
Architectural Services Department
Environmental/Health/Safety
Report 2002
English/繁体/简体

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1.0 Director's Message

I have pleasure to present our 2002 Environmental Health and Safety Report to you, which covers the period from 1st January 2001 to 31st December 2001. Compared with our reports over the past three years, this year's report has taken a step forward to expand our environmental reporting to include our health and safety performance.

The Architectural Services Department is committed to raising the professional standards and promoting best practices in the design and maintenance of public buildings which are environmentally and user friendly, and to leading the local construction industry in enhancing its overall quality, environmental, health and safety performance.

As a means to promote innovative sustainable design, we have launched the departmental "Sustainable Design Award" scheme in 2001. To pursue our efforts in energy conservation, and following a year of consultations with our stakeholders, we have published the revised "General Specification for Air-Conditioning" adopting the overall energy approach. To promote best practices on construction sites, we have encouraged our contractors to participate in various government-led site safety motivation schemes and we continue to implement our departmental "Green Contractor Award" scheme. To enhance the accessibility of public buildings and facilities, we have, in addition to fulfilling statutory requirements, incorporated safety, comfort and accessibility considerations in our designs.

Today we are faced with unprecedented challenges in trying to meet rising public expectations while at the same time re-engineering the delivery of our services and implementing the "Enhanced Productivity Programme". These challenges provide an excellent opportunity for us to review our operations and develop our potential. I am confident that, with the full support of our stakeholders, namely our clients, consultants, contractors and suppliers, we will all work together to make steady and significant improvements to a construction industry that will be capable of delivering high quality works in a safe and environmentally friendly manner.

Mr. Yue Chi Hang, JP
Director of Architectural Services

2.0 Overview of ArchSD's Services, Activities and Operations

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Serving as the HKSAR Government's Architect, the Architectural Services Department provides professional and technical advice on all matters related to public buildings and facilities except for public housing. In particular, we are responsible for the design, procurement and maintenance of all government buildings and facilities excluding public housing estates. We work closely with other government departments and bureaux, quasi-governmental organizations and professional bodies on various contractual, secondment, partnership and advisory arrangements to fulfil our roles and responsibilities. We also provide advice to the construction industry as necessary. We are a multi-disciplinary department with approximately 2,000 staff, of which over 500 are professionals. In the year 2001, our budget totalled at around HK$770 million.

Architectural Services Department

- ArchSD's Headquarters
- Project Management Branch
- Architectural Branch
- Building Services Branch
- Property Services Branch
- Quantity Surveying Branch
- Structural Engineering Branch

Development of Government Properties

All Branches:
Provide architectural and associated professional and project management services. The work involves:

- Designing facilities to meet user's and property management's requirements and needs;
- Assisting user departments in developing their building specifications in light of existing policies; and
- Appointing contractors and inspecting work to ensure facilities are up to standard.

total of 330 projects valued at HK$72 billion were under planning, design and construction in 2001.

Upkeep of Government Properties

Property Services Branch:
Provide professional and project management services for the maintenance and refurbishment of buildings and facilities. The work involves:

- Maintenance and repair of all government buildings and facilities;
- Maintenance services for non-government premises controlled by the Hong Kong Institute of Education, subvented schools and voluntary agencies' holiday camps, and hospitals under the Hospital Authority (HA); and
- Refurbishment, fitting-out, alterations, additions and improvements and emergency repairs to all properties maintained by the Branch.

A total of 26,000,000 m^2 building floor area of properties were maintained/improved with an expenditure of HK$3,000 million in 2001.

Monitoring & Advisory Services

All Branches:
Provide professional and technical advice to Government and quasi-government organizations on construction costs, practices and standards in relation to building, engineering and landscaping services.

About 1750 nos. of subvented/ entrusted projects valued at HK$62 billion were monitored in 2001 with respect to their

Subvented Projects Division: Oversee subvented and joint-venture projects to ensure conformance with government requirements. The work involves:

- Vetting budget, design, tender documents, tender recommendations and final accounts; and
- Identifying non-conformance in designs, standards and tender procedures.

construction costs and standards.

3.0 EHS Principles and Management Approach

Environmental Health and Safety (EHS) Principles
ArchSD is committed to improving environmental performance and ensuring a safe and healthy environment for our staff, contractors and the public. In this respect our EHS principles are as follows :-

a. to integrate environmental sustainability and health and safety principles into the design, construction and maintenance of public buildings, the procurement of goods and services and the monitoring and advisory services provided within government, industry and the community.

b. to systematically identify, control, monitor and review our environmental impacts and our health and safety risks and to continually improve our EHS performance through the implementation of our health and safety programmes and our ISO 14001 certified Environmental Management System.

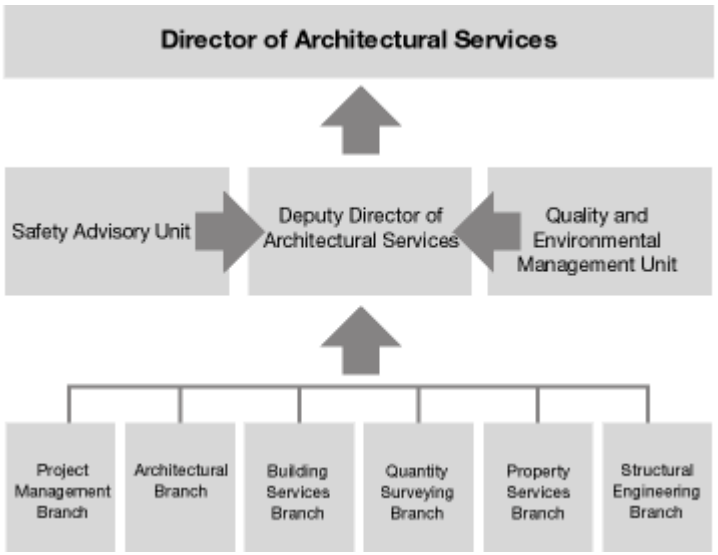
c. to comply with all relevant legislations and regulations as a minimum requirement and, wherever practicable, to achieve standards that are beyond those legally imposed.

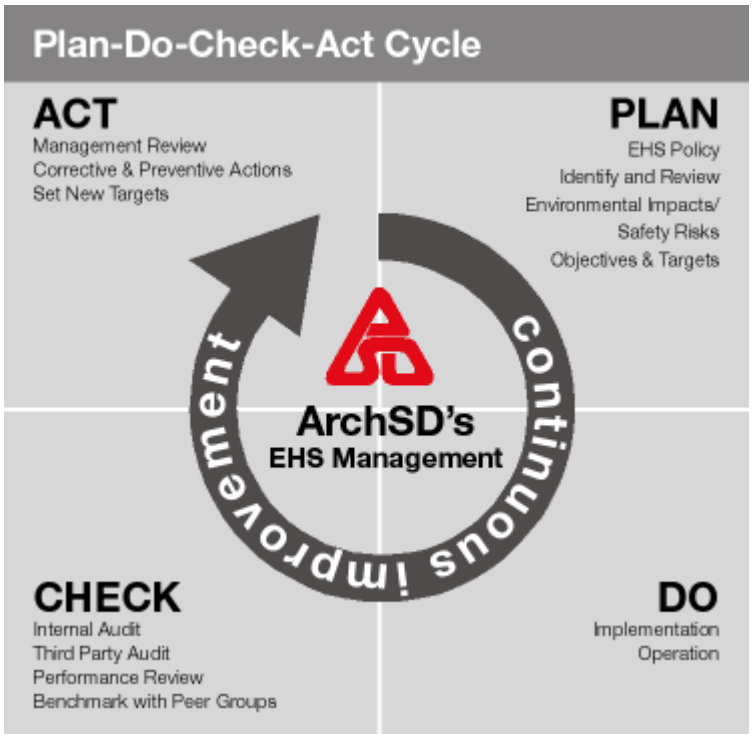
d. to provide continuous training to equip our staff with updated EHS knowledge and the necessary skills for application in their daily work.

e. to promote ArchSD's principles of environmental protection, health and safety to the construction industry and the public.

EHS Management Structure and Responsibilities
EHS Management is a core value of the ArchSD and its 2000 staff members. To successfully incorporate these corporate values throughout the Department, a "top-down" approach supported by an effective management framework is essential and has been adopted. A top management steering group known as the Quality and Environmental Management Committee, a middle management ISO 14001 Working Group, and a Green Manager Committee have all been established to ensure the designation of appropriate level responsibilities and the dissemination of information throughout the Department.

Apart from the establishment of various levels' committees, designated staff are also appointed for the day-to-day administration of EHS matters. In 1994, a **Departmental Safety Advisory Unit** (DSAU) was set up to promote and implement construction safety. Further to this, in 1997, the Department began the implementation of an environmental management system (EMS) and was the first government department to be certified to ISO 14001, the international EMS Standard. Designated staff within the **Quality and Environmental Management Unit** (QEMU) are responsible for the administration of the Department's quality and environmental management systems.




Plan-Do-Check-Act Cycle
ACT
Management Review
Corrective & Preventive Actions
Set New Targets
PLAN
EHS Policy
Identify and Review
Environmental Impacts/
Safety Risks
Objectives & Targets
continuous improvement
ArchSD's
EHS Management
CHECK
Internal Audit
Third Party Audit
Performance Review
Benchmark with Peer Groups
DO
Implementation
Operation


Quality and Environmental Management Committee
Chairman : Deputy Director of Architectural Services
Members : Chief professionals from all disciplines,
Chief Training Officer, QEMU staff
ISO 14001 Working Group
Chairman : Chief of QEMU
Members : Senior professionals
from all disciplines,
QEMU staff
Green Manager Committee
Chairman : Assistant Director
Members : Departmental
Secretary,
Senior Treasury
Accountant,
selected staff from
ISO 14001
Working Group,
QEMU staff

4.0 EHS Issues and Initiatives of ArchSD

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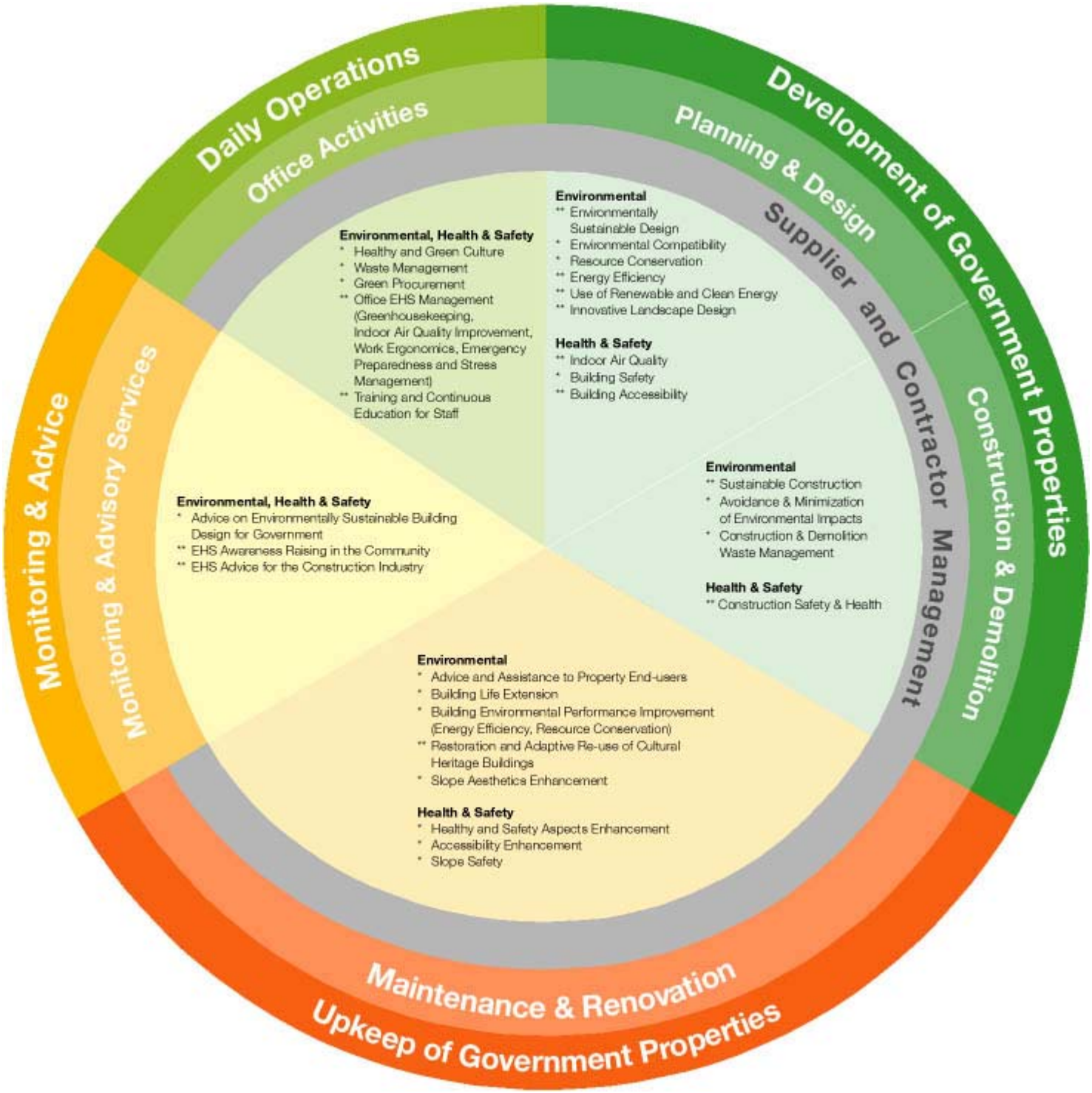

EHS Principles:

1 Planning, Design & Construction for EHS & Sustainability
2 ISO 14001 EMS and Systematic Monitoring, Review and Control of H&S issues
3 Legal Compliance
4 Staff Training
5 EHS Promotion and Awareness Raising

Remarks:

1 applies to all ArchSD activities except daily operations
2-5 applies to all ArchSD activities
* Initiatives taken to address the EHS issues are presented in Chapter 4
** Issues in are further substantiated in Chapters 5 to 7

4.0 EHS Issues and Initiatives of ArchSD #2

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Planning & Design

Environmental Issues

Planning and design that incorporate:

- Environmentally Sustainable Design
- Environmental Compatibility
- Resource Conservation
- Energy Efficiency
- Use of Renewable and Clean Energy
- Innovative Landscape Design

ArchSD's Continuous Initiatives

Planning and design that incorporate:

- Implementing Sustainable Design Concepts that consider the compatibility of the building with the peripheral environment, as well as the conservation and efficient use of land, energy and material resources.
- Enforcing design control to ensure that responsible staff holistically consider all relevant environmental aspects in the planning stage.
- Promoting design innovation through our departmental Sustainable Design Award Scheme for in-house project teams.
- Including environmental requirements in the Department's General Specifications for building contracts.
- Sourcing environmentally preferable building materials and establishing an information database.
- Submitting projects for assessment against HK-BEAM, the Hong Kong Building Environmental Assessment Method; and other international assessment tools.
- Participating in the HK Energy Efficiency Registration Scheme for Buildings and complying with the Energy Code requirements.
- Exploring and promoting the use of renewable and clean energy through the application of high performance building services installations in projects where possible, e.g. BIPV (Building Integrated Photovoltaic panels).
- Maximizing landscaping both within and outside buildings.

Health & Safety Issues

Planning and design that incorporate considerations for:

- Indoor Air Quality

ArchSD's Continuous Initiatives

Planning and design that incorporate:

- Adopting the Overall Energy Approach in the design of air conditioning systems to achieve Indoor Air Quality requirements in a cost-effective and energy-efficient way.
- Publishing the 2001 edition "General Specification for Air Conditioning, Refrigeration, Ventilation and Central Monitoring and Control System Installation in Government Buildings" which incorporates specifications that are in line with the Overall Energy Approach.
- Procuring environmentally preferable and/or health conscious products and building materials by identifying materials/products that have low pollutant emission levels and continually revising the Department's purchasing specifications.
- Addressing health and safety issues in the design of building envelopes by conducting a study on minimizing water leakage in curtain walls to control moisture accumulation, resultant condensation and microbial growth.

- Building Safety

- Promoting building safety awareness by disseminating safety information to staff and sharing experiences and "lessons learnt".

- Building Accessibility

- Incorporating barrier-free design in public facilities to improve accessibility and user-friendliness.

4.0 EHS Issues and Initiatives of ArchSD #3

Construction and Demolition

Environmental Issues

Construction and demolition practices that incorporate:

- Pollution Prevention and Environmental Management for Construction Activities

ArchSD's Continuous Initiatives

Planning and design that incorporate:

- Requiring contractors to manage environmental issues at construction sites.
- Managing contractors by assessing their compliance with environmental requirements, and taking action to ensure that they improve their performance as needed.
- Running the Green Contractor Award Scheme to promote environmental best practices and good management at construction sites.

Construction and demolition practices that achieve:

- Construction & Demolition Waste Minimization

Planning and design that incorporate:

- Adopting modular designs and state-of-the-art construction methods, including the use of prefabricated components and system build formwork.
- Encouraging innovative measures from contractors through the "Design and Build" procurement strategy.
- Incorporating the requirement for a Waste Management Plan in all construction contracts by mandating on-site waste sorting and proper waste management.
- Implementing a "trip ticket system" to record the types and quantities of waste generated.
- Serving as a member of the "Task Group to Review the General Specification for the Use of Recycled Inert Construction & Demolition Materials".

Health & Safety Issues

Construction and demolition practices that emphasize:

- Construction Safety

ArchSD's Continuous Initiatives

Planning and design that incorporate:

- Adopting the "Pay for Safety" payment condition in all contracted projects to ensure that payment is contingent on the contractors meeting site safety requirements to a satisfactory level.
- Requiring contractors to submit and implement a project Safety Plan for all sites.
- Requiring contractors to assign/designate senior management personnel to address safety and health matters.
- Conducting Independent Safety Audits of specific major projects.
- Providing safety training and conducting safety workshops for contractors, consultants and in-house staff to enhance their knowledge of construction safety.
- Promoting construction safety through award schemes, including the Site Safety Model Worker Award Scheme, the Site Safety Cycle and the Considerate Contractors Site Award Scheme.

4.0 EHS Issues and Initiatives of ArchSD #4

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Maintenance & Renovation

Environmental Issues	ArchSD's Continuous Initiatives
Maintenance and renovation works that incorporate/achieve/ contribute to :	Planning and design that incorporate:
• Guidance to End-users on the Management of ArchSD Completed Properties	• Issuing User's Manuals for selected building types to end-users to facilitate the efficient operation and management of the properties.
• Building Life Extension • Building Environmental Performance Improvement	• Developing and implementing building maintenance programmes for properties maintained by the Department. • Undertaking large-scale refurbishments as necessary to extend building life, enhance usage and diversify types of use. • Adopting energy efficient automation, environmentally preferable materials and environmental installations wherever possible in fitting out works to conserve energy, water and material resources. • Through multi-disciplinary study groups, monitoring and evaluating the performance of building materials in terms of their durability, reliability, environmental desirability, etc.
• Adaptive Re-use of Existing Buildings and Historical Heritage Buildings	• Actively seeking opportunities to adapt and re-vitalise existing, cultural heritage and historical heritage buildings, thereby sustaining the city fabric and enhancing diversity in building uses.
• Conservation and Restoration of Historically/Culturally Listed Buildings and Gazetted Monuments	• Assigning in-house expertise to work closely with the Antiquities and Monuments Office (AMO) of the Leisure and Cultural Services Department (LCSD) in a HKSAR-wide extensive heritage restoration and conservation programme.
• Slope Aesthetics	• Ensuring acceptable slope aesthetics through the work of the Vetting Committee on Slope Appearance. In particular, the Committee ensures that chunam or shortcreting are ranked as the least favourable options in all proposals and the use of these materials is accompanied with appropriate mitigation measures that effectively reduce visual impacts.

Health & Safety Issues	ArchSD's Continuous Initiatives
• Building Health and Safety Aspects Enhancement	• Providing regular cleaning of water tanks and maintenance of the plumbing system to avoid water leakage and ensure supply of clean water. • Implementing regular maintenance, and if necessary, upgrade fire services installations to ensure compliance with the latest fire safety legislations. • Conducting periodic inspection, testing and certification of the fixed electrical installation to meet the latest Electricity Ordinance.
• Building Accessibility Enhancement	• Implementing a phased improvement programme to improve the accessibility of existing government properties and community facilities, including the addition of lifts to existing schools.

- Slope Safety

- Establishing an electronic database of all slopes maintained by the Department (at present around 5650 nos.).
- Conducting site inspections, stability assessments, routine maintenance and improvement works to ensure slope safety.

4.0 EHS Issues and Initiatives of ArchSD #5

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Monitoring & Advisory Services

Environmental, Health & Safety Issues	ArchSD's Continuous Initiatives
Monitoring and advisory services that incorporate:	Planning and design that incorporate:
• Sustainability Advice to Government on Property Planning and Development	• As active members in various advisory committees for EHS matters, providing advice to Government on environmental sustainability in property planning and development. These include membership in the Waste Reduction Task Force for the Construction Industry, the Indoor Air Quality Management Group, the Advisory Committee on Barrier Free Access, etc. • Providing technical advice and comments related to environmental protection and sustainable design for landuse planning, including private sector submissions (e.g. S.16 planning applications) and HKSAR-wide landuse plans (e.g. Outline Zoning Plans). • Providing technical advice and comments related to EHS requirements for government subvented/entrusted/joint-venture projects.
• EHS Promotion in the Construction Industry and Community	• Raising the EHS awareness of contractors, consultants and the general public through various publicity functions, including seminars, interviews, forums, exhibitions etc.

4.0 EHS Issues and Initiatives of ArchSD #6

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Office Activities

Environmental, Health & Safety Issues	ArchSD's Continuous Initiatives
Office activities that incorporate/achieve:	Planning and design that incorporate:
• Healthy and Green Office Culture	• Promoting a healthy and green culture within the Department through the work of the Green Manager Committee. The committee meets regularly and raises staff awareness through postings on the Green Corner Notice Boards and the departmental intranet, and by organizing various departmental functions including seminars, workshops, recreational activities etc.
• Green Housekeeping Measures	• Establishing and implementing green housekeeping guidelines and conducting regular audits to ensure compliance by staff. • Monitoring consumption levels of energy, water, paper and other office stationery items and setting yearly targets for performance improvement. • Retrofitting office lighting fixtures with energy efficient installations and replacing old water taps with water efficient, spring return type water taps. • Implementing a Car-Pooling Policy for staff transport. • Implementing e-tendering in line with the Environment, Transport and Works Bureau's programme.
• Waste Management	• Monitoring the collection of recycled paper in the ArchSD's Property Services Branch Headquarters at Tokwawan. • Installing recycling bins at all ArchSD offices to collect paper, aluminum cans and plastic bottles. • Collecting used printer cartridges for recycling.
• Environmentally Preferable Procurement	• Adopting a Green Procurement Policy for office supplies. Specific actions include selecting environmentally preferable items from the Government Supplies' Store and procuring energy-efficient office appliances and recyclable printer cartridges from independent suppliers.
• Office Indoor Air Quality	• Commissioning the Electrical and Mechanical Services Department (EMSD), our maintenance agent, to monitor indoor air quality in all ArchSD offices and to regularly clean air filters in the air-conditioning systems.
• Smoke-free Work Place Policy	• Implementing a smoke-free policy in all ArchSD office floors.
• Ergonomics	• Implementing a phased programme for the purchase of anti-glare screens, ergonomically designed computer chairs, and foot and wrist rests to enhance staff's occupational health.
• Emergency Preparedness and Response	• Designating and training fire safety officers for each office floor. • Regularly conducting fire drills and reviewing office emergency preparedness following the drills.

	• Arranging for first-aid courses for staff to ensure that appropriate proportion of trained staff members are available in the offices in the event of an accident and/or emergency.
• Training and Continuous Education for Staff	• Providing continuous training to staff on environmental, safety and health issues through training courses, seminars, sites visits, workshops & knowledge sharing sessions etc.

Protecting the Environment
5.1 Environmentally Sustainable Design

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ArchSD encourages its staff to adopt sustainable designs that consider the integration and compatibility of the project with the peripheral environment, and the conservation and efficient use of land, energy and material resources.

Design Control : - Project Environmental Design Submission (PEDS)

To ensure that all project teams adopt a holistic approach to environmental design, a PEDS must be submitted by the project team to the Design Vetting Committee for approval during the design stage and before proceeding further to the contract documentation stage. The issues listed in 'Box X' must be considered in the PEDS.

'Box X': Environmental issues for consideration during the project design stage for inclusion in the PEDS

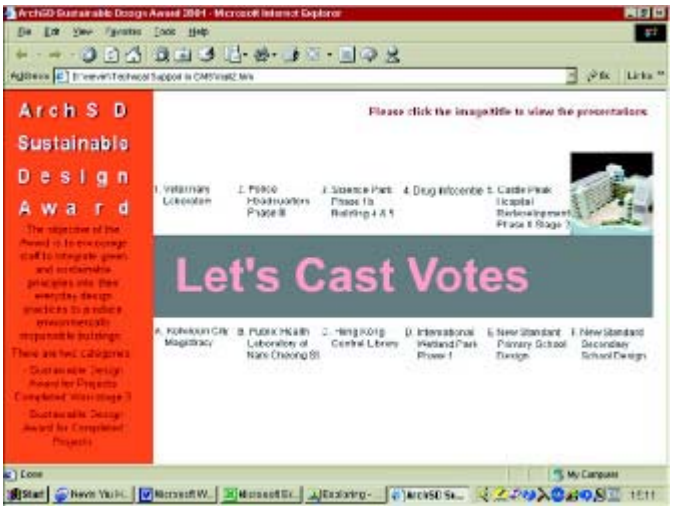
PEDS Checklist : -

- Sustainable Planning
- Ecological Impact
- Environmental Enhancement
- Energy Conservation
- Visual Impact
- Noise Impact
- Air Quality and Ventilation
- Daylighting, Illumination & Visual Access
- Water Conservation
- Waste Water Discharge
- Design Waste Management
- Construction Waste Management
- Material Use and Specification
- Functionality
- Operation & Maintenance

Sustainable Design Award Scheme

To recognize project teams that excel in achieving sustainability in design, a 'Sustainable Design' Award Scheme was launched in 2001. The judging criteria concentrated on the degree of difficulty and innovation of the proposed strategies, and whether sustainable principles were holistically applied to all aspects of design.
All submissions are uploaded to the departmental intranet and presented at an open forum to facilitate the sharing of knowledge and to enable all professionals in ArchSD to participate in the judging.

The winners of the 2001 Sustainable Design Award were the International Wetland Park Phase I (Completed Project Category), and the Primary School in Ma Wan (Project Completed Detail Design Stage Category).



Sustainable Design Award Scheme –
Web page on intranet for staff voting

Environmental Assessment of Projects

ArchSD continues to promote holistic environmental design through conducting environmental performance assessment for selected projects using local methodology such as HK-BEAM (Hong Kong Building Environmental Assessment Method)[1] and international methodologies such as the International GBTool Methodology software[2].

In 1999 and 2001, the 'Public Records Office'and the 'North Point Government Office' which were designed and constructed under the management of ArchSD, were both awarded an "Excellent" rating by HK-BEAM. To further support the use of HK-BEAM, more than 10 projects are currently awaiting assessment.

In 2000, the 'Buddhist Po Kong School' was assessed by International GBTool methodology software and presented in the biennial "International Conference on Sustainable Building" in the Netherlands. To continue our efforts in this field, the Department also plans to participate in the next conference in 2002. The Public Health Laboratory at Nam Cheong Street has been selected for assessment using the updated GBTool software.

Presentation of 2001 Sustainable Design Awards to Winners.
(Left) Primary School at Ma Wan (Right) International Wetland Park Phase I.

1 HK-BEAM defines good practice criteria for a range of environmental issues relating to the design, operation, maintenance and management of buildings. The environmental issues are grouped under three main headings, global issues and use of resources' 'Local issues' and 'Indoor issues'. Certificate ratings (range from fair to excellent) will be given to projects under assessment based on the total credit points achieved.

2 International GBTool methodology software is an assessment method based on four categories, 'resources consumption', 'environmental loadings', 'indoor environmental quality' and 'quality of services'. Each category is assigned scores from -2 to +5, and the project's environmental performance is dependent on the standard of the "benchmark" adopted for the assessment.

Protecting the Environment
5.1 Environmentally Sustainable Design #2

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Case Highlight: Veterinary Laboratory at Tai Lung, Sheung Shui.

Sustainable Site Planning
The building design both integrate with, and make the best use of, the existing environment. Cutting of existing topography was minimized and panoramic view towards the Tai Lung Farm and the Hong Kong Golf Club was maximized. Positioning of building blocks also minimizes disturbance to mature trees.

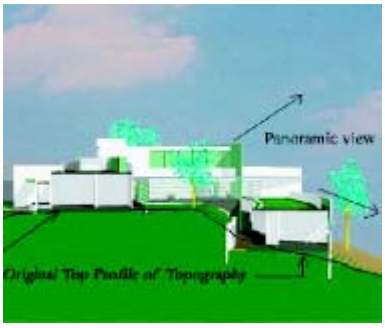
Innovative Landscape Design
Incorporation of roof garden and landscaped terrace enables the building to blend in with its surrounding natural environment. Native species were used wherever possible.

Energy Efficiency
The building was planned for maximum energy efficiency during the design stage. Openings on the western elevation are minimized to reduce solar heat gain. An open corridor around a central courtyard linking all functional areas allows penetration of daylight and shades the functional areas from direct sunlight. Canopies and shading devices are employed over glazed areas. Landscaping on the roof improves the building's insulation. The Overall Thermal Transmission Value (OTTV), which is directly related to the energy consumption within a building, is 20.9 W/m^2. It compares favourably with the statutory minimum of 30 W/m^2.

On the building services side, a Direct Digital Controlled air-conditioning system with plant optimization programme control was installed to maximize operational efficiency. A Variable Air Volume air-handling system is used to address the fluctuating room temperature. Energy saving fluorescent tubes with electronic ballasts, compact tubes, and separately controlled lighting circuits for perimeter and interior zones are used for the lighting system.

Air Pollution Control
A concealed exhaust system equipped with High Efficiency Particulate Air (HEPA) Filter was installed for the safety cabinets and the fume cupboards to reduce pollutant emission of the exhaust air by 99%.

Environmentally Preferable Building Materials
Majority of the external walls and internal ceilings are bare concrete without finishes to minimize the use of materials. The access road, constructed of concrete, is stained with "Lithochrome Chemstain" to eliminate the application of floor finishes. Foamglas made of recycled glass with low embodied energy is used as the insulation material on the roof. Linoleum, a chemical-free and biodegradable natural material is used for the laboratory's floor finish.



Cross-section of the Building (Windows with panoramic view towards the Tai Lung Farm and the Hong Kong Golf).

Integration of the building with the surrounding natural environment.

“Foamglas” made of recycled glass with low embodied energy is used as insulation materials on roof.

Protecting the Environment
5.2 Energy Efficiency

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Overall Energy Approach

In 2001, the revised General Specification for Air-Conditioning adopting the concept of Overall Energy Approach (OEA), was published by ArchSD after consultation with stakeholders including consultants, contractors, suppliers and professional institutions.

In this revised version, the OEA concept has been integrated into the design methodology for air-conditioning systems to achieve satisfactory air quality without compromising energy efficiency. By using various energy recovery systems, waste energy can be partially recovered for humidity control to improve indoor air quality.

Volume 1 & 2 of the revised Air-conditioning General Specification

High Performance Air-Conditioning System

In recent years, high performance air-conditioning systems adopting the OEA concept have been extensively incorporated into ArchSD's projects. In the year 2001, 9 out of 15 projects (60%) were designed with thermal wheel/heat exchangers. As illustrated in the bar chart, the percentage of completed projects with cental air-conditioning systems and using thermal wheel/heat exchangers has increased steadily over the past few years.

High Performance Lighting System

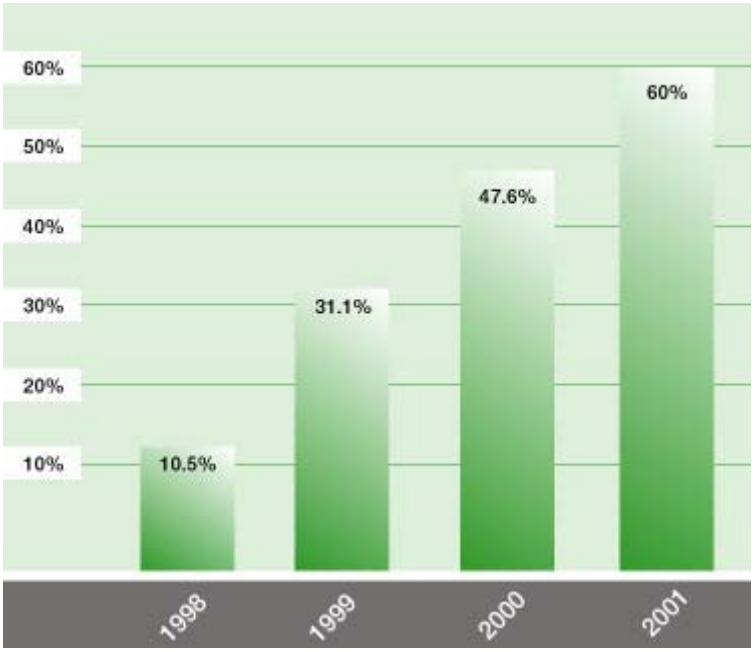
High performance lighting, such as T5 fluorescent tubes, high intensity discharge lamps, etc. and electronic ballasts have also been extensively applied in ArchSD projects. In the year 2001, 37 out of 42 projects (88.1%) were designed with energy saving fluorescent lamps with electronic ballasts including T5 fluorescent tubes. Recently, high intensity T5 fluorescent lamp which is more energy efficient than high intensity discharge lamp has been developed. A pilot scheme has been implemented to replace the high bay discharge lightings in the indoor games halls. The results were satisfactory and a saving of about 40% of the electrical power was achieved.

High Intensity Discharge Lamps

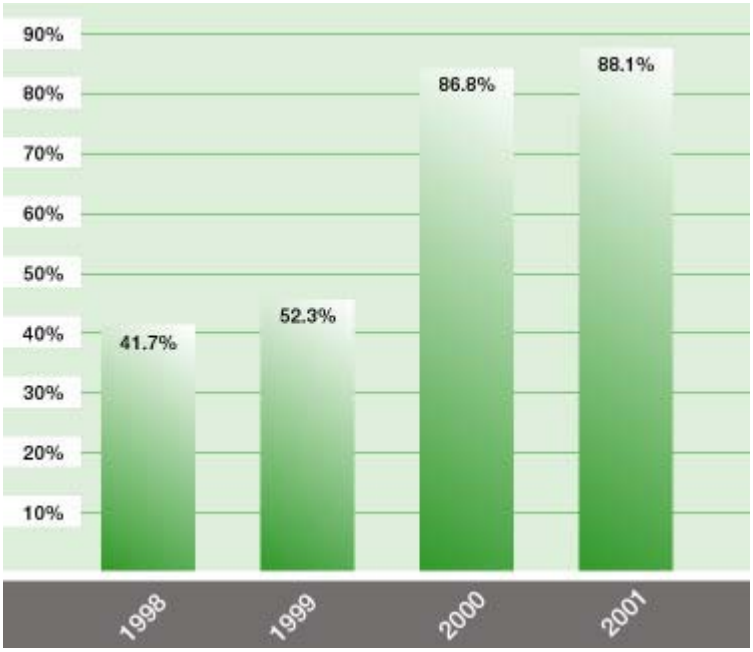
Percentage of Completed Projects Installing Thermal Wheel/ Heat Exchangers

•••

Percentage of Completed Projects Installing Energy Saving Fluorscent Lamps with Electronic Ballasts (including "T5" Fluorescent Tubes)



Graph showing Percentage of Completed Projects (with central air-conditioning) Installing Thermal Wheel/Heat Exchangers



Graph showing Percentage of Completed Projects Installing Energy Saving Fluorscent Lamps with Electronic Ballasts "T5" Fluorescent Tubes

Protecting the Environment
5.2 Energy Efficiency #2

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Compliance with Energy Codes

All new ArchSD's projects are designed to meet the requirements of the "Code of Practice for Energy Efficiency" issued by the Electrical and Mechanical Services Department in 1998. Depending on the availability of resources, projects are selected to register under the energy efficiency registration scheme. In 2001, four projects had successfully been registered under the scheme and 15 projects were still undergoing the assessment process..

The four projects which have obtained the registration certificates for compliance with the Code of Practice for Energy Efficiency of Air-Conditioning Installations, Electrical Installations & Lighting Installations are:

1) Hong Kong Southern District Government Primary School
2) Precious Blood Primary School (South Horizons)
3) Kowloon City Magistracy Building
4) Kwai Chung Custom House (Air-conditioning only)

Monetary Saving in Utilities Bills

There is a continuous increase in our energy savings. Over the last 4 years, estimated savings in utility bills have increased from $45 million in 1998 to $84 million in 2001.

Registration certificates for compliance with the Code of Practice for Energy Efficiency of Air-Conditioning Installations, Electrical Installations & Lighting Installations

Estimated Savings in Utility Bills/CO_2 Emissions Avoided in Completed Projects due to Energy Savings

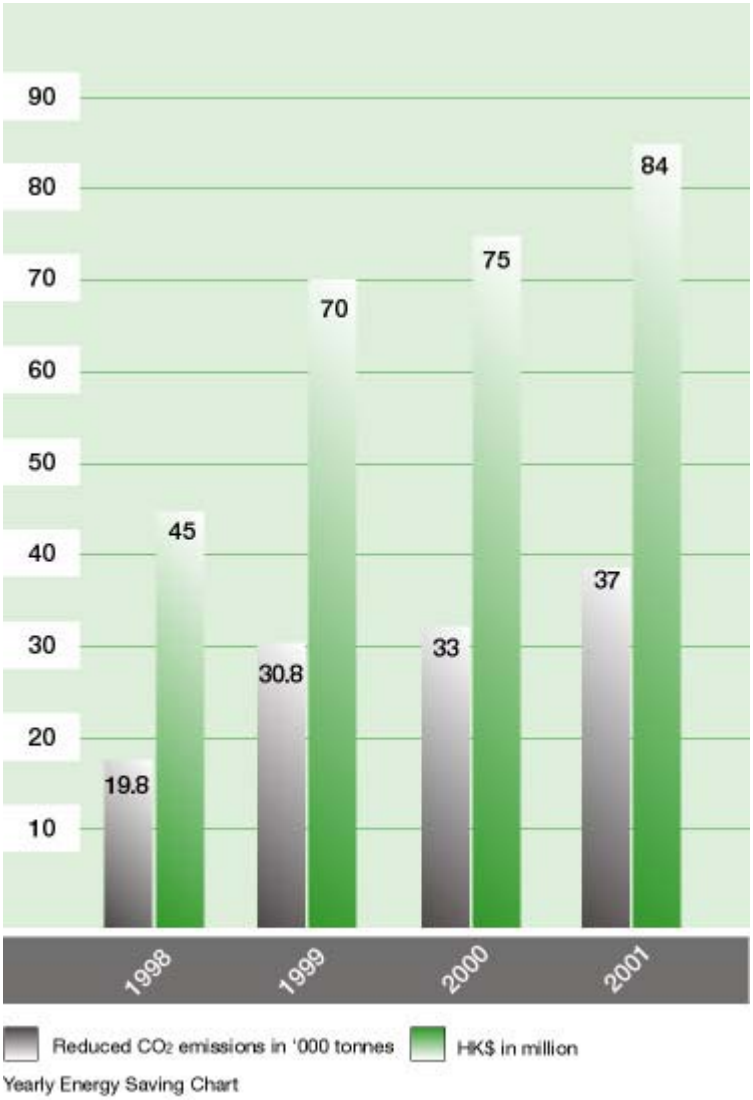
Legend: Savings in HK$ is calculated by using
1kWh = HK$1 = 0.44kg CO_2 reduction

Hong Kong Southern District Government Primary School

Precious Blood Primary School (South Horizons)

Kowloon City Magistracy Building

Kwai Chung Custom House (A/C only)



Yearly Energy Saving Chart

Protecting the Environment
5.3 Use of Renewable and Cleaner Energy

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Solar Panels
Solar panels collect energy from the sun and transform it into electrical power. Back in the 80s, ArchSD had already started installation of solar panels in projects and the area of panels installed had increased from 882m^2 in 2000 to 1700m^2 in 2001(under construction). In the Victoria Park Improvement Project currently under phased construction, a pole-top lantern and a ventilation fan, driven by the electricity generated from solar panels, have been installed in 2001.

Building Integrated Photovoltaic (BIPV) Panels
Building Integrated Photovoltaic (BIPV) panel is an innovative concept that integrates the solar panel system within the building fabrics such as façades or sunshades. ArchSD has taken the lead in promoting the application of renewable energy in Hong Kong and recent examples include the Science Park Building and the Primary School in Ma Wan. The installation of BIPV panels in the Ma Wan School is a joint research project with CLP Power and the University of Hong Kong. Three different types of BIPV panels will be installed at different locations within the school. On completion of the school in 2003, the research data generated from the installation will be published on the internet to promote public awareness on renewable energy.

Proposed BIPV Panels to be installed on the roof and the western elevation of Ma Wan Primary School

Photovoltaic Panels installed on the roof of public toilet for the generation of Solar Power

Solar Power Driven Ventilation Fan installed in the public toilet at Victoria Park Proper

Protecting the Environment
5.4 Indoor Air Quality

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As an average person spends over 70% of time indoors, providing a healthy indoor environment is an important building design criterion. In ArchSD, an Overall Energy Approach (OEA - refer to Section 5.2 Energy Efficiency for details) is adopted to ensure that a comfortable and healthy indoor condition is designed within an acceptable energy and cost framework. Examples of the implementation of the OEA approach are provided below.

Installation of Fresh Air Pre-conditioners for School Projects

In our recent school projects, fresh air pre-conditioners are incorporated into the air-conditioning system. This mechanism ensures good air quality by supplying adequate fresh air while at the same time utilizing the exhaust air to pre-cool (in the hot season) or pre-heat (in the cold season) the fresh air intake.

Environmentally Preferable Building Materials

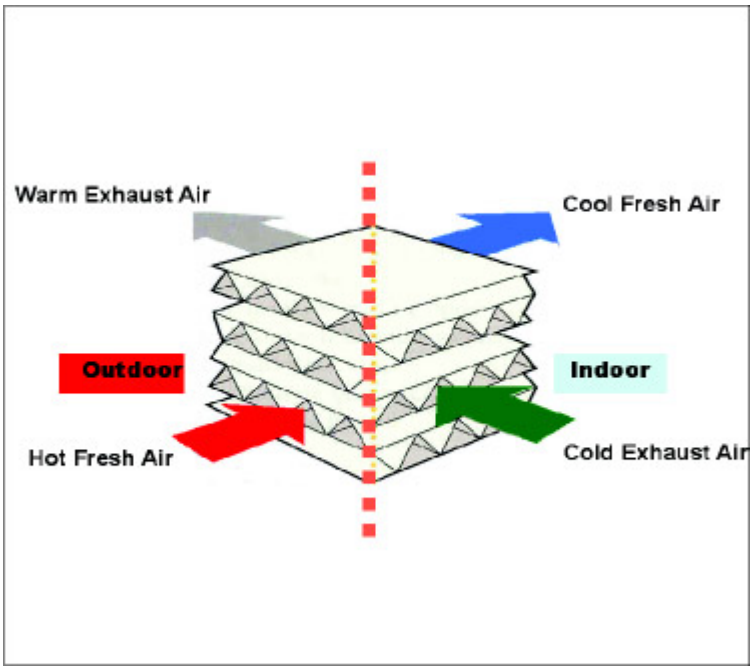
The potential emissions from building materials can contribute to indoor air pollution. To achieve IAQ objectives, research has been carried out by our Best Practice Working Groups on materials such as paints, plywood panels, particle boards, carpets, varnishes and adhesives. Following these studies, technical information papers on the above subjects are now available on ArchSD's intranet. Our General Specification for Building was revised in 2001 in response to the results of the research to control the emission of excessive volatile organic compounds (VOC) and formaldehyde. To further enhance the IAQ standard, a staged programme to adopt increasingly stringent requirements for the VOC content in paints is being planned.

Building Envelope Design

Moisture accumulation can cause condensation and microbial growth, causing potential impacts to IAQ. To reduce the potential for this, a study on how to minimize water leakage in curtain walls was carried out and the findings were disseminated to staff through the intranet. When designing the locations of the outdoor fresh air intake, an analysis of the surrounding outdoor environment, the wind direction and the traffic condition is also taken into consideration.

Fresh Air Pre-conditioner installed above corridor of school (Left) and the appearance of the equipment (Right).

Staff carrying out Indoor Air Quality measurement for a newly completed project



Principle of Fresh Air Pre-conditioner

Protecting the Environment

5.5 Restoration and Adaptive Re-use of Cultural Heritage Buildings

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ArchSD has in-house expert staff who work closely with the Antiquities and Monuments Office (AMO) to restore and conserve historical heritage.

Case Highlight: Restoration of King Law Ka Shuk at Tai Po Tau Tsuen, Tai Po

The temple was originally built in the Qing Dynasty. During a previous restoration in 1932, the building was substantially altered and a modern concrete structure was unsympathetically added. When ArchSD was commissioned the project, a comprehensive conservation study was carried out and as a result of this investigation, some of the missing architectural features were identified. The restoration which plans for the reversion of the temple to its Qing Dynasty state was agreed among the village representatives, the Guangdong Institute of Culture Relics and Archaeology and the AMO of Hong Kong. During the painstaking process of restoration, weekly meetings with the villagers, AMO and the specialist contractor were held to ensure the work was undertaken with care.

The project was awarded the Award of Merit of 2001 UNESCO Asia-Pacific Heritage Awards for Culture Heritage Conservation.

Before Restoration

Worker restoring the fresco painting on the elevation of the temple.

After Restoration

Protecting the Environment

5.5 Restoration and Adaptive Re-use of Cultural Heritage Buildings #2

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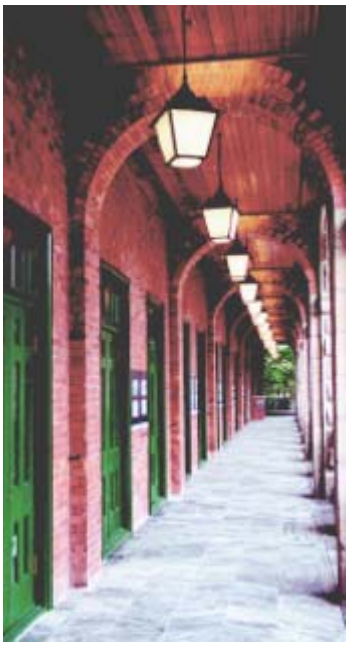
ArchSD has in-house expert staff who work closely with the Antiquities and Monuments Office (AMO) to restore and conserve historical heritage.

Case Highlight : Integrated Community Centre/Singleton Hostel in Sai Ying Pun

The Old Mental Hospital, constructed in 1892, was dilapidated and had been deserted for many years. In 1992, this two-storey Victorian style building was listed as a Grade 1 historic building. To conserve the historical heritage, while at the same time maximising the site development potential, the external façade of the Old Mental Hospital was restored. A new community hall and social welfare building were constructed adjacent to the existing structure and old facade.

The dilapidated verandah of the Old Mental hospital.



The verandah after restoration.

The old mental hospital being demolished for the construction of a new community centre and a singleton hostel while preserving the old façade.

A new community centre and a singleton hostel was constructed behind the old façade with historical heritage.

Protecting the Environment
5.6 Innovative Landscape Design

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Landscape design is an integral part of every ArchSD's building project. Despite constraints such as limited space, budget and loading capacity of the building structure, we strive to incorporate innovative landscape design techniques into all building projects to enrich the environment with colour, texture, movement and sound.

Case Highlight : Lai King Princess Margaret Hospital

Landscape design was applied to the slopes, the external open space, the podium, the roof and the terraces of the hospital to soften the impact of the built-up areas.
Different theme gardens such as Exercise, Music and Water Gardens were specifically designed to encourage healing, rehabilitation and small group socialization.

Terraces and balconies : with peripheral planting

External Open Space : Garden at ground level

Podium Garden linked up with external garden at G/F by ramp.

Roof Area : sky garden on roof

The existing 'shortcreted' slope was also treated with toyo mulching[1] which serves to maintain the geotechnical integrity as well as providing a greening effect to the slope.

1 Toyo Mulching is a double layer of non-woven fertilizer strip which is installed inside the three dimension pvc coated wire mesh and fixed on any non-soil surface slope with galvanized mild steel anchor and sub-anchor to provide full vegetation cover to the slope.

Adjacent Slope of the hospital : Monotonous shotcreted slope treated with toyo mulching to achieve greening effect.

Protecting the Environment
5.7 Environmentally Sustainable Construction

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Partnership Approach
Sustainable construction is a team effort involving the contractor, the design team and the employer. Through the adoption of procurement strategies such as “design and build”, innovative construction technologies proposed by the contractors are encouraged.

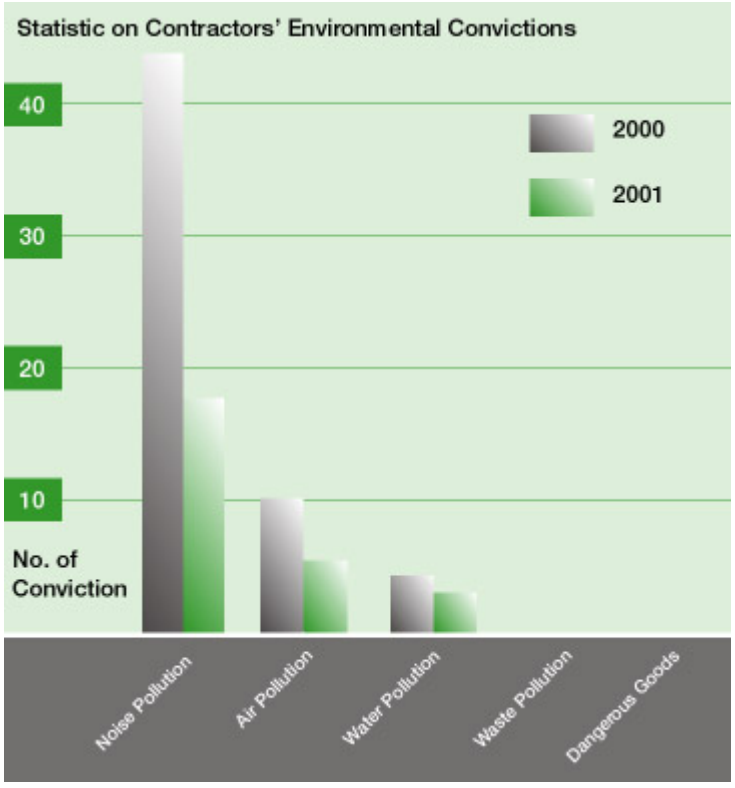
Green Contractor Award
To further promote environmental awareness within the construction industry, the Green Contractor Award Scheme was first launched by ArchSD in the year 2000. As a result, three contractors were presented with “Green Contractor Awards” in 2001. Shui On Construction Co. Ltd. was presented with the Green Contractor ‘Gold Award’ while Goldfield N & W Construction Co. Ltd and Excel Engineering Co. Ltd. were presented the ‘Silver’ and ‘Bronze’ “Green Contractor Awards” respectively.

Presentation of ‘Gold Award’ to Shui On Construction Co. Ltd.

Construction Site Environmental Performances
All contractors are required to implement environmental management practices on ArchSD’s construction sites. Their environmental performance is closely monitored and reflected in their performance reports. Through continuous training and close monitoring, it is noted that the number of convictions against environmental legislation on ArchSD’s sites in 2001 is significantly lower overall than that in 2000.

Timber formwork piled up for re-use on site.

Collection of steel re-inforcement for recycling.



Notes: Total number of projects undertaken by ArchSD in 2001 is 51,753 nos. including new capital work and maintenance work projects. Among these, 105 projects are of value

Demolition of Police Headquarters – Implementation of waste sorting on site.

exceeding $15 million, 302 projects are of value under $15 million but exceeding $3 million and 51,341 projects are of value less than $3 million.

Protecting the Environment
5.7 Environmentally Sustainable Construction #2

Case Highlight : Shatin Government Offices

Shatin Government Offices, procured under the “design and build” strategy, utilized technical innovations to achieve a sustainable design, fast-track construction, and reduction of construction waste.

Hybrid Structural System

The hybrid structural system of concrete and steel provides a lightweight large-span floor area which facilitates the flexible planning of office space. Through the use of off-site fabricated steel members and slip-form construction for concrete core walls, the construction time was considerably shortened, the standard of workmanship controlled and the use of timber formwork eliminated.

Unitized Curtain Wall System

A single unit (unitized) curtain wall system employed for the external building façade was prefabricated off-site and locked into position using interlocking mullions (vertical posts) and split transoms (horizontal beams). Through the use of a tower crane which transfers the panels directly to the building’s periphery for installation, no scaffolding was required and the quantity of construction waste was reduced. These methods also contributed to the rapid completion of the building in a safe, efficient manner with a high standard of site cleanliness.

Construction of the hybrid Structure –
concrete core walls and structural steel frame.

Hybrid structure under construction.

Protecting the Environment
5.7 Environmentally Sustainable Construction #3

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Low Waste Technologies
Low waste technologies were extensively adopted for this project. For example, a drywall partition system was used instead of the conventional brick construction and leave-in metal formwork used for the concreting of floor slab. Building services installations, such as power ducts and integral floor boxes, were also prefabricated off-site.

Waste Management
The reduction of construction and demolition wastes (C&DW) continues to be a priority for ArchSD. As early as the **design stage**, waste reduction schemes are integrated through the careful dimensional coordination and standardization of building modules, consideration of 'cut & fill' in site formation design and the use of appropriate construction methods.

During the **construction stage**, the requirements for waste management plans and the implementation of the 'trip ticket' system are incorporated into contracts and monitored closely by our site supervisory staff. Low waste technologies such as machine sprayed plaster, 'left-in' formwork and dry-wall partitions are also encouraged.

Installation of the unitized curtain wall system on site.

Prefabrication of the unitized curtain walls and stone faced precast walls off-site.

Respecting and Safeguarding People in the Community

6.1 Building Accessibility

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Barrier Free Design

Barrier free design is an important criterion in the design of public buildings and facilities. Apart from fulfilling statutory requirements of Building (Planning) Regulation, Section 72 and the obligatory requirements as laid down in the Design Manual for Barrier Free Access 1997 which are regarded as the minimum requirements, careful consideration is also taken to ensure the safety and convenience of persons with a disability.

Barrier Free Access to Existing Government Buildings

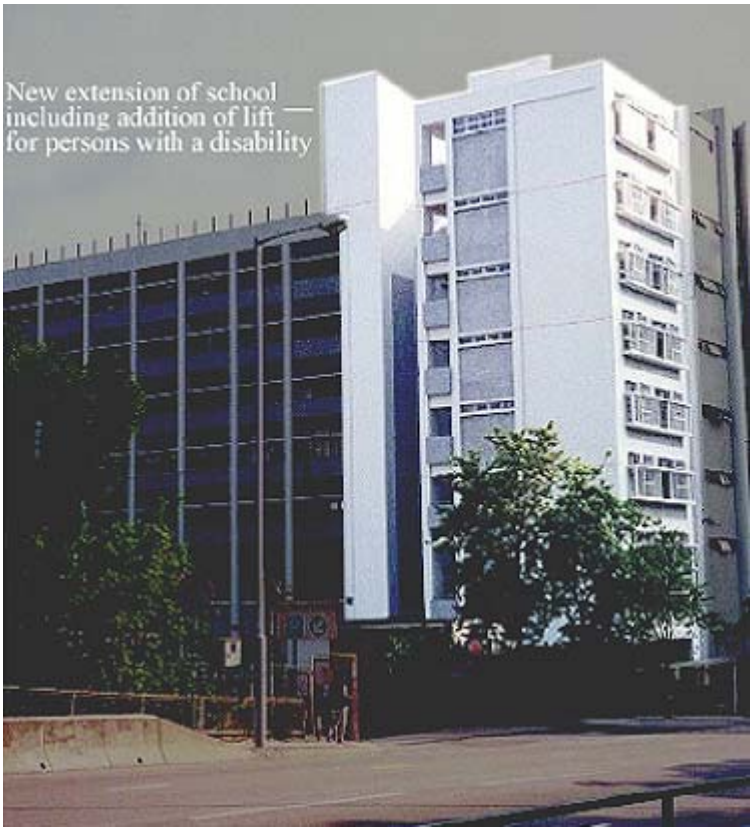
To facilitate access for persons with a disability to existing government buildings, ArchSD has been carrying out a phased “access enhancementprogramme” to a total of 35 existing buildings since 1999 with an estimated cost of $35.5 million. The enhancement programme is due for completion in 2002, and works include the addition of ramps, drop kerbs, stairlifts and other facilities such as toilets for persons with a disability and induction loop systems at counters. Ten projects had been completed by the end of 2001, with a total expenditure of $1.7 million.

Barrier Free Design for the School Improvement Programme

The School Improvement Programme (SIP), commenced in 1994, aims to upgrade the facilities and provide additional spaces in existing schools to meet the current standards for quality teaching and learning activities. Apart from the addition and upgrading of teaching facilities, opportunity has been taken to enhance accessibility to the schools by providing ramps, toilets for persons with a disability and lift towers with footbridges linking the overall school compound as far as practicable. By the end of 2001, improvements to 38 schools were completed while works on another 84 were underway.

Access ramp to building entrance.

Provision of toilet for persons with a disability.



School Improvement Programme – Tsing Yi Public School.

Addition of footbridge and lift tower at a new school block to link up to the rest of the existing school compound.

Respecting and Safeguarding People in the Community

6.1 Building Accessibility #2

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Case Highlight: Hong Kong Central Library

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1 Ramp at main entrance, with handrails on both sides and tactile warning strips at both ends of the ramp.
2 Tactile guide paths along main circulation areas of the library.
3 Public service counter with indented counter edge for placing crutches. The counter is also equipped with an induction loop system.
4 Public service counter of special height for wheelchair users.
5 Raised directional signs on handrails of staircase.
6 Public telephone with special height for wheelchair users.
7 Wheelchair spaces with unobstructed line of vision in lecture theatre.
8 Special design seating for wheelchair users at an information station.
9 Braille & tactile markings on the lift control panel.

Respecting and Safeguarding People in the Community
6.2 Construction Safety and Health

Site Safety Cycle

Science Park Footbridge Construction

Safety Advisory Unit

In 1994, ArchSD established a Safety Advisory Unit under the direction of the Works Bureau to promote safety initiatives within the construction industry. This includes the implementation of **Safety Plans**[1], the **Pay for Safety Scheme**[2] and the **Independent Safety Audit Scheme**[3] in ArchSD's construction contracts. As noted in the statistics in Chapter 9, ArchSD's safety performance has gradually improved as a result of these initiatives.

In 2001, the **Site Safety Cycle**[4], modelled on the Japanese Safety Work Cycle, was introduced to 19 construction sites on a trial basis to further promote site safety and tidiness.

1. The 'Safety plan' is a document prepared by the contractor setting out details of the safety management system which will be implemented to ensure safety & health in the execution of works on site. It is a mandatory requirement for most of the construction contracts.
2. The 'Pay for safety' scheme is the inclusion of a schedule of fully specified safety related items into the works contract. The contractor will be paid if the items are provided or specific activities are performed satisfactorily.
3. The 'Independent Safety Audit Scheme' is the conduction of quarterly safety audit by an accredited safety auditor under the management of Occupational Safety & Health Council for selected works contracts.
4. The 'Site Safety cycle' is modelled on the Japanese practice of "Safety Work Cycle" which encourages active participation of and communication among site staff at all levels with a view to promoting safety and tidiness of construction sites.

Contractual Safety and Health Requirements

From 2001 onward, ArchSD's contracts have specified that a contractor's **senior management representative be involved in site safety**. The representative is required to sign the Safety Plan. Project Manager or a representative at senior management level from the contractor's headquarters is required to attend the monthly Site Safety Management Committee meetings. Under this arrangement, the contractor's top management should be fully aware of the prevailing site conditions and can arrange follow-up actions if necessary.

Site Hygiene and Tidiness

Aside from the emphasis on safety, ArchSD is also committed to ensure that the site environment is **hygienic and tidy** to minimize health risks. Starting from 2002, the construction contracts will make allowance to pay for "maintaining site cleanliness" to the contractors.

ArchSD Safety Guidelines

All ArchSD's staff are required to comply with the "Construction Site Safety Manual" published by the Works Bureau. In addition to the general administrative procedures that are applicable to all ArchSD's sites, the Department has established specific guidelines for high-risks construction projects such as demolition works, footbridge construction and lifting operations. Taken together, these help ensure the safety of the workers, the general public and adjacent properties.

One of the construction site of ArchSD which demonstrates site tidiness and hygienic condition.

Respecting and Safeguarding People in the Community
6.2 Construction Safety and Health #2

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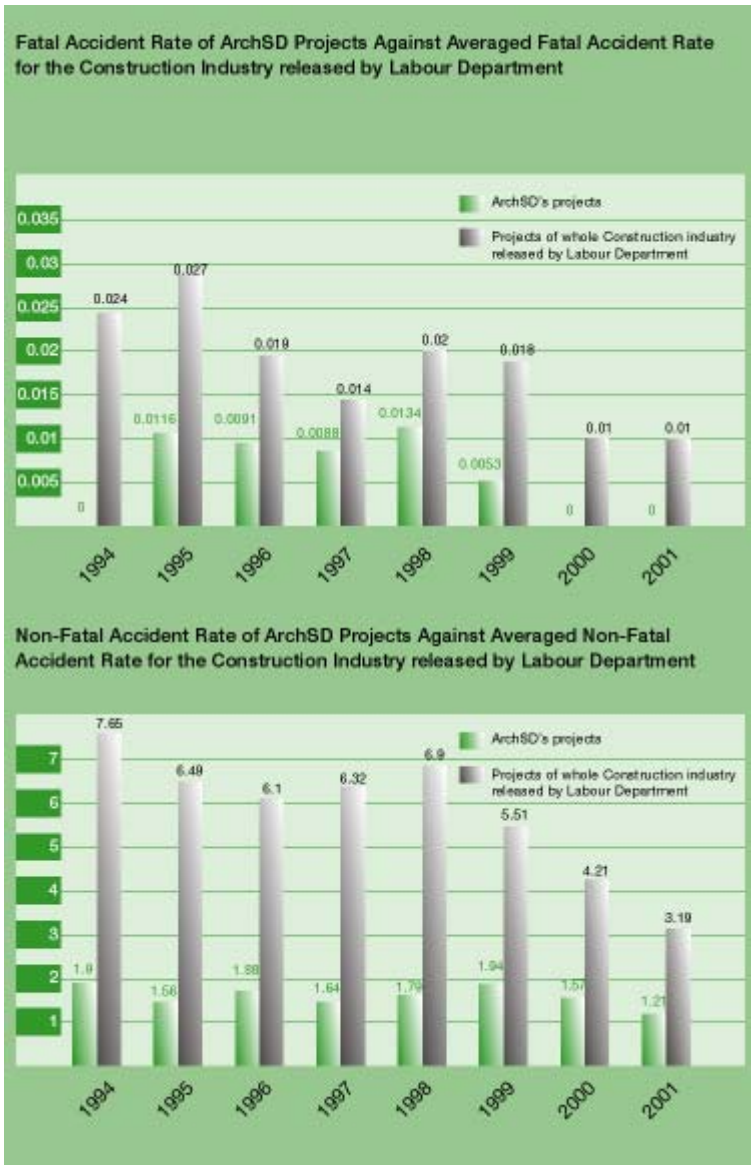
ArchSD's Safety Performance

ArchSD's safety performance, measured in terms of the accident rate per 100,000 man-hours, has continually improved in recent years. The non-fatal accident rate has decreased by 24% from 1.57 in 2000 to 1.20 in 2001. No fatal accidents have been recorded in the past 2 years.

When compared to the overall safety performance of the construction industry in Hong Kong, ArchSD performs significantly better with an accident rate approximately 60% lower than the average local performance.



Safety Award Schemes for the Construction the Industry

To promote a safety culture, ArchSD encourages contractors to participate in the various government-led motivation schemes, including the 'Considerate Contractors Site Award Scheme' organized by the Works Bureau, the 'Site Safety Model Worker Award Scheme' initiated by ArchSD and the 'Construction Industry Safety Award Scheme' led by the Labour Department.

As a result of this encouragement, 3 ArchSD contractors were awarded in the 'Considerate Contractors Site Award Scheme', 3 ArchSD contractors were awarded in the 'Construction Industry Safety Award Scheme' and a total of 227 awards were presented to model workers under the 'Site Safety Model Worker Award Scheme'.

Presentation of Site Safety Model Worker Award

Presentation of Considerate Constractors Site Award Scheme.

Respecting and Safeguarding People in the Community

6.3 EHS Promotion in the Construction Industry and Community

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ArchSD's Safety Performance

The Central Management Branch and the Subvented Projects Division of ArchSD are dedicated to providing advisory services on public and private development projects and on all issues relating to environmental management. In 2001, environmental advice was provided in response to 571 queries from government, quasi-government and subvented project personnels.

Safety Advice for the Construction Industry

As a member of the Working Groups developing or reviewing Codes of Practice and guidance on construction safety, ArchSD provides advice to enhance construction safety standards in Hong Kong. For projects that involve high-risk construction activities such as demolition and footbridge construction, specific advice is also provided by our Safety Advisory Unit to the project team and the contractor for their consideration.

Participation in External Advisory Committees

ArchSD participates in more than twenty advisory committees, studies and working groups led by other government departments or bureaux and contributes to the formulation of policies and strategies on environmental, safety and health issues.

Exhibitions

ArchSD also actively participated in various exhibitions promoting environmental protection, safety and health.

Workshops and Seminars

In-house Safety Workshops for ArchSD's staff, consultants and contractors have been organized to promote site safety in the construction industry.

In 2001, 22 papers on environmental protection and site safety and health have been presented in seminars and forums organized by government, institutions, universities and professional bodies.

Media and Academic Interviews

ArchSD also takes a proactive stance in communicating with the public including the media, professional journals, students, organisations and events. Press conferences as well as interviews are frequently conducted to share our knowledge and experience related to environmental protection and site safety.

Exhibition booth in CSTDI, HKSAR's "Learning Symposium 2001" introducing technologies in energy saving, air quality and renewable energy (Left) and demonstration on the use of Solar Energy (Right).

Safety workshop for Arch's staff and Contractor.

Respecting and Safeguarding People in the Community
6.3 EHS Promotion in the Construction Industry and Community #2

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Papers and Presentations on EHS in 2001

Authors	Titles and other details
Vivian W.Y. Au, Senior Architect	“Arch SD’s Approach to Sustainable Design” Presentation at the Built Expo 2001 Seminar organized by the City University of Hong Kong, 27 April 2001 in Hong Kong.
S.H. Pau, Director of Arch S	“Sustainable Development for Community Architecture” Presentation at Symposium on Environmentally Friendly Building Design and Construction, 10 May 2001 in Hong Kong.
W.H. CHENG, Senior Building Services Engineer and S.K. HO, Project Manager	“Advanced Techniques in Designing for the Use of Energy and the Environment: Case Study Experience in the Hong Kong Science Park” Works Bureau’s International Conference on Construction, June 2001 in Hong Kong; and The 10th Annual Business Environment Conference, October 2001 in Hong Kong.
T.Y. Chan, Chief Building Services Engineer	“Best Practices of EMS implementation in Government Departments” Workshop on Greening Government Operations, 18 June 2001 in Hong Kong.
Vivian W.Y. Au, Senior Architect	“Building Towards a More Sustainable Future” Works Bureau’s International Conference on Construction, 19 June 2001 in Hong Kong.
Y.S. Lee, Project Manager	“Construction of a Modern Slaughterhouse in a High-density Developed City” Works Bureau’s International Conference on Construction, 19 June 2001 in Hong Kong.
S.K. Wong, Project Director	“Conservation of Architectural Heritage in Tomorrow’s City” Works Bureau’s International Conference on Construction, 19 June 2001 in Hong Kong.
S.W. Tam, Architect	“Dynamic Re-use of Old Structures : The Hong Kong Museum of Coastal Defence” Works Bureau’s International Conference on Construction, 19 June 2001 in Hong Kong.
R.S. Chin, Assistant Director (Building Services)	“Total Energy Approach in Achieving an Acceptable Indoor Air Quality in Tomorrow’s Buildings” Works Bureau’s International Conference on Construction, 19-21 June 2001 in Hong Kong.
Vivian W.Y. Au, Senior Architect	"Our Green Office in Practice” Presentation to Singapore Government Delegation, during their visit to Works Bureau and HKSAR Government on 24 July 2001.
S.H. Pau, Director of Arch S	"Green Construction” Presentation at Seminar on Quality, Safety & Environment (organized by China Overseas Construction Co. Ltd), 31 July 2001 in Hong Kong.
T.Y. Chan, Chief Building Services Engineer	“Energy Efficient Architechural Design” Presentation at Press Conference, 28 August 2001 in Hong Kong.
R.S. Chin, Assistant Director (Building Services)	“Overall Energy Approach” Presentation at Press Conference, 24 September 2001 in Hong Kong.
K.F. Lau, Chief Building Services Engineer	“Indoor Air Quality Measurement in Government Buildings” 4th International Conference on Indoor Air Quality, Ventilation and Energy Conservation in Buildings, 2-5 October 2001 at Hunan, China.
W.K. Fung, Assistant Director (Structural Engineering)	“Making site safety a value-added function of a construction enterprise” The Hong Kong Construction Association's Annual Safety Conference 2001, 14 November 2001 in Hong Kong.
K.F. Lau, Chief Building Services Engineer and M.T. Suen, Senior Building Services Engineer	“Ventilation and Lighting Design for Green and Odourless Public Toilets” World Toilet Summit 2001, 19-21 November in Singapore.
K.F. Lau, Chief Building Services Engineer and K.W. Chan, Senior Building Services Engineer	“Real-Time Monitoring with Integrated Control of Air Quality in Buildings” Joint Symposium 2001 on Towards Environmental Sustainability, 20 November 2001 in Hong Kong.
K.F. Lau, Chief Building Services Engineer, W.K. Yiu, Senior Building Services Engineer and S.H. Mak, Senior	“Introduction on the New Edition of Air-conditioning General Specification of Architectural Services Department, HKSAR” HKIE (BS Div)/ASHRAE HKC/CIBSE HKB Joint Function, 22 November, 2001 (24 & 27 Sep. 2001

Building Services Engineer	— Institutes, 10 & 17 Sep., 2001 – Consultants & Contractors) in Hong Kong.
S.H. Pau, Director of Arch S	Opening Speech for Symposium on Indoor Air Quality & Energy Efficient Technology, 29 November 2001 in Hong Kong.
K.F. Lau, Chief Building Services Engineer K.W. Chan, Senior Building Services Engineer W.K. Wong, Building Services Engineer	“Using Waste Heat Reclaimed from Direct Expansion Air-Conditioning Units for Reheating” Symposium on Indoor Air Quality & Energy Efficient Technology, 29 November 2001 in Hong Kong.
K.F. Lau, Chief Building Services Engineer	“Air-conditioning System Design, A case study on Hong Kong Central Library” Short Course for Hong Kong Institution of Engineers – Building Services Division, 22 December 2001 in Hong Kong.
Vivian W.Y. Au, Senior Architect	“Architectural Design – Sustainable Design Award Scheme” Presentation at Press Conference, 31 December 2001 in Hong Kong.

Caring for and Enhancing our staff
7.1 Office Environmental, Health and Safety Management

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‘Green’ Housekeeping
A green Manager Committee has been established to promote a healthy and green culture in the ArchSD offices. The committee meets regularly to set clear housekeeping guidelines and review the Department’s green housekeeping performance (for details refer to “Summary of Performance Statistics” Chapter 9).

Indoor Air Quality Improvement
A “smoke-free work place” policy is implemented in the entire office, including the working areas as well as all public areas such as corridors and toilets. As more staff become environmentally conscious and use stairs instead of lifts, the staircases are also designated as non-smoking areas.

The office’s indoor air quality is regularly monitored and controlled. Routine measurements of carbon dioxide (CO_2), respiratory suspended particulates (RSP), radon (Rn) and airborne bacteria revealed that the IAQ in our working environment is healthy and acceptable.

Recently, soft landscaping has been included on the podium of our Property Services Branch office providing a more pleasant outdoor environment for staff.

Work Ergonomics
Attention is also given to the increased use of computers and their potential health hazards. Colleagues are reminded to adopt a proper working posture when using the computers. A phased progamme for the purchase of anti-glare screens, computer chairs and foot and wrist rests is being arranged to enhance the occupational health of our staff.

Emergency Preparedness
To prepare for emergencies such as fire, we have designated fire security officers for each floor of the department. Fire drills are carried out every year to familiarise our colleagues with the evacuation procedures. First-aid courses are also arranged for staff to ensure that trained personnel are available in the event of accidents or emergencies.

Stress Management
One of the most effective means of handling stress is through active participation in community services and recreational activities. ArchSD’s staff are very supportive of the activities organized by charitable organisations as well as by the Department. Classes on Tai Chi and Yoga are organized free-of-charge with in-house staff volunteering as mentors. In 2001, ArchSD staff participated in more than 10 nos. of external activities including the Po Leung Kuk Walking Marathon and the dragon boat competition.

Work Ergonomics

Po Leung Kuk Charity Walk

Dragon Boat Race

Tai Chi Class

Caring for and Enhancing our staff
7.2 Training and Continuous Education for Staff

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EHS Training
ArchSD is committed to providing continuous training to staff on environmental, health and safety issues. As demonstrated in the statistics below, the resources committed for staff training has continued to increase in recent years. In 2001, ArchSD's staff attended a total of 155 training courses/seminars. The number of trained staff on environmental issues has increased by 36% when compared to 2000.

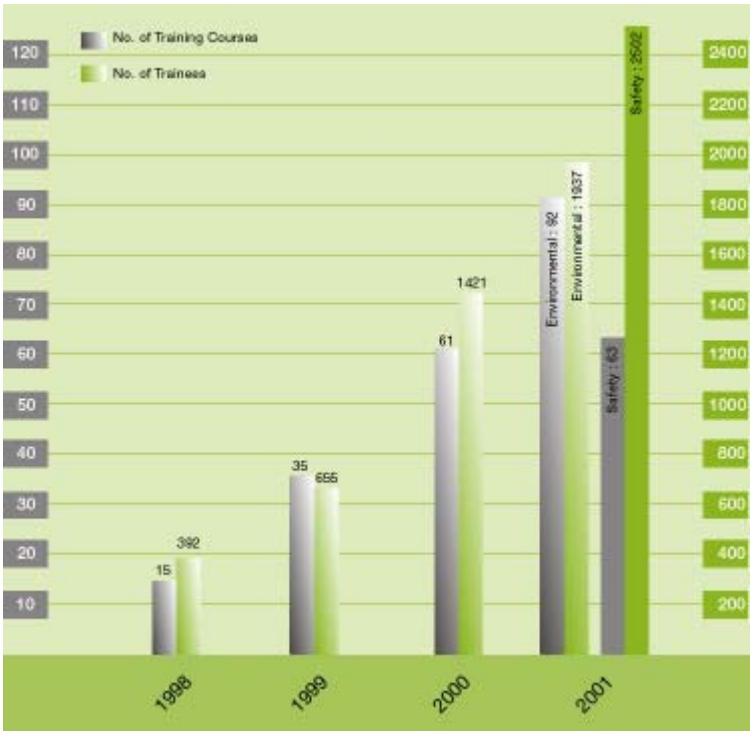
Staff Research and Enhancement
All professional staff of ArchSD are required to participate in Best Practice Working Groups/Specialist Support Groups in addition to their day-to-day project administration work. These groups conduct research on building technologies and materials and a total of 21 study reports were compiled as detailed below.

2001 Internal Reports on EHS

Authors	Titles and other details
Kevin Kwok, Quantity Surveyor	Environmentally Friendly Carpets, January 2001
TIC	How to Minimize Water Leakage in Curtain Wall, February 2001
Kevin Kwok, Quantity Surveyor	Means to Reduce Volatile Organic Compounds (VOC) Emissions from Carpets, March 2001
MISSG	An Interim Study Report on Pre-fabricated Acoustic Enclosure for Small Size Generator Set, March 2001
Tse Shun Kai, Senior Architect	Particular Specification for Chinese Theme Garden, May 2001
ACSSG	Carbon Dioxide (CO_2) as Alternative Refrigerant, May 2001
ACSSG	Guideline on Calculation of Fresh Air Rate to meet CO_2 Level in Indoor Air Quality Requirement, June 2001
David Booth, Senior Architect	Waste Management: Building Design and Construction Issues, July 2001
Hermann Fong, Principal Technical Officer	Technical Investigation Report on "Anti-bacteria" Tiles and Sanitary Fittings, July 2001
MISSG	Study Report on Ventilation Requirement and Thermal Environment for Laundry Area, August 2001
William Chan, Architect	Guideline for the Use of Proprietary Tile Adhesives, August 2001
W.M. Tang, Technical Secretary	Radon Experiment Preliminary Finding, August 2001
MISSG	Investigation on the Use of Town Gas Fire Engine for Gen-set Installation, August, 2001
K.Y. Lee,	Standard Drawing Index, August 2001

Knowledge Sharing
A variety of training initiatives have been implemented to enhance staff skills and knowledge, including site visits to construction sites, experience sharing workshops and overseas visits. Information such as study reports and design guidelines are also regularly uploaded onto the ArchSD intranet for access by all staff.

Staff Training Statistics

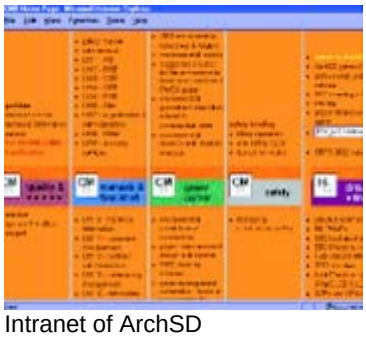



Site Vist to Factory manufacturing Prefabrication Units


Chinese University's training workshop on the application of computational simulation techniques in the design of sustainable buildings

Chief Technical Officer	
EESSG	Report on the Investigation for the Adoption of 'T5' Fluorescent Lamps and Luminaires in Office Lighting, September 2001
ACSSG	The Way Ahead for Dehumidification in Air-conditioning System, October 2001
ACSSG	Study Report on Geothermal Heat Pump Systems, November 2001
LFSSG	Soft Starting for Lift and Escalator Installations, November 2001
EESSG	Study Report on Power Harmonics and Report of Harmonics Measurement at Wan Chai Immigration Tower, December 2001

Visit to Building & Construction Authority of the Singapore Government to share experience on sustainable design and construction



Intranet of ArchSD

Legend

ACSSG	Air-conditioning, Refrigeration, Building Automation and Filtration Specialist Support Group
MISSG	Mechanical Installation Specialist Support Group
EESSG	Electrical Specialist Support Group
LFSSG	Lifts and Escalators Specialist Support Group
TIC	Technical Information Committees

8.0 2001 Performance Review

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Environmental Initiatives	Action	Performance
Reduce impact to environment	• To carry out preliminary environmental review in feasibility stage for 100% Hospital Authority projects and 90% Public Works Projects.	• 100% (54 out of 54) projects achievement.
	• To provide background information for the client regarding the potential environmental performance of the facilities with a view to incorporating agreed requirements in the project briefs for new projects.	• 84% (61 out of 73) client project briefs have incorporated environmental requirements.
Water conservation	• 90% of refurbishment projects which involved replacement of toilets use water cistern of 7.5 litres max. per flush.	• 97% (70 out of 72) eligible projects have used water cistern of 7.5 litres max. per flush.
Energy conservation	• 90% of new buildings with air-conditioning to achieve Overall Thermal Transmission Value (OTTV)<23W/m^2, and 20% of projects to achieve OTTV<18W/m^2.	• 93% (14 out of 15) projects with OTTV < 23W/m^2, and 67% (10 out of 15) projects with OTTV < 18W/m^2.
	• In not less than 60% of new projects with central chiller plant of total building cooling load capacity exceeding 400kW, heat recovery chiller to be used for re-heating in outdoor air dehumidification treatment.	• 75% (6 out of 8 projects) complied with the target.
	• In not less than 50% of the new projects where there are fluorescent luminaries, at least 80% of the fluorescent tubes to be “T5” (dia. 16mm).	• 93.3% (28 out of 30) projects complied with the target.
	• In not less than (a) 90% of new school classroom with air-conditioning; (b) 100% of new government offices buildings; (c) 80% of new indoor games hall of recreational centre and community hall of community centre with air-conditioning; thermal wheel/heat exchanger to be used.	• 100% (9 out of 9) projects complied with the target.
Conservation of resources	• To reduce the use of hardwood by considering alternative construction solutions.	• 100% (17 out of 17) projects reviewed.
	• To carry out structural scheme design report (SSDR) for all new projects with the issue of studying the use of alternative material, improved construction method or structural form.	• 100% (17 out of 17) projects considered the issue.
Reduce the use of ozone depleting materials	• In not less than 70% of the new projects, zero ozone-depleting refrigerant to be used for split units and room coolers of capacity smaller than 35kW.	• 86% (19 out of 22) projects complied with the target.
Compliance to environmental regulations	• To use piling methods that have less environmental impact.	• 0% of diesel hammer used.
	• To formally register minipiles and rock socket H piles as approved piling system and compile their corresponding list of approved	• 10 mini-pile contractors registered on the list and 6 applications under investigation as at 31.12.2001.

contractors.

8.0 2001 Performance Review #2

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Environmental Initiatives	Action	Performance
Waste reduction	• In not less than 80% of new projects, addressable system to be used for automatic fire alarm system having more than 80 heat/smoke detectors.	• 100% (15 out of 15) projects complied.
Promote environmental awareness	• To give technical advice on environmental protection measures to government departments, quasi-govt. departments and subvented projects.	• 324 advices to government/quasi-government departments, 247 advices on subvented/ entrusted projects.
	• To promote environmental awareness to consultants, contractors and general public through publicity functions, e.g. seminars, interviews, forums and exhibition etc.	• 27 functions orgainzed/participated and 12 pieces of information disseminated through ArchSD Homepage.
Energy conservation (green housekeeping)	• To reduce electricity consumption in ArchSD's Property Services Branch Office by 0.2%.	• 2% increase in electricity consumption due to the aging of chiller plant and the extended working hours due to increased workload.
Paper conservation (In QGO office)	• To reduce A4 paper and A3 paper consumption by 0.1% and 1% respectively	• 1% increase of A4 paper consumption and no decrease in A3 paper consumption due to increased workload and additional staff in the School Improvement Project group.
	• To reduce computer paper consumption by 0.5%	• 84% reduction of computer paper consumption.
	• To reduce envelope consumption by 1%.	• 29% reduction of envelope consumption.
Paper conservation (office general)	• To adopt the electronic media for the control of QMS/EMS manuals.	• All manuals converted. Conversion of ArchSD's Operational Instructions/Technical Instructions in progress.
Paper recycling	• To monitor the waste paper collection in ArchSD's Property Services Branch Office.	• 7,770 kg waste paper collected.
Safety Initiatives	**Key Targets**	**Performance**
Performance	• To reduce reportable accident rate to less than 1.5 per 100,000 man-hours work.	• Accident rate per 100,000 man-hours was 1.20 with no fatality.
Promote awareness on site safety	• To conduct in-house safety workshops for contractors, consultants and site supervisory staff.	• 18 nos. of in-house safety workshops and seminars had been conducted with a total of 927 nos. of participants.
Enhance occupational safety	• To arrange various OSHC and CITA training courses on occupational safety.	• 31 nos. of OSHC and CITA training courses had been arranged with a total of 1,171 nos. of staff attended.

9.0 Summary of Performance Statistics

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	2001	2000	1999
Energy Efficient Design			
OTTV < 23 W/m² (% to total no. of designed projects)(1)	93%	100%	87%(2)
OTTV < 18 W/m² (% to total no. of designed projects)(1)	67%	45%	60%(2)
High performance BS equipment (no. of application)	278(3)	605	432
Saving in energy in kWh(4)	84,000,000	75,000,000	70,000,000
Equivalent to Saving in $	$84M	$75M	$70M
Equivalent to CO_2 reduction (tonnes)(5)	37,000	33,000	30,800
Renewable Energy			
Solar panel/photovoltaic panel (area in sq.m.)	1,700(6)	882	313
Minimise Depletable Materials			
Non ozone depletion refrigerants (no. of application)	19	23	29
Non ozone depletion fire extinguishing agents (no. of application)	7	4	7
Waste Reduction			
Timber saved due to use of metal hoarding (cu.m.)	476	590(7)	#
Timber saved due to use of precast/semi precast slab construction, aluminium formwork and steel table formwork (cu.m.)	1,972	1,672	#
Timber saved due to use of metal formwork for insitu construction (cu.m.)	2,203	2,674(7)	#
Construction Safety			
No. of fatalities	0	0	2
Fatal accident rate (per 100,000 man-hours)	0	0	0.0053
No. of non-fatal reportable accidents(8)	421	547	725
Non-fatal accident rate (per 100,000 man-hours)	1.20	1.57	1.94
Environmental and Safety Training			
No. of Trainees on environmental	1937	1421	655
No. of Trainees on safety	2502	#	#
No. of Environmental Training courses/seminars	92	61	35
No. of safety Training courses/seminars	63	#	#
Advisory and Promotion			
No. of paper, presentation & reports	41	25	16
No. of environmental site visit	15	10	6
No. of general advice given on environmental protection	324	460	414
No. of advice given on projects on environmental protection	247	263	191
No. of environmental award	7	7	3
No. of safety award	6	#	#
No. of Environmental Targets	49	42	34
No. of target achieved	31	25	30
No. of target achieved better than expected	12	15	-
No. of target on-going	2	1	2
No. of target failed	4	1	2
Green Housekeeping			
Waste paper collection (kg)	7,770	6,900	6,400
Consumption of A4 paper (ream)	26,333	26,144	28,897
Consumption of A3 paper (ream)	1,834	1,835	#
Consumption of Computer paper (box)	28	160	162
Consumption of Envelope (no.)	94,905	113,425	111,720
Consumption of Electricity in APB Centre (kWh/m² p.a.)	255.8	251.9	255.5

Legend

\# data not available

1) The figures are collected from designed projects approved under stage 3 detailed design stage.
2) Achievement figures have been adjusted from based on financial year of the HKSAR to calendar year.
3) No. of application for new works is based on project completion date while that for refurbishment projects is based on works order issue date.
4) Saving in energy due to use of high performance BS equipment is based on mathematical calculation.
5) CO_2 reduction is base on a factor of 0.44kg CO_2 per kWh which is reference from http://www.energy-efficiency.gov.uk

6) The figures are based on projects under construction in 2001.
7) The figures in 2000 of timer saved due to use of metal hoarding and metal formwork for insitu construction have been recalculated using the current methodology.
8) Non-Fatal Reportable accident is one resulting in incapacity for more than 3 days.

10.0 Awards

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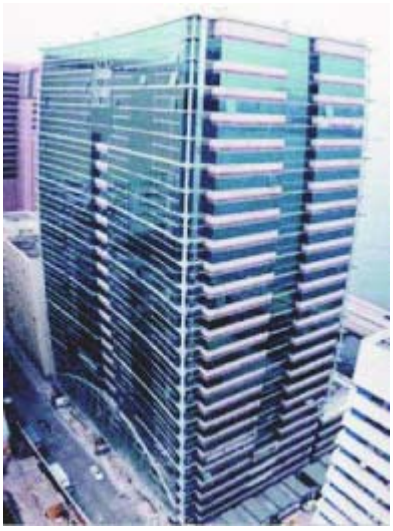
The project was among 38 other entries in the UNESCO Asia-Pacific Heritage Award for Culture Heritage Conservations in 2001 and awarded the Award of Merit.

Restoration of King Law Ka Shuk Temple.

Second consecutive year that ArchSD has received the Award for Design Excellence at the 2001 Hong Kong Flower Show.



The North Point Government Offices achieves “Excellent” in HK BEAM Rating in 2001.

11.0 2001 Achievements and Looking Forward

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Initiatives	2001 Goals	Achievements	Future Goals
Ensure holistic approach in sustainable design	• Strengthen the design control mechanism by requiring all projects to include a PEDS (Project Environmental Design Submission) for approval by the multi-disciplinary design vetting committee before allowing the project to proceed further to the contract document stage. • Provide incentive to staff through the “Sustainable Design Award Scheme”. • Assign more projects to participate in environmental assessment, eg. HK-BEAM (Hong Kong Building Environmental Assessment Method).	• Target met. Requirement of PEDS submission incorporated into ArchSD’s manual for compliance by all project team members. • “Sustainable Design Award Scheme” launched in 2001. • The North Point Government Office was awarded an “Excellent” rating by HK-BEAM in 2001 and more than 10 projects are currently in the pipeline, awaiting assessment.	• “Sustainable Design Award Scheme” to include both in-house as well as outsourced projects. • “Sustainable Design Award Scheme” to include both in-house as well as outsourced projects. • Continue promoting holistic environmental design through conducting environmental performance assessment for projects using local methodolgy such as HK- BEAM and international methodologies such as the International GBTool Methodology Software.
Achieve energy efficiency	• Keep in pace with advance technologies and promote the wider application of high performance building services installations in new projects.	• The variety as well as the scale of high performance building services installation applications in new projects had increased in 2001 leading to an overall savings of 12% in energy (kWh) over the past year.	• Continue promoting the application of high performance building services installations in new buildings. • Assign projects to actively participate in the development of “District cooling system” and “water cooled A/C system” in Hong Kong.
Promote the use of clean and renewable energy	• Actively seek opportunities for the use of clean and renewable energy such as fuel cell and BIPV (building integrated photovoltaic) panels in projects.	• The area of solar panels installed in projects increased from 882m^2 in 2000 to 1,700m^2 in 2001(under construction). BIPV panels had been incorporated into the design of several new projects.	• Continue seeking opportunities for the use of clean and renewable energy including BIPV panels, biomass and earth air purification in projects. Statistics in BIPV installed (based on projects under construction) to be reported in next year’s Report.
Improve air quality in built environment	• Explore and adopt “Overall Energy Approach” in the design of A/C system to achieve satisfactory air quality in built environment. • Publish 2001 edition of the “General Specification for Air Conditioning, Refrigeration, Ventilation and Central Monitoring and Control System Installation in Government Buildings” to incorporate the requirements in design and construction undertaken in line	• The revised Air-conditioning General Specification incorporating the “Overall Energy Approach” was successfully published in 2001 after consultation with stakeholders including consultant/contractor associations, professional institutions and suppliers.	• Commence implementation in 2002 the revised Air-conditioning General Specification (published in 2001) in all government projects. • Install carbon dioxide monitoring sensors to control the amount of fresh air intake in not less than 80% of new projects with central A/C system.

	with the “Overall Energy Approach”.		
Extensive use of landscaping	• Promote the inclusion of soft and hard landscaping in buildings, including roofs, terraces, balconies and other covered and semi-covered areas.	• 54% of projects in the design stage (in 2001) had incorporated roof garden.	• Apart from setting target on roof gardens, set target on the application of soft and hard landscaping in buildings, including terraces, balconies and other covered and semi-covered areas.

11.0 2001 Achievements and Looking Forward #2

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Initiatives	2001 Goals	Achievements	Future Goals
Improve the aesthetical appearance of slopes	• Set up a “Vetting Committee on Slope Appearance” to ensure that the use of chunam or shortcreting is permitted only as a last resort and such proposal to be accompanied by suitable mitigation measures to reduce any undesirable visual impact.	• “Vetting Committee on Slope Appearance” had been established in 2001.	• Continue to promote soft landscape treatment to both new and existing slopes wherever possible.
Upgrade existing buildings	• Incorporate energy efficient lighting system and water-saving sanitary appliances in maintenance and refurbishment projects as far as possible.	• In year 2001, $1.8 million savings in electricity bill has been achieved through the installation of energy efficient lighting system in refurbishment projects. In the renovation of existing toilets, 97% of projects used water cistern of 7.5 litres max. per flush.	• Continue to set targets in 2002 on the use of energy efficient lighting system and water-saving sanitary appliances in maintenance and refurbishment projects.
Reduce construction waste	• Encourage the use of low-waste technologies in construction sites. • Wider application of prefabrications and standardisation in design. • Incorporate the “Specification of recycled aggregates in concrete” in ArchSD’s General Specification for Building.	• A total of 4,651m^3 timber had been saved due to the use of metal hoardings, precast/semi-prescast slab construction, aluminium formwork, steel table formwork and metal formwork for construction. • “Specification of recycled aggregates in concrete” incorporated into works contract in the form of particular specification.	• Continue promoting the use of low-waste technologies in construction and the use of prefabrication and standardization in design. • Liaise with CED and actively seek opportunities for the use of recycled aggregates in projects. • Strengthen the management of construction and demolition material (C&DM) in ArchSD’s sites. Set up a departmental C&DM database to facilitate data analysis and enhance the future estimation of C&DM.
Reduce paper consumption through greater use of the electronic format for internal/external communication	• Implement electronic tendering by stages in line with (ETWB) Environment, Transport and Works Bureau’s programme. • Dissemination of tender document in CD-rom already commenced in 2000. Dissemination of tender document through internet, submission of tender returns in electronic format to be implemented in stages in coming years. • Study the feasibility of e-project management.	• Feasibility study of e-tendering through internet completed in 2001. Dissemination of tender document in CD-rom for works contract and consultancies contract commenced in 2000 and 2001 respectively. • Feasibility study of e-project management commenced in March 2001. • Feasibility study of e-financial management completed in 2001.	• Continue to implement the electronic tendering by stages in line with ETWB’s programme. Submission of tender documents in CD-rom to be commenced in 2002. • Complete the feasibility study of e-project management in 2002. • Commence to implement e-financial management by stages in 2002.
Improve the method used	• review the existing	• Environmental performance	• Aim for continuous improvement

in environmental performance evaluation	environmental objectives and targets. Set environmental performance indicators based on ISO 14031 standard.	indicators are set and recorded as shown in Section 9 of this EHS Report.	by regularly monitor and review the environmental performance indicators.
Ensure site hygiene and tidiness	*****	*****	• Construction contracts to make allowance to pay for “Maintaining site cleanliness” to the contractors in 2002.
Plan for safety	*****	*****	• Select a trial project in 2002 and commence implementing the practicable features of the UK’s (Construction Design and Management) Regulations in the design and planning of the project.
Improve Working Environment & conserve energy	*****	*****	• Replace in stages the existing lighting system in ArchSD’s office (Queensway Government Offices) with T5 flurorescent tubes and electronic ballasts.

***** Initiatives and Goals on Health & Safety was not included in the previous Environmental Report.

12.0 Verification

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Verification Objectives
The Architectural Services Department (ArchSD) commissioned BMT Asia Pacific Limited to verify the contents of the Department's Environmental, Health and Safety Report 2002 and its supporting data collection systems. As part of this independent verification, BMT reviewed the extent to which the report identified and addressed the EHS issues relevant to the Department's operations, and provided recommendations for improving future reports. This statement represents an independent opinion of Environmental, Health and Safety Report 2002 and is based on the results of a systematic verification process.

Approach to Verification
The verification was conducted from 28 Oct to 1 Nov 2002. BMT interviewed top management and professional staff from several core departmental branches to substantiate commitments and claims made in the report, and examined and validated primary data sources. The following elements of the report were sampled during our verification:

- EHS principles, management approach and implementation;
- Environmentally sustainable design;
- Environmental features installed to refurbish existing buildings;
- Building energy efficiency and energy saving measures;
- Construction related environmental, health and safety initiatives;
- Legal compliance and EHS data;
- Green procurement;
- Contractor management;
- Environmental, health and safety training for internal staff and contractors;
- Target setting and implementation; and
- Assessment of performance against targets.

Results of the Verification
Report Accuracy
- The content of Environmental, Health and Safety Report 2001 represents an accurate account of ArchSD's approach, actions and performance in the year 2001.
- Claims made in the report are supported by data and information that were appropriately extracted from ArchSD's data collection systems and have been substantiated during discussions with various divisions/parties within the Department.
- The data collection systems that support the report contents are structured and documented, and effectively provide robust information on ArchSD's performance. In particular, data and information are collated in accordance with specified parameters and formats, and are stored and analysed in a systematic manner.

Report Coverage and Relevance
- The report provides a balanced account of ArchSD's EHS performance with respect to its key areas of responsibility, activities, daily operations and influence on the local community and the built environment.
- The report sufficiently reflects ArchSD's specific actions in the year 2001 and the planned targets for the year 2002 to achieve specific policy commitments.
- The report demonstrates ArchSD's contribution to: adopting environmental sustainability in the design of public projects; furthering safety management and practices at construction sites; and providing amenities for the physically challenged in public buildings and facilities.
- The report supports ArchSD's positioning as a responsible organisation in the community, and details its approach and efforts to develop a close partnership with the construction industry and the public to address environmental, health and safety issues related to both the design-build-operate cycle and the maintenance and refurbishment of the built environment.

ArchSD is commended for expanding its environmental reporting to include information on its health and safety issues and performance. In future reports, ArchSD is encouraged to continue to expand the depth and breadth of its reporting in line with the Global Reporting Initiatives Sustainability Reporting Guidelines, where possible.

19 Nov 2002

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We Welcome Your Comments

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