

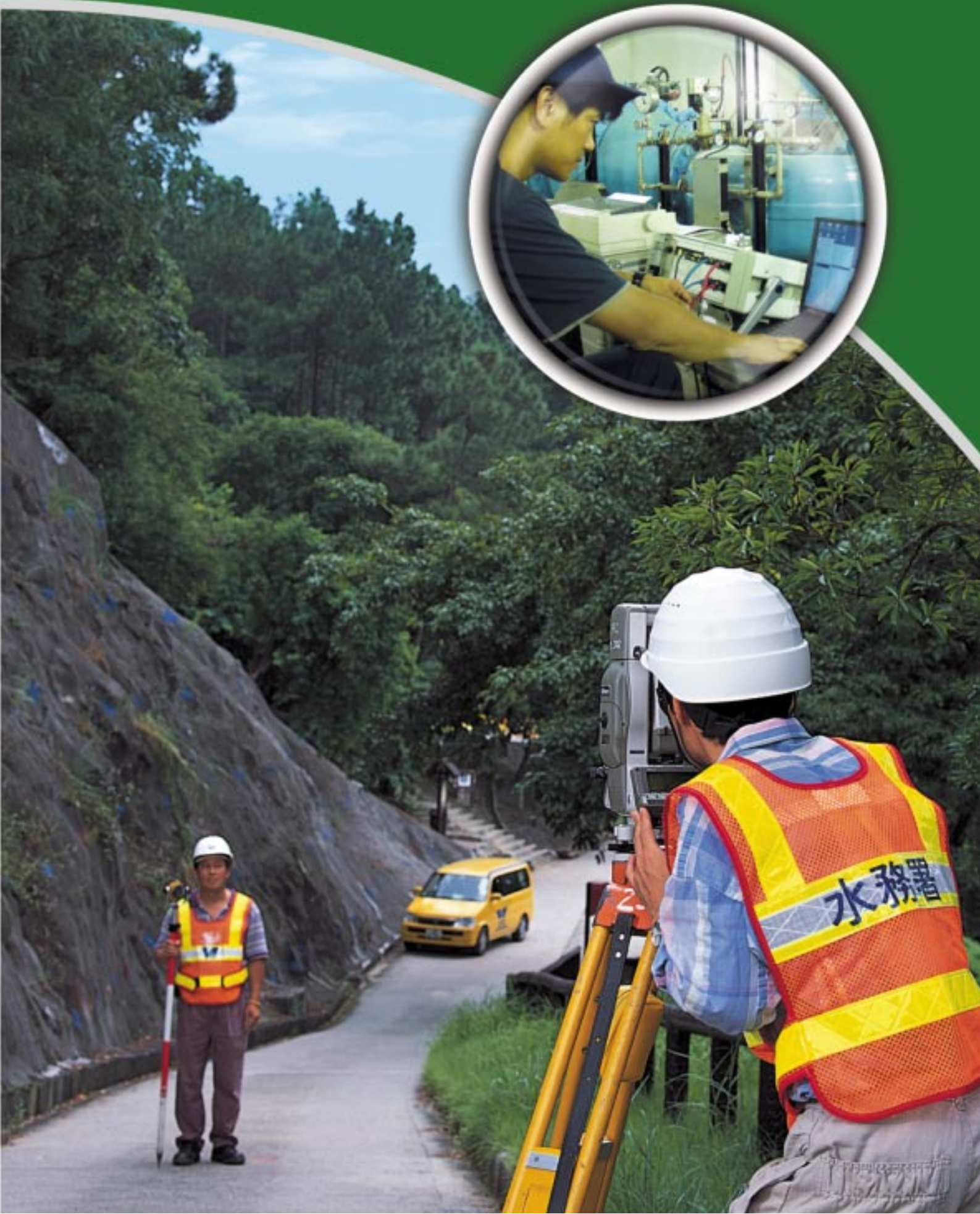


# 資產及風險管理

## ASSET AND RISK MANAGEMENT

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為提供穩定可靠的供水服務，我們非常重視資產管理，從而減低服務故障的風險。本署的資產主要分為地面和地下資產兩大類。地面資產包括水塘、配水庫、濾水廠、抽水站和樓宇，而地下資產則包括水管、管道和電纜。

### 地下資產管理

為配合地下資產管理計劃，並同時達致部門目標和履行法定責任，我們正密切監察供水網絡的狀況和性能，以提供符合成本效益的服務。

本署採用數碼繪圖系統以電子方式更新資產記錄。在二零零二年年底前，我們可透過電腦系統與公用事業公司和其他政府部門交換數碼資產記錄。在這些資訊得以迅速傳輸的情況下，地下供水網絡遭挖掘工程損毀的風險將會減少。

### 地面資產管理

本署正著手製備地面資產管理計劃，而綜合資產登記冊將於二零零四年完成。

### 更換資產

在20年內更換或修復3 050公里水管的龐大改善計劃的第一階段工程取得長足進展。首350公里水管的工程已於二零零零年十二月展開，以期於二零零八年完竣。是項計劃估計的總費用為100億元。

機電設備更換計劃進展良好。約33座舊式水務設施的設備更換或修復工程正進行規劃或施工。其中，下老圍海水抽水站的更換工程已於二零零二年一月完竣，而大口環食水抽水站和鯽魚涌海水抽水站則正進行水泵更換工程。此外，有關原址重建沙田濾水廠和更換大埔頭原水抽水站水泵的可行性研究已告完成。



利用先進儀器監察電動機和水泵的振動情況。  
*Using state-of-the-art equipment to monitor electric motor and pump vibration.*

### 資產保養

資產保養是有效管理策略的重要一環，因此我們定期採取預防措施，盡量減少臨時中斷供水和搶修的事件。

### 機電設備

為確保供水系統內的泵水、濾水和監控設備時刻保持最高的可靠性及可用率，我們實施全面的預防性保養計劃，並於發生故障時迅速進行搶修。此外，我們亦透過監察和進行效能測試，以決定作出檢修或更換設備的適當時間。年內，經保養和維修的機電和儀器設備達46 500部。

For the provision of a stable and reliable water supply, we place a great deal of emphasis on the proper management of our assets and thereby avoiding any risks to our delivery of service. There are two main types of assets which are on the surface or underground. Surface assets include impounding and service reservoirs, water treatment works, pumping stations and buildings, while underground assets comprise water mains, pipework and cables.

### UNDERGROUND ASSET MANAGEMENT

In keeping with the Underground Asset Management Plan, we are closely monitoring the condition and performance of the water supply network to achieve cost-effective service while meeting corporate goals and statutory obligations.

Asset records are updated electronically by the use of a digital mapping system. Digital asset records can be exchanged with utility companies and other government departments through a computer system by the end of 2002. The quick transfer of this information will lessen the risk of damage to the underground network due to excavation work.

### SURFACE ASSET MANAGEMENT

A Surface Asset Management Plan is under preparation and a comprehensive register of assets will be available by 2004.

### ASSET REPLACEMENT

Stage One of the major improvement programme to replace or rehabilitate 3 050 kilometres of water mains in 20 years has been well underway. Work began in December 2000 on the first 350 kilometres will be completed by 2008. The estimated total cost of the programme is \$10 billion.



敷設聚乙烯管。  
*Polyethylene pipes being laid.*



正進行水錶加速損耗的測試。  
*Conducting water meter accelerated wear test.*



工作人員為剛修妥因爆裂而損壞的地下水管作最後檢查。  
*Staff making a final inspection on the repaired underground pipes after a mains burst.*

## 水塘的安全檢查

為提高效率，水塘及配水庫的部分安全檢查工作由顧問公司執行，而年內進行的檢查亦由去年的1 147次增至1 250次。

## 水務署斜坡

本署定期為所負責護理的6 200多個斜坡進行例行檢查及維修工程。為提高更新斜坡資料目錄的效率，我們正著手研究使用個人數碼助理(PDA)即場收集資料。

## 水管爆裂

為使供水中斷情況並對客戶造成的不便減至最少，我們在精簡工序以縮短關水閘和維修爆裂水管所需時間方面有良好的進展。我們亦正考慮在配水系統的重要位置使用遙控斷流閘，以進一步縮短因水管爆裂而暫停供水的時間。

## 滲漏檢測

為減低因水管滲漏而流失的水量，並避免滲漏情況演變成嚴重的爆水管事故，我們採取了積極的管理策略。

這些策略包括把水壓管理計劃推展至兩個更大的供水區，並使用先進的流量調節式減壓閘，以及使用流量計和數據記錄儀在區域檢測區的配水系統中進行持續監測，以找出區內水管滲漏之處。

隨著Permalog聲音數據記錄儀和GSM數據記錄儀試用成功，我們會更廣泛加以使用，以提高測漏效率，並持續監察供水網絡的滲漏情況。



自動為水管測漏的 Permalog 聲音數據記錄儀及巡邏接收器。  
*Permalog Noise Loggers and Patroller Module for detecting pipe leaks.*

Good progress is being made in a replacement programme for mechanical and electrical plants. Replacement and rehabilitation of some 33 old installations were under planning or implemented. Work on the replacement of the Ha Lo Wai Sea Water Pumping Station was completed in January 2002 and installation was being carried out on the replacement of pumpsets at Sandy Bay Fresh Water Pumping Station, as well as at the Quarry Bay Sea Water Pumping Station. In addition, feasibility studies were completed for in-situ reprovisioning of Sha Tin Water Treatment Works and replacement of the pumping plant at Tai Po Tau Raw Water Pumping Station.

## ASSET MAINTENANCE

Asset maintenance is regarded as a key component of an effective management strategy and regular preventive measures are taken so as to minimize unplanned interruptions of service and the need for emergency repairs.

## MECHANICAL & ELECTRICAL PLANT

Comprehensive planned preventive maintenance is carried out and faults quickly repaired to ensure optimal reliability and availability of plant for pumping, treatment, control and monitoring of the water supply systems at all times. Monitoring and efficiency tests are also performed to determine the right time for overhaul or replacement. During the year, 46 500 items of mechanical, electrical and instrumentation equipment were maintained or repaired.

## RESERVOIR SAFETY INSPECTION

For greater efficiency, safety inspections of impounding and service reservoirs are partly carried out by consultants. There was an increase in the number of inspections from 1 147 last year to 1 250.

## WSD SLOPES

Routine inspections and maintenance work are carried out regularly on more than 6 200 slopes under our care. To improve the efficiency in updating the slope inventory, we are looking into the use of Personal Digital Assistant (PDA) for acquiring data on site.

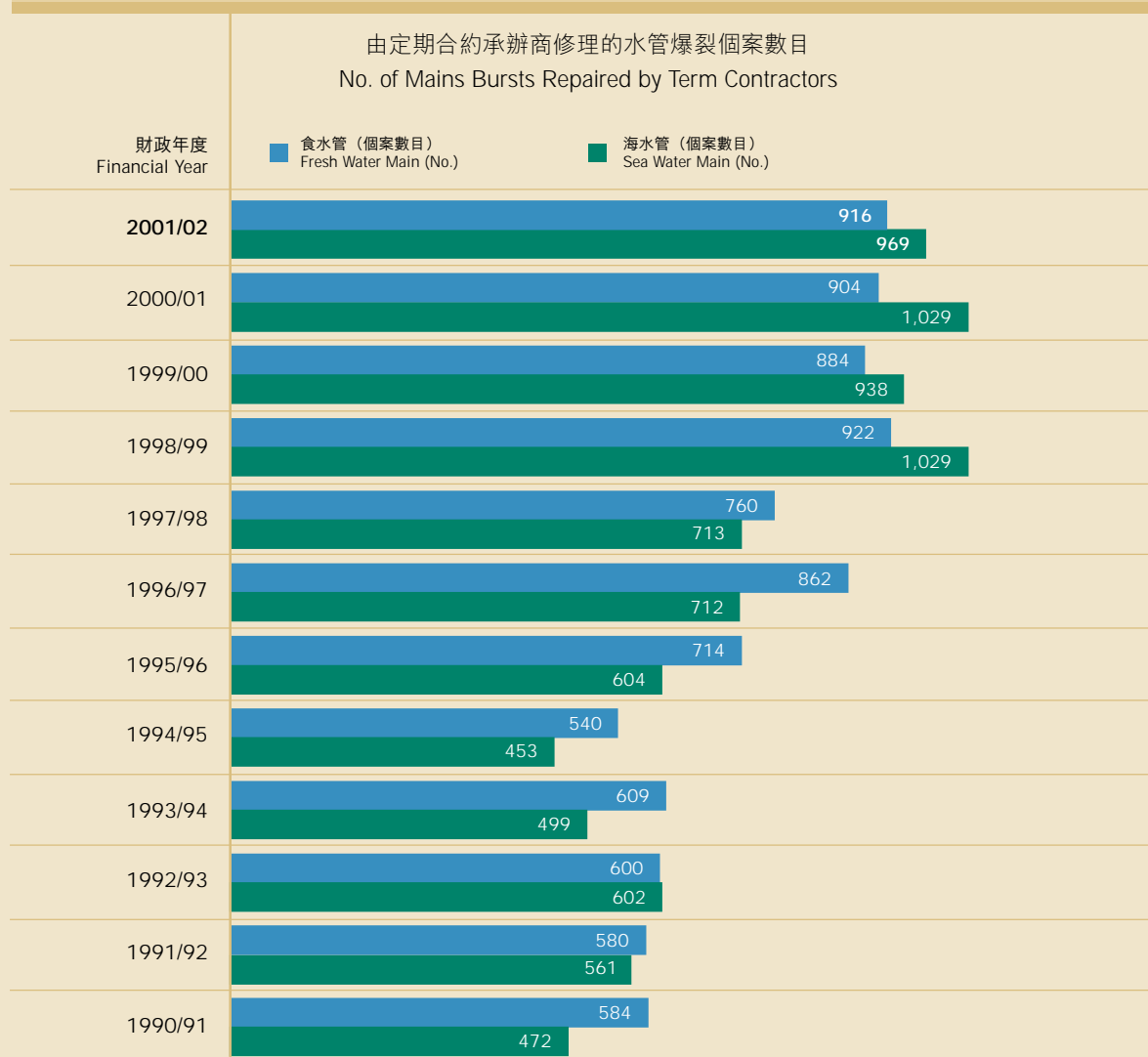
## MAINS BURSTS

We have been progressing well in streamlining work procedures to lessen the isolation time and repair time for mains bursts to keep the supply interruptions and inconvenience to our customers to the minimum. To further shorten the time of supply suspension due to mains bursts, we are also considering the use of remotely controlled shut-off valves at strategic locations in the distribution system.



員工正檢查水塘的水壩。  
*A dam of an impounding reservoir being inspected.*

水管爆裂修理個案統計數字 (按供水類別劃分)  
Statistics on Mains Bursts Repaired (By Type of Water Supply)



財政年度 = 由每年四月一日起至翌年三月三十一日止 Financial Year = 1 April to 31 March

## 風險管理

為使供水不受間斷，我們致力有效地管理會危及供水系統的風險。此外，我們制定危機管理計劃，以備遇上系統故障及重大突發事故時得以迅速調動資源及妥善協調各項應急行動。該計劃清楚列明應急狀態分級、計劃啟動機制和危機管理架構，藉以加快處理緊急情況和危機。為測試本署的應變能力，我們亦參加了一項對付輻射和生化劑襲擊的全港演習。

## 緩解風險措施

除制定危機管理計劃外，本署採取了多種措施，以緩解會損害基礎設施和資產的風險。這些措施包括提高重要水務設施電力供應的可靠程度、改良監控及資料收集系統設施，以及透過適當的培訓提高操作人員的應變能力等等。

## 監控及資料收集系統中心

為使管理層在緊急情況可監督供水設施的運作，我們在沙田濾水廠設立監控及資料收集系統中央監控中心，而總部內的客戶電話諮詢中心則設立較小型的後備控制中心。

水管爆裂修理個案統計數字 (按地區劃分)  
Statistics on Mains Bursts Repaired (By Regions)

由定期合約承辦商修理的食水管及海水管爆裂個案數目  
No. of (F.W. & S.W.) Mains Bursts Repaired by Term Contractors

地區 Region

財政年度 Financial Year	香港及 離島區 (個案數目) HK & I (No.)	九龍西及 葵青區 (個案數目) MSW (No.)	九龍東及 西貢區 (個案數目) MSE (No.)	新界西及 荃灣區 (個案數目) MNW (No.)	新界北及 沙田區 (個案數目) MNE (No.)	總數 Total (No.)
1991/92	342	319	220	140	120	1,141
1992/93	392	373	184	153	100	1,202
1993/94	314	268	162	254	110	1,108
1994/95	242	316	168	150	117	993
1995/96	335	431	198	229	125	1,318
1996/97	359	642	206	257	110	1,574
1997/98	322	526	242	263	120	1,473
1998/99	395	665	380	262	249	1,951
1999/00	565	442	286	275	254	1,822
2000/01	584	500	409	197	243	1,933
<b>2001/02</b>	<b>546</b>	<b>486</b>	<b>346</b>	<b>244</b>	<b>263</b>	<b>1,885</b>

財政年度 = 由每年四月一日起至翌年三月三十一日止 Financial Year = 1 April to 31 March

## LEAKAGE DETECTION

A proactive management strategy has been put into effect to reduce water loss through mains leakage and to prevent major bursts developing from leaks.

Steps taken included extending the pressure management scheme to two larger supply zones with the use of advanced flow-modulated pressure reducing valves, and continuously monitoring the water distribution systems by using flow meters and data loggers to identify leaks in District Metering Areas.

Following the successful trials, more Permalog Noise Loggers and Global System for Mobile Communications (GSM) data loggers will be put into use to increase the efficiency in leak detection and continuously monitor the network leakage.



工作人員正進行地下水管滲漏檢測。  
Staff conducting leak detection test on underground pipework.



測漏統計數字  
Statistics on Waste Detection

食水  
Fresh Water

各財政年度所進行的測漏工作 Tests Conducted Per Financial Year	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02
最低晚間流量測試次數 No. of Minimum Night Flow Tests	471	453	411	396	410	443	495	487	431
分段流量測漏次數 No. of Step Tests (or Leakage Tests)	55	55	72	69	72	77	46	43	15
日間流量測試次數 No. of Day Flow Tests	44	45	65	88	100	124	200	217	223
音聽視察次數 No. of Sounding & Visual Inspections	1,366	1,502	1,975	3,423	3,545	4,169	4,045	4,438	3,853
測試及視察次數總計 Total No. of Tests & Inspections	1,936	2,055	2,523	3,976	4,127	4,813	4,786	5,185	4,522
經發現的滲漏個案數目 No. of Leaks Detected	1,148	1,847	1,910	2,829	3,287	4,868	5,353	5,714	5,054
估計每日可節省的水量(立方米) Estimated Quantity of Water Saved (cu.m/day)	144,206	184,278	193,826	209,820	203,998	249,615	254,623	290,940	231,161

海水  
Sea Water

各財政年度所進行的測漏工作 Tests Conducted Per Financial Year	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02
最低晚間流量測試次數 No. of Minimum Night Flow Tests	19	9	6	19	23	3	6	5	0
分段流量測漏次數 No. of Step Tests (or Leakage Tests)	2	3	0	1	1	0	0	1	4
日間流量測試次數 No. of Day Flow Tests	0	0	3	4	11	10	20	23	14
音聽視察次數 No. of Sounding & Visual Inspections	186	170	208	177	211	171	284	312	319
測試及視察次數總計 Total No. of Tests & Inspections	207	182	217	201	246	184	310	341	337
經發現的滲漏個案數目 No. of Leaks Detected	100	92	66	127	156	208	216	254	191
估計每日可節省的海水量(立方米) Estimated Quantity of Sea Water Saved (cu.m/day)	54,901	62,006	10,416	14,511	11,543	23,430	25,532	41,895	25,805

財政年度 = 由每年四月一日起至翌年三月三十一日止 Financial Year = 1 April to 31 March

## RISK MANAGEMENT

To provide an uninterrupted service to our customers, we are committed to managing effectively any risks or threats to the integrity of our water supply system. A Crisis Management Plan is in place for rapid mobilisation of resources and well-coordinated actions to deal with any system failures and major unplanned events. Emergency classification, activation mechanism and crisis management structure are clearly set out in the Plan to speed up our response to emergencies and crises. To test its response capability, the WSD took part in a territory-wide exercise against a possible radiological, biological and chemical agent attack.



危機應變演習。  
*Crisis management drill.*

## RISK MITIGATION MEASURES

In addition to the formulation of the Crisis Management Plan, various measures have also been taken to mitigate the risks to our infrastructure and assets. These measures included improving the reliability of power supply to critical installations, upgrading SCADA control facilities, enhancing operational staff's capability to handle emergencies by proper training etc.

## SCADA CENTRES

A centralised Supervisory Control and Data Acquisition (SCADA) monitoring and control centre has been set up at Sha Tin Water Treatment Works for the management to oversee the operations of water supply facilities during emergency. A smaller back-up centre was established in the Customer Telephone Enquiry Centre at the headquarters.



一幅載有主要水務設施及原水輸送系統的全港地圖。  
*A map showing major waterworks installations and raw water transfer system in Hong Kong.*