Pre-Design

Design

Construction

Operation

# CEPAS

## Comprehensive Environmental Performance Assessment Scheme for Buildings

## Pre-Design Stage

2006 Edition

ARUP

屋宇署
BUILDINGS DEPARTMENT

# Comprehensive Environmental Performance Assessment Scheme for Buildings

# Pre-Design Stage Assessment Manual

**Buildings Department**

**HKSAR Government**

**2006 Edition**

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# PREFACE

Thank you for reading this CEPAS Pre-design Stage Assessment Manual.

This assessment manual for **Pre-design Stage** forms one part of the holistic life-cycle considered Comprehensive Environmental Performance Assessment Scheme (CEPAS) for buildings in Hong Kong. It is for use during the building Pre-design period. The target users for these publications are building developers, owners, designers and building environmental specialists, i.e. all parties of the building industry. The general public is also encouraged to use this scheme to understand more about building environmental issues. It is expected that the building performance will be improved when all the users are involved.

The entire CEPAS assessment scheme consists of the following publications:

- CEPAS Application Guidelines
- CEPAS Pre-design Stage Assessment Manual
- CEPAS Design Stage Assessment Manual
- CEPAS Construction Stage Assessment Manual
- CEPAS Operation Stage Assessment Manual

The CEPAS manuals are prepared to provide a measure to evaluate the sustainability performance for all building types in Hong Kong. It is expected that this assessment scheme (2006 edition) will develop continuously together with other international and local assessment schemes by sharing research supports and implementation experience. In order to maximise the flexibility of building planning, design, construction and operation, there is no restriction to single method when using some indicators in this assessment scheme. It is recommended to use this assessment scheme with reference to related technical guidelines from local and international academia, professional organisations and the Government.

These CEPAS manuals were written by Ove Arup & Partners Hong Kong Limited and the associated sub-consultants. The scheme has incorporated advices from local experts and the Steering Group members, issues raised in the Discussion Forum and Expert Panels, as well as findings of Questionnaire Survey to the stakeholders. The CEPAS assessment schemes, application guidelines and other codes, handbooks and information published by the Buildings Department can be downloaded at http://www.bd.gov.hk/.

December 2006

# CEPAS Building Data Sheet (Pre-design Stage)

| | | | | |
|---|---|---|---|---|
| BD Ref. No. | | | | |
| Building Name | | | | |
| Building Address | | | | |
| Building Type | RESIDENTIAL | | NON – RESIDENTIAL | |
| | Usages | | Usages | |
| Building Dimension | Total site area ($m^2$) | | Total site area ($m^2$) | |
| | Total floor area ($m^2$) ($A_{PD-R}$) | | Total floor area ($m^2$) ($A_{PD-NR}$) | |
| | Occupancy (Person) | | Occupancy (Person) | |
| | Building Height (m) | | Building Height (m) | |
| | No. of floor (including basement) | | No. of floor (including basement) | |
| | Open space area ($m^2$) | | Open space area ($m^2$) | |

## Completed Assessment Submission Record

| Building Type | RESIDENTIAL | | NON – RESIDENTIAL | |
|---|---|---|---|---|
| STAGE | This submission (Tick one) | Building stage assessed (Tick relevant) | This submission (Tick one) | Building stage assessed (Tick relevant) |
| Pre-design | | | | |
| Design | | | | |
| Construction (Construction works) | | | | |
| Construction (Demolition works) | | | | |
| Operation | | | | |
| Operation (Re-assessment) | | | | |

# INDOOR ENVIRONMENTAL QUALITY (IE)

## IE 1 Health & Hygiene

***Intent*** To minimise the threat of health and hygiene problems arising from building operation

***Criteria*** Commitment in Client's Project Brief to minimise the threat of health and hygiene problems arising from building operation and usages

***Explanation*** In the concept and planning stage of the Building, the Client is required to include the notion of minimising the threat of health and hygiene problems arising from building operation for the whole life of the Building in the project objectives. Indoor environmental quality shall cover, but not be limited to indoor air quality, thermal comfort, noise and vibration control and visual quality.

The extent of health and hygiene issues shall focus on the provisions and facilities for cleansing and controlling of pollutant / bacteria / virus dispersion. Accessibility for maintenance shall also be taken into consideration in this aspect.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **IE 1 Committed**

# IE 2 Indoor Air Quality

***Intent*** To maintain the environment of occupied space with good indoor air quality

***Criteria*** Commitment in Client's Project Brief to provide optimum building design and suitable facilities to maintain the environment of occupied space with good indoor air quality

***Explanation*** In the concept and planning stage of the Building, the Client is required to include the notions of designing occupied space with good indoor air quality in the project objectives. The extent of indoor air quality shall cover, but not be limited to fresh air quantity, room temperature, relative humidity, air movement, carbon dioxide and carbon monoxide concentration, influence from respirable suspended particulates, nitrogen dioxide, ozone, formaldehyde, volatile organic compounds, radon and airborne bacteria. In addition, good spatial planning may also enhance the indoor air quality.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

As building materials are considered to be the principle sources of indoor air pollution in addition to those caused by humans and their activities. Hence, in the concept and planning stage of building, the Client is required to include the notions of minimising the use of high emission building materials for the whole life of the building in the projective objectives.

☐ **IE 2 Committed**

## IE 3 Noise and Acoustic Environment

***Intent*** To minimise the noise nuisance affecting building occupants

***Criteria*** Commitment in Client's Project Brief to minimise noise nuisance affecting building occupants due to building equipment, occupants from other compartments and site surroundings

***Explanation*** In the concept and planning stage of the Building, the Client is required to include the notion of minimising noise nuisance affecting building occupants in the project objectives. The extent of noise issues shall cover the noise and vibration control within the building, to and from its surroundings.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **IE 3 Committed**

## IE 4 Lighting Environment

***Intent*** To create a high quality visual environment by means of energy saving meausres

***Criteria*** Commitment in Client's Project Brief to create a high quality visual environment, and to provide optimum use of daylight, energy efficient lighting installations and effective lighting control

***Explanation*** In the concept and planning stage of the Building, the Client is required to include the notion of creating a high quality visual environment for building occupants and users by means of various energy saving measures in the project objectives.

A high quality visual environment shall cover the context of lighting level and glare control. Lighting control shall be manual or automatic type, while interactions of daylight and electric lighting operation is recommended. The EMSD Code of Practice for Lighting Installations shall also be referred to in the design stage.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **IE 4 Committed**

# BUILDING AMENITIES (BA)

## BA 1 Safety

***Intent***

To provide to safe habitation and working environment for building occupants and users

***Criteria***

Commitment in Client's Project Brief to provide safe habitation and working environment for building occupants and users

***Explanation***

In the concept and planning stage of the Building, the Client is required to include the notion of providing safe habitation and working environment for building occupants and users in the project objectives. Compliance with safety related statutory requirements shall be considered as the minimum requirements in a construction / demolition site and in a completed building. Additional safety measures are recommended. Also, the safety measures shall be applicable for building occupants and visitors, healthy and disabled persons as well as other minority groups.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **BA 1 Committed**

## BA 2 Management

***Intent*** To design the building and its facilities for ease of effective management

***Criteria*** Commitment in Client's Project Brief to design the building and its facilities for ease of effective management during the whole life-cycle of the occupied building.

***Explanation*** In the concept and planning stage of the Building, the Client is required to include the notion of maintaining good design for the building and its facilities to achieve long-term effective management in the project objectives. The extent of building management of the completed building shall cover the performance of property & facilities management services, environmental management quality as well as support to building occupants and users.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **BA 2 Committed**

## BA 3 Controllability

***Intent*** To design the building and its facilities for ease of effective control and operation

***Criteria*** Commitment in Client's Project Brief to design the building and its facilities for ease of effective control and operation during the whole life-cycle of an occupied building.

***Explanation*** In the concept and planning stage of the Building, the Client is required to include the notion of providing the building and its facilities with the means for long-term effective control and operation in the project objectives. The extent of building controllability shall cover the performance of property & facilities operation such as adequacy of facilities control and monitoring, control flexibility by building occupants and users, opportunities of saving and management of building energy consumption.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **BA 3 Committed**

## BA 4 Serviceability

***Intent*** To design the building and its facilities for ease of effective maintenance

***Criteria*** Commitment in Client's Project Brief to design the building and its facilities for ease of effective maintenance during the whole life-cycle of an occupied building.

***Explanation*** In the concept and planning stage of the Building, the Client is required to include the notion of maintaining good design for the building and its facilities to achieve long-term effective maintenance in the project objectives. The extent of building serviceability shall cover the records of building, regular inspection and maintenance, housekeeping, building handover quality, as well as serviceability of the building fabric and facade, structure, facilities, electrical and mechanical installations, landscape area, open space, slope, retaining wall, private roads, pedestrian circulation and signboards etc.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **BA 4 Committed**

## BA 5 Adaptability

***Intent*** To design the building and its facilities with high adaptability for change in usage

***Criteria*** Commitment in Client's Project Brief to design the building and its facilities with high adaptability for change in usage during the whole life-cycle of an occupied building

***Explanation*** In the concept and planning stage of the Building, the Client is required to include the notion of providing good design for the building and its facilities to achieve high adaptability for change in usage in the project objectives. The extent of building adaptability shall cover the usage and capacity of building interior and building services installations.

Performance of building adaptability shall consider, but not be limited to the flexibility of building services installations in meeting users changing requirements, floor loading capacity and floor height for changing usage, spare capacity for services shaft and horizontal distribution for future expansion, system adaptability for future changes in energy supply, as well as the adaptability of internal circulation path connecting to lift, escalator and staircase.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **BA 5 Committed**

## BA 6 Living Quality

***Intent***

To design and provide better spatial and facility provisions in buildings to enhance the living quality

***Criteria***

Commitment in Client's Project Brief to design and provide better spatial and facility provisions in buildings to enhance the living quality

***Explanation***

In the concept and planning stage of the Building, the Client is required to include the notion of designing and providing better spatial and facility provisions in the building to enhance the living quality in the project objectives. The extent of living quality enhancement in building covers the selected green and innovative building features, as described in the BD, LandsD & PlanD Joint Practice Note No. 1 & 2, which include balconies, wider common corridors and lift lobbies, mail delivery rooms with mailboxes for residential building, and communal sky gardens for both residential & non-residential buildings, as well as other applicable features, such as wing walls, utility platforms, wind catchers and funnels.

Each of the green and innovative features may be applicable for a particular building type and build form only. Simply providing the features as gimmicks but without actual function is not recommended. The features which provide a reasonable function in improving the building environmental performance will be considered as acceptable.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **BA 6 Committed**

# RESOURCES USE (RE)

## RE 1 Energy Consumption

***Intent*** To reduce the overall building energy consumption of the planned Building

***Criteria*** Commitment in Client's Project Brief to minimise energy consumption by effective design and efficient operation

***Explanation*** In the concept and planning stage of the Building, the Client is required to include the notion of reducing building energy consumption for the whole life of the building in the project objectives. This is a performance-based requirement and is expected to have a holistic consideration on the energy consumption issues of the planned building.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **RE 1 Committed**

## RE 2 Energy Efficiency

***Intent*** To enhance the energy efficiency of the planned Building and its systems

***Criteria*** Commitment in Client's Project Brief to design the building and its systems with a higher level of energy efficiency

***Explanation*** In the concept and planning stage of the Building, the Client is required to include the notion of designing the building and its building services systems with a higher level of energy efficiency in the project objectives. The extent of energy efficiency shall cover the aspects of architectural and built form planning, building services systems, electrical appliances as well as energy monitoring.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **RE 2 Committed**

## RE 3 Use of Renewable Energy

***Intent***

To encourage the use of renewable energy technology to reduce environmental impacts associated with fossil fuel use

***Criteria***

Commitment in Client's Project Brief to use renewable sources for building energy demands

***Explanation***

Use of renewable energy sources is encouraged by both the HKSAR Government and environmental groups, with the support from many practising building professionals. The technology of many renewable energy generation methods are mature and have been adopted in many other developed countries. Apart from photovoltaic and solar thermal applications, wind, small scale hydropower, geothermal and fuel cell applications are also possible renewable energy sources for consideration. Albeit there may have been many restrictions in using renewable energy within a building site due to the current high density urban form and high-rise built form practices in Hong Kong, a certain scale of renewable energy use with proper integration with the building system is still feasible.

In the concept and planning stage of the Building, the Client is required to include the notions of reducing fossil fuel use and green house gas emission during the whole life of the Building in the project objectives. The Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **RE 3 Committed**

## RE 4 Water Conservation

***Intent***

To minimise water consumption and wastage, and to reuse water in an appropriate way

***Criteria***

Commitment in Client's Project Brief to minimise water consumption and wastage in the building

***Explanation***

This criteria aims to reduce the consumption of both potable & flushing water (which could be either seawater or fresh water), recycle and reuse where possible, and increase awareness of its importance. In order to improve water wastage habits, one of the active approaches is by means of education. Alternatively, the passive approach is to use manual / automatic flow control devices in controlling water supply. In addition, the Government is also endeavouring to reduce the amount of water consumption by various means.

Reducing water consumption not only helps to reduce loading on both water supply and waste treatment facilities, but also reduces the demand for energy use, pumping power in utility networks, chemical treatment and environmental loadings in water treatment process. Water saving measures shall be applicable in general sanitary uses, such as washing basin, bathing, janitorial service facilities, commercial kitchen facilities, irrigation, cleansing as well as other occupant functions and building equipment operation, etc. Water conservation and recycling facilities could be developed in parallel to reduce the amount of water consumption.

In the concept and planning stage of the Building, the Client is required to include the notion of water conservation and seek for opportunities to recycle and reuse this valuable resource in the project objectives. The Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **RE 4 Committed**

## RE 5 Timber Use

***Intent***

To reduce the use of timber and encourage the use of timber from sustainable sources

***Criteria***

Commitment in Client's Project Brief to minimise timber consumption and wastage, and to use timber produced from recognised sustainable sources.

***Explanation***

Timber is a global valuable resource. The construction industry in Hong Kong uses a large amount of timber for temporary purposes in Building, and a high percentage is disposed to landfill sites after minimal use.

On the other hand, both construction and refurbishment works consume large amounts of timber. Wood is an important material in the global context Over-harvesting of forests will lead to extinction of indigenous species and forests, which adversely affects the ecological cycle of the environment. Therefore, being one of the largest importers of tropical hardwood, Hong Kong should demonstrate the belief in adopting timber from recognized sustainable managed sources.

In the concept and planning stage of the Building, the Client is required to include the notion of less timber consumption and seek for opportunities to use timber from sustainable sources in the project objectives. The Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **RE 5 Committed**

## RE 6 Material Use

***Intent*** To reduce material consumption and to encourage the use of recycled materials

***Criteria*** Commitment in Client's Project Brief to minimise material consumption and wastage and to encourage the use of recycled materials

***Explanation*** Environmental impact always links to the use of materials and energy. The aim of this criteria is to reduce environmental impact by reducing the use of materials and energy consumption, by means of reusing material, use of environmental-friendly material and dematerialisation. On the use of materials, the following criteria should be considered to arrive an optimise design:

- Reduce quantity (regardless of material types)
- Extend Life cycle: prolonged usage or reuse of concrete or timber
- Material characterisation – nature of material. E.g. less cement in the concrete or timber from sustainable sources.

In the concept and planning stage of the Building, the Client is required to include the notion of reducing material use and seek for opportunities to use recycled materials in the project objectives. The Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **RE 6 Committed**

## RE 7 Building Reuse

***Intent***

To encourage refurbishment of building to reduce the amount of resources use and waste generation

***Criteria***

Commitment in Client's Project Brief to minimise material consumption and wastage

***Explanation***

Environmental impact is always linked to the use of materials and energy. The aim of this criteria is to reduce environmental impact by reducing the use of specific materials and energy consumption. Refurbishment of buildings can reduce the amount of resources used and waste generation, unless reconstruction of a building is more environmental and investment cost justifiable. Besides, retaining certain portions of building structure prolongs the building life span.

In the concept and planning stage of the Building, the Client is required to include the notion of material use reduction and seek for opportunities to use recycled materials in the project objectives. The Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **RE 7 Committed**

# LOADINGS (LD)

## LD 1 Pollution

***Intent***

To minimise and mitigate outdoor air, noise and water pollution and the subsequent health and environmental impacts

***Criteria***

Commitment in Client's Project Brief to minimise and mitigate air, noise and water pollution and the subsequent health and environmental impacts

***Explanation***

In the concept and planning stage of the Building, the Client is required to include the notions of minimising air, noise and water pollution outdoors during the whole life of the Building, in the project objectives.

Compliance with relevant Air Pollution Control Ordinance, Noise Control Ordinance and Water Pollution Ordinance are considered as minimum performance requirements to fulfil the statutory requirements. Further minimisation of adverse environmental impact is encouraged.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **LD 1 Committed**

## LD 2 Waste Management

***Intent***

To encourage best practices in waste management, including sorting, recycling and disposal of municipal, construction and demolition waste

***Criteria***

Commitment in Client's Project Brief to plan and implement effective waste management strategies, and hence reduce the health and environmental impacts

***Explanation***

In the concept and planning stage of the Building, the Client is required to include the notion of minimising waste generation and to sort recyclable materials in the project objectives.

Waste minimisation mainly focuses on solid waste type. The waste shall be categorised in the form of municipal, construction and demolition wastes. Municipal waste includes paper, aluminium cans, plastics, glass bottles, battery and wet waste. Construction and demolition waste include reusable building components and building services installations, metal, wood, inert and non-inert materials.

Some buildings with hazardous waste disposal (e.g. Chemical and Asbestos) should also have full compliance with the corresponding Ordinances, Guidelines and Codes of Practice from EPD (e.g. Waste Disposal (Chemical Waste) (General) Regulation).

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **LD 2 Committed**

# SITE AMENITIES (SA)

## SA 1 Inclusion

***Intent***

To provide optimum spatial arrangements and facilities to enhance the sense of inclusion for all building occupants and users

***Criteria***

Commitment in Client's Project Brief to provide optimum spatial arrangements and facilities to enhance the sense of inclusion for all building occupants and users

***Explanation***

In the concept and planning stage of the Building, the Client is required to include the notion of creating an environment in the Building to promote a sense of inclusion for all building occupants and users in the project objectives.

Effective inclusion will harmonise all building occupants and users, irrespective whether they are of healthy or disabled, children, adult or elder persons, new immigrants, different gender or race. Particular aspects such as provisions for disabled, children and elderly use, as well as space for human interactions and communication shall be focused.

Also, space and facility provisions shall be provided to enhance the physical connections within Building for all building occupants and users. The connection can be in the form of circulation paths, such as easy access to open space, construction with cover and continuous circulation paths. Connection to the open space is particularly important in the urban development as environmental and communal benefits from open space is widely recognised.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **SA 1 Committed**

## SA 2 Landscape

***Intent*** To design and provide greenery treatment and landscape features within a site

***Criteria*** Commitment in Client's Project Brief to design and provide greenery and landscape features within a building

***Explanation*** In the concept and planning stage of the Building, the Client is required to include the notions of designing and providing greenery and landscape features within a building in the project objectives. Landscape, in form of greenery, water features, hard landscape and fixed furniture are recommended in communal open space, podium garden, skygarden, slope, retaining wall and semi-enclosed area. Communal podium gardens and skygardens are considered as innovative green features as described in the BD, LandsD & PlanD Joint Practice Note No. 1 & 2.

Opportunity for tree planting and greening should be optimised to provide natural shade and surface to reduce solar heat gain and to create a habitable environment. Also, planting of tree belt with undergrowth can also help to trap or remove air pollutants from the nearby traffic. The heat island effect is common in city area, particularly in Hong Kong where air-cooled type air conditioning and electric lighting are widely used within a concentrated living area and the urban area is dominated by concrete or paved surface. Landscape with greenery and water features help to mitigate the heat island effect and reduce the ambient temperature. Adequate open space provision with convenient accessibility shall be planned. Boundary treatment with soft landscape treatment shall be provided where appropriate to improve the pedestrian setting. The building design shall also incorporate the preserved landscape features within the site to form an integrated development.

Landscape of slopes and retaining walls within a site boundary are not uncommon, and landscape on those areas can improve the view and environmental conditions. For detailed guidance of slope & retaining wall landscape, the PNAP 270 issued by BD and the Technical Guidelines on Landscape Treatment and Bio-engineering for Man-made Slopes and Retaining Walls, CEDD can be referred.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **SA 2 Committed**

## SA 3 Cultural Character

***Intent*** To provide a cultural character to the Building and its occupants and users

***Criteria*** Commitment in Client's Project Brief to provide a cultural character to the Building and its occupants and users

***Explanation*** In the concept and planning stage of the Building, the Client is required to include the notion of providing a cultural character to the building.

Cultural character is a broad term and is rather difficult to quantify. However, a building designed or constructed with cultural distinctiveness, is recognised as a good example or paradigm for the development of the building industry and the society. Cultural distinctiveness of individual buildings and developments create many long-term benefits to the HKSAR, such as the sense of innovation in the society, diverse cultural characters and distinctiveness, which is in-line with the mixed culture tradition in this international city. The direct copy of building design is not recommended. The cultural distinctiveness can be recognised in aspects of sustainability, aesthetics, cultural character, function and technology.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **SA 3 Committed**

## SA 4 Building Economics

***Intent***

To encourage comprehensive and life-cycle building economic considerations in building development

***Criteria***

Commitment in Client's Project Brief to carry out comprehensive and life-cycle building economic analysis in the design stage

***Explanation***

In the concept and planning stage of the Building, the Client is required to include the notion of comprehensive and life-cycle building economic analysis in the project objectives. The economic analysis shall be in form of life-cycle costing (LCC) approach, with the considerations of capital cost, construction and installation cost, operation and maintenance cost, decommissioning cost, life of the building / component / system, interest rates, discount rates and other significant factors that may affect the LCC results. The LCC process shall be a co-operation among the Client, designer and quantity surveyor. Through the process, wider consideration of economic factors in the whole project team is encouraged.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **SA 4 Committed**

## SA 5 Security

***Intent*** To provide effective security to the Building and its occupants and users

***Criteria*** Commitment in Client's Project Brief to provide effective security to the Building and its occupants and users

***Explanation*** In the concept and planning stage of the Building, the Client is required to include the notion of providing effective security to the Building and its occupants and users.

Hong Kong is a city with high living density. Although the crime rate in Hong Kong is relatively low compared with many other countries, a sense and provisions of living security are important to all building occupants and users. The extent of security provisions shall cover both spatial planning and security facilities, such as elimination of dark cul-de-sacs and unnecessary recessed space, provision of security guards and electronic surveillance system, etc.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **SA 5 Committed**

# NEIGHBOURHOOD AMENITIES (NA)

## NA 1 Provisions for Community

***Intent*** To provide spatial and facility provisions in the Building that benefits the community

***Criteria*** Commitment in Client's Project Brief to provide spatial and facility provisions in the Building that benefits the community

***Explanation*** In the concept and planning stage of the Building, the Client is required to include the notion of providing spatial and facility provisions in the Building that benefits the community. The extent of provision covers various support for elderly, youth, students, passer-by, building occupants and people from outside the Building. Support could be in form of elderly centre, youth centre, library, leisure & recreational facilities. However, duplication of provisions that may lead to long-term over-providing of facilities within a district should be avoided. The planners shall carry out a site survey to identify possible community supports that could be offered by the Building.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **NA 1 Committed**

## NA 2 Transportation

***Intent***

To provide convenient and sustainable transportation services within or around the Building

***Criteria***

Commitment in Client's Project Brief to provide convenient and sustainable transportation services within or around the Building

***Explanation***

In the concept and planning stage of a building, the Client is required to include the notion of providing convenient transportation services within or around the Building. The extent of quality transportation services shall include convenient and safe access for building occupants through walking, cycling and public transportation. Public transportation is encouraged as it helps to reduce pollution.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **NA 2 Committed**

## NA 3 Sustainability Economics

***Intent***

To recognise the additional expenditure on improving environmental and social performance

***Criteria***

Commitment in Client's Project Brief to acknowledge the additional expenditure on improving building sustainability performance

***Explanation***

Expenditure on improving environmental and social performance is essential as a driving force for sustainability enhancement and provision of green features and local community facilities. Commitment should be made at as an early stage of the project. The potential cost expenditure to improve the environmental and social performance shall refer to the CEPAS indicators in the Design, Construction and Operation Stages. However, priority should be put on cost effective design, whilst achieving good environmental performance.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **NA 3 Committed**

# SITE IMPACTS (SI)

## SI 1 Site Environment

***Intent***

Site development with full considerations of the existing environmental conditions of the land and its surroundings

***Criteria***

Commitment in Client's Project Brief to develop the site with full considerations of the existing environmental conditions of the land and its surroundings, while a preliminary investigation shall be carried out before commencement of detailed design

***Explanation***

In the concept and planning stage of the Building, the Client is required to consider the existing environmental conditions within the site, and to carry out preliminary site investigation before commencement of concept design. The extent of site environmental conditions shall cover, but not be limited to building environmental value of the land, site layout planning and arrangement of buildings, as well as site microclimate.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **SI 1 Committed**

## SI 2 Nature Conservation

***Intent***

To conserve and enhance the natural environment by preserving landscape resources and protecting the ecological value of the site

***Criteria***

Commitment in Client's Project Brief to conserve and enhance the natural environment by protecting the ecological value of the site and implement effective preventive works before site formation works

***Explanation***

In the concept and planning stage of the Building, the Client is required to include the notion of natural environment conservation and enhancement in the project objectives. Effective preservation measures shall be implemented in the early stage before site formation. Meanwhile, surveys on the ecological value and existing vegetation should be taken to ensure that the conceptual design will take full consideration of the existing ecological conditions and landscape features so that preservation and mitigation measures can be formulated accordingly. The extent of nature conservation shall include both habitat and biodiversity.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **SI 2 Committed**

## SI 3 Heritage Conservation

***Intent***

To conserve and protect archaeological and historic buildings, monuments, components and artefacts

***Criteria***

Commitment in Client's Project Brief to conserve and protect archaeological and historic building, monument, component and artefacts within the site

***Explanation***

In the concept and planning stage of the Building, the Client is required to include the notion of heritage conservation in the project objectives. Compliance of the Antiquities and Monuments Ordinance and Environmental Impact Assessment are considered as pre-requisite criteria in the CEPAS.

Since some of the graded buildings as listed by the Antiquities Advisory Board do not have statutory protection, these buildings, components and artefacts with cultural and historical value may be damaged or destroyed during building demolition, redevelopment, alteration and addition works. However, those buildings, components and artefacts are of interest to the public and the Antiquities and Monuments Office, and so preserving the cultural value on site, reuse of historical building or conveying the salvaged building materials with cultural and historical values to the Government before demolition is highly recommended.

Preliminary site appraisal should be conducted to evaluate the cultural and historical value of land and existing buildings. In the case of certain cultural and historical value being identified, it is recommended to consult with archaeologists, historians or conservation experts for further site planning.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **SI 3 Committed**

## SI 4 Buildability

***Intent***

To design and construct the building and its facilities for ease of construction and less materials use, and encourage the use of innovative construction technology to enhance buildability

***Criteria***

Commitment in Client's Project Brief to design and construct the building and its facilities for ease of construction and less materials use, and with consideration of innovative construction technology

***Explanation***

In the concept and planning stage of the Building, the Client is required to include the notion of buildability in the project objectives. Standardised building components, simple installation details and building services systems, pre-fabricated building elements, shortest services routes, integrated building components, simple site fabrication works, storage management of construction site materials, are possible methods to enhance buildability. Shorter construction period and less material consumption could be the benefits from better buildability.

On the other hand, construction and demolition process usually requires heavy demand on technologies, logistic management, site supervision and quality assurance. These alternatively give rise to considerable environmental problems. The designer and contractor are encouraged to adopt innovative methods to create project-specific construction technologies and to satisfy high quality requirements of various construction activities. The developer would benefit from the new technology through a better profit, whilst the designer and contractor would be benefited by sound technical competitiveness.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **SI 4 Committed**

# NEIGHBOURHOOD IMPACTS (NI)

## NI 1 Environmental Impact Assessment

***Intent***

To avoid environmental impacts and to mitigate adverse effects due to environmental impacts of the Building

***Criteria***

Commitment in Client's Project Brief to avoid environment impact, to minimize and control adverse effects due to environmental impacts of the building and to present such information to future occupants

***Explanation***

In the concept and planning stage of the Building, the Client is required to include the notion of minimisation and control of the adverse effects due to environmental impacts in the project objectives, whilst implementing effective remedial measures for adverse environmental impacts.

Environmental Impact Assessment (EIA) as stipulated in the Environmental Impact Assessment Ordinance and the Technical Memorandum on Environmental Impact Assessment Process not only is a strategic process, but also is an active planning tool for building development. It aims to achieve a balance between environmental management and development decision. Early EIA is able to minimise community conflicts and helps to smooth the project development process.

However, EIA is statutory applicable for designated projects as stipulated in Appendix 2 or 3 of the Technical Memorandum. Hence, the notions behind the EIA may not be considered by many building development projects in Hong Kong. Hence, the building developer and planner are encouraged to consider the relevant environmental aspects as described in the Technical Memorandum in the Pre-design Stage.

Apart from the building developments requiring EIA according to the current statutory requirements, the developer / planner shall prepare a preliminary report to address the existing environmental conditions and to identify potential environmental impacts of the site, as carried out in the Pre-design Stage.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **NI 1 Committed**

## NI 2 Environmental Interactions

***Intent***

To minimise adverse environmental impacts and enhance the environmental performance to the surrounding buildings and streets due to the building operation

***Criteria***

Commitment in Client's Project Brief to minimise adverse environmental impacts to the surrounding buildings and streets due to the building form design and arrangements

***Explanation***

In the concept and planning stage of the Building, the Client is required to include the considerations of environmental interactions improvement between the new building and its surroundings in the project objectives.

Erection of a new building may lead to numerous environmental interactions with the surrounding buildings and streets. The interactions may be of benefit to the new building itself, or to the surroundings, or both. This indicator aims to encourage the building planner and designer to harmonise the environmental benefits gained by the Building and to minimise adverse environmental impacts to the surroundings. The extent of the environmental considerations shall cover setback, natural ventilation effectiveness, outdoor air quality, pedestrian wind comfort, noise impacts and visual impacts to the surroundings.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **NI 2 Committed**

## NI 3 Impacts to Communities

***Intent***

To encourage public participatory approached planning, and to minimize social problems generated from the building that cause adverse impacts to the community and surroundings

***Criteria***

Commitment in Client's Project Brief to encourage public participatory approached building planning, and to minimize nuisance generated from the building that cause adverse impacts to the community and surroundings

***Explanation***

In the concept and planning stage of the Building, the Client is required to include the notion of nuisance minimisation in the project objectives.

The extent of impacts to community will be site specific and also related to the usage of the building. For instance, wet market construction will be of benefit to the community but the window openings of the market facing directly to the residential flats within a short distance may cause nuisance. When planning a building with potential nuisance during its operation, the Client is recommended to consult the communities or their representatives, to introduce their building concept and to receive feedback, so that conflicts between the future building and the local residents could be minimised.

To commit to the project objectives, the Client is required to include the objectives in the Project Brief / Design Control Document. The designers and planners are required to plan and design the entire Building in line with the objectives. The environmental performance criteria as described in other CEPAS stages shall be used for reference in preparing the Project Brief.

☐ **NI 3 Committed**

# APPENDIX 1. LIST OF ABBREVIATIONS

The following abbreviations shall be referred in this assessment scheme:

| | |
|---|---|
| A&A | Addition and Alternation |
| ACH | Air Change per Hour |
| AFCD | Agriculture, Fisher and Conservation Department, HKSAR Government |
| AP | Authorized Person |
| ArchSD | Architectural Service Department, HKSAR Government |
| ASHRAE | American Society of Heating, Refrigerating and Air-conditioning Engineers, USA |
| BA | Building Authority, HKSAR Government |
| BD | Buildings Department, HKSAR Government |
| BRE | Building Research Establishment, UK |
| BREEAM | Building Research Establishment Environmental Assessment Method, UK |
| BS | British Standard |
| BSRIA | Building Services Research and Information Association, UK |
| C&D | Construction and Demolition |
| CASBEE | Comprehensive Assessment System of Building Environmental Efficiency for Japan |
| CCMS | Central Control and Monitoring System |
| CEDD | Civil Engineering and Development Department, HKSAR Government |
| CEPAS | Comprehensive Environmental Performance Assessment Scheme |
| CIBSE | Chartered Institution of Building Services Engineers, UK |
| CIE | Commission Internationale de Eclairage |
| CIRIA | Construction Industry Research and Information Association, UK |
| COP | Code of Practice |
| DSD | Drainage Services Department, HKSAR Government |
| EIA | Environmental Impact Assessment |
| EMGB-Taiwan | Evaluation Manual for Green Buildings in Taiwan 綠建築標章 |
| EMO | Energy Management Opportunity |
| EMSD | Electrical and Mechanical Services Department, HKSAR Government |
| EPD | Environmental Protection Department, HKSAR Government |
| ETWB | Environmental, Transport and Works Bureau, HKSAR Government |
| EUI | Energy Utilisation Index |
| FEHD | Food and Environmental Hygiene Department |
| FSD | Fire Services Department, HKSAR Government |
| GBC | Green Building Challenge |
| GBTool | Green Building Tool |
| GFA | Gross Floor Area |
| GHEM - PRC | Green House Evaluation Manual – China Assessment Handbook for Ecological Residential Building 中國生態住宅技術評估手冊 |
| HK-BEAM | Hong Kong Building Environmental Assessment Method |
| HKHA | Hong Kong Housing Authority, HKSAR Government |
| HKHD | Hong Kong Housing Department, HKSAR Government |
| HKIA | The Hong Kong Institute of Architects |
| HKIE | The Hong Kong Institution of Engineers |
| HKIP | Hong Kong Institute of Planners |
| HKIS | The Hong Kong Institute of Surveyors |

| | |
|---|---|
| HKPolyU | The Hong Kong Polytechnic University |
| HKSAR | Hong Kong Special Administrative Region of the People's Republic of China |
| HVAC | Heating, Ventilation and Air-Conditioning |
| HVACR | Heating, Ventilation, Air-Conditioning and Refrigeration |
| HVCA | Heating and Ventilating Contractors Association, UK |
| IAQ | Indoor Air Quality |
| IBI | Intelligent Building Index, Hong Kong |
| IEQ | Indoor Environmental Quality |
| IESNA | Illumination Engineering Society of North America |
| ISO | International Organization for Standardization |
| LA | Land Authority, HKSAR Government |
| LandsD | Lands Department, HKSAR Government |
| LEED | Leadership in Energy and Environmental Design, USA |
| LCA | Life Cycle Analysis |
| LCC | Life Cycle Costing |
| NABERS | The National Australian Building Environmental Rating System of Australia |
| N/A | Not Applicable |
| O&M | Operation and Maintenance |
| ODS | Ozone-depleting substances |
| OTTV | Overall Thermal Transfer Value |
| PlanD | Planning Department, HKSAR Government |
| PGBC | Professional Green Building Council, Hong Kong |
| PNAP | Practice Notes for Authorised Persons and Registered Structural Engineers, issued by BD, HKSAR Government |
| PNRC | Practice Notes for Registered Contractors, issued by BD, HKSAR Government |
| ProPECC PN | Professional Persons Environmental Consultative Committee Practice Notes, issued by EPD, HKSAR Government |
| SC | Site Coverage |
| SDU | Sustainable Development Unit, HKSAR Government |
| SPeAR® | Sustainable Project Appraisal Routine |
| SUSDEV21 | Sustainable Development for the 21st Century, HKSAR Government |
| WSD | Water Supplies Department, HKSAR Government |

# APPENDIX 2. SUMMARY OF CEPAS INDICATORS

| PRE - DESIGN STAGE | | |
|---|---|---|
| **Criteria** | | **Intent** |
| **Indoor Environmental Quality (IE)** | | |
| **IE 1** | Health & Hygiene | Enhance of health and hygiene |
| **IE 2** | Indoor Air Quality | Maintain the environment of occupied space with good indoor air quality |
| **IE 3** | Noise and Acoustic Environment | Minimise the noise nuisance affecting building occupants |
| **IE 4** | Lighting Environment | Create a comfort visual environment by means of energy saving operations |
| **Building Amenities (BA)** | | |
| **BA 1** | Safety | Provide a safe habitation and working environment for building occupants and users |
| **BA 2** | Management | Design the building and its facilities ease of effective management |
| **BA 3** | Controllability | Design the building and its facilities ease of effective control and operation |
| **BA 4** | Serviceability | Design the building and its facilities ease of effective maintenance |
| **BA 5** | Adaptability | Design the building and its facilities with high adaptability in usage changes |
| **BA 6** | Living Quality | Design and provide better spatial and facility provisions in building to enhance the living quality |
| **Resources Use (RE)** | | |
| **RE 1** | Energy Consumption | Reduce the overall building energy consumption of the planned Building |
| **RE 2** | Energy Efficiency | Enhance the energy efficiency of the planned Building and its systems |
| **RE 3** | Use of Renewable Energy | Encourage the use of renewable energy technology to reduce environmental impacts associated with fossil fuel use |
| **RE 4** | Water Conservation | Minimise water consumption and wastage, and to reuse water in an appropriate way |
| **RE 5** | Timber Use | Reduce the use of timber and encourage the use of timber from sustainable source |
| **RE 6** | Material Use | Reduce material consumption and to encourage the use of recycled materials |
| **RE 7** | Building Reuse | Encourage refurbishment of building to reduce the amount of resources use and waste generation |
| **Loadings (LD)** | | |
| **LD 1** | Pollution | Minimise and mitigate outdoor air, noise and water pollution and the subsequent health and environmental impact |
| **LD 2** | Waste Management | Encourage best practices in waste management, including sorting, recycling and disposal of municipal, construction and demolition waste |
| **Site Amenities (SA)** | | |
| **SA 1** | Inclusion | Provide optimum spatial arrangements and facilities to enhance the sense of inclusion for all building occupants and users |

| Criteria | | Intent |
|---|---|---|
| **SA 2** | Landscape | Design and provide greenery sensitive boundary treatment and landscape features within a site |
| **SA 3** | Cultural Character | Provide a cultural character to the Building and its occupants and users |
| **SA 4** | Building Economics | Encourage comprehensive and life-cycle building economic considerations in building development |
| **SA 5** | Security | Provide effective security to the Building and its occupants and users |
| **Neighbourhood Amenities (NA)** | | |
| **NA 1** | Provisions for Community | Provide spatial and facility provisions in the Building that benefits to the community |
| **NA 2** | Transportation | Provide convenient and sustainable transportation services within or around the Building |
| **NA 3** | Sustainability Economics | Recognise the effort of the additional expenditure on improving environmental and social performance |
| **Site Impacts (SI)** | | |
| **SI 1** | Site Environment | Considerate existing environmental conditions of the land and its surroundings fully on site development |
| **SI 2** | Nature Conservation | Conserve and enhance the natural environment by preserving landscape resources and protecting the ecological value of the site |
| **SI 3** | Heritage Conservation | Conserve and protect archaeological and historic buildings, monuments, components and artefacts |
| **SI 4** | Buildability | Design and construct the building and its facilities ease of construction and less materials used, and encourage the use of innovative construction technology to enhance buildability |
| **Neighbourhood Impacts (NI)** | | |
| **NI 1** | Environmental Impact Assessment | Avoid environmental impacts and to mitigate adverse effects due to environmental impacts of the Building |
| **NI 2** | Environmental Interactions | Minimise adverse environmental impacts the surrounding buildings and streets due to the Building form and arrangements |
| **NI 3** | Impacts to Communities | Encourage public participatory approached planning, and to minimize social problems generated from the building that cause adverse impacts to the community and surroundings |