



# Environmental Report 2003



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## Foreword

The Environment is Hong Kong's important asset. Drainage Services Department is fully committed to integrating environmental protection and sustainable development principles into our plans and operations. Our core activities are closely tied to nature's water cycle as we manage land drainage in the urban and rural areas to reduce flood risk and we collect municipal sewage for treatment to protect environmental waters from pollution. In delivering the service, we are mindful of our influence on the Environment and constantly seek to excel in our work while mitigating any potential impact. This report describes our environmental performance in 2003.





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## Environmental Policy and Goals

### Environmental Policy

We commit to being environmentally conscious in all our activities and services and endeavor to serve the HK community with the best of our expertise in safeguarding human health, protecting and preserving natural ecosystems, thus contributing to the sustainable development of HK.

We aim to continually improve the quality of our services, and to alleviate as far as practicable the impact that our facilities and sewage and drainage system impose on the environment of HK. To meet these objectives, we are committed to:

- Adopting state-of-the-art clean technologies and pollution prevention measures;
- Incorporating environmental considerations, whenever practicable, into our design, construction and operation in order to prevent pollution and maximize resource conservation;
- Minimizing and mitigating environmental impacts arising from the construction and operation of our facilities; and
- Meeting all statutory and regulatory requirements on environmental performance that are applicable to the activities of the department.

We ensure that our Environmental Policy is communicated to all staff, our consultants and contractors, and is open to public scrutiny. Our staffs are committed to upholding this departmental policy and receive the necessary training and resources to enable its implementation.

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### Environmental Goals

1. To provide and operate world-class sewerage/drainage systems and sewage treatment/disposal facilities to fulfil the growing needs of the local community and contribute to the sustainable development of Hong Kong.
2. To implement sewerage and sewage treatment/disposal programmes in a professional manner, in partnership with other Government establishments including the EPD, and to meet the Water Quality Objectives for HK waters.
3. To implement drainage and flood protection programmes in a professional manner, to minimize flooding, and to provide protection to local inhabitants, property and the environment.



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## Environmental Functions and Performance

DSD's key responsibility is to provide and operate the drainage, sewerage and sewage treatment infrastructure in Hong Kong. In 2003, DSD collected and treated 943 million cubic metres of sewage to achieve a high level of sanitation control in Hong Kong. In delivering the service, we operated 65 sewage treatment works, 157 sewage pumping stations and low flow interceptors, 43 submarine outfalls, 2 effluent disposal tunnels and maintained 1514 km of sewers. In flood defence, we maintained 2507 km of drainage channels and drains and 23 flood pumping schemes. In continuously improving the drainage and sewage treatment infrastructure, we are running 69 contracts where construction of new works and upgrading works, as well as major maintenance works, are in progress.

Ever higher public health standard and environmental effectiveness of sewage treatment are put in place. Towards improving Victoria Harbour, the treatment of sewage from some 3 million people equivalent was upgraded from screening to CEPT since 2001 under the HATS (Harbour Area Treatment Scheme) Stage I Scheme.

*Table 1.1 Sewage treatment in Hong Kong*

| Treatment level provided              | 2001<br>(Million m3) | 2002<br>(Million m3) | 2003<br>(Million m3) | Percentage    |
|---------------------------------------|----------------------|----------------------|----------------------|---------------|
| Screening and degritting              | 571                  | 274                  | 275                  | 29.2%         |
| Primary treatment                     | 4                    | 4                    | 4                    | 0.4%          |
| Chemically Enhanced Primary Treatment | 152                  | 485                  | 508                  | 53.9%         |
| Secondary biological treatment        | 158                  | 148                  | 156                  | 16.5%         |
| <b>Total</b>                          | <b>885</b>           | <b>911</b>           | <b>943</b>           | <b>100.0%</b> |

## Performance Measures

We constantly introduce sound management practices and best available technology to make our operations more energy efficient,

more ecologically sustainable and more effective in pollution reduction. Considerable achievements were made in 2003. The removal of pollutants, resource consumption and environmental emissions are quantified in Table 1.2.



Figure 1.1 Sewage treatment facilities in Hong Kong

**Table 1.2**  
**Achievements, Resource consumption and Environmental Emissions in 2003**

| <b>Sewage treatment</b>           |              | <b>2002</b> | <b>2003</b> |
|-----------------------------------|--------------|-------------|-------------|
| <b>Quantity</b>                   |              |             |             |
| <b>Total Flow</b>                 | (Million m3) | 911         | 943         |
| <b>BOD (tonnes)</b>               | In           | 126460      | 124157      |
|                                   | Removed      | 97972       | 93654       |
|                                   | Out          | 28488       | 30503       |
| <b>SS (tonnes)</b>                | In           | 149620      | 155693      |
|                                   | Removed      | 125049      | 129563      |
|                                   | Out          | 24571       | 26130       |
| <b>Total N (tonnes)</b>           | In           | 6674        | 5906        |
|                                   | Removed      | 4531        | 3770        |
|                                   | Out          | 2143        | 2136        |
| <b>Waste</b>                      |              |             |             |
| <b>Screenings</b>                 | m3           | 19582       | 20705       |
| <b>Grit</b>                       | m3           | 7879        | 7078        |
| <b>Dewatered sludge</b>           | tonnes       | 300017      | 305660      |
| <b>Gas emission</b>               |              |             |             |
| Greenhouse gas recovered & flared | million m3   | 7.8         | 9.3         |
| <b>Resource Consumption</b>       |              |             |             |
| <b>Power</b>                      | KWh          | 229646835   | 231002217   |

**Chemicals****a. sewage treatment**

|                        |        |       |       |
|------------------------|--------|-------|-------|
| <b>ferric chloride</b> | tonnes | 13265 | 13235 |
| <b>alum</b>            | tonnes | 4     | 86    |
| <b>polymer</b>         | tonnes | 51    | 72    |

**b. sludge dewatering**

|                        |        |      |      |
|------------------------|--------|------|------|
| <b>ferric chloride</b> | tonnes | 2959 | 2912 |
| <b>polymer</b>         | tonnes | 650  | 682  |
| <b>Calcium nitrate</b> | tonnes | 0    | 0    |

**Effectiveness**

|  |  |       |       |
|--|--|-------|-------|
| <b>BOD removed</b>   |  | 77.5% | 75.4% |
| <b>SS removed</b>  |  | 83.6% | 83.2% |
| <b>Total N removed</b>                                       |  |       |       |
| <b>Power consumed (KWh per m<sup>3</sup> sewage treated)</b> |  | 0.252 | 0.245 |
| <b>Power consumed (KWh per tonne BOD removed)</b>            |  | 2344  | 2466  |

**2002****2003****Office**

|                             |        |         |         |
|-----------------------------|--------|---------|---------|
| <b>Paper consumed</b>       | Reams  | 18380   | 17300   |
| <b>Envelopes consumed</b>   | number | 133741  | 148089  |
| <b>Waste paper recycled</b> | kg     | 13068   | 13108   |
| <b>Power</b>                | KWh    | 152 554 | 159 505 |

**Unit rates**

|  |  |     |     |
|--|--|-----|-----|
| <b>Paper consumed (ream per staff)</b> |  | 9.1 | 8.9 |
|--|--|-----|-----|

**Sewer and Drainage Maintenance****Quantity**

|  |                |       |       |
|--|----------------|-------|-------|
| <b>Drains, channels and water courses cleansed</b> | km             | 1825  | 513   |
| <b>Silt removed</b>                                | m <sup>3</sup> | 71302 | 59946 |
| <b>Sewers cleansed</b>                             | km             | 729   | 614   |

|                     |    |      |      |
|---------------------|----|------|------|
| <b>Silt removed</b> | m3 | 7343 | 6351 |
|---------------------|----|------|------|

**Abbreviations**

|                |                          |
|----------------|--------------------------|
| <b>BOD</b>     | Biological Oxygen Demand |
| <b>SS</b>      | Suspended Solids         |
| <b>Total N</b> | Total Nitrogen           |
| <b>KWh</b>     | Kilowatt hour            |

Through treating municipal sewage, we removed 93654 tonnes of BOD, 129563 tonnes of Suspended Solids and 3770 tonnes of Nitrogen from entering water courses and the sea.

Methane is a strong greenhouse agent which is 21 times more powerful in trapping heat in the atmosphere than Carbon Dioxide is. Last year, 9.3 million m3 of methane generated from anaerobic digestion of sewage sludge in our works was collected and flared, hence reducing its impact on global warming. On-site gas boiler such as the unit at Tai Po Sewage Treatment Works was powered by methane to generate heat for plant use and help reduce demand on electricity or fossil fuel.



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## Energy Efficiency

DSD recognises that fossil fuels are finite resources and is therefore strongly committed to the conservation of energy in seeking to reduce Hong Kong's ecological footprint. We place considerable emphasis in energy efficiency in sewage pumping and treatment which constitute the bulk of the department's energy expenditure.

We continuously look for better ways and better equipments to operate our plants. Energy Audit is regularly carried out on a plant by plant basis to identify Energy Management Opportunities. Improvements involve introduction of energy saving equipment, implementation of efficient operations, and phasing out of obsolete and inefficient sewage pumping or treatment equipments.

The work is concentrated in 4 key areas :

- [Effluent Disinfection](#)
- [Variable Speed Drive in effluent pumping](#)
- [Energy Efficient Motors](#)
- [Deodorization Systems](#)

### Adopting alternative UV Irradiation Technology for Effluent Disinfection

LPHI system has technical advantages over MPHI system.

Medium Pressure High Intensity system (**MPHI**) → Low Pressure High Intensity system (**LPHI**)

- ✓ more efficient disinfection
- ✓ lower power consumption
- ✓ longer lamp life

- DSD tested and evaluated life cycle cost of MPHI & LPHI systems for local operations.
- implement LPHI at new works.

Successful case : Ma Wan Sewage Treatment Works achieved 60% lower power consumption

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### Variable Speed Drive (VSD) in Sewage Pumping and sludge dewatering

#### Using energy efficient VSD

Advantages :

- ✓ Lower Kilovolt-Ampere (electrical power) demand due to soft start of the motor
- ✓ Smooth control of pump set during operation.

Successful applications :

- ▶ sludge dewatering centrifuge in **Siu Ho Wan Sewage Treatment Works Upgrading**

- ▶ Sewage pumping, eight 11KV 2.5 MW induction motors in **HATS Stage I**

Estimated power saving : up to 17%

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### Energy Efficient Motors

Apply contract specification to motors :

- ▶ Motors of rated output 1.1KW to 90KW to meet EU and European Committee of Manufacturers and Electrical Machines and Power Electronics EFF Band 1 energy efficiency requirements (efficiency values >83.8% to >95%)
- ▶ Motors of rated output > 90KW motors to have minimum full load efficiency of 95%

Site implemented : Siu Ho Wan Sewage Treatment Works Upgrading.

Estimated saving over conventional motors : 6%

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### Deodorisation Systems

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a) Deploying 2 speed fans

- high speed - for odour-generating operation e.g. sludge unloading, maintenance of sludge treatment/disposal equipment
- low speed - for normal operation

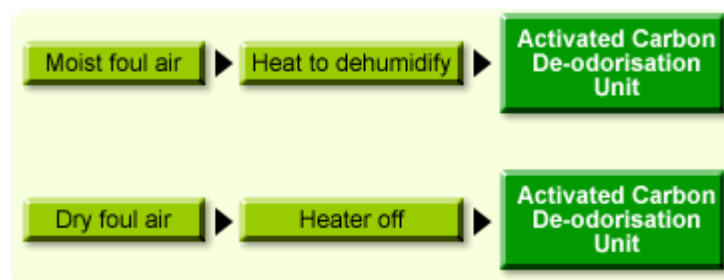
b) Design for odour containment

limit the volume of odorous gases, hence reducing size of De-odorisation unit and power demand



c) Automatic control of Dehumidifiers

Saving energy by automation. Apply heating only for moist foul air.



As a result of the conservation drive, DSD accomplished a remarkable increase in energy efficiency in sewage treatment : 2.77% saving in KWh/m3 over the previous year.

### DSD Electricity Consumption in sewage treatment and sewage pumping

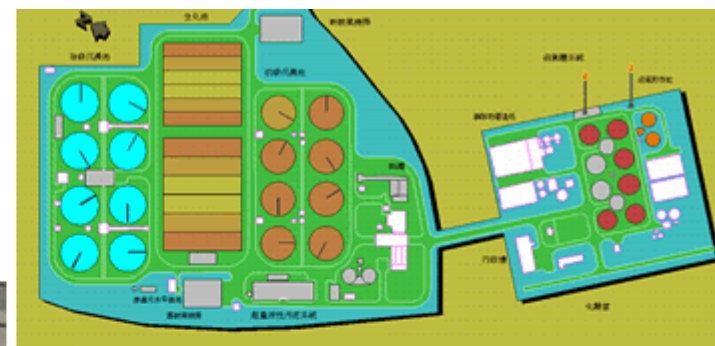
|                     | 2002         | 2003         | Change        |
|---------------------|--------------|--------------|---------------|
| Sewage treated (m3) | 911 million  | 943 million  | +3.5%         |
| Power consumed KWh  | 229,646,835  | 231,002,217  | +0.6%         |
| <b>KWh/m3</b>       | <b>0.252</b> | <b>0.245</b> | <b>-2.77%</b> |

### Other Energy Efficiency Best Practices

- Sewage pump start/stop levels in Stonecutters Island Main Pumping Station was reviewed and optimized to minimize running hours and the no. of units in operation
- Sewage pump start/stop levels in Pillar Point Outfall Pumping Station was reviewed and optimized to

minimize running hours and the no. of units in operation

- Biogas generated in treatment process in Shek Wu Hui Sewage Treatment Works is utilised for water heating instead of relying on electric water heater.





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## Ecological Enhancement

It is our policy to incorporate environmentally friendly features into new or upgrading projects wherever possible. The features provide greenery in the countryside, restore or compensate for disturbed habitats and preserve valuable freshwater ecosystems. As a result of our commitment and actions, works in the past decade have cumulated into large tracts of vegetated river banks, preserved meanders, wetland features and mangrove habitats.

Ecological and landscape improvement measures are usually derived from EIAs of new projects, while we also advocate good ecological practices amongst our engineers through circulation of guidance notes.

### Our effort has included:

- [Wetland Creation](#)
- [Habitat preservation and enrichment](#)
- [Harmonising new works with the surrounding](#)

### 1. Wetland Creation

2 major river training projects namely Yuen Long Bypass Floodway, and Construction of San Tin Eastern Main Drainage Channel are notable examples of habitat creation. Works were in progress in 2003. These projects will respectively create 7.9 and 3.7 hectares of wetland habitats.

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### Yuen Long Bypass Floodway

The [Yuen Long Bypass floodway](#) is a new channel constructed to divert storm water from south east of Yuen Long into Kam Tin River to reduce flood risk in Yuen Long town centre and other lower lying areas.

To promote biodiversity, this flood defence works will incorporate two major ecological features - a created



wetland and in-channel shallow ponds.

### Created Wetland

Several fallow fish ponds in the North of the confluence of the Bypass Floodway and Kam Tin River will be enriched to become 7.9 ha of wetland, comprising 6.4 ha of marshes of varying depths and 1.5 ha of reedbed.



Differential depths sustain a diversity of ecological niches. The deeper marsh provides habitat for large fishes and the associated bird community, while the shallower submerged marsh will be ideal to become foraging grounds for wading birds. Planting of marsh vegetation will jump start the plant establishment process which will lead to colonisation of the wetland by insects, aquatic invertebrates, fishes, amphibians, reptiles and birds. The biodiversity of the created wetland will thus be a quantum leap from that of the original fishponds.

The reed bed will take the flow of the channel over a mass of artificial boulders that acts as a biofilter to break down organic matter. The reed bed further serves as an effective purifier that assimilates nutrients. Passage of flow over the boulder area and reed bed gives a steady supply of clean water to the marshes.

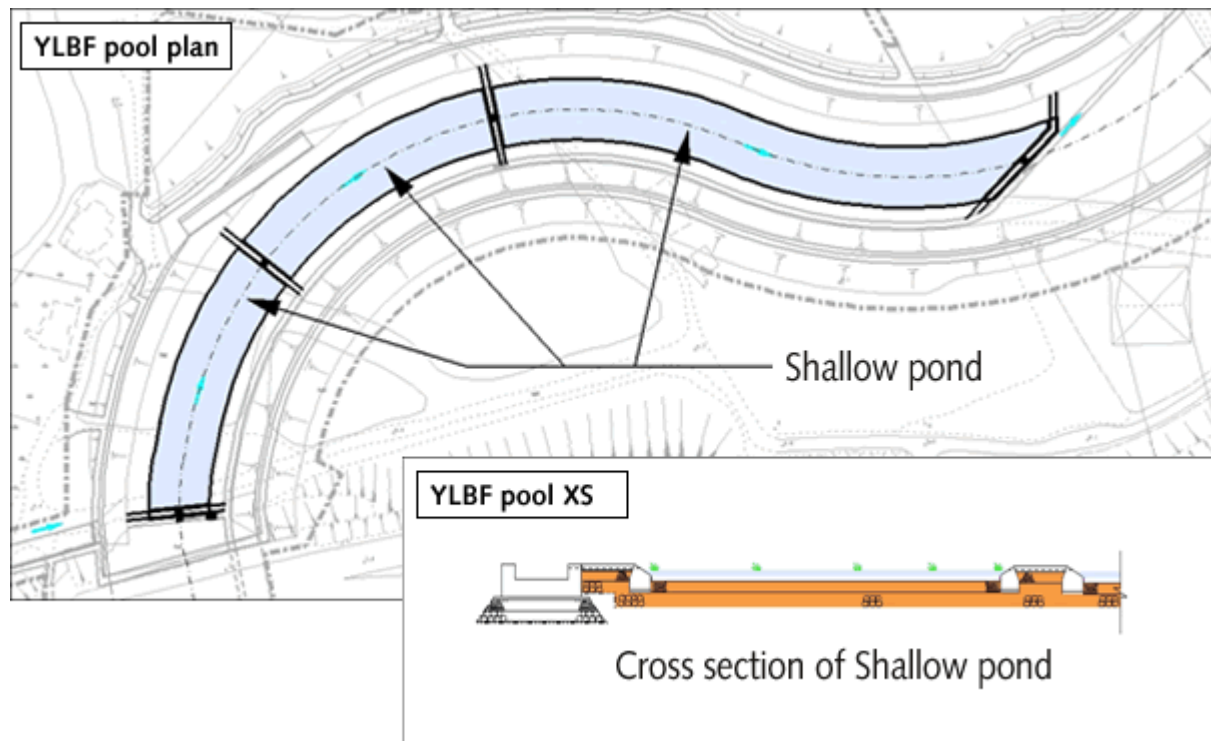


Two bat roosts will also be constructed in the wetland to encourage habitation by this type of flying mammal.

Ecologically important animal life attracted to the YLBF wetland will include damselflies, spotted narrow-mouth frog (*Kalophrynus pleurostigma*), bats such as Japanese Pipistrelle, birds both resident and visitors such as egrets, pond heron, Stints, and the endangered Black-faced Spoonbill.

### Shallow pond feature

To promote and sustain stream life, 350 m of channel bed or about 1.2 ha of the floodway will take the form of shallow ponds that are purposely engineered to provide habitat for freshwater fish, amphibians and water birds. It is the first of its kind in Hong Kong, of a man-made waterway that serves a flood defence purpose while specially built to become a vibrant freshwater ecosystem.



### Landscaping

Landscape quality of YLBF is enhanced with establishment of grass on the channel base and the inner embankment on grassing concrete, giving a total of 6.8ha of greenery. Furthermore, about 3,000 trees will be planted along the channel to compensate for the loss of 400. Grass cover and trees have tremendous environmental benefits as they reduce heat retention, provide foliage, shades and landscape features to the water edge, trap dustfall and increase habitat diversity and amenity value.

Success of this project will go a long way in providing valuable reference for future channel engineering work to

coexist with nature conservation.

### Wetland in San Tin

The San Tin Eastern Main Drainage Channel project that aims to alleviate flooding problems in the low-lying areas at the east of San Tin and Ki Lun Tsuen of Yuen Long has incorporated environmental mitigation measures including compensatory planting, wetland creation and landscape works. It includes establishment of 3.7 ha of wetland habitat comprising ponds and reedbed alongside the channel. Additionally, to facilitate vegetation development and animal foraging and breeding, the embankment will not be lined at the lower reaches of the San Tin Eastern Main Channel.



Another project in the area, the flood control works to protect San Tin, has necessitated the construction of embankments, flood pumping station and floodwater storage ponds. As the landscape and ecological mitigation measure, the San Tin Created Wetland was developed from an abandoned fishpond at the junction of San Tin Tsuen Road and Castle Peak Road, Shek Wu Wai, San Tin, Yuen Long.



Wetland plants such as water lilies, sedges and *Lugwigia* were successful introduced in the submerged area and water margin. The open water and sides now support a diversity of plants, freshwater fishes, amphibians and dragonflies.

44 species of birds including Grey Heron, Kingfishers, sandpipers, waterhen, and Oriental Reed Warbler have been sighted since creation of the wetland. They included resident species, winter visitors and passage migrants.

## 2.Habitat preservation and enrichment

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Much attention is given to leaving shelter and foraging grounds for wildlife in our works to reintegrate the channel into the natural environment. Our endeavours are shown below.





Grassed embankment and channel bed at River Indus



Mangrove created along the bank of Kam Tin River to provide compatibility and integration with the environment



Grass-lined side slope at River Beas promoting the regeneration of riparian habitat.



Grassed levee along Shan Pui River



**Creation of wetland habitat** - Shallow pond with reed bed and open water sustaining freshwater fishes, amphibians, dragonflies, birds and bats



Grassed levee along Shan Pui River

### 3. Harmonising new works with the surrounding [▲ back to top](#)

In one of our latest projects, the Ngong Ping Sewage Treatment Works which has now started construction, the landscape and social setting was studied in detail to pave way for a meticulously designed architecture that blends seamlessly into the local area.

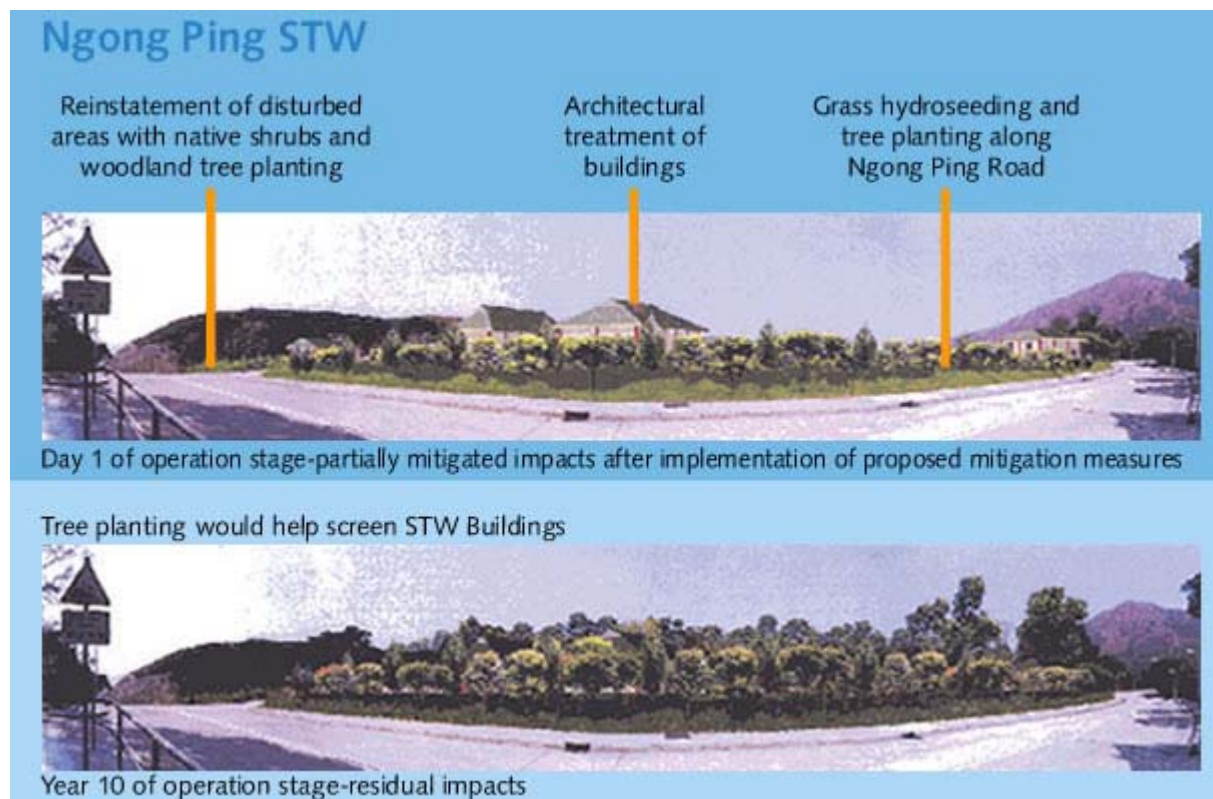
This sewage treatment plant serves the Po Lin Monastery, Ngong Ping Village, and the future theme village associated with the Tung Chung Cable Car ride. In the design, most of the major structures of the sewage treatment works will be underground or covered. Generous planting of native woodland trees and shrubs is specified in the landscape plan to compensate for loss of any existing vegetation, to screen sensitive views and to act as an environmental benefit for local residents, workers, and visitors.

Furthermore, the choice of architectural design and finishing of the superstructures will adopt traditional Chinese elements and colours interpreted in a contemporary manner to make the sewage works

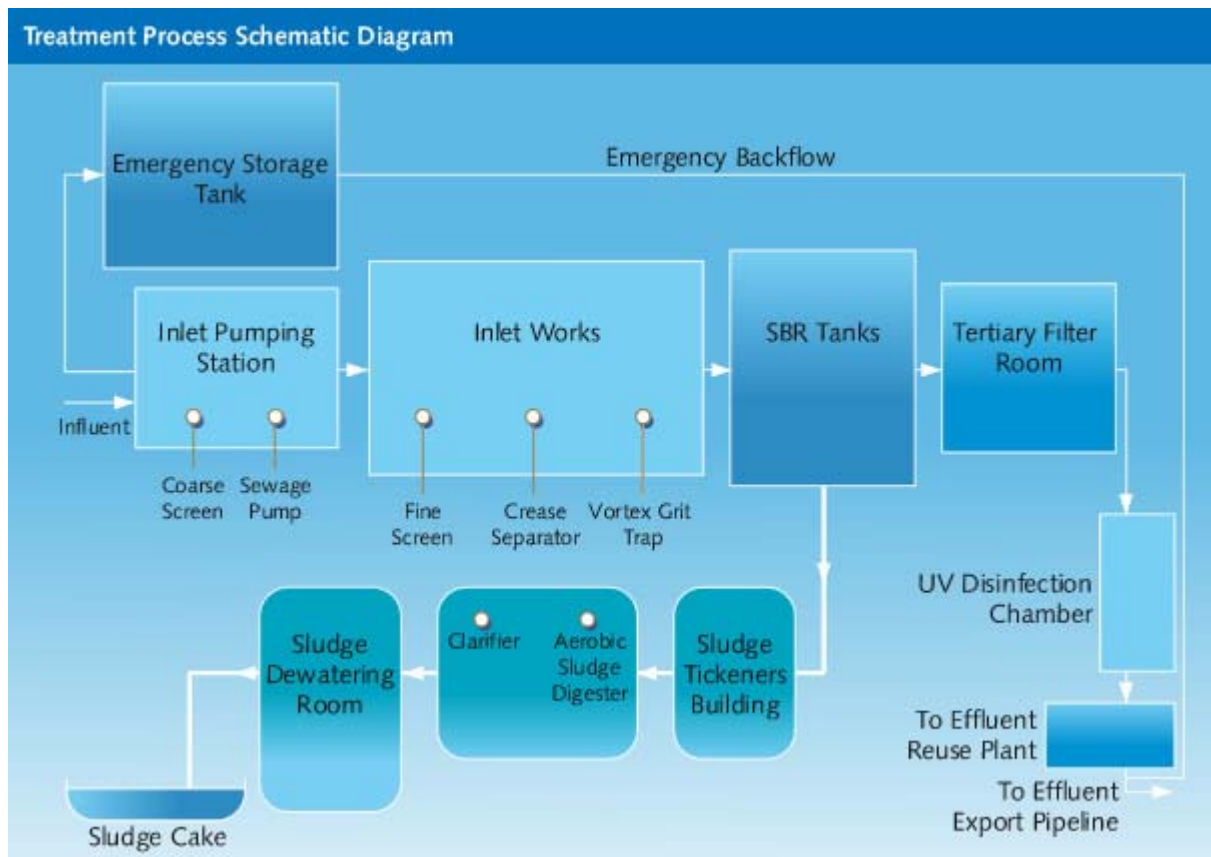


inconspicuous and fit smoothly into the landscape character of the area.





The Ngong Ping STW will also be Hong Kong's first tertiary treatment plant that includes due media filter and effluent disinfection by ultraviolet light. Effluent will be reused for toilet flushing and thus help conserve freshwater resources. Giving due regard to the fragile ecology of the Ngong Ping highland area, the project includes a 5.7-km pipeline system to discharge surplus effluent to sea at Tung Wan, Lantau.



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## Greener Office

Conservation of resources are valued equally extensively in the office. The main fronts include Air Conditioning and Ventilation, Lighting, Office Equipment and Elevator Service.

### Lighting

- a. All DSD offices have completed installation of electronic ballasts for fluorescent lamps, adopted **T-5 tubes**, used new **luminaries** with parabolic reflectors. Lighting areas are arranged with suitable individual switch to allow flexibility.
- b. Operational measures are emphasized, including :  
Switch off lighting when rooms are not occupied and during lunch time. Reduce **light** near windows.

### Air Conditioning

The thermal setting is adjusted to 24-25°C. Heat ingress is reduced by lowering Venetian blinds or keeping windows shut. Air conditioning of unoccupied rooms is switched off.

### Office Equipment

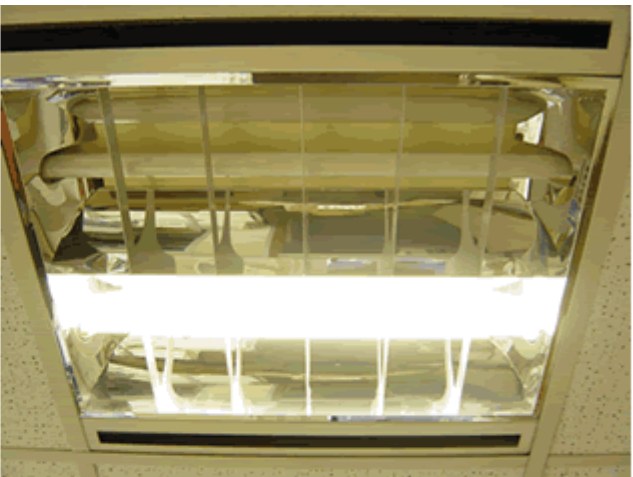
Set photocopiers and fax machines to go into hibernation mode while inactive. Advocate paper saving and paperless office to reduce energy and paper consumption for document copying and printing.

### Elevator service

Promote using stairs rather than the elevator.

### Paper

Economy in use of paper, paper re-use and recycling are promulgated in the department. **Paper consumption** was some 6% less in 2003 compared to 2002.



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## Environmental Challenges and Continuous Improvement

In 2003, all major sewage treatment works performed satisfactorily, meeting and very often achieving better than the licence requirement imposed by the environmental authority. Various difficulties were encountered and subsequently resolved, while new initiatives were introduced to continuously improve the output and outcome of our work. A few examples are highlighted below.

### Stonecutters Island Sewage Treatment Works

In 2003, our largest facility Stonecutters Island Sewage Treatment Works treated close to 1.4 million cubic meters of sewage a day, putting it amongst the world's largest operation of its kind. Using Chemical Enhanced Primary Treatment (CEPT) process, the SCISTW achieved an average BOD5 removal efficiency of around 70% and TSS removal efficiency of around 80%, hugely surpassing the designed values of 35% and 70% respectively. By sustaining the highest standards of operation, DSD assured the best possible environmental benefit for Victoria Harbour.

### Shatin Sewage Treatment Works

Against an increase of odour complaints, the works took a number of measures to address the situation. This included containment of the odour source by enclosures or covers, dosing chemicals to prevent the formation and release of odour, treating the malodorous gas before emission, and putting in place a monitoring system to measure hydrogen sulphide at strategic locations. Upon these efforts, the air quality in the neighbouring areas improved and the number of odour complaint dropped.

The shortfall in treatment capacity remained to be a challenge. Online sensors were installed to provide instantaneous information on the condition of the reactor tanks. With intensive effort in adjusting reactor conditions, the effluent quality continued to improve in 2003, bringing it in line with the effluent discharge licence conditions by November. Construction of the long term improvement works to provide the much needed capacity was in good progress, with effluent treatment phase of Phase I due for completion in 2004 and Phase II, in 2005.

### Shek Wu Hui STW

To save energy, the High Volume and Low Volume Blower Systems were connected up in 2003. Lower air flow is now applied to reactor tanks at low effluent flow period, whereas full flow is applied during peak flow period. It is observed that the unit aeration cost is reduced from \$0.158 to \$0.138 per m<sup>3</sup> of sewage treated, which is equivalent to \$584,000/yr. Working on this success and to provide further energy savings, we will install a new LV



blower by October 2004 funded under Save and Invest Accounts. This will allow further flexibility to match air supply with flow volume throughout the day, hence achieving power economy.

### **Yuen Long STW**

In 2003, the aged ceramic air diffusers in all aeration tanks were replaced with more efficient membrane type air diffusers. Less air supply is required from the air blowers due to improved oxygen transfer efficiency. This improvement will result in a \$0.4M saving in electricity expense each year.

### **Tai Po Sewage Treatment Works**

Significant electricity was saved by channelling effluent into a few reactor tanks during the low intake period at night time. Energy savings was accomplished without affecting effluent compliance. In seeking continuous improvement, an energy audit was carried out in June 2003 with a view to identifying further Energy Management Opportunities.

### **Mui Wo Sewage Treatment Works**

DSD conducted an energy audit in June 2003 joined by EMSD engineers. The main purposes of the audit were:- (1) to identify the major power consumption equipment and recommend feasible energy management opportunity (EMO) with the energy saving forecast; and (2) to apply EMO to improve the efficiency and performance of the plant with the implementation of energy-saving measures. The walk also served as a "train-the-trainer" session where skills from EMSD in energy auditing could pass on and multiply in DSD.

### **Sewerage works in urban area**

Construction and replacement of sewers in the busy urban area poses a unique challenge to DSD. The mitigation of disruption to traffic, air, noise and drainage nuisances is our prime concern. Road openings are reduced to a minimum such as by the use of trenchless methods. Hoardings are placed to separate pedestrians from the work site. Stringent environmental controls are enforced at the site to properly manage dust, odour, noise and muddy drainage. Works duration is shortened to the minimum possible. Communication channels are open to neighbours so that grievances can be attended to and resolved immediately.



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## Law compliance

All sewage treatment works and relevant new works (Designated Projects) are regulated by EPD under the Water Pollution Control Ordinance and Environmental Impact Assessment Ordinance respectively, in addition to other relevant pollution control legislations. DSD directly holds 26 discharge licences under the WPCO and 19 various Environmental Permits under the EIA Ordinance.

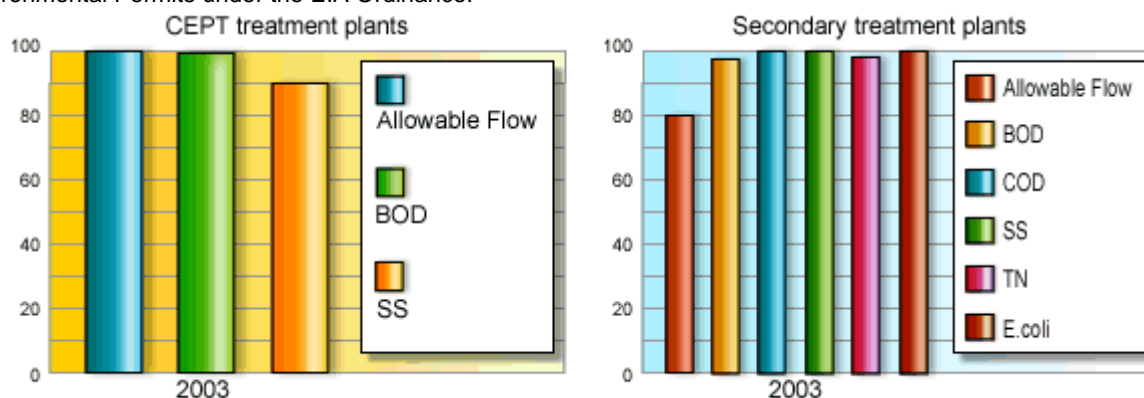


Figure 4.2 Percentage Compliance in 2003 for CEPT and Secondary Treatment Plants

To measure performance and to guard against pollution, DSD has an intensive programme to monitor the quality of discharge at all of the Sewage Treatment Works. Effluent is sampled and tested. Anomalies are immediately identified, reported to EPD and corrective action made. Data are compiled and sent to EPD for reference every month. Some major sewage works such as Shatin, Tai Po and Sai Kung also have online sensors to monitor TSS, NH<sub>3</sub>-N, NO<sub>x</sub>-N of the final effluent.

DSD thoroughly complied with the EIA Ordinance in 2003. We carried out Environmental Monitoring and Audit work associated with Environmental Permits issued under the EIA Ordinance for new works.

Our contractors had 14 convicted environmental offences in 2003 - 12 related to irregularities in dust control at construction sites, one on construction site drainage and one on noise offence.

### **Implementing EMS**

Tai Po STW has acquired ISO 14001 since 2001. We hope to extend such certification progressively to other works once experience is consolidated.

We also designate a Green Manager to oversee environmental management initiatives.

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## Staff commitment and Development

To empower our staff to do our job with environmental awareness and understanding, we supported 15 training events in 2003 on environmental knowledge and practices.

To promote environmental awareness amongst staff, good office practices in saving paper, energy and other resources are communicated in detail to all levels of staff through circular memorandum, notice boards and e-mail. It embraces use of paper, photocopiers, electronic mail, computer monitor, computer printers, lighting, elevators, air conditioning, and all relevant office equipment and practices. Consumption of key indicators such as paper, electricity and selected stationeries are monitored on a monthly basis. The Supplies Officer also advocated Best Practices in procurement and convey it to all staff through his circular memorandum, which emphasized and elaborated on the 4R Principles (Reduce, Reuse, Recycle & Recover) for all staff to achieve Environmental Goods Purchasing.

We embarked on reduction targets on paper and power. Engagement to the objectives and the expectation of successful outcome promote staff commitment on resource conservation. Environmentally friendly work attitude and active participation are instilled by posting notices at prominent places in the office.

Green social activities such as eco-tour or charity walk for nature are circulated for staff information to raise interest and environmental awareness.



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## Communication with Stakeholders

We endeavour to make our activities as transparent as possible to environmental stakeholders.

We held an Open Day on 1 & 2 March 2003 at the Stonecutters Island Sewage Treatment Works to invite the public to visit Hong Kong's world class sewage treatment facility and one of the world's most efficient CEPT plant. This was the first time the plant was open to public since its full commissioning in December 2001. The event aimed to reveal to the stakeholders - the public, the enormity of the task and the sophistication behind treating sewage to protect Victoria Harbour from pollution. The Open Day included video shows on DSD duties, a technical tour of the plant, exhibitions and games. The activity was a great success attracting 8,300 visitors over the two-day event.

We also communicate the content of our work and Environmental Performance of our activities through the DSD Homepage, which is freely accessible to the public, the engineering profession and green groups.

Relevant stakeholders are consulted as we propose new projects on sewerage, sewage treatment or flood control.

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## Management of Environmental Risks

Due to the polluting nature of sewage, DSD recognises the potential threat of sewage overflows upon bathing beaches, the sea or even in the street. We place immense emphasis to possess readiness and the ability to respond to overflow of sewage from anywhere in the sewerage system or the treatment works. Contingency Plans are written for individual sewage treatment works and major pumping stations. Guidelines for classification, response and reporting of sewage bypass are agreed with the environmental authority and communicated to all relevant offices. The line of communication with the environmental authority is also well defined and the telephone list frequently updated.

Risk is minimised by inspection, desilting, proactive repairs and upgrading in order to ensure our system is in top performance. In 2003, 614 km of sewer were cleansed, 6351 m<sup>3</sup> of silt were removed from sewers.

# Environmental Report 2003

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## Achievement of environmental targets

Upon embarking on the good practices and gauging staff commitment, we accomplished a significant reduction of paper consumption in 2003 of 5.9 % compared to the previous year. Electricity consumption was not measurable for most of our offices because they are situated in multi-user buildings. We observed an increase in energy use in our Guardian House offices, mainly a result of refitting out work of the respective floors.

|                     | 2001          | 2002          | 2003          | Change against 2002 level |
|---------------------|---------------|---------------|---------------|---------------------------|
| Paper (reams)       | <b>18200</b>  | <b>18380</b>  | <b>17300</b>  | -5.9%                     |
| Electricity (KWh) * | <b>162619</b> | <b>152554</b> | <b>159505</b> | +4.5%                     |

\* Individual meters only available at DSD Guardian House offices

In committing to saving natural resources, we target to reduce paper consumption by 5% and power consumption in the office by 3% by 2004/05 compared against 2002/03 levels.

Energy efficiency measures of our sewage pumping and sewage treatment work and the work targets are reported in earlier sections of this report.

