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Chapter 7

Environmental Performance



Last year, along with other Government departments, we issued our first Environmental Report. As the department produces its first annual report, we decided to incorporate this year's Environmental Report as a chapter in this annual report.

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Environmental Goals and Policy

To reaffirm our commitment of providing the community with the best environmental service, we set the departmental environmental goals and policy as follows:

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 HK.
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.



Purified effluent from final sedimentation tank

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
- Complying with legal and any other requirements to which DSD subscribes.

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.



Laboratory personnel at work in sewage treatment work

Environmental Functions and Activities

From a macro perspective, virtually all our work and activities are crucial to the well being of the HK community as they contribute towards an inhabitable environment in which people are protected from major flooding and all wastewater is properly conveyed, treated and disposed of. Significant direct and indirect environmental benefits can be derived from a better-preserved environment contaminated with less pollution loads. Nonetheless, during the interim construction phase, the public would have to bear with temporary adversities such as construction noise, odor and visual impacts etc. Furthermore, after construction, the day-to-day operation/maintenance of our sewerage/drainage system and treatment works would inevitably continue to exert a multitude of adverse impacts that must be alleviated.



Washing wheels before leaving construction site

Environmental Performance and Improvement Targets

Although many aspects of our work have environment implications, not all of them can be quantified easily or will necessarily be reported here. For instance, those intangible benefits that the presence and functioning of our sewerage/drainage systems and treatment facilities brings to the environment cannot practically be measured. On the other hand, some tangible benefits consequential to our treatment and disposal efforts were reported separately in the environmental report of EPD and will not be duplicated here. In any case, to reveal our environmental performance, a usable indicator would be the measured effluent quality of our 58 treatment plants (including 24 preliminary, 2 primary, 1 CEPT and 31 secondary plants) operated by us. As shown in Figure 7.1, the average effluent qualities of our CEPT and major secondary treatment works in 2000 were very close to 100% meeting the discharge requirements. Despite this notable achievement, as disclosed in our last report, the biological treatment-based Shatin STW has continued to suffer from overloading problems and occasionally encountered difficulty in achieving the treatment target. In view of this, corresponding upgrading works have been initiated and Phase I works were due for completion in 2004.

CEPT treatment plant

Secondary treatment plants

Allowable flow

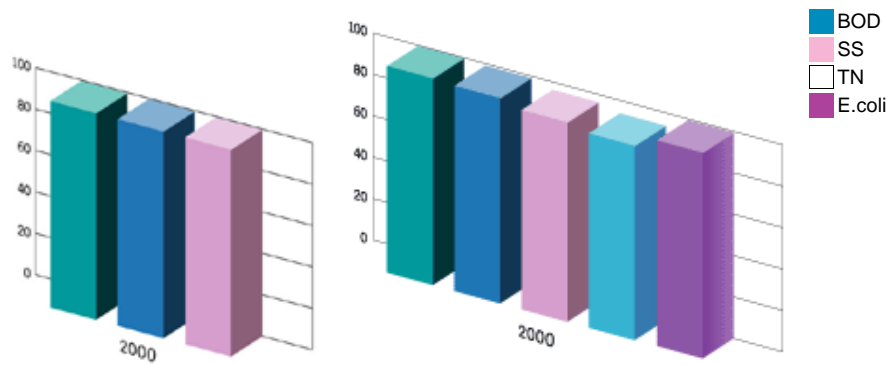


Figure 7.1 Percentage Compliance in 2000 for CEPT and Secondary Treatment Plants

To ensure full compliance of our STWs both now and in future, we continue to implement the following tasks:

- expanding and upgrading our treatment capacity as far as economically viable;
- progressively upgrading older and malfunctioning facilities;
- conducting inspections to uncover/remove illegal cross-connections which allow influxes of wastewater of unacceptable quantity and strength into our facilities;
- regularly maintaining our plant and equipment to minimize occurrence of breakdowns;
- devising and implementing Contingency Plans at all of our facilities;
- working closely with other Government departments, especially the EPD, and implementing joint initiatives, e.g., the Beach Pollution Response Plan for responding promptly/effectively to pollution incidents; and
- undertaking extensive public education initiatives.

We consider it important to keep the public informed of the progress on our various programmes initiated for enhancing environmental performance. Major environmental objectives and targets, which encompass general management, construction and operation of the sewerage and drainage systems, as well as green management, are presented below.

In streamlining general management, we are committed to establishing and implementing Quality and Environmental Management Systems (QMS and EMS) progressively throughout the department. As an initial step, our laboratories have acquired HOKLAS accreditation in the summer of 1999. Processing of the remaining seven divisional ISO 9000 certifications are in progress at present. We expect to complete two certifications in 2001 and the others in 2002. The acquisition of a QMS serves as the building block for an EMS. Regarding ISO 14001 certification, our Tai Po STW received the first EMS certification for DSD in February 2001. In fact, the ISO 14001 EMS had been fully implemented in the plant since September 2000. Significant improvements have been achieved in many aspects of the plant operation that include waste control, dangerous goods control, waste recycling and other environmental improvement issues.

ISO 14001 EMS certification constitutes part of our department's endeavor to serve the HK community with world-class drainage and sewage treatment systems. We expect to extend it progressively to other works of the department in due course. A summary of the current management initiatives is shown in Table 7.1.

Table 7.1 Management initiatives for improving environmental performance

Objective	Target	Progress
Progressively implementing QMS and EMS throughout DSD	To acquire ISO 9000 certification for the whole department by 2002	On schedule. 2 and 5 certifications expected to be completed by 2001 and 2002 respectively. Planned acquisition of Corporate Certificate by 2002
	To acquire ISO 14001 certification for the Tai Po STW by mid-2001	Successful completing of ISO 14001 certification for Tai Po STW in Feb 2001 and ahead of schedule

Regarding enhancement of the sewerage system, programmes have progressively been initiated and implemented. The current ones are summarized in Table 7.2 below.

Table 7.2 Sewerage system enhancement initiatives for improving environmental performance

Objective	Target	Progress
Continue to improve the sewerage system in HK	Completing the HK Island South SMP by the end of 2000	Works already completed in Dec 1999 and ahead of schedule
	Completing the East Kowloon SMP by 2001	On schedule
	Completing the North-West Kowloon SMP by 2003	On schedule
	Completing the Tuen Mun SMP by 2004	Delayed due to villagers' objection. Programme under review by EPD
	Completing the Tsuen Wan, Tsing Yi & Kwai Chung SMP by 2005	On schedule
Minimize the number of recurrent blockage incidence	Working towards the minimizing of the number of complaints received per km of pipe to below the current rate of 14.5 per year	Meeting target, the rate achieved for year 2000 is 12.3 per km
Minimize environmental impacts arising from blocked sewers	Further improving on our Performance Pledge (currently 99% success rate) for responding to, and resolving blockage/complaints	Meeting target, the success rate achieved for year 2000 is over 99%
Improve STW operation	Completing upgrading works at the Shek Wu Hui STW (adding aeration/final setting tanks, digester and UV system) by late 2001	On schedule

	Completing upgrading works at the Shatin STW (adding treatment units, UV system and sludge dewatering plant) by 2009	We anticipate completion of the upgrading works by 2007
Reduce energy consumption	Ensuring our facilities all operate on appropriate tariff rate by 2000	All our facilities are now operating on appropriate tariff rate
	Providing automatic monitoring system for aeration tanks at STWs by 2000 to optimize energy use	Meeting target. At Shatin STW, new sensors for dissolved oxygen and mixed liquor suspended solids were installed in Jun 2000
Reduce chemical consumption	Initiating feasibility studies in 2000 to examine alternative disinfection systems at STWs to reduce the use of chemicals	On schedule. At Stanley STW, full-scale trial on multi-points chlorine dosing method was conducted.
	Conducting a research and development programme on disinfection techniques to identify energy efficient, clean and cost-effective technologies	On schedule. Alternative techniques including ozone, electrochemical and UV disinfection have been examined. Studies extended into year 2001
Improve operational performance & levels of treatment	On-going review of STW operations to identify ways to resolve potential overloading problems and to minimize the occurrence of discharge non-compliance	On-going. At Shatin STW, new types of air diffuser and sludge scrapper were due to be installed by early 2001 to alleviate overloading problem

Regarding enhancement of the drainage system, various programmes have been progressively initiated and implemented. The current major ones were summarized in Table 7.3 below.

Table 7.3 Drainage system enhancement initiatives for improving environmental performance

Objective	Target	Progress
Visual enhancement of river training works, flood protection schemes and drainage channels	Formalizing an inventory and procedures to ensure the incorporation of environmental features into drainage and flood protection works by mid-2001	On schedule and completed in May 2001
Minimise the number of flooding black spots	Reducing the number of flooding black spots through the implementation of drainage improvement projects, including:	

	• the Shenzhen River Regulation Project Stage II by Dec 2000;	Works completed in Jun 2000 and ahead of schedule
	• the Shenzhen River Regulation Project Stage III by Aug 2005;	On schedule
	• the main drainage channels for Ngau Tam Mei by Aug 2002;	On schedule
	• the village flood protection scheme for Pok Wai by Aug 2002;	On schedule
	• the West Kowloon Drainage Improvement Works Stage 1 & 2 by end of 2005	On schedule
	• the eastern main drainage channel for San Tin by Sep 2005; and	On schedule
	• the Yuen Long bypass floodway by Nov 2005	On schedule

In green management, we recorded our efforts in the reduction of energy/paper consumption, reusing/recycling where possible and the avoidance of wastage etc. in the annual Green Manager's Report. Further to the general initiatives, noteworthy targets are highlighted in Table 7.4 below.

Table 7.4 Green initiatives for improving environmental performance

Objective	Target	Progress
Enhance the environmental awareness of the staff	Reviewing & implementing environmental awareness and training programmes annually	Recurrent and ad hoc training have been provided annually to our staffs, e.g. Continuing Professional Development Course for engineering graduates. Engineers were also sent to attend seminar/course such as ISO 14000, odor control, sustainability etc.
	Ongoing enhancement of staff awareness to conserve energy and to avoid wastage	Through notices and Administrative Circulars, our staffs were constantly reminded to be environmentally conscious
Maximize our purchase of Green Products	Reviewing purchasing policies in 2000 to identify opportunities for increasing the purchase of Green Products	Chlorine free paper that contain 50% recycled pulp has been in use since year 2000
Strive to meet HK's objectives on Indoor Air Quality (IAQ) at our premises	Conducting regular IAQ audits, to ensure satisfactory air quality continues to be maintained at our premises	IAQ audits conducted once every two years, improvement works in progress based on the outcome of the Aug 2000 audit

Monitor the environmental performance of our contractors	Ongoing close monitoring of contractors through enforcement of contract terms plus regular appraisal of their performance	On-going. Requirements for contractors were stipulated in contracts and performances were monitored closely and appraised quarterly. Poor performance will receive warning and penalty
Enhance the environmental awareness of the general public	Outreach Programme for educational purpose	Programme launched in Sep 1999 and completed successfully in Nov 2000. Our professional staff had visited 53 secondary schools and the programme is being reviewed



Stanley water front

Environmental Impacts Minimization and Mitigation

Whilst all our activities are geared for serving the community and would produce beneficial impacts, the construction/operation/maintenance of our facilities inevitably brings about adverse environmental effects. They can be visual intrusion, noise or odor as well as losses of natural habitats etc. To alleviate these potential impacts of our activities, we have developed mitigating measures as shown below in Table 7.5.

Table 7.5 Measures to minimize impacts and to enhance environmental performance

Environmental Implication	Activity	Mitigation Measure
Visual impact	Building pumping stations, treatment works & drainage channels	<ul style="list-style-type: none"> • Designing facilities and channels to blend in with the environment • Planting greenery around treatment facilities and flood protection systems • Removal of blockages and debris
Noise impact	Construction works	<ul style="list-style-type: none"> • Adopting trenchless technology for pipe-laying works • Shielding construction equipment with acoustic screens as appropriate
	Facility operation	<ul style="list-style-type: none"> • Shielding noisy operations with enclosures or acoustic screens as appropriate • Using silenced plant & equipment • Adopting good

		housekeeping & maintenance measures
Odour impact	Facility operation	<ul style="list-style-type: none"> • Enclosing operations as appropriate • Using deodorizing techniques such as activated carbon, wet scrubbing and bio-filtering • Adopting good housekeeping & maintenance measures • Removal of blockages and debris
Land-use	Building pumping station & treatment works	<ul style="list-style-type: none"> • Constructing multi-storeyed buildings as appropriate to minimize land-use
Resource use	Pipe-laying works	<ul style="list-style-type: none"> • Careful selection of lining & material to prolong pipe longevity including reuse of rock aggregates as piping support, choosing epoxy resin lining and/or corrosion suppressant as appropriate • Preferential use of locally obtainable material to avoid pollution arising from distant transportation
	Facility operation	<ul style="list-style-type: none"> • Using energy efficient plant & equipment, such as those with variable speed drive, to conserve energy • Exploiting biogas generated by STW where practicable and using this as a supplementary power source • Reusing treated effluent where possible to minimize water consumption • Using on-line monitoring systems to gauge performance and ensuring optimal operation • Adopting volume-reducing techniques to minimize quantity of sludge to be disposed of at landfills
Water quality deterioration	Construction works & operation of channels and protection schemes	<ul style="list-style-type: none"> • Minimizing the dispersion of waste and nutrients to the aquatic environment • Removal of blockages and debris

Loss and/or impairment of habitat	Planning stage through to implementation	<ul style="list-style-type: none"> • Planting of vegetation to stabilize embankments • Grasscreting the slopes of drainage channels • Culturing mangroves • Reinstating fishponds • Conserving disused meanders • Wetland planting to make up for lost habitat
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In addition, to ensure compliance with the Environmental Impact Assessment Ordinance (EIAO), we conduct EIA studies for Designated Projects during planning to identify and assess any potential impacts that may arise from our construction and operation activities. Mitigating measures can therefore be incorporated at an advanced stage into all phases of design, construction and operation works.



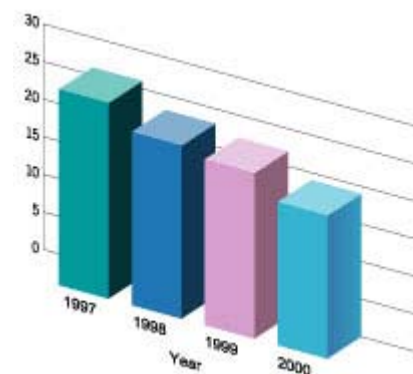
Preventive Maintenance and Emergency Response

To minimize sewer blockage, we carried out frequent inspections, clearance and maintenance of the sewerage system. To minimize flooding, we have implemented a preventive maintenance programme which consists of:

- regular inspections of all river channels and drains by visual observation as well as close-circuit television;
- regular desilting works and removal of wastes and debris in river channels and drains; and
- proactive repairing and upgrading of river channels and drains.

To ensure prompt response to any reported blockages in sewers/drains, a computerized database system was established since 1997 that enables us to identify trends of blockages quickly and prioritize effective maintenance activities. Figure 7.2 demonstrate that, notwithstanding increased public awareness in recent years, the number of complaints received per kilometre of sewer and drain both show a declining trend.

Complaints per km sewer per year



Complaints per km drain

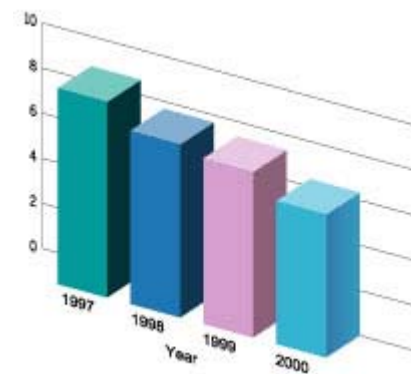


Figure 7.2 Number of complaints recieved per km of sewer/drain in recent years



Entering a confined space with good preparation



Safety hintcard on confined space

Safety and Health

The department put strong emphasis on safety at work in our sewerage and drainage facilities and construction sites. The Safety Advisory Unit (SAU) was set up in 1994 to oversee and regulate all safety matters that include preparing safety instructions and procedures, conducting safety inspections, compiling accident investigation reports and accident statistics, and organizing safety training courses for our staff and the site staff of our consultants and contractors. These include talks on the hazards of working in confined space, the enactment and requirements of the new legislations, such as the newly amended Factories and Industrial Undertakings (Confined Spaces), safety precautionary measures and emergency procedures, and case studies of previous accidents involving confined spaces, etc. in order to promote safety at work.

In 2000, the SAU also produces a set of safety poster and safety hintcard for safe working in confined spaces. The posters are displayed at prominent positions in construction sites, site offices, depots, pumping stations and sewage treatment works, whilst the hintcards are distributed to all in-house and site staff/workers employed by our consultants and contractors so to prevent accident.



Safety facilities

