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A Road Towards Sustainability – Case Sharing of BEAM Plus Certification of Kwai Shing West Estate



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Building Services Engineer
Housing Department, HKSARG



Hong Kong Housing Authority

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- **Statutory body established in 1973 under the Housing Ordinance to develop and implement public housing policies**
- **Provides homes for over 2 million people**
- **Over 740 000 flats in 216 public housing estates**
- **About 1200 existing HA buildings**
- **Around 44% built in 1980s or earlier**



Maintenance Strategy

- Sustainability is one of key maintenance strategy
- Tie in with life cycle and constantly upgrade facilities
 - Comprehensive Structural Investigation Programme
 - Estate Improvement Programme
 - Total Maintenance Scheme
 - Responsive In-flat Maintenance Scheme
 - Lift Modernisation and New Lift Addition



Green Living

- **Benchmark with international standards and scientific building assessment method:**



**ISO 14001
Environmental
Management System**



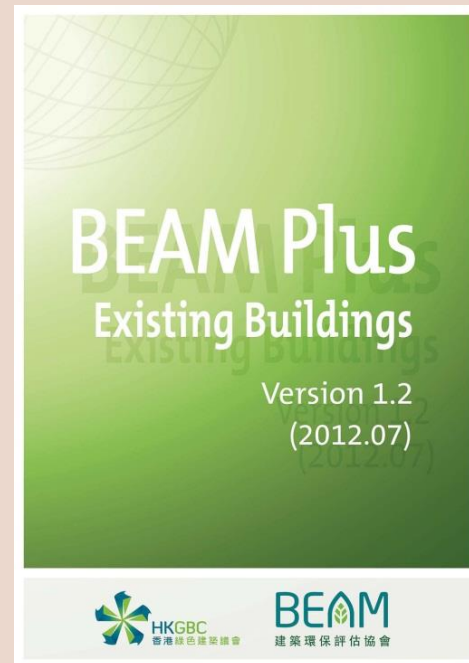
**ISO 50001
Energy
Management System**



**OHSAS 18001
Occupational Health and
Safety Management System**



**Green Roof and
Vertical Greening**



**Feasibility Study and
Pilot Implementation
of
BEAM Plus for EB**



Pilot Implementation of BEAM Plus

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- 2012 – Feasibility Study
- 2013 – Pilot Implementation at **Kwai Shing West Estate**
- Improvements tied in with Estate Improvement Programme
- June 2014 – Provisional **PLATINUM** rating under Version 1.2
- October 2015 – **Final PLATINUM** rating under Version 1.2
- First existing building to achieve this rating in EB category



hereby certifies that 特此證明

Kwai Shing West Estate
Kwai Shing West Estate, Kwai Chung,
New Territories, Hong Kong

葵盛西邨
香港新界葵涌葵盛西邨

has achieved the following
Final Rating of BEAM Plus V1.2 for EB:
獲得以下綠建環評1.2版(既有建築)最終評級:

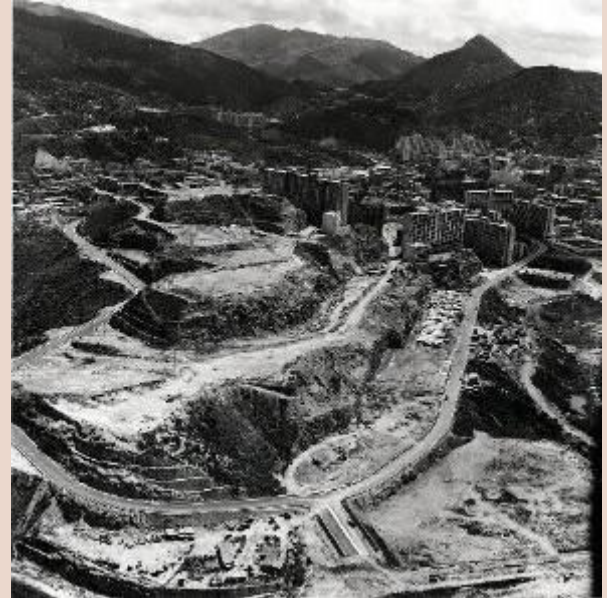



Ir Conrad WONG Tin-cheung, BBS, JP
Chairman
Hong Kong Green Building Council Limited
香港綠色建築議會有限公司主席
兼天祥工程師、副董事、大平紳士



Kwai Shing West Estate

| | |
|--------------------------|--|
| District : | Kwai Tsing |
| Completion Year : | 1975 - 1977 |
| Estate Area : | 85,000 m² |
| Domestic Flats : | 5,260 |
| Population : | 14,800 / Elderly : 4,430 (30%) |
| Facilities : | Shopping Centre & Market Multi-storey Car Parks Public Transport Terminal Community Hall Primary Schools & Kindergarten |
| Block Type : | 10 Old Slab Blocks (7-25 storeys) |





Kwai Shing West Estate





BEAM Plus Existing buildings

Version 1.2

- **Six assessment aspects i.e. Site Aspects (SA), Materials Aspects (MA), Water Use (WU), Energy Use (EU), Indoor Environmental Quality (IEQ); and Innovations & Additions (IA);**

| Rating | Overall Achievement | SA | EU | IEQ | IA |
|---------------------|---------------------|-----|-----|-----|-----------|
| Platinum | 75% | 70% | 70% | 70% | 3 credits |
| Gold | 65% | 60% | 60% | 60% | 2 credits |
| Silver | 55% | 50% | 50% | 50% | 1 credit |
| Bronze | 40% | 40% | 40% | 40% | |
| Unclassified | | | | | |



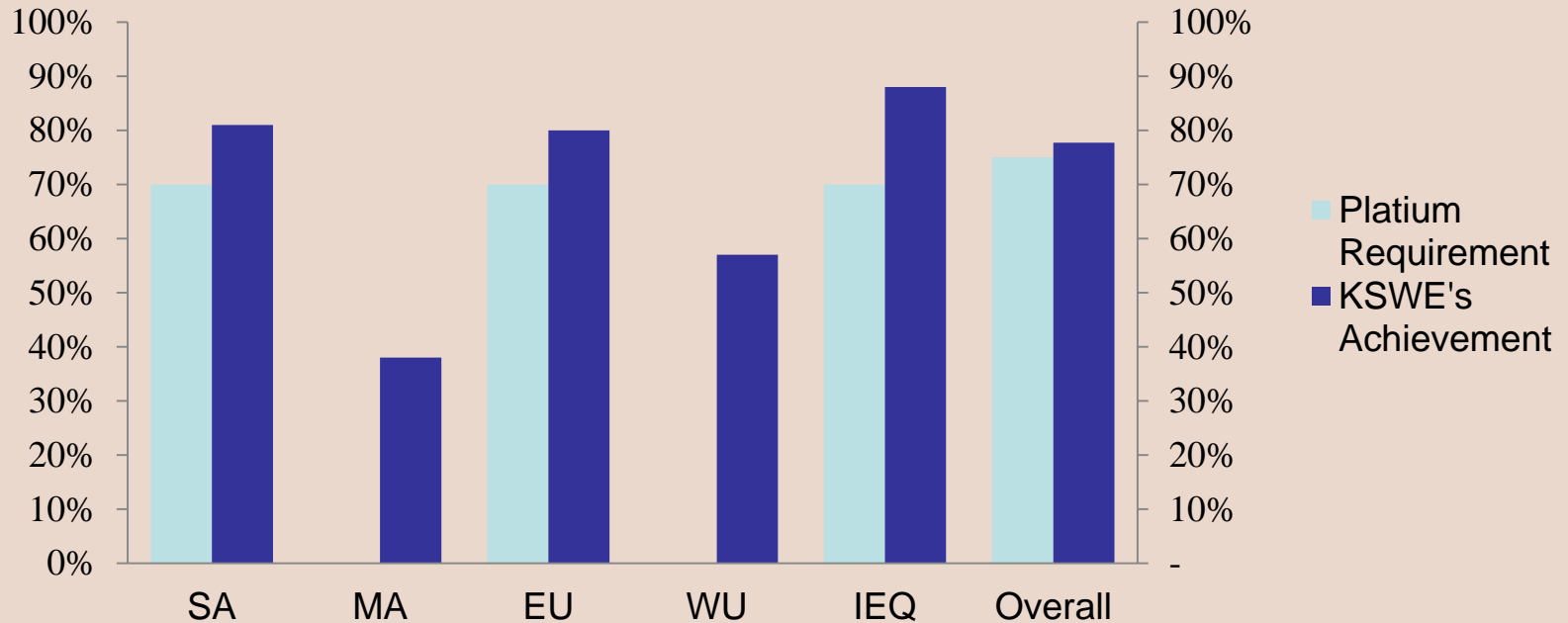
BEAM Plus Assessment on Kwai Shing West Estate

| Category | Applicable Credits | Achieved Credits | % of Achieved Credits | Weighing Factor | Achieved Credits |
|----------------------|--------------------|------------------|-----------------------|-----------------|------------------|
| SA | 16.0 | 13.0 | 81% | 18% | 14.6 |
| MA | 8.0 | 3.0 | 38% | 12% | 4.5 |
| EU | 20.1 | 16.0 | 80% | 30% | 23.9 |
| WU | 7.0 | 4.0 | 57% | 15% | 8.6 |
| IEQ | 11.1 | 9.8 | 88% | 25% | 22.1 |
| IA | 6 Bonus | 4 Bonus | | 100% | 4.0 |
| Overall Score | | | | | 77.7 |



Kwai Shing West Estate vs Platinum Requirements of BEAM Plus EB V1.2

Credit Summary





Site Aspects – Major Sustainable Features

Credits have been achieved in the following areas:

- Health, Safety and Environmental Management
- Environmental Purchasing Practices
- Operation and Maintenance
- Staffing and Resources
- Tenants' Guidance



Materials Aspects – Major Features

Scores have been achieved in the following areas:

- **Non- ozone Depleting Substances**
- **Waste Management Audit**
- **Waste Management Practices**



Energy Use – Major Features

Scores have been achieved in the following areas:

- **Reduction of CO₂ Emission;**
- **Carbon Audits have been conducted**
- **Energy Audits have been conducted;**
- **Energy Management System to ISO 50001 have been implemented;**
- **Energy Efficient Appliances**
- **On-going Programme on commissioning of all non-HVAC equipment and systems**



Water Use – Major Features

Scores have been achieved in the following areas:

- **Minimum Water Saving Performance**
- **Water Conservation Plan**
- **Water Audit**
- **Effluent Discharge to Foul Sewers**



Indoor Environmental Quality – Major Features

- Security
- Plumbing and Drainage
- Waste Disposal Facilities
- Integrated Pest Management
- Localised Ventilation
- Ventilation in Common Areas
- Over 80% of these common areas are Naturally Ventilated
- 80% of acceptability limits (as defined in BEAM Plus Manual) could be met
- Interior Lighting in Areas Not Normally Occupied
- Access for Persons with Disability
- Amenity Features



Indoor Environmental Quality – Major¹⁶ Features

- 80% of common areas are natural ventilated
- Full access to building facilities for persons with disability
- Provision of amenity features to improve the standard and quality of buildings



Innovations and Additions

4 Bonus credits have been granted in the features:

- **Water Audit;**
- **Use of Natural Ventilation;**
- **Performance Enhancements**
- **BEAM Professional**

Challenges

- **Building Constraints**

- Open refuse areas
- No full enclosures
- No mechanical ventilation
- Do not comply with PNAP requirements



- **Mitigation of Disturbance to Tenants**

- **Minimized Interruptions to Building Services**

- **Cost-effectiveness**



Improvement Measures

- **5 categories of improvement measures:**
 - 1) Management and Maintenance Practices**
 - 2) Building Improvement Works**
 - 3) Building Services Improvement Works**
 - 4) Building Services Operation and Maintenance Works**
 - 5) Technical Studies**



Management & Maintenance Practices²⁰

Health, Safety and Environmental Management

- ISO 14001 Environmental Management System
- OHSAS 18001 Occupational Health and Safety Management System



Energy Management

- ISO 50001 Energy Management System

Waste Management

- Waste recycling facilities
- Waste stream audit





Building Improvement Works

Building Upgrade

- Open refuse storage areas do not fulfill PNAP requirements
- Addition of independent mechanical air filtration system



Building Improvement Works

Water-saving Provisions

- Dual flush water cisterns
- Water-saving urinals
- Auto-sensory water taps



WATER-SAVING URINALS



DUAL FLUSH W.C.

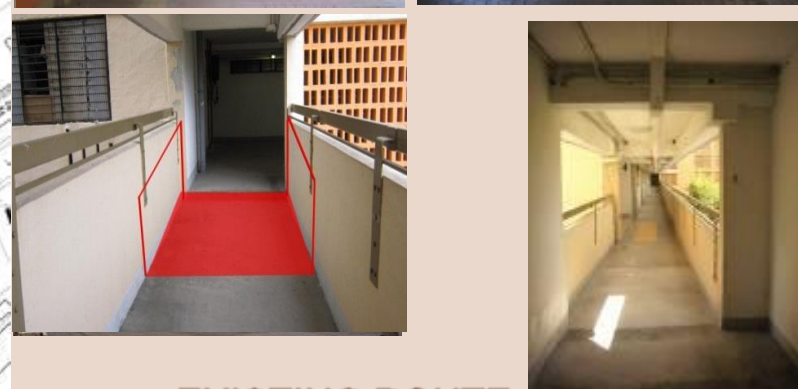
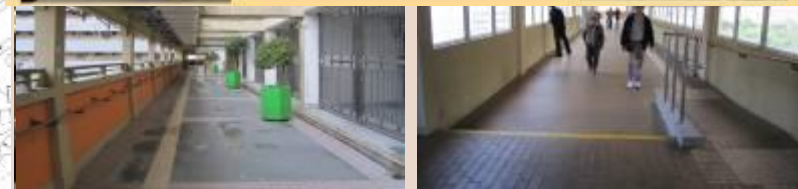
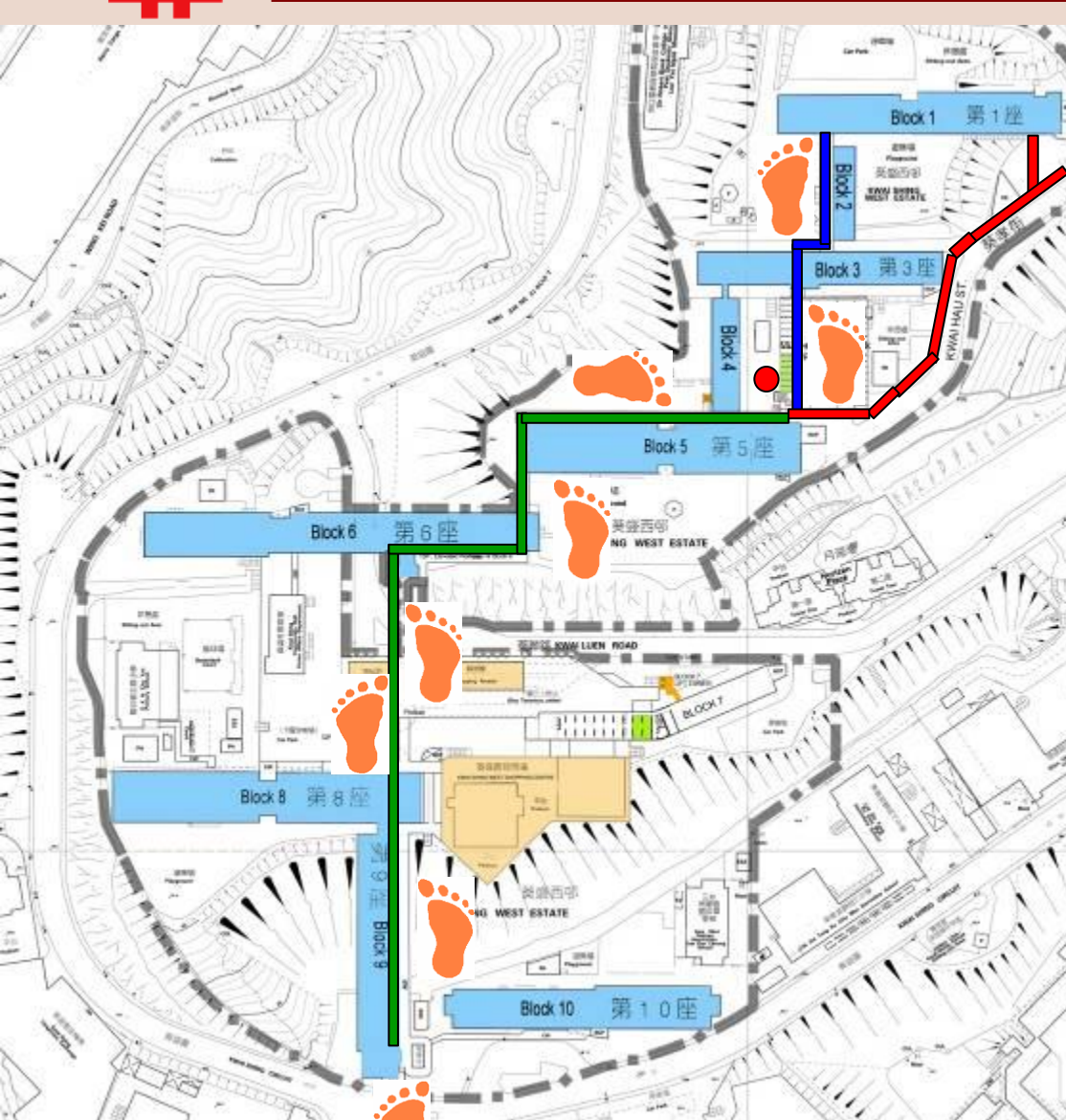


AUTO-SENSORY WATER TAPS



Building Improvement Works

Access for Persons with Disability



EXISTING ROUTE
NEW ROUTE



Building Improvement Works

Addition of New Lift Towers

- Add new lift and new lift landings
- Overcome structural constraints
- Mitigate nuisance and disturbance to tenants
- Minimize cost and time



FOOTING CONSTRUCTION



STEEL FRAME INSTALLATION



CLADDING INSTALLATION



Building Services Improvement

Works

- **Lighting Improvement Programme**
- **Lift Modernization Programme to replace energy inefficient and aged lifts with the most energy efficient type of lift with ACVVVF drive**
- **Installation of ventilation c/w de-odourization system for each newly built Refuse Collection Room**
- **Installation of additional Lift towers to improve the connectivity of the estate**



Building Services Improvement

Works (Cont'd)

- Install check meters to facilitate energy consumption measurement
- Monitor electricity consumption of major electrical loading



CHECK METER SYSTEM





Building Services Operation and Maintenance Works

- Submit O&M manual, maintenance programme, maintenance and inspection records, training records for O&M improvement practice;



Technical Study

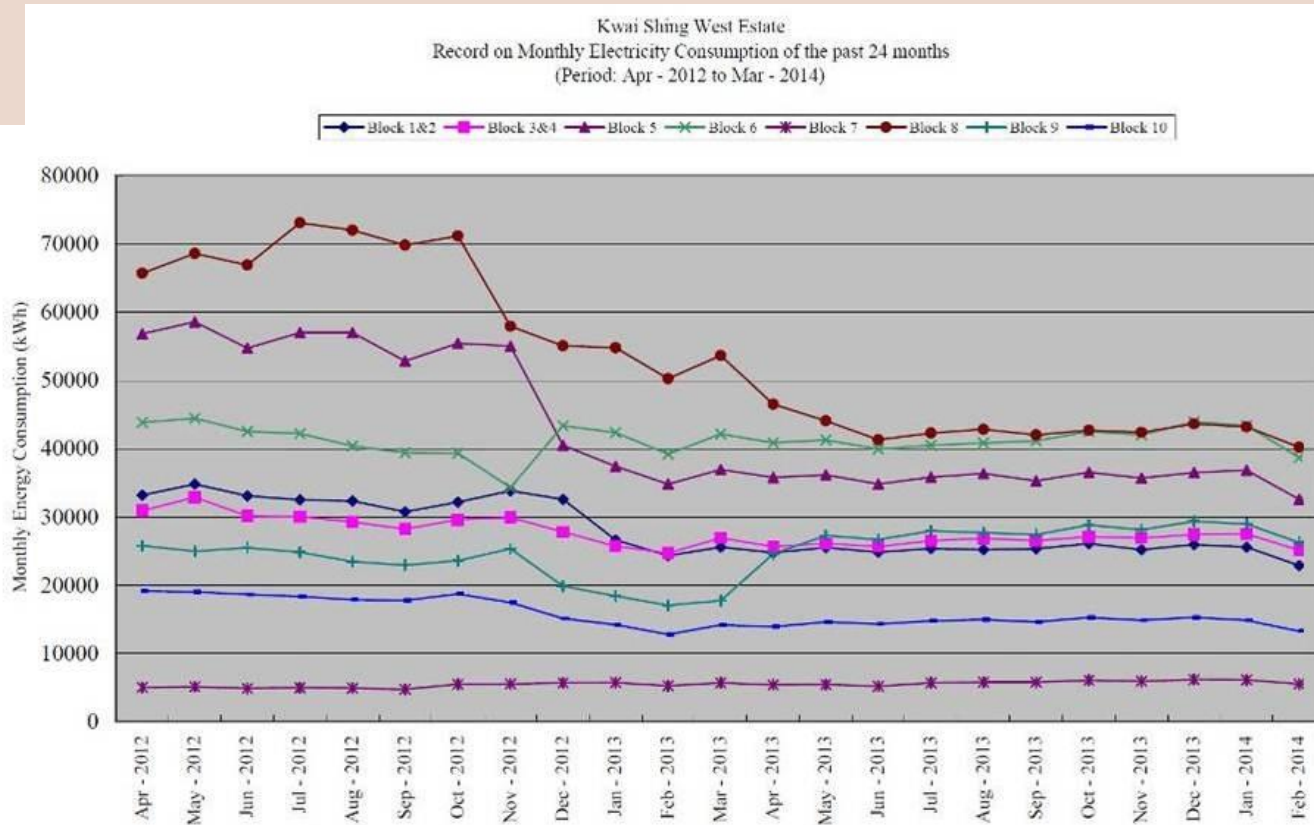
The following studies were conducted:

- Energy Audit
- Carbon Audit
- Waste Management Audit



Results of Improvement Works

- Upon replacement of public lighting with energy efficient light fittings (i.e. compact fluorescent light with electronic ballast), consumption of electricity dropped by around 20%

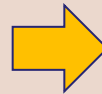


**BULKHEAD LIGHT FITTINGS
C/W ELECTRONIC BALLAST**

Other Initiatives

Greening

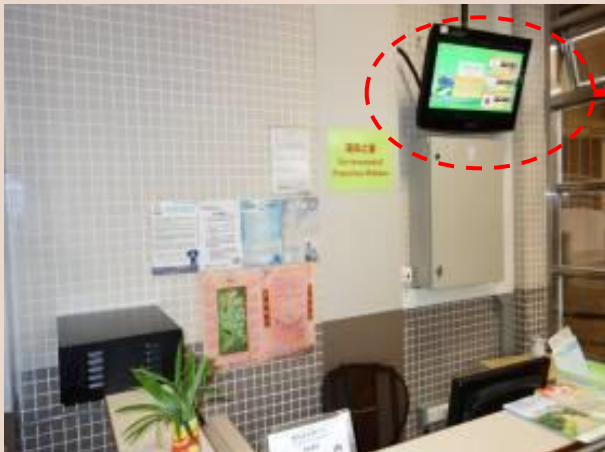
- Green roof and vertical greening at low rise structures



Other Initiatives

Tenants' Education and Community Engagement

- Arouse tenants' awareness
- Display energy consumption at ground floor
 - Electricity
 - Gas
 - Water



Other Initiatives

Tenants' Education and Community Engagement

Kwai Shing West Estate 葵盛西邨

Community Workshop – Focus Group Meetings

「社區工作坊」籌備小組會議





Continuous Improvement

- **Final Platinum Certificate** achieved in October 2015
- **On-going** estate improvements and green management
- **Regular** monitoring and feedback
- **Continuous improvement** of environmental





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Thank you