



BOARD OF WATER SUPPLY

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POWERS, DUTIES AND FUNCTIONS

The Board of Water Supply (BWS) manages Oahu's municipal water resources and distribution system. This City and County Department exists to provide residents with safe and dependable drinking water service at reasonable cost. Monies collected from water sales finance the Department's operations and projects.

A seven-member Board of Directors presides over the semi-autonomous agency and sets its policies. Five are appointed by the Mayor and approved by City Council. The remaining two serve in their capacities as the Director of the State Department of Transportation and the Chief Engineer of the City Department of Facility Maintenance.

The Board appoints the BWS Manager and Chief Engineer to supervise the agency's overall operations and the Deputy Manager's office. The Board-appointed Deputy Manager oversees the day-to-day functions and the six BWS Operating Units that compose the Department – Business Development, Business Services, Customer Care, Maintenance, Operations and Water Resources.

HIGHLIGHTS

The BWS maintains Oahu's groundwater resources and distribution system to meet the needs of customers now and in the years to come, despite growing restrictions such as increasingly stricter drinking water regulations as well as Oahu's growing water demand.

During Fiscal Year (FY) 2002, the BWS responded to 392 main breaks, a seven percent decrease over the average of the last ten years. This decrease can be attributed to BWS' main replacement program, which identifies and replaces older mains with high rupture incidence.

The events of Sept. 11 profoundly affected day-to-day BWS operations. Once the terrorist nature of the attack was determined, special security precautions were implemented to safeguard the water supply around-the-clock.

Other precautionary measures were soon put into action including security patrols, special monitoring equipment and procedures for entering or exiting remote facilities; cancellation of public tours and educational classes at sensitive water facilities, and photo identification cards for employees.

The Department continued its reengineering work as the QUEST (Quality Utility Employees Striving Together) program rolled into, and is now being implemented by each individual operating unit. The Department has not raised water rates since July 1995, and is now operating with about 15% less staff than a few years ago.

To ensure that all future efforts support the strategic goals of the Department, Operating Unit Leaders met together early in the fiscal year to create a unified mission statement

and bring the management team into alignment as they guide reengineering activities within each unit.

Work began on the multi-skilled worker pilot program that will experiment with modernization of the work force to achieve greater cost-efficiency in the Department and its operations. At the end of FY 2002, the Department had submitted proposals for the program to the two public worker unions for their review.

The BWS continued to install its AkamaiRead automatic meter reading (AMR) equipment that allows drive-by retrieval of meter consumption data. By the time it is finished, AMR will have involved changing out or modifying about 150,000 meters throughout Oahu. The Department expects this project to be completed by the end of the calendar year 2002.

In January, the BWS won a \$20 million settlement from a two-year lawsuit against six petrol-chemical companies and pineapple growers for contamination of water supplies in Central and Leeward Oahu.

Shell Oil Company, Dow Chemical Company, Great Lakes Chemical Company, Del Monte Corporation, Dole Food Company, and Libby McNeil Libby, Inc., made a one-time payment of \$19.95 million. The settlement will be used to cover costs of filtering drinking water wells with granular activated carbon (GAC) to meet federal and state drinking water standards.

Throughout the year, the Department has also provided a number of national and international water professionals, especially from Asia-Pacific countries, with orientations on Oahu's water system. The meetings also included visits to various BWS water production facilities.

The Department recognized the accomplishments of several employees this year.

In November, civil engineer III Kevin Ihu and construction equipment operator I Jerry Martin were honored with other City Department Employees of the Year.

Both men were selected for their strong dedication to the BWS and their drive and determination to excel at their jobs as well as their strong work ethic and can-do attitude. They have proven that they are exceptionally competent at their work and eager to learn new things. Both produce high caliber results, carry extra shares of the workload to help out others, and are greatly appreciated and trusted within the Department.

Kevin Ihu, currently assigned to the Automatic Meter Reading (AMR) Program office, was hired at the Department in Sept. 1997 as a civil engineer I.

Throughout his BWS career, Ihu has taken the initiative to provide assistance where he notices a need. Applying his accumulated computer knowledge and engineering

skills, he has produced outstanding work.

He developed a 40-page user's manual for the Customer Accounting System (CAS) to help Water Conservation staff understand and navigate their way through the system. It describes and illustrates the processes needed to guide users through each screen so effectively that he was asked to share it with all CAS users.

He has helped to streamline and expedite work procedures and documentation used in the construction design process. Ihu developed a database that tracks activities in preparing construction plans and permits needed to complete construction projects. He attended AutoCAD classes on his own time to learn more about the automated drafting program.

He can be depended on to produce a complete, on-time, and well-done result for any task assigned to him. He takes on extra assignments to cover staff shortages while keeping up the excellent quality of his own work, as evidenced by his consistently high ratings of his annual performance evaluations.

A member of the Hawaii Water Works Association, Ihu is also a regular blood donor and an active sports enthusiast.

Jerry Martin, a construction equipment operator in the Manana Corporation Yard of the Maintenance Unit, left the City Department of Parks and Recreation to join the BWS in 1995.

As a member of field crews that install new mains and services, work on grounds maintenance and landscaping, repair facilities and respond to broken mains and other water emergencies that often occur in late night or pre-dawn hours or on weekends or holidays, Martin performs a critical task. He transports and runs the machines that excavate the ground, help with repair and clean up the site.

He is able to work the heavy construction equipment with such deftness that he can remove dirt and debris very close to buried water lines. This reduces the amount of effort and time the crews spend in manual labor to remove excess soil around the pipes without sacrificing the quality or the safety of work performed.

Others can also count on him to assist them where needed; he doesn't mind carrying an extra share of the workload.

He gives back to the community through his church, assisting with various functions, organizing the seating and playing drums as musical accompaniment in the worship service.

Both men represented the BWS in the City's annual search for its outstanding employee and were given the chance to attend the American Water Works Association (AWWA) national conference in New Orleans, LA, in June.

May 2002 brought Maintenance Unit employees Ferdinand Baguso, James Easley, and Andrew Freitas, with coach Everett Arquero, the men's state pipe tapping title at the annual AWWA Hawaii Section conference.

Their winning time was one minute, 27.03 seconds

(1:27.03). The next best time was Hawaii Department of Water Supply's 1:28.23.

The BWS female pipe tapping team composed of Danielle Ornellas, Carolyn Sawai, and Anna Tanaka with coach Glenn Ah Yat, swept the women's state competition with a 1:42.46 best time.

They went on to the annual AWWA National Conference in New Orleans, LA, when they challenged female pipe tappers from throughout the country and came in third place.

BUSINESS DEVELOPMENT

The Business Development Operating Unit examines and pursues new business opportunities for the Department.

In FY 2002, the Unit completed signing up all recycled water customers identified at the start of the program. The water reclamation facility continued operations, delivering an average of 6.8 million gallons of recycled water per day to various Ewa and Campbell Industrial Park users.

The Department is expanding its service area in response to recent opportunities to own and operate military water systems. In addition, the Department completed negotiating a contract with the Pohnpei Utilities Corporation to conduct a water system assessment and provided emergency water testing services. Pohnpei is part of the Federated States of Micronesia. These types of projects are part of the Department's vision to increase its presence and to build lasting business relationships in the Asia Pacific region.

During the fiscal year the Department successfully negotiated its use of abandoned water pipes as telecommunication conduits and completed a water display in association with the Asia Pacific Urban Institute resource center.

BUSINESS SERVICES

The Business Services Operating Unit meets the administrative support and information needs of the Department's employees. It provides accurate and timely financial information analysis, information management tools, and administrative support.

This division is responsible for all financial and accounting activities, including fiscal analysis and accounting systems development, management accounting, and budgetary accounting and control.

Finance Section

During the year, the **Finance Section** personnel participated in several of the Board's major business initiatives which include implementation of a comprehensive financial accounting system (FAS), a procurement card system, and a time and attendance system. Each of these initiatives is expected to result in more efficient information processing, and in more timely access to comprehensive and readily understandable financial information.

The design phase of the Financial Accounting System (FAS) was completed; a request for proposals (RFP) for software with implementation services was issued; and evaluation of respondents' proposals and system demonstrations are in progress. The primary objective of the FAS Project is to replace outdated, primarily financial, information subsystems with a comprehensive, integrated group of software applications and re-engineered work processes. Systems slated for replacement include budgeting, general ledger, human resources, job costing, accounts payable, payroll, purchasing, fixed assets, and inventory management.

The Purchasing Card Team is about to begin implementation of a procurement subsystem expected to substantially reduce the time and effort required to procure high volumes of relatively low-value items. Present procedures for this group of procurements are extremely labor-intensive, particularly in the areas of purchase requisition and related accounts payable processing. Planning for and setup of a pilot program for this system is in progress.

Implementation of an automated time and attendance system was commenced to replace the Board's outdated, similarly labor-intensive timekeeping and leave reporting systems. The main objectives of this new system included providing accurate time records essential to an efficiently functioning payroll system, and reducing time spent completing paper-based timesheets and leave applications, entering data from these documents, and reconciling time and leave records. Expected benefits include providing timely, accurate information to managers to facilitate their management of employees and workloads; and enabling BWS personnel to access their respective leave balances and perform self-service tasks that presently require involvement of payroll or human resources personnel.

A major financial transaction in which Finance personnel were involved during the year was the issuance of \$54,400,000 in water system revenue bonds. Proceeds from this issue, floated in March 2002, were used to reimburse advances from the Board's general fund for the acquisition of the Honouliuli Water Reclamation Facility, which commenced in July 2000. This facility is designed to produce 12 million gallons of reclaimed water daily from wastewater effluent. One grade of reclaimed water produced is suitable for landscape irrigation, and a higher-grade reclaimed water product is suitable for high-quality industrial uses by energy production and generation industries.

During the year, the Finance Section developed and obtained Board approval of the Fiscal Year 2002-03 operating budget, which provides \$80 million for operating expenditures; \$60 million for pipeline repair and replacement, pumping station renovation, business process improvements, and business development. The total budgeted among these broad expenditure categories is about \$140 million. The Board also approved a Capital Improvement Program (CIP) budget of approximately \$27 million, primarily for construction of new water system facilities.

The Board is currently performing a rate study to ensure the adequacy of the amounts being charged and collected for water services. BWS has not implemented an increase in its rates and charges since July 1, 1995.

The **Information Technology Section (IT)** provides complete computer and network related services to the Department. Last year, the Section:

- Adopted a Service Level Agreement (SLA) between IT and all other business units. The SLA defines IT responsibilities and performance levels.
- Reorganized the IT function to be better able to respond to increased demand from the user community and provide a higher level of customer service.
- Continued to provide billing and customer information services for the BWS to the Department of Environmental Services (wastewater); Board of Water Supply, County of Maui; and the Department of Water, County of Kauai.
- Continued to enhance existing customer accounting system and financial applications to provide additional functionality and interfaces to other applications.
- Started implementation of a Time and Attendance package, which will automate manual time keeping and leaves of absence applications. Installed servers for the Time and Attendance package.
- Developed and issued a Financial Accounting System Request for Proposals (RFP) and started evaluating proposals. This system will automate many paper processes and produce financial reports in a more timely fashion.
- Started development of a microbiological water sampling application using Pocket PCs with barcode scanning capability.
- Started implementation of a check printing application that will utilize a laser printer to print checks including signatures and MICR bar codes.
- Provided customer, billing and financial information for several studies and audits.
- Implemented electronic transfer of payment data from Satellite City Halls.
- Instituted a PC Help Desk to provide hardware and software maintenance and support for Department users. Implemented a help desk application to track requests and generate performance reports.
- Continued to procure and install new PC workstations, notebook computers, printers, scanners, digital cameras and other peripheral equipment throughout the Department.
- Conducted customized, on-site PC training classes for Department users in Windows basics, Microsoft Outlook, Microsoft Word and other applications. Also, created a permanent computer training facility.
- Upgraded all servers to Windows 2000 and currently

upgrading workstations and notebook computers with additional memory and converting to Windows 2000. Also, upgraded server hardware and software at the Kalihi Corporation Yard.

- Installed server hardware and software to provide direct access to Internet e-mail. This eliminated the need to go through an outside service provider.
- Installed a Blackberry server to provide remote handheld access to internal and Internet e-mail.
- Continued to upgrade the BWS network infrastructure at the Beretania Complex with new network hardware, fiber optic cabling, gigabit connections to servers and high speed (100Mbps) network wiring to workstations. Also, upgraded wide area network communications to corporation yards.
- Designed and implemented a GIS Geospatial Database which will house all Department asset information and provide integration with future systems.
- Completed a web-based GIS application to provide easy access to GIS information.
- Initiated a data capture program to convert data from Field Maintenance valve books into electronic format.
- Started a GPS pilot program to more accurately locate assets (e.g. valves, hydrants, meters, etc.).
- Completed the Electronic Data Management System (EDMS) project. The project scanned customer records on microfiche and paper as-built drawings and implemented an EDMS system, which provides users access to the scanned documents.

Personnel Office

The **Personnel Office** formulates policies and procedures on personnel administration and industrial relations; processes personnel actions; maintains records of control and personnel transactions; maintains liaison with the Department of Human Resources and other agencies dealing with personnel matters; and conducts training, safety, driver improvement and employee-management relations programs.

During the fiscal year, the Department had an average of 600 regular, full-time employees. Eleven new employees were hired, while seven retired, and 15 resigned. At the end of the year, there were a total of 592 regular, full-time employees in the Department.

Industrial accidents totaled 66; total lost time cases were 43. Total workers' compensation expenditures increased 4 percent from the previous fiscal year.

The Personnel Office coordinated the Department's programs for the Employees of the Year, Service Awards, Aloha United Way Drive, Blood Bank Drives, Foodbank Drive and the March of Dimes Drive.

During the fiscal year, six employees received 25-year service awards and three employees received 35-year ser-

vice awards. By year's end, 127 acquired 25 or more years of government service.

The Fleet Safety Section

The Fleet Safety Section's Driver Improvement Coordinator, who serves on the Executive Board of Directors of the National Safety Council's (NSC) "Fleet Safety Administration" and "Motor Transportation Division," will be a guest speaker, representing the Board of Water Supply at the 90th Annual NSC Congress and Expo in San Diego, California.

The session will be titled "Examining an Effective Light-Vehicle Fleet Safety Program." Other speakers on the panel will consist of executives from Marsh Insurance Co., Safety Resources of Ohio, and Lafayette Ins. Co.

As always, the mission of the BWS Fleet Safety Section is to train and re-train as necessary, to continue to adopt safe driving practices, and minimize losses to keep Oahu roadways safe.

This year, the Department trained 12 new employees to hold Commercial Motor Vehicle Licenses and to operate the vehicles with safety.

Also, the Safety Section did a comprehensive study on industrial injury that analyzed data from the past eight years. The focus of the study was to quantify costs of muscular/skeletal-related injuries associated with the Maintenance Unit-Field.

The data was categorized by type of injury and classification of worker with associated data (cost of medical attention, cost of permanent partial payments, and lost time from work) analyzed in regard to classification of worker and type of injury.

This analysis represented the first efforts to associate worker compensation costs to an evolving business model for field operations. The key discoveries made from the data were significant factors in establishing a proposed work process model for field operations.

It is anticipated that the implementation of these proposed new work processes will not only abate muscular/skeletal injuries in the future, but will save both time and money in the execution of field maintenance work.

It also developed and distributed jumper cables, volt-meters, and rubber mats to all field operations personnel who work on water meters. The potential for electric shock when working on water meters is a constant safety risk. The Safety Section established a standard operating procedure and developed the jumpers to eliminate the risk of electric shock. Additionally, it delivered training to all affected personnel.

The Safety Section likewise did routine training for new personnel, workplace violence training, hazard communications training, respiratory training and fit testing, on-site inspections and risk-to-hazard analysis at various job sites on the island.

The Safety Section worked with HIOSH on three separate investigations involving routine inspections by the

regulatory agency that were satisfactorily completed without any financial citations.

The Safety Section continues to work with all personnel on safety issues and compliance standards as they arise in the workplace. It continues to research and recommend the most modern and effective safety equipment needed to perform water distribution work.

Training classes, workshops, conferences and seminars continue to be well attended. The Department also covered job-related skills and supervision; retirement and financial planning; drug, violence, and sexual harassment awareness.

Under the Apprentice Program, seven new apprentices were indentured, two apprentices completed the program and one resigned. One apprentice remains in the program at the end of the fiscal year.

CUSTOMER CARE

The Customer Care Operating Unit (formerly the Customer Service Division) shapes and presents the "face" of the BWS. It handles the majority of contacts with consumers.

The unit prepares applications and contracts for water services; reviews and approves building permit applications; reviews construction plans; inputs and maintains water service information in the Geographic Information System (GIS); generates GIS based maps; maintains all service records; designs service connections; collects bills; investigates consumers' service problems; administers water system facilities charges; and administers the rules and regulations governing water service to consumers.

The Department added 1,857 services during the year for a total of 159,362 active services in the system, which includes 157,481 domestic services and 1,881 fire services.

Community Relations Office (CRO)

The **Community Relations Office (CRO)** educates BWS customers about Oahu's water supply and promotes personal stewardship in conserving this limited resource. CRO also works with the Department and the Board to ensure positive contacts with the public regarding BWS operations.

CRO channels information flow between the BWS and the public. In FY 2002, CRO took in and handled 23,841 phone calls involving community concerns, complaints, and inquiries; and gave out information about BWS activities and programs.

Community Relations staff issued 25 news releases, prepared four speeches for BWS personnel, fulfilled 33 requests for speeches, and composed 422 letters. They participated in 16 community events, including special tours and exhibition booths, and distributed 218,780 publications, including materials on conservation and the water supply, annual reports, and other resource material.

Year-round tours (except for the Fred Ohrt Museum) were shut down in September, only three months into this

fiscal year, due to security concerns generated by the Sept. 11 terrorist attacks. CRO honored reservations to the Ohrt Museum made prior to Sept. 11. The museum hosted 1,762 people; 1,975 persons viewed water-saving landscape techniques and methods in use at the Halawa Xeriscape Garden's (HXG); 739 took the Halawa Tour, although it was closed after September 12; and 346 visited the Waihee Tunnel in Kahaluu.

The 13th Annual Unthirsty Plant Sale in August promoted water-efficient landscaping, offered water-saving plants for purchase and gave out rare, native Hawaiian plant seeds propagated by the Department.

The plant sale, co-sponsored by the BWS and the Friends of Halawa Xeriscape Garden, also included classes on xeriscaping, plant craft and plant propagation, and tours of the garden and Halawa Shaft. Proceeds benefit the garden's water education program.

In August, the BWS printed and distributed 7,500 Teacher's Water Conservation Calendars. Each month displays a winning entry from the 2001 Annual Water Conservation Week Poster Contest with a photo of the student artist and the teacher. Artwork illustrated the theme, "A Calabash Full of Water Holds the Wealth of Life."

The 12th Annual Detect-A-Leak Week program prompted water users to check for property leaks from March 3 to 9. The Community Relations-coordinated program, co-sponsored by Sheraton Waikiki Hotel, the Oahu Chapter of the Hawaii Sierra Club, the Chamber of Commerce of Hawaii and Royal Hawaiian Shopping Center, generated over 200 phone requests for free home leak checks.

The 24th Annual Water Conservation Week Poster Contest drew more than 2,715 entries from 86 public and private school students island-wide in grades kindergarten through six. This year's theme was "Conservation - Caring for the Future of Our Drinking Water." Winning and honorable mention entries were displayed at City Hall's Lane Gallery from May 1 to 15.

Also, CRO continued to administer the Neighborhood Board Liaison program to foster ties to the grass roots level of the public. Employee volunteers share BWS information and bring back community concerns and inquiries for response for the 30-plus Oahu Neighborhood Boards.

Investigation Section

The **Investigation Section** handled various assignments including 9,088 of abnormally high water bills. Also, there were a total of 1,312 leaks and 5,881 general jobs, including requests for locating of water mains.

Customer Service and Records Section

Customer Service and Records Section representatives received an average of 4,454 calls each month from customers requesting various services and information.

Collection and Credit Section

The **Collection and Credit Section** visited 22,275 delinquent customers. The Cashiering Unit collected \$106,648,650.78 in water bill payments and \$103,797,141.33 in sewer payments for the year.

The Customer Care Unit, since August 31, 1988, has offered Automatic Bill Payment Plan to all customers. As of June 30, 2002, the BWS has 37,304 customers on Automatic Bill Payment, which represents 23.4% of its customers.

Service Engineering Section

Service Engineering Section's personnel reviewed 8,500 building permits, processed 1,100 water service applications and reviewed 400 construction plans.

Plans Review Section

The **Plans Review Section** reviews all development construction plans, specifications, and reports for all City, State, Federal and private water system improvements for conformity with BWS standards; performs hydraulic calculations to verify adequacy of fire protection for proposed projects; prepares and administers agreements and Memorandums of Understanding with public agencies and private developers; reviews and processes agreements and bonds for subdivision water system improvements; and coordinates the review of plans with other units within the Department and the City Department of Planning and Permitting.

This year, the Section reviewed and approved various water system improvements for large subdivisions such as developments for Ewa by Gentry, Mililani Mauka, Ocean Pointe and Makakilo subdivisions in the Ewa area, large meter installations for commercial and industrial developments throughout the island and various road improvements from City, State and private utility companies.

Project Review Section

The **Project Review Section** evaluates master plans and requests for water availability, maintains records of water allocations, responds to requests for hydraulic data (flow and pressure), reviews environmental assessments, coordinates departmental reviews of submittals from other public agencies such as the Department of Planning and Permitting (DPP) Subdivision Committee and monitors water allocations from new and future well projects at Maakua, Makaha, Honouliuli, Waipahu III, Mililani Wells IV, Royal Kunia, and HECO-Waiiau.

This year, the Section reviewed projects and water master plans for Mililani Mauka, Ocean Pointe, Central Oahu Regional Park, Kakaako, and the reclaimed water system in the Ewa Plain.

Environmental Section

The **Environmental Section** advises the Department on all environmental matters, such as the coordination of En-

vironmental Impact Statements (EIS), Conservation District Use Applications (CDUA), Special Management Area Permits, Stream Channel Alteration Permits, Department of Army Permits (which include the Coastal Zone Management Consistency Concurrence and the Department of Health Section 401 Water Quality Certification), National Pollutant Discharge Elimination System (NPDES) Permits, Archaeological Services and Hazardous Materials. In addition, it handles the preparation and submission of environmental documents for BWS projects and manages and implements the BWS' Cross-Connection Control and Backflow Prevention Assembly Testing Program, which includes over 6,000 backflow prevention assemblies island wide.

During the past year, the Section processed 968 building permit applications, requiring 171 backflow prevention assemblies to be installed. In addition, multiple field inspections addressed consumer's concerns regarding the BWS' Cross Connection Control and Backflow Prevention Annual Testing requirements. The Unit is also assisting the various City and State agencies in complying with the annual testing requirement by having the BWS' contracted certified tester test the assemblies for the government agency. Currently, there are 353 privately owned and government owned backflow prevention assemblies and 112 agricultural assemblies that are to be inspected in the coming year for installation according to BWS Standards.

The Environmental Section's Annual Testing Program has mailed 3,243 first notice test forms and 1,424 second notices. An average of 270 test forms have been mailed out per month for the past fiscal year.

Environmental Section staff continued environmental assessment work for the Expansion of the Ewa Nonpotable System, Waimanalo Well III Production Facility, Nuuanu Pali 12-inch mountain line, Kalaniana'ole Highway (Olomana to Waimanalo) 36-inch water main, Diamond Head Water System Improvements project, Kalama Valley Water System Improvements project, Kunia Wells II Nitrate Treatment System, Nuuanu Upper Reservoir and Kalaeloa Desalination Plant. Work was completed for the Malaekahana Production Facility environmental assessment and conceptual design, Kalawahine Reservoir environmental assessment and Wahiawa-Whitmore Village 16-inch water main environmental assessment.

Work continued on archaeological surveys and construction monitoring contracts for the Kamehameha Highway 36-inch transmission main project from Punaluu to Kahana, Farrington Highway 24-inch transmission main project from Makaha to Nanakuli, Pupukea 16-inch waterline project, King Street 16-inch waterline project and many other waterline projects in sensitive areas. An archaeological on-call contract was initiated to handle any unforeseen archaeological remains during BWS construction activities. Cultural monitoring work continued for the Punaluu 36-inch transmission main project and the Makaha Water Systems Improvements project, Phase II.

The Environmental Section also coordinates the Department's NPDES permitting requirements for water main, reservoir, and water treatment facility projects of the Capital Improvement Program. The Section worked on obtaining permit coverage for discharges into State receiving waters, State drainage systems and City drainage systems for storm water discharges associated with the Kamehameha Highway 36-inch main from Kaaawa to Punaluu, Dillingham Boulevard 42-inch transmission main and Kahekili Highway 42-inch transmission main. Blanket NPDES permit coverage is also coordinated for commonplace BWS activities that result in discharges.

The Section is also responsible for coordinating the handling of hazardous materials inadvertently discovered in BWS construction projects. An on-call hazardous materials contract was initiated to address hazardous materials inadvertently discovered during BWS construction activities.

Revenue and Customer Account Section

The **Revenue and Customer Account Section** conducts the Department's water billing operations and its related functions, which include meter reading, pre-auditing water billing data and maintaining accounts receivable records. The Section also reviews financial and statistical reports, is responsible for mailing Department correspondence and maintains the City Department of Environmental Services' sewer accounts-receivable records.

This year, the Section continues its conversion from manual meter readings to electronic meter readings captured by computer in a drive-by vehicle. As of June 30, 2002, a total of 134,000 meters, or approximately 90 percent of the total residential water meters in the BWS system have been converted to these electronically read water meters.

MAINTENANCE

The Maintenance Operating Unit is responsible for ensuring the continued operational integrity of the municipal water system.

Maintenance Unit-Engineering

The **Maintenance Unit-Engineering** ensures that all improvements to Oahu's municipal water system are designed and constructed in compliance with the Department's standards. Engineering personnel reviewed the plans and specifications of water system improvement projects submitted to the Department by consultants. In-house design projects were undertaken to utilize Engineering personnel in the design of plans and specifications for water main replacements projects. BWS inspectors supervised the construction of all water system projects, both public and private, to ensure the improvements conform to water system standards.

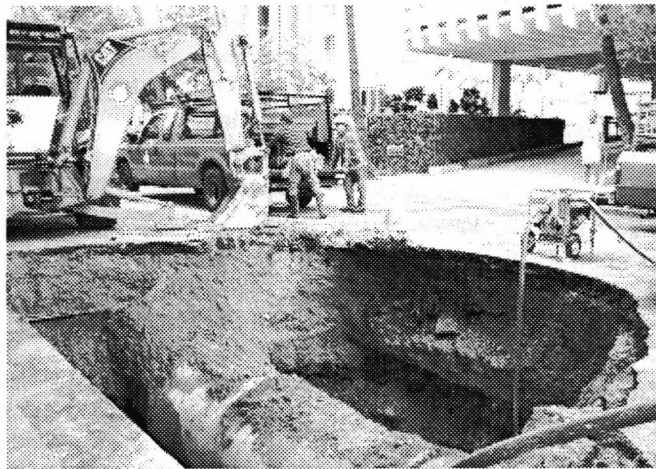
With collaboration from all four Counties of the State,

revisions and updates to the Water System Standards were completed. The Department oversaw the editing and publishing of this statewide document, which was ready for distribution in August 2002.

One of the major functions of Maintenance Unit-Engineering is the implementation of the Department's Capital Improvement Program (CIP) and Research and Facility Improvement Program (RFIP) budgets. Through Engineering, the Department awarded a total of nearly \$32 million in construction contracts and over \$9 million in consultant contracts as of June 30, 2002. The following summarizes projects awarded and construction completed by the Department in the past fiscal year:

- Contracts were awarded to drill a monitor well at Iwaena in Kahuku and to deepen an existing monitor well at Jonathan Springs in Kalihi. These wells are used to monitor the condition of the fresh water lens. Data from these wells will help BWS manage Oahu's precious groundwater resources.
- An exploratory well drilling project was completed in the Kalaeloa area, site of the former Barbers Point Naval Air Station. Work continued on the design of a desalination plant in this area. When constructed, this future plant will convert salt water from the basalt aquifer into potable water, providing an alternative source of drinking water to meet the demands of the Leeward area.
- Construction of the Kunia 228 Reservoir No. 2 was completed, adding a new 1.5 million gallon reservoir to the Leeward water system. Construction continued on the Makaha 242' Reservoir No. 2, a new 2.0 million gallon reservoir, and the Kailua 272' Reservoir, a new 4.0 million gallon reservoir. Reservoirs are situated at strategic locations to ensure a reliable supply of water and to maintain adequate pressures within the water distribution system. Upon completion, these new reservoirs will provide needed storage capacity within BWS' water system.
- New water mains were added to the municipal water system island-wide to improve system reliability, ensure sufficient pressure during periods of peak demand, and improve and enhance fire protection. Water main construction projects were completed in Aina Haina, Haleiwa, Hawaii Kai, Kahaluu, Kailua, Kaimuki, Kalama Valley, Kalihi, Kaneohe, Moanalua, McCully, Moiliili, Niu Valley, Palolo, Waialea, Waikiki, Wailupe, Waipahu and Wilhelmina Rise. New construction contracts were awarded for water main installations in Haiku, Kahala, Kahaluu, Kalihi, Kaneohe, Liliha, Manoa, Nanakuli, Palolo, Wahiawa, Waialae, Waianae, Waikiki, Waimanalo and Waipahu.
- Construction contracts were awarded for the renovation of the mechanical and/or electrical systems for Aiea Booster No. 1, Aiea Wells, Beretania Control Center,

Luluku Wells, Mililani Wells I and Moanalua Well No. 1. Renovation projects were completed for Aiea Booster No. 2, Aiea Gulch Wells, Kahana 315' Reservoir, Makakilo Booster No. 2, Mililani Wells I, Waialea Well III, Waihee Line Booster, and Waipahu Wells I GAC water treatment facility. These projects ensure the dependable service and operational efficiency of the Department's facilities.



During FY 2001-02, the number of main breaks — such as this one in Waikiki - dropped by seven percent over the average of the past ten years. This decrease can be attributed to the Department's main replacement program that identifies and replaces pipelines with a high main break incidence.

- Maintenance Unit – Engineering continued its program to identify and improve the appearance of water facilities showing signs of deterioration. Construction contracts were awarded to repair, reroof, renovate and/or improve landscaping and irrigation systems at Kalihi Corporation Yard, Kapunahala 272' Reservoir, Makaha Booster No. 1, Makaha Shaft, Pearl City Booster, Waianae Corporation Yard and Waipio Heights Booster.

Maintenance Unit-Field

The **Maintenance Unit-Field** is responsible for providing continuous water service to the Department's 155,000 customers.

Responsibilities include repairing pipeline and service line leaks; installing, replacing, and enlarging water service lines; performing scheduled preventive maintenance of large meters, fire hydrants, waterline valves, and facility grounds and buildings; and providing 24-hour response to trouble calls and service requests including investigation of leaks, water service closure for repairs and turn-ons.

Masonry, carpentry, and welding support services are also provided to the Department.

There were 392 main breaks, which is seven percent lower than the average of the past 10 years. The following are some of the significant main breaks during the past year:

- **Fort Weaver Road** 16-inch nonpotable line. There were three breaks on the nonpotable line – Dec. 2, 2001, Jan. 6, 2002, and Mar. 7, 2002. Although the impact of the water service interruption was minimal, the potential disruption to Ewa traffic was enormous so the repairs were held off until the evening and early morning hours. Repairs consisted of splicing various lengths to eliminate corroded sections.
- A 36-inch concrete cylinder leak on **Moanalua Road** in Waimalu caused traffic headaches for area residents.

A ring weld was installed in the joint to stop the leak.

- A 12-inch main break on **School Street** at Pali Highway flooded the two right lanes of the Lunalilo Freeway causing an early morning traffic jam for westbound motorists. A nine-foot section was replaced to eliminate the corroded section.
- A 12-inch cast iron main break on **Ala Aolani Street** at the entrance to Moanalua valley caused the closure of the roadway to traffic. The entire valley, including Kaiser Hospital, was without

water until the break was isolated. The 405' water system was temporarily fed by the Navy water system via a by-pass on top of Red Hill. A 12-foot section was spliced to eliminate the corroded section.

The Department was well represented in the National AWWA Pipe Tapping Contest held in New Orleans, Louisiana. The women's team made up of employees, pipe person Anna Tanaka, tappers Carolyn Sawai and Danielle Ornellas, and coach Glenn Ah Yat, defended their 2001 National Championship. Unfortunately, they were unsuccessful in their bid for another championship placing third in the competition with a time of 2:27.49. A team from the Lansing Board of Water and Light in Lansing, Michigan, had the winning time of 2:20.43.

The work force was kept busy maintaining Oahu water system components to ensure continuous water service to BWS consumers.

Maintenance Section

Maintenance Section crews repaired 18 main breaks on mountain pipelines and fire hydrant laterals. The welder completed 362 general welding projects.

Valve crews inspected and maintained 8,484 valves and 1,064 air valves, repaired or replaced 34 main valves and 11 air valves, and raised 26 manhole frames and covers to street grade.

In conjunction with work done by contractors, the valve crews conducted 75 valve checks and water closure surveys and made four live taps: one 24-inch tap on a 24-inch main, two 6-inch taps, and one 12-inch tap.

Hydrant crews inspected and maintained 5,010 hydrants, repainted 5,093 hydrants, repaired 476 hydrants of which 72 were damaged by motorists, plotted 35 new or relocated hydrants and replaced 20 hydrants in the Metropolitan Honolulu area. The Hydrant Unit exceeded their mainte-

nance goal of 4,932 hydrants by 78.

Metropolitan grounds keeping crews continue to provide excellent care to the 102 BWS facilities in the metropolitan area.

In keeping with the Department's grounds maintenance program to use water wisely and judiciously, crews spent considerable time maintaining landscaped areas employing xeric concepts at Halawa Xeriscape Garden, Kalihi Pumping Station, Aina Koa 640' Reservoir, Bella Vista 180' Reservoir, Ft. Ruger Tunnel, Kaimuki Pumping Station, Kapalama Wells, Keanu East Portal, Kuliouou Line Booster, Pacific Heights 578' Reservoir, St. Louis 865' Reservoir, St. Louis Booster, Waiālae Iki 405' Reservoir and Wilhelmina Rise 811' Reservoir.

Overall improvements to landscaped areas included work to upgrade the appearance of these sites and to demonstrate the use of water-conserving plants and methods to the public. These improvements also minimize the hours required to maintain the facilities. In addition, crews supported two events to promote xeriscape concepts — the Hawaii State Farm Fair and the 13th Annual Unthirsty Plant Sale.

Construction Section

Construction Section crews repaired 181 main breaks on pipelines 4- inches and larger in diameter and 1,855 service leaks. The number of both main breaks and service leaks are expected to decline over time as the BWS continues programs to replace old galvanized services and cast iron mains.

Crews renewed 124 galvanized services with copper, cut 18 services at the main, turned on/off 1,624 services, installed 17 bypasses, and replaced 85 defective meters.

Masonry crews maintained and repaired BWS facilities and provided masonry support to other field units, made 248 road cuts for service renewals and main break road patches, repaired sections of 335 sidewalks, 57 gutters, and 58 driveways.

Carpenters repaired vent screens, booster housing screens, windows, doors and roofs at various sites throughout the island. They also performed other regular duties involving the repair, upgrade and maintenance of BWS facilities, and installed shoring in conjunction with main break repairs.

Significant pipe repairs completed by the Construction Section included:

- a horizontal split on a 12-inch cast iron main on Haleola Street repaired by replacing an 8-foot section of pipe,
- a horizontal split on a 12-inch cast iron main on Waiālae Avenue repaired by replacing a 12-foot section of pipe,
- a damaged 12-inch cast iron main on University Avenue and Oahu Avenue repaired by replacing an 8-foot section of pipe,
- a horizontal split on a 16-inch cast iron main on North School Street repaired by replacing with a 7-foot sec-

tion of pipe,

- a horizontal split on 12-inch cast iron main on Middle Street repaired by replacing a 10-foot section of pipe.

Suburban Field Services (SFS)

Suburban Field Services (SFS) pipefitting crews, operating from corporation yards at Manana, Waiānae, and Wahiawa, repaired 122 main breaks; 763 service leaks; 3 air relief valves; installed 946 new services; renewed 2,590 feet of service main, and 120 old and leaking galvanized services with copper pipe; and placed 80 additional fire hydrants in service.

They also cut off 2 abandoned services at the main; re-located 74 services/meters; enlarged 18 services/meters; ordered on/off 457 and turned on/off 1,309 services; inspected 6,637 fire hydrants, 8,818 gate valves and 1,490 air relief valves; and raised 74 manhole frames and covers to grade.

Crews responded to 7,345 trouble calls and followed up on 3,543 meter/meter box and service related problems (field service reports) and replaced 625 defective meters.

Main breaks decreased by 21.8 percent and service leaks increased by 18.3 percent. Installation of new services decreased by 18.7 percent, service renewals decreased by 20.8 percent, and replacement of defective meters increased by 14.7 percent.

Significant pipe repairs completed by SFS personnel included the following:

- Repairing 20-inch and 24-inch concrete cylinder mains on Farrington Highway in Waiānae by welding patches. There was an adverse affect on traffic as both these breaks were on Farrington Highway.
- Repairing two (2) 16-inch concrete cylinder mains on Kili Drive in Makaha by welding a patch and splicing with ductile iron and Bakers coupling. Traffic was not adversely affected because residents have an alternate access from Makaha Valley Road.
- Repairing a 30-inch concrete cylinder main at Hoāeae Street by welding a patch. Traffic was not adversely affected because the traffic volume is not great on this street.

Other significant work done by SFS personnel included the following:

- Completing work to assist Operations with sealing of the Waialele Tunnel.
- Repairing PVC water mains for Makalena Golf Course on three occasions.
- Installing 12-inch piping to complete the connection of Kaamilo wells to the distribution system.
- Repairing a 16-inch valve and bypass in Campbell Industrial Park.
- Repairing the 8-inch cast iron main in the Makaha Shaft.
- Making inspections and performing corrective work

including clearing of overgrowth, trimming trees and correcting other deficiencies noted in preparation for and as a result of Department of Health Sanitary Surveys.

- Correcting deficiencies, installing hardware for services and repairing meter and service lateral leaks related to the Automatic Meter Reading program.
- Providing water wagons for emergency water service to consumers in conjunction with repairs to the State of Hawaii water distribution system in the vicinity of Dillingham Airfield and providing a water wagon for emergency water service for a private water system in Waiawa.

The SFS grounds keeping crews continued to maintain the 118 BWS facilities in the SFS area and performed the following additional work:

- Upgrading the landscaping and removal of oleander hedges at Makakilo Well I, Waiawa Booster I and 285' Reservoir, and Kaamilo 497' Reservoir facilities. Completed landscaping and clean up at Waipahu Wells 3 and Waikele 395' Reservoir.
- Painting over graffiti expeditiously to minimize its effect at various facilities.
- Repairing damages and replacing landscaping caused by main breaks.

Service and Meters Section

Service and Meters Section crews compose the Service Connections and Building Maintenance Units. Service Connections Unit crews installed 117 new services, repaired 38 service leaks, relocated 40 services, resized 45 services, and replaced 265 defective meters.

The crews of the Service Connections Unit also completed 3,403 field service reports to verify and repair leaks, adjust and replace meter boxes, remove dirt and roots from meter boxes, and obtain follow-up meter readings.

The unit's field crews maintained, repaired, and tested 560 large meters, including the 47 largest water users.

The unit's Meter Shop personnel repaired and tested 590 displacement type meters, repaired 118 register dials and tested 1,050 meters from the meter contract purchases and 5,859 meters for the island wide automatic meter reading replacement program. They also evaluated and tested sample meters submitted by manufacturers for approval and acceptance for use in the water system.

Building Maintenance Unit

The **Building Maintenance Unit** performed custodial and building maintenance services for the Beretania Complex, Kalihi Corporation Yard, and Fred Ohrt Museum. The unit's building maintenance repairer fixed various plumbing fixtures island-wide, painted over graffiti in the metropolitan area, and made miscellaneous repairs to facilities.

Windward Section

Windward Section crews repaired 62 main breaks on pipelines four inches and larger in diameter and 41 service lateral leaks as compared to 43 main breaks and 30 lateral leaks last year. Main breaks were 14 percent higher than the past 10-year moving average while lateral leaks were 56 percent lower. The Windward district normally has about 56 main breaks, and 122 service lateral leaks per year.

The Section continued work on its service renewal program and replaced 4 galvanized laterals with corrosion-resistant copper pipe. Pipe crews also enlarged 14 copper services; installed 50 new services; replaced 95 malfunctioning meters and responded to 2,005 trouble calls and 546 meter-related field service reports.

Valve and hydrant maintenance crews met or exceeded their performance goals by servicing 3,601 valves and 2,047 hydrants to ensure the reliability of the system for isolating mains during emergencies and fire fighting capability.

Grounds crews kept pace with the work in the Windward area and maintained all facilities as scheduled.

OPERATIONS

The Operations Operating Unit's primary objective is to provide BWS customers with a reliable water supply that is safe and a reasonably priced. It pumped 156.79 million gallons of water daily while maintaining all of its pumping and water treatment facilities.

The tragic events of September 11 had a significant impact on this unit. Security rose to the forefront. In addition to continuing its daily activities, the Operations Unit became heavily involved in the protection of the municipal water system. The most critical facilities were identified and the Honolulu Police Department (HPD) and private security companies provided immediate security for them.

Installation of closed-circuit security cameras was deemed to be the long-term solution to provide more coverage and replace the more costly guard service. A \$1,500,000 emergency contract was awarded to procure and install cameras at these facilities. The system included state-of-the-art day/night/pan/tilt/zoom dome cameras and dual sensing motion detectors. Additional funds were allocated to include BWS base yards and additional stations during the upcoming fiscal year.

As a consequence of Sept. 11, Congress mandated that all water purveyors conduct a vulnerability assessment of their system. In coordination with the Board's Risk Manager, the Operations Unit undertook planning for this mandated assessment that will be conducted next fiscal year. Personnel were trained in the required process. Applications for Federal grants were filed to help finance the assessment. The selection of a consultant to assist the Board with the assessment has begun.

The Operations Unit continues to support the Board's re-engineering project. During the year, a team was commissioned to examine the work processes in the Pumps Section. Additional computers were placed in the Auto-

motive and Water Quality Sections to expand their use of computers. A computer kiosk was set up for the pump mechanics that will allow them to be better able to do their work in the "New Board." A bar code project was started for the MicroLab sampling and testing process. Unit members served on the Purchase Card and Time-and-Attendance project teams in which the Operations Unit will serve as the pilot group.

PLANT OPERATIONS DIVISION

Plant Operations Division consists of the Pumps and Telecommunications Section. These two sections operate and properly maintain all of the Department's pumping and treatment plants, including its telemetry and communication systems.

Pumps Section

The **Pumps Section** continues to emphasize its preventive maintenance and equipment replacement programs. Highlights of these programs included the servicing and inspection of 27 motor control centers, rewinding two motors and reconditioning 28 motors of various types and horsepower. The Section also overhauled eight horizontal centrifugal pumps and one altitude valve.

Pumps Section is also pursuing its pilot program to utilize state-of-the-art equipment in place of more conventional electro-mechanical devices. Highlights of this program included the installation of a solid-state starter at Waialae Iki Booster No. 3, and the utilization of programmable logic controller (PLC) technology to replace the more costly sequential timers for three deep well pumping units. In addition, nine gas chlorinators were converted to sodium hypochlorite systems that were designed and fabricated by in-house personnel. If successful, these technologies will be disseminated to all personnel and utilized throughout the water system to improve equipment reliability and efficiency.

The Pumps Section was immediately affected after September 11. They increased their presence at stations as a precautionary measure. Again, when the United States began its attack on Afghanistan, personnel were called in as a precaution to monitor BWS stations. The section also participated in a security assessment conducted by HPD.

Telecommunications Section

The **Telecommunications Section** continued their efforts to maintain the telemetry system in support of the SCADA system, as well as the Board's mobile radio system. This Section was given the responsibility for the security camera project. They also dedicated staff to ensure that the intrusion alarms were functioning properly at all stations.

Water Quality Section

The **Water Quality Section** consists of the Chemical

and Microbiological Laboratories. It monitors the integrity and quality of the Department's water sources and system in conformance with all applicable Federal and State drinking water laws, rules and regulations. The Section also monitors regulatory changes and provides consultative services to the Department on environmental health issues related to water quality and the design of water treatment facilities.

The Chemical Laboratory analyzed 3,937 samples requiring more than 12,300 tests during the fiscal year. This includes responding to 270 water quality complaints and analyzing 181 seepage investigation samples. The laboratory fields an average of 1.5 calls each workday from customers requesting information or registering complaints. BWS chemists completed another round of distribution system sampling for asbestos during the year and processed samples from 53 different sources for the Federal Phase II/V and Unregulated Contaminant Monitoring Requirement (UCMR) programs. The Chemical laboratory continues to maintain its EPA certification for Atomic Adsorption, Gas Chromatography, Ion Capture, and wet chemistry techniques.

The Microbiology Laboratory continues to maintain its State Department of Health and EPA certification. The laboratory routinely monitors well stations, reservoirs and points in the distribution system to insure that the Department's drinking water meets Federal and State regulations.

During the fiscal year, BWS microbiologists examined 9,095 water samples for coliform bacteria. Of this total, 6,538 were for regulatory compliance; 1,296 were for new main disinfection; 188 were in response to water quality complaints; and 1,073 were special investigation and project samples.

In response to concerns for future threats of terrorist attacks on drinking water supplies, the Department has begun a study with the Water Resources Research Center of the University of Hawaii to develop and evaluate a water monitoring plan to detect contamination of the BWS water system by chemical, physical or biological agents. Three instruments: the InSpectra Analyzer, the Pallchek Luminometer and the R.A.P.I.D. were acquired to conduct rapid screening tests to determine changes in water quality and possible type of contaminant in the water. Another instrument, the Riboprinter, was acquired through a university lease agreement plan. This instrument will be used to characterize microbial populations in different BWS water sources. Additionally personnel were sent to conferences and workshops on bioterrorism to enhance their ability to monitor water quality.

AUTOMOTIVE DIVISION

The **Automotive Division** administers and operates the fleet management functions for the Department. It is responsible for the procurement, maintenance, repair, replacement, and disposition of all BWS vehicles and equip-

ment.

During the fiscal year, Automotive maintained and repaired 297 motor vehicles, 73 field construction equipment, and 32 trailers at its Manana Corporation Yard repair facility in Pearl City. In addition, plans and specifications were prepared for the purchase of 19 vehicles of various types, a light/tower generator, and a dewatering pump.

The annual vehicle and equipment public auction was held in April of this year in the Beretania equipment lot. A total of 32 vehicles and equipment were offered and sold at this event.

To further develop the repair staff's skills and knowledge, and to keep abreast with technological advancements in the automotive industry, supervisors coordinated numerous technical training sessions led by various equipment manufacturers, industry professionals, and government inspectors. These sessions provided methods to maximize vehicle and equipment longevity and ensure safe operation.

The Automotive staff completed its first year working with the newly implemented computerized fleet management system. This system has assisted staff in providing real-time data to track fleet history, performance, warranties, and inventories. Because fleet history is now stored on database, this system has allowed for more paperless activity.

Mechanical/Electrical Engineering Section

The **Mechanical/Electrical Engineering Section** administers the Department's RFIP and CIP projects whose major scope of work involves mechanical or electrical work or equipment. The Section also supports the Maintenance Unit engineering design sections when their projects involve mechanical or electrical work. They ensure that new facilities are designed, constructed and tested to comply with the department's standards.

Construction projects that were completed this fiscal year include Aiea Booster No. 2 Renovation, Haiku Pressure Regulating Valve Replacement, Kahana 315' Reservoir Level Transmitter, Kalihi Uka Booster Renovation, Makaha Well II Pump Replacement, Makakilo Booster No. 2 Renovation, Mililani Wells I Pump No. 1 Replacement, Waialeale Well II Motor Control Center Replacement, Waihee Line Booster Circuit Breaker and Valve Replacement, and Waipahu Wells I Backwash System and Flow Meter Replacement. Construction contracts awarded were Aiea Wells Pump No. 1 Replacement, Luluku Well Pump Replacement, Mililani Wells I Pump No. 4 Replacement, and Moanalua Wells Pump No. 1 Replacement. The completed and awarded projects totaled \$2.45 million.

WATER RESOURCES

The Water Resources Operating Unit conducts the planning and outreach needed to provide current and future customers with high quality service at reasonable costs,

while protecting the long-term viability of Oahu's water resources and enhancing the environment.

Land Section

The **Land Section** acquires water rights, land, and land interests by purchase, condemnation, lease, easement, executive order, etc. This Section also disposes surplus real property and manages approximately 13,216.737 acres of land under the control of the Department.

During this fiscal year BWS acquired 21.952 acres for \$13,500,000 from the Trustees under the Will and of the Estate of James Campbell, Deceased, by Eminent Domain for the Ewa Shaft.

BWS also purchased 0.828 acre for \$31,000 from Gale and Gail Berengue for a portion of the Kailua 272' Reservoir; 0.869 acre for \$60,000 from Dole Food Company, Inc. for the Haleiwa 225' Reservoir; 1.662 acres for \$115,000 from Dole Food Company, Inc. for the Waialua 225' Reservoir and Wells; 2.179 acres from the Trustees under the Will and of the Estate of James Campbell, Deceased, for the Barbers Point 215' Potable Reservoir; 1.927 acres for \$1,000,000 from Castle & Cooke Renaissance, LLC for the Waipahu Wells IV; and 1.573 acres for \$109,000 from Castle & Cooke Homes Hawaii, Inc. for the Waipio Heights Wells III.

The Department's other transactions include the acquisition of 15 water pipeline and water meter easements and processing of 94 miscellaneous documents.

Long-Range Planning Unit

The **Long-Range Planning Unit** is responsible for the preparation of the Department's Six-Year CIP and long range plans for projected water system requirements, and the coordination of proposed Development Plan Map Amendments with the City Planning Department.

Testimony was provided for proposed legislation in the areas of water resource management and State land use planning. Proposed legislation for revising the State Water Code was evaluated for impacts to the BWS.

Work was done on Watershed Management Partnerships with public, private, and government entities. The goal of this program is to restore and preserve water resources and the environmental quality of BWS watershed areas through cooperative partnerships.

Proposals were prepared to acquire federal land at Kalaeloa for the desalination plant and a proposed Deep Ocean Water Facility (DOWAF). The DOWAF will use cold deep ocean water for high technology processes such as: electricity production with a potable water by-product, chilled water for air conditioning, irrigation and enhanced crop growth for diversified agriculture, and ocean water for aquaculture farming.

A scope of work and contract for a DOWAF feasibility study and preliminary design is being prepared.

Studies worked on during the year included: population and water demand projections; Waialua-Mokuleia-

Kawailoa Water Development and Transmission Feasibility Study; Waianae 242' Reservoir No. 2 Preliminary Engineering Study and EIS; various CIP project feasibility and water availability studies; and Ewa district nonpotable water planning.

Population and water demand projections were analyzed for future CIP facilities development requirements to coincide with the 2000 Federal Census, State DBEDT M-K projections, and the City Planning Department's projected distribution of population up to the year 2025.

The ongoing Waialua-Mokuleia-Kawailoa Water Development and Transmission Feasibility Study will assess water availability and source development in the Waialua-Kahuku water district for possible transmission to either Waianae, Ewa, or Windward districts. Capital and operating costs will be evaluated for development feasibility compared to groundwater development in Pearl Harbor and Windward districts, desalination, and wastewater reuse costs.

The ongoing Waianae 242' Reservoir No. 2 Preliminary Engineering Study and EIS will select a preferred site for a new 4 MG reservoir to provide storage capacity to meet BWS system standards for the Waianae district, which has been gradually upgraded since the BWS acquisition of the old Waianae Suburban Water and Plantation systems.

CIP project feasibility studies assessed costs, water system benefits and integration, and development parameters. The studies are used to identify the need and priority for scheduling projects.

Water availability studies assessed surplus water in existing systems for the entire island. Average day and max day demands for each source will be compared with design capacities, permitted use, sustainable yield, and operating capacities.

For conserving groundwater aquifer supply, the unit worked on the Ewa Nonpotable Water Master Plan to develop additional recycled R-1 and RO quality water in Ewa. The master plan will improve current Honouliuli Recycled Water Facility system operations, identify future users and required infrastructure, and provide integration with the Ko Olina-West Beach nonpotable system.

Other future recycled water development is being assessed for Waianae, Wahiawa, and Windward districts to develop treated wastewater for nonpotable uses.

The **Water Systems Planning Section** is responsible for the following tasks: (1) Developing and maintaining computer hydraulic models of the various water systems; (2) Updating the water use zone codes and maps, which provide geographical consumption data for use by various Operating Units; (3) Reviewing and evaluating hydraulic calculations and assumptions for various planning studies; (4) Evaluating the hydraulic feasibility and extent of water system facilities improvements proposed in the Department's Research and Facilities Improvement Program (RFIP) and Capital Improvement Program (CIP); (5) Collecting real-time water system operational data (flow rate, pressure, etc.) from the field for the development and

calibration of the water system hydraulic models, and to assist the work of other Operating Units; and (6) Periodically updating the Water System Schematics which depict the major water system facilities and transmission mains.

During the fiscal year, the Section completed or helped to complete cross-training with the Operations Unit which will help the Water Resources Unit (WRU) in its proposals of future water projects, updated the Consumer Confidence Reports, calibrated the Ewa-Kapolei Water System models and completed various pre-calibration tasks for the Metro 170' water system and Waianae area, provided hydraulic evaluations of various RFIP and CIP projects, completed various Water Resources Unit Business Plan Initiatives such as: the proposed Reorganization for the WRU and training initiative which enables the employees of WRU to receive training from the University of Hawaii, Toastmasters International and cross train between units.

Ongoing projects administered by the Section include the formulation of two district plans that assesses the current situation and plan for and develop future BWS strategies to address various concerns in each district, one plan for the Windward area the other for the Metropolitan area; the calibration of the computer hydraulic models, and the conversion of the existing Water Use Zone coding and maps to the new Geographical Consumption coding system; continuous updating of water system schematic, the Waiau 850' Reservoir Easement Pipeline Feasibility Study (to identify and evaluate alternatives to a cross-country pipeline that provides water service to the Waiau, Newtown and Royal Summit communities) including the hydraulic modeling required for each alternative; assisting with the Vulnerability Assessment for all BWS water infrastructure; the acquisition of the Waimano Training School and Hospital water system from the State, the Kalaeloa water system (portions of the water system that served the former Barbers Point Naval Air Station) from the Navy and other various water systems from the Navy, Army and Air Force; as well as for various RFIP and CIP projects.

In addition to working on the projects mentioned above, Water Systems Planning staff continues to participate in the Department's QUEST (Competitive Assessment) Program by volunteering to serve on the program's various design and work teams. These teams are helping the QUEST program investigate and evaluate issues and current practices in an effort to help redefine and improve the Department's ability to perform the best services possible for its customers.

The **Hydrology-Geology Section** provides technical support involving the development, monitoring, and management of municipal groundwater sources on Oahu. To conduct this support, the Section collects, evaluates, and interprets data on rainfall, water levels, water quality, geophysical logs, and pumpage.

Island-wide collection of water level data, meter readings and water samples are conducted on a regular schedule

from 17 raingages, 30 observation wells and piezometers, 28 artesian wells, 10 springs, a streamgage, and three weirs/flumes. Reports for internal agency use, regulatory requirements and those used within this Annual Report and Statistical Summary are prepared weekly, monthly, and annually.

In addition to compiling and assessing hydrologic data, the Section also assists, reviews and comments on a variety of water and environment related correspondence, locates water sources, prepares contract and well specifications, handles well permit applications, conducts hydrologic studies, and furnishes resource information and advice to intradepartmental units, private individuals, organizations, and agencies.

Section staff carries out the project management of BWS research and production well construction. Three deep monitor wells were completed (Moanalua, Waimano Gulch, and Lower Waiawa) with work started on the preparation of contract documents for several others. Drilling operations commenced on an additional deep monitor well in Helemano. The Kalaeloa desalination plant caprock and basalt exploratory wells were completed.

Geophysical logging of 32 wells was conducted (26 specific conductance and temperature logs, one neutron log, and five fluid sampling logs).

The Nuclear Regulatory Agency (NRC) approved the BWS license renewal application in July for the neutron source utilized by BWS. In March, the radiation safety program was inspected by the NRC and passed with no deficiencies found. Section staff oversees the radiation protection program of its well-logging operations in compliance with NRC regulations.

Other Section highlights were as follows:

Staff assisted the USGS in interval sampling of five deep monitor wells in the Pearl Harbor aquifer for age dating research.

Technology upgrades of analog raingages to digital tipping bucket types were completed for six sites. Additional site upgrades are planned in the next fiscal year. Two head level digital loggers are scheduled to be installed shortly to replace analog stage recorders.

The Waikele Tunnel in Waipahu, located on former Oahu Sugar land owned by the City and County, was sealed as a condition of a land transfer agreement. The work was done in-house.

Staff assisted personnel from the Department of Land and Natural Resources in a site survey of a potential well location in Makao Valley.

A head survey of several Kaimuki Station wells

was conducted to determine leakage within the existing well casings.

Participation in watershed partnership programs, such as the Koolau Mountains Watershed Partnership, is ongoing. Another, the Mohala I Ka Wai group (Waianae and Makaha watersheds), resulted in the installation of a Parshall flume in Makaha Valley. Technical advice and training in hydrologic data gathering were provided to the participants in the previous fiscal year.

A contract for a three-dimensional model based on the Feflow code was executed and is currently under development by Todd Engineering. The applicability of a three-dimension model in simulating Honolulu groundwater conditions will be pursued. Preparations are under way for a cooperative study with the USGS on a model describing the effects of alluvial valley deposits on groundwater movement.

The Section also assisted a Korean contingent visiting to learn about the hydrology and geology of Oahu. Staff accompanied this party to the neighbor islands to assist them in learning more about Hawaiian volcanic and hydrologic processes.

Water Conservation Unit

The **Water Conservation Unit** continues to administer the Automatic Meter Reading Project. The Water Conservation Unit coordinates and assists with conservation projects and activities, conducts water conservation and consumption studies and analyses, and researches and investigates water conservation appliances and devices for use in single- and multi-family dwellings and in business and industry.

The Automatic Meter Reading Project Staff is responsible for the coordination of the installation of automatic meter reading devices. The Board is replacing or retrofitting approximately 150,000 meters so that they no longer have to be manually read. By installing an electronic device on the meter, the data will be transmitted to a computer in a vehicle driving past the meter. The project began in January 2000 and should take about three years to complete. As of June 30, 2002, a total of 134,000 meters have been installed or retrofitted. The project should be completed by the end of 2002.

The Board of Water Supply, in conjunction with the City, is offering \$100 rebates for the installation of ultra-low flush toilets. The program was approved June 10, 1998 by the Mayor and applies only to residential retrofits.