Space which is often landscaped such as a park, a garden, a sitting-out area, a waterfront promenade, a paved area for informal games, a children's playground, a jogging and fitness circuit etc., where people can enjoy surroundings in a leisurely manner.

A pedestrian zone may include covered but not enclosed areas such as covered walkways and covered sitting areas.

The Applicant shall submit a report, prepared by a suitably qualified person, demonstrating the anticipated thermal comfort. The report should include the following:

- Scale drawings depicting the building disposition; and
- Relevant data, results of simulations and calculations for thermal comfort.

The assessment should be based on the following key approaches:

- All recreation Open Spaces and pedestrian zones within the Site, hereafter referred to as the Focus Areas, should be included in the assessment. A demarcation plan of the Focus Areas should be provided in the report;
- The climatic conditions of a typical summer day should make reference to the environmental conditions in Table OEQ 1.1 below, which are based on a 5-year average from 2009 to 2013; and
- A brief summary of the selected thermal comfort calculation methodology, together with the recommended thermal comfort range of the selected method, should be clearly stated in the report.

Table OEQ 1.1 Reference Environmental Conditions

Time	9:00 am	3:00 pm
Global Horizontal Irradiance, GHI (W/m^2)	298	525
Direct Normal Irradiance, DNI (W/m^2)	213	340
Diffuse Horizontal Irradiance, DHI (W/m^2)	161	254
Air Temp., T_a (^oC)	28.5	31.0
Relative Humidity, RH (%)	82	72

Source: HKO (Averaged data from 2009 to 2013)

The Applicant may choose to select any widely accepted methodology to demonstrate that the thermal comfort is in accordance with the credit requirement.

Should any method other than the Thermal Sensation Index (TSI) or Thermal Physiological Equivalent Temperature (PET) be chosen to demonstrate the thermal comfort in outdoor spaces (e.g. or equivalent indicator / index for thermal comfort level), supplementary information on methodology, calculation and / or simulation results should be provided. The onus is placed on the Applicant to justify the use of the chosen methodology and the relevant precedent(s). The selected methodology should be one widely accepted by professionals in the field.

BACKGROUND

Human experience of thermal comfort in an outdoor space is determined by many factors such as personal expectation and preference, clothing of the time, air temperature, air movement, solar irradiation and humidity etc. When the difference in personal expectation is removed, the assumptions are restricted to a group of people from similar climate conditions, a scientific method can be used to estimate the comfort level of a space at any given time; based on the ambient temperature, air movement, and solar irradiation. Through this calculation, it would inform the number of hours in a year with desirable and comfortable conditions of a given Open Space, the result can be used to estimate the percentage of usable hours of an Open Space for public enjoyment.

After removing individual variations, the usability of outdoor spaces will depend on thermal sensation of potential users. Thermal sensation is determined by many variables including the availability of wind, the ambient temperature and the amount of solar irradiation available in a specific site. There are many different methodologies to predict and / or measure the comfort level of a space. They generally take into consideration the factors largely on individual experience of comfort, including the ambient temperature, the relative humidity, the wind availability as well as shading.

One of the widely used methodologies is Thermal Sensation Index (TSI) by Givoni *et al.*, and it is widely used in the context of built environment in Hong Kong to examine the thermal comfort of outdoor spaces in public housing projects.

TSI was developed through empirical studies conducted in the context of Japan [1], and it has been well received, used and tested since its introduction. It is particularly favoured for its user-friendly, easy-to-understand index system that is divided into seven (7) thermal sensation scales as given in the Table OEQ 1.2 below.

Table OEQ 1.2 Thermal Sensation Index

TSI	**Thermal Sensation**	
1	Cold	Too cold
2	Slightly Cold	
3	**Acceptably cool**	**Thermally acceptable range**
4	**Neutral**	
5	**Acceptably warm**	
6	Slightly Hot	Too hot
7	Hot	

[1] Givoni, B., M. Noguchi, H. Saaroni,O, Pocher, Y., Yaacov, N. Feller and S. Becker 2003, Outdoor comfort research issues, *Energy and Buildings* vol. 33, pp. 77-86.

Level 4 is considered to be comfortable and most favourable to humans as no thermal discomfort is noted, while Levels 3 to 5 can reasonably be categorised as suitable where no obvious or severe discomfort is expected.

TSI can be established using the following formula:

$$TSI = 1.7 + 0.1118 \times T_a + 0.0019 \times SR - 0.322 \times WS - 0.0073 \times RH + 0.0054 \times ST \quad [1]$$

Where,

T_a = air temperature (°C)

SR = horizontal solar radiation (W/m^2)

WS = wind speed (m/s)

RH = relatively humidity (%)

ST = surrounding ground surface temperature (°C)

TSI should be based on the following:

- Users shall refer to reference environmental conditions shown in Table OEQ1.2, which outlines the solar irradiation, the air temperature and the relatively humidity to assess outdoor thermal comfort;
- The surrounding ground surface temperature (ST) of Air Temperature plus 3°C, (i.e. T_a + 3°C) shall be used in the TSI equation. For PET calculation, the Mean radiant temperature, Tr (Air Temperature plus 3°C, (i.e. T_a + 3°C) shall be used;
- Wind environment of the Site shall adopt Computational Fluid Dynamics (CFD) technique to assess the air velocity (m/s) of the Project. The methodology of using CFD in outdoor urban scale studies shall refer to Air Ventilation Assessment (AVA) Technical Circular and Technical Guide [2];
- The power ***n*** relates to the ground roughness. A larger value of the power ***n*** represents the higher roughness of the ground i.e. the dense city. Alternatively, a smaller ***n*** represents the lower ground roughness i.e. the sea surface. The ground roughness for the wind profile of the CFD simulation can be referred to Table OEQ 1.1;
- The thermal comfort assessment shall consider the effect of shading from the immediate surroundings, for example, trees, shading devices, self-shading from buildings; and
- The calculations must be based on an appropriate area breakdown in the range between $1m^2$ and $100m^2$.

Table OEQ1.3 Ground Roughness Value for Power-Law Equation

Terrain Crossed by Approaching Wind	n-value
Sea and Open Space	~ 0.15
Suburban or medium-rise	~ 0.35
City centre or high-rise	~ 0.50

[2] Housing, Planning and Lands Bureau, and Environment, Transport and Works Bureau 2006, *Technical Circular No. 1/06: air ventilation assessments*, viewed 8 October 2015, https://www.devb.gov.hk/filemanager/en/content_679/hplb-etwb-tc-01-06.pdf

Physiological Equivalent Temperature (PET) is another well-recognised thermal index to assess thermal comfort [3]. Theoretically, PET is equivalent to the air temperature in a typical indoor setting at which heat balance of the human body is maintained, with core and skin temperatures equal to those under the conditions being assessed.

The methodology is based on human physiological modelling and heat balance of human body, derived from the Munich Energy Balance Model for individuals (MEMI) [3]. It has been widely used for outdoor thermal study internationally, regardless of the climatic conditions, including sub-tropical and temperate climate zones.

The following table outlines the PET range for thermal comfort in sub-tropical and temperate climates.

Table OEQ 1.4 Thermal perceptions classifications for temperate region and sub-tropical region

Thermal Perception	**TPC for subtropical region** [4]	**TPC for temperate region** [5]	**Range of thermal comfort**
Very cold	< 14	< 4	Too cold
Cold	≥ 14 to < 18	≥ 4 to < 8	
Cool	≥ 18 to < 22	≥ 8 to < 13	
Slightly cool	≥ 22 to < 36	≥ 13 to < 18	Range of thermal comfort
Neutral	≥ 26 to < 30	≥ 18 to < 23	
Slightly warm	≥ 30 to < 34	≥ 23 to < 29	
Warm	≥ 34 to < 38	≥ 29 to < 35	Too hot
Hot	≥ 38 to < 42	≥ 34 to < 41	
Very hot	≥ 42	≥ 41	

[3] Hoppe, P. 1999, 'The physiological equivalent temperature—A universal index for the biometeorological assessment of the thermal environment', *International Journal of Biometeorology, vol.* 43, pp. 71–75.

[4] Lin, T. P., & Matzarakis, A. 2008, 'Tourism climate and thermal comfort in Sun Moon Lake, Taiwan', *International Journal of Biometeorology,* vol. 52, pp. 281 -290.

[5] A. Matzarakis and H. Mayer 1996, 'Another Kind of Environmental Stress: Thermal Stress. WHO Collaborating Centre for Air Quality Management and Air Pollution Control', *NEWSLETTERS,* Vol. 18, pp. 7-10.

7 OUTDOOR ENVIRONMENTAL QUALITY

7.1 THERMAL ENVIRONMENT

OEQ 2 INTRA-URBAN TEMPERATURE AND URBAN HEAT ISLAND EFFECT

EXCLUSIONS None.

OBJECTIVE Reduce the potential increase in intra-urban temperature difference and the Urban Heat Island effect.

NO. OF CREDIT POINTS 4 credit points

PREREQUISITES None.

CREDIT REQUIREMENT

a) Tree Coverage

1 credit point is awarded where at least 15% of the total Site Area is provided with tree coverage in plan view.

OR

2 credit points are awarded where at least 25% of the total Site Area is provided with tree coverage in plan view.

b) Intra Urban Heat Island Study

2 credit points are awarded where an Intra Urban Heat Island Study is conducted demonstrating that a maximum Intra-Urban Heat Index (difference between T_{urban} and T_{met}) in summer is less than 3.0 °C.

ASSESSMENT

a) Tree Coverage

The Applicant shall submit a preliminary landscape strategy or a Landscape Master Plan showing the following:

- The tree planting locations of all proposed tree species; and
- The tree circles showing the estimated crown spread 10 years after the landscape installation for each tree species.

Tree coverage is defined as the combined plan area under all tree canopies, projected perpendicularly to the ground / floor surface, within the Site, where tree canopies are drawn at their estimated spread 10 years after the landscape installation.

A Preliminary landscape strategy or a Landscape Master Plan shall be prepared by a suitably qualified person to depict the predicted tree crown diameters 10 years after the landscape installation based on the average tree growth in Hong Kong for the specified tree species.

The predicted tree diameters shall be stated with reference to examples of existing trees of that species in Hong Kong. In order not to overestimate tree crown diameter, the largest dimension permitted in the calculation shall be 12m in diameter for large wide spreading trees.

b) Intra Urban Heat Island Study

The Applicant shall submit a report, prepared by a suitably qualified person, demonstrating the compliance through Urban Heat Island Intensity calculation. The assessment shall use the maximum temperature difference of T_{urban} and T_{met} between 08:00 to 18:00 hours to represent the Intra Urban Heat Index for the Site, where

$$\text{Intra Urban Heat Index} = \text{Max}\left[T(t)_{urban} - T(t)_{met} \right]$$

$for\ time, t\ between\ 8AM\ to\ 6PM$

$T(t)_{urban}$ = the predicting urban air temperature at the Site
$T(t)_{met}$ = the meteorological air temperature

The assessment should be based on the following:

- A brief summary of the adopted methodology to calculate the Intra-Urban Heat Index should be clearly outlined in the report;
- An individual Intra-Urban Heat Index within the Site shall be assessed and reported under appropriate area breakdown with the maximum area of 10 ha.; and
- The Intra-Urban Heat Island effect of a project is the contribution to the energy balance at a certain time, which can be quantified by Intra-Urban Heat Index. The Intra-Urban Heat Index here shall be defined by the maximum temperature difference of $T(t)_{urban}$ and $T(t)_{met}$ in the corresponding hour between 08:00 to 18:00 hours on a typical summer day. The detailed calculation methodology shall be referring to relevant literature [1,2,3,and 4].

In order to capture Intra-Urban Heat Island effect of the Project precisely, the proposed methodology shall address the air temperature changes due to the Intra-Urban Heat Island Effect.

The report shall as a minimum contain detailed considerations of the factors listed below:

i) <u>Radiation heat gain / loss from / to the environment</u>
- The direct and diffused solar radiation on surfaces;
- The shading effects from buildings / trees;
- The radiant heat loss from the urban fabric to the surroundings; and
- The effects of absorptivity / emissivity of surfaces.

[1] Santamouris M. 2001, 'On the impact of urban climate on the energy consumption of buildings', *Solar Energy,* vol. 70, pp. 201-216.
[2] Oke TR. 1988, 'The urban energy balance', *Progress in Physical Geography,* vol.12, pp. 471-508.
[3] Shashua-Bar, L. Hoffman, M. E. 2002, 'The Green CTTC model for predicting the air temperature in small urban wooded sites', *Building and Environment,* vol. 37, pp. 1279 –1288.
[4] Elnahas, M. M., Willimanson, T. J. 1997, 'An improvement of the CTTC model for predicting urban air temperatures', *Energy and Building,* vol. 25, pp. 41–49.

ii) Thermal storage effect of the urban fabric

- Thermal capacity in participating ground layer, building and tree surface etc.

iii) Wind environment

- Convective heat transfer within urban cluster; and
- Computational Fluid Dynamics (CFD) technique shall be used to assess the ventilation of the Project (refer to section below).

iv) Evaporative heat transfer

- The evapotranspiration from greenery;
- The evaporative heat transfer from water features; and
- The evaporative heat transfer from the ground surface.

The calculation of Intra-Urban Heat Index should be based on:

- The reference environmental conditions detailed in Table OEQ 2.1 to assess both $T(t)_{met}$ and $T(t)_{urban}$;
- The Applicant should use reference environmental conditions in table OEQ 2.1 except the one for the near-ground wind velocity on Project Site to calculate$T(t)_{urban}$; and
- In order to calculate $T(t)_{urban}$, the wind environment of the Project shall be derived from Computational Fluid Dynamics (CFD) using wind tunnel data or MM5 data as stipulated in the Air Ventilation Assessment (AVA) Technical Circular and Technical Guide [5].

Table OEQ 2.1 Reference Environmental Conditions for Intra-Urban Heat Index Calculation

Hours	Air Temperature, T_a (oC)	Relative Humidity, RH (%)	Global Horizontal Irradiance, GHI (W/m^2)	Diffuse Horizontal Irradiance, DHI (W/m^2)	Near Ground Wind Velocity at the Weather Station, (m/s)
1	28.5	83	0	0	0.5
2	28.3	84	0	0	0.4
3	28.1	85	0	0	0.4
4	28.0	85	0	0	0.4
5	27.8	86	0	0	0.4
6	27.7	87	0	0	0.4
7	27.8	86	0	0	0.4
8	28.1	84	154	93	0.4
9	28.5	82	298	161	0.6
10	29.0	79	449	216	0.7
11	29.8	76	573	259	0.8
12	30.3	74	622	272	0.8
13	30.7	73	638	285	0.9
14	30.9	72	602	287	0.9

[5] Housing, Planning and Lands Bureau, and Environment, Transport and Works Bureau 2006, *Technical Circular No. 1/06: Air Ventilation Assessments*, viewed 15 November 2016, https://www.devb.gov.hk/filemanager/en/content_679/hplb-etwb-tc-01-06.pdf

15	31.0	72	525	254	0.9
16	31.0	72	429	210	0.8
17	30.5	73	290	154	0.7
18	29.9	75	141	89	0.7
19	29.5	77	0	0	0.6
20	29.3	78	0	0	0.6
21	29.1	80	0	0	0.5
22	29.0	80	0	0	0.5
23	28.9	81	0	0	0.5
24	28.7	82	0	0	0.5

Source: HKO (Averaged data from 2009 to 2013)

BACKGROUND

Urban Heat Island (UHI) describes the phenomenon where a metropolitan area is significantly warmer than its surrounding rural areas on a typical summer day. Three major reasons contributing to the Urban Heat Island effect are:

a. materials with high absorptivity;
b. lack of sufficient greenery; and
c. reduction in sky view factor (SVF).

SVF represents the amount of visible sky when viewed from the ground up from a point. SVF of one (1) denotes an entirely visible sky and zero (0) denotes sky being completely blocked by obstacles (e.g. buildings, trees, bridges).

In addition, surrounding buildings may act as a wind barrier preventing the dissipation of extra heat generated. This causes a change in energy balance of urban areas, often leading to a higher temperature than the surrounding rural areas.

Given the compact development pattern in Hong Kong, many people suffer from the adverse impact of Urban Heat island effect. The stagnant air in deep crevasses of buildings packed in urban areas has resulted in a further temperature rise during hot and humid conditions in summer.

It is important to denote the scale of UHI investigation between the urban canopy layer (UCL) and urban boundary layer (UBL). This differentiates the heating processes operating at a microscale below roof level (UCL) and operating at a mesoscale, generally refer to above roof level (UBL) [6].

This credit focuses on heating effects at a micro-scale level within UCL, where the intra-urban temperature difference is assessed. The effects of intra-urban heating can be quantified by Intra-urban heat index, which is defined as the temperature difference between urban and reference meteorological air temperature. Higher Intra-urban heat index suggests a more severe intra-urban heating effect.

[6] Unger, J. 2004, 'Intra-urban relationship between surface geometry and urban heat island : Review and new approach', *Climate Research*, vol. 27, No, 3, pp. 253-264

There are a number of ways to calculate Urban Heat Island effect at a micro scale developed by the academia and government, including the Design standard for thermal environment of urban residential areas adopted by China's Green Building Label [7]. Most methodologies involve using overall masterplan design, building dispositions, availability of greenery as well as material properties to estimate the temperature difference in a given development.

Given the complexity of this field of study, no single methodology has been widely accepted and recognised amongst professionals in the building industry and academics. Therefore, the Applicant can exercise the flexibility to appoint a suitably qualified person to demonstrate and investigate the potential Intra-Urban Heat Index as a result of the development.

[7] Ministry of Housing and urban-rural development 2013, *Design Standard for thermal environment of urban residential areas (JGJ 286-2013)*, MOH, People's Republic of China.

7 OUTDOOR ENVIRONMENTAL QUALITY

7.2 DAYLIGHT AND VISUAL QUALITY

OEQ 3 NEIGHBOURHOOD DAYLIGHT ACCESS

EXCLUSIONS None.

OBJECTIVE Minimise the overshadowing of neighbouring properties by the new development.

NO. OF CREDIT POINTS 1 credit point

PREREQUISITES Compliance with Building (Planning) Regulations (CAP 123F) Regulation 37.

CREDIT REQUIREMENT 1 credit point is awarded where daylight access of neighbouring sensitive buildings is maintained to the prescribed level.

ASSESSMENT Neighbouring buildings within the Impact Area, both planned and existing, shall be assessed to determine the value of daylight to sensitive buildings. Assessment shall be done by appropriate computer and / or physical modelling.

Sensitive receivers should be identified within a radius of 2H, H being the height of the tallest building on the Site.

A sensitive building is defined as follows:

i) residential buildings;
ii) non-residential buildings refer to:
- premises that require daylight to enhance the lighting environment for the occupants to perform tasks, such as offices and schools;
- premises that require daylight for energy saving and an improved environment for the transient stage of occupation, such as the circulation area of shopping centres and indoor games halls; and
- premises that require daylight primarily for views, such as hotels and hospitals.

To identify sensitive receivers within the Impact Area, both existing buildings as well as those being planned should be included.

For any potential sensitive receiver with unknown use and building bulk at the time of certification, the Applicant may use either of the following methods to test the Project's impact on potential sensitive receivers. The zoning for these shall include Comprehensive Development Area (CDA), Residential and Government, Institution or Community (GIC) and Other Uses (OU). One of the following methods can be used, or any other method which the Applicant can substantiate its suitability for adoption:

- **The-worst-case-scenario bulk using plot ratio**: using the maximum allowable plot ratio for the specific plot to extrude a simple building bulk without any setback. 100% site coverage should be used for the extrusion. 4m should be used as floor-to-floor height regardless of use;

  OR

- **APP-152-compliant bulk**: a building bulk designed in compliance with Appendix B of Buildings Department - PNAP APP-152 Sustainable Building Design Guidelines [1] using various planning parameters such as maximum allowable GFA, Plot Ratio, building height, setback etc. for the specific plot in question. 4m should be used for floor-to-floor distance regardless of use.

The Applicant shall submit a report, prepared by a suitably qualified person, containing a comprehensive analysis (complete with calculations and drawings) to describe the extent to which the building development would impact on the sensitive neighbouring buildings in respect of access to daylight.

Change in the access to daylight may be objectively assessed in terms of the change in Vertical Daylight Factor (VDF) on the façades of sensitive receivers, or change in viewing angle, whichever is deemed most appropriate.

The credit point shall be awarded under the following situations:

- The resultant VDF on the façade of the lowest floor of the most affected sensitive receiver is either unchanged or no less than 12%; or
- The viewing angle is reduced by less than 5%.

BACKGROUND

Tall buildings cause substantial overshadowing to the neighbouring developments and amenities, affecting the access of both direct and indirect sunlight for the neighbouring buildings. The profile of a building and its layout may have an adverse impact on the beneficial views of neighbouring buildings, such as views towards the harbour, mountains or Open Spaces. Natural breezeways around the neighbouring development may also be affected as a result.

If the new development is located near sensitive receivers like residential buildings, hospitals, schools, etc., the impact on daylight of a new building to the neighbouring buildings should be assessed. Wherever possible, the access to these beneficial natural elements should be safeguarded. This issue reinforces the fundamental concept and objective of 'good neighbour buildings'.

[1] Buildings Department 2011, *PNAP APP-152 sustainable building design guidelines,* viewed 15 November 2016, http://www.bd.gov.hk/english/documents/pnap/APP/APP152.pdf

7 OUTDOOR ENVIRONMENTAL QUALITY

7.2 DAYLIGHT AND VISUAL QUALITY

OEQ 4 VISUAL QUALITY

EXCLUSIONS

None.

OBJECTIVE

Encourage the provision of recreation Open Spaces with high visual quality.

Minimise potential solar glare from street furniture, infrastructure or building element that lead to hazards or discomfort to pedestrians, motorists or building occupants in the surrounding buildings.

NO. OF CREDIT POINTS

2 credit points

PREREQUISITES

None.

CREDIT REQUIREMENT

a) Visual Quality Study

1 credit point is awarded where a Visual Quality Study Report is provided on the provision of recreation Open Space(s) within the Site.

b) Solar Reflectivity Study

1 credit point is awarded where a Solar Reflectivity Study is provided for all horizontal surfaces within the Site. If risk of glare exists, a letter of commitment, signed by an authorised signatory at director level, shall be submitted by the Applicant to outline the intention to mitigate the potential glare risks in order to secure this credit.

ASSESSMENT

a) Visual Quality Study

Visual Quality (VQ) can be described by identifying the inherent characteristics and attributes of the surrounding environment. This includes the identification of elements that have both positive and negative contributions.

Positive visual elements include pleasant views towards a waterfront, a valley, a hill or well-designed outdoor landscape. Negative visual elements include obstructions by buildings, the lack of landscape or natural features, or other features or factors that degrade the visual quality. Positive visual elements should be preserved and enhanced as they reinforce the visual image of the Open Space and enhance its amenity values; while analysis of negative visual elements could provide an indicator of recommendations to enhance the visual quality of the Open Space.

The Visual Quality Study should address the visual quality of all recreation Open Spaces within the Site. The assessment should be based on the following approaches:

- All recreation Open Spaces, with an area greater than 500m^2 and located within the Site, shall be included in the assessment. The Applicant shall provide a report for a minimum of one major Open Space within the Site;
- A demarcation plan of Open Spaces shall be provided;
- A minimum of one (1) viewpoint shall be placed within each contiguous Open Space;
- Images taken from the viewpoints should be analysed based on a weighting factor of 1 to 5 to indicate the quality of the view. The weighting factor is listed in the following table:

Weighting factor	Representation	Examples*
5	Best Quality	Waterfront; Natural terrain; and Sky
4	Good Quality	Open Space (green, park, trees)
3	Medium quality	Low rise development
2	Poor Quality	Medium rise development
1	Worst Quality	High rise development, 30m or above; and Road and highways

* Pedestrians, cars or any non-permanent installation would not be rated by the weighting factor.

Vertical elevation of camera	1,600mm above ground/ finished floor
Equivalent Lens Focal Length or Focal Length	27mm
Aspect Ratio	3:2

- The Applicant should produce images from the viewpoints using either single lens camera or viewpoints in 3D model. The specifications for camera or 3D model are as follows:

a. Single lens camera

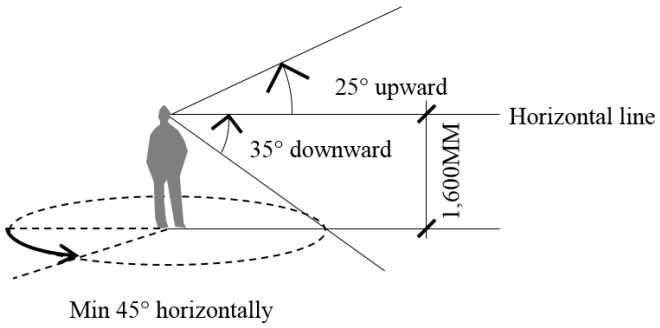
b. Camera or Viewpoint in 3D Model

Option 1:

Vertical elevation of camera	1,600mm above ground/ finished floor
Vertical upward angle	25°
Vertical downward angle	35°

Option 2:

Vertical elevation of camera	1,600mm above ground/ finished floor
Equivalent Lens Focal Length or Focal Length	27mm



Important notes:

- No fisheye or image distortion before or after picture taking;
- No zooming or pan function shall be used.

Number and location of Viewpoints:

- The viewpoint should be appropriately located to demonstrate the most representative view from the Open Space outwards; and
- At least one viewpoint should be assessed for each Open Space.

Number of Frames:

A series of frames from 8 different directions at 45° interval should be taken using landscape orientation. The 8 directions are:

- North;
- North East;
- East;
- South East;
- South;
- South West;
- West;
- North West.

Methodology

- For each frame, assign weighting factors from 1 to 5 to different portions of the frame depending on the quality of the view, i.e. 5 for mountain view and 1 for high rise buildings;
- Calculate the Visual Quality Score of the frame using Area Weighting Methodology ;
- Repeat the process for each frame; and
- Calculate the average Visual Quality Score for the viewpoint.

Primary Tools:

- 3D model using any appropriate 3D visualisation software;
- Physical photographs taken from the Site; or
- A combination of the above.

Supplementary Tools:

- Google Map's Street View or other accessible street view tools and / or database may be used as supplementary tool. When using externally sourced images, the source must be clearly stated;
- Maps of various kind; and
- Scale drawings of the Project – both existing buildings and those in the planning stage may be included.

The view must include those in foreground such as buildings on Site and vicinity as well as background including mountains and / harbour in distance and sky. Images from supplementary sources such as Google Maps or other similar street view tools and scale drawings may be used to demonstrate view in far distance, as most 3D models lack extensive information. For example, a foreground and middle ground view may be extracted from 3D models while background view may be extrapolated using street tools.

Should images from street view tool be used, images from primary tool and supplementary tool should be presented alongside to demonstrate how background information is established.

Basic Demonstration

Using a camera, the following view angle was set, and taken 8 views at 45° interval.

Frame 1A, taken from Viewpoint A, has:

- 35% of the area that are mountain and sky view;
- 25% of the area that are nearby low-rise buildings; and
- 40% of the area that are high-rise building.

The following calculation can take place.

% of Frame 1A	View	Corresponding viewing factor	Normalised viewing factor
35	Mountain and sky	5	1.75
25	Nearby low-rise buildings	3	0.75
40	High-rise building	1	0.4
Normalised viewing factor for this viewpoint			**2.9**

Therefore the normalised viewing factor for this view is 2.9.

The same process is repeated for images taken from the other 7 directions, then the normalised viewing factors of different viewing directions should be averaged to calculate the Visual Quality Score for the particular viewpoint.

8 frames from Viewpoint A	Normalised Viewing factor
Frame 1A	2.90
Frame 2A	3.64
Frame 3A	3.54

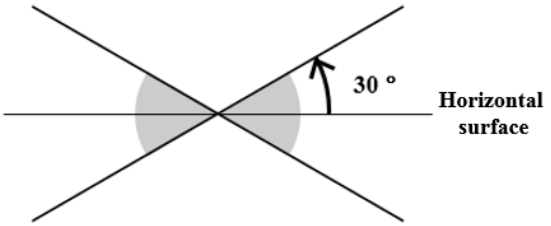
Frame 4A	3.00
Frame 5A	2.86
Frame 6A	2.84
Frame 7A	2.77
Frame 8A	2.80
Visual quality score for Viewpoint A	**3.04**

Therefore, the Visual Quality Score for the Open Space from Viewpoint A is 3.04.

b) Solar Reflectivity Study

If the Project includes building elements with up to 30° inclination such as glass canopies, covered walkways and photovoltaic panel installations including roof-mounted installations, the Solar Reflectivity Study should investigate geometry of the installation(s), based on the following approaches:

- Establish the study area where test points are positioned within 1H (H being the height of the tallest building on Site) from the Site Boundary.
- Potential reflection of the sun shall be assessed by placing a suitable scale model of the building and surrounding large structures within a radius of 2H, with H being the height of the tallest building on Site.
- Based on the geometry of the installation(s), analyse the solar reflection potential of all horizontal surfaces of installations with up to 30° inclination (i.e. photovoltaic panels, canopies of covered walkways, other canopies over playgrounds etc.) on the Site.
- Should the proposed design include vertical curved surfaces, those curved vertical surfaces shall also be included in the study. Non-curved, straight or vertical surfaces shall not be included in the study.



- Study should investigate all sun hours, at a minimum from 06:00 to 18:00 hours, throughout a year to compute the percentage of hours with no potential glare risk to neighbouring buildings.

Sensitive receivers should be identified within a radius of 2H, with H being the height of the tallest building on Site.

Sensitive buildings are defined as follows:

- residential buildings;
- non-residential buildings described as follows:
- premises that require daylight to enhance the lighting environment for the occupants to perform tasks, such as offices and schools;
- premises that require daylight for energy saving and an improved environment for the transient stage of occupation, such as the circulation area of shopping centres and indoor games halls; and
- premises that require daylight primarily for views, such as hotels and hospitals.

Both planned and existing sensitive receivers should be included.

For any potential sensitive receiver with unknown use and building bulk at the time of certification, the Applicant may use either of the following methods to test the Project's impact on the potential sensitive receivers. The zoning for these shall include Comprehensive Development Area (CDA), Residential and Government, Institution or Community and Other Uses (OU). One of the following methods shall be used; or any other methods which the Applicant can substantiate its suitability for adoption:

- **The-worst-case-scenario bulk using plot ratio**: using the maximum allowable plot ratio for the specific plot, to extrude a simple building bulk without any setback. 100% of the site coverage should be used for extrusion. 4m should be used as floor-to-floor height regardless of use;

  OR

- **APP-152-compliant bulk**: a building bulk designed in compliance with Appendix B of Buildings Department - PNAP APP-152 Sustainable Building Design Guidelines [1] using various planning parameters such as maximum allowable GFA, Plot Ratio, building height, setback etc. for the specific plot in question. 4m should be used for floor-to-floor distance regardless of use.

The Project should achieve 80% of all sun hours without risk of causing glare to sensitive buildings in order to secure this credit.

If the Project fails to achieve this prescribed percentage, the Applicant is required to submit a letter of commitment, signed by an authorised signatory at director level, to confirm his / her intention to mitigate the potential glare issues either through geometrically designed external sun shading devices, or specifying the concerned materials with a reflectivity of 20% or less in order to secure this credit.

[1] Buildings Department 2011, *PNAP APP-152 sustainable building design guidelines*, viewed 12 October 2015, http://www.bd.gov.hk/english/documents/pnap/APP/APP152.pdf

BACKGROUND

Visual environment of an urban space is one of the key considerations addressed under Chapter 11, Urban Design Guidelines of Hong Kong Planning Standards and Guidelines [2]. The guidelines categorised urban design attributes of Hong Kong into three (3) levels:

- Macro Level: Image of the City;
- Intermediate Level: Buildings and Spaces; and
- Micro Level: User Environment.

In recent years, greater effort has been made for visual impact and visual quality study, not only from subjective and artistic standpoints but also from scientific and technical points of view. In particular, there is an increasing trend to use Geographic Information System (GIS) for the study of visual quality and visual impact (Bishop & Hulse, 1994 [3]; Bishop, 1996 [4]; Pullar & Tidey, 2001[5], He et al. 2005[6]). GIS provides a mean to generate complex visual impact and visual quality analysis based on available territorial data. It allows more accurate and objective visual impact and visual quality measurements and calculations.

Recognising that an accepted comprehensive visual quality scoring system is not available in Hong Kong, this credit only outlines the general approach of calculating the Visual Quality Score. This will help to develop a unified scoring system based on industry practice in future.

Solar reflection from reflective building materials, such as glass canopy, photovoltaic panel and external envelope of buildings, may result in undesirable glare for pedestrians, occupants of neighbouring buildings and even potentially hazardous glare for motorists. In extreme cases, an excessive solar reflection resulted from design negligence may lead to permanent damage of third party properties and injuries to occupants [7].

Geometric form and material properties are the two main factors governing solar reflection of objects. Various cities (for example Shanghai [8], Sydney [9] and Singapore [10]) have developed codes and guidelines to regulate the reflectance of façade to be within the range of 15% to 20%. Comprehensive guidance on geometric forms is often unavailable. Hence, a comprehensive solar reflectivity study can help improve design decisions and minimise potential damage and discomfort.

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[2] Planning Department 2010, 'Chapter 11: Urban Design Guidelines', *Hong Kong Planning Standards and Guidelines,* viewed 7 October 2015, http://www.pland.gov.hk/pland_en/tech_doc/hkpsg/full/ch11/ch11_text.htm

[3] Bishop, I.D., Hulse, D.W. 1994, 'Predicting scenic beauty using mapping data and geographic information systems', *Landscape and Urban Planning,* vol. 30, pp. 59 –70.

[4] Bishop, I.D. 1996, 'Comparing regression and neural net based approaches to modelling of scenic beauty', *Landscape and Urban Planning,* vol. 34, pp. 125-134.

[5] Pullar, D.V., Tidey, M.E. 2001, 'Coupling 3D visualization to qualitative assessment of built environment designs', *Landscape and Urban Planning,* vol. 55, pp. 29-40.

[6] He, J., Tsou, J.Y, Zue, Y., Chow, B. 2005, 'A visual landscape assessment approach for high-density urban development—a GIS-based index', *Computer Aided Architectural Design Futures,* vol. 2005, pp. 125-134.

[7] Smith-Spark, L 2013, 'Reflected light from London skyscraper melts car', *CNN,* 3 September 3, viewed 12 October 2015, http://edition.cnn.com/2013/09/03/world/europe/uk-london-building-melts-car/

[8] Shanghai Curtain Wall Code 2012, *DGJ 08-56-2012 Technical Code for Building Curtain Wall*. Shanghai, China.

[9] City of Sydney 2012, *Sydney Development Control Plan 2012 (Section 3: General provisions),* viewed 8 October 2015, http://www.cityofsydney.nsw.gov.au/development/planning-controls/development-control-plans

[10] Building and Construction Authority 2013, *New Requirements under the Building Control (Amendment) Regulation*, viewed 12 October 2015, http://www.bca.gov.sg/BuildingControlAct/others/Building_control_amdt_regs_2013.pdf

7 OUTDOOR ENVIRONMENTAL QUALITY

7.3 ACOUSTICS AND AIR QUALITY

OEQ 5 AIR QUALITY OF OPEN SPACES

EXCLUSIONS None.

OBJECTIVE Promote outdoor spaces with better air quality for the neighbourhood.

NO. OF CREDIT POINTS 2 credit points

PREREQUISITES None.

CREDIT REQUIREMENT

a) Buffer Distance from Roads and Highways

1 credit point is awarded where a buffer distance between any Open Space within the Site and the nearest road or highway is maintained in the manner as outlined in Table 3.1 of HKPSG, Chapter 9 [1].

b) Buffer Distance from Industrial Use

1 credit point is awarded where a buffer distance between any Open Space within the Site and an industrial use in the vicinity is maintained in the manner as outlined in Table 3.1 of HKPSG, Chapter 9 [1].

Should a pollution source, a road, a highway, or industrial use be planned within the Site, the same buffer distance should be maintained with the neighbouring Open Spaces.

ASSESSMENT To attain these 2 credit points, the Applicant shall submit the following:

- A scale drawings showing the locations of all Open Spaces, roads, highways, industrial buildings, if any in the surroundings, and the allocated buffer zone with distance annotated.
- A summary table to demonstrate that the buffer distance, as proposed, comply with the credit requirement.

A buffer distance is the horizontal, shortest distance between the boundary of an Open Space and the boundary of a pollution source (i.e. a road, a highway or industrial area).

Should a pollution source, a road, a highway, or industrial use be planned within the Site, credit points are awarded where the following requirements are fulfilled:

1 credit point is awarded where a buffer distance between any Open Space within the Site and the nearest road or highway is maintained in the matter as outlined in Table 3.1 of HKPSG, Chapter 9 [1].

An additional credit point is awarded where a buffer distance between any Open Space within the Site and any industrial building within the Assessment Area is maintained in the manner as outlined in Table 3.1 of HKPSG, Chapter 9 [1]. This credit will only apply if actively used industrial buildings / area exist within the Assessment Area.

BACKGROUND

Air quality is affected by various factors including the emission rate of air pollutants, the separation distance between an emission source and the locations of receptors, topography, building forms and climatology. In Hong Kong, site planning effort should be made to ensure the significant air pollution emitters are located far from sensitive receivers. High-rise buildings and low-rise air pollution emitters should also be located away from each other. Land use pattern that embraces pedestrian-oriented transport and the use of public transport, especially railway and MTR, can minimise the demand for road traffic, hence the impact of air pollution emission from vehicles.

The purpose of this credit is to promote outdoor spaces with better air quality by providing adequate separation between Open Space and pollution sources, such as roads, highways and industrial areas.

The following table [1] outlines the recommended buffer distance between a sensitive receptor and potential air pollution emitter under the HKPSG.

Table OEQ 5.1 Recommended Buffer Distance by HKPSG

Pollution Source	Parameter	Buffer distance	Permitted Uses
Road and Highways	*Type of Road*		
	Trunk Road and Primary Distributor	> 20m	Active and passive recreational uses
		3 – 20m	Passive recreational uses
		< 3m	Amenity areas
	District Distributor	> 10m	Active and passive recreational uses
		< 10m	Passive recreational uses
	Local Distributer	> 5m	Active and passive recreational uses
		< 5m	Passive recreational uses
	Under Flyover		Passive recreational uses
Industrial Areas	*Difference in Height between Industrial Chimney Exit and the Site*		
	< 20m	> 200m	Active and passive recreational uses
		5 – 200m	Passive recreational uses
	20 – 30m (*)	> 100m	Active and passive recreational uses
		5 – 100m	Passive recreational uses
	30 - 40m	> 50m	Active and passive recreational uses
		5 – 50m	Passive recreational uses
	> 40m	> 10m	Active and passive recreational uses

Remarks:

(a) In situations where the height of chimneys is not known, use the set of guidelines marked with an asterisk for preliminary planning purpose and refine as and when more information is available.

(b) The buffer distance is the horizontal, shortest distance from the boundary of the industrial lot, the position of existing chimneys or the edge of road kerb, to the boundary of Open Space sites.

(c) The guidelines are generally applicable to major industrial areas but NOT individual large industrial establishments which are likely to be significant air pollution sources. Consult EPD when planning Open Space sites close to such establishments.

(d) Amenity areas are permitted in any situation.

[1] Planning Department 2010, 'Chapter 9: Environment', *Hong Kong Planning Standards and Guidelines*, viewed 7 October 2015, http://www.pland.gov.hk/pland_en/tech_doc/hkpsg/full/ch9/ch9_tbl_3-1.htm

7 OUTDOOR ENVIRONMENTAL QUALITY

7.3 ACOUSTICS AND AIR QUALITY

OEQ 6 MITIGATION OF NOISE

EXCLUSIONS

Projects that require approval under Section 16 of the Town Planning Ordinance or any other project that is required to undertake Noise Assessment.

OBJECTIVE

Encourage and recognise developments that are designed to mitigate the impact of noise.

NO. OF CREDIT POINTS

1 credit point

PREREQUISITES

None.

CREDIT REQUIREMENT

1 credit point is awarded where a Noise Assessment Report is provided to demonstrate a proactive approach to create an appropriate acoustic environment.

ASSESSMENT

The Applicant shall confirm in a form of a Noise Assessment report prepared by a suitably qualified person to demonstrate that the Project will not exceed the noise standards outlined in Table 4.1 of Chapter 9 in the HKPSG [1].

Methodology for preparing the assessment report shall follow the requirements stipulated in Annex 13: Guidelines for Noise Assessment, of Environmental Protection Department's Technical Memorandum [2].

The report should outline the following:

- Locations of noise sensitive uses and noise emitters on and around the Site;
- The anticipated noise levels of the noise emitters;
- The list of mitigations on how the noise standards outlined in Table 4.1 of Chapter 9 in the HKPSG be met [1];
- Recommendations for addressing all identified site issues and any noise reduction design to prevent disturbance to noise sensitive uses.

In order to qualify for the exclusion, the Applicant shall submit a letter to confirm the requirements for the study is mandated by relevant authority.

[1] Planning Department 2010, 'Chapter 9: environment', *Hong Kong Planning Standards and Guidelines*, viewed 7 October 2015, http://www.pland.gov.hk/pland_en/tech_doc/hkpsg/full/ch9/ch9_tbl_4-1.htm

[2] Environmental Protection Department 2011, '*Technical Memorandum: Annex 13—guidelines for noise assessment,'*, viewed 8 October 2015, http://www.epd.gov.hk/eia/english/legis/memorandum/annex13.html

BACKGROUND

Similar to other large cities, one of the major types of environmental pollution in Hong Kong is noise pollution. It has great impact on residents' daily lives as excessive noise levels often interfere with verbal communications, disrupt sleep, contribute to stress, all these would hamper quality of life and general health.

Dwellings, schools, hospitals, residential care homes for the elderly and recreational areas are the common types of noise sensitive uses in Hong Kong. These areas should be located as far as possible from noise emitters, such as roads and vehicular traffic. Where such separation distance is not possible, noise reduction design should be incorporated at the early stages of the design. Chapter 9.4 of HKPSG [3] has provided guidelines for noise emitters and noise exposure reduction, for example: self-protecting building design and arrangement, integrated building and noise source design, purpose-built noise barriers, acoustic insulation of buildings, as well as guidelines for developments in rural area.

The Guidance by EPD [4] includes various causes and solutions for environmental noise, data, statistics, study reports, guidelines and references as well as innovative noise mitigation design measures etc. General requirements and practical guidance on meeting the requirements is available from EPD [4].

[3] Planning Department 2010, 'Chapter 9: environment', *Hong Kong Planning Standards and Guidelines,* viewed 8 October 2015, http://www.pland.gov.hk/pland_en/tech_doc/hkpsg/full/ch9/ch9_text.htm

[4] Environmental Protection Department 2014, *Noise–an overview on noise pollution and control in Hong Kong*, viewed 8 October 2015, http://www.epd.gov.hk/epd/english/environmentinhk/noise/noise_maincontent.html

7 OUTDOOR ENVIRONMENTAL QUALITY

7.4 QUALITY ACCESS TO EXTERNAL SPACES

OEQ 7 UNIVERSAL ACCESS

EXCLUSIONS

None.

OBJECTIVE

Ensure full access to Open Space and buildings within the site for persons with disability.

NO. OF CREDIT POINTS

1 credit point

PREREQUISITES

None.

CREDIT REQUIREMENT

1 credit point is awarded where at least three (3) enhanced features are provided under the guidelines, Universal Accessibility for External Areas, Open Spaces & Green Spaces by Architectural Services Department, HKSAR Government [1].

ASSESSMENT

The Applicant shall provide evidence of investigation in the form of a report, prepared by a suitably qualified person to demonstrate the provision of at least three (3) enhanced provisions as stipulated in the Universal Accessibility in External Areas, Open Spaces and Green Spaces.

BACKGROUND

In order to enhance social integration, disabled persons should have the same rights as any other individual. Under Disability Discrimination Ordinance, discrimination against persons with a disability by failing to provide means of access to any premise that the public is entitled to enter or use, or by refusing to provide appropriate facilities, is prohibited, unless the premises are designed to be inaccessible to persons with a disability. The legal requirements for the provision of facilities for the disabled are prescribed in the Building (Planning) Regulations (CAP 123F) Regulation 72 'Buildings to be planned for use by persons with a disability' and Schedule 3 'Persons With A Disability'.

Full Access for disabled persons means more than just being able to enter and leave Open Space and buildings. It enables persons with disability to make full use of various external spaces without assistance and undue difficulties. In addition to Universal Accessibility in External Areas, Open Spaces and Green Spaces, the Code of Practice for Barrier Free Access [2] also sets out design requirements to cater for the special needs of persons with locomotor disabilities, visual impairment and hearing impairment.

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[1] Architectural Services Department 2007, *Universal Accessibility for External Areas, Open Spaces and Green Spaces*, viewed 15 November 2016, http://www.archsd.gov.hk/archsd/html/ua2/

[2] Buildings Department 2008, *Code of Practice for Barrier Free Access*, viewed 15 November 2016, http://www.bd.gov.hk/english/documents/code/e_bfa2008.htm

Facilities that cater for the special needs of the physically impaired should be provided. These include, but should not be limited to, the shaded or covered areas for walking and sitting, accessibility to public toilets, adequate lighting, emergency phones, visual-free walking areas, ramps with handrails, and car or bus dropping-off points close to venues.

As the advice provided cannot be exhaustive, developers and designers should exercise forethought and care to cater for the well-being of disabled persons when designing buildings, allowing greater independence of disabled persons, the elderly, and other less physically abled persons using the facilities.

8 INNOVATIONS AND ADDITIONS

IA 1 INNOVATION TECHNIQUES
IA 2 PERFORMANCE ENHANCEMENT
IA 3 BEAM PROFESSIONAL

INTRODUCTION

This section allows the Applicant to submit for consideration for the award of BONUS credit points for any innovative technique or performance enhancement which the Applicant deems to provide environmental benefits and social wellbeing additional to those already covered in earlier sections of this rating tool.

NO. OF CREDIT POINTS

Maximum 5 BONUS credit points + 1 credit point for engaging a BEAM Professional (ND) in the Project.

IA 1 INNOVATIVE TECHNIQUES

This section applied to advanced practices and new technologies that have not hitherto found application in Hong Kong or even elsewhere. Any credit points gained under this heading shall be regarded as a 'BONUS' credit point, counting towards the overall score, but not towards the total credit points obtainable.

Credits may be awarded to any assessed infrastructure or public realm element with innovative and / or unconventional designs, or provisions for operation that will improve the environmental performance of a neighbourhood development during any part of its life cycle.

OBJECTIVE

Encourage adoption of new practices, technologies and techniques that have yet to find practical application in Hong Kong.

ASSESSMENT

The onus 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, material use, improved comfort and reduced pollution, etc. The Assessor will refer the proposal to the Technical Review Committee of BEAM Society Limited, who will consider each aspect on its merits and award credits accordingly.

The Applicant shall make a submission applying for the additional credits, including a description of the proposed innovative technique and the proposed criteria for assessing compliance. The weighting (number of credits) proposed would be considered against the existing weightings under the various sustainability aspects categorised in BEAM Plus, i.e. a technique that can demonstrate resource savings or reduced environmental loading, and be made comparable with the existing criteria deemed to achieve similar levels of benefits.

IA 2 PERFORMANCE ENHANCEMENT

An alternative approach to achieving BONUS credit points under BEAM Plus is to demonstrate significant performance enhancement, i.e. strategies and techniques that greatly exceed the requirements of existing BEAM Plus credits. For example, features that result in significantly higher levels of savings in services, energy, water or materials. Any credit point gained under this heading shall be regarded as a 'BONUS' credit point, counting towards the overall score, but not towards the total credit points obtainable.

OBJECTIVE

Encourage the adoption of practices, technologies and techniques with performance exceeding the stated performance criteria in this rating tool.

ASSESSMENT

The onus will be on the Applicant to present evidence of the performance gains as compared to the existing criteria. The Assessor will refer the proposal to the Technical Review Committee of BEAM Society Limited who will consider each aspect on its merits and award credits accordingly.

The Applicant shall make a submission applying for the additional credit points that may be a result of attaining an enhancement in performance in any sustainability aspect. The weighting (number of credit points) proposed would be considered against the existing weightings provided under the various sustainability aspects categorised in BEAM Plus, i.e. a demonstrated resource saving would be compared to existing criteria on a pro-rata basis in order to determine the number of BONUS credits to be awarded.

IA 3	**BEAM PROFESSIONAL**	At least 1 key member of the Project Team shall be a certified BEAM Professional for Neighbourhood.
	OBJECTIVE	To facilitate the application for the BEAM Plus certification process and to ensure the design of the Project following the requirement of the BEAM Plus standards.
	ASSESSMENT	The Applicant shall provide the evidence of engaging at least one BEAM Pro (ND) as the key project team member.

APPENDIX A - LIST OF SUITABLY QUALIFIED PERSON

A relevant local professional qualification or a qualification awarded by a recognized professional body considered as being equivalent by the Assessment Body with 3-year post-qualification experience.

CREDITS		SUITABLY QUALIFIED PERSONS
COMMUNITY ASPECTS		
CA 1	Community Engagement	Planners or, architects or public relations consultants.
CA 2	Sustainable Lifestyle	Planners, urban designers, architects, engineers, sociologists, social workers or economists.
CA 3	Neighbourhood Amenities	**d) Shaded or Covered Pedestrian Routes to Basic Services or Recreational Facilities** – if tree-lined shading is claimed Ecologists, planners, horticulturists, aboriculturists or landscape architects.
CA 5	Existing Community and Economy	**a) Socio-economic Study** Planners, urban designers, architects, sociologists, social workers or economists. **b) Continuation of Existing Community** Planners, urban designers, architects, sociologists, social workers or economists. **c) Net Gain in Employment** Planners, economists or human geographers.
CA 6	Placemaking & Local Character	Planners, urban designers or architects or sociologists.
CA 7	Conservation of Cultural Assets	Planners, urban designers, architects or heritage consultants.
SITE ASPECTS		
SA 1	Brownfield Development	Environmental consultants or geotechnical engineers.
SA 2	Accessibility to Open Space, Green Space and Blue Assets	**c) Shaded or Covered Pedestrian Routes to Open Space, Green Space and Blue Assets** – if tree-lined shading is claimed Ecologists, planners, horticulturists, aboriculturists or landscape architects.
SA 3	Pedestrian-Oriented / Low Carbon Transport	**b) Shaded or Covered Pedestrian Routes to Public Transport** – if tree-lined shading is claimed Ecologists, planners, horticulturists, aboriculturists or landscape architects.
SA 4	Site Design Appraisal	Planners, urban designers, architects or landscape architects.

CREDITS		SUITABLY QUALIFIED PERSONS
SA 5	Ecological Value	**a) Reduction of Ecological Impact** Ecologists, horticulturists, aboriculturists or landscape architects. **b) Enhancement of Ecological Values** Ecologists, horticulturists, aboriculturists or landscape architects. **c) Tree Retention** Ecologists, horticulturists, aboriculturists or landscape architects.
SA 6	Cultural Heritage	Heritage consultants, planners, urban designers, architects or building surveyors.
SA 7	Quality Open Space	Planners, urban designers, architects or landscape architects.

MATERIALS AND WASTE ASPECTS

MWA1	Building Reuse	Architects, civil engineers, structural engineers or building surveyors.
MWA2	Minimised Cut and Fill	Architects, civil engineers, geotechnical engineers or structural engineers.
MWA3	Integrated Waste Management	Architects, environmental consultants, built-environment specialists or facility managers.

ENERGY ASPECTS

EA2	Passive Design	**a) Solar Orientation - Site Layout Optimisation Report** Architects, built-environment specialists, mechanical engineers or building services engineers. **b) Wind Environment** Architects, built-environment specialists, wind engineers or mechanical engineers.
EA3	Energy Efficient Infrastructure	Building services engineers, mechanical engineers, energy engineers or electrical engineers.
EA 3	Renewable Energy	Building services engineers, mechanical engineers, energy engineers or electrical engineers.

WATER ASPECTS

WA 1	Water Environment	Civil engineers, environmental consultant or ecologists.
WA 2	Stormwater Management	Civil engineers, building services engineers or mechanical engineers.
WA 3	Alternative Water Source	Architects, landscape architects, building services engineers or mechanical engineers.

CREDITS		SUITABLY QUALIFIED PERSONS
OUTDOOR ENVIRONMENTAL QUALITY		
OEQ 1	Outdoor Thermal Comfort	**b) Passive Open Spaces with Thermal Comfort** Built-environment specialists, environmental consultants or mechanical engineers
OEQ 2	Intra-urban Temperature and Urban Heat Island Effects	**a) Tree Coverage** Ecologists, horticulturists, aboriculturists or landscape architects. **b) Intra Urban Heat Island Study** Built-environment specialists, environmental consultants or mechanical engineers
OEQ 3	Neighbourhood Daylight Access	Architects, urban designers, built-environment specialists or environmental consultants.
OEQ 4	Visual Quality	**a) Visual Quality Study** Architects, urban designers, built-environment specialists or environmental consultants. **b) Solar Reflectivity Study** Architects, urban designers, built-environment specialists or environmental consultants.
OEQ 6	Mitigation of noise	Acoustic consultants, built environment specialists or environmental consultants.
OEQ 7	Universal Access	Architects, urban designers, architects, landscape architects or building surveyors.