*East Bay Municipal Utility District*

# Water Conservation Market Penetration Study

FINAL REPORT

March 2002

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# WATER CONSERVATION MARKET PENETRATION STUDY

## FINAL REPORT

*Prepared for*

East Bay Municipal Utility District
Water Conservation Division
Oakland, California

*Prepared by:*

Water Resources Engineering, Inc.
San Francisco, CA

*In Collaboration With:*

Grassetti Environmental Consulting
Public Affairs Management
Uribe and Associates

March 2002

## Acknowledgements

Many people contributed to the successful completion of the 2001 water conservation market penetration study. Richard W. Harris and Michael Hazinski of the District's Water Conservation Division supervised all phases of the study and provided technical review. The District's Field Service Representatives under the supervision of Sheila Ward conducted most of the site visits in the non-residential sectors. Sherri Hong of the District's Customer Services Division supervised telephone interviews conducted primarily by Edwin Anderson. Vivian Ling of the Information Systems Division provided information used for the development of lists of study participants.

A team of consultants headed by Water Resources Engineering, Inc. (WRE) of San Francisco conducted telephone interviews, developed and maintained databases, scheduled and tracked appointments, and visited single- and multi-family customers. Gustavo Arboleda of WRE supervised all work performed by consultants. Richard Grassetti of Grassetti Environmental Consulting assisted in staff training and field supervision duties. Theresa Hughes of Uribe and Associates (U&A) supervised U&A's field personnel. Dawn Schellenberger and Julie Ortiz of Public Affairs Management assisted with staff training and report review. Mr. Arboleda prepared draft and final reports.

Finally, we extend our appreciation to all of the District's customers who responded to our surveys, without whom this project would not have been possible.

## Disclaimer

The information in this report is believed to be accurate and every effort was made to ensure the statistical confidence and reliability of the findings including but not limited to professional peer review of the study design, training programs, database automation, and quality assurance and control procedures. However, neither the author, nor reviewers, nor the East Bay Municipal Utility District nor its employees make any warranty, guarantee, or representation, expressed or implied, with respect to the accuracy, truth, effectiveness, or usefulness of any information, method, or material in this document, nor assume any liability for the use of any information, methods, or materials disclosed herein, or for any damages arising from such use. Readers use this report at their own risk.

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# EXECUTIVE SUMMARY

## INTRODUCTION

*"This study improves East Bay MUD's ability to make inferences about the market penetration of water-conserving hardware, rates of hardware replacement, and customer attitudes and behavior."*

The East Bay Municipal Utility District (District) and its customers have a long history of commitment to water conservation and currently support one of the largest conservation programs in California.

Developing and evaluating an effective water conservation program requires detailed knowledge of how customers use water. To that end, the District's 1994 Water Conservation Master Plan identified the need to conduct market penetration studies at regular intervals.

In response, the District's Water Conservation Division has conducted three studies: a 1995 Water Conservation Baseline Study, a 1998 Water Conservation Residential Site Survey and a 2001 Water Conservation Market Penetration Study.

The objectives of the 2001 study were to collect current data on water conservation attitudes and behavior, determine the types and saturation of water-conserving hardware, assess water conservation potential for identified market sectors, and relate the study findings to those of the previous studies. These goals were met through telephone and site surveys, statistical analysis of collected data, and analysis of pertinent data from other sources.

The 2001 study provides new findings and expands the ability to make inferences about the market penetration of water-conserving hardware, the rate of hardware replacement, and customer behavior and attitudes.

## METHODOLOGY

### Two Survey Types

**Telephone Interviews**

- Single-family residents
- Multi-family owners/managers
  - Two to four units
  - Five or more units

**Site Visits**

- Single-family residences
- Multi-family buildings with 5 or more units
- Selected non-residential customers
  - Warehouses
  - Retail trade
  - Food sales
  - Fast food
  - Restaurants
  - Offices

### Market Sectors and Sampling Methodology

The 2001 study was designed to ensure that the sampled population represented the EBMUD service area, allowing valid inferences to be made about the studied market sectors.

The study team evaluated nine market sectors within the District's service area: three residential (single-family, multi-family two-to-four units, and multi-family five or more units) and six non-residential (warehouses, retail trade, food sales, fast food places, restaurants, and offices).

The customers in each market sector were organized or "stratified" into subgroups to minimize sample bias. Key characteristics were used to stratify the customer base, including location (east or west of San Pablo Ridge and the Oakland-Berkeley hills), date of building construction, type of tenancy, and outdoor water use. Participants were selected at random in proportion to the prevalence of key characteristics, making the final samples largely unbiased.

The study team conducted 763 telephone interviews to assess customers' behavior and attitudes regarding water conservation. The market penetration of water-using hardware was assessed through the inspection of fixtures, appliances, and irrigation systems at 747 residential and 536 non-residential properties.

A confidence level of 95% was used to determine sample sizes for all surveys. Tolerable sampling errors for proportional data varied between 5% and 10%. Table ES-1 shows the relationship between the number of customers in the market sectors studied and the sample size required for the appropriate confidence level and tolerable sampling error.

**Table ES-1: Market Penetration Study Sectors**

| Market Sector | Number of Accounts* | Sample Size | Confidence Level | Sampling Error |
|---|---|---|---|---|
| **Telephone Surveys** | | | | |
| Single-Family | 287,209 | 384 | 95% | 5% |
| Multi-Family | 21,970 | 377 | 95% | 5% |
| **Residential Site Surveys** | | | | |
| Single-Family | 287,209 | 384 | 95% | 5% |
| Apartment Buildings (5 or more units) | 6,713 | 363 | 95% | 5% |
| **Non-Residential Site Surveys** | | | | |
| Warehousing | 868 | 57 | 95% | 10% |
| Retail Trade | 2,030 | 60 | 95% | 10% |
| Food Sales | 492 | 55 | 95% | 10% |
| Eating Places, Fast Food | 231 | 49 | 95% | 10% |
| Eating Places, Restaurants | 644 | 72 | 95% | 10% |
| Offices | 2,650 | 225 | 95% | 5% |

* These numbers reflect the number of records used in the study, rather than a total of all EBMUD accounts in each sector. Duplicate account numbers and inactive accounts were removed from the database for sample selection purposes.

## Study Management, Training, and Quality Control

Study staff included District personnel and staff from the consulting team retained to conduct the study. District personnel participated in the telephone interviews for the attitudes survey and the site visits to non-residential customers. The consulting team provided field and office staff to conduct site visits; set up interviews; enter collected data into computer files; and conduct telephone interviews.

Training programs acquainted study staff with their respective tasks. Telephone interviewers were trained in the use of software designed for data collection. Appointment schedulers were trained in customer relations, use of scheduling software, and coordination with field personnel. Data entry clerks were trained in computer use and data checking. Site surveyors received training in customer relations, leak detection, faucet and showerhead flow measurement, landscapable area measurement, determination of manufacturers and model types, and determination of toilet flush volumes.

Quality assurance and control was exercised throughout the various study activities. Written quality control guidelines were provided to all study staff members. Management personnel monitored customer contacts and field representative performance to ensure quality and uniformity of work.

## Response Rates

**Attitudes Survey**

- 69 percent of single-family and 59 percent of multi-family customers contacted agreed to a telephone interview.
- Higher response rates were obtained on weekdays and standard working hours for calls to multi-family owners/managers; evenings and Saturday mornings yielded the best response rates from single-family customers.

**Site Surveys**

- 57 percent of single-family and 75 percent of multi-family customers contacted agreed to a site visit.
- 71 percent of non-residential customers contacted agreed to a site visit.
- Contacting potential participants was a challenge: the percent of calls that reached a potential participant was 30 for single-family and 28 for multi-family and non-residential customers.

## Respondent Characteristics and Response Rates

Respondent characteristics closely matched the makeup of the customer base in each market sector studied. In the single-family residential sector, for example, 5.46 percent of District customers live as tenants in single-family homes built before 1950 and have high summer water use; 5.67 percent of single-family site survey participants had those characteristics.

A response rate of one in ten was anticipated in the study design. That is, for each planned interview or site survey, ten customers were included in the list of potential participants. None of the lists of participants for the various market sectors were exhausted during the study. Response rates were significantly higher than anticipated.

The apportioning of the total survey sample by key characteristics (resulting in as many as 72 subgroups within one market sector) and the better than anticipated response rates minimized sample bias.

### Attitudes Survey

The study team conducted a total of 763 telephone interviews: 388 interviews of single-family residents and 375 of apartment building owners/managers. 62.9 percent of single-family respondents are listed in District files as homeowners; of the remainder, 16.3 percent are listed as "tenants" and 20.8 percent as "unknown." 69 percent of multi-family respondents own or manage properties with 2 to 4 units; 31 percent of responses were from owners/managers of buildings with 5 or more units. Response rates were better than anticipated: once contact was established with the appropriate person, almost two out of three people agreed to an interview.

### Single-Family Site Survey

Of the 387 homes surveyed 25 percent are located east of the hills and 75 percent west of the hills. About 64 percent of respondents own the homes they live in, and 59 percent live in homes built before 1950. The mean number of occupants per home was 2.9. The actual response rate was better than the one in ten anticipated for the study: about one in two respondents contacted agreed to a site visit. Sample bias was avoided in several ways: potential participants were subdivided into 72 different groups according to location, tenancy, age of dwelling, and outdoor water use patterns; calls to customers were made during normal working hours, evenings, and weekends; site visits were scheduled for both week-days and weekends.

### Multi-Family Site Survey

A total of 360 apartment buildings with five or more units were surveyed. Smaller multi-family dwellings were not included as a cost containment measure; while more numerous in terms of accounts, the smaller apartment buildings account for only about 7 percent of residential consumption. 91 percent of respondents were from west of the

hills. About 73 percent of respondents own or manage properties that were built prior to 1950. About 44 percent of the facilities visited reported between 5 and 9 units per structure, 46 percent reported 10 or more units per structure; three mobile home parks were visited. 97 percent of respondents reported occupancy rates between 90% and 100%. The mean number of units represented by each water account surveyed is 21.3.

Three out of four potential study participants contacted agreed to a site visit. Sample bias was avoided by dividing potential participants into 12 groups according to location and age of dwelling, and by making calls and visits during working and non-working hours and on weekends.

### Non-Residential Site Surveys

A total of 518 non-residential account holders were targeted and 536 sites were surveyed. 54 percent of the sites surveyed were of a mixed commercial use; 9 percent reported a mix of residential and commercial uses; the remainder reported a mix of other uses. About three out of four potential study participants contacted agreed to a site visit. Potential participants were selected from six different classifications and each classification was further subdivided by location (east and west of hills). Calls and visits were made primarily during working hours.

## KEY FINDINGS

The attitudes and site surveys provided information on water conservation attitudes and behavior, types and saturation of water-conserving hardware, and incidence of water-using fixtures and appliances in the various market sectors. Data collected allowed comparisons with the *Water Conservation Baseline Study* completed in 1995.

The format of the telephone interviews and site visits was largely modeled after the baseline study to facilitate comparison of results and identify changes over time. A high level of consistency was generally observed between the results of these surveys and those of the 1995 study, except for a few areas where samples had different characteristics.

### Conservation Attitudes, Actions, and Potential Actions

The attitudes survey shows that customer support for water conservation has increased in the District's service area since 1995. The number of people willing to conserve water to save money, protect the environment, and prevent future shortages was higher in 2001 than in 1995, as illustrated in Table ES-2; 1995 percentages are for a mix of single (SF) and multi-family (MF) residences.

**Table ES-2: Distribution of Responses to Conservation Attitudes Questions**

| Statements Read to Respondents | | Percent of Respondents | | | | |
|---|---|---|---|---|---|---|
| | | Strongly Disagree | Somewhat Disagree | Somewhat Agree | Strongly Agree | Don't Know |
| Making efforts to conserve water is an inconvenience | 1995 | 38 | 33 | 18 | 10 | 1 |
| | SF 2001 | 53 | 35 | 10 | 1 | 1 |
| | MF 2001 | 47 | 35 | 11 | 3 | 4 |
| I am willing to conserve water if it saves money on water bill | 1995 | 6 | 8 | 22 | 56 | 8 |
| | SF 2001 | 2 | 4 | 27 | 66 | 1 |
| | MF 2001 | 1 | 2 | 25 | 69 | 3 |
| I am willing to conserve water to help protect the environment | 1995 | 5 | 3 | 21 | 68 | 3 |
| | SF 2001 | 1 | 1 | 23 | 74 | 1 |
| | MF 2001 | 0 | 1 | 21 | 74 | 4 |
| I am willing to conserve water to prevent future shortages during drought conditions | 1995 | 5 | 2 | 19 | 72 | 2 |
| | SF 2001 | 1 | 1 | 15 | 83 | 0 |
| | MF 2001 | 0 | 1 | 16 | 79 | 4 |

A significant proportion of single and multi-family District customers have taken recent water conservation actions. As illustrated in Figure ES-1, about 80 percent reported fixing leaks in faucets or toilets, and over 70 percent reported watering their plants evenings and early mornings rather than during the day. The proportion of customers taking a proactive water conservation stance increased since 1995 for most of the conservation measures included in the attitudes survey.

When questioned about potential conservation actions, over half of the District customers surveyed expressed willingness to install low-flow showerheads, faucet aerators, and toilet inserts. As illustrated in Figure ES-2, a smaller proportion of customers expressed willingness to improve the efficiency of their irrigation systems.

The attitudes survey highlights the need for increased customer education about the amount of water used. Almost 60 percent of single-family respondents thought their homes used less than 50 gallons per day, when actual use averages 228 gallons per day west of the hills and 480 gallons per day east of the hills.

**Figure ES-1: Partial List of Responses to Recent Conservation Measures**

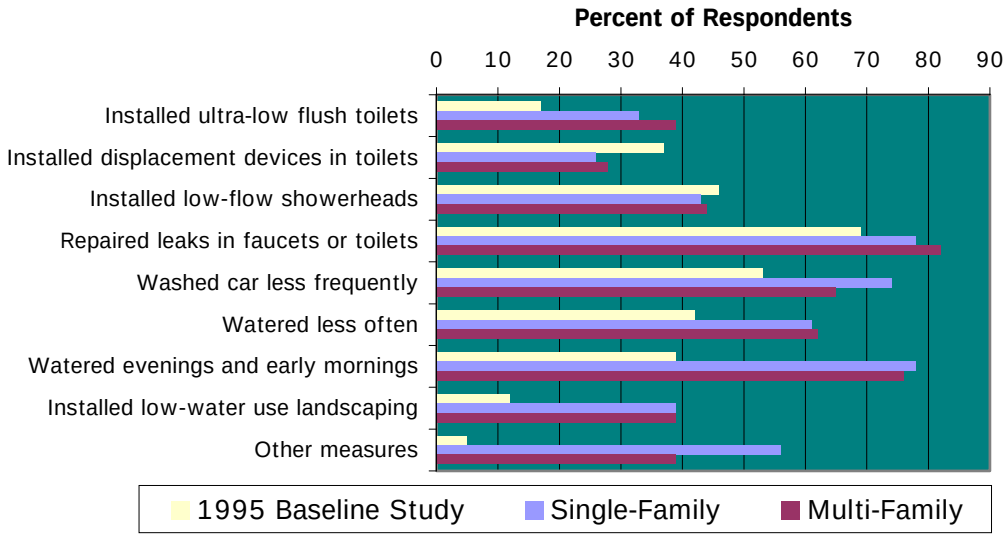
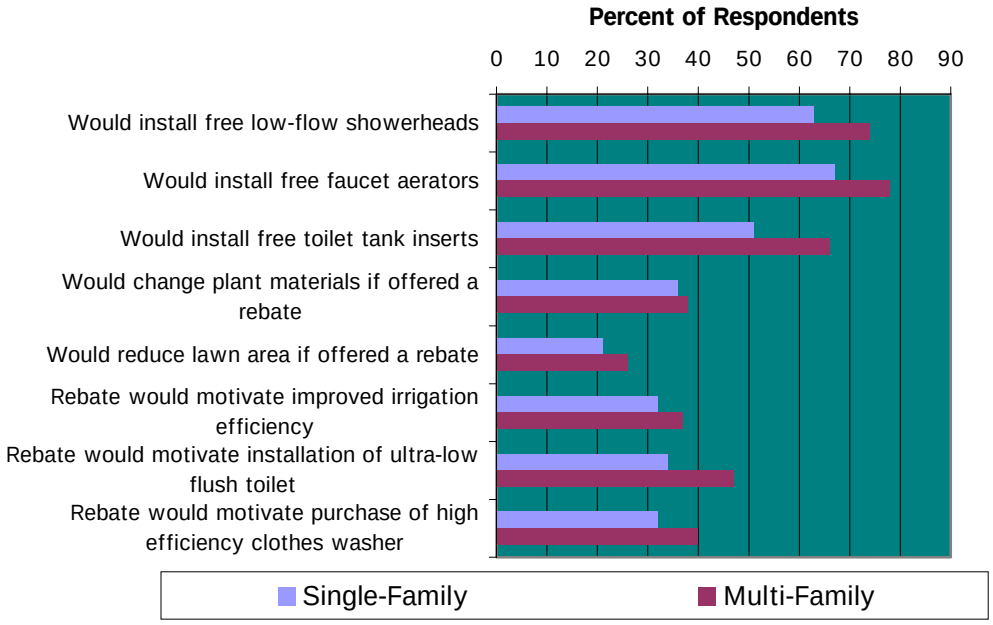



**Figure ES-2: Responses to Potential Conservation Actions***




*** The 1995 study answers are not directly comparable because they were asked in a different form.**

Increased awareness of the volumes of water used both indoors and outdoors would help promote water-conserving habits and hardware. In particular, District customers appear to need greater motivation to reduce their lawn areas, change their plant materials, and improve irrigation efficiency. Over two thirds of survey respondents expressed unwillingness to implement these measures, even if offered rebates.

Rebates appear to resound most with owners and managers of multi-family properties. More multi-family than single-family respondents indicated willingness to make changes in their landscape and irrigation, purchase ultra-low flush toilets, and install high efficiency clothes washers when offered a rebate. Responses indicate that increasing rebates for high efficiency clothes washers to $100 or more would improve program participation.

### Single- and Multi-Family Site Surveys

The 2001 survey showed a slight increase since 1995 in the mean number of fixtures per dwelling unit, as illustrated in Table ES-3; this increase may be attributable to the construction of new homes. The number of dishwashers decreased slightly in the same period for single-family homes, and showed a small increase in the multi-family sector; the changes are small enough to fall within tolerable sampling error. The average number of clothes washers per apartment unit decreased since 1995, possibly indicating a trend towards less in-unit washers and more common area laundry facilities, although differences in sample characteristics make the 1995 value suspect.

**Table ES-3: Average Number of Fixtures/Appliances per Dwelling Unit**

| | Single-Family | | Multi-Family | |
|---|---|---|---|---|
| **Fixture/Appliance** | **1995** | **2001** | **1995** | **2001** |
| Toilets | 2.0 | 2.1 | 1.2 | 1.2 |
| Showers | 1.7 | 1.8 | 1.0 | 1.1 |
| Faucets | 3.6 | 3.8 | 2.1 | 2.3 |
| Bathtubs | 1.2 | 1.3 | 1.0 | 1.0 |
| Dishwashers | 0.7 | 0.6 | 0.2 | 0.3 |
| Clothes washers | 0.9 | 0.9 | 0.3 | 0.15 |

The study found that more recently built homes have more fixtures/appliances than older homes. The distinction is most notable in faucets and dishwashers: homes built after 1992 have on average twice as many faucets and dishwashers than those built before 1950. Homes built in the last decade also have on average 78 percent more toilets, 87 percent more showers, and 91 percent more bathtubs. Newer homes also tend to have a higher incidence of water-saving fixtures and appliances.

The market penetration of water-saving fixtures and appliances among all single and multi-family District customers is presented in Table ES-4. The findings show an increase in the proportion of ultra-low flush toilets, low-flow showerheads, and faucet aerators between 1995 and 2001. The significant increase in the penetration of ultra-low flush toilets is likely due to plumbing code mandates; it may also be attributed in part to the District's toilet rebate and direct-install programs.

Moisture and rain sensors in irrigation systems have yet to make any market inroads.

**Table ES-4: Market Penetration of Water-Saving Fixtures/Appliances (Single and Multi-Family)**

| Fixture/Appliance | Percent of Fixtures/Appliances Inspected/Tested | | | |
|---|---|---|---|---|
| | Single-Family | | Multi-Family | |
| | 1995 | 2001 | 1995 | 2001 |
| Toilets rated as ULFT | 10 | 34 | 5 | 37 |
| Toilets with measured flow volume of 1.6 gallons or less | - | 22 | - | 20 |
| Showerheads with measured flow rates under 3 gallons per minute* | 46 | 70 | 43 | 71 |
| Faucets with measured flow rates under 3 gallons per minute** | 64 | 78 | 49 | 78 |
| Indoor faucets with aerators | 69 | 85 | 69 | 84 |
| High efficiency clothes washers | - | 12 | - | 7.5 |
| Dishwashers with water efficiency settings | 58 | 86 | 75 | 73 |
| Moisture sensor in irrigation system | 2 | 1 | 0 | 0 |
| Rain sensor in irrigation system | 2 | 2 | 3 | 2 |

* The 1995 study does not show the percentage of showerheads with flow rates of 2.5 gpm or less; the 2001 survey found 67 percent of single-family and 64 percent of multi-family faucets in that range.

** The 1995 study does not show the percentage of faucets with flow rates of 2.2 gpm or less in the single-family sector; the 2001 survey found 56 percent of single-family faucets in that range. In the multi-family sector, the percentage of faucets with flow rates of 2.2 gpm or less was 7 in 1995 and 11 in 2001.

Tables ES-5 and ES-6 summarize major landscape area and irrigation system features noted during single and multi-family site surveys. The 1995 Baseline study reported much larger landscapable, irrigated, and turf areas for multi-family properties. No circumstances were found that would support a significant decrease in these areas between 1995 and 2001. The 1995 sample apparently had an over-representation of houses east of the hills, which tended to inflate the average values for landscapable, irrigated, and turf areas.

**Table ES-5: Landscape and Irrigation System Characteristics in Single-Family Homes**

| Characteristic | 1995 | 2001 |
|---|---|---|
| Mean size of landscapable area in front (square feet) | 1,515 | 1,440 |
| Mean size of landscapable area in back (square feet) | 4,201 | 2,640 |
| Mean size of irrigated landscapable area in front (square feet) | 1,154 | 934 |
| Mean size of irrigated landscapable area in back (square feet) | 1,434 | 1,576 |
| Mean size of lawn in front (square feet) | 471 | 551 |
| Mean size of lawn in back (square feet) | 545 | 554 |
| Hose irrigation only | 62% | 33% |
| Average percent of irrigated areas in front watered with a drip system | 5% | 7.5% |
| Average percent of irrigated areas in back watered with a drip system | 6% | 8.1% |
| Average number of stations in irrigation controller | 3.0 | 3.9 |

**Table ES-6: Landscape and Irrigation System Characteristics in Multi-Family Properties**

| Characteristic | 1995 | 2001 |
|---|---|---|
| Mean size of landscapable area (square feet) | 12,323 | 4,858 |
| Mean size of irrigated landscapable area (square feet) | 10,455 | 3,546 |
| Mean size of lawn (square feet) | 5,594 | 645 |
| Hose irrigation only | 58% | 56% |
| Percent of properties with drip irrigation systems | - | 2.2% |
| Average number of stations in irrigation controller | 6.3 | 4.7 |

## Non-Residential Site Surveys

Table ES-7 summarizes general water uses observed at non-residential sites surveyed. Little information from the 1995 study allowed valid comparisons between conditions then and now. The baseline study surveyed only restaurants and offices. In addition, sample sizes were considerably smaller in 1995: fifty-one restaurants and 46 offices, compared to 70 restaurants and 235 offices in 2001. Some of the results, particularly from the office survey, indicate that the 1995 sample was not representative of the entire sector.

**Table ES-7: Major Purposes of Water Use at Non-Residential Sites**

| | Percent of Sample with Specified Water Use | | | | | |
|---|---|---|---|---|---|---|
| Water Use | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
| Domestic/sanitary | 100 | 100 | 100 | 100 | 100 | 100 |
| Facility cooling/heating | 11.5 | 13.6 | 21.9 | 21.3 | 17.1 | 17.0 |
| Other cooling | 26.9 | 27.1 | 47.9 | 59.6 | 30.0 | 38.7 |
| Laundry | 11.5 | 6.8 | 1.4 | 8.5 | 4.3 | 2.6 |
| Automated dishwashers or garbage compactors | 19.2 | 6.8 | 17.8 | 34.0 | 55.7 | 23.0 |
| Ice-making machines | 3.8 | 10.2 | 39.7 | 80.9 | 72.9 | 8.9 |
| Landscape and decorative uses* | 9.6 | 8.5 | 8.2 | 21.3 | 11.4 | 28.5 |
| Water features** | 7.7 | 6.8 | 0.0 | 0.0 | 1.4 | 6.0 |
| Washing and sanitation | 26.9 | 25.4 | 39.7 | 34.0 | 20.0 | 19.6 |
| Process water purification | 15.4 | 5.1 | 6.8 | 4.3 | 10.0 | 8.5 |
| Wastewater pretreatment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 |
| Other uses*** | 9.6 | 8.5 | 16.4 | 14.9 | 5.7 | 5.1 |

* This category included exterior irrigation and fountains/ponds.

** Water features included jacuzzis/spas and fish tanks

*** Most common "other" uses were soda fountains, ice machines, coffee makers, and refrigerators.

Table ES-8 shows the average number of fixtures and appliances found in the non-residential sectors surveyed.

**Table ES-8: Mean Values of Fixtures/Appliances per Non-Residential Site**

| Fixture/Appliance | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Bathroom facilities | 2.8 | 2.4 | 1.9 | 1.7 | 1.9 | 3.3 |
| Gravity flush toilets | 2.5 | 2.0 | 1.5 | 1.1 | 1.5 | 2.4 |
| Pressure-assisted toilets | 0.2 | 1.3* | 0.2 | 0.4 | 0.2 | 0.6 |
| Flushometer toilets | 0.7 | 0.2 | 0.3 | 0.7 | 0.7 | 1.5 |
| Urinals, siphon | 0.2 | 0.1 | 0.2 | 0.3 | 0.3 | 0.6 |
| Urinals, washdown | 0.5 | 0.7** | 0.2 | 0.2 | 0.3 | 0.7 |
| Urinals, waterless | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.2*** |
| Bathroom faucets | 3.2 | 2.9 | 1.8 | 1.9 | 2.2 | 5.0 |
| Kitchen faucets | 0.7 | 0.6 | 1.4 | 2.0 | 2.6 | 1.7 |
| Utility faucets | 0.8 | 0.6 | 1.0 | 0.7 | 0.7 | 0.9 |
| Showers | 0.3 | 0.1 | 0.1 | 0.0 | 0.0 | 0.4 |
| Drinking fountains | 0.5 | 0.3 | 0.2 | 0.0 | 0.2 | 0.9 |

*This value is skewed by 69 pressure-assisted toilets at one location; outside of that location, the mean value is 0.1.

** This value is skewed by 33 urinals at one location; outside of that location the mean value is 0.1.

*** This value is skewed by 24 urinals at one location; outside of that location the mean value is under 0.1.

Table ES-9 shows the overall market penetration of water-conserving fixtures within the non-residential sectors surveyed.

**Table ES-9: Market Penetration of Water-Conserving Fixtures in Non-Residential Sectors**

| | Percent of Market in Each Sector Surveyed | | | | | |
|---|---|---|---|---|---|---|
| Fixture/Appliance | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
| Ultra-Low Flush Toilets | 31.8 | 45.4 | 47.2 | 68.0 | 44.1 | 49.8 |
| Low-Flow Urinals | 21.6 | 5.9 | 24.0 | 22.2 | 22.7 | 24.4 |
| Faucet Aerators | 72.2 | 65.9 | 60.8 | 60.1 | 57.5 | 78.3 |

## Analysis and Conclusions

### Rates of Replacement

Where 1995 data were available, the study team calculated the rates at which high-water use fixtures have been replaced with water-conserving equivalents. Fixtures included toilets, showerheads, and faucet aerators in the single and multi-family sectors; and toilets and faucet aerators in one non-residential sector: restaurants.

Replacement rates were calculated by comparing the number of non-conserving fixtures in a base year (1991 for toilets, 1994 for other fixtures) with the number of the same fixtures at a later point in time. The end of 1991 was used as the base or starting time for toilets because it represents the time at which non-ultra-low flush toilets were no longer allowed in the District's service area. As of the beginning of 1992, California plumbing codes mandated that all new and replacement toilets had to be ultra-low flush fixtures. The end of 1994 was used as the base period for other fixtures, as it represents the time when data for the 1995 baseline study was collected.

**Toilet Replacement Rates.** The study team calculated three rates of replacement for single and multi-family toilets. One was the actual rate at which toilets have been replaced between 1991 and 2001. An "unassisted" rate (estimated toilet replacement rate in the absence of District rebate and direct-install programs) was also estimated. In addition, a "natural" rate of replacement was calculated based on the average age of toilets. The various rates of toilet replacement for the single and multi-family sectors are illustrated in Table ES-10. The average annual rate of replacement for restaurant toilets was calculated at 3.5% for the period between 1991 and 2001.

**Table ES-10: Average Annual Rates of Replacement for Toilets**

| Average Annual Rates | Percent of Toilets Replaced Annually | |
|---|---|---|
| | Single-Family | Multi-Family |
| Actual Between 1991 and 2001 | 2.5 | 3.5 |
| "Unassisted" Between 1991 and 2001 (assuming no "free riders") | 2.2 | 1.8 |
| "Natural" (using average age of toilets from survey: 18.8±1.3 years for single-family toilets, and 17.3±1.9 years for multi-family toilets) | 5.0-5.7 | 5.2-6.5 |

**Showerhead Replacement Rates.** The average annual rate of replacement for single-family showerheads between 1991 and 2001 was calculated at 1.8 percent. This relatively low replacement rate may be a result of the already high market penetration of low-flow showerheads. About two-thirds of all showerheads have flow rates under 2.5 gallons per minute (gpm).

The 1.8 percent replacement rate for showerheads is based on measured flow rates. It does not include low-flow showerheads that may have been altered or for any other reason do not perform at 2.5 gpm or less. It also does not include the replacement of low-flow shower-heads with newer and potentially more water- saving models; data on showerhead types indicates that many such changes have taken place since 1995: there are fewer atomizing (low-flow) and more stream spray type (also low-flow) showerheads now than six years ago.

The total rate of replacement for multi-family showerheads between 1995 and 2001 was approximated at 4 percent. This rate does not take into account replacement of showerheads with flow rates within the 2.5 gpm range by others in the same range

**Faucet Aerator Replacement Rates**. There were insufficient data from previous studies to determine the rate at which higher-than-2.2 gpm aerators are being replaced with low-flow aerators, although data collected in the 2001study will allow this determination in future studies.

Data from the 1995 baseline study was used to calculate the rate at which aerators are being installed on faucets that previously did not have them. This rate was calculated at an annual average of 6.9 percent in the single-family sector and 6 percent in the multi-family sector (5+ units).

The total rate of installation for faucet aerators in restaurants decreased. There are more faucets without aerators now than in 1995, assuming the 2.7-faucet-per-restaurant estimate from the Baseline study is correct.

## Water Conservation Potential

There is an estimated 13.17 million gallon per day (mgd) water conservation potential from the replacement of non-conserving toilets, showerheads, and clothes washers, and from the installation of aerators on indoor faucets. Figure ES-3 presents a breakdown of the estimated water savings by fixture/ appliance and residential sector.

Retrofitting toilets with displacement devices rather than replacing them with ULFTs was estimated to have a conservation potential of 1.18 mgd: 0.86 mgd from the single-family sector and 0.32 mgd from the multi-family sector (five or more units).

This figure was based on single-family survey data from this study showing that displacement devices would save on the average 0.3 gallons per flush (gpf) for all non-conserving toilets.

The study team calculated water savings using data from the 2001 survey and other sources. Mean flush or flow volumes for conserving and non-conserving fixtures were used to compute water savings. Data on frequency of fixture use was obtained from the AWWA Research Foundation's *Residential End Uses of Water*.

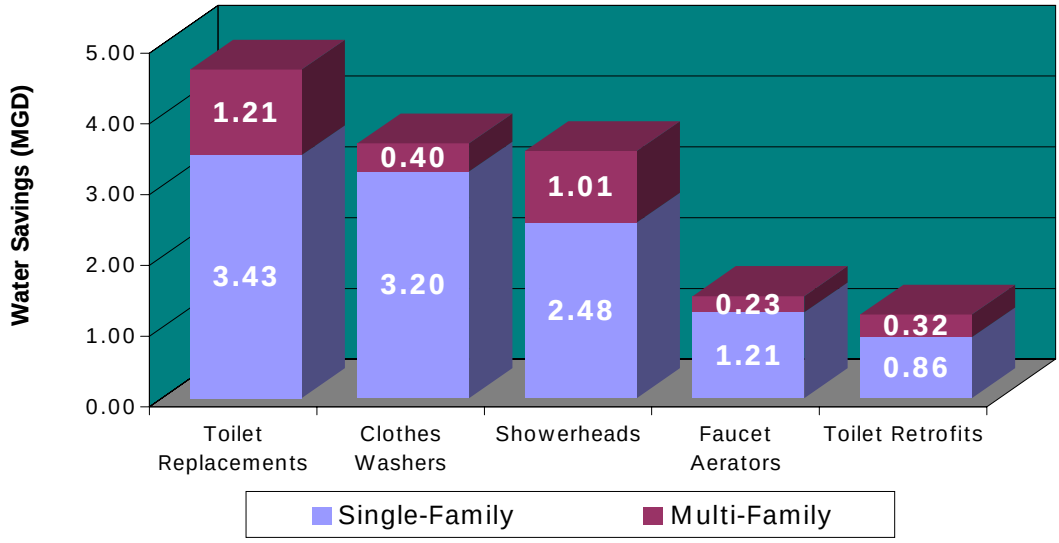



**Figure ES-4: Potential Water Savings from Fixture/Appliance Replacement or Retrofit**

Survey data do not provide water consumption numbers that would allow the quantification of potential water savings from improved irrigation efficiency, although they do provide valuable information on the breakdown of landscapable and irrigated areas.

Findings show that outdoor water use is prevalent on the east side of the District's service area. The comparison of summer to winter water use shows that residents east of the hills average from twenty percent to 390 percent outdoor water use in summer months, which represents a ratio of summer to winter water use between 1.2 and 3.9. The ratios of summer to winter water use west of the hills range from 0.75 to 1.25 for all but one of the groups surveyed. Houses built after 1990 show a ratio of 1.42.

The vast majority of single-family homes with water conservation potential from improved irrigation efficiency belong to 12 of the 72 groups surveyed in this study and represent about 5 percent of the single-family water accounts in the District's service area. These homes are located east of the hills, are generally occupied by the owners, and have a high summer to winter water consumption differential.

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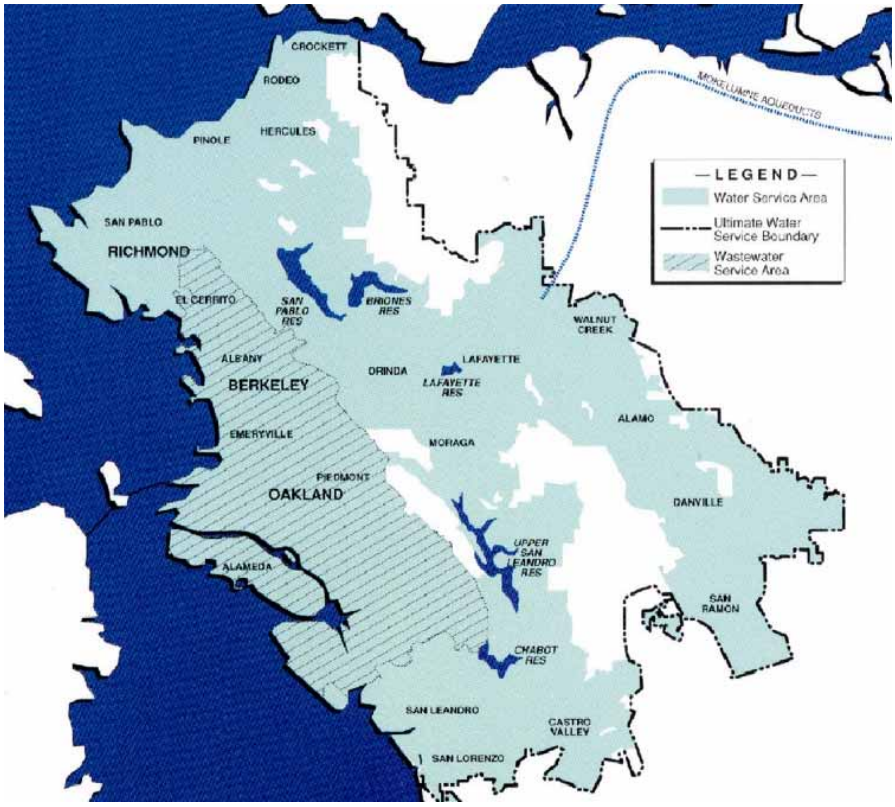
# 1.0 INTRODUCTION

## 1.1 BACKGROUND

The East Bay Municipal Utility District (District) is a public water utility that provides water to approximately 1.3 million people in a 325-square-mile area, including 20 cities and 15 unincorporated communities in parts of Alameda and Contra Costa counties. Ninety-five percent of all accounts in the District's service area are residential.




*Source: East Bay MUD 2000 Annual Report*

**Figure 1-1: East Bay Municipal Utility District Service Area**

The District and its customers have a long history of commitment to water conservation and currently support one of the largest conservation programs in California. Water conservation is a central component of the District's 1993 Water Supply Management Program (WSMP), an integrated resource plan that seeks to address the full set of issues that affect the reliability of the District's water supply now and in the future. The WSMP set a conservation goal of 34 million gallons per day (MGD) in the year 2020 and directed District staff to prepare a Water Conservation Master Plan (WCMP). The master plan, approved in 1994, is a blueprint for meeting water savings goals that maintain the District's long-standing emphasis on voluntary conservation by customers through cost-effective conservation programs.

A fundamental requirement for the development and evaluation of an effective water conservation program is a detailed knowledge of how customers use water. The WCMP identified the need to conduct market penetration studies at regular intervals. The District's Water Conservation Division conducted studies in 1995 *(Water Conservation Baseline Study*) and in 1998 (*Water Conservation Residential Site Survey*). The 2001 study summarized in this report provides new findings and expands the ability to make inferences about the market penetration of water-using hardware, the rate of hardware replacement, and customer behavior and attitudes.

Findings of the 2001 study will support the ongoing development, marketing, and implementation of conservation programs targeted to residential and non-residential customers, including an array of incentives for hardware installation and educational outreach to affect customer water-use practices. The District's annual reports on the WCMP describe these programs in detail. Study inferences regarding conservation potential and the rate of market transformation will also support ongoing evaluation of water conservation program impacts and District water supply planning.

## 1.2 STUDY OBJECTIVES

The objectives of the 2001 water conservation market penetration study were to collect current data on water conservation attitudes and behavior, determine the types and saturation of water-conserving hardware, assess water conservation potential for identified market sectors, and relate study findings to those of the two previous studies. These objectives were met through telephone and site surveys, statistical analysis of collected data, and analysis of pertinent data from other sources.

Customer attitudes and behavior regarding water conservation were assessed for residential customers only. Telephone interviews were conducted of a representative sample of District customers that included owners and tenants of single-family residences and owners/managers of multi-family properties.

The market penetration of water-conserving hardware was assessed among residential and selected non-residential customers. Data was collected through site visits to customers' homes and places of business. Study participants were selected to accurately reflect District-wide customer characteristics.

Water conservation potential within the market sectors analyzed in the study was assessed from collected data and other sources. Survey data and studies on volume and frequency of fixture use were used to estimate the annual rates of total replacement and natural replacement of common water-using hardware with low-water-use and high-efficiency hardware.

## 1.3 REPORT ORGANIZATION

The methods and procedures used in the 2001 water conservation market penetration study and the study's results are presented in the following six sections of this report:

Section 2: Methodology

Section 3: Attitudes Survey

Section 4: Single-Family Site Survey

Section 5: Multi-Family Site Survey

Section 6: Non-Residential Site Surveys

Section 7: Analysis and Conclusions

Detailed documentation on sampling methodology, ways to enlist customer participation, quality control, training of survey personnel, survey forms, data collection, and survey responses is presented in eleven appendices attached to this report:

Appendix A: Sampling Methodology

Appendix B: Development of Customer Lists

Appendix C: Enlisting Customer Participation

Appendix D: Data Collection Forms

Appendix E: Quality Control Guidelines

Appendix F: Training Programs

Appendix G: Single-Family Telephone Interviews

Appendix H: Multi-Family Telephone Interviews

Appendix I: Single-Family Site Survey

Appendix J: Multi-Family Site Survey

Appendix K: Non-Residential Site Surveys

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# 2.0 METHODOLOGY

## 2.1 SURVEY TYPES

Two types of surveys were conducted using separate samples of District customers: telephone interviews and site visits. Telephone interviews were used to assess residential customers' attitudes toward water conservation, including their reasons for conserving or not conserving water, perceptions regarding water-conserving fixtures/ appliances, knowledge of household water use, and knowledge of District conservation programs. Site visits were conducted to collect information on the types and characteristics of water-using fixtures, appliances, and equipment. The site visits included measurements of flow rates (faucets and showerheads) landscaped areas, and toilet flush volumes.

## 2.2 MARKET SECTORS

The market penetration study included nine market sectors as defined by *business classifications codes* (BCC) within the District's databases. These comprised three residential classifications and six non-residential categories. Table 2-1 presents the classifications, along with their BCCs, number of accounts, and average daily water use.

**Table 2-1: Market Sectors**

| Classification | BCC | Number of Accounts* | Sector MGD† | Account GPD† |
|---|---|---|---|---|
| Single-Family Residence | 8800 | 287,209 | 88.62 | 289 |
| Multiple Dwelling (2-4 units) | 6514 | 15,077 | 8.61 | 460 |
| Apartment Building (5 or more units) | 6513 | 6,713 | 24.58 | 2,919 |
| Warehousing | 4200 | 868 | 1.15 | 1,048 |
| Retail Trade, Other | 5300 | 2,030 | 1.85 | 477 |
| Food Sales | 5400 | 492 | 0.67 | 777 |
| Eating Places, Fast Food | 5811 | 231 | 0.39 | 791 |
| Eating Places, Restaurants | 5812 | 644 | 1.43 | 1,118 |
| Offices | 6800 | 2,650 | 3.62 | 961 |

* These numbers reflect the number of records used in the study, rather than a total of all District accounts in each sector. Duplicate account numbers and inactive accounts were removed from the database for sample selection purposes.

† Average water consumption in million gallons per day (MGD) for entire market sector, and gallons per day (gpd) per individual account. Values from District Water Conservation Division, April 2001

The nine market sectors were selected to maximize the collection and usefulness of data while containing costs. The residential sectors, representing 95% of all accounts, were obvious choices. The attitudes survey focused strictly on the three residential sectors, targeting residents of single-family homes (BCC 8800) and owners/managers of multi-family properties (BCCs 6513 and 6514). The residential site survey focused on single-family homes (BCC 8800) and apartment buildings with five or more units (BCC 6513). To conserve costs, multiple dwellings with 2 to 4 units (BCC 6514) were not surveyed. Although more numerous in terms of accounts, they use significantly less water as a sector than the apartment buildings with five or more units and thus present less of a water-savings potential.

The six non-residential sectors surveyed in this study presented advantages in the data collection process. First, sectors were selected with sites that could be surveyed in an hour or less by individuals with only a basic training in the identification and evaluation of water-using fixtures and equipment. Second, potential difficulties obtaining access to sites and possible disruptions to client activities were avoided, excluding hospitals and schools. Third, selected non-residential sectors were identified by the 1997 California Urban Water Council's *CII ULFT Savings Study* as having high water savings potential from toilet replacement.

The 1995 and 1998 studies used different means to analyze the three residential sectors and two of the non-residential business classification codes used in the 2001 study. Table 2-2 illustrates how the previous two studies differed in scope and sample size from the 2001 study. Sampling error, which decreases as the sample size increases, is lowest in this study.

**Table 2-2: Comparison with Previous Studies**

| | | Sample Sizes (Number of Accounts Analyzed) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Site Visits | | | Telephone Interviews | | |
| Market Sector | BCC | 1995 | 1998 | 2001 | 1995 | 1998 | 2001 |
| Single-Family Residence | 8800 | 290 | 103 | 387 | 350 | | 388 |
| Multiple Dwelling (2-4 units) | 6514 | | | | | | |
| Apartment Building (5 or more units) | 6513 | 151 | 103 | 360 | 150 | | 375 |
| Warehousing | 4200 | | | 52 | | | |
| Retail Trade, Other | 5300 | | | 59 | | | |
| Food Sales | 5400 | | | 73 | | | |
| Eating Places, Fast Food | 5811 | | | 47 | | | |
| Eating Places, Restaurants | 5812 | 51 | | 70 | | | |
| Offices | 6800 | 46 | | 235 | | | |
| Hospitals | 8060 | 10 | | | | | |
| Hotels | 7000/7001 | 50 | | | | | |
| Schools | 8200 | 57 | | | | | |

## 2.3 SAMPLING METHODOLOGY

Stratified random sampling was used to obtain unbiased, representative samples of District customers. All market sectors were stratified by geographic location. Residential sectors were additionally stratified by the year built. Single-family residences were further stratified by tenancy and outdoor water use. Lot size was initially proposed as a stratification factor for single-family accounts. Data available from District files and from County Assessors' databases, however, proved insufficient to allow this stratification. The levels of stratification and their rationale are summarized below (see Appendix A for complete details on sampling methodology and sample sizes):

- *Geography*: The District serves two areas that differ significantly in terms of their climate and water use patterns. The market penetration study differentiated between "east of the hills" and "west of the hills." Customers located in the cities of Alamo, Danville, Lafayette, Moraga, Orinda, Pleasant Hill, San Ramon, and Walnut Creek were designated east of the hills; other cities within the service area were designated west of the hills.
- *Year-Built*: Residential customers (single and multi-family dwellings) were stratified into six age groups: those built before 1950, and those built in the decades of the '50s, '60s, '70s, '80s, and from 1990 to 2001. The selected age groups facilitate the isolation of data for residences built after 1982, when legislation was passed in California that prohibited toilets with flush volumes in excess of 3.5 gallons, and for houses and apartment buildings built after 1992, when flush volumes were further restricted in the state to 1.6 gallons or less.
- *Tenancy*: Three types of tenancy were considered among single-family residents: "owners," who comprised 63% of the single-family accounts; "tenants," who made up 17% of the total; and "unknown," a category assigned in District files to 20% of the 287,209 accounts used in the study. Different types of tenancy were used to assess possible differences in attitudes toward water conservation and in the implementation of conservation measures.
- *Outdoor Water Use*: Single-family residences were stratified by how their outdoor water use compared to that of other houses in the same geographical location and age and tenancy groups. The ratio of average summer to winter water consumption was determined for all single-family customers. A ratio of 1.0 indicates equal summer and winter use, and ratios higher than 1.0 indicate higher summer use, assumed attributable to outdoor uses. The median ratio was calculated for customers in each of thirty-six groups that represented all possible combinations of locations, year-built, and tenancy types. Customers with ratios higher than the median for their group were classified as having "high" outdoor water use and the remainder classified as having "low" outdoor water use.

A confidence level of 95% was used to determine sample sizes for all surveys. Tolerable sampling errors for proportional data were assumed at 5% for all residential surveys and for site visits to office buildings. A sampling error of 10% was used in determining sample sizes for site surveys in restaurants, retail trade, warehousing, food sales, and fast food facilities; a larger sampling error was allowed in these non-residential sectors for cost-containment purposes; the five sectors together use less than 3% of the District's total metered water consumption.

The selected market sectors were surveyed individually, except for two multi-family sectors (buildings with 2-4 units and buildings with 5-plus units) that were combined for the attitudes survey to facilitate collection of attitudinal data from owners/ managers of income property. Table 2-3 shows the confidence level, sampling error, and sample sizes for the 10 surveys conducted.

**Table 2-3: Sample Sizes**

| Survey Type | Confidence Level | Sampling Error | Sample Size |
|---|---|---|---|
| 1. Telephone Interviews Single-Family | 95% | 5% | 384 |
| 2. Telephone Interviews Multi-Family | 95% | 5% | 377 |
| 3. Site Visits Single-Family | 95% | 5% | 384 |
| 4. Site Visits Multi-Family (5+ Units) | 95% | 5% | 363 |
| 5. Site Visits Warehouses | 95% | 10% | 57 |
| 6. Site Visits Retail Trade, Other | 95% | 10% | 60 |
| 7. Site Visits Food Sales | 95% | 10% | 55 |
| 8. Site Visits Fast Food | 95% | 10% | 49 |
| 9. Site Visits Restaurants | 95% | 10% | 72 |
| 10. Site Visits Offices | 95% | 5% | 225 |
| | **Total Number of Accounts Targeted** | | **2,026** |

Samples were stratified as follows:

1. Telephone interviews of single-family residents were stratified into 72 subgroups:
    a. Three types of tenancy (owners, renters, unknown)
    b. Two locations (east or west of hills)
    c. Six year-built categories (<1950, 1950s, 1960s, 1970s, 1980s, 1990-2001)
    d. Two outdoor water use categories (high and low).

2. Telephone interviews of apartment owners/managers were stratified into 24 subgroups:
    a. Two building sizes (2-4 units and 5-plus units)
    b. Two locations (east or west of hills)
    c. Six year-built categories (<1950, 1950s, 1960s, 1970s, 1980s, 1990-2001).
3. Site visits to single-family residents were stratified into 72 subgroups:
    a. Three types of tenancy (owners, renters, unknown)
    b. Two locations (east or west of hills)
    c. Six year-built categories (<1950, 1950s, 1960s, 1970s, 1980s, 1990-2001)
    d. Two outdoor water use categories (high and low).
4. Site visits to apartment buildings (5-plus units) were stratified into 12 subgroups:
    a. Two locations (east or west of hills)
    b. Six year-built categories (<1950, 1950s, 1960s, 1970s, 1980s, 1990-2001).
5. Site visits to warehouses (BCC 4200) were stratified by location (east or west of hills).
6. Site visits to retail trade facilities (BCC 5300) were stratified by location (east or west of hills).
7. Site visits to food sales facilities (BCC 5400) were stratified by location (east or west of hills).
8. Site visits to fast food establishments (BCC 5811) were stratified by location (east or west of hills.
9. Site visits to restaurants (BCC 5812) were stratified by location (east or west of hills).
10. Site visits to offices (BCC 6800) were stratified by location (east or west of hills).

## 2.4 DEVELOPMENT OF CUSTOMER LISTS

Customer lists were developed from District water use and year-built data. Water use data for 1998, 1999, and 2000 were used to compute the average ratio of summer to winter water use for single-family residences. Year-built data for single and multi-family accounts were incorporated into District databases matching parcel numbers from County Assessors' files.

The raw data were subdivided into the appropriate subgroups. Single-family accounts were separated into 72 groups, multi-family accounts into 24 groups, and non-residential accounts into two groups. The number of accounts in each subgroup was then determined, as well as the proportion of the total that they represented. Each sample was configured using the same proportions found in the entire service area. For example, among the single-family accounts the largest subgroup was the one corresponding to houses built before 1950, located west of the hills, occupied by the owner, and with a summer water use above the median for that subgroup: 45,702 accounts, or 15.9 percent of the total, shared those characteristics. The survey sample included 61 accounts, or 15.9 percent of the total sample of 384, from that particular subgroup.

Lists of potential study participants were developed assuming a response rate of 10 percent (one out of ten account holders contacted would agree to participate in the study). This assumption was adjusted for the non-residential sectors due to the small number of accounts available. Table 2.4 shows how the total number of potential participants, selected at random from the account numbers available in each subgroup, was divided (see Appendix B for complete details on the development of customer lists).

**Table 2-4: Sizes of Customer Lists**

| Survey Type | Sample Size | Number of Potential Study Participants |
|---|---|---|
| 1. Telephone Interviews Single-Family | 388* | 3,880 |
| 2. Telephone Interviews Multi-Family | 377 | 3,770 |
| 3. Site Visits Single-Family | 388* | 3,880 |
| 4. Site Visits Multi-Family (5+ Units) | 363 | 3,630 |
| 5. Site Visits Warehouses | 57 | 570 |
| 6. Site Visits Retail Trade, Other | 60 | 600 |
| 7. Site Visits Food Sales | 55 | 492 |
| 8. Site Visits Fast Food | 49 | 231 |
| 9. Site Visits Restaurants | 72 | 644 |
| 10. Site Visits Offices | 225 | 2,250 |

* The sample size for single-family surveys increased from 384 to 388 due to necessary rounding up of the number of accounts per subgroup.

## 2.5 ENLISTING CUSTOMER PARTICIPATION

Announcement letters and follow-up telephone calls were used to enlist customer participation in the market penetration study. The content of the announcement letters and the procedures used to initiate contact with potential study participants were designed to minimize sample bias.

Announcement letters did not disclose the water-conservation aspects of the study. Voluntary participation was requested in a water-use study to collect data on water-using fixtures and appliances that would allow the District to improve service to its customers.

Participants were encouraged to participate through appeals to their sense of community service. Material incentives in the form of credits on water bills were initially considered and later discarded due to administrative and legal concerns. Five different letters were prepared to enlist customer participation, one for each of the major survey groups: telephone survey of single-family residents, telephone survey of apartment building owners and managers, site survey of single-family homes, site survey of apartment buildings, and site survey of non-residential sectors.

Announcement letters were mailed in five batches to minimize the time between the customer's receipt of the letter and the initial telephone contact from an appointment scheduler. A sample of each letter is included in Appendix C.

Telephone calls to potential study participants were made during working hours and on weekends and weekday evenings. Weekday calls were generally made between 10 a.m. and 8 p.m. Weekend calls were made between 9 a.m. and 6 p.m. The after-hour and weekend calls sought to avoid sample bias by including all segments of the customer base, not only those customers home during working hours.

Telephone callers encouraged customers to participate in the study by stressing that the data collection effort was important to the District and would take only a few minutes of their time (five minutes for telephone interviews, 20-30 minutes for single family homes, 45 minutes to an hour for multi-family buildings and businesses). Material incentives were offered to potential participants in single and multi-family site surveys in the form of water conservation kits (low-flow showerhead, kitchen and bathroom faucet aerators) and copies of the American Horticultural Society's "*Water-Wise Gardening*" guide. Multi-family owners/managers and non-residential customers were encouraged to participate in the site surveys by offering free assessments of water use efficiency in an effort to decrease their water bills in the long term.

## 2.6 DATA COLLECTION

The study involved two distinct types of data collection: telephone interviews for the attitudes survey and paper forms for the market penetration study. Telephone interviewers asked attitudinal questions from a questionnaire specially designed for the particular type of customer (single family resident or multi-family owner/ manager). Site survey field representatives filled out the appropriate forms based on their visual inspection of customer fixtures, appliances, landscaped areas, irrigation systems and controllers, pools, spas, fountains, ponds, and any other water-using equipment at each visited site.

Data from telephone interviews were entered directly into computer files. A computer program was developed to provide interviewers with ready access to lists of participants, facilitate data entry, and check for completeness. The program tracked the number of interviews per subgroup and automatically made a subgroup unavailable when the targeted number of customers had been reached. Interviewers were able to enter responses to questions with simple clicks on the pre-programmed computer screen. The questionnaires used in the attitudes survey are included in Appendix D.

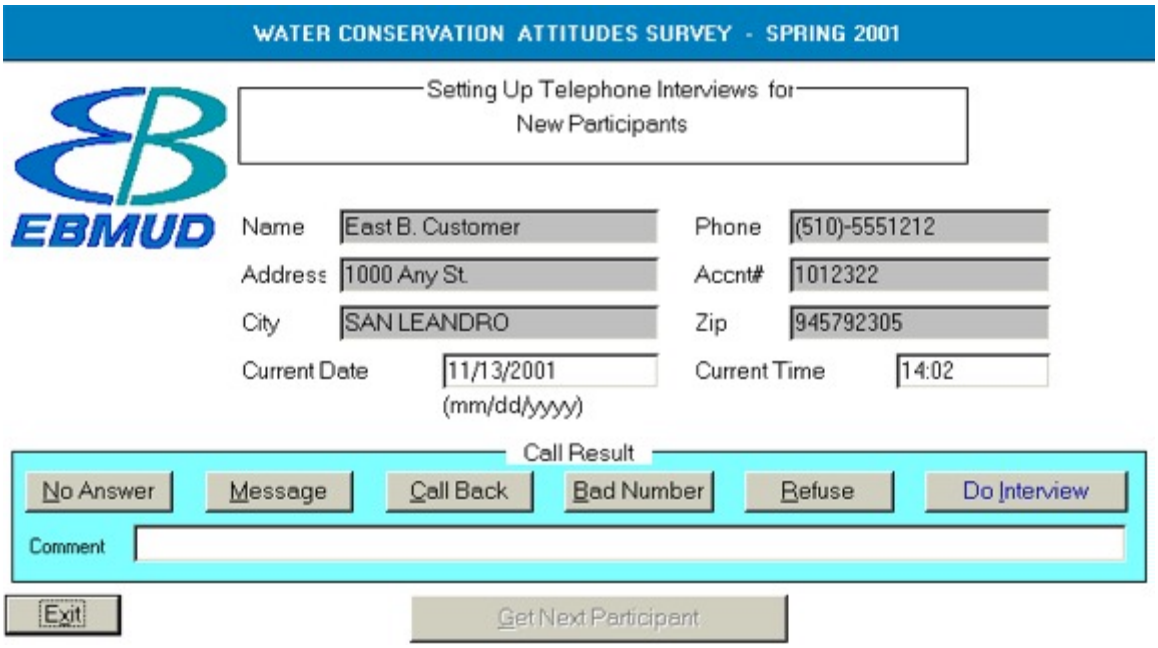


**Figure 2-1: Sample Screen from "Interviews" Program**

Data collection for the site surveys started with an appointment form generated by a specially designed computer program that facilitated the scheduling of site visits. The appointment scheduler filled out this form on a computer screen when a customer contacted over the telephone agreed to have a field representative visit his/her home or place of business. The appointment form was printed out and attached to an appropriate survey package. The form contained relevant customer and account information such as name, address, phone number, type of account (BCC), account number, type of tenancy, year-built, and site location in the Thomas Street Guide. A sample appointment form is included in Appendix D.

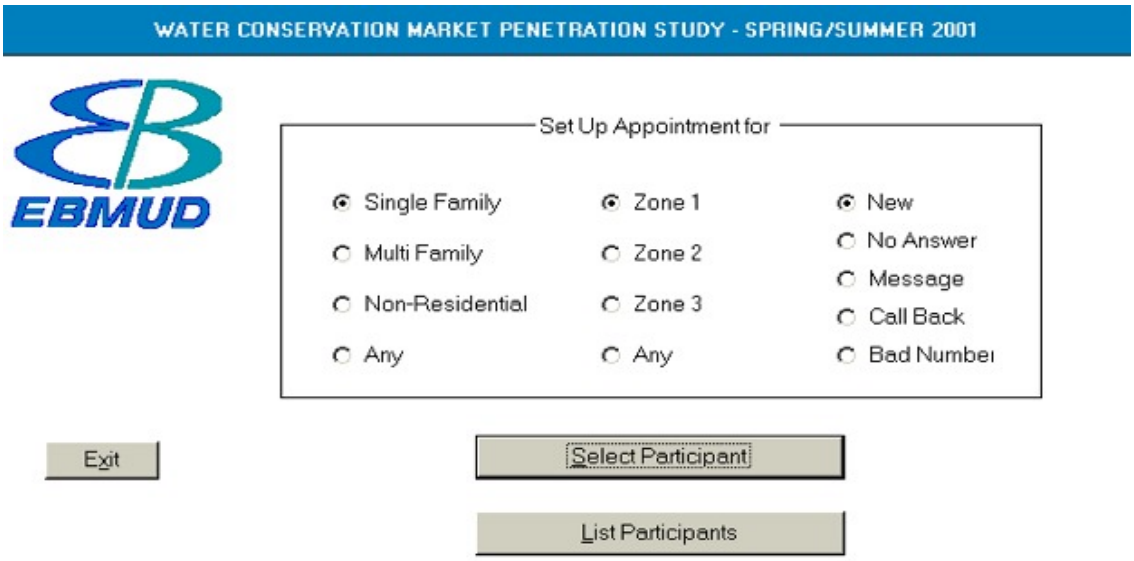


**Figure 2-2: Sample Screen from "Appointments" Program**

Field representatives fulfilled several functions during their prearranged visits to single-family, multi-family, and non-residential sites. They provided customers with an informational flyer on the study; offered low-flow showerheads and faucet aerators (up to five per customer), and conducted brief interviews with the customer and visual inspections of water-using fixtures, appliances, and equipment.

Copies of the various data sheets and informational flyer used in the study are included in Appendix D.

Data from the survey forms were entered into a master database using a data entry program specially designed for the study. The data entry program contained quality control features to verify each entry and check for completeness.

## 2.7 Quality Control

Quality assurance and control were exercised throughout the various study activities. Written quality control guidelines were available to every member of the study staff. Guidelines for telephone interviewers, site surveyors, appointment schedulers, and administrative assistants are presented in Appendix E. Customer contacts from telephone interviews and site visits were monitored by management personnel to insure uniformity and quality, and project team managers and trainers worked with every staff member during their initial client contacts. Computer programs used to collect telephone interview data, set up appointments for site visits, and enter field data contained quality control features such as automatic checks for completeness and limitations on the range of possible entries. Management and staff personnel conducted additional quality control checks on field data before entry into the master database. Managers also performed random follow-up calls and visits to verify the integrity of collected data (on the average one call or visit per consultant field representative per week).

## 2.8 PROJECT STAFF

Study staff included District personnel and personnel from the consulting team retained to conduct the study. District personnel conducted a portion of the telephone interviews for the attitudes survey and most of the site visits to non-residential customers. About 40 non-residential appointments a week were set aside for District personnel.

The consulting team provided field and office staff. Four to six field representatives conducted site visits six to seven days a week. Three staff members set up appointments and entered collected data into computer files. One staff member conducted telephone interviews on evenings and weekends during the initial stages of the study. Two staff members from the consulting team subsequently handled both daytime and after-hours telephone interviews. Three managers supervised the activities of consultant personnel.

Use of District staff in survey performance presented both advantages and disadvantages. District representatives brought to the study substantial customer service experience, familiarity with the District's service area and customer base, and knowledge of the end uses of water. On the other hand, the use of District personnel required more training sessions and more complex logistics to coordinate appointment scheduling and fieldwork, transfer data from field representatives to data entry personnel, and resolve cancellations and other customer contact problems.

## 2.9 STAFF TRAINING

Training programs were instituted to acquaint telephone interviewers, appointment schedulers, site surveyors, and data entry clerks with their respective tasks. Telephone interviewers were trained in the use of the software designed for the interviews. Appointment schedulers were trained in customer relations, use of the appointments program, and coordination with field personnel. Data entry clerks were trained in computer use, data checking, and coordination with field personnel. Site surveyors received training in customer relations, faucet and showerhead flow measurements, distance and area measurements for determination of landscapable areas, leak detection, determination of manufacturers and model types for various fixtures and appliances, and determination of toilet flush volumes. Site surveyor training included mock surveys where several surveyors inspected the same facilities and the results were compared for consistency and discussed for training purposes. Separate training sessions were conducted for field personnel in charge of single and multi-family surveys and for District personnel in charge of non-residential site visits. Appendix F includes the slide presentations for the two training sessions.

# 3.0 ATTITUDES SURVEY

## 3.1 QUESTIONNAIRES

Two separate questionnaires were used: one for single-family residents and another for owners/ managers of multi-family dwellings (see Appendix D). Both questionnaires asked respondents similar questions about their attitudes regarding water conservation, specific water use and conservation behaviors, and their interest and potential participation in District conservation programs. Single-family residents were also asked about the number of people and annual income in their household. Owners/managers of multi-family sites were asked about the number and type of units in their buildings and their occupancy rates.

## 3.2 RESPONSE RATES

Response rates varied widely depending on a number of factors, including day of the week, time of day, target sector, target subgroup within sector, person making calls, and policies regarding messages and call-backs:

- Higher response rates were obtained on weekdays and standard working hours for calls to multi-family owners/ managers; evenings and Saturday mornings yielded the best response rates from single-family customers.
- The single-family sector was easier to approach than the multi-family sectors; apartment managers in buildings with five or more units were easier to find than owners/managers of smaller multiple dwellings.
- Subgroups requiring a large number of participants were generally more difficult to complete than subgroups requiring one or two participants; the largest subgroup (requiring 196 respondents), corresponding to multi-family dwellings with 2 to 4 units, west of the hills, built before 1950, averaged one interview in eleven calls.
- The person making calls made a difference because the levels of persuasiveness varied from one individual to another.
- Policies regarding messages and call-backs were changed during the study. Initially messages were left on answering machines or when the head of household was not available, but this practice was discontinued due to logistic difficulties (District interviewers were not available after normal working hours to respond to call-backs) and to save time.

Reaching the appropriate person proved more difficult than anticipated. There were numerous unanswered calls, incorrect telephone numbers, and required call-backs. Averages of call outcomes are presented in Table 3-1.

**Table 3-1: Attitudes Survey Call Outcomes**

| Market Sector | Percent of Telephone Calls | | | | | |
|---|---|---|---|---|---|---|
| | Interview | Refusal | No Answer | Message | Call Back | Incorrect Number |
| Single-Family Residents | 40 | 18 | 24 | 2 | 8 | 8 |
| Multi-Family Owners/ Managers (2-4 Units) | 10 | 7 | 36 | 14 | 10 | 23 |
| Multi-Family Owners/ Managers (5+ Units) | 19 | 13 | 31 | 8 | 7 | 22 |

Customer participation rates were better than anticipated. Once contact was established with the appropriate person, about two out of three people agreed to the interview. Among single-family respondents, 69% of those contacted agreed to participate in the survey. The equivalent percentage among multi-family owners/managers was 59%.

No sample bias was perceived from response rates. The stratification of the sample resulted in 96 subgroups, the majority of them requiring between one and four participants; by meeting the target number of respondents per subgroup, bias due to geographic location, tenancy, age of dwelling, and water use was avoided. The telephone calls were spread out over daytime, evening, and weekend hours to avoid an over-representation of senior citizens and stay-at-home customers. Customers with incorrect telephone numbers were not removed from consideration; reverse directories were used to obtain correct telephone numbers.

## 3.3 SAMPLE CHARACTERISTICS

A total of 763 telephone interviews were conducted, most of them in June and July, 2001: 388 interviews of single-family residents and 375 of apartment building owners/ managers. The single-family sample was subdivided into 72 groups according to location, tenancy, age of dwelling, and ratio of summer to winter water use. The multi-family sample was divided into 24 groups according to size of building (2-4 units or 5-plus units), location, and age of building. The representation of each group in the sample was in the same proportion as the representation of the group in the District's service area. The makeup of the single and multi-family samples is presented in appendices G and H and tables G-1 and H-1.

## 3.4 RESPONDENT CHARACTERISTICS

According to District data, the majority of single and multi-family respondents live west of the hills in dwellings built before 1950. Figure 3-1 illustrates the distribution of respondents by geographic location and age of dwelling. The percentage of respondents in each category closely matched the percentage of District customers with the corresponding characteristics.

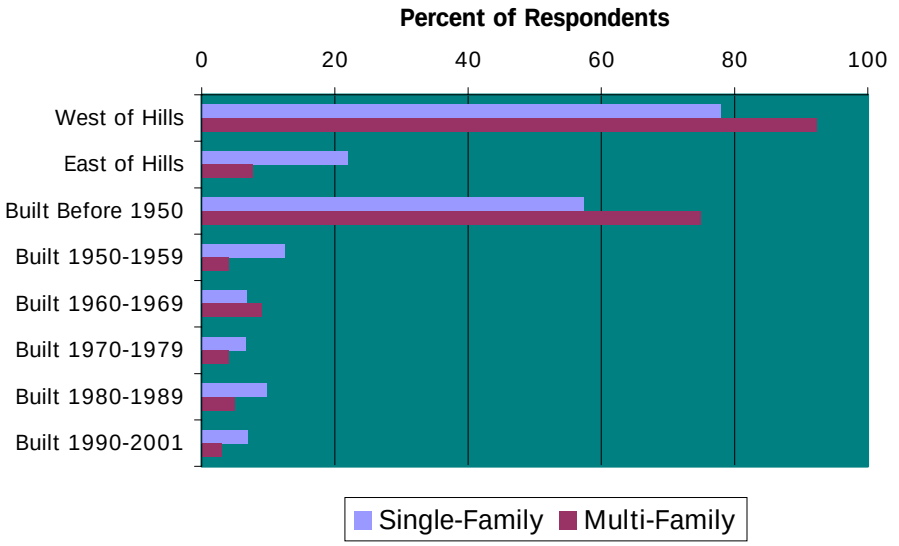


**Figure 3-1: Distribution of Respondents to Attitudes Survey by Location and Age of Dwelling**

The majority (62.9%) of single-family respondents are listed in District files as homeowners, 16.3% as tenants, and 20.8% as unknown. U.S. Bureau of the Census data from 1990 (data from 2000 census not yet available) indicate that 16.2% of single-family homes in cities within the District's service area are occupied by tenants and 80.7% by homeowners (3.1% listed as vacant). It is likely, therefore, that most accounts with unknown tenancy are actually occupied by their owners.

Ninety-two percent of multi-family respondents own or manage properties west of the hills; 69% represent properties with 2 to 4 units and 31% represent buildings with 5-plus units.

According to the answers provided by respondents:

- Forty-seven percent of the single-family households surveyed had one or two occupants; 86% had four occupants or less.
- Fifty-four percent of the single-family households surveyed reported annual incomes under $20,000; 75% reported annual incomes under $80,000; 17% declined to respond.
- Eighty-two percent of multi-family respondents claimed to own the property they were called about; the rest were managers, maintenance staff, or rental office employees.
- Eighty-nine percent of multi-family sites surveyed reported occupancy rates between 90 and 100 percent.

## 3.5 SURVEY FINDINGS

Survey findings are reported in terms of conservation attitudes, conservation actions, and potential conservation actions to facilitate comparison with the 1995 study. Attitudes are gauged on the basis of customer knowledge of the quantity of water used, perception of the importance of water conservation, willingness to save water, and motivations to do so. The conservation actions section of this report provides an indication of water-conserving activities undertaken by District customers in recent months. The potential conservation actions section highlights customers' level of interest in possible District-sponsored conservation measures. Survey answers are tabulated in appendices G (single-family) and H (multi-family). The statistical level of confidence on survey answers is 95%. The maximum relative error around the percent distribution of proportional data is 5%.

### Conservation Attitudes

Single-family residents were asked to guess the number of gallons of water used by their household in one day for inside and outside uses. A fourth of the respondents declined to venture a guess; 58% thought that the daily household water use was less than 50 gallons; 10% thought it was between 50 and 199 gallons; and 5% estimated daily water use between 200 and 300 gallons. According to April 2001 Water Conservation Division figures, the average daily use per household is 289 gallons.

Single-family residents east of the hills underestimated water use to a greater extent than residents west of the hills. The average daily water use estimated by east of the hills residents who provided a numerical answer was 58 gallons; their actual average daily water use is 480 gallons (based on water consumption figures for 1998-2000). Residents in west of the hills single-family homes estimated water use at 65 gallons per day (gpd), while their actual use averages 228 gpd.

Underestimation of daily water use was most notable in the 2001 survey. The 1995 baseline study reported a mean perceived water use by single-family households of 147 gpd, whereas the 2001 study reported a mean of about 60 gpd among people who provided a numerical answer. Of the 262 respondents who estimated water use under 200 gpd, 71% live west of the hills, 67% own their homes, and 76% live in houses built before 1980.

Single and multi-family respondents were asked how important it was for consumers in Northern California to conserve water. Responses were distributed as follows

| | Single Family | Multi Family |
|---|---|---|
| Not important | 1.0% | 0.3% |
| Important | 27.2% | 35.4% |
| Very important | 71.8% | 64.3% |

These responses differ from those reported in the 1995 baseline study, due perhaps to the wording of the question. When given the choice between unimportant and important, 94% chose important in 1995; when asked to clarify, 78% of the total rated water conservation as very to

extremely important, 12% as important, and 8% as unimportant. Respondents to this survey were provided the three choices. The proportion of respondents who consider water conservation unimportant decreased from about 8 to 1% or less between 1995 and 2001.

Single and multi-family respondents were asked whether they agreed or disagreed with several statements regarding water conservation. The distribution of responses from the 1995 and 2001 surveys is presented in Table 3-2.

**Table 3-2: Distribution of Responses to Conservation Attitudes Questions**

| Statements Read to Respondents | | Percent of Respondents | | | | |
|---|---|---|---|---|---|---|
| | | Strongly Disagree | Somewhat Disagree | Somewhat Agree | Strongly Agree | Don't Know |
| Making efforts to conserve water is an inconvenience | 1995 | 38 | 33 | 18 | 10 | 1 |
| | SF 2001 | 53 | 35 | 10 | 1 | 1 |
| | MF 2001 | 47 | 35 | 11 | 3 | 4 |
| I am willing to conserve water if it saves money on water bill | 1995 | 6 | 8 | 22 | 56 | 8 |
| | SF 2001 | 2 | 4 | 27 | 66 | 1 |
| | MF 2001 | 1 | 2 | 25 | 69 | 3 |
| I am willing to conserve water to help protect the environment | 1995 | 5 | 3 | 21 | 68 | 3 |
| | SF 2001 | 1 | 1 | 23 | 74 | 1 |
| | MF 2001 | 0 | 1 | 21 | 74 | 4 |
| I am willing to conserve water to prevent future shortages during drought conditions | 1995 | 5 | 2 | 19 | 72 | 2 |
| | SF 2001 | 1 | 1 | 15 | 83 | 0 |
| | MF 2001 | 0 | 1 | 16 | 79 | 4 |

Responses to the attitudes questions show an increased willingness to conserve water among District customers. The proportion of respondents who strongly disagree that water conservation is an inconvenience went up from 38% in 1995 to 53% and 47% for single-family and multi-family respondents, respectively. Responses also demonstrate an increased concern about the cost of water: the percentage of those who strongly agree they would conserve water to save money went up from 56% in 1995 to 66% (single-family) and 69% (multi-family) in 2001. Conserving water to protect the environment also went up in acceptance: 74% of respondents strongly agree, as opposed to 69% in 1995. Willingness to conserve to prevent water shortages during drought conditions was a more important issue to single-family respondents: 83% strongly agreed they would conserve in that situation, as opposed to 79% among multi-family respondents. Both proportions were greater than the 73% overall reported in 1995.

## Conservation Actions

Single and multi-family respondents were asked whether they had taken specific water conservation actions in the past year. A list of actions was read to them, and they had the choice to answer "yes," "no," or "don't know." The questions as posed presented several problems. Some respondents had only a vague recollection of when a particular action, such as changing a toilet or installing a low-flow showerhead, was taken. Other respondents knew that an action had been taken recently, but not in the last year. Interviewers were told to clarify the question by using "in recent months" instead of "in the past year," and allowing "yes" answers to actions taken as far back as 18 months. Another problem was that several respondents who already had ultra-low flush toilets or low-flow showerheads, or did not have landscapable areas or irrigation systems, found the questions inapplicable. Interviewers were told to expand the "don't know" answer to include "not applicable." The distribution of responses is summarized in Table 3-3 and compared to the distribution of "prompted" responses from the 1995 study.

The single and multi-family responses to the conservation action questions were similar. Both groups had the exact same percentage of respondents claiming to have installed drought resistant landscaping. The number of single and multi-family respondents who installed low-flow showerheads and watered less often differed by only one percentage point. The number of single and multi-family respondents who claimed to water lawn and shrubs evenings and early mornings, and those who installed displacement devices in toilets differed by two percentage points.

Twelve of the 14 conservation actions (including "other") showed an increased participation by District customers as compared to 1995 results. Only the installation of low-flow showerheads and toilet displacement devices showed a decrease: from 46 to 43% and from 37 to 26%, respectively. Installation of ultra-low flush toilets went up from 17% the year before the 1995 study was conducted to 33% (single-family) and 39% (multi-family) in recent months. Less frequent car washing showed a significant increase from 53% overall in 1995 to 74% for single-family respondents in 2001. The largest increase was reported for "other conservation measures," from 5% overall in 1995 to 56% for single-family respondents in 2001.

Single-family respondents were asked how much overall effort their households made to conserve water; multi-family respondents were asked to rate their building management's efforts to conserve water. As illustrated in Figure 3-2 (Page 3-8), more than 40% of both single and multi-family respondents rated their water conservation efforts as moderate and about 30% rated them as "large." The proportion of respondents claiming moderate and large water conservation efforts went up from 1995. Fewer respondents claimed "very large" water conservation efforts in this study than in the 1995 study.

**Table 3-3: Distribution of Responses to Conservation Action Questions**

| Were any of the following actions taken in your household [building] last year: | | Percent of Respondents | | |
|---|---|---|---|---|
| | | YES | NO | Don't Know |
| Take shorter showers | 1995 | 68 | 29 | 3 |
| | SF 2001 | 74 | 25 | 1 |
| | MF 2001 | N/A | N/A | N/A |
| Install low-flow showerheads | 1995 | 46 | 50 | 4 |
| | SF 2001 | 43 | 55 | 2 |
| | MF 2001 | 44 | 55 | 1 |
| Install displacement devices in toilets | 1995 | 37 | 59 | 4 |
| | SF 2001 | 26 | 74 | 0 |
| | MF 2001 | 28 | 71 | 1 |
| Install ultra-low flush toilets | 1995 | 17 | 78 | 5 |
| | SF 2001 | 33 | 66 | 1 |
| | MF 2001 | 39 | 60 | 1 |
| Use garbage disposal less often | 1995 | 37 | 44 | 19 |
| | SF 2001 | 47 | 34 | 19 |
| | MF 2001 | N/A | N/A | N/A |
| Use dishwasher less often and/or fuller loads | 1995 | 42 | 38 | 20 |
| | SF 2001 | 64 | 17 | 19 |
| | MF 2001 | N/A | N/A | N/A |
| Use clothes washer less often and/or fuller loads | 1995 | 55 | 36 | 9 |
| | SF 2001 | 83 | 14 | 3 |
| | MF 2001 | N/A | N/A | N/A |
| Repair leaks or drips in faucets or toilets | 1995 | 69 | 24 | 7 |
| | SF 2001 | 78 | 21 | 1 |
| | MF 2001 | 82 | 17 | 1 |
| Wash car less frequently/Restrict car washing on premises | 1995 | 53 | 34 | 13 |
| | SF 2001 | 74 | 19 | 7 |
| | MF 2001 | 65 | 34 | 1 |
| Water lawn and shrubs less often | 1995 | 42 | 44 | 14 |
| | SF 2001 | 61 | 32 | 7 |
| | MF 2001 | 62 | 31 | 7 |
| Water lawn and shrubs evenings and early mornings | 1995 | 39 | 47 | 14 |
| | SF 2001 | 78 | 14 | 8 |
| | MF 2001 | 76 | 12 | 12 |
| Install drought resistant/low water use landscaping | 1995 | 12 | 70 | 18 |
| | SF 2001 | 39 | 52 | 9 |
| | MF 2001 | 39 | 53 | 8 |
| Limited spa/pool use | 1995 | N/A | N/A | N/A |
| | SF 2001 | N/A | N/A | N/A |
| | MF 2001 | 8 | 50 | 42 |
| Other water conservation measure | 1995 | 5 | 76 | 19 |
| | SF 2001 | 56 | 43 | 1 |
| | MF 2001 | 39 | 58 | 3 |

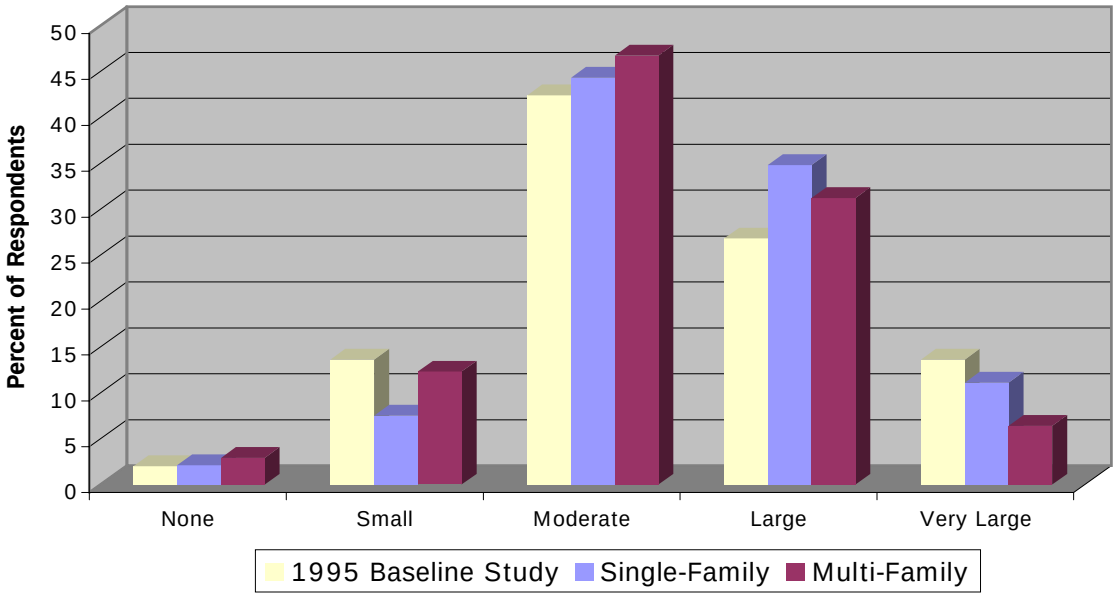


**Figure 3-2: Level of Water Conservation Effort**

Single and multi-family respondents ranked the primary reasons for conserving water in the same order. As illustrated in Figure 3-2, preventing shortages in future droughts was the top reason for conserving water, followed by saving money, protecting the environment, and other (common sense, media attention, guilt, etc). Saving money on water bills had a higher percentage of respondents in the multi-family sector than among residents of single-family homes.

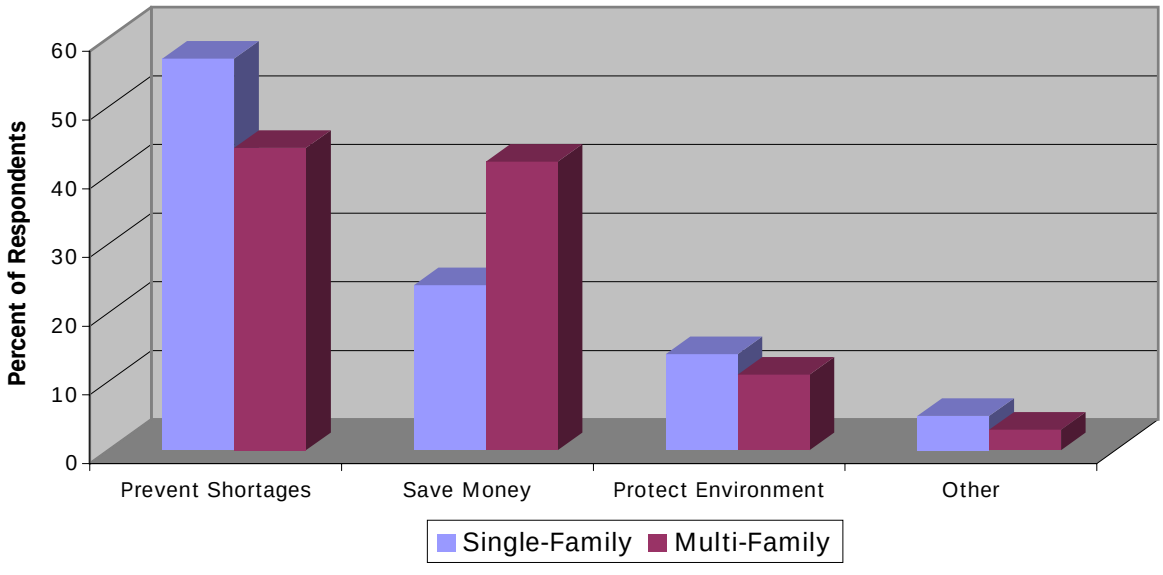


**Figure 3-3: Distribution of Reasons to Conserve Water**

Most respondents claimed not to need additional information on how to save water (75% of single-family and 68% of multi-family respondents), reflecting an increase over the 53% of respondents who noted such in 1995.

## Potential Conservation Actions

Survey respondents were asked questions regarding their potential implementation of several water conservation measures. The simplest option they were questioned about was the use of water-saver kits (low-flow showerheads, faucet aerators, toilet tank inserts). They were also queried as to whether they would be motivated by District rebates to implement changes to landscaping and irrigation, install ultra-low flush toilets, or purchase high-efficiency clothes washers. Questions were also asked about the possible implementation of gray water systems.

Single and multi-family respondents were asked whether they would install low-flow showerheads, faucet aerators, and/or toilet tank inserts if they were provided free of charge. As shown in Table 3-4, showerheads and aerators were more popular than toilet tank inserts. The 1995 study answers are not directly comparable, because customers were asked whether they would install none (19%), some (25%), or all of them (48%).

**Table 3-4: Distribution of Responses to Conservation Kit Questions**

| If you were to receive a free water-saver kit, would you install: | | Percent of Respondents | | | |
|---|---|---|---|---|---|
| | | Yes | No | Need More Information | Don't Know or N/A |
| Low-flow showerheads | SF 2001 | 63 | 28 | 5 | 4 |
| | MF 2001 | 74 | 18 | 2 | 6 |
| Water and energy-saving faucet aerators | SF 2001 | 67 | 25 | 4 | 4 |
| | MF 2001 | 78 | 13 | 3 | 6 |
| Toilet tank inserts | SF 2001 | 51 | 42 | 4 | 3 |
| | MF 2001 | 66 | 23 | 3 | 8 |

Responses to potential outdoor conservation actions are summarized in Table 3-5. Even with the offer of a rebate, a majority of single and multi-family respondents would opt not to change plant materials in their landscaping nor reduce the size of the lawn or improve irrigation system efficiency. These responses are consistent with 1995 results, although the percentage of negative responses was lower then, with 45% of all respondents indicating they would not consider changing their landscaping to improve water use efficiency if a rebate was offered.

**Table 3-5: Distribution of Responses to Outdoor Conservation Questions**

| If rebates were offered for improved irrigation system efficiency, would you consider: | | Percent of Respondents | | |
|---|---|---|---|---|
| | | Yes | No | Don't Know or N/A |
| Changing plant materials | SF 2001 | 36 | 52 | 12 |
| | MF 2001 | 38 | 50 | 12 |
| Reducing the lawn area | SF 2001 | 21 | 62 | 17 |
| | MF 2001 | 26 | 58 | 16 |
| Improving irrigation system efficiency | SF 2001 | 32 | 53 | 15 |
| | MF 2001 | 37 | 47 | 16 |

Single and multi-family respondents were asked whether rebates from the District would motivate them to purchase ultra-low flush toilets or high-efficiency clothes washers. As shown in Table 3-6, most single-family respondents answered no. Multi-family owners/managers were more evenly divided on both questions, with the majority favoring ultra-low flush toilet purchase but not switching to high-efficiency clothes washers. According to 1995 study responses, 46% of all respondents said they would not install an ultra-low flush toilet and 36% said they would. There is no direct comparison to 2001 study results, however, because the question posed in 1995 specified a $50 rebate for the toilet retrofit and no rebate amount was specified in this survey.

**Table 3-6: Distribution of Responses to Toilet and Washer Rebate Questions**

| If rebates were offered for their purchase and installation, would you consider: | | Percent of Respondents | | |
|---|---|---|---|---|
| | | Yes | No | Don't Know or N/A |
| Purchasing and installing an ultra-low flush toilet, which may cost $75-$300 | SF 2001 | 34 | 53 | 13 |
| | MF 2001 | 47 | 43 | 10 |
| Purchasing and installing a high-efficiency clothes washer, which may cost $600+ | SF 2001 | 32 | 56 | 12 |
| | MF 2001 | 40 | 45 | 15 |

Respondents who answered "yes" to the toilet and washer rebate questions were asked the level of rebate that would motivate them to make the appropriate purchases. Among single-family respondents, 25% specified $50 or less, 25% chose $60 to $100, 30% gave a number higher than $100, and 20% did not know what level of rebate would motivate them to purchase an ultra-low flush toilet. Among multi-family respondents, 35% specified $50 or less, 28% chose $60 to $100, 24% gave a number higher than $100, and 13% did not know what level of rebate would motivate them to purchase an ultra-low flush toilet. Of the customers who would buy high-efficiency clothes washers, about 57% of both the single and multi-family respondents specified a number above $100. Twenty-three percent of the single-family and 20% of the multi-family respondents specified that a $100 rebate would motivate them to purchase an energy-efficient clothes washer.

Single-family respondents were asked whether they would prefer to change their households' water use habits or install water-saving equipment. Forty-seven percent indicated they would like to do both (as compared to 34% in 1995). Twenty-three percent would prefer to change water-use habits (20% in 1995). Twenty percent would prefer to install water-saving equipment (24% in 1995). About 6% were not sure about their preferences and 4% would do neither (13% in 1995 would do neither).

Sixty-seven percent of single-family and 58% of multi-family respondents did not know what a gray water system is, compared to an overall 54% in 1995. After interviewer clarification of what gray water is (untreated household wastewater which has not come into contact with toilet or kitchen waste and is sometimes used to water landscaping and gardens), respondent were asked whether they would consider installing a gray water system. Thirty-nine percent of single-family and 37% of multi-family respondents answered "no," 24% of single-family respondents said "yes" and 25% indicated they needed more information. Twenty-seven percent of multi-family respondents said "yes" and 24% needed more information. In the 1995 study, 26% of respondents indicated they would consider installing a gray water system and 21% wanted more information.

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# 4.0 SINGLE-FAMILY SITE SURVEY

## 4.1 SAMPLE CHARACTERISTICS

A total of 3,880 single-family account holders were randomly selected as potential participants in the study. Potential participants were subdivided into 72 groups, according to location, tenancy, age of dwelling, and ratio of summer to winter water use. The representation of each group in the sample was in the same proportion as the representation of the group in the District's single-family account base. Every effort was made to schedule appointments and conduct site visits with the targeted number of respondents in each group. Numerous cancellations and other difficulties in the appointment scheduling process, however, left a few groups short and others over-represented.

The total number of documented visits was 387, one away from the target total of 388 and three over the number of accounts required to maintain a 95% confidence level in survey results with 5% tolerable sampling error. The number of visits to account-holders in the three largest groups in the sample were within three percentage points of the target, thus staying close to the intended proportionalities: 97% of the targeted number of homes west of the hills, 102% of the targeted homes owned by the resident, and 103% of the targeted number of homes built before 1950 were visited. The makeup of the single-family site survey sample is presented in Appendix I, Table I-1.

## 4.2 RESPONSE RATE

The actual response rate was better than the one in ten anticipated for the study. About one in six calls from an appointment scheduler resulted in a scheduled site visit, and roughly one in eight resulted in a refusal to participate in the survey. Seventy percent of scheduling calls to single-family account-holders went unanswered, reached an incorrect telephone number, or did not find a head of household available. Table 4-1 presents the breakdown of calls to potential participants in the single-family site visits.

**Table 4-1: Single-Family Site Survey – Appointment Scheduling Call Outcomes***

| | Percent of Telephone Calls | | | | | |
|---|---|---|---|---|---|---|
| Market Sector | Appoint. | Refusal | No Answer | Message | Call Back | Incorrect Numbers |
| Single-Family Residents | 17 | 13 | 20 | 20 | 12 | 18 |

*Based on 5385 calls made during the first six weeks of the study (May 17 to June 30, 2001), 2795 of them to single-family residences

The list of 3,880 potential participants was not exhausted. The number of calls required to reach the target number of participants in each subgroup varied. Of the potential participants called, 78% were called only once, an additional 15% were called twice, and 5% were called three times; the other 2% were called from 4 to 14 times. Repeat calls to the same account were necessary in some of the subgroups with a limited number of potential participants and many incorrect telephone numbers.

Not all scheduled visits resulted in a completed survey. Sixteen percent of scheduled visits resulted in cancellations by the customer. Some customers called to cancel; others refused access to the field representative or were not home at the scheduled time.

No sample bias was perceived from the response rate. Calls to schedule appointments were made during working hours, evenings, and weekends. Site visits were scheduled for both weekdays and weekends. The sample stratification insured a representative distribution of customers by location, tenancy, age of dwelling, and water use patterns.

## 4.3 RESPONDENT CHARACTERISTICS

Figure 4-1 illustrates the distribution of respondents to the single-family site survey, according to District data.

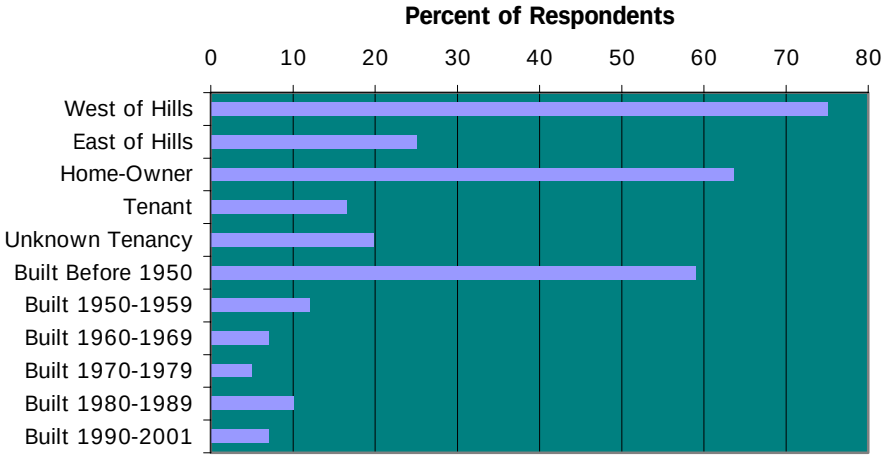



**Figure 4-1: Distribution of Respondents to Single-Family Site Survey by Location, Tenancy, and Age of Dwelling**

In terms of the ratio of summer to winter water use, respondents were selected such that half had a ratio below the mean for their particular group and the other half had a ratio above the mean.

The majority (62.9%) of single-family respondents is listed in District files as homeowners. Of the remainder, 16.3% are listed as tenants and 20.8% as unknown.

As indicated in Section 3 of this report, U.S. Bureau of the Census data from 1990 indicate that 16.2% of single-family homes in cities within the District's service area are occupied by "tenants" and 80.7% by homeowners. It is therefore likely that most of the accounts with unknown tenancy are actually occupied by the owners and that roughly 80% of survey respondents were homeowners.

According to respondents' answers:

- 30.5% of respondents had lived in their home 5 years or less, 46.3% 10 years or less, and 56.9% 15 years or less; 21.5% had lived in their homes for more than 30 years.
- 74.7% of the households surveyed reported one or two occupants over 18 years of age; 97.7% reported four or fewer occupants over 18 years; 75% had no children under 12 and 85% reported no children between 12 and 18.
- The mean number of people per household was 2.9, compared to 2.7 reported in the 1995 study. Preliminary data from the 2000 census show average household sizes ranging from 1.7 in Emeryville to 3.1 in Hayward, with most other cities in the District's service area between 2.6 and 2.9 people per household.
- Of surveyed households, 8.8% reported annual incomes under $20,000; 20.7% reported annual incomes under $40,000; 12.6% reported incomes over $100,000; and 39.2% did not know or declined to respond.

## 4.4 SURVEY FINDINGS

Survey findings are reported for appliance/fixture characteristics and lot and landscaping features. Comparisons are made where possible with the responses to the 1995 and 1998 single-family site surveys. Survey answers are tabulated in Appendix I.

### Incidence of Appliances/Fixtures

The incidence of water-using appliances and fixtures in homes surveyed is presented in Table 4-2 and summarized below.

- Thirty-seven percent had at least one toilet rated (designed or quoted by manufacturer) as ultra-low flush (1.6 gallons or less per flush).
- Thirty-two percent had at least one toilet with an actual (measured) flush volume of 1.6 gallons or less.
- Over three-quarters had low-flow showerheads (flow rate of 2.5 gpm or less); 38% had showerheads with flow rates in excess of 2.5 gpm (many homes have more than one showerhead).
- Bathtubs were found at 95% of the homes; 4% had bathtubs with Jacuzzis.
- Faucet aerators were found at 94% of the homes visited.

**Table 4-2: Incidence of Appliances/Fixtures in Single-Family Homes**

| Appliances/Fixtures | Percent of Homes with at Least One Appliance/Fixture |
|---|---|
| Toilets with design flush volumes of 1.6 gallons per flush (gpf) | 37 |
| Toilets with design flush volumes of 3.5 gpf | 25 |
| Toilets with design flush volumes of 5-plus gpf | 20 |
| Toilets with unknown design volume | 36 |
| Toilets with measured flush volumes of 1.6 gallons or less | 32 |
| Toilets with measured flush volumes between 1.61 and 3.5 gallons | 74 |
| Toilets with measured flush volumes over 3.5 gallons | 20 |
| Toilets where flush volumes could not be measured | 4 |
| Toilets with conservation devices | 20 |
| Toilets with leaks | 4 |
| Showerheads with flow rates 2.5 gallons per minute (gpm) or less | 76 |
| Showerheads with flow rates between 2.51 and 5.0 gpm | 35 |
| Showerheads with flow rates over 5 gpm | 3 |
| Showerheads with shutoff button | 16 |
| Showerheads with leaks | 34 |
| Bathtubs | 95 |
| Bathtubs with Jacuzzi/spa | 4 |
| Faucets with flow rates of 2 gpm or less | 82 |
| Faucets with flow rates between 2.01 and 2.99 gpm | 52 |
| Faucets with flow rates between 3 and 3.99 gpm | 30 |
| Faucets with flow rates of 4 gpm or more | 29 |
| Faucets with aerators | 94 |
| Leaky faucets | 7 |
| Dishwashers | 63 |
| Dishwashers with efficiency setting | 54 |
| Clothes washers | 89 |
| High-efficiency clothes washers | 11 |
| Recirculating hot water | 4 |
| Refrigerators with built-in water dispensers | 26 |
| Refrigerators with built-in ice-makers | 41 |
| Water softener | 0.5 |
| Point-source water heaters | 8 |
| Water purification units | 17 |
| Evaporative coolers | 2 |
| Pressure regulators | 14 |
| Swimming pool | 10 |
| Outdoor spa/Jacuzzi | 12 |
| Fountains/ponds | 7 |
| Gray water system | 1 |
| Well water | 2 |

- Faucets with flow rates under 2 gpm were the most commonly found, followed by those with flow rates between 2 and 3 gpm.
- Sixty-three percent of the homes surveyed had dishwashers, 54% had dishwashers with efficiency settings.
- Eighty-nine percent of the homes surveyed had clothes washers; 12% had high efficiency clothes washers.
- The incidence of leaky toilets was relatively low: 4% of respondents had at least one leaky toilet; survey procedures, however, allowed only the detection of leaks clearly visible during inspection, which excluded intermittent or very slow leaks.
- Seven percent of homes surveyed had at least one leaky faucet.
- Leaks were identified in showerheads at 34% of the homes visited.
- Refrigerators with built-in icemakers were found at 41% of the homes visited, water dispensers at 26% of them.
- Ten percent of the homes visited had swimming pools.
- Twelve percent of the homes visited had outdoor Jacuzzis.

Only numbers for fixtures/appliances that have a single occurrence per household, such as dishwashers, clothes washers, and swimming pools can be directly compared to the 1995 baseline study. The 1995 study found dishwashers at 70% of the homes, clothes washers at 90% of them, and swimming pools at 9%. The corresponding numbers for this study are 63% for dishwashers, 89% for clothes washers, and 10% for swimming pools. The percentage of outdoor spas was nine in 1995 and 12 this year.

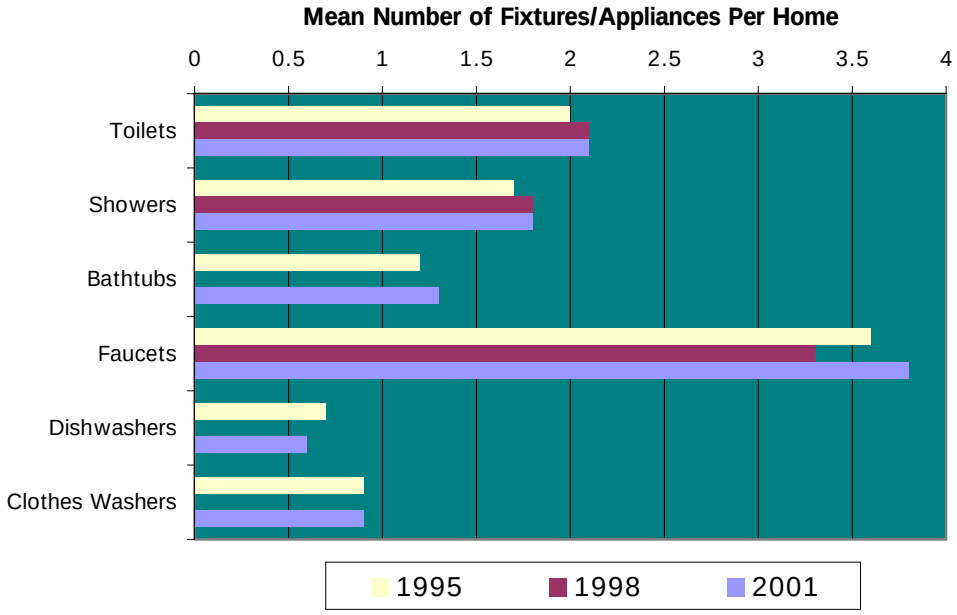
Fixtures that are likely to occur more than once per house cannot be compared directly. The numbers reported in Table 4-2 reflect the percent of homes that have at least one such fixture, but the same is not true of the 1995 figures. The numbers reported in 1995 reflect the percent of the total number of fixtures identified in that study. When the baseline study reports that 61% of the sites had low-flow showerheads, for example, it means that 293 of the 479 showerheads identified at 290 sites were of that type. It does not mean that 177 of the 290 sites (61%) had at least one such showerhead.

The mean number of major fixtures/appliances per home is presented in Figure 4-2. The number of toilets, showers, bathtubs and faucets per home increased between 1995 and 2001. The number of clothes washers remained the same, while the number of dishwashers per home decreased from 0.7 to 0.6.

Dishwashers decreased from 0.71 units per home in 1995 to 0.64 in 2001. It is not clear whether this change is due to the 7.8% margin of error for the 1995 study, or corresponds to an actual decrease in the incidence of these appliances within the District's service area. U.S. Census data from the *American Housing Survey* of 1998 show 0.64 dishwashers per home for the city of Oakland, but no numbers are available for previous years.

The 1998 survey included only toilets, showers, and faucets in the single-family sector. The average number of toilets and showers per home reported in 1998 coincided with the numbers from this study. The average number of faucets per home, however, was 3.3, significantly lower than the 3.8 found in the 2001 study and lower than the 3.6 reported in the 1995 study. It is unlikely that the average number of faucets decreased between 1995 and 1998; the 1998 figure may be partially attributed to the absence of newer homes in the 1998 sample and the relatively large margin of error in that study.

**Figure 4-2: Mean Number of Fixtures/ Appliances per Single-Family Home**




A breakdown of the mean number of fixtures/appliances per home, by location and age of dwelling, is presented in Table 4-3. The mean value for toilets and showers in houses located east and west of the hills increased. There were 2.5 toilets per house east of the hills in 1995 and 2.6 in 2001 and 1.8 toilets per house west of the hills in 1995 and 1.9 in 2001. Showers east and west of the hills increased from 2.1 and 1.5 to 2.3 and 1.6. The mean value of faucets increased from 4.3 to 4.7 for houses east of the hills and from 3.3 to 3.4 for those west of the hills.

Table 4-3 indicates a distinct relationship between the age of a dwelling and the mean number of fixtures/appliances. More recently built homes have more toilets, showers, bathtubs, faucets, dishwashers, and clothes washers than older homes. The difference is most significant in faucets and dishwashers: homes built after 1992 have on the average twice as many faucets and dishwashers as homes built before 1950. Homes built in the last decade also have on the average 78% more toilets, 87% more showers, and 91% more bathtubs.

**Table 4-3: Breakdown of Mean Values of Fixtures/Appliances Per Home**

| Fixture/Appliance | Service Area | Location | | Year-Built | | | |
|---|---|---|---|---|---|---|---|
| | | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| Toilets | 2.1 | 2.6 | 1.9 | 1.8 | 2.4 | 2.7 | 3.2 |
| Showers | 1.8 | 2.3 | 1.6 | 1.5 | 2.0 | 2.3 | 2.8 |
| Bathtubs | 1.3 | 1.5 | 1.2 | 1.1 | 1.2 | 1.8 | 2.1 |
| Faucets | 3.8 | 4.7 | 3.4 | 3.2 | 4.1 | 5.0 | 6.4 |
| Dishwashers | 0.6 | 0.9 | 0.5 | 0.5 | 0.9 | 0.8 | 1.0 |
| Clothes washers | 0.9 | 1.0 | 0.9 | 0.9 | 0.9 | 0.9 | 1.0 |

## Toilet Data

A total of 836 toilets were identified in the 387 single-family residences visited. Of these, 827 were inspected for leaks, inserts, make and year installed, and rated flush volume (design flush volume quoted by manufacturer). The flush volume was measured in 804 of the toilets inspected; the other 23 toilets had access restrictions.

Forty different toilet makes were recorded. The most common toilet names were American Standard (17.5%), Kohler (17.4%), Standard, an older name for American Standard (17.2%), Eljer (5.6%), Norris (4.4%), and Briggs (4%). Toilet manufacturer could not be identified for 13% of the toilets inspected.

Year of manufacture was recorded from toilet tanks. Fifty-one percent were manufactured after 1980, 24% before then, and 25% had no year of manufacture available. Table 4-4 shows the distribution of toilets by age.

**Table 4-4: Distribution of Single-Family Toilets by Age of Fixture**

| Year of Toilet Manufacture | Percent of 827 Toilets Inspected | | | | | | |
|---|---|---|---|---|---|---|---|
| | Service Area | Location | | Year-Built | | | |
| | | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| <1950 | 3.6 | 0.1 | 3.5 | 3.1 | 0.5 | 0 | 0 |
| 1950-1982 | 24.2 | 7.3 | 16.9 | 11.3 | 11.9 | 1.1 | 0 |
| 1983-1992 | 25.3 | 9.2 | 16.1 | 13.1 | 4.8 | 6.5 | 0.8 |
| >1992 | 21.8 | 8.1 | 13.7 | 10.8 | 5.7 | 1.9 | 3.3 |
| Unknown | 25.2 | 8.8 | 16.3 | 16.3 | 6.2 | 2.2 | 0.5 |

For rated flush volume (design flush volume quoted by manufacturer), toilet distribution was determined by crosschecking rating data with manufacture year and measured flush volumes. Rating data (values engraved on toilet tank cover or printed on tank side) showed 29.5% were ultra-low flush; almost 20% were rated at 3.5 gallons per flush (gpf), and 22.4% at volumes higher than 3.5 gallons. No rated flush volume could be determined with certainty for 28.5% of the toilets inspected (236 of the 827). The large

number of toilets with indeterminate rated flush volumes is due to survey procedures. Survey personnel recorded rated flush volumes only when they were engraved on the toilet tank cover or printed on the side of the tank or on the toilet bowl. This procedure was instituted to avoid guessing or relying on surveyors' expertise, which varied from one individual to another.

The year of manufacture was checked for each toilet with indeterminate flush rating. All toilets manufactured after 1991 were noted as ultra-low flush, because California Codes mandated that all toilets installed after January 1992 had to be rated at 1.6 gpf or less. Toilets manufactured between 1982 and 1992 were assumed to have an average flush rating of 3.5 gpf or less, also in accordance with California Codes; the actual (measured) flush volume was checked for these toilets, and those showing flush volumes of 1.6 gpf or less were taken as ultra-low flush units. This crosschecking reduced the number of toilets with indeterminate flush rating by almost half. The final distribution of toilets by rated flush volumes is presented in Table 4-5.

**Table 4-5: Distribution of Single-Family Toilets by Rated Flush Volume**

| | Percent of 827 Toilets Inspected | | | | | | |
|---|---|---|---|---|---|---|---|
| | Service | Location | | Year-Built | | | |
| Rated Flush Vol. | Area | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 1.6 gpf | 34.0 | 12.7 | 21.3 | 18.0 | 8.9 | 3.3 | 3.7 |
| 3.5 gpf | 27.9 | 9.8 | 18.1 | 13.5 | 7.1 | 6.3 | 1.0 |
| >3.5 gpf | 22.4 | 7.0 | 15.4 | 15.1 | 5.6 | 1.7 | 0 |
| Unknown | 15.7 | 4.0 | 11.7 | 7.9 | 7.4 | 0.5 | 0 |

The 1995 study found that 10% of all toilets had a flush volume of 1.6 gpf. The percentage of toilets rated as ultra-low flush has increased to 34% since 1995, an increase of about 24 percentage points. Forty-eight percent of toilets had a rated flush volume of 3.5 gallons in 1995, compared to 27.9% in 2001, a decrease of about 21 percentage points. Forty-two percent of toilets had a rated flush volume higher than 3.5 gpf in 1995. If the toilets with unknown rating are assumed to have flush volumes in excess of 3.5 gpf, about 38% of all toilets in 2001 have rated flush volumes above 3.5 gpf. The gains in the percentage of ultra-low flush toilets, therefore, is made up primarily of the losses among the 3.5 gpf-rated toilets with only a small contribution from toilets with higher flush volumes, as illustrated in Figure 4-3.

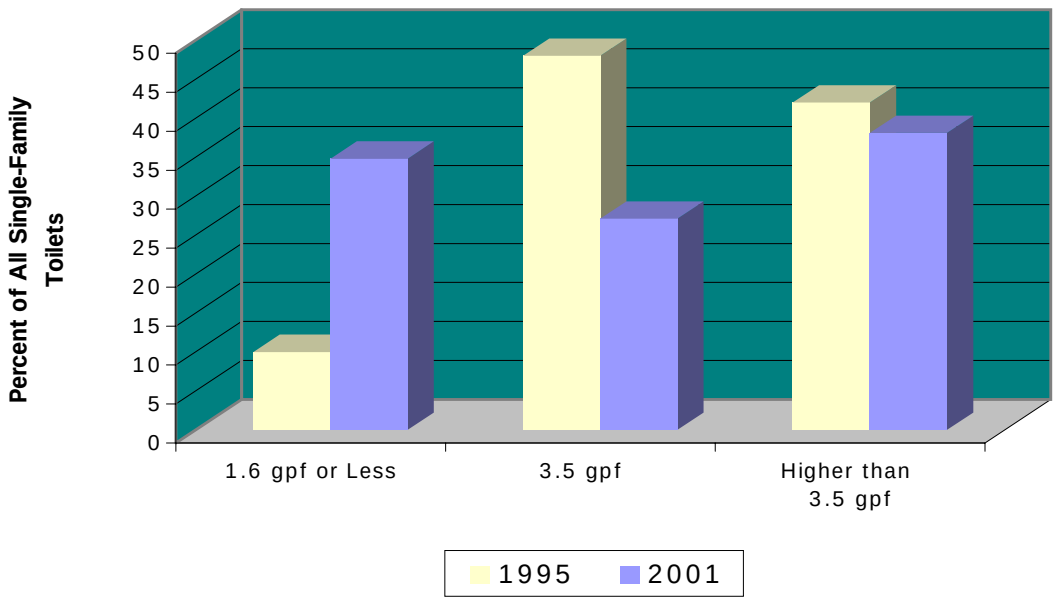



**Figure 4-3: Distribution of Single-Family Toilets by Flush Rating**

The rated flush volume of some of the toilets did not correspond with the flush volume measured by study personnel at respondents' homes. About half of the toilets rated as ultra-low flush had measured flush volumes in excess of 1.6 gallons, whereas some of the toilets rated at 3.5 gpf and higher had measured flush volumes under 1.6 gpf. The distribution of toilets by measured flush volumes is presented in Table 4-6.

**Table 4-6: Distribution of Single-Family Toilets by Measured Flush Volume**

| Measured Flush Volume | Percent of 827 Toilets Inspected | | | | | | |
|---|---|---|---|---|---|---|---|
| | Service Area | Location | | Year-Built | | | |
| | | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 1.6 gpf or less | 21.6 | 6.9 | 14.8 | 11.1 | 4.8 | 2.9 | 2.8 |
| 1.61 to 3.5 gpf | 60.9 | 19.2 | 41.7 | 32.8 | 18.7 | 7.5 | 1.9 |
| >3.5 gpf | 14.7 | 7.0 | 7.6 | 9.1 | 4.4 | 1.2 | 0 |
| Unknown | 2.8 | 0.4 | 2.4 | 1.6 | 1.1 | 0.1 | 0 |

The 1998 survey reported measured flush volumes, but only rated flush volumes were reported in the 1995 study. The 1998 study reported 27% of toilets with a measured flush volume of 1.6 gallons or less and 51% with flush volumes between 1.61 and 3.5 gallons. There are no circumstances that suggest a decrease in the proportion of ultra-low flush toilets between 1998 and 2001; the difference between the 27% in 1998 and the 22% in 2001 may be attributable to the sampling error of the 1998 study (plus or minus 5%).

Toilet tank inserts were found in 14% of the toilets inspected. Of these, 7.6% were quick closing flapper valves and 4.6% were displacement devices; the remainder involved either water level adjustments or toilet dams. The baseline study reported that 11% of the toilets had displacement devices in 1995. It is not clear whether the 1995 study included all types of toilet retrofits within their definition of displacement devices. If the term displacement device was used in the 1995 study as it was in this study, the use of such devices has decreased from 11 to 4.6%. If the term displacement device was used to represent any toilet retrofit, the number of toilets with such inserts has increased since 1995 from 11 to 14%. The 1998 study did not provide any data on toilet inserts or displacement devices

Leaks were identified in 2% of the toilets inspected. About half of the leaky toilets were manufactured/ installed after 1982, and 35% of them after 1992. About a fourth of the leaky toilets were made by American Standard, 18% by Standard, 12% by Celite; the rest were made by Norris, Eljer, Bemis, UPC, and Sterling.

Both the 1995 and 1998 studies reported higher percentages of leaky toilets (7% and 7.7%, respectively) than the 2001 survey. It is not clear whether the decrease to 2% of toilets leaking in 2001 represents better toilet maintenance or simply reflects different methods of identifying leaks. The 1998 study examined toilets for flapper valve or overflow leaks. The 1995 study did not specify their leak detection method. Survey personnel in this study identified leaks by simple visual inspection of the toilet bowl; no dyes or tracer were used. This method may not capture some of the leaks due to flapper valve malfunction, which in 1998 amounted to 41% of the total.

## Showerhead Data

A total of 693 showerheads were inspected in the 387 single-family residences visited. The type of showerhead was determined (fixed or handheld, stream or atomizing), and the incidence of shutoff buttons and leaks recorded. The flow rate was measured at 681 of the showerheads; there were access restrictions at the other 12.

Most of the inspected showerheads were of the stream/spray type (92%), and fixed (79%) rather than handheld. Of these, 11% had shutoff buttons, 23% had leaks either at the showerhead (8%), the diverter valve (14%), or the shutoff valve (1%). The proportion of stream/spray types increased from 84% reported in 1995, although the percentage of fixed showerheads remained similar, two points under the 81% reported in 1995. Fewer shutoff buttons were found in this survey than the 20% reported in the 1995 study. Thirteen percent of showerheads inspected in 1995 were reported to leak. If diverter and shutoff valve leaks were not considered in 1995, the percentage of showerhead leaks has decreased.

The mean flow rate for showerheads tested was 2.7 gallons per minute (gpm), down from the 1995 mean value of 3.1 gpm. Sixty-seven percent of the showerheads were found to have flow rates under 2.5 gpm. Table 4-7 presents the distribution of showerhead flow rates in 1995 and 2001.

**Table 4-7: Distribution of Single-Family Showerheads by Flow Rate**

| Measured Flow Rate (gpm) | Percent of 681 Showerheads Tested | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Service Area | | Location | | Year-Built | | | |
| | 1995 | 2001 | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 1.99 or less | 15 | 10.7 | 2.9 | 7.8 | 6.3 | 2.8 | 0.6 | 1.0 |
| 2.0 to 2.50 | 46 | 56.4 | 18.9 | 37.4 | 27.3 | 17.3 | 8.8 | 3.0 |
| 2.51 to 2.99 | | 3.1 | 0.7 | 2.4 | 2.1 | 0.6 | 0.3 | 0.1 |
| 3.0 to 3.99 | 9 | 12.9 | 4.0 | 9.0 | 6.9 | 3.5 | 1.3 | 1.2 |
| 4.0 to 4.99 | 8 | 11.3 | 6.9 | 4.4 | 7.8 | 2.9 | 0.6 | 0 |
| 5.0 to 5.99 | 10 | 4.4 | 1.9 | 2.5 | 2.2 | 1.8 | 0.4 | 0 |
| 6.0 or more | 11 | 1.2 | 0.4 | 0.7 | 0.1 | 0.7 | 0.3 | 0 |

## Bathtub Data

A total of 497 bathtubs were identified in the 387 single-family residences visited. The length, width and depth of the bathtubs were measured for 472. Bathtubs with built-in spas/Jacuzzis were identified. Bathtubs had a mean length of 53.2 inches, mean width of 24.3 inches, mean depth of water of 11 inches, mean volume of 61.8 gallons, and a median volume of 57.2 gallons. Jacuzzis were found in 5.5% of the bathtubs inspected. The mean and median volumes calculated from survey data are smaller than the values reported in the baseline study (mean of 78 and median of 75 gallons). The most probable cause of this discrepancy is that survey personnel in this study were trained to report the depth of water in the tub rather than the total depth of the tub to its rim. The measured depth of water was from the floor of the tub to the bottom of the overflow orifice, which is generally one to two inches below the rim. The distribution of bathtubs by volume is presented in Table 4-8.

**Table 4-8: Distribution of Single-Family Bathtubs by Volume**

| Measured Volume (gallons) | Percent of 471 Bathtubs Inspected | | | | | | |
|---|---|---|---|---|---|---|---|
| | Service Area | Location | | Year-Built | | | |
| | | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 50 or less | 23.8 | 9.1 | 14.6 | 11.7 | 5.7 | 4.2 | 2.1 |
| 51 to 80 | 67.5 | 17.8 | 50.0 | 39.3 | 18.0 | 7.2 | 3.2 |
| Over 80 | 8.7 | 3.4 | 5.1 | 4.0 | 2.3 | 1.7 | 0.4 |

## Faucet Data

A total of 1,448 faucets were identified in the 387 single-family residences visited. Inspections were conducted of 1,408 faucets to identify leaks, determine faucet location, and check for aerators. Flow rates were measured at 1,402 faucets.

Four possible faucet locations were included in the survey: kitchen bathroom, utility, and "other." Of faucets inspected, 27.8% were found in kitchens, 63.1% in bathrooms, 8% were classified as utility, and 1.1% as other. These percentages closely resemble the values from the 1995 study: 27% for kitchens, 61% for bathrooms, 9% for utility, and 2% for other. Most of the measured flow rates were between one and three gallons per minute. The distribution of measured flow rates is presented in Table 4-9, along with values from the 1995 study for the overall service area.

**Table 4-9: Distribution of Single-Family Faucets by Flow Rate**

| Measured Flow Rate (gpm) | Service Area | | Percent of 1,402 Faucets Tested | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Location | | Year-Built | | | |
| | 1995 | 2001 | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 2.20 or less | 64 | 55.5 | 21.2 | 34.3 | 27.5 | 15.9 | 7.2 | 4.9 |
| 2.21 to 2.99 | | 22.5 | 7.8 | 14.7 | 11.4 | 6.4 | 3.9 | 0.8 |
| 3.0 to 3.99 | 12 | 11.1 | 2.6 | 8.5 | 5.9 | 4.3 | 0.6 | 0.2 |
| 4.0 to 4.99 | 10 | 6.1 | 1.8 | 4.3 | 3.8 | 1.6 | 0.7 | 0.1 |
| 5.0 to 5.99 | 5 | 3.0 | 0.4 | 2.6 | 2.1 | 0.6 | 0.2 | 0 |
| 6.0 or more | 9 | 1.8 | 0.4 | 1.4 | 1.0 | 0.6 | 0.1 | 0 |

The percentage of faucets with flow rates under 3 gpm increased from 64% in 1995 to 78% in 2001. The percentage of faucets with flow rates over 4 gpm decreased from 24% in 1995 to 11% this year.

The incidence of faucet aerators was high, while the percentage of faucets that leaked was relatively low. Of faucets inspected, 85% had aerators in place, as compared with the 69% recorded in 1995. Only 2% of the faucets were observed to leak, close to the 3% observed in 1995.

## Dishwasher Data

A total of 248 dishwashers were identified in the 387 single-family residences visited. All but five were inspected to determine the manufacturer and whether or not they had a water efficiency setting. Dishwashers from 18 different manufacturers were inspected. The most commonly found dishwasher manufacturers were GE (21.8%), Kitchen Aid (21%), Maytag (14.8%), and Whirlpool (14%). About 86% of the dishwashers had water efficiency settings, an increase from the 58% recorded in 1995.

### Clothes Washer Data

A total of 362 clothes washers were identified in the 387 single-family residences visited. Thirty-one locations had no clothes washer, 350 had one, and six locations had two. The washers were inspected to determine the manufacturer, whether or not they had a water efficiency setting, and whether or not they were high-efficiency washers. The most commonly found clothes washer manufacturers were Kenmore (33%), Maytag (24%), and Whirlpool (18%). About 90% of the clothes washers had water efficiency settings, as compared with the 94% recorded in the 1995 baseline study, and 12.2% of were high-efficiency appliances.

### Pool, Spa, and Fountain/Pond Data

A total of 40 outdoor swimming pools, 47 spas, and 35 fountains/ponds were identified in the study. The pools had a mean water volume of 22,857 gallons, lower than the 33,338 reported in the 1995 Baseline study; the median value of 23,562 was closer to the 1995 median of 24,796 gallons. Forty percent of the pools had a cover with another 10% listed as indeterminate. The spas had a mean volume of 766 gallons (702 in 1995) and a median value of 673 gallons (717 in 1995); all but five of the spas were outdoors and 60% of them had a cover. The fountains/ponds varied widely in volume: 12 had volumes under 100 gallons; nine had volumes between 100 and 500 gallons; seven had volumes between 500 and 2,500 gallons; one pond had a volume of about 6,600 gallons and the largest one held about 42,500 gallons of water. Twenty-nine of the fountains/ponds had a recirculating water system.

### Landscape and Irrigation System Characteristics

Landscape areas and irrigation system characteristics were inspected at the 387 sites surveyed. The square footage of landscapable areas, lawn, and irrigated areas were measured in the front and back of each house; outdoor areas not covered by cement, gravel, or rock were noted as "landscapable." Water pressure was measured where possible; measurements were collected at 337 homes. Irrigation system controllers were inspected to gather data on manufacturer, type (digital, mechanical, other), number of stations served, multiple start capabilities, type of calendar clock, and the incidence of moisture and rain sensors.

Survey personnel were equipped with pressure gages, ultrasonic distance measurers, and tape measures. Pressure gages with a threaded ¾-inch fitting that could be easily screwed-on to most hose bibs were used; gages had a 0-200 pounds-per-square-inch (psi) range with markings every four psi. Distance measurers (Pocket Dimension Master from Calculated Industries) allowed immediate measurement up to 50 feet, although they also required solid surfaces that were not always available from which to bounce the

sound signals. Tape measures with 27-foot lengths were used to complement the sonic devices.

The distribution of landscapable areas in front yards is presented in Table 4-10. The mean size of the front landscapable areas was 1,440 square feet, about 5% smaller than the 1,514 square feet reported in the 1995 study. The majority of respondents (53.5%) had one thousand square feet or less. Most of the areas over 2,000 square feet were located east of the hills and on houses built before 1982.

**Table 4-10: Distribution of Landscapable Areas in Front Yards of Single-Family Homes**

| | Percent of 387 Homes Surveyed | | | | | | |
|---|---|---|---|---|---|---|---|
| | Service | Location | | Year-Built | | | |
| Square Footage | Area | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 0 | 7.8 | 1.0 | 6.7 | 4.7 | 1.3 | 1.6 | 0.3 |
| 1 to 1,000 | 53.5 | 4.9 | 48.6 | 38.5 | 9.6 | 3.6 | 1.8 |
| 1,001 to 2,000 | 17.8 | 5.7 | 12.1 | 7.2 | 7.5 | 2.1 | 1.0 |
| 2,001 to 3,000 | 10.1 | 5.4 | 4.7 | 4.1 | 4.4 | 1.3 | 0.3 |
| 3,001 to 7,000 | 8.3 | 6.5 | 1.8 | 3.1 | 3.9 | 1.0 | 0.3 |
| Over 7,000 | 2.7 | 1.8 | 0.8 | 1.3 | 0.5 | 0.8 | 0.0 |

The distribution of landscapable areas in front yards that are irrigated is presented in Table 4-11. The mean size of irrigated front landscapable areas was 934 square feet, about 20% lower than the 1,154 square feet reported in the 1995 study. Of homes surveyed, 22.7%, primarily pre-1950 houses west of the hills, had no irrigation in front. Most houses east of the hills with landscapable areas in front had irrigation; several houses with large front yards irrigated only portions of them (that is why 6.2% of houses east of the hills had irrigated areas between 1 and 1,000 square feet, although only 4.9% had landscapable areas that size). West of the hills, only about half of the houses with front yards larger than one thousand square feet had irrigation.

**Table 4-11: Distribution of Irrigated Areas in Front Yards of Single-Family Homes**

| | Percent of 387 Homes Surveyed | | | | | | |
|---|---|---|---|---|---|---|---|
| | Service | Location | | Year-Built | | | |
| Square Footage | Area | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 0 | 22.7 | 3.1 | 19.6 | 14.5 | 5.7 | 1.8 | 0.8 |
| 1 to 1,000 | 50.6 | 6.2 | 44.4 | 34.1 | 10.3 | 4.1 | 2.1 |
| 1,001 to 2,000 | 12.7 | 5.7 | 7.0 | 4.9 | 5.7 | 1.8 | 0.3 |
| 2,001 to 3,000 | 7.2 | 4.4 | 2.8 | 2.6 | 2.8 | 1.6 | 0.3 |
| 3,001 to 7,000 | 5.4 | 4.9 | 0.5 | 2.1 | 2.3 | 0.8 | 0.3 |
| Over 7,000 | 1.3 | 1.0 | 0.3 | 0.8 | 0.3 | 0.3 | 0.0 |

The distribution of landscapable areas in back yards is presented in Table 4-12. The mean size of the back landscapable areas was 2,640 square feet, about 63% of the 4,201 square feet reported in 1995. Of the respondents, 10.1%, mostly from pre-1950 houses west of the hills had no landscapable area; about 36% had under one thousand square feet, again mostly pre-1950 houses west of the hills; back yard areas over 3,000 square feet are more likely to be found east of the hills, in houses built before 1982.

**Table 4-12: Distribution of Landscapable Areas in Back Yards of Single-Family Homes**

| | Percent of 387 Homes Surveyed | | | | | | |
|---|---|---|---|---|---|---|---|
| | Service | Location | | Year-Built | | | |
| Square Footage | Area | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 0 | 10.1 | 1.0 | 9.0 | 5.9 | 2.3 | 1.6 | 0.3 |
| 1 to 1,000 | 35.9 | 3.6 | 32.3 | 25.6 | 5.7 | 3.1 | 1.6 |
| 1,001 to 2,000 | 22.0 | 4.1 | 17.8 | 12.9 | 5.7 | 2.1 | 1.3 |
| 2,001 to 3,000 | 9.0 | 2.6 | 6.5 | 5.9 | 2.3 | 0.5 | 0.3 |
| 3,001 to 7,000 | 14.0 | 7.0 | 7.0 | 5.2 | 6.2 | 2.3 | 0.3 |
| Over 7,000 | 9.0 | 7.0 | 2.1 | 3.4 | 4.9 | 0.8 | 0.0 |

The distribution of landscapable areas in back yards that are irrigated is presented in Table 4-13. The mean size of irrigated back landscapable areas was 1,576 square feet, about 10% higher than the 1,434 square feet reported in the 1995 baseline study. Of surveyed homes, 23.8%, primarily pre-1950 houses west of the hills had no irrigation in back. The majority of large (over 3,000 square feet) irrigated back yards are located east of the hills.

**Table 4-13: Distribution of Irrigated Areas in Back Yards of Single-Family Homes**

| | Percent of 387 Homes Surveyed | | | | | | |
|---|---|---|---|---|---|---|---|
| | Service | Location | | Year-Built | | | |
| Square Footage | Area | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 0 | 23.8 | 2.8 | 20.9 | 15.2 | 5.9 | 1.8 | 0.8 |
| 1 to 1,000 | 41.9 | 5.4 | 36.4 | 28.7 | 7.5 | 4.1 | 1.6 |
| 1,001 to 2,000 | 12.9 | 3.6 | 9.3 | 7.0 | 3.6 | 1.6 | 0.8 |
| 2,001 to 3,000 | 7.5 | 3.4 | 4.1 | 3.6 | 2.8 | 0.8 | 0.3 |
| 3,001 to 7,000 | 9.6 | 6.2 | 3.4 | 2.6 | 4.9 | 1.8 | 0.3 |
| Over 7,000 | 4.4 | 3.9 | 0.5 | 1.8 | 2.3 | 0.3 | 0.0 |

The distribution of lawn areas in front yards is presented in Table 4-14. Of the 25.3% of homes surveyed that were located east of the hills, about a third (8%) had no front lawns. Of the 74.7% of homes surveyed that were located west of the hills, 30% had no front lawns. The mean size of front lawns was calculated at 551 square feet, about 17% higher than the 471 square feet reported in 1995.

**Table 4-14: Distribution of Lawn Areas in Front Yards of Single-Family Homes**

| | Percent of 387 Homes Surveyed | | | | | | |
|---|---|---|---|---|---|---|---|
| | Service | Location | | Year-Built | | | |
| Square Footage | Area | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 0 | 38.0 | 8.0 | 30.0 | 22.2 | 11.1 | 3.9 | 0.8 |
| 1 to 500 | 27.4 | 3.1 | 24.3 | 19.1 | 4.9 | 2.1 | 1.3 |
| 501 to 1,000 | 17.8 | 5.7 | 12.1 | 11.1 | 4.4 | 1.6 | 0.8 |
| Over 1,000 | 16.8 | 8.5 | 8.3 | 6.5 | 6.7 | 2.8 | 0.8 |

The distribution of lawn areas in back yards is presented in Table 4-15. About half of the homes surveyed east and west of the hills had no lawn in back. The mean size of back yard lawns was calculated at 554 square feet, very close to the 545 square feet reported in 1995.

**Table 4-15: Distribution of Lawn Areas in Back Yards of Single-Family Homes**

| | Percent of 387 Homes Surveyed | | | | | | |
|---|---|---|---|---|---|---|---|
| | Service | Location | | Year-Built | | | |
| Square Footage | Area | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 0 | 47.3 | 11.9 | 35.4 | 26.4 | 15.5 | 4.4 | 1.0 |
| 1 to 500 | 21.4 | 3.1 | 18.3 | 13.7 | 4.1 | 2.6 | 1.0 |
| 501 to 1,000 | 13.2 | 2.6 | 10.6 | 9.8 | 1.8 | 1.0 | 0.5 |
| Over 1,000 | 18.1 | 7.8 | 10.3 | 9.0 | 5.7 | 2.3 | 1.0 |

The distribution of types of irrigation systems in front yards is presented in Table 4-16. About a third of the houses, almost all west of the hills, used only a hose to irrigate the front yard; that is a decrease from the 56% reported in the 1995 study. The percentages of other types of systems are not directly comparable to figures from the 1995 study, because the 1995 study included several types of irrigation per house and the 2001 survey entered only one system per home.

**Table 4-16: Distribution of Types of Irrigation Systems in Single-Family Front Yards**

| | Percent of 387 Homes Surveyed | | |
|---|---|---|---|
| | | Location | |
| Type of Irrigation System | Service Area | East | West |
| Hose alone | 32.8 | 2.3 | 30.5 |
| Hose and sprinkler | 15.2 | 3.1 | 12.1 |
| In-ground system with controller | 16.5 | 9.0 | 7.5 |
| Drip irrigation | 11.4 | 4.9 | 6.5 |
| Other or no irrigation | 24.0 | 5.9 | 18.1 |

The distribution of types of irrigation systems in back yards is presented in Table 4-17. About a third of the houses, almost all west of the hills, used only a hose to irrigate the back yard; that is a decrease from the 62% reported in the 1995 study. As with the front yard irrigation types, the percentages of other types of systems are not directly comparable to figures from the 1995 study. Most of the houses east of the hills have some type of irrigation other than hose only; the opposite is true of houses west of the hills.

**Table 4-17: Distribution of Types of Irrigation Systems in Single-Family Back Yards**

| | Percent of 387 Homes Surveyed | | |
|---|---|---|---|
| | | Location | |
| Type of Irrigation System | Service Area | East | West |
| Hose alone | 33.9 | 2.1 | 31.8 |
| Hose and sprinkler | 13.4 | 2.3 | 11.1 |
| In-ground system with controller | 13.2 | 7.8 | 5.4 |
| Drip irrigation | 12.4 | 5.9 | 6.5 |
| Other or no irrigation | 27.1 | 7.2 | 19.9 |

The use of drip irrigation was not widespread. About 4% of respondents used drip to irrigate all their front yards, and 2% used it to irrigate all their back yard area. About 17% used drip to irrigate portions of their front yards, and about 19% used drip to irrigate portions of their back yards. The mean value for percent of landscapable area using drip irrigation in front was 7.5%, up from the 5% reported in 1995. The mean value for percent of landscapable area using drip irrigation in back was 8.1%, up from the 6% reported in 1995.

Landscaped areas are maintained primarily by the owner/resident of most homes. About 13% of respondents reported using a gardener or landscape maintenance service.

A total of 156 irrigation controllers were identified and inspected. The most commonly found manufacturers were Lawn Genie (21.8%) and Rain Bird (16%), as they were in the 1995 study (with percentages of 37% and 20%). About 40% of the controllers covered irrigation in both front and back of the house; about 35% were dedicated to the back yard only. Approximately 76% of the controllers inspected were digital, 23% mechanical and 87% had programmable multiple start capabilities. Over 80% of the controllers had six stations or less; the mean number of stations was 3.9, compared to 3.0 in 1995. About 83% had a 7-day clock, up from 70% in 1995. Less than 1% had moisture sensors (2% in 1995) and 2% had rain sensors (same as in 1995).

Water pressures ranged from a low of 38 to a high of 170 psi. The mean pressure value was 76 psi., with 68% of the homes reporting water pressures under 80 psi. Only 1% exceeded 140 psi.

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# 5.0 MULTI-FAMILY SITE SURVEY

## 5.1 SAMPLE CHARACTERISTICS

A total of 3,630 multi-family account holders with BCC 6513 (five or more units) were randomly selected as potential participants in the study. As indicated in Section 2 of this report, multi-family dwellings with two to four units (BCC 6514) were not included in the survey as a cost containment measure. Although more numerous in terms of accounts, properties with two to four units use significantly less water as a sector than the apartment buildings with five or more units and thus present less of a water-savings potential. Apartment buildings with five or more units use about 74% of all water used by the multi-family sector.

Potential participants were sub-divided into 12 groups, according to location and age of dwelling. The representation of each group in the sample was in the same proportion as the representation of the group in the District's multi-family account base. Every effort was made to schedule appointments and conduct site visits with the targeted number of respondents in each group. Numerous cancellations and other difficulties in the appointment scheduling process, however, left a few groups short and others over-represented.

The most significantly over-represented group in the sample was apartment buildings located west of the hills and built before 1950. The target number of respondents was 255, and the actual number of surveys was 262. There was a high level of cooperation among apartment building owners/managers in this group.

The most significantly under-represented group in the sample was apartment buildings located east of the hills and built after 1990. One survey was completed out of the four targeted. This group was particularly difficult to reach because the account holders listed in the database were almost all homeowners associations and managers of condominium complexes who were very protective of the residents' privacy and generally refused to participate in the study.

The under-representation of large condominium complexes is not detrimental to this study. Owners of condominiums have total control over the type and water-saving characteristics of their fixtures, and their preferences are likely to differ from those of owners/managers of apartment buildings who work under a different set of constraints. For future analysis of water-use patterns, the District may consider separating condominiums from apartment building accounts.

The 1995 baseline study analyzed the same group of multi-family accounts: buildings with five or more units. Similar difficulties were encountered during the 1995 study with home-owner associations. The initial target of 185 surveys was reduced to 151, reportedly because of problems gaining the cooperation of the managers of large condominium complexes. The reduction in the size of the sample affected its proportionality, resulting in an apparent over-representation of apartment buildings east of the hills (discussed in Section 5.4 of this report).

The total number of documented visits in the 2001 multi-family survey was 360, close to the target total of 363. The corresponding sampling error for proportional data for a 95% confidence level is 5.02%, very close to the target of 5%. The makeup of the multi-family site survey sample is presented in Appendix J, Table J-1.

## 5.2 RESPONSE RATE

The actual response rate was better than the one in ten anticipated for the study. Three out of four potential study participants reached by an appointment scheduler (28% of all calls) agreed to a site visit. Seventy-two percent of scheduling calls to multi-family account-holders went unanswered, reached an incorrect telephone number, or did not find an owner/manager available. Table 5-1 presents the breakdown of calls to potential participants in the multi-family site visits.

**Table 5-1: Multi-Family Site Survey – Appointment Scheduling Call Outcomes***

| | Percent of Telephone Calls | | | | | |
|---|---|---|---|---|---|---|
| Market Sector | Appoint. | Refusal | No Answer | Message | Call Back | Incorrect Number |
| Multi-Family (5+ Units) | 21 | 7 | 22 | 21 | 10 | 19 |

*Based on 5385 calls made during the first six weeks of the study (May 17 to June 30, 2001), 1096 of them to multi-family properties

The list of 3,630 potential participants was not exhausted. The number of calls required to reach the target number of participants in each subgroup varied. Of the potential participants called, 91% were called only once, an additional 8% were called twice, and 1% had to be called more than twice.

Not all scheduled visits resulted in a completed survey. Eleven percent of scheduled visits resulted in cancellations by the customer. Some customers called to cancel; others refused access to the field representative or were not available at the scheduled time.

No sample bias was perceived from the response rate. Calls to schedule appointments were made during working hours, evenings, and weekends. Site visits were scheduled for both weekdays and weekends. The sample stratification insured a representative distribution of customers by location, and age of dwelling.

## 5.3 RESPONDENT CHARACTERISTICS

Figure 5-1 illustrates the distribution of respondents to the multi-family site survey, according to District data. Sample characteristics closely matched those of the District's service area; 9.4% of the sample was from east of the hills where 10.6% of the apartment buildings with five or more units are located. Seventy-three percent of the buildings in the sample were built before 1950; District records show 71% of the buildings with five or more units in that age bracket. Ten percent of the buildings

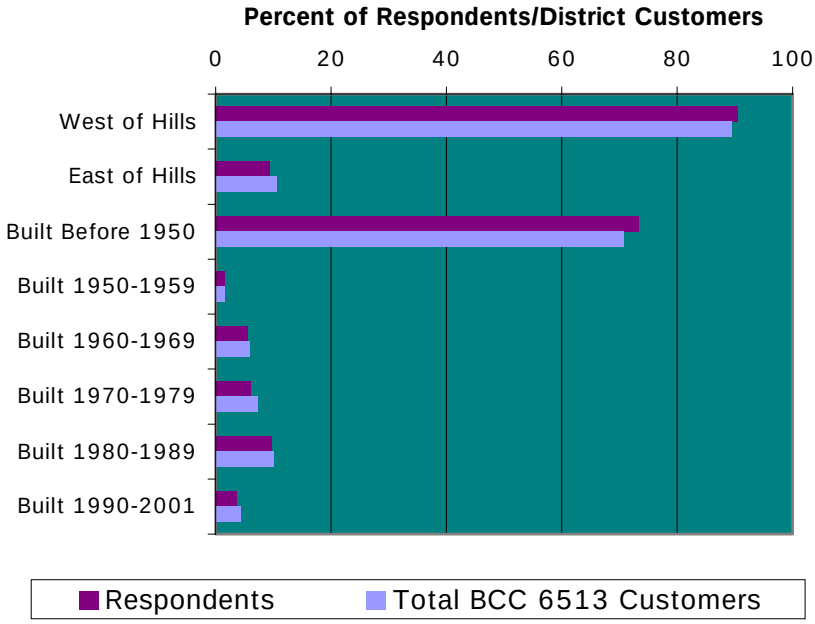


**Figure 5-1: Distribution of Respondents to Multi-Family Site Survey by Location and Age of Dwelling**

in the sample were built between 1980 and 1989; District records show 9.7% of the buildings with five or more units in that age bracket.

According to the answers provided by respondents:

- Thirty-nine percent of the multi-family respondents reported to own the property surveyed; the remainder were managers, maintenance personnel, or rental office employees.
- About 44% of the facilities visited reported between five and nine units per structure, 46% reported 10 or more units per structure; three mobile home parks were visited; 4.5% of respondents had less than five units although their BCC was 6513.
- The mean number of units represented by each water account in the survey was 21.3; which corresponds closely with U.S. Census 1990 data (2000 data not yet available) for Alameda County that show approximately 22 housing units per apartment building with 5 or more units. 1998 data from the American Housing Survey for the Oakland Metropolitan Area also indicate that there are approximately 22 housing units per property in apartment buildings with five or more units.
- Seventy-eight percent of the multi-family sites surveyed had one building on the property; 9% had two buildings, 5% had three, and 8% had four or more. The mean number of buildings was 3.
- Ninety-seven percent of respondents reported occupancy rates between 90 and 100 %.

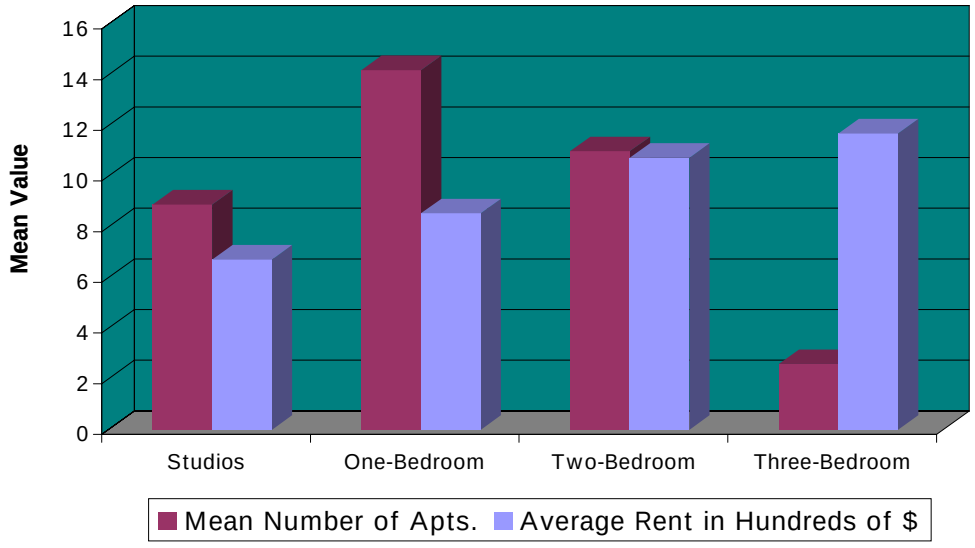


**Figure 5-2: Multi-Family Site Survey Respondents: Average Number of Apartments per Site/Average Rent**

## 5.4 SURVEY FINDINGS

Survey findings are reported in terms of appliance/fixture characteristics. Comparisons are made where possible with the responses to the 1995 and 1998 multi-family site surveys. Survey answers are tabulated in Appendix J.

### Incidence of Appliances/Fixtures

The incidence of water-using appliances and fixtures that exist in respondents' buildings is summarized in Table 5-2. The corresponding values from the 1995 baseline study are presented alongside for comparison. The distribution and characteristics of inspected appliances and fixtures are discussed in subsequent subsections of this report.

**Table 5-2: Incidence of Appliances/Fixtures at Multi-Family Sites**

| Appliances/Fixtures | Percent of Buildings with at Least One Appliance/Fixture | |
|---|---|---|
| | 1995 | 2001 |
| Toilets with design flush volumes of 1.6 gpf | 17 | 37 |
| Toilets with conservation devices | 14 | 5 |
| Low-flow showerheads | 61 | 62 |
| Bathtubs | 98 | 94 |
| Dishwashers | 31 | 33 |
| Clothes washer hookups in apartments | 31 | 18 |
| Common laundry facility for residents | 64 | 66 |
| Reverse osmosis units | 0 | 3 |
| Recirculating hot water | 31 | 22 |
| Commercially delivered bottled water | 23 | 10 |
| Refrigerators with built-in water dispenser | 0 | 5 |
| Refrigerators with built-in icemaker | 9 | 7 |
| Water softener | 1 | 0 |
| Point-source water heaters | 2 | 1 |
| Evaporative coolers | 1 | 1 |
| Cooling towers | 0 | 1 |
| Pressure regulators | 12 | 14 |
| Swimming pool | 13 | 13 |
| Outdoor spa/Jacuzzi | 4 | 6 |
| Fountains/ponds | 3 | 6 |
| Gray water system | 0 | 0 |
| Well water | 2 | 1 |

The percent of buildings with at least one fixture/appliance was determined the same way in the 1995 and 2001 studies. The 1995 study, however, had a smaller sample size resulting in a wider margin of error (plus or minus 8%, as compared to plus or minus 5% in 2001). The makeup of the 1995 sample may also skew some of the comparisons, because it had 29.5 units per site compared to 21.3 units per site in the 2001 survey. Significant decreases in the incidence of appliances, from 31 to 18% for clothes washer hookups in apartments, 31 to 22% in recirculating hot water, and 23 to 10% in commercially delivered bottled water, may be due in part to the different sample compositions.

The mean number of fixtures per unit is summarized in Table 5-3. These numbers were computed by dividing the calculated mean number of fixtures/appliances by the mean number of housing units per water account (29.5 for the 1995 study and 21.3 for the 2001 survey).

**Table 5-3: Mean Values of Fixture/Appliances Per Unit**

| Fixture/Appliance | 1995 | 2001 |
|---|---|---|
| Toilets | 1.2 | 1.2 |
| Showers | 1.0 | 1.1 |
| Faucets | 2.1 | 2.3 |
| Bathtubs | 1.0 | 1.0 |
| Dishwashers | 0.2 | 0.3 |
| Clothes washers | 0.3 | 0.1 |

The number of clothes washers per housing unit appears to have decreased significantly since 1995. The 1995 value of 0.3 clothes washers per unit, however, may have been skewed by the composition of the sample. Data from the 1998 American Housing Survey for the Oakland Metropolitan Area shows a less significant decrease, with 0.17 clothes washers per housing units in apartment buildings with five or more units. This estimate is close to the 0.13 obtained in the 2001 survey.

## Toilet Data

About 9,000 toilets were identified in the 360 multi-family buildings surveyed. A total of 292 toilets were inspected for leaks, inserts, make and year installed, and rated flush volume. The flush volume was measured in 282 of the toilets inspected.

Thirty-one different toilet makes were recorded. The most common toilet names were American Standard (21.2%; 31% in 1995), Briggs (11%; 14% in 1995), Standard, an older name for American Standard (8.9%; 11% in 1995), and Norris (8.6%). Toilet manufacturer could not be identified for 13% of the toilets inspected.

Year of manufacture was recorded from toilet tanks. Of the toilets inspected, 32% were manufactured on or before 1982, 17% between 1983 and 1992, and 27% after 1992. This distribution is similar to that reported in 1995 if the "unknowns" are assumed to be pre-1982 toilets. The distribution of toilets by age is presented in Table 5-4.

**Table 5-4: Distribution of Multi-Family Toilets by Age of Fixture**

| Year of Toilet Manufacture | Percent of 292 Toilets Inspected | | | | | | |
|---|---|---|---|---|---|---|---|
| | Service Area | Location | | Year-Built | | | |
| | | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| <1950 | 0.3 | 0.0 | 0.3 | 0.3 | 0.0 | 0.0 | 0.0 |
| 1950-1982 | 31.8 | 5.1 | 26.7 | 22.9 | 8.2 | 0.7 | 0.0 |
| 1983-1992 | 17.1 | 2.1 | 15.1 | 8.9 | 2.7 | 5.1 | 0.3 |
| >1992 | 26.7 | 1.7 | 25.0 | 19.9 | 3.4 | 2.7 | 0.7 |
| Unknown | 24.0 | 4.5 | 19.5 | 15.8 | 6.8 | 1.0 | 0.3 |

In terms of rated flush volume (design flush volume quoted by manufacturer), the distribution of toilets was determined by crosschecking rating data with year of toilet manufacture and measured flush volumes. Rating data (values engraved on the toilet tank cover or printed on the side of the tank) showed 34.9% of the toilets were ultra-low flush, 23.3% of the toilets were rated at 3.5 gallons per flush, and 17.8% at flush volumes higher than 3.5 gpf. No rated flush volume could be determined with certainty for 24% of the toilets inspected.

The year of manufacture was checked for each toilet with indeterminate flush rating; all toilets manufactured after 1992 were noted as ultra-low flush. Toilets manufactured between 1982 and 1992 were assumed to have an average flush rating of 3.5 gpf or less; the actual (measured) flush volume was checked for these toilets, and all were found to fall between 1.6 gpf and 3.5 gpf. This crosschecking reduced the number of toilets with indeterminate flush rating by about a third. The final distribution of toilets by rated flush volumes is presented in Table 5-5.

**Table 5-5: Distribution of Multi-Family Toilets by Rated Flush Volume**

| | Percent of 292 Toilets Inspected | | | | | | |
|---|---|---|---|---|---|---|---|
| | Service | Location | | Year-Built | | | |
| Rated Flush Vol. | Area | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 1.6 gpf | 37.0 | 2.4 | 34.6 | 28.1 | 4.5 | 3.1 | 1.4 |
| 3.5 gpf | 29.1 | 7.5 | 21.6 | 15.4 | 8.9 | 4.8 | 0.0 |
| >3.5 gpf | 17.8 | 3.4 | 14.4 | 10.6 | 5.8 | 1.4 | 0.0 |
| Unknown | 16.1 | 0.0 | 16.1 | 13.7 | 2.1 | 0.3 | 0.0 |

The proportion of toilets rated as ultra-low flush increased significantly between 1995 and 2001. The 1995 baseline study reported 5% of inspected toilets as ultra-low flush and 50% rated at 3.5 gpf. Most of the increase from 5 to 37% of all toilets rated as ultra-low flush appears to come from the replacement of 3.5 gpf toilets.

The rated flush volume of some of the toilets did not correspond with the flush volume measured by study personnel. About 42% of the toilets rated as ultra-low flush had measured flush volumes of more than 1.6 gallons. Most of these had been manufactured after 1992, indicating that the toilets were indeed ultra-low flush toilets with flush volumes that exceeded the 1.6 gpf standard. 18 percent of the toilets rated as 3.5 gpf had measured flush volumes of more than 3.5 gallons. Most of these were installed before 1982. Ninety-two percent of the toilets rated as more than 3.5 gpf had measured flush volumes under 5 gallons. These figures indicate that ultra-low flush toilets are about twice as likely to flush above their rated volume than 3.5 gpf toilets, which in turn are about twice as likely to flush above their rated volume than toilets over 3.5 gpf.

The distribution of toilets by measured flush volumes is presented in Table 5-6. About 20% of toilets had measured flush volumes of 1.6 gallons or less. The 1998 study reported 18% of toilets in that range. Sixty-one percent of toilets had flush volumes between 1.6 and 3.5 gallons; the 1998 study reported 48% of toilets in that range. The baseline study did not report measured flush volumes.

**Table 5-6: Distribution of Multi-Family Toilets by Measured Flush Volume**

| Measured Flush Volume | Percent of 292 Toilets Inspected | | | | | | |
|---|---|---|---|---|---|---|---|
| | Service Area | Location | | Year-Built | | | |
| | | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 1.6 gpf or less | 19.9 | 0.7 | 19.2 | 15.1 | 1.4 | 2.7 | 0.7 |
| 1.61 to 3.5 gpf | 61.3 | 10.3 | 51.0 | 38.4 | 16.4 | 6.5 | 0.0 |
| >3.5 gpf | 15.4 | 1.7 | 13.7 | 12.0 | 3.1 | 0.3 | 0.0 |
| Unable to measure | 3.4 | 0.7 | 2.7 | 2.4 | 0.0 | 0.3 | 0.7 |

The percentage of toilets with flush volumes in excess of 3.5 gallons has decreased since the 1998 study, which reported that 34% of the toilets had measured flush volumes higher than 3.5 gpf. The 2001 survey found about 18% of multi-family toilets with measured flush volumes above 3.5 gpf.

Toilet tank inserts were found in 12% of the toilets inspected. About three quarters of these were quick closing flapper valves and most of the others were displacement devices. The baseline study reported that 7% of the toilets had displacement devices in 1995.

Leaks were identified in 2% of the toilets inspected. Most of the toilets with leaks were rated as ultra-low flush toilets and were manufactured after 1982. The 1995 study reported 5% of toilets leaked, and the 1998 study reported that 10% of toilets leaked. It is not clear whether the decrease to 2% represents better toilet maintenance or simply reflects different methods of identifying leaks. The 1998 study examined toilets for flapper valve or overflow leaks. The 1995 study did not specify leak detection method. Survey personnel in this study identified leaks by simple visual inspection of the toilet bowl; no dyes or tracer were used. The method used in this survey may not capture some of the leaks due to flapper valve malfunction, which in 1998 amounted to 66% of the total.

## Showerhead Data

About 7,700 showerheads were identified in the 360 multi-family buildings surveyed. A total of 296 showerheads were inspected to determine type (fixed or handheld, stream or atomizing) and record the incidence of shutoff buttons and leaks. The flow rate was measured at 294 of the showerheads inspected; there were access restrictions at the other two.

Showerhead characteristics identified by the survey were as follows.

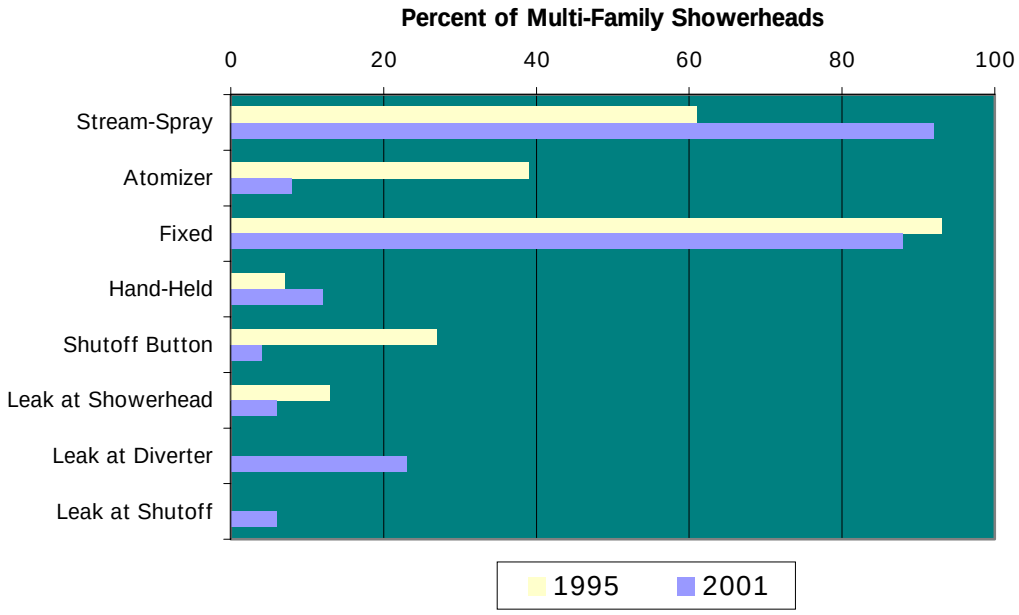


**Figure 5-3: Multi-Family Showerhead Characteristics**

Percentages reported in 2001 differ significantly from 1995 data. The number of stream/spray type showerheads is 31% higher while the number of atomizer heads is 31% lower; the number of fixed-type showerheads is 5% lower; shutoff buttons were found only in one out of 25 showerheads as opposed to the one in four reported in 1995; and almost three times as many leaks were identified this year as were reported in 1995. While other data (showerhead flow rates, discussed below) suggest that between 20 and 30% of showerheads have been replaced since 1995, some of the differences may be due to survey methodology. Survey personnel in this study were trained to detect three types of leaks, which was apparently not the case in 1995 because only one type of leak was reported. The lower incidence of shutoff buttons corresponds closely with the larger incidence of low-flow showerheads (see below), suggesting that the change to the water-conserving head may have led to the elimination of the water-conserving button.

The mean flow rate for the showerheads tested was 2.8 gpm, as compared to 3.0 gpm in 1995. Sixty-four percent of the showerheads were found to have flow rates under 2.5 gpm. The distribution of showerhead flow rates and a comparison with 1995 values is presented in Table 5-7.

**Table 5-7: Distribution of Multi-Family Showerheads by Flow Rate**

| Measured Flow Rate (gpm) | Percent of 294 Showerheads Tested | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Service Area | | Location | | Year-Built | | | |
| | 1995 | 2001 | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 1.99 or less | 5 | 7.5 | 0.0 | 7.5 | 6.5 | 0.7 | 0.3 | 0.0 |
| 2.0 to 2.50 | 43 | 56.5 | 6.8 | 49.7 | 41.2 | 11.9 | 2.7 | 0.7 |
| 2.51 to 2.99 | | 7.1 | 1.0 | 6.1 | 3.4 | 1.4 | 2.4 | 0.0 |
| 3.0 to 3.99 | 29 | 12.6 | 2.0 | 10.5 | 7.8 | 4.1 | 0.7 | 0.0 |
| 4.0 to 4.99 | 5 | 5.4 | 0.0 | 5.4 | 4.4 | 1.0 | 0.0 | 0.0 |
| 5.0 to 5.99 | 9 | 7.1 | 3.7 | 3.4 | 2.4 | 3.4 | 1.4 | 0.0 |
| 6.0 or more | 9 | 3.7 | 0.7 | 3.1 | 1.0 | 0.7 | 2.0 | 0.0 |

## Bathtub Data

About 7,600 bathtubs were identified in the 360 multi-family buildings surveyed. The length, width and depth were measured for 253 of the bathtubs. Bathtubs had a mean length of 53.5 inches, mean width of 23.1 inches, and mean depth of water of 11.1 inches. Their mean volume was 59.2 gallons, with a median volume of 58.1 gallons. The mean value of bathtubs per property was 21.2.

The mean and median volumes calculated from survey data are smaller than the values reported in the baseline study (mean of 71 and median of 70 gallons). The most probable cause of this discrepancy is that survey personnel in this study were trained to report the depth of water in the tub rather than the total depth of the tub to its rim. The measured depth of water was from the floor of the tub to the bottom of the overflow orifice, which is generally one to two inches below the rim. The distribution of bathtubs by volume is presented in Table 5-8.

**Table 5-8: Distribution of Multi-Family Bathtubs by Volume**

| Measured Volume (gallons) | Percent of 253 Bathtubs Inspected | | | | | | |
|---|---|---|---|---|---|---|---|
| | Service Area | Location | | Year-Built | | | |
| | | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 50 or less | 25.3 | 3.6 | 21.7 | 18.2 | 5.9 | 1.2 | 0.0 |
| 51 to 80 | 72.7 | 8.7 | 64.0 | 48.6 | 13.8 | 9.9 | 0.4 |
| Over 80 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 0.0 |

## Faucet Data

About 16,500 indoor faucets were identified in the 360 multi-family buildings surveyed. Inspections of 572 faucets were conducted to identify leaks, determine faucet location, and check for aerators. Flow rates were measured at 571 faucets. The mean flow rate measured was 2.5 gpm, down from the 3.1 gpm recorded in 1995 and similar to the 2.53 reported in 1998.

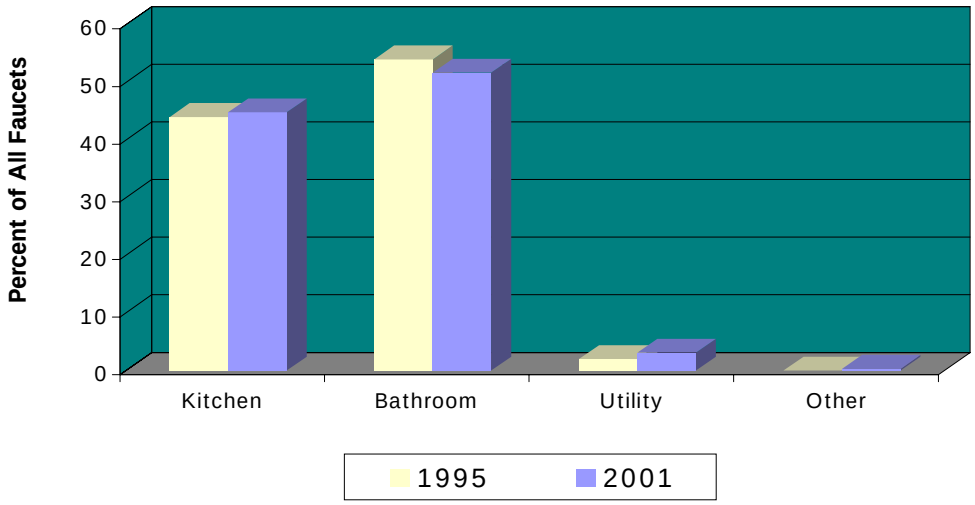


**Figure 5-4: Multi-Family Site Survey - Distribution of Faucet Types**

Most of the measured flow rates were between one and three gpm, with about 11% under 2.2 gpm. The distribution of measured flow rates is presented in Table 5-9, along with values from the 1995 baseline study.

**Table 5-9: Distribution of Multi-Family Indoor Faucets by Flow Rate**

| Measured Flow Rate (gpm) | Percent of 571 Faucets Tested | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Service Area | | Location | | Year-Built | | | |
| | 1995 | 2001 | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 2.20 or less | 7 | 10.7 | 0.4 | 10.2 | 7.7 | 2.3 | 0.5 | 0.0 |
| 2.21 to 2.99 | 42 | 67.6 | 9.5 | 58.1 | 44.8 | 14.7 | 7.7 | 0.4 |
| 3.0 to 3.99 | 21 | 9.6 | 0.9 | 8.6 | 8.1 | 1.2 | 0.2 | 0.0 |
| 4.0 to 4.99 | 10 | 8.1 | 2.5 | 5.6 | 5.3 | 2.6 | 0.2 | 0.0 |
| 5.0 to 5.99 | 8 | 2.8 | 0.0 | 3.0 | 1.9 | 0.0 | 1.1 | 0.0 |
| 6.0 or more | 12 | 1.2 | 0.0 | 1.4 | 1.1 | 0.2 | 0.2 | 0.0 |

The percentage of low-flow faucets (under 2.2 gpm) increased from 7% in 1995 to 10.7% in 2001. Faucets with flow rates between 2.2 and 4.0 gpm increased from 63% in 1995 to 77% in 2001. Most faucet replacements between 1995 and 2001, therefore, were from high-flow faucets (4-plus gpm) to intermediate-flow fixtures (2.2 to 4 gpm).

The incidence of faucet aerators was high, while the percentage of faucets that leaked was relatively low. Eighty-four percent of the faucets inspected had aerators in place, as compared with the 69% recorded in 1995. Only 3% of the faucets were observed to leak, same as in 1995.

### Dishwasher Data

Over 2,600 dishwashers were identified in the 360 multi-family buildings surveyed. Seventy-nine dishwashers were available for inspection; they were inspected to determine the manufacturer, type of apartment unit at which the appliance was located, and whether or not the dishwasher had a water efficiency setting. Dishwashers from 13 different manufacturers were inspected. The most commonly found dishwasher manufacturers were Whirlpool (20%), GE (18%), Hotpoint (17%), and Kitchen Aid (15%). Fifty-five percent of the dishwashers were located in two-bedroom apartments, 18% of them in 3-plus bedroom units, 17% in one-bedroom units, and 10% in studio apartments. About 73% of the dishwashers had water efficiency settings, close to the 75% recorded in 1995. The mean number of dishwashers per site was 7.3, down from the 9.5 recorded in 1995.

### Clothes Washer Data

Over 1,100 clothes washers were identified in the 360 multi-family buildings surveyed. A total of 274 of the washers were available for inspection; they were inspected to determine the manufacturer, location (in-unit or common laundry area), and the type of machine in terms of efficiency.

Eighty-five percent of the washers inspected were in common laundry areas. Five percent of the machines inspected were high-efficiency units. Twenty-three percent had the water saving load size selection feature (compared to the 29% recorded in 1995).

The most commonly found clothes washer manufacturers among inspected washers were Maytag (32%), Kenmore (24.8%), and Speed Queen (20%).

Information about in-unit, common area, and high efficiency clothes washers was requested from property owners/managers. The information obtained from these interviews is summarized in Table 5-10, below; a more complete breakdown of clothes washer data is presented in Appendix J.

Based on the information provided by property owners/managers, there are on average 3.19 clothes washers per multi-family property with five or more units (1,150 washers/360 properties). This corresponds to 0.15 clothes washers per unit (assuming the survey average of 21.3 units per property). 7.5% of all clothes washers were identified as high efficiency units. 14% of clothes washers in common area laundries were identified as high efficiency units.

**Table 5-10: Clothes Washer Data**

| | | |
|---|---|---|
| Number of properties: | | |
| Surveyed | 360 | |
| With no clothes washers | 79 | 21.9% of properties surveyed |
| With in-unit clothes washers | 60 | 16.7% |
| With common area laundry facilities | 233 | 64.7% |
| With both in-unit and common area washers | (12) | (3.3%) |
| For 360 properties surveyed: | | |
| Total clothes washers identified by owners/managers | 1,150 | |
| Total in-unit clothes washers | 539 | 47% of identified washers |
| Total common area clothes washers | 611 | 53% |
| Total high-efficiency clothes washers | 86 | 7.5% of identified washers |
| Total high efficiency washers in common areas | 85 | 99% of high effic. washers<br>14% of washers in common area laundries |
| Properties with at least one high efficiency clothes washer | 29 | 8% of properties surveyed<br>12.4% or properties with common area laundries |
| Number of apartment units served by each common area washer: | | |
| Minimum | 1 | |
| Maximum | 40 | |
| Average | 9 | |

## Pool, Spa, and Fountain/Pond Data

Fifty-six swimming pools were identified in this survey: 42 sites had one, three sites had two, and two sites had four. Thirty-seven swimming pools were available for inspection to determine water volume and identify location (indoor or outdoor) and cover (yes or no). Average pool length was 34 feet, average width 20 feet, and average depth five feet. Mean pool volume was 24,546 gallons of water. Ninety-seven percent of the pools were outdoors and had no cover.

Thirty spas were identified in the survey: 14 sites had one spa and eight sites had two. Seven of the spas were available for inspection to determine water volume and identify location (indoor or outdoor) and cover (yes or no). Average spa length and width were 6.7 feet, average spa depth 3.4 feet, and mean spa volume was 1,158 gallons of water. All of the spas were outdoors and 14% had a cover.

Twenty-six fountains/ponds were identified in the survey: 19 sites had one fountain/pond, two sites had two, and one site had three. Eleven of the fountains/ponds were available for inspection to determine water volume and whether they were equipped with a water recirculating system. The ponds had a wide range of sizes and volumes: two held under 100 gallons of water, two held between 100 and 200 gallons, and the other seven ranged from about 540 gallons to nearly 18,000 gallons. Ten of the 11 fountains/ponds inspected (91%) had a recirculating water system.

## Landscape and Irrigation System Characteristics

Landscape areas and irrigation system characteristics were inspected at the 360 sites surveyed. The square footage of landscapable (unpaved, soil surface) areas, lawn, and irrigated areas were measured. Water pressure was measured where possible and measurements were collected at 229 sites. Irrigation system controllers were inspected to gather data on manufacturer, type (digital, mechanical, other), number of stations served, multiple start capabilities, type of calendar clock, and the incidence of moisture and rain sensors.

The distribution of landscapable areas is presented in Table 5-11. The mean size of the landscapable areas was 4,858 square feet, with a minimum of zero and a maximum of 806,436 square feet. The 1995 baseline study reported a mean of 12,323 square feet, with minimum of zero and maximum of 522,720 square feet. The majority of respondents to this survey (64%) had one thousand square feet or less of landscapable area. These respondents were primarily west of the hills in buildings erected prior to 1950.

**Table 5-11: Distribution of Landscapable Areas in Multi-Family Sites**

| | Percent of 360 Sites Surveyed | | | | | | |
|---|---|---|---|---|---|---|---|
| | Service | Location | | Year-Built | | | |
| Square Footage | Area | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 0 | 22.5 | 0.6 | 21.9 | 16.9 | 1.9 | 3.3 | 0.3 |
| 1 to 1,000 | 41.7 | 3.3 | 38.3 | 34.7 | 3.3 | 3.6 | 0.0 |
| 1,001 to 2,000 | 15.6 | 2.5 | 13.1 | 11.4 | 3.1 | 0.8 | 0.3 |
| 2,001 to 3,000 | 5.2 | 0.3 | 5.0 | 3.1 | 2.2 | 0.0 | 0.0 |
| 3,001 to 7,000 | 8.6 | 1.1 | 7.5 | 3.9 | 1.7 | 3.1 | 0.0 |
| Over 7,000 | 6.4 | 1.7 | 4.7 | 3.3 | 2.2 | 0.8 | 0.0 |

Table 5-12 shows the distribution of irrigated landscapable areas. The mean size of irrigated landscapable areas was 3,546 square feet; the 1995 study reported a mean of 10,455 square feet. Of the 360 sites, 43.1 %, primarily pre-1950 buildings on the west side, had no irrigation.

**Table 5-12: Distribution of Irrigated Areas in Multi-Family Sites**

| | Percent of 360 Sites Surveyed | | | | | | |
|---|---|---|---|---|---|---|---|
| | Service | Location | | Year-Built | | | |
| Square Footage | Area | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 0 | 43.1 | 2.2 | 40.8 | 33.3 | 4.4 | 5.0 | 0.3 |
| 1 to 1,000 | 31.9 | 1.9 | 30.0 | 26.1 | 3.3 | 2.5 | 0.0 |
| 1,001 to 2,000 | 11.4 | 2.5 | 8.9 | 7.2 | 3.3 | 0.6 | 0.3 |
| 2,001 to 3,000 | 4.4 | 0.8 | 3.6 | 2.8 | 1.4 | 0.3 | 0.0 |
| 3,001 to 7,000 | 5.6 | 0.6 | 5.0 | 1.9 | 0.8 | 2.8 | 0.0 |
| Over 7,000 | 3.6 | 1.4 | 2.2 | 1.9 | 1.1 | 0.6 | 0.0 |

The distribution of lawn areas is presented in Table 5-13. The mean size of lawns was calculated at 645 square feet, significantly lower than the 5,594 square feet reported in 1995. Sixty-five percent of the sites surveyed had no lawn; these were primarily pre-1950 buildings on the west side.

**Table 5-13: Distribution of Lawn Areas in Multi-Family Sites**

| | Percent of 360 Sites Surveyed | | | | | | |
|---|---|---|---|---|---|---|---|
| | Service | Location | | Year-Built | | | |
| Square Footage | Area | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
| 0 | 65.0 | 4.2 | 60.8 | 48.1 | 8.9 | 7.8 | 0.3 |
| 1 to 1,000 | 20.6 | 3.6 | 16.9 | 15.0 | 3.1 | 2.5 | 0.0 |
| 1,001 to 2,000 | 6.7 | 0.6 | 6.1 | 5.0 | 1.1 | 0.3 | 0.3 |
| Over 2,000 | 7.7 | 1.1 | 6.7 | 5.3 | 1.4 | 1.1 | 0.0 |

There are significant differences between the landscapable and turf areas reported in this survey and those of the 1995 study. The most probable reason for this discrepancy is the sample configuration. The 2001 survey had a sample of 360 sites that proportionally represented geographical sectors and age of dwellings. The 1995 study had an initial target of 185 sites and evaluated 151 of them. There is no information available on the geographic distribution of the respondents to the 1995 study. Results indicate that the 1995 sample may have had an over-representation of apartment buildings east of the hills, where lawns and landscaped areas tend to be more frequent and larger in size.

The distribution of types of irrigation systems is presented in Table 5-14. At over half of the sites inspected (55.8%), almost all west of the hills, only a hose is used to irrigate, similar to the 59 % reported in 1995. Of the 276 sites inspected, 22.5% used an in-ground system with controller; 1995 data reported 21 %. The proportion of in-ground systems without controllers decreased from 12 % in 1995 to 7.2% in 2001. Of the sites inspected, 2.2 % used drip irrigation.

**Table 5-14: Distribution of Types of Irrigation Systems in Multi-Family Sites**

| Type of Irrigation System | Percent of 276 Sites Inspected | | |
|---|---|---|---|
| | | Location | |
| | Service Area | East | West |
| Hose alone | 55.8 | 1.4 | 54.3 |
| Hose and sprinkler | 12.3 | 0.7 | 11.6 |
| In-ground system with controller | 22.5 | 6.9 | 15.6 |
| In-ground system without controller | 7.2 | 1.1 | 6.2 |
| Drip irrigation | 2.2 | 0.4 | 1.8 |

The building owner in 55% of the sites surveyed maintains landscaped areas. About 30% of respondents reported they use a gardener or landscape maintenance service.

A total of 54 irrigation controllers were identified and inspected. The most commonly found manufacturers were Irritrol (20.4%), Toro (11.1 %), Rain Bird (9.3 %), and Hardie (7.4 %). In the 1995 study Rain Bird was first and Irritrol second. Approximately 70% of the controllers inspected were digital and 28 % mechanical. Eighty percent of the controllers had programmable multiple start capabilities. Over 70 % had six stations or less; the mean number of stations was 4.7, compared to 6.3 in 1995. About 75% had a 7-day clock, up from 67% in 1995. None had moisture sensors, same as in 1995, and 2 % had rain sensors (3% in 1995).

Water pressures up to 125 psi were measured at the sites tested. The mean pressure value was 74 psi. One percent of the sites had pressures under 40 psi, 25% had water pressures between 40 and 60 psi, and 50% had pressures between 60 and 80 psi. There was only one instance of a 125 psi pressure.

# 6.0 NON-RESIDENTIAL SITE SURVEYS

## 6.1 SAMPLE CHARACTERISTICS

A total of 518 non-residential account holders were targeted and 536 sites were surveyed. They were randomly selected from the 6,915 accounts available with BCC 4200 (Warehouses), 5300 (Retail Trade), 5400 (Food Sales), 5811 (Fast Food), 5812 (Restaurants), and 6800 (Offices). Potential participants from each BCC were subdivided by location (east and west of hills).

The representation of each group in the sample was in the same proportion as the representation of the group in the District's account base for that sector. Every effort was made to schedule appointments and conduct site visits with the targeted number of respondents in each group. Numerous cancellations and other difficulties in the appointment scheduling process, however, left a few groups short and others over-represented:

The most significantly over-represented groups were Food Sales facilities and office buildings. Fifty-five food sales establishments were targeted and 73 were surveyed. Two hundred and twenty-five office buildings were targeted and 235 were surveyed. For a confidence level of 95%, the larger sample sizes reduce the sampling error from 5% to 4.9% for Food Sales and from 10% to 8.5% for office buildings.

The most significantly under-represented group was warehouses. Fifty-seven were targeted and 52 surveyed. The smaller sample size increases sampling error from 10% to 10.5%.

The 6,915 accounts initially available were reduced to 4,252 after the customer lists had been developed and fieldwork initiated. One of the accounts selected for participation was found to be a fire service. The entire list of potential participants was then revised to remove all fire services. The target numbers were kept the same.

## 6.2 RESPONSE RATES

The actual response rates were better than the one in ten anticipated for the study. Three out of four potential study participants reached by an appointment scheduler (28% of all calls) agreed to a site visit. Seventy-two percent of scheduling calls to non-residential account-holders went unanswered, reached an incorrect telephone number, or did not find a responsible person available. Table 6-1 presents the breakdown of calls to potential participants in the non-residential site visits.

**Table 6-1: Non-Residential Site Surveys – Appointment Scheduling Call Outcomes***

| Market Sector | Percent of Telephone Calls | | | | | |
|---|---|---|---|---|---|---|
| | Appoint. | Refusal | No Answer | Message | Call Back | Incorrect Number |
| Warehouses | 19 | 10 | 13 | 19 | 5 | 35 |
| Retail Trade | 23 | 8 | 21 | 20 | 5 | 24 |
| Food Sales | 29 | 6 | 20 | 14 | 9 | 22 |
| Fast Food | 23 | 3 | 25 | 17 | 6 | 25 |
| Restaurants | 16 | 9 | 21 | 17 | 10 | 26 |
| Offices | 17 | 6 | 26 | 26 | 7 | 18 |
| Overall Non-Resident. | 20 | 8 | 21 | 20 | 7 | 25 |

*Based on 5385 calls made during the first six weeks of the study (May 17 to June 30, 2001), 1494 of them to non-residential customers

No sample bias was perceived from the response rate. The list of 4,252 potential participants was not exhausted. The number of calls required to reach the target number of participants in each subgroup varied. Of the potential participants called, 96% were called only once, an additional 3% were called twice, and 1% had to be called more than twice.

## 6.3 RESPONDENT CHARACTERISTICS

Most of the non-residential accounts surveyed were located west of the hills. More than 90% of warehouse, food sales, and fast food accounts, 77% of retail trade accounts, 74% of office accounts, and 69% of restaurant accounts are located west of the hills.

According to the answers provided by respondents, 54% of the sites surveyed were of a mixed commercial use, and 9% reported a mix of residential and commercial uses; the remainder reported a mix of other uses.

There were significant discrepancies between the type of establishments reported by survey personnel and the corresponding business classification codes listed in the District's databases. Some of the differences may be attributable to changes in property use not yet incorporated into District files. Part of the difference is also the result of mixed uses at many of the sites: District field representatives responsible for most of the non-residential site visits generally listed as "retail trade" locations with multiple uses, many of them listed as "offices" in District files. A comparison of reported versus listed types of establishment is presented in Table 6-2.

**Table 6-2: Comparison of Business Classification Codes Listed and Reported**

| | Number of Sites Visited | | | | | |
|---|---|---|---|---|---|---|
| | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
| Use reported by surveyor | 59 | 119 | 47 | 45 | 63 | 203 |
| Use according to District files | 52 | 59 | 73 | 47 | 70 | 235 |

## 6.4 SURVEY FINDINGS

Survey findings are reported in terms of the major purposes of water use at each type of establishment, and a description of the characteristics of water fixtures and other water-using equipment. Comparisons are made where possible with the responses to the 1995 non-residential site surveys. Survey answers are tabulated in Appendix K.

### Purposes of Water Use

The survey collected information on general water uses and the existence of specific water-using fixtures, appliances, and equipment. The distribution of general water uses among the six non-residential sectors surveyed is presented in Table 6-3.

**Table 6-3: Major Purposes of Water Use at Non-Residential Sites**

| | Percent of Sample with Specified Water Use | | | | | |
|---|---|---|---|---|---|---|
| **Water Use** | **Warehouses** | **Retail** | **Food Sales** | **Fast Food** | **Restaurants** | **Offices** |
| Domestic/sanitary | 100 | 100 | 100 | 100 | 100 | 100 |
| Facility cooling/heating | 11.5 | 13.6 | 21.9 | 21.3 | 17.1 | 17.0 |
| Other cooling | 26.9 | 27.1 | 47.9 | 59.6 | 30.0 | 38.7 |
| Laundry | 11.5 | 6.8 | 1.4 | 8.5 | 4.3 | 2.6 |
| Automated dishwashers or garbage compactors | 19.2 | 6.8 | 17.8 | 34.0 | 55.7 | 23.0 |
| Ice-making machines | 3.8 | 10.2 | 39.7 | 80.9 | 72.9 | 8.9 |
| Landscape and decorative uses* | 9.6 | 8.5 | 8.2 | 21.3 | 11.4 | 28.5 |
| Water features** | 7.7 | 6.8 | 0.0 | 0.0 | 1.4 | 6.0 |
| Washing and sanitation | 26.9 | 25.4 | 39.7 | 34.0 | 20.0 | 19.6 |
| Process water purification | 15.4 | 5.1 | 6.8 | 4.3 | 10.0 | 8.5 |
| Wastewater pretreatment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 |
| Other uses | 9.6 | 8.5 | 16.4 | 14.9 | 5.7 | 5.1 |
| **Sample Size** | **52** | **59** | **73** | **47** | **70** | **235** |

* This category included exterior irrigation and fountains/ponds.

** Water features included Jacuzzis/spas and fish tanks

The 1995 baseline study surveyed two of the non-residential sectors analyzed in this study: offices and restaurants. The restaurant sample had 51 accounts in the baseline study; 70 restaurants were surveyed in this study for a confidence level of 95% and a tolerable sampling error of 10%. The office sample had 46 accounts in the 1995 study; 235 offices were surveyed in this study for a confidence level of 95% and a tolerable sampling error of 5%. The sampling error for restaurants in the baseline study was 14%; it was higher for the office sample.

Table 6-4 presents a comparison of the water uses reported at restaurants and offices in 1995 and this year. Among the reported water uses at restaurants only water purification units show increased usage since 1995; all other water uses show smaller percentages. Only two water uses at offices, other cooling and landscape and decorative uses, show an increase since 1995. Some of the difference may be attributed to different approaches to the survey questions and the tabulation of answers. The values entered in Table 6-4 represent participants who answered in the affirmative to one or more questions associated with a particular water use. For example, the question on kitchen facilities asked whether the establishment had dishwashing machines or garbage disposers; only respondents who answered "yes" to at least one of those two questions were listed as having kitchen facilities. Small kitchens without the automated equipment were not counted; and several fast food places such as Burger King or Taco Bell were listed as restaurants and may not have automated dishwashers or garbage disposers. Another factor affecting results was that some sites did not have the type of establishment represented by the classification code; some of the accounts listed as offices, for example, may now represent retail trade or other classification.

**Table 6-4: Comparison of Major Purposes of Water Use**

| | Percent of Sample with Specified Water Use | | | |
|---|---|---|---|---|
| | Restaurants | | Offices | |
| Water Use | 1995 | 2001 | 1995 | 2001 |
| Domestic/sanitary | 100 | 100 | 100 | 100 |
| Facility cooling/heating | 31 | 17.1 | 64 | 17.0 |
| Other cooling | 44 | 30.0 | 36 | 38.7 |
| Laundry | 8 | 4.3 | 13 | 2.6 |
| Kitchen facilities with automated dishwashers or garbage compactors | 100 | 55.7 | 85 | 23.0 |
| Ice-making machines | 86 | 72.9 | 33 | 8.9 |
| Landscape and decorative uses | 16 | 11.4 | 26 | 28.5 |
| Water features | 4 | 1.4 | 24 | 6.0 |
| Washing and sanitation | 80 | 20.0 | 28 | 19.6 |
| Process water purification | 6 | 10.0 | 13 | 8.5 |
| Wastewater pretreatment | 0 | 0.0 | 2 | 0.4 |
| Other uses | 8 | 5.7 | 17 | 5.1 |
| **Sample Size** | **51** | **70** | **46** | **235** |

A summary of the incidence of specific water-using devices is presented in Table 6-5. This table expands on the major purposes of water use listed in Table 6-3.

**Table 6-5: Detailed Purposes of Water Use**

| | Percent of Sample with Specified Water Use | | | | | |
|---|---|---|---|---|---|---|
| **Water Use** | **Warehouses** | **Retail** | **Food Sales** | **Fast Food** | **Restaurants** | **Offices** |
| **Domestic/sanitary** | **100** | **100** | **100** | **100** | **100** | **100** |
| Employee use | 100 | 100 | 100 | 100 | 100 | 100 |
| Customer or public use | 30.8 | 44.1 | 38.4 | 74.5 | 84.3 | 54.9 |
| **Facility cooling/heating** | **11.5** | **13.6** | **21.9** | **21.3** | **17.1** | **17.0** |
| Cooling towers | 1.9 | 10.2 | 13.7 | 6.4 | 5.7 | 9.8 |
| Evaporative coolers | 5.8 | 6.8 | 5.5 | 6.4 | 11.4 | 4.3 |
| Air washers | 0.0 | 0.0 | 6.8 | 2.1 | 2.9 | 0.0 |
| Humidifiers | 1.9 | 1.7 | 1.4 | 6.4 | 1.4 | 2.1 |
| Boilers | 3.8 | 8.5 | 5.5 | 4.3 | 7.1 | 7.7 |
| **Other cooling** | **26.9** | **27.1** | **47.9** | **59.6** | **30.0** | **38.7** |
| Air conditioners | 17.3 | 23.7 | 42.5 | 55.3 | 27.1 | 35.3 |
| Air compressors | 17.3 | 10.2 | 16.4 | 19.1 | 4.3 | 10.6 |
| **Laundry** | **9.6** | **6.8** | **1.4** | **8.5** | **4.3** | **2.6** |
| Commercial washers | 3.8 | 5.1 | 0.0 | 8.5 | 4.3 | 1.7 |
| Coin-operated washers | 5.8 | 1.7 | 1.4 | 0.0 | 1.4 | 0.9 |
| Dry cleaning | 0.0 | 5.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Kitchen facilities** | **19.2** | **6.8** | **17.8** | **34.0** | **55.7** | **23.0** |
| Dishwashing machines | 17.3 | 5.1 | 8.2 | 29.8 | 54.3 | 16.6 |
| Garbage disposers | 19.2 | 5.1 | 13.7 | 8.5 | 14.3 | 16.2 |
| **Ice-making machines** | **3.8** | **10.2** | **39.7** | **80.9** | **72.9** | **8.9** |
| Water-cooled | 0.0 | 5.1 | 20.5 | 46.8 | 27.1 | 3.8 |
| Air-cooled | 3.8 | 5.1 | 23.3 | 40.4 | 45.7 | 5.1 |
| **Water features** | **7.7** | **6.8** | **0.0** | **0.0** | **1.4** | **5.6** |
| Swimming pools | 1.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Spas/Jacuzzis | 1.9 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 |
| Fountains | 3.8 | 6.8 | 0.0 | 0.0 | 1.4 | 4.3 |
| **Washing and sanitation** | **26.9** | **25.4** | **39.7** | **34.0** | **20.0** | **19.6** |
| Facility washdown | 25.0 | 25.4 | 39.7 | 34.0 | 20.0 | 15.7 |
| Vehicle wash | 5.8 | 1.7 | 4.1 | 0.0 | 0.0 | 5.5 |
| **Process water purification** | **15.4** | **5.1** | **6.8** | **4.3** | **10.0** | **8.5** |
| Water softeners | 1.9 | 1.7 | 2.7 | 0.0 | 4.3 | 0.9 |
| Water filters | 11.5 | 5.1 | 5.5 | 4.3 | 10.0 | 7.2 |
| Reverse osmosis units | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 |
| Deionization/ion exchange | 1.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Sample Size** | **52** | **59** | **73** | **47** | **70** | **235** |

Noteworthy findings from Table 6-5 are listed below:

- The highest incidence of public restrooms is in restaurants and fast food places.
- Cooling towers are most prevalent at food sales establishments; this is likely due to the common use of cooling towers to cool refrigeration equipment in supermarkets.
- Very few account holders use evaporative coolers; the highest incidence is among restaurants, where 11.4% of the sites surveyed reported using evaporative coolers.
- Air washers, humidifiers, and boilers are used by less than ten percent of the account holders in each of the non-residential sectors surveyed.
- Air conditioners are reportedly most prevalent in fast food places (55.3% of them) and food sales establishments (42.5%).
- Commercial clothes washers were found in small numbers at five of the six types of non-residential accounts surveyed; only the food sales establishments reported not having commercial washers. The highest incidence of commercial washers was at facilities classified as fast food (8.5%).
- Self-service (coin-operated) washers were found primarily at facilities classified as warehouses; as previously indicated, the business classification code often did not reflect the type of operation; buildings originally classified as warehouses probably changed to laundries.
- Dishwashing machines and garbage disposers were found at all classification codes; most of the dishwashers were at facilities listed as restaurants (54.3%) and fast food places (29.8%), some were found at sites classified as warehouses (17.3%).
- Ice-making machines were found primarily at food sales establishments, restaurants, and fast food places; the majority was air-cooled.
- The few swimming pools identified in the study were at sites listed as warehouses.
- A total of four spas were identified, one at a site listed as warehouse, three at sites listed as offices.
- The most fountains were found at retail trade sites, where 6.8% of the sites had them.
- Facility washdown was most common at food sales establishments (39.7%) and fast food places (34%).
- Few vehicle washes were found; slightly under 6% of sites listed as warehouses and offices reported them.
- The most commonly found water purification equipment was a filter; they were found at 11.5% of sites listed as warehouses and at 10% of restaurants.
- Some water softeners were found at five of the six types of non-residential sites surveyed; only fast food places did not report any.
- Three reverse osmosis units were identified in the survey, at three different office buildings.
- One deionization/ion exchange unit was identified at a site listed as a warehouse.

The mean number of major fixtures/appliances at each non-residential sector is presented in Table 6-6. The 1995 study found 2.9 toilets per restaurant; the value from this survey is 2.4, with about two thirds of them gravity flush units. The mean value of toilets for offices is 4.5, compared to 40.4 in the baseline study. The mean value of urinals per restaurant is 0.6, compared to 0.7 in 1995; the mean value for urinals per office is 1.5 in this survey, where the 1995 study reported 20.5 per account.

In general, the comparison of mean values for restaurants shows smaller percentages per site this year. The comparison of mean values for offices shows much higher values in 1995, many a different order of magnitude. This may be attributable to the small sample size in 1995, and the apparent selection for the baseline study of a few large office buildings rather a representative sampling of all accounts in this business classification code.

**Table 6-6: Mean Values of Fixtures/Appliances per Non-Residential Site**

| Fixture/Appliance | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Bathroom facilities | 2.8 | 2.4 | 1.9 | 1.7 | 1.9 | 3.3 |
| Gravity flush toilets | 2.5 | 2.0 | 1.5 | 1.1 | 1.5 | 2.4 |
| Pressure assisted toilets | 0.2 | 1.3* | 0.2 | 0.4 | 0.2 | 0.6 |
| Flushometer valve toilets | 0.7 | 0.2 | 0.3 | 0.7 | 0.7 | 1.5 |
| Urinals, siphon | 0.2 | 0.1 | 0.2 | 0.3 | 0.3 | 0.6 |
| Urinals, washdown | 0.5 | 0.7** | 0.2 | 0.2 | 0.3 | 0.7 |
| Urinals, waterless | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.2*** |
| Bathroom faucets | 3.2 | 2.9 | 1.8 | 1.9 | 2.2 | 5.0 |
| Kitchen faucets | 0.7 | 0.6 | 1.4 | 2.0 | 2.6 | 1.7 |
| Utility faucets | 0.8 | 0.6 | 1.0 | 0.7 | 0.7 | 0.9 |
| Showers | 0.3 | 0.1 | 0.1 | 0.0 | 0.0 | 0.4 |
| Drinking fountains | 0.5 | 0.3 | 0.2 | 0.0 | 0.2 | 0.9 |
| **Sample Size** | **52** | **59** | **73** | **47** | **70** | **235** |

*This value is skewed by 69 pressure-assisted toilets at one location; outside of that location, the mean value is 0.1.

** This value is skewed by 33 urinals at one location; outside of that location the mean value is 0.1.

*** This value is skewed by 24 urinals at one location; outside of that location the mean value is under 0.1.

### Toilet Data

About 1,850 toilets were identified in the 536 non-residential sites surveyed. A total of 1,745 toilets were inspected for leaks, inserts, make and year installed, and rated flush volume. The flush volume was measured in 1,127 of the toilets inspected.

Forty-two different toilet makes were recorded. The most common toilet names were American Standard (36.7%), Standard, an older name for American Standard (9%), and Kohler (7%). Toilet manufacturer could not be identified for about 20% of the toilets inspected.

Year of manufacture was recorded from toilet tanks where possible. Eighteen percent of all toilets inspected were manufactured on or before 1982, 19% between 1983 and 1992, and 20% after 1992. The distribution of toilets by age is presented in Table 6-7.

**Table 6-7: Distribution of Non-Residential Toilets by Age of Fixture**

| | Percent of Toilets Inspected per Sector | | | | | |
|---|---|---|---|---|---|---|
| Year of Manufacture | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
| Pre-1950 | 0.9 | 2.0 | 3.1 | 0.0 | 0.5 | 0.7 |
| 1950 to 1982 | 28.4 | 10.5 | 10.3 | 4.9 | 12.3 | 16.9 |
| 1983 to 1992 | 17.5 | 34.9 | 25.6 | 21.3 | 15.9 | 16.0 |
| After 1992 | 16.1 | 22.4 | 20.0 | 22.1 | 14.9 | 21.7 |
| Unknown | 37.0 | 30.3 | 41.0 | 51.6 | 56.4 | 44.8 |
| **No. of Toilets Inspected** | **211** | **152** | **195** | **122** | **195** | **870** |

In terms of rated or design flush volume the largest percentage was recorded for ultra-low flush toilets at all six different types of non-residential customers surveyed. About 66% of inspected toilets were rated as ultra-low flush at fast food accounts; about 40% of the toilets at retail trade, food sales, restaurants, and office accounts were rated as ultra-low flush. The distribution of toilets by flush volume rating is presented in Table 6-8.

**Table 6-8: Distribution of Non-Residential Toilets by Rated Flush Volume**

| | Percent of Toilets Inspected | | | | | |
|---|---|---|---|---|---|---|
| Rated Flush Volume (gpf) | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
| 1.6 | 29.9 | 41.4 | 39.0 | 66.4 | 44.1 | 43.0 |
| 3.5 | 25.6 | 28.3 | 16.9 | 15.6 | 22.6 | 20.0 |
| >3.5 | 29.9 | 9.2 | 10.8 | 1.6 | 10.8 | 14.5 |
| Unknown | 14.7 | 21.1 | 33.3 | 16.4 | 22.6 | 22.5 |
| **No. of Toilets Inspected** | **211** | **152** | **195** | **122** | **195** | **870** |

Some of the toilets in the "Unknown" flush rating category of Table 6-8 were pressure-assisted toilets. Data on rated flush volumes was cross-referenced with data on type of toilets; the number of toilets not rated as ultra-low flush but listed as pressure-assisted were identified. Adding these toilets, the resulting percentages of ultra-low flush fixtures are 31.8% for warehouses, 45.4% for retail trade, 47.2% for food sales, 68.0% for fast food, 44.1% for restaurants, and 49.8% for offices.

The distribution of toilets by measured flush volumes is presented in Table 6-9. The percentages of measured ultra-low flush volumes are significantly lower than the percentages of rated ultra-low flush volumes for all non-residential sectors. This is due to the fact that flush volumes were measured for gravity-flush toilets only; the flush

volumes of pressure-assisted toilets and flushometer valves were not measured. If the pressure-assisted toilets are assumed to be ultra-low flush, the percentages of toilets in this category would be 28.9% for warehouses, 32.2% for retail trade, 38.0% for food sales, 21.3% for fast food, 17.4% for restaurants, and 23.7% for offices.

**Table 6-9: Distribution of Non-Residential Toilets by Measured Flush Volume**

| | Percent of Toilets Inspected | | | | | |
|---|---|---|---|---|---|---|
| **Measured Flush Volume** | **Warehouses** | **Retail** | **Food Sales** | **Fast Food** | **Restaurants** | **Offices** |
| 1.6 gpf or less | 24.2 | 13.8 | 15.9 | 7.4 | 12.3 | 10.6 |
| Between 1.61 and 3.5 gpf | 43.1 | 50.0 | 35.9 | 42.6 | 40.0 | 35.4 |
| >3.5 gpf | 16.1 | 9.9 | 14.9 | 4.9 | 8.2 | 14.3 |
| Pressure-assisted | 4.7 | 18.4 | 22.1 | 13.9 | 5.1 | 13.1 |
| Flushometer | 11.8 | 6.6 | 11.3 | 25.4 | 31.3 | 21.0 |
| Unknown | 0.0 | 1.3 | 0.0 | 5.7 | 3.1 | 5.6 |
| **No. of Toilets Inspected** | **211** | **152** | **195** | **122** | **195** | **870** |

The distribution of toilets by leaks and water-saving inserts is presented in Table 6-10. Leaks were found in less than 5% of all toilets inspected. Inserts were found in less than 12% of toilets inspected. The most commonly found water saving devices were the quick-closing flapper valves.

**Table 6-10: Distribution of Non-Residential Toilets by Leaks and Inserts**

| | Percent of Toilets Inspected | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Warehouses** | **Retail** | **Food Sales** | **Fast Food** | **Restaurants** | **Offices** |
| Leaky toilets | 7.1 | 3.9 | 0.5 | 0.0 | 8.7 | 4.9 |
| Quick-closing flappers | 0.9 | 7.2 | 15.4 | 8.2 | 11.8 | 8.5 |
| Water level adjustments | 0.5 | 1.3 | 1.0 | 0.0 | 0.5 | 2.5 |
| Displacement devices | 0.5 | 1.3 | 0.0 | 3.3 | 2.6 | 0.6 |
| Toilet dams | 0.0 | 2.6 | 0.5 | 0.0 | 1.0 | 0.9 |
| **No. of Toilets Inspected** | **211** | **152** | **195** | **122** | **195** | **870** |

### Urinal Data

A total of 346 urinals were identified in the 536 non-residential sites surveyed. Fifty-six percent of urinals were located in common areas; the rest were located in limited access private restrooms. Sixty-one percent of urinals inspected were of the washdown type, 38% were of the siphon type, and 1% were of the waterless type. Less than 2% of the urinals inspected were observed to leak. The most prevalent flush volume for urinals was between one and two gallons. The distribution of urinals by flow rate and non-residential sector is presented in Table 6-11.

**Table 6-11: Distribution of Urinals by Rated Flush Volume**

| Rated Flush Volume | Percent of Urinals Inspected | | | | | |
|---|---|---|---|---|---|---|
| | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
| 1.0 gpf or less | 21.6 | 5.9 | 24.0 | 22.2 | 22.7 | 24.4 |
| Between 1.1 and 2.0 gpf | 5.4 | 52.9 | 12.0 | 0.0 | 34.1 | 20.5 |
| Between 2.1 and 3.0 gpf | 13.5 | 0.0 | 8.0 | 5.6 | 0.0 | 2.9 |
| >3.0 gpf | 8.1 | 0.0 | 0.0 | 5.6 | 0.0 | 2.9 |
| Unknown | 51.4 | 41.2 | 56.0 | 66.7 | 43.2 | 49.3 |
| **No. of Urinals Inspected** | **37** | **17** | **25** | **18** | **44** | **205** |

## Faucet Data

About 3,200 faucets were identified in the 536 non-residential sites surveyed. Inspections were carried out in 2,287 faucets to identify leaks, determine faucet location, and check for aerators. The mean flow rate measured was 2.7 gpm. Sixty-one percent of the faucets inspected were located in bathrooms, 25% in kitchens; the rest were utility or other types of faucets. The distribution of faucets by type and non-residential sector is presented in Table 6-12.

**Table 6-12: Distribution of Non-Residential Faucets by Type**

| Type | Percent of Faucets Inspected | | | | | |
|---|---|---|---|---|---|---|
| | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
| Kitchen | 19.4 | 14.5 | 27.7 | 43.1 | 41.6 | 17.2 |
| Bathroom | 71.8 | 74.3 | 45.7 | 44.5 | 44.7 | 71.4 |
| Utility | 7.9 | 10.1 | 19.3 | 11.5 | 9.2 | 7.8 |
| Other | 0.9 | 1.1 | 7.4 | 0.9 | 4.5 | 3.6 |
| **No. of Faucets Inspected** | **216** | **179** | **311** | **218** | **358** | **1005** |

The distribution of faucets by flow rate and non-residential sector is presented in Table 6-13. Flow rate could not be measured at 16 of the faucets inspected; among those tested, the most prevalent flow rate was between two and three gallons. Less than 2% of the faucets were observed to leak. Aerators were attached to 69% of the faucets.

**Table 6-13: Distribution of Non-Residential Faucets by Flow Rate**

| Flow Rate (gpm) | Percent of Faucets Tested | | | | | |
|---|---|---|---|---|---|---|
| | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
| 1.99 or less | 9.7 | 32.6 | 24.3 | 15.5 | 24.0 | 23.2 |
| 2.0 to 2.99 | 56.9 | 36.0 | 41.4 | 42.3 | 33.8 | 47.9 |
| 3.0 to 3.99 | 18.1 | 12.9 | 14.6 | 13.1 | 15.9 | 12.2 |
| 4.0 to 4.99 | 7.9 | 12.4 | 9.7 | 10.3 | 10.6 | 9.9 |
| 5.0 to 5.99 | 2.3 | 3.9 | 3.6 | 7.5 | 5.3 | 3.3 |
| 6.0 or more | 5.1 | 2.2 | 6.5 | 11.3 | 10.3 | 3.4 |
| **No. of Faucets Tested** | **216** | **178** | **309** | **213** | **358** | **997** |

### Showerhead Data

A total of 132 showerheads were identified in the 536 non-residential sites surveyed. 96 of them were inspected to determine type (fixed or handheld, stream or atomizing), and the incidence of shutoff buttons and leaks. 89 of the showerheads were tested to determine flow rate.

Most of the showerheads inspected were of the stream/spray type (78%), and fixed (89%) rather than handheld. 14% of them had shutoff buttons. 9% exhibited leaks either at the showerhead itself (5%), the diverter valve (2%), or the shutoff valve (2%). The mean flow rate for the showerheads tested was 2.8 gpm. Seventy-six percent of the showerheads were found to have flow rates under 3 gpm.

### Dishwasher Data

Fifty-one dishwashers were identified in this survey and 48 of them inspected. Dishwashers had chemical dispensing units from Auto Chlor (40%), Jackson (13%), and Eco Lab (10%). Eighty-seven percent of the inspected units were of the stationary rack type and 13% had conveyor racks. Fifty-four percent of the units had a chemical rinse and 27% had a pressure regulator on the incoming water line.

### Other Water-Using Equipment

The survey identified 17 sites with evaporative coolers, 34 sites with cooling towers, and 11 sites with garbage disposers. Six clothes washers were identified and inspected. Details on these appliances/equipment are included in Appendix K.

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# 7.0 ANALYSIS AND CONCLUSIONS

## 7.1 EBMUD CUSTOMER ATTITUDES

The attitudes survey provides a clear indication that the water conservation ethic among District customers remains strong. The proportion of customers indicating they are willing to conserve water is higher today than it was in 1995. The percentage of customers recently involved in water conservation actions is likewise higher today than in 1995. And more District customers are willing to install water-conserving showerheads, aerators, and toilet tank inserts now than six years ago.

Conservation attitudes have solidified since the 1995 study. As illustrated in Figure 7-1, more than 60% of single and multi-family customers are willing to conserve water.

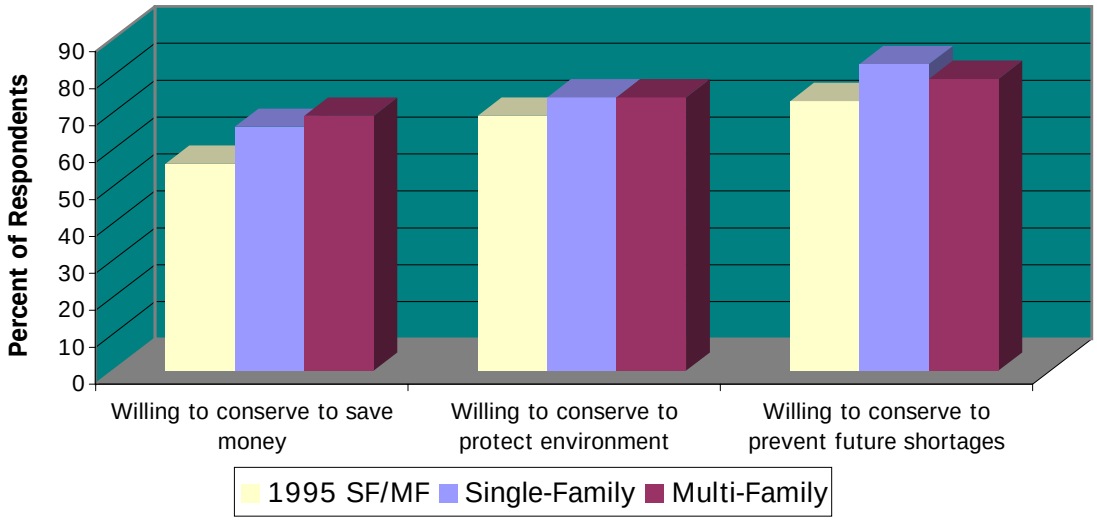


**Figure 7-1: Conservation Attitudes**

Multi-family customers, as shown in Figure 7-2, are more motivated to conserve for economic reasons than single-family residents. The primary reason for conserving among customers in both groups is concern over possible shortages in drought conditions.

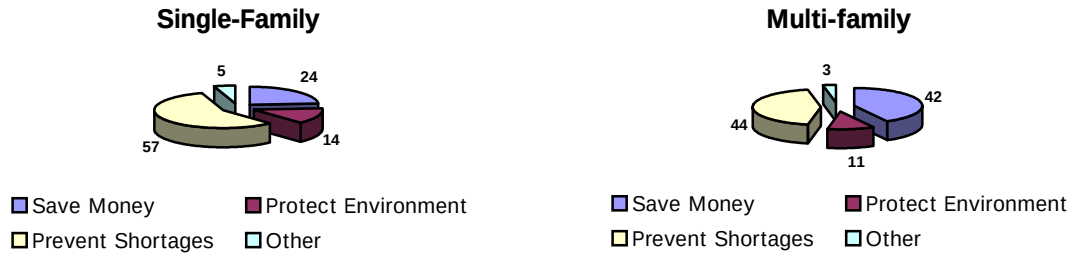


**Figure 7-2: Distribution of Reasons to Conserve Water**

The survey pointed to the need for increased customer education about the amounts of water they use. Almost 60% of single-family respondents thought their homes used less than 50 gallons per day, both indoor and outdoor. An additional 25% would not even guess at the number, some of them objecting to being questioned about the amount of water they use. Increased awareness of the volumes of water used indoor and outdoors will facilitate the "selling" of water-conserving habits and hardware. The District's outreach efforts have clearly been successful in maintaining a water conservation ethic and making customers aware of the benefits of conservation. A greater emphasis on consumption numbers may be warranted. Knowing that their home may use two or three hundred gallons per day to water lawns and shrubs may motivate some customers to consider reducing their lawn area, changing plant materials, or improving irrigation efficiency. These three potential conservation actions in particular scored low on customers' priorities list: only 21% of single-family respondents expressed a willingness to reduce lawn area and only about a third would consider changing plant materials or improving irrigation efficiency, even with a rebate offer.

Rebates understandably resound more with owners and managers of multi-family facilities. They responded favorably in greater proportions than single-family residents to making changes in their landscape and irrigation, purchasing ultra-low flush toilets, and installing high efficiency clothes washers when offered a rebate. Responses indicate that increasing future rebates for high efficiency clothes washers to $100 or more would improve program participation; over three quarters of multi-family respondents affirmed they would be motivated to install the water-savings washing machines if the rebate offered was $100 or higher.

## 7.2 MARKET PENETRATION

### Single and Multi-Family Customers

The market penetration of water-saving fixtures and appliances is summarized in Table 7-1 for single and multi-family customers. Values from the 1995 study are also included to facilitate referencing.

**Table 7-1: Market Penetration of Water-Saving Fixtures/Appliances (Single- and Multi-Family)**

| | Percent of Total Market | | | |
|---|---|---|---|---|
| | Single-Family | | Multi-Family | |
| Fixture/Appliance | 1995 | 2001 | 1995 | 2001 |
| Ultra-low flush toilets | 10 | 34.0 | 5 | 37.0 |
| Showerheads under 3.0 gpm* | 46 | 70 | 43 | 71 |
| Faucet aerators | 69 | 85 | 69 | 84 |
| Dishwashers with efficiency setting | 58 | 86 | 75 | 73 |
| Clothes washers with load size selection | 94 | 90 | 29 | 23.4 |
| High efficiency clothes washers | - | 12 | - | 7.5 |
| Moisture sensor in irrigation system | 2 | 1 | 0 | 0 |
| Rain sensor in irrigation system | 2 | 2 | 3 | 2 |

* The 1995 study does not show the percentage of showerheads with flow rates of 2.5 gpm or less; the 2001 survey found 67 percent of single-family and 64 percent of multi-family faucets in that range.

The market penetration figures for multi-family toilets are not as dependable as the corresponding figures for the single-family sector. Ninety-nine percent of all toilets identified in the single-family survey were inspected. Only about 3% of all toilets identified in the multi-family survey were inspected, as a result primarily of access restrictions. While efforts were made to select representative fixtures at each site visited, there is no way to ascertain that these efforts were successful. Owners/managers of multi-family properties were questioned about the total number of toilets and the number of ultra-low flush fixtures at their buildings, but many of them did not know the breakdown of toilets in their property by flush volume, nor were they willing to take the time to investigate.

The 1995 study faced the same difficulties accessing toilets in the multi-family sector. The 5% market penetration figure from the 1995 study represents the proportion of toilets rated as ultra-low flush among those inspected. The 37% market penetration figure from this 2001 study was determined the same way. The penetration of ultra-low flush toilets, low-flow showerheads, and faucet aerators increased between 1995 and 2001 both in the single and multi-family sectors. Appliances did not show the same kind of increased penetration.

The mean number of dishwashers in the single-family sector showed a slight decrease, from 0.7 dishwashers per home in 1995 to 0.6 dishwashers per home today. These numbers are close enough to be within tolerable sampling error. The number of dishwashers with water-saving efficiency settings increased from 58% in 1995 to 86% in 2001.

The mean number of dishwashers in the multi-family sector showed a decrease from 9.3 dishwashers per site in 1995 to 7.3 dishwashers per site today. The number of units with water-saving efficiency decreased from 75% in 1995 to 73% in 2001.

These decreases may have to do with the baseline study's sample size and selection of survey respondents. As pointed out in Section 5 of this report, there are several indications that the 1995 sample may have had an over-representation of apartment buildings east of the hills; this is one of those instances.

The mean number of clothes washers in the single-family sector was the same in this survey as in the baseline study: 0.9 washers per home. The number of units with water-saving load size selection features decreased from 94% in 1994 to 90% in 2001. Twelve percent of the clothes washers inspected in single-family homes were of the high efficiency type; no comparable figure is available from the 1995 study, as high efficiency washers became available for purchase after 1995. The increased penetration of high efficiency clothes washers reflects successful market transformation strategies from product manufacturers.

The mean number of clothes washers in the multi-family sector showed a decrease from 0.3 washers per unit in 1995 to 0.15 per unit today. The number of units with load size selection features decreased from 29% in 1995 to about 23% in 2001. As with other multi-family values from the baseline study, the number of washers per unit and the percentage of washers with load size selection features may have been overestimated in 1995 due to over-representation of apartment buildings east of the hills. 7.5 percent of the clothes washers identified in multi-family properties with five or more apartments were of the high efficiency type; all but one of the high efficiency washers identified in the survey were located in common area laundry facilities; the high efficiency washers in common areas represent 14 percent of the total washers in laundry facilities.

Moisture and rain sensors in irrigation systems have yet to make any market inroads. Their market penetration remains very low (1 to 2 percent).

Digital irrigation controllers are more widely used today than in 1994. Single-family survey results indicate that 76% of the controllers are digital, an increase from the 64% reported in the baseline study. Ninety-two percent reported multiple-start capabilities in 1994, however, and only 87% did this year.

Drip irrigation has made only modest increases in market penetration. Single-family survey results indicate that 7.5% of front yard areas and 8.1% of back yard areas are now irrigated with drip systems. The corresponding percentages were 5% and 6% in 1995.

## Non-Residential Customers

The market penetration of water-saving fixtures is summarized in Table 7-2 for the six non-residential business classification codes surveyed. The 1995 baseline study included only two of these sectors: restaurants and offices. Penetration values from the 1995 study are included in Table 7-2, in parentheses next to 2001 figures.

**Table 7-2: Market Penetration of Water-Conserving Fixtures in Non-Residential Sectors**

| | Percent of Market in Each Sector Surveyed | | | | | |
|---|---|---|---|---|---|---|
| Fixture/Appliance | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
| Ultra-Low Flush Toilets | 31.8 | 45.4 | 47.2 | 68.0 | 44.1 (19) | 49.8 (9) |
| Low-Flow Urinals | 21.6 | 5.9 | 24.0 | 22.2 | 22.7 (46) | 24.4 (61) |
| Faucet Aerators | 72.2 | 65.9 | 60.8 | 60.1 | 57.5 (53) | 78.3 (80) |

The penetration of ultra-low flush toilets assumes that all pressure-assisted toilets are ultra-low flush. It is not clear whether these toilets were included as ultra-low flush in the baseline study; their contribution to the total penetration figures for restaurants and offices, however, is small. The penetration percentages for restaurants and offices in 2001 were 44.1 and 49.8, respectively, compared to 19 and 9 in 1995. These figures reflect a substantial increase in the market penetration of ultra-low flush toilets since 1995.

Market penetration figures from the baseline study for offices are suspect, as was pointed out in Section 6 of this report. The sample size in the 1995 study was 46, as compared to 235 in this survey. The mean number of toilets per site is 4.5 in this survey, compared to 40.4 in the baseline study. The mean number of urinals per office is 1.5 in this survey, where the 1995 study reported 20.5 per account. These figures indicate that a few large office buildings were probably selected for the 1995 study, rather than a representative sampling of all accounts in this business classification code. Market penetration numbers for urinals and faucet aerators further bear this out: they are both higher for the baseline study than for this survey.

Ultra-low flush urinals are defined for the purposes of Table 7-2 as units with a flush volume of no more than one gallon. Sixty-one percent of urinals inspected were of the washdown type. Siphon type urinals were most prevalent in fast food places (44% of all urinals) and offices (45%).

The incidence of faucet aerators ranged from 57.5% of all faucets in restaurants to 78.3% of faucets in sites classified as offices. The mean flow rate for faucets in all sectors was 2.7 gpm. The majority of faucets in all sectors had flow rates between one and three gpm.

## 7.3 RATES OF REPLACEMENT

The rates at which high-water use fixtures are replaced with water-conserving equivalents were calculated for major water-using fixtures where data from the 1995 baseline study were available. That includes toilets, showerheads, and faucet aerators in the single and multi-family sectors; and toilets, urinals, and faucet aerators in restaurants.

Replacement rates were calculated by comparing the number of non-conserving fixtures in a base year (1991 for toilets, 1994 for other fixtures) with the number of the same fixtures at a later point in time. The end of 1991 was used as the base or starting time for toilets because it represents the time at which non-ultra-low flush toilets (ULFT) - toilets

with flush volumes of 3.5 gpf and higher - were no longer allowed in the District's service area. As of the beginning of 1992, California plumbing codes mandated that all new and replacement toilets had to be ultra-low flush fixtures.

The times elapsed between the base or starting time and the various studies were assumed as follows: three years to the baseline study (end of data collection in December 1994); six and two-thirds years to the 1998 survey (end of data collection in August 1998); nine and two-thirds years to the 2001 surveys (end of data collection in August 2001). The determination of the number of non-conserving fixtures required data from the site surveys performed in 1994 and 2001. The 1998 study was used sparingly: it covers only single- and multi-family dwellings built before 1992 and mixes small (2-4 units) and large (five or more units) apartment buildings in its multi-family sample.

The determination of the number of non-conserving fixtures also required data on the number of accounts in each sector of interest. The following assumptions were made with regard to the number of accounts per sector:

- The number of accounts in all sectors was assumed to increase linearly at the same constant rate between 1991 and 2001. The rate of increase of the number of accounts was assumed at 0.83% per year; this figure was derived from the *EBMUD Accounts vs Consumption* chart on Page 5 of the District's *FY00 Annual Report, Water Conservation Master Plan*. The chart shows approximately 370,000 accounts in 1999 and 355,000 accounts in 1994; this rate of increase for "all accounts" was assumed to apply equally to single-family, multi-family, and non-residential sectors.
- The number of single-family accounts in FY00 was assumed to be 287,209. This was the number of single-family accounts with distinct addresses that were provided by the District for this study.
- The number of multi-family accounts with BCC 6513 (five or more units) in FY00 was assumed to be 6,713. This was the number of this type of accounts with distinct addresses that were provided by the District for this study.

### Toilet Replacement Rates

Determination of toilet replacement rates required approximating the current (2001) number of ultra-low flush toilets in the District's service area, as well as the number of toilets with flush ratings of 3.5 gpf and higher. These numbers were determined from survey data on "rated" flush volumes (design flush volumes from manufacturers, generally printed on the bowl or engraved in the tank or tank cover), measured flush volumes, toilet inserts, and toilet manufacture dates. Cross-referencing the various pieces of information available for each toilet and applying the assumptions listed below defined the flush volume of all inspected toilets:

- Toilets with indeterminate flush rating that were manufactured after 1991 were assumed to be ultra-low flush fixtures.

- Toilets manufactured between 1982 and 1991 were assumed to be either ultra-low flush or 3.5 gpf fixtures; those toilets without inserts and with measured flush volumes of 1.6 gpf or less were listed as ultra-low flush, all others were listed as 3.5 gpf. The remaining toilets (no rating available, manufacture date before 1982), were considered either 3.5 gpf fixtures or fixtures with higher flush volumes, depending on measured flush volumes. None were considered ULFTs since ULFTs did not appear in the market until the mid-1980s. It is reasonable to expect some 3.5 gpf units, as most major toilet manufacturers introduced these water-conserving toilets in the early to mid 1970s. Figure 7-3 illustrates the process of determining the proportion of toilets in each flush rating.

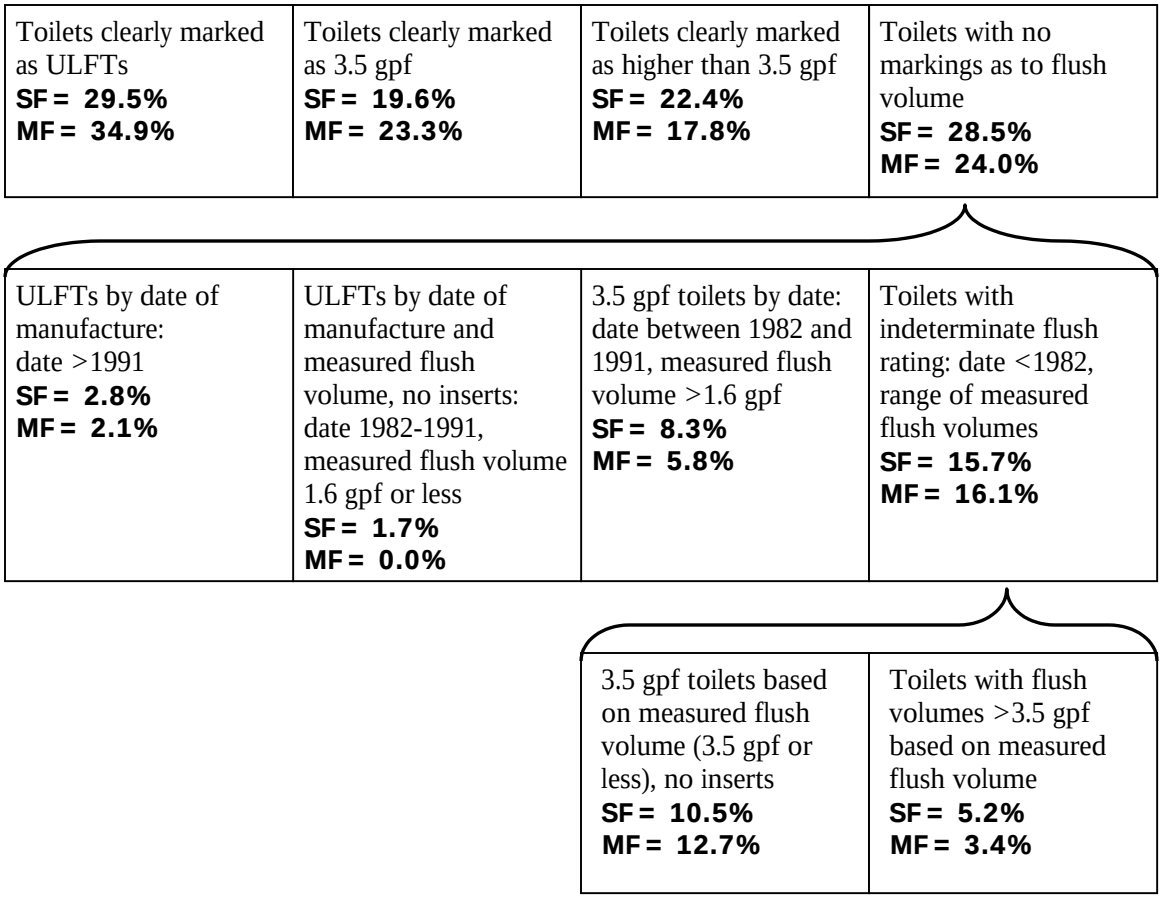


**Figure 7-3: Breakdown of Single and Multi-Family Toilets by Flush Rating**

The base number of toilets was calculated by starting with the known number of accounts in the year 2000 and working back to 1991. The number of toilets per single-family home and multi-family housing unit were assumed to be the same in 1991 as they were in 1994.

The figures used to calculate the total rate of replacement for toilets in the single-family sector are presented in Table 7-3. A substantial number of ULFTs were determined to be in place at the end of 1991, based on data from this study. The 2001 database was queried for the number of ultra-low flush toilets with manufacture date before 1991, and toilets with unknown rating, measured flush volumes of 1.6 gpf or lower, and no inserts; 5.8% of the toilets in place in 1991 met these specifications.

**Table 7-3: Figures Used to Calculate Total Rate of Replacement for Single-Family Toilets**

| Year | Number of Single-Family Accounts | Number of Toilets per Account | Total Toilets | Percent of Ultra-Low Flush Toilets | Number of Ultra-Low Flush Toilets | Number of Toilets Rated at 3.5 gpf and Higher |
|---|---|---|---|---|---|---|
| 1991 | 266,618 | 2.0 | 533,236 | 5.8 | 30,928 | 502,308 |
| 1994 | 273,312 | 2.0 | 546,624 | 10.0 | 54,662 | 491,962 |
| 2001 | 289,593 | 2.1 | 608,145 | 34.0 | 206,769 | 401,376 |

The assumed number of accounts and toilets per account yield a total of 533,236 single-family toilets in place at the end of 1991. Almost 6% of these toilets (30,928/533,236) are ULFTs. The other 502,308 toilets represent the total non-ULFTs available for replacement.

The number of ULFTs increased to 206,769 by 2001. This number includes the initial 30,928 toilets increased by the replacement of 100,932 (502,308-401,376) non-ULFTs and the installation of 74,909 (608,145-533,236) new toilets.

Based on the assumptions outlined above, about one hundred thousand of the roughly half a million single-family non-ULFTs have been replaced since the end of 1991, or about 20%. The average annual rate of replacement was under one percent for the three years between 1991 and the baseline study, and went up to 2.08% for the period between 1991 and 2001.

The replacement rates calculated above are affected by the transition to mandatory ULFTs. Calculations assume that all new toilets installed after 1991 were ultra-low flush fixtures. Data from the 2001 survey, however, indicate otherwise: 27% of toilets installed in houses built after 1991 were rated at 3.5 gpf (all of these non-ULFTs were installed in houses built between 1992 and 1994). This represents 20,225 toilets (0.27x[608,145-533,236]) that were initially added to the ranks of non-ULFTs and increase the number of replacements. The replacement of 121,157 (100,932+20,225) toilets between 1991 and 2001 represents an average annual replacement rate of 2.5%.

The replacement rate for single-family toilets was verified by querying the 2001 database as to the percentage of ULFTs installed in houses built before 1992, all of which are likely to represent replacement

(rather than new) toilets. About 24% of all ULFTs inspected in this survey were installed since 1991 in houses built before 1992, for an average annual replacement rate of 2.5%.

The 1998 study indicates a replacement rate of 27.3% for single-family toilets (reported as a penetration rate among houses built before 1992). The average annual replacement rate for the time period between 1991 and 1998 works out to 3.2%. This could indicate a spike in the number of ULFT replacements between 1994 and 1998; it may also be attributed to different data collection methods: the 1998 study relied exclusively on measured flush volumes while the 2001 survey used both the measured and the rated flush volumes.

The District actively encouraged the replacement of non-conserving toilets with ultra-low flush fixtures. In the period between 1997 and 2001 the District awarded 12,395 rebates for single-family toilet replacements, accounting for about 10% (12,395/121,157) of all replacements. The average annual rate of replacement not counting the toilets installed with District rebates is 2.2%.

The "unassisted" rate of replacement for single-family toilets, defined as the rate of replacement that would occur without any District participation, falls somewhere between the average annual rates of 2.2% and 2.5%. If all District rebates went to the replacement of toilets that would otherwise not have been changed, the "unassisted" rate of replacement would be 2.2%. If all of the rebates went to the replacement of toilets that were going to be replaced regardless of rebate (referred to in the water conservation literature as "free-riders"), the "unassisted" rate of replacement would be 2.5%.

The calculation of replacement rates for multi-family toilets required adjustments to the data from the 1995 baseline study and the 1998 survey. Deficiencies were identified in the baseline study's reported number of housing units per account, and in the 1998 study's reported number of toilets per dwelling unit. The calculated replacement rates for multi-family toilets must therefore be considered approximations valid only to the extent that the following assumptions hold true:

- The number of housing units per water account for apartment buildings with five or more units has been constant at 21.3 since 1991 (the 1995 baseline study reported 29.5 units per building, well above U.S. Census Bureau 1990 data for Alameda County and 1998 data for the Oakland Metropolitan Area, both showing 22 units per building; the 29.5 units per building from the 1995 study would imply there were more toilets in 1994 than in 2001; the 1998 study did not report the number of units per building).
- The number of toilets per multi-family housing unit has remained at 1.2 since 1991 (although the 1998 study reported 1.4 toilets per dwelling unit, both the 1995 Baseline study and this survey found 1.2 toilets per unit).
- The mean number of toilets per multi-family account (BCC 6513) has remained at 25.7 since 1991 (this number is based on 2001 results showing 21.3 housing units per account and 1.206 toilets per unit).

The figures used to calculate the total rate of replacement for toilets in the multi-family sector are presented in Table 7-4.

**Table 7-4: Figures Used to Approximate Total Rate of Replacement for Multi-Family Toilets**

| Year | Number of Multi-Family Accounts (5 + Units) | Number of Toilets per Account | Total Toilets | Percent of Ultra-Low Flush Toilets | Number of Ultra-Low Flush Toilets | Number of Toilets Rated at 3.5 gpf and Higher |
|---|---|---|---|---|---|---|
| 1991 | 6,232 | 25.7 | 160,162 | 0 | 0 | 160,162 |
| 1994 | 6,388 | 25.7 | 164,172 | 5.0 | 8,209 | 155,963 |
| 2001 | 6,769 | 25.7 | 173,963 | 37.0 | 64,366 | 109,597 |

The assumed number of accounts and toilets per account yield a total of 160,162 multi-family toilets in place at the end of 1991, all of them with flush ratings of 3.5 gpf and higher. These 160,162 toilets represent the total non-ULFTs available for replacement.

The number of ultra-low flush units in apartment buildings with five or more units went from zero in 1991 to more than 64,000 in 2001. This number includes the replacement of 50,565 (160,162-109,597) non-ULFTs and the installation of 13,801 (173,963-160,162) new toilets.

Based on the assumptions outlined above, the average annual rate of replacement was under 1% for the three years between 1991 and 1994, and went up to 3.3% for the period between 1991 and 2001.

The rate of replacement for multi-family toilets was also computed using data from the 2001 survey, independent of assumptions on the growth of the number of accounts. The 2001 database was queried for ULFTs installed in buildings built before 1992, all of which must represent replacement (rather than new) toilets. About 98% of all ULFTs inspected in this survey were installed in buildings built before 1992. Thirty-four percent of the toilets were found to represent replacement units. The average annual replacement rate since 1991 is 3.5% when calculated on the basis of these data. The two calculated rates of replacement for multi-family toilets, 3.3% and 3.5%, are within each other's margin of error.

As a point of reference, the 1998 study indicates a replacement rate of 18.1% for multi-family toilets (reported as a penetration rate among apartment buildings built before 1992). The average annual replacement rate for the time period between 1991 and 1998 works out to 2.7%. This number is not directly comparable to previous calculations, as the 1998 study included apartment buildings with less than five units.

Forty-five percent of all non-ULFT replacements in the multi-family sector have been undertaken with District participation. In the period between 1995 and 2001 the District awarded 14,035 rebates for multi-family toilet replacements, accounting for 27.8% (14,035/50,565) of all replacements. The District also installed an additional 8,720 ultra-low flush toilets in low-income multi-family housing as part of the Direct ULFT Installation Program, accounting for 17.2% (8,720/50,565) of all replacements. The average annual rate of replacement not counting the toilets installed through the District's Direct Install or rebate programs is 1.80%.

The "unassisted" rate of replacement for multi-family toilets (the rate of replacement that would occur without any District participation) is between the average annual rates of 1.80% and

3.5%. If all District rebates went to the replacement of toilets that would otherwise not have been changed, the "unassisted" rate of replacement would be 1.80%. If all of the rebates went to the replacement of toilets that were going to be replaced regardless of rebate ("free-riders"), the "unassisted" rate of replacement would be 3.5%. The rates of replacement calculated above are significantly lower than the "natural" replacement rates. Natural replacement rates are generally anticipated to fall around 4%, corresponding to an average toilet life of 25 years. The natural replacement rates for the District's service area were approximated from toilet age data. The average age for a single-family toilet, according to 2001 survey data, is 18.8 years, plus or minus 1.3 (this corresponds closely to the 18.2 reported in the 1995 baseline study). The average age for a multi-family toilet is 17.3 years, plus or minus 1.9. The corresponding ranges of replacement rates are 5.0% to 5.7% for single-family toilets, and 5.2% to 6.5% for multi-family toilets.

Rates of replacement in the last decade, therefore, appear to have been about half of the expected "natural" rates. One possible explanation is the uncertainty associated with a new product. Homeowners and income property owners/managers may have delayed toilet retrofits until data on customer satisfaction with the ultra-low flush devices became available. One way to verify the effect of the transition years is to look at the period between the baseline study and this study. If 1994 were taken as the base year instead of 1991, the calculated rates of replacement would be 3.4% for single-family and 4.5% for multi-family toilets, moving closer to the "natural" replacement rates.

Viewed in light of the lower-than-natural replacement rates, District efforts at encouraging the installation of ultra-low flush toilets possibly went a long way toward increasing the acceptability of the new fixtures. District education, public outreach, rebate, and direct-install programs may have accelerated ULFT replacement. On the other hand, the lower-than-natural replacement rates also imply that most of the District-assisted ULFT installations were "free riders," or installations that would likely have been made regardless of rebates or other assistance.

The total replacement rate for toilets in restaurants was calculated on the basis of the figures presented in Table 7-5. The rate of replacement between 1991 and 1994 averaged 1.9% per year; between 1991 and 2001 the average annual rate of replacement was 3.5%. If 1994 is taken as the base year, the rate of replacement goes up to 4.4%.

**Table 7-5: Figures Used to Calculate Total Rate of Replacement for Restaurant Toilets**

| Year | Number of Restaurant Accounts | Number of Toilets per Account | Total Toilets | Percent of Ultra-Low Flush Toilets | Number of Ultra-Low Flush Toilets | Number of Toilets Rated at 3.5 gpf and Higher |
|---|---|---|---|---|---|---|
| 1991 | 598 | 2.9 | 1,734 | 11.9 | 207 | 1,527 |
| 1994 | 613 | 2.9 | 1,778 | 19.0 | 338 | 1,440 |
| 2001 | 650 | 2.8 | 1,820 | 44.1 | 886 | 933 |

## Showerhead Replacement Rates

The figures used to arrive at the replacement rate for showerheads in single-family homes are presented in Table 7-6. The percent of low flow showerheads in 1994 was approximated from survey data. The 1995 baseline study reported 61% of all showerheads had flow rates under 3.0 gpm; the 2001 survey showed that the number of showerheads with flows between 2.5 and 3.0 gpm was small (about 4.5% of the number of showerheads at or under 3.0 gpm); based on this information the percent of low flow showerheads was set at 58% in 1994.

**Table 7-6: Figures Used to Calculate Total Rate of Replacement for Single-Family Showerheads**

| Year | Number of Single-Family Accounts | Number of Showerheads per Account | Total Showerheads | Percent of Low Flow (2.5 gpm) Showerheads | Number of Low Flow (2.5 gpm) Showerheads | Number of Showerheads with Flow Rates Over 2.5 gpm |
|---|---|---|---|---|---|---|
| 1994 | 273,312 | 1.7 | 464,631 | 58.0 | 269,486 | 195,145 |
| 2001 | 289,593 | 1.8 | 521,267 | 67.1 | 349,770 | 171,497 |

The average annual rate of replacement for showerheads in the single-family sector was calculated at 1.8% for the period between the baseline study and the 2001 survey (6.67 years). This relatively low replacement rate may be attributable to the already high market penetration of low flow showerheads; about two-thirds of all showerheads have flow rates under 2.5 gpm. The low replacement rate may also be attributable to the fact that as calculated above, the rate of replacement accounts only for the replacement of showerheads with a higher-than-2.5 gpm with a low-flow fixture; replacement of showerheads with 2.5 gpm flow rate for newer and potentially more water-saving models is not reflected in the 1.8% rate of replacement. There were indications in the 2001 survey, such as the reduction in the number of atomizing showerheads, that the replacement of low flow showerheads with other low flow units is taking place.

The figures used to arrive at the replacement rate for showerheads in multi-family buildings are presented in Table 7-7. The number of showerheads in 1994 was approximated assuming 21.3 units per water account, as the 2001 survey indicates, rather than the 29.5 reported in the baseline study. The 1995 study reported 1.0 shower per unit; this survey found 1.1 showers per unit. The percent of low-flow showerheads in 1994 was approximated from survey data; the baseline study reported 48% of showerheads with flow rates of 3.0 gpm and under; this number was adjusted to 43% for showerheads with flow rates of 2.5 gpm and less.

**Table 7-7: Figures to Approximate Total Rate of Replacement for Multi-Family Showerheads**

| Year | Number of Single-Family Accounts | Number of Showerheads per Account | Total Showerheads | Percent of Low Flow (2.5 gpm) Showerheads | Number of Low Flow (2.5 gpm) Showerheads | Number of Showerheads with Flow Rates Over 2.5 gpm |
|---|---|---|---|---|---|---|
| 1994 | 6,388 | 21.3 | 136,064 | 43.0 | 58,508 | 77,556 |
| 2001 | 6,769 | 23.4 | 158,586 | 64.0 | 101,495 | 57,091 |

The average annual rate of replacement for showerheads in the multi-family sector was approximated at 4% for the period between the baseline study and the 2001 survey (6.67 years). This rate does not take into account replacement of showerheads with flow rates within the 2.5 gpm range by others in the same range.

### Faucet Aerator Replacement Rates

There were insufficient data from previous studies to allow the determination of the rate at which higher-than-2.2 gpm aerators are being replaced with low flow aerators. Neither the 1995 nor 1998 studies presented flow data for different types of aerators. The flow data collected in this study, summarized below in Table 7-8, will allow future studies to compute rates of replacement for aerators.

**Table 7-8: Faucet Aerator Distribution and Flow Data**

| | Percent of Faucets Tested | | Average Flow Rate (gpm) | |
|---|---|---|---|---|
| Faucet Types | Single-Family | Multi-Family | Single-Family | Multi-Family |
| Faucets with aerator and flow rates of 2.2 gpm or less | 52.4 | 37.9 | 1.8 | 1.9 |
| Faucets with aerators and flow rates higher than 2.2 gpm | 33.2 | 45.8 | 3.0 | 2.9 |
| Faucets without aerators and flow rates of 2.2 gpm or less | 3.1 | 4.9 | 1.7 | 1.8 |
| Faucets without aerators and flow rates higher than 2.2 gpm | 11.3 | 11.4 | 3.9 | 4.0 |

The rate at which aerators are being installed on faucets that previously did not have them was calculated using data from the 1995 baseline study. This rate was calculated at an annual average of 6.9% in the single-family sector, based on the figures presented in Table 7-9.

**Table 7-9: Figures Used to Calculate Rate of Installation for Single-Family Aerators**

| Year | Number of Single-Family Accounts | Number of Faucets per Account | Total Faucets | Number of Faucets With Aerators | Number of Faucets Without Aerators |
|---|---|---|---|---|---|
| 1994 | 273,312 | 3.6 | 983,925 | 678,908 (69%) | 305,017 (31%) |
| 2001 | 289,593 | 3.8 | 1,100,453 | 935,385 (85%) | 165,068 (15%) |

The rate of installation of faucet aerators in the multi-family sector was approximated at an annual average of 6.0% based on the figures presented in Table 7-10. The number of aerators in 1994 was approximated assuming 21.3 units per water account, as the 2001 survey indicates, rather than the 29.5 reported in the baseline study. The 1995 study reported 2.1 faucets per unit; this survey found 2.3 faucets per unit.

**Table 7-10: Figures Used to Approximate Rate of Installation for Multi-Family Aerators**

| Year | Number of Multi-Family Accounts | Number of Faucets per Account | Total Faucets | Number of Faucets With Aerators | Number of Faucets Without Aerators |
|---|---|---|---|---|---|
| 1994 | 6,388 | 44.7 | 285,735 | 197,157 (69%) | 88,578 (31%) |
| 2001 | 6,769 | 49.0 | 331,613 | 278,555 (84%) | 53,058 (16%) |

The total replacement rate for faucet aerators in restaurants was calculated as negative: if the 2.7 faucets per restaurant from the baseline study is accepted as correct, there would be more faucets without aerators now than in 1995. This survey found a mean of 5.1 faucets per restaurant, including bathroom, kitchen, and utility faucets (also included in the 1995 study). In any case the number of restaurant faucets without aerators is small (under one thousand) and not a significant contributor to potential water savings.

### Urinal Replacement Rate

No replacement rate could be calculated for urinals in restaurants. As the figures in Table 7-11 indicate, the number of urinals with flush volume under one gallon per minute has apparently decreased since the 1995 study. This result may be the product of poor urinal identification skills on the part of survey personnel. Almost half of the urinals inspected in restaurants were classified as having an "unknown" flush volume. As was the case with restaurant faucets, the number of urinals is too small to represent any significant water savings potential.

**Table 7-11: Figures Used to Calculate Total Rate of Replacement for Restaurant Urinals**

| Year | Number of Restaurant Accounts | Number of Urinals per Account | Total Urinals | Number of Urinals with Flush Volume of 1 gpf or Less | Number of Urinals with Flush Volume Over 1 gpf |
|---|---|---|---|---|---|
| 1994 | 613 | 0.70 | 429 | 197 (46%) | 232 (54%) |
| 2001 | 650 | 0.63 | 410 | 94 (23%) | 316 (77%) |

## 7.4 WATER CONSERVATION POTENTIAL

Water conservation potential is quantified for three fixtures (toilets, showerheads, faucets) and one appliance (clothes washers). The potential water savings are calculated for both single and multi-family sectors. In the case of toilets, water conservation is estimated both for toilet replacement and the installation of displacement devices in non-conserving gravity flush toilets.

The potential water savings from improved irrigation efficiency is discussed in this section. Although survey data does not provide enough information to quantify potential water savings from irrigation efficiency, it does provide information that may be used to target the most likely conservation candidates.

### Water Savings from Ultra-Low Flush Toilet Installations: 4.64 mgd

Water savings were calculated using data from the 2001 surveys and other sources. The following assumptions were made:

- Installing ultra-low flush toilets in place of toilets with a higher rated flush volume will generate savings equivalent to the difference in the mean flush volumes.
- A person flushes a toilet on the average 5.05 times a day (*Residential End Uses of Water*, AWWA Research Foundation, Page xxvii).
- There are on the average 3 occupants per single-family account (Appendix I of this report).
- There are on the average 2.1 toilets per single-family home (Table 4-3 of this report).
- The number of occupants per apartment unit is estimated at 2.25; this assumes 1.3 million people in the District's service area and approximately 429,000 of them in 190,700 apartment units.
- The average number of toilets per multi-family housing unit is 1.2 (Table 5-3 of this report).
- There are an estimated 608,145 single-family toilets in the District's service area in 2001 (Table 7-3 of this report).
- There are an estimated 173,963 multi-family toilets in apartment buildings with five or more units in the District's service area in 2001 (Table 7-4 of this report).

**Table 7-12: Potential Water Savings from Toilet Replacement**

| | Type of Toilet Replaced with ULFT | | | |
|---|---|---|---|---|
| | Single-Family 3.5 gpf | Single-Family > 3.5 gpf | Multi-Family 3.5 gpf | Multi-Family > 3.5 gpf |
| (1) Mean ULFT Flush Volume in Sector (gpf) | 1.83 | 1.83 | 1.94 | 1.94 |
| (2) Mean Toilet Flush Volume (gpf) | 2.80 | 3.32 | 2.94 | 3.42 |
| (3) Avg. Water Savings in Gallons per Flush (2)-(1) | 0.97 | 1.49 | 1.00 | 1.48 |
| (4) Avg. Number of People per Dwelling | 3.0 | 3.0 | 2.25 | 2.25 |
| (5) Avg. Number of Flushes per Person per Day | 5.05 | 5.05 | 5.05 | 5.05 |
| (6) Total Flushes per Dwelling per Day (4)x(5) | 15.15 | 15.15 | 11.36 | 11.36 |
| (7) Number of Toilets per Dwelling | 2.1 | 2.1 | 1.2 | 1.2 |
| (8) Total Flushes per Toilet per Day (6)/(7) | 7.2 | 7.2 | 9.5 | 9.5 |
| (9) Total Water Savings in Gallons per Toilet per Day (3)x(8) | **7.0** | **10.7** | **9.5** | **14.0** |
| (10) Total Number of Toilets in Sector in Year 2001 | 608,145 | 608,145 | 173,963 | 173,963 |
| (11) Percent of Replaceable Toilets (Figure 7-3) | 38.4 | 27.6 | 41.8 | 21.2 |
| (12) Total Number of Replaceable Toilets (10)x(11) | 233,528 | 167,848 | 72,717 | 36,880 |
| (13) Total Water Savings in MGD (9)x(12) | **1.63** | **1.80** | **0.69** | **0.52** |

A total of 4.64 mgd can be saved from the replacement of all non-conserving toilets with ultra-low flush fixtures. Assuming that replacement rates will stabilize around the "natural" rates of about 5% for single-family and approximately 6% for multi-family, roughly 20,000 ULFTs will be installed in single-family homes per year and about 6,600 in multi-family apartment buildings with five or more units.

### Water Savings from Retrofitting Toilets with Displacement Devices: 1.19 mgd

Water savings from the installation of displacement devices in non-conserving gravity flush toilets were estimated from data collected in this study. Thirty-four of the 827 single-family toilets inspected were non-conserving fixtures with displacement devices in the tank. The average measured flush volume was 2.5 gpf for the toilets rated at 3.5 gpf and about 3.0 gpf for the toilets rated higher than 3.5 gpf. The implication is that displacement devices are saving on the average about 0.3 gallons per flush, regardless of toilet rating.

The number of displacement devices found in multi-family toilets was too small to provide a reliable water savings estimate. The same 0.3 gallons per flush will be assumed for purposes of estimating water savings in the multi-family sector.

The 0.3 gpf water saving for displacement devices is lower than other estimates found in the water conservation literature. The *Handbook for Water Use and Conservation* (Amy Vickers, Waterplow Press, 2001) estimates 0.5-1.0 gpf savings. The Metropolitan Water District of Southern California's *The Top Ten Tips For Saving Water* estimates 5-10 gallons per day, roughly equivalent to 0.5-1.0 gpf. The higher estimates may be applicable to individual installations. The 0.3 gpf water savings from 2001 data, on the other hand, may reflect the uneven application of displacement devices and the differences in toilet characteristics and performance across the entire service area.

Table 7-13 illustrates the calculation of water savings. Installing displacement devices in all non-conserving toilets in single-family homes would save about 0.86 mgd. Doing the same in all apartments in buildings with five or more units would save about 0.33 mgd.

The calculated water savings from displacement devices is applicable only if all toilets are retrofitted in a brief time period. In the longer term the natural replacement of toilets would reduce the number of non-conserving toilets and increase the number of ULFTs, therefore altering the water conservation estimates.

**Table 7-13: Potential Water Savings from Retrofitting Toilets with Displacement Devices**

| | Type of Toilet Replaced with ULFT | | | |
|---|---|---|---|---|
| | Single-Family 3.5 gpf | Single-Family > 3.5 gpf | Multi-Family 3.5 gpf | Multi-Family > 3.5 gpf |
| (1) Mean Toilet Flush Volume (gpf) | 2.80 | 3.32 | 2.94 | 3.42 |
| (2) Avg. Water Savings in Gallons per Flush | 0.30 | 0.30 | 0.30 | 0.30 |
| (3) Avg. Number of People per Dwelling | 3.0 | 3.0 | 2.25 | 2.25 |
| (4) Avg. Number of Flushes per Person per Day | 5.05 | 5.05 | 5.05 | 5.05 |
| (5) Total Flushes per Dwelling per Day (3)x(4) | 15.15 | 15.15 | 11.36 | 11.36 |
| (6) Number of Toilets per Dwelling | 2.1 | 2.1 | 1.2 | 1.2 |
| (7) Total Flushes per Toilet per Day (5)/(6) | 7.2 | 7.2 | 9.5 | 9.5 |
| (8) Total Water Savings in Gallons per Toilet per Day (2)x(7) | **2.16** | **2.16** | **2.85** | **2.85** |
| (9) Total Number of Toilets in Sector in Year 2001 | 608,145 | 608,145 | 173,963 | 173,963 |
| (10) Percent of Non-Conserving Toilets (Figure 7-3) | 38.4 | 27.6 | 41.8 | 21.2 |
| (11) Total Number of Non-Conserving Toilets (9)x(10) | 233,528 | 167,848 | 72,717 | 36,880 |
| (12) Total Water Savings in MGD (8)x(11) | **0.50** | **0.36** | **0.21** | **0.11** |

### Water Savings from Showerhead Retrofits: 3.49 mgd

The water savings associated with showerhead retrofits were calculated from survey data and from information on the *Residential End Uses of Water*, AWWA Research Foundation. The mean flow rate for single-family showerheads with a measured flow rate of 2.5 gpm or less is 2.1 gpm; the mean flow rate for showerheads with higher water consumption is 3.8 gpm. The average water savings from retrofitting the high consumption showerheads is 1.7 gpm. Similar considerations show the savings from multi-family showerheads to be the same, 1.7 gpm.

Fixture use assumptions for single-family homes are as follows: an average of three occupants per home (Appendix I of this report), taking 0.75 showers per capita per day with average shower duration of 6.8 minutes (*Residential End Uses of Water*, AWWA Research Foundation). There are on the average 1.8 showers per home (Table 4-3). Based on these assumptions, a retrofitted showerhead will save 14.45 gpd.

The only differences in the multi-family sector are the number of people per unit, 2.25, and the number of showerheads per unit, 1.1. Using these numbers, showerhead retrofits in multi-family housing units are estimated to save 17.7 gpd.

There are approximately 171,500 (Table 7-6) potential candidates for retrofitting in the single-family sector and 57,000 (Table 7-7) in the multi-family sector. Retrofitting all high-water-consumption showerheads would save about 3.5 mgd.

### Water Savings from Faucet Aerators: 1.44 mgd

The water savings associated with faucet retrofits were calculated from survey data and from information on the *Residential End Uses of Water*, AWWA Research Foundation. The mean flow rate for single-family faucets with aerators is 2.25 gpm; the mean flow rate for faucets without aerators is 3.39 gpm. The average water savings from retrofitting the high consumption faucets is 1.14 gpm. Similar considerations show the savings from multi-family faucet retrofits to be 0.55 gpm (mean flow rates of 2.46 and 3.01 gpm with and without aerator).

Fixture use assumptions for single-family homes are as follows: an average of three occupants per home (Appendix I of this report), using faucets on the average 8.1 minutes per capita per day (*Residential End Uses of Water*, AWWA Research Foundation). There are on the average 3.8 faucets per home (Table 4-3). Based on these assumptions, a retrofitted faucet will save 7.3 gpd.

The only differences in the multi-family sector are the number of people per unit, 2.25, and the number of faucets per unit, 2.3. Using these numbers, faucet retrofits in multi-family housing units are estimated to save 4.4 gpd.

There are approximately 165,000 (Table 7-9) potential candidates for retrofitting in the single-family sector and 53,000 (Table 7-10) in the multi-family sector. Retrofitting all high-water-consumption faucets would save about 1.44 mgd.

### Water Savings from Clothes Washer Replacements: 3.60 mgd

Water savings from clothes washer replacements in the single-family sector were estimated on the basis of the following assumptions:

- 289,593 single-family accounts in the District's service area in 2001.
- An average of 0.9 clothes washers per single-family home.
- 88 percent of clothes washers in single-family homes are standard efficiency appliances.
- 14 gallons per day per clothes washer are saved by replacing a standard efficiency machine with a high-efficiency one (according to the *Memorandum of Understanding Regarding Urban Water Conservation in California*).

These assumptions yield 229,358 washers available for replacement, representing a potential water savings of 3.2 mgd.

Water savings from clothes washer replacements in the multi-family sector (5+ units) were estimated on the basis of the following assumptions:

- 6,769 water accounts in the District's service area in 2001 for properties with five or more units.
- The average number of clothes washer per multi-family property with five or more units is 3.19, for an estimated 21,593 clothes washers in this market sector (6,769 x 3.19).
- 47 percent of washers or 10,149 (21,593 x 0.47) machines are in-unit appliances. All of these machines are assumed to be of standard efficiency and available for replacement.

- 53 percent of washers or 11,444 (21,593 x 0.53) machines are in common area laundries. Eighty-six percent of them or 9,842 washers are assumed to be of standard efficiency and available for replacement.
- Properties with common area laundries have on the average 2.6 washers per property (Table 5-10 shows 611 common area washers in 233 properties).
- Multi-family properties in the District's service area have on the average 21.3 apartment units and 2.25 people per unit, equivalent to about 48 tenants per property.
- Water use in common area laundries is estimated at 0.1 cycles per person per day, from *Multi-Residential High Efficiency Clothes Washer Pilot Project* in Metropolitan Toronto (Canada Mortgage & Housing Corporation, 2001).
- Water savings per washer cycle are estimated at 14.8 gallons, based on the Canadian study cited above.
- Multi-family residents with in-unit washers use 3.9 times more water to do their laundry on site than their counterparts in buildings with common area laundries (according to *A National Study of Laundry-Water Use in Multi-Housing*, National Research Center, Inc., Boulder, Colorado, 2001). This is equivalent to 0.39 (0.1 x 3.9) cycles per person per day.

Water savings from the replacement of in-unit washers with high efficiency appliances were calculated as follows:

***In-Unit Washer Water Savings***=
0.39 cycles per person per day x
2.25 persons x
14.8 gallons per cycle x
10,149 washers=
**0.13 mgd**

Water savings from the replacement of standard efficiency common area washers with high efficiency appliances were calculated as follows:

***Laundry Washer Water Savings***=
(0.1 cycles per person per day x
48 persons per property x
14.8 gallons per cycle /
2.6 washers per property) x
9,842 washers =
**0.27 mgd**

The potential water savings from replacing all standard efficiency washers, therefore, is 3.6 mgd (3.2 from the single-family sector and 0.4 from multi-family properties).

### Water Savings from Improved Irrigation Efficiency

Survey data do not provide water consumption numbers that would allow the quantification of potential water savings. The surveys do provide valuable information on the breakdown of landscapable and irrigated areas and the use of various types of irrigation systems.

Outdoor water use is prevalent on the east side of the District area only. The comparison of summer to winter water use (see Appendix B) shows that residents east of the hills average from 20% to 390% percent outdoor water use in summer months (ratios

of summer to winter water use between 1.2 and 3.9). The ratios of summer to winter water use west of the hills range from 0.75 to 1.25 for all but one of the groups surveyed (houses built after 1990 show a ratio of 1.42).

According to *Residential End Uses of Water* (AWWA Research Foundation), homes with in-ground sprinkler systems use 35% more water outdoors than those who do not have an in-ground system. The same publication affirms that households that employ an automatic timer to control their irrigation system use 47% more water than those who do not. 16.5% of single-family homes reported using in-ground systems with controllers in their front yards, 13.2% in their back yards. The vast majority of single-family homes with water conservation potential from improved irrigation efficiency belong to 12 of the 72 groups surveyed in this study. These homes are classified as "east" by location, "own" and "unknown" by tenancy, and "high" in terms of summer to winter water consumption differential. In terms of number of accounts they represent about 5% of the single-family water accounts in the service area.

# East Bay Municipal Utility District
# Water Conservation Market Penetration Study

## APPENDIX A

## Sampling Methodology

Stratified random sampling was used to obtain unbiased, representative samples of District customers. A random sample is one in which each element in a homogeneous population has an equal chance of being picked for the sample; in addition, the selection of one element should in no way influence the selection of another. Stratification is used when the population is heterogeneous, or when a representative sample is sought across different population attributes. A stratified random sample is defined as a combination of independent samples selected in proper proportions from homogeneous groups within a heterogeneous population. The procedure calls for categorizing the heterogeneous population into groups that are homogeneous in themselves. If one group is proportionally larger than the other, its sample size should also be proportionally larger.

The size of a sample is determined from a statistical formula based on the population size, desired accuracy and level of confidence, and estimated percentage of the population possessing the attribute of interest.

$$n = \frac{P(1-P)}{\left(\frac{A^2}{Z^2}\right) + \left(\frac{P(1-P)}{N}\right)}$$

Where

n= sample size required

N= number of elements in the population

P= Percentage of the population with attribute of interest

A= Accuracy desired, or tolerated sampling error

Z= Number of standard deviation units of the sampling distribution corresponding to the desired confidence level

The most conservative (largest) sample size is obtained when P=50%. A confidence level of 95% and a plus-or-minus 5% precision level, commonly used in surveys, correspond to a "Z" value of 1.96 and an "A" value of 0.05.

Stratification of a sample requires detailed knowledge of the distribution of attributes or characteristics of interest in the population to ensure that each subgroup is represented in the same proportion as other subgroups as they occur in the population. Information contained in District and County Assessor databases allowed for stratification in terms of geographic location, type of tenancy (owner or renter in single-family homes), and age of dwelling. Available seasonal water use data also made it possible to segregate single-family accounts into those with significantly different water use patterns in summer months (attributable to irrigation) and those with similar water use patterns year-round (no irrigation).

Sample sizes depend on the population selected as the "homogeneous" group (i.e. the population with the same value of “P”), the desired confidence level (i.e. the probability that answers obtained are correct), and precision or tolerable error (i.e. the range by which the answers will differ from the mean for continuous data or from the true value for proportional data). The value of “P” (percentage of population with attribute of interest) is difficult to estimate, as the surveys examine the market penetration of different water conserving fixtures/appliances/equipment rather than a single attribute. For purposes of determining sample sizes for telephone and site surveys in the residential sectors, a “P” value of 50% was assumed, as it yields the largest possible sample size; this insures that when results are analyzed with a known “P” value, the sampling error will remain within 5%. “P” values of 30% (for eating places, restaurants) and 20% (for all other non-residential sectors) were assumed in determining sample sizes in the non-residential sectors. The primary

focus of the surveys in non-residential sectors was the market penetration of ultra-low flush toilets; the highest actual "P" value in the 1995 Baseline Study was 19% in restaurants, with all other non-residential sectors under 10%.

A confidence level of 95% was used to determine sample sizes for all surveys. Tolerable sampling errors for proportional data were assumed at 5% for all residential surveys and for site surveys in offices. A sampling error of 10% was used in determining sample sizes for site surveys in restaurants, retail trade, warehousing, food sales, and fast food facilities. A larger sampling error was allowed in selected non-residential sectors for cost-containment purposes; these five sectors together use less than 3% of the District's total water production. Sample sizes are presented in Table A-1.

Other than the combination of two multi-family sectors (2-4 units and 5+ units) for the purpose of obtaining attitudinal data from income property owners/managers, the selected market sectors were surveyed individually. Ten surveys were conducted, with the sectors stratified as shown below:

1. Telephone interviews of single-family residents stratified into 72 subgroups:
    a. Three types of tenancy (owners, renters, unknown)
    b. Two locations (east or west of hills)
    c. Six year-built categories (<1950, 1950s, 1960s, 1970s, 1980s, 1990-2001)
    d. Two outdoor water use categories ("high" and "low")
2. Telephone interviews of apartment owners/managers stratified into 24 subgroups:
    a. Two building sizes (2-4 units and 5+ units)
    b. Two locations (east or west of hills)
    c. Six year-built categories (<1950, 1950s, 1960s, 1970s, 1980s, 1990-2001)
3. Site visits to single-family residents stratified into 72 subgroups:
    a. Three types of tenancy (owners, renters, unknown)
    b. Two locations (east or west of hills)
    c. Six year-built categories (<1950, 1950s, 1960s, 1970s, 1980s, 1990-2001)
    d. Two outdoor water use categories ("high" and "low")
4. Site visits to apartment buildings (5+ units) stratified into 12 subgroups:
    a. Two locations (east or west of hills)
    b. Six year-built categories (<1950, 1950s, 1960s, 1970s, 1980s, 1990-2001)
5. Site visits to warehouses (BCC 4200), stratified by location (east or west of hills)
6. Site visits to retail trade facilities (BCC 5300), stratified by location (east or west of hills)
7. Site visits to food sales facilities (BCC 5400), stratified by location (east or west of hills)
8. Site visits to fast food establishments (BCC 5811), stratified by location (east or west of hills)
9. Site visits to restaurants (BCC 5812), stratified by location (east or west of hills)
10. Site visits to offices (BCC 6800), stratified by location (east or west of hills)

**Table A-1: Sample Sizes**

| Survey Type | Statistical Parameters Used to Determine Sample Size | | | Sample Size |
|---|---|---|---|---|
| | "P" | Confidence Level | Sampling Error | |
| 1. Telephone Surveys Single-Family | 50% | 95% | 5% | 384 |
| 2. Telephone Surveys Multi-Family | 50% | 95% | 5% | 377 |
| 3. Site Surveys Single-Family | 50% | 95% | 5% | 384 |
| 4. Site Surveys Multi-Family (5+ Units) | 50% | 95% | 5% | 363 |
| 5. Site Surveys Offices | 20% | 95% | 5% | 225 |
| 6. Site Surveys Restaurants | 30% | 95% | 10% | 72 |
| 7. Site Surveys Retail Trade, Other | 20% | 95% | 10% | 60 |
| 8. Site Surveys Warehousing | 20% | 95% | 10% | 57 |
| 9. Site Surveys Food Sales | 20% | 95% | 10% | 55 |
| 10. Site Surveys Fast Food | 20% | 95% | 10% | 49 |

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# East Bay Municipal Utility District
# Water Conservation Market Penetration Study

## APPENDIX B
## Development of Customer Lists

Lists of potential study participants were prepared in accordance with the stipulations presented in this Appendix. A list was prepared for each targeted subgroup. A worst-case response rate of 10% was assumed; each list, therefore, contained ten times the targeted number of customers in the respective subgroup (except in a few non-residential sectors where the total number of accounts was too small to allow it).

The first step in the preparation of lists was the development of a *Microsoft Access* database containing all potential study participants. This database contained the following fields:

| | |
|---|---|
| ACCTNO | Account number, a unique number identifying a particular account (District's database field SERV_NU) |
| BCC | Business classification code (District's database field BUS_CLASS_CD) |
| PARCELNO | Parcel number (District's database field SERV_PARCL_NU) |
| CUST_NM | Customer name |
| ADDRESS | Customers address (District's database field SERV_ADDR_TX) |
| CITY | City corresponding to customer address |
| COUNTY | County corresponding to customer address |
| ZIP | Zip code corresponding to customer address |
| AREA | Area code of customer home phone number |
| PHONE | Customer phone number |
| APTNO | The apartment number component of a customer's address (District's database field SERV_ADDR_APT_NU) |
| BLDGNO | The building number component of a customer's address (District's database field SERV_ADDR_BLDG_NU) |
| FRACT | The fractional part, if any, of a service address (District's database field SERV_ADDR_FRACT_NU) |
| PREFIX | A prefix, if any, to a street name in a service address (District's database field SERV_ADDR_PFIX_CD) |
| SUFIX | The suffix to the street name in a service address (District's database field SERV_ADDR_SFIX_CD) |
| STREET | The street name component of a service address (District's database field SERV_ADDR_ST_NM) |
| BUS_ADDR | Business address where bill is sent (use additional fields if necessary) |
| BUS_PHONE | Business phone, or phone of person responsible for bill (use additional fields if necessary) |
| TENANCY | Own or rent, necessary only for BCC 8800 |
| STRTDATE | Date from which customer has been responsible for District's bill |

| | |
|---|---|
| E/W | East or west of the hills |
| TAPDATE | Date tap was installed (District's database field TAP_INST_DT) |
| YR_BUILT | Date building was erected, from County Assessors databases |
| PRESSURE | Code identifying operational pressure zone (District's database field PRSZ_CD) |
| METER | Two-digit character field containing the meter-size code used by CIS (District's database field MTR_SZ_CD) |
| IRR | Field containing the ratio of average summer to winter water use. |
| LOTSIZE | Lot square footage from County Assessors' databases |
| KIT | Yes or no, indicating whether account holder received water conservation kit |
| THOMPG | Page number on Thomas directory |
| THOMGRD | Grid number on Thomas directory |

The database included all active accounts under the nine business classification codes listed in Table 1 (8800, 6514, 6513, 5300, 6800, 5812, 4200, 5400, 5811). Only three of the proposed database fields did not come directly from District files. The YR_BUILT and LOTSIZE fields came originally from County Assessor files and were incorporated into the database by District personnel.

The IRR field was not available directly: it was developed on the basis of water use data. The following procedure for developing this information was used (by District personnel):

- For each account with BCC 8800, water consumption for two winter and two summer months for the past three years was listed;
- For each account, average winter and summer water use was calculated from the available data.
- Average winter and summer water uses were compared; the ratio of average summer to winter water use was entered into the IRR field.

The second important step in the development of customer lists was the characterization of the customer database in terms of the subgroups selected for the study. The number of accounts in each subgroup were determined.

The third step in the development of customer lists was the extraction of potential study participants from the previously developed tables. Records were extracted from the various tables at random, with each subgroup represented in each sample in the same proportion as it is represented in the District's service area. Based on the assumed worst-case response rate of 10% and the required sample sizes:

- A total of 7,680 records divided into appropriately proportioned 72 subgroups were extracted from the single-family accounts table; half of the records in each subgroup (selected at random) were used for the single-family site surveys, the other half for the telephone interviews.
- A total of 3,770 records divided into appropriately proportioned 24 subgroups were extracted from the multi-family accounts table to be used for telephone interviews.
- A total of 3,670 records divided into appropriately proportioned 12 subgroups were extracted from the multi-family accounts with five or more units to be used in multi-family site surveys.
- A total of 4,787 records were extracted from the six non-residential sector tables, apportioned into east and west: 2,250 from the "Offices" table; 644 from "Restaurants"; 600 from the "Retail" table; 570 from the "Warehouse" table; 492 from the "Food Sales" table; and 231 from the "Fast Food" table.

## Database Revisions

The data received from the District was carefully evaluated and analyzed to extract the account data necessary to the study. A list of the various analyses is presented below.

1. Distribution of EBMUD records by business classification code (BCC)

| BCC | No. of Records | Table Name |
|---|---|---|
| 4200 | 979 | Warehouses |
| 5300 | 2234 | Retail |
| 5400 | 558 | FoodSales |
| 5811 | 253 | FastFood |
| 5812 | 705 | Restaurants |
| 6513 | 26044 | MF5Plus |
| 6514 | 16383 | MF2to4 |
| 6800 | 3092 | Offices |
| 8800 | 295608 | SF |
| **Total** | **345856** | |

2. Initial distribution of single-family (SF) accounts (from EBMUD table)

| | | |
|---|---|---|
| By location | West | 124846 |
| | East | 66832 |
| | No Location Given | 103930 |
| | | **295608** |
| By BLDG YR | <1950 | 106150 |
| | 1950-1959 | 36473 |
| | 1960-1969 | 19962 |
| | 1970-1979 | 19747 |
| | 1980-1989 | 20210 |
| | 1990-2001 | 18706 |
| | No Year Given | 74360 |
| | | **295608** |
| By Tenancy | T (Tenant) | 48118 |
| | O (Owner) | 184447 |
| | A (Tenant) | 421 |
| | L (Owner) | 1919 |
| | U (Unknown) | 60703 |
| | | **295608** |
| By Lot Size | <5000 | 70213 |
| | Between 5000 and 9999 | 98645 |
| | Between 10000 and 14999 | 22973 |
| | Between 15000 and 19999 | 10424 |
| | Between 20000 and 24999 | 6800 |
| | Between 25000 and 50000 | 6754 |
| | Over 50000 | 2900 |
| | No Lot Size Given | 76899 |
| | | **295608** |

| | | |
|---|---|---|
| By irrigation factor | Between 0.0 and 1.0 | 126649 |
| | Between 1.0 and 1.2 | 29786 |
| | Between 1.2 and 1.3 | 11913 |
| | Between 1.3 and 1.4 | 10819 |
| | Between 1.4 and 1.5 | 11436 |
| | Between 1.5 and 2.0 | 36323 |
| | Over 2.0 | 67933 |
| | No Value Given | 749 |
| | | **295608** |

3. Correction of SF records by removing duplicates (Per Vivian Ling of EBMUD, equal "Serv_Nu" values represent same address)

| | |
|---|---|
| Addresses that appear once | 282590 |
| Addresses that appear more than once (up to 21 times) | 4619 |
| Distinct Addresses | **287209** |

| | |
|---|---|
| Parcel numbers that appear once | 276664 |
| Parcel numbers that appear more than once | 5938 |
| Distinct Parcel Numbers | **282602** |

NOTE: Same address could have multiple Parcel Nos.
THEREFORE: Serv_Nu used to identify unique addresses

4. Correction of SF records by Location, Year, Tenancy, Lot Size

LOCATION: E/W values assigned from "City" data

BLDG_YR: Of the 74360 records missing Year, 62341 had a tap date of 1/1/1951; Vivian Ling of EBMUD verified that those tap dates indicated buildings from before 1950; these records were grouped with the pre-1950 BLDG_YR records. All but one of the remaining 12019 records without a BLDG_YR had usable tap dates; the Tap_Inst_Dt was used as the BLDG_YR. The one remaining record showed that client had been responsible for bill since 1966; that year was used as BLDG_YR for that address.

TENANCY: Records with "T" and "A" were grouped as Tenants; Records with "O" and "L" were grouped as Owners; "Unknown" was made into a separate category.

LOT SIZE: Lot size was abandoned as a stratification parameter. Vivian Ling indicated there was no way to obtain the 76899 records missing. Many of the available records were observed to be in error; for example, one apartment appearing multiple times had over 30000 sq ft (probably the area of the entire building) in each appearance; other addresses had sizes of 6 sq ft.

5. Breakdown of corrected SF records

| | | |
|---|---|---|
| By location | West | 222776 |
| | East | 64433 |
| | | **287209** |

| | | |
|---|---|---|
| By BLDG YR | <1950 | 164507 |
| | 1950-1959 | 35853 |
| | 1960-1969 | 19493 |
| | 1970-1979 | 19125 |
| | 1980-1989 | 28030 |
| | 1990-2001 | 20201 |
| | | **287209** |
| By Tenancy | T & A | 46830 |
| | O & L | 180654 |
| | U (Unknown) | 59725 |
| | | **287209** |
| By irrigation factor | Between 0.0 and 1.0 | 121972 |
| | Between 1.0 and 1.2 | 29182 |
| | Between 1.2 and 1.3 | 11772 |
| | Between 1.3 and 1.4 | 10658 |
| | Between 1.4 and 1.5 | 11230 |
| | Between 1.5 and 2.0 | 35666 |
| | Between 2.0 and 3.0 | 33979 |
| | Between 3.0 and 4.0 | 14459 |
| | Over 4.0 | 17576 |
| | No Value Given | 715 |
| | | **287209** |

6. Correction of records for multi-family accounts with 5 or more units (MF5) by removing duplicate addresses

| | |
|---|---|
| Distinct Addresses | 6713 |

7. Correction of MF5 by location and year
LOCATION: E/W values assigned from "City" data

BLDG_YR: 4904 records were missing Year, and 4477 of those had a tap date of 1/1/1951; Vivian Ling verified that those tap dates indicated buildings from before 1950; these records were grouped with the pre-1950 BLDG_YR records. All remaining records without a BLDG_YR had usable tap dates; the Tap_Inst_Dt was used as the BLDG_YR.

8. Breakdown of corrected MF5 records

| | | |
|---|---|---|
| By location | West | 712 |
| | East | 6001 |
| | | **6713** |
| By BLDG YR | <1950 | 4753 |
| | 1950-1959 | 104 |
| | 1960-1969 | 405 |
| | 1970-1979 | 489 |
| | 1980-1989 | 674 |
| | 1990-2001 | 288 |
| | | **6713** |

9. Correction of MF2to4 records by removing duplicate addresses

| | |
|---|---|
| Distinct Addresses | 15077 |

10. Correction of records for multi-family accounts with 2 to 4 units (MF2to4) by location and year

LOCATION: E/W values assigned from "City" data

BLDG_YR: 2837 records were missing Year, and 2538 of those had a tap date of 1/1/1951; Vivian verified that those tap dates indicated buildings from before 1950; these records were grouped with the pre-1950 BLDG_YR records. All remaining records without a BLDG_YR had usable tap dates; the Tap_Inst_Dt was used as the BLDG_YR.

11. Breakdown of corrected MF2to4 records

| | | |
|---|---|---|
| By location | West | 14130 |
| | East | 947 |
| | | **15077** |
| By BLDG YR | <1950 | 11585 |
| | 1950-1959 | 739 |
| | 1960-1969 | 1501 |
| | 1970-1979 | 431 |
| | 1980-1989 | 535 |
| | 1990-2001 | 286 |
| | | **15077** |

12. Correction of Non-Residential records by removing duplicate addresses

| | |
|---|---|
| Distinct 4200 addresses (Warehouses) | 868 |
| Distinct 5300 addresses (Retail) | 2030 |
| Distinct 5400 addresses (Food Sales) | 492 |
| Distinct 5811 addresses (Fast Food) | 231 |
| Distinct 5812 addresses (Restaurants) | 644 |
| Distinct 6800 addresses (Offices) | 2650 |

13. Breakdown of SF records by subgroup

| | Total Addresses | IRR NULL | IRR<1 | 1<IRR<1.2 | 1.2<IRR<1.5 | 1.5<IRR<2 | IRR>2 | MEDIAN |
|---|---|---|---|---|---|---|---|---|
| East, <1950, Tenant | 780 | 3 | 235 | 45 | 90 | 104 | 303 | 1.58 |
| East, 1950-1959, Tenant | 866 | 1 | 255 | 56 | 88 | 137 | 329 | 1.61 |
| East, 1960-1969, Tenant | 630 | 0 | 73 | 35 | 61 | 113 | 348 | 2.15 |
| East, 1970-1979, Tenant | 1257 | 0 | 321 | 83 | 114 | 199 | 540 | 1.77 |
| East, 1980-1989, Tenant | 929 | 0 | 229 | 60 | 82 | 128 | 430 | 1.88 |
| East, 1990-2001, Tenant | 457 | 2 | 191 | 42 | 33 | 52 | 137 | 1.16 |
| | | | | | | | | |
| West, <1950, Tenant | 32004 | 61 | 19906 | 3619 | 3658 | 2825 | 1935 | 0.83 |
| West, 1950-1959, Tenant | 4380 | 9 | 2295 | 543 | 600 | 581 | 352 | 0.94 |
| West, 1960-1969, Tenant | 1781 | 2 | 1205 | 165 | 155 | 151 | 103 | 0.75 |
| West, 1970-1979, Tenant | 538 | 1 | 282 | 65 | 74 | 66 | 50 | 0.97 |
| West, 1980-1989, Tenant | 2452 | 2 | 1471 | 250 | 251 | 250 | 228 | 0.83 |
| West, 1990-2001, Tenant | 756 | 3 | 469 | 66 | 75 | 73 | 70 | 0.80 |
| | | | | | | | | |
| East, <1950, Owner | 5707 | 8 | 859 | 294 | 451 | 767 | 3328 | 2.34 |
| East, 1950-1959, Owner | 5233 | 11 | 580 | 245 | 417 | 747 | 3233 | 2.40 |
| East, 1960-1969, Owner | 5938 | 1 | 422 | 210 | 352 | 760 | 4193 | 2.74 |
| East, 1970-1979, Owner | 9280 | 5 | 1258 | 344 | 524 | 1040 | 6109 | 2.63 |
| East, 1980-1989, Owner | 10307 | 14 | 1211 | 365 | 509 | 837 | 7371 | 3.18 |
| East, 1990-2001, Owner | 9945 | 95 | 1778 | 418 | 596 | 1049 | 6009 | 2.48 |
| | | | | | | | | |
| West, <1950, Owner | 90779 | 335 | 46670 | 11117 | 11883 | 10963 | 9811 | 0.97 |
| West, 1950-1959, Owner | 15474 | 13 | 6079 | 1971 | 2584 | 2640 | 2187 | 1.16 |
| West, 1960-1969, Owner | 5842 | 15 | 2403 | 629 | 748 | 796 | 891 | 1.16 |
| West, 1970-1979, Owner | 3335 | 2 | 1646 | 367 | 421 | 394 | 505 | 1.00 |
| West, 1980-1989, Owner | 10168 | 21 | 3808 | 1034 | 1346 | 1655 | 2304 | 1.25 |
| West, 1990-2001, Owner | 9006 | 50 | 3551 | 936 | 1233 | 1432 | 1804 | 1.19 |
| | | | | | | | | |
| East, <1950, Unknown | 2380 | 4 | 391 | 142 | 228 | 335 | 1280 | 2.15 |
| East, 1950-1959, Unknown | 2513 | 0 | 312 | 129 | 207 | 354 | 1511 | 2.31 |
| East, 1960-1969, Unknown | 2966 | 1 | 285 | 117 | 196 | 446 | 1921 | 2.51 |
| East, 1970-1979, Unknown | 3490 | 0 | 439 | 138 | 235 | 377 | 2301 | 2.66 |
| East, 1980-1989, Unknown | 1728 | 0 | 161 | 44 | 72 | 142 | 1309 | 3.33 |
| East, 1990-2001, Unknown | 27 | 0 | 2 | 1 | 2 | 3 | 19 | 3.90 |
| | | | | | | | | |
| West, <1950, Unknown | 32857 | 47 | 17289 | 3963 | 4240 | 4055 | 3263 | 0.95 |
| West, 1950-1959, Unknown | 7387 | 4 | 3146 | 973 | 1219 | 1216 | 829 | 1.10 |
| West, 1960-1969, Unknown | 2696 | 2 | 1193 | 338 | 418 | 396 | 349 | 1.08 |
| West, 1970-1979, Unknown | 1225 | 0 | 556 | 113 | 170 | 190 | 196 | 1.10 |
| West, 1980-1989, Unknown | 2446 | 3 | 1000 | 262 | 326 | 391 | 464 | 1.18 |
| West, 1990-2001, Unknown | 10 | 0 | 1 | 3 | 2 | 2 | 2 | 1.42 |

14. Breakdown of MF5 records by subgroup

| | | |
|---|---|---|
| East, <1950 | 42 | |
| East, 1950-1959 | 36 | |
| East, 1960-1969 | 158 | |
| East, 1970-1979 | 241 | |
| East, 1980-1989 | 169 | |
| East, 1990-2001 | 66 | 712 |
| | | |
| West, <1950 | 4711 | |
| West, 1950-1959 | 68 | |
| West, 1960-1969 | 247 | |
| West, 1970-1979 | 248 | |
| West, 1980-1989 | 505 | |
| West, 1990-2001 | 222 | 6001 |
| | | 6713 |

15. Breakdown of MF2to4 records by subgroup

| | | |
|---|---|---|
| East, <1950 | 247 | |
| East, 1950-1959 | 160 | |
| East, 1960-1969 | 110 | |
| East, 1970-1979 | 198 | |
| East, 1980-1989 | 104 | |
| East, 1990-2001 | 128 | 947 |
| | | |
| West, <1950 | 11339 | |
| West, 1950-1959 | 578 | |
| West, 1960-1969 | 1391 | |
| West, 1970-1979 | 233 | |
| West, 1980-1989 | 431 | |
| West, 1990-2001 | 158 | 14130 |
| | | 15077 |

16. Breakdown of Non-Residential records by subgroup

| | | |
|---|---|---|
| 4200, East | 34 | |
| 4200, West | 834 | 868 |
| 5300, East | 467 | |
| 5300, West | 1563 | 2030 |
| 5400, East | 43 | |
| 5400, West | 449 | 492 |
| 5811 East | 20 | |
| 5811, West | 211 | 231 |
| 5812, East | 200 | |
| 5812, West | 444 | 644 |
| 6800, East | 686 | |
| 6800, West | 1964 | 2650 |
| | | 6915 |

17. Total number of records per survey sample

| | Confidence Level | "P" | Error | No. of Accounts | Sample Size |
|---|---|---|---|---|---|
| Telephone surveys single family | 95% | 50% | 5% | 287209 | 384 |
| Telephone surveys multi-family | 95% | 50% | 5% | 21790 | 377 |
| Site surveys single-family | 95% | 50% | 5% | 287209 | 384 |
| Site surveys multi-family (5+ units) | 95% | 50% | 5% | 6713 | 363 |
| Site surveys offices (BCC 6800) | 95% | 20% | 5% | 2650 | 225 |
| Site surveys restaurants (BCC 5812) | 95% | 30% | 10% | 644 | 72 |
| Site surveys retail trade (BCC 5300) | 95% | 20% | 10% | 2030 | 60 |
| Site surveys Warehousing (BCC 4200) | 95% | 20% | 10% | 868 | 57 |
| Site surveys Food Sales (BCC 5400) | 95% | 20% | 10% | 492 | 55 |
| Site surveys Fast Food (BCC 5811) | 95% | 20% | 10% | 231 | 49 |

18. Define size of subgroups to be used in surveys

**Single-Family (BCC 8800) Subgroups**: Use seasonal fluctuation in water use as a stratification factor. Customers whose water use in the summer is above the median ratio (avg summer use/avg winter use) for their group will be classified as "High." Customers below the median seasonal fluctuation ratio will be classified as "Low." The number of sites to be surveyed applies to site and phone surveys. The group number applies to the Appointments and Interviews programs.

| | No. of Accounts W/IRR data | Percent of Group | IRR Median | No. of Sites to be Surveyed | Group Number |
|---|---|---|---|---|---|
| East, <1950, Tenant,High | 389 | 0.14% | 1.58 | 1 | SF1 |
| East, 1950-1959, Tenant,High | 433 | 0.15% | 1.61 | 1 | SF2 |
| East, 1960-1969, Tenant,High | 311 | 0.11% | 2.15 | 0 | SF3 |
| East, 1970-1979, Tenant,High | 624 | 0.22% | 1.77 | 1 | SF4 |
| East, 1980-1989, Tenant,High | 461 | 0.16% | 1.88 | 1 | SF5 |
| East, 1990-2001, Tenant,High | 230 | 0.08% | 1.16 | 0 | SF6 |
| East, <1950, Tenant,Low | 388 | 0.14% | 1.58 | 1 | SF7 |
| East, 1950-1959, Tenant,Low | 432 | 0.15% | 1.61 | 1 | SF8 |
| East, 1960-1969, Tenant,Low | 319 | 0.11% | 2.15 | 0 | SF9 |
| East, 1970-1979, Tenant,Low | 633 | 0.22% | 1.77 | 1 | SF10 |
| East, 1980-1989, Tenant,Low | 468 | 0.16% | 1.88 | 1 | SF11 |
| East, 1990-2001, Tenant,Low | 225 | 0.08% | 1.16 | 0 | SF12 |
| West, <1950, Tenant,High | 15643 | 5.46% | 0.83 | 21 | SF13 |
| West, 1950-1959, Tenant,High | 2185 | 0.76% | 0.94 | 3 | SF14 |
| West, 1960-1969, Tenant,High | 877 | 0.31% | 0.75 | 1 | SF15 |
| West, 1970-1979, Tenant,High | 272 | 0.09% | 0.97 | 0 | SF16 |
| West, 1980-1989, Tenant,High | 1224 | 0.43% | 0.83 | 2 | SF17 |
| West, 1990-2001, Tenant,High | 377 | 0.13% | 0.80 | 1 | SF18 |
| West, <1950, Tenant,Low | 16300 | 5.69% | 0.83 | 22 | SF19 |
| West, 1950-1959, Tenant,Low | 2186 | 0.76% | 0.94 | 3 | SF20 |
| West, 1960-1969, Tenant,Low | 902 | 0.31% | 0.75 | 1 | SF21 |
| West, 1970-1979, Tenant,Low | 265 | 0.09% | 0.97 | 0 | SF22 |
| West, 1980-1989, Tenant,Low | 1226 | 0.43% | 0.83 | 2 | SF23 |
| West, 1990-2001, Tenant,Low | 376 | 0.13% | 0.80 | 1 | SF24 |

| | No. of Accounts W/IRR data | Percent of Group | IRR Median | No. of Sites to be Surveyed | Group Number |
|---|---|---|---|---|---|
| East, <1950, Owner,High | 2836 | 0.99% | 2.34 | 4 | SF25 |
| East, 1950-1959, Owner,High | 2623 | 0.92% | 2.40 | 4 | SF26 |
| East, 1960-1969, Owner,High | 2944 | 1.03% | 2.74 | 4 | SF27 |
| East, 1970-1979, Owner,High | 4625 | 1.61% | 2.63 | 6 | SF28 |
| East, 1980-1989, Owner,High | 5165 | 1.80% | 3.18 | 7 | SF29 |
| East, 1990-2001, Owner,High | 4955 | 1.73% | 2.48 | 7 | SF30 |
| East, <1950, Owner,Low | 2863 | 1.00% | 2.34 | 4 | SF31 |
| East, 1950-1959, Owner,Low | 2599 | 0.91% | 2.40 | 3 | SF32 |
| East, 1960-1969, Owner,Low | 2993 | 1.05% | 2.74 | 4 | SF33 |
| East, 1970-1979, Owner,Low | 4650 | 1.62% | 2.63 | 6 | SF34 |
| East, 1980-1989, Owner,Low | 5128 | 1.79% | 3.18 | 7 | SF35 |
| East, 1990-2001, Owner,Low | 4895 | 1.71% | 2.48 | 7 | SF36 |
| West, <1950, Owner,High | 45702 | 15.96% | 0.97 | 61 | SF37 |
| West, 1950-1959, Owner,High | 7842 | 2.74% | 1.16 | 10 | SF38 |
| West, 1960-1969, Owner,High | 2567 | 0.90% | 1.16 | 3 | SF39 |
| West, 1970-1979, Owner,High | 1687 | 0.59% | 1.00 | 2 | SF40 |
| West, 1980-1989, Owner,High | 5075 | 1.77% | 1.25 | 7 | SF41 |
| West, 1990-2001, Owner,High | 4554 | 1.59% | 1.19 | 6 | SF42 |
| West, <1950, Owner,Low | 44742 | 15.62% | 0.97 | 60 | SF43 |
| West, 1950-1959, Owner,Low | 7619 | 2.66% | 1.16 | 10 | SF44 |
| West, 1960-1969, Owner,Low | 2900 | 1.01% | 1.16 | 4 | SF45 |
| West, 1970-1979, Owner,Low | 1646 | 0.57% | 1.00 | 2 | SF46 |
| West, 1980-1989, Owner,Low | 5072 | 1.77% | 1.25 | 7 | SF47 |
| West, 1990-2001, Owner,Low | 4402 | 1.54% | 1.19 | 6 | SF48 |
| East, <1950, Unknown,High | 1188 | 0.41% | 2.15 | 2 | SF49 |
| East, 1950-1959, Unknown,High | 1245 | 0.43% | 2.31 | 2 | SF50 |
| East, 1960-1969, Unknown,High | 1492 | 0.52% | 2.51 | 2 | SF51 |
| East, 1970-1979, Unknown,High | 1731 | 0.60% | 2.66 | 2 | SF52 |
| East, 1980-1989, Unknown,High | 863 | 0.30% | 3.33 | 1 | SF53 |
| East, 1990-2001, Unknown,High | 13 | 0.00% | 3.90 | 0 | SF54 |
| East, <1950, Unknown,Low | 1188 | 0.41% | 2.15 | 2 | SF55 |
| East, 1950-1959, Unknown,Low | 1268 | 0.44% | 2.31 | 2 | SF56 |
| East, 1960-1969, Unknown,Low | 1473 | 0.51% | 2.51 | 2 | SF57 |
| East, 1970-1979, Unknown,Low | 1759 | 0.61% | 2.66 | 2 | SF58 |
| East, 1980-1989, Unknown,Low | 865 | 0.30% | 3.33 | 1 | SF59 |
| East, 1990-2001, Unknown,Low | 14 | 0.00% | 3.90 | 0 | SF60 |
| West, <1950, Unknown,High | 16597 | 5.79% | 0.95 | 22 | SF61 |
| West, 1950-1959, Unknown,High | 3680 | 1.28% | 1.10 | 5 | SF62 |
| West, 1960-1969, Unknown,High | 1362 | 0.48% | 1.08 | 2 | SF63 |
| West, 1970-1979, Unknown,High | 606 | 0.21% | 1.10 | 1 | SF64 |
| West, 1980-1989, Unknown,High | 1205 | 0.42% | 1.18 | 2 | SF65 |
| West, 1990-2001, Unknown,High | 5 | 0.00% | 1.42 | 0 | SF66 |

| | No. of Accounts W/IRR data | Percent of Group | IRR Median | No. of Sites to be Surveyed | Group Number |
|---|---|---|---|---|---|
| West, <1950, Unknown,Low | 16213 | 5.66% | 0.95 | 22 | SF67 |
| West, 1950-1959, Unknown,Low | 3703 | 1.29% | 1.10 | 5 | SF68 |
| West, 1960-1969, Unknown,Low | 1332 | 0.47% | 1.08 | 2 | SF69 |
| West, 1970-1979, Unknown,Low | 619 | 0.22% | 1.10 | 1 | SF70 |
| West, 1980-1989, Unknown,Low | 1238 | 0.43% | 1.18 | 2 | SF71 |
| West, 1990-2001, Unknown,Low | 5 | 0.00% | 1.42 | 0 | SF72 |
| | 286494 | 100.03% | | 388 | |

**Multi-Family 2-4 (BCC 6514) Subgroups**:

| | No. of Addresses | Percent of Group | No. of Sites Phone Surveys | No. of Sites Site Surveys | Group No. Interviews | Group No. Appointments |
|---|---|---|---|---|---|---|
| East, <1950 | 247 | 1.64% | | 4 | | MF1 |
| East, 1950-1959 | 160 | 1.06% | | 3 | | MF2 |
| East, 1960-1969 | 110 | 0.73% | | 2 | | MF3 |
| East, 1970-1979 | 198 | 1.31% | | 3 | | MF4 |
| East, 1980-1989 | 104 | 0.69% | | 2 | | MF5 |
| East, 1990-2001 | 128 | 0.85% | | 2 | | MF6 |
| | | | | | | |
| West, <1950 | 11339 | 75.21% | | 196 | | MF7 |
| West, 1950-1959 | 578 | 3.83% | | 10 | | MF8 |
| West, 1960-1969 | 1391 | 9.23% | | 24 | | MF9 |
| West, 1970-1979 | 233 | 1.55% | | 4 | | MF10 |
| West, 1980-1989 | 431 | 2.86% | | 7 | | MF11 |
| West, 1990-2001 | 158 | 1.05% | | 3 | | MF12 |
| | 15077 | 100.00% | | | | |

**Multi-Family 5+ (BCC 6513) Subgroups**:

| | No. of Addresses | Percent of Group | No. of Sites Phone Surveys | No. of Sites Site Surveys | Group No. Interviews | Group No. Appointments |
|---|---|---|---|---|---|---|
| East, <1950 | 42 | 0.63% | 1 | 2 | MF13 | MF13 |
| East, 1950-1959 | 36 | 0.54% | 1 | 2 | MF14 | MF14 |
| East, 1960-1969 | 158 | 2.35% | 3 | 9 | MF15 | MF15 |
| East, 1970-1979 | 241 | 3.59% | 4 | 13 | MF16 | MF16 |
| East, 1980-1989 | 169 | 2.52% | 3 | 9 | MF17 | MF17 |
| East, 1990-2001 | 66 | 0.98% | 1 | 4 | MF18 | MF18 |
| | | | | | | |
| West, <1950 | 4711 | 70.18% | 82 | 255 | MF19 | MF19 |
| West, 1950-1959 | 68 | 1.01% | 1 | 4 | MF20 | MF20 |
| West, 1960-1969 | 247 | 3.68% | 4 | 13 | MF21 | MF21 |
| West, 1970-1979 | 248 | 3.69% | 4 | 13 | MF22 | MF22 |
| West, 1980-1989 | 505 | 7.52% | 9 | 27 | MF23 | MF23 |
| West, 1990-2001 | 222 | 3.31% | 4 | 12 | MF24 | MF24 |
| | 6713 | 100.00% | 377 | 363 | | |

**Non-Residential Subgroups**:

| | No. of Accounts | Percent of Group | No. of Sites to be Surveyed | No. of Records in Sample | Group Number |
|---|---|---|---|---|---|
| 4200, East | 34 | 3.92% | 2 | | NR1 |
| 4200, West | 834 | 96.08% | 55 | 570 | NR2 |
| | 868 | | | | |
| 5300, East | 467 | 23.00% | 14 | | NR3 |
| 5300, West | 1563 | 77.00% | 46 | 600 | NR4 |
| | 2030 | | | | |
| 5400, East | 43 | 8.74% | 5 | | NR5 |
| 5400, West | 449 | 91.26% | 50 | 492 | NR6 |
| | 492 | | | | |
| 5811 East | 20 | 8.66% | 4 | | NR7 |
| 5811, West | 211 | 91.34% | 45 | 231 | NR8 |
| | 231 | | | | |
| 5812, East | 200 | 31.06% | 22 | | NR9 |
| 5812, West | 444 | 68.94% | 50 | 644 | NR10 |
| | 644 | | | | |
| 6800, East | 686 | 25.89% | 58 | | NR11 |
| 6800, West | 1964 | 74.11% | 167 | 2250 | NR12 |
| | 2650 | | 518 | 4787 | |

19. Define three working zones for site surveys

| | Number of Addresses | |
|---|---|---|
| City | SF | MF5 |
| Alameda | 188 | 304 |
| Alamo | 62 | 5 |
| Albany | 44 | 56 |
| Berkeley | 311 | 560 |
| Castro Valley | 177 | 88 |
| Crockett | 10 | 8 |
| Danville | 245 | 27 |
| El Cerrito | 111 | 49 |
| El Sobrante | 9 | 28 |
| Emeryville | 6 | 21 |
| Hayward | 95 | 130 |
| Hercules | 70 | 32 |
| Kensington | 19 | 0 |
| Lafayette | 133 | 27 |
| Moraga | 68 | 44 |
| Oakland | 981 | 1425 |
| Orinda | 71 | 1 |

| | Number of Addresses | |
|---|---|---|
| City | SF | MF5 |
| Piedmont | 30 | 1 |
| Pinole | 61 | 35 |
| Pleasant Hill | 35 | 10 |
| Richmond | 384 | 116 |
| Rodeo | 31 | 7 |
| San Leandro | 288 | 255 |
| San Lorenzo | 95 | 23 |
| San Pablo | 76 | 102 |
| San Ramon | 128 | 90 |
| Walnut Creek | 152 | 186 |
| | 3880 | 3630 |
| **Zone 1** | | |
| Albany | 100 | |
| Berkeley | 871 | |
| Crockett | 18 | |
| El Cerrito | 160 | |
| El Sobrante | 37 | |
| Hercules | 102 | |
| Kensington | 19 | |
| Pinole | 96 | |
| Richmond | 500 | |
| Rodeo | 38 | |
| San Pablo | 178 | |
| | 2119 | |
| **Zone 2** | | |
| Alameda | 492 | |
| Emeryville | 27 | |
| Oakland | 2406 | |
| Piedmont | 31 | |
| | 2956 | |
| **Zone 3** | | |
| Alamo | 67 | |
| Castro Valley | 265 | |
| Danville | 272 | |
| Hayward | 225 | |
| Lafayette | 160 | |
| Moraga | 112 | |
| Orinda | 72 | |
| Pleasant Hill | 45 | |
| San Leandro | 543 | |
| San Lorenzo | 118 | |
| San Ramon | 218 | |
| Walnut Creek | 338 | |
| | 2435 | |

20. Develop data tables for "Appointments" and "Interview" programs
The Appointments program will be used to set up dates and times for site visits to SF, MF5 and NR customers. Its database will contain all addresses of potential participants in those groups.

The Interviews program will be used to identify potential participants in phone surveys and collect their data. Its database will contain all phone survey addresses.

*Appointments Program Database*

| | No. of Addresses in Sample |
|---|---|
| SiteSurvSF | 3880 |
| SiteSurvMF | 3630 |
| SiteSurvWarehouse | 570 |
| SiteSurvRetail | 600 |
| SiteSurvFoodSales | 492 |
| SiteSurvFastFood | 231 |
| SiteSurvRestaurants | 644 |
| SiteSurvOfficeOffices | 2250 |
| No. of Records in "Appointments" Database | **12297** |

*Interview Program Database*

| | |
|---|---|
| PhoneSurvSF | 3880 |
| PhoneSurvMF | 3770 |
| No. of Records in "Interview" Database | **7650** |

21. Develop tables for mailing of announcement letters. Mailings to be done in four batches:

**Batch 1:**
Half of PhoneSurvSF (half of the records in each individual subgroup): 1940 records
Half of PhoneSurvMF (half of the records in each individual subgroup): 1885 records
About 25% of records in each SiteSurvSF subgroup: 982 records
About 25% of records in each SiteSurvMF subgroup : 910 records
All records in SiteSurvWarehouse: 570 records
All records in SiteSurvRetail: 600 records
No. of Records in Table MailBatch1: 6887

The other three batches to be determined according to study progress

22. Revise Non-Residential tables to delete fire services
Sheila Ward noticed on 5/22/01 that several of the appointments given to EBMUD representatives were for fire services. Mike Hazinski was appraised of the situation and he gave instructions to Vivian Ling to identify fire services within the records being used for NR site visits. WRE sent Vivian a table containing the 6915 NR records; Vivian identified 993 fire services.

| Category | BCC | Initial Number of Records | Number of Identified Fire Services | Number of Records Selected for Site Visits | FS Within Records Selected for Site Visits | Number of FS Already Contacted by 5/23 | Records Deleted from Site Visits Tables | Records Remaining in Site Visits Tables | Number of Site Surveys Required | Ratio of Records Available to Surveys Required |
|---|---|---|---|---|---|---|---|---|---|---|
| Warehouses | 4200 | 868 | 192 | 570 | 125 | 7 | 118 | 452 | 57 | 8 |
| Retail | 5300 | 2030 | 226 | 600 | 55 | 3 | 52 | 548 | 60 | 9 |
| FoodSales | 5400 | 492 | 52 | 492 | 40 | | 40 | 452 | 55 | 8 |
| FastFood | 5811 | 231 | 9 | 231 | 6 | | 6 | 225 | 49 | 5 |
| Restaurants | 5812 | 644 | 70 | 644 | 58 | | 58 | 586 | 72 | 8 |
| Offices | 6800 | 2650 | 444 | 2250 | 261 | | 261 | 1989 | 225 | 9 |
| | | 6915 | 993 | 4787 | 545 | 10 | 535 | 4252 | 518 | |

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# East Bay Municipal Utility District
# Water Conservation Market Penetration Study

## APPENDIX C
## Enlisting Customer Participation

Customers were enlisted to participate in the market penetration study through individual telephone contacts initiated by study staff and preceded by announcement letters. The format of the announcement letters and the procedures used to initiate contact with potential study participants minimized possible sample bias.

Announcement letters did not disclose the water-conservation aspects of the study. Voluntary participation was requested in a water-use study that sought to collect data on water-using fixtures and appliances to allow the District to improve service to its customers. Participants were encouraged to participate through appeals to their sense of community service. Material incentives in the form of credits on water bills were initially considered and later discarded due to administrative and legal concerns. Five different letters were prepared to enlist customer participation, one for each of the major survey groups: telephone survey of single-family residents, telephone survey of apartment building owners and managers, site survey of single-family homes, site survey of apartment buildings, and site survey of non-residential sectors. Announcement letters were mailed in five batches to minimize the time between the customer's receipt of the letter and the initial telephone contact from an appointment scheduler. A sample of each letter is included in Appendix C.

Telephone calls to potential study participants were made not only during working hours but also on weekends and weekday evenings. Weekday calls were generally made between 10 AM and 8 PM. Weekend calls were made between 9 AM and 6 PM. The after-hour and weekend calls sought to avoid sample bias by including all segments of the customer base, not only those customers home during working hours.

Telephone callers encouraged customers to participate in the study by stressing that the data collection effort was important to the District and would take only a few minutes of their time (five minutes for telephone interviews, 20-30 minutes for single family homes, 45 minutes to an hour for multi-family buildings and businesses). Material incentives were offered to potential participants in single and multi-family site surveys in the form of water conservation kits (low-flow showerhead, kitchen and bathroom faucet aerators) and copies of the District's "*Water Conserving Plants and Landscapes*" book. Multi-family owners/managers and non-residential customers were encouraged to participate in the site surveys by offering them free assessments of their water use efficiency with a view to decreasing their water bills in the long term.

SAMPLE TELEPHONE INTERVIEW ANNOUNCEMENT LETTER – SINGLE-FAMILY

**April 2001**
**Re: Upcoming Water Use Survey**

Dear Customer:

Between May and July 2001 your water provider, the East Bay Municipal Utility District (EBMUD) will be conducting telephone surveys on water use as part of its ongoing efforts to ensure high-quality water service to all customers. The surveys will help assess general water use practices and the types of water-using appliances and fixtures used in homes in the EBMUD service area. This information will help EBMUD plan for the future water needs of residential customers.

### Your Participation is Important!

Your home is one of several randomly selected to participate in a brief telephone survey, and your input will be vital to helping EBMUD collect accurate information. Participation is voluntary and will take about five minutes of your time.

### Benefits to You!

The information collected with your help will allow EBMUD to plan for the future with a better understanding of your needs as a consumer of high-quality water. Knowing your needs will help us keep your water and energy costs as low as possible.

### Next Steps

Within the next week, an EBMUD representative will call you to conduct the telephone survey on water usage.

### For More Information

Please feel free to call the EBMUD project information number at (510)839-6456 if you have any questions about the survey process.

We look forward to your participation in this study. Thank you for your consideration.

Sincerely,

Artis L. Dawson
Director of Administration

SAMPLE TELEPHONE INTERVIEW ANNOUNCEMENT LETTER – APARTMENT BLDG

**April 2001**

**Re: Upcoming Water Use Survey**

Dear Customer:

Between May and July 2001 your water provider, the East Bay Municipal Utility District (EBMUD) will be conducting telephone surveys on water use as part of its ongoing efforts to ensure high quality water service to all customers. The surveys will help assess general water use practices and the types of water-using appliances and fixtures used in homes in the EBMUD service area. This information will help EBMUD plan for the future water needs of residential customers.

### Your Participation is Important!

Your building is one of several randomly selected to participate in this survey, and your input will be vital to helping EBMUD collect accurate information. We would like to conduct this telephone survey with the building owner or manager. Participation is voluntary and will take approximately 5-10 minutes.

### Benefits to You!

The information collected with your help will allow EBMUD to plan for the future with a better understanding of your needs as a consumer of high-quality water. Knowing your needs will help us keep your water and energy costs as low as possible.

### Next Steps

Within the next week, an EBMUD representative will call you to conduct the telephone survey on water usage.

### For More Information

Please feel free to call the EBMUD project information number at (510)839-6456 if you have any questions about the survey process.

We look forward to your participation in this study. Thank you for your consideration.

Sincerely,

Artis L. Dawson
Director of Administration

SAMPLE SINGLE-FAMILY SITE SURVEY ANNOUNCEMENT LETTER

**April 2001**

**Re: Upcoming Water Use Survey**

Dear Customer:

Between May and July 2001 your water provider, the East Bay Municipal Utility District (EBMUD) will be conducting water use surveys as part of its ongoing efforts to ensure high quality water service to all customers. Surveys will involve determining the types of water-using appliances and fixtures used in homes in the EBMUD service area. This information will help EBMUD plan for the future water needs of residential customers.

### Your Participation is Important!

Your home is one of several randomly selected to participate in this survey, and your input will be vital to helping EBMUD collect accurate information. Participation is voluntary and will take approximately 30 minutes of your time during an appointment to be scheduled at your convenience.

### Benefits to You!

The information collected with your help will allow EBMUD to plan for the future with a better understanding of your needs as a consumer of high-quality water. Knowing your needs will help us keep your water and energy costs as low as possible.

### Next Steps

In the next few weeks, an EBMUD representative will call you to schedule an appointment for your home survey. To conduct the survey, a surveyor will visit your home and examine water-using appliances such as toilets, showerheads, washing machines and irrigation systems to determine their rate of water use and whether any leaks exist.

### For More Information

Please feel free to call the EBMUD project information number at (510)839-6456 if you have any questions about the survey process.

We look forward to your participation in this study. Thank you for your consideration.

Sincerely,

Artis L. Dawson

Director of Administration

SAMPLE MULTI-FAMILY SITE SURVEY ANNOUNCEMENT LETTER

**April 2001**

**Re: Upcoming Water Use Survey**

Dear Customer:

Between May and July 2001 your water provider, the East Bay Municipal Utility District (EBMUD) will be conducting water use surveys as part of its ongoing efforts to ensure high quality water service to all customers. Surveys will involve determining the types of water-using appliances and fixtures used in multi-family buildings in the EBMUD service area. This information will help EBMUD plan for the future water needs of residential customers.

### Your Participation is Important!

Your building is one of several randomly selected to participate in this survey, and your input will be vital to helping EBMUD collect accurate information. We would like to conduct this onsite survey with the building owner or manager. Participation is voluntary and will take approximately one hour during an appointment to be scheduled at your convenience.

### Benefits to You!

The information collected with your help will allow EBMUD to plan for the future with a better understanding of your needs as a consumer of high-quality water. Knowing your needs will help us keep your water and energy costs as low as possible.

### Next Steps

In the next few weeks, an EBMUD representative will call you to schedule an appointment for your water use survey. A surveyor will visit your building, ask you a few questions, and examine water-using appliances such as toilets, showerheads, washing machines and irrigation systems to determine their rate of water use and whether any leaks exist.

### For More Information

Please feel free to call the EBMUD project information number at (510)839-6456 if you have any questions about the survey process.

We look forward to your participation in this study. Thank you for your consideration.

Sincerely,

Artis L. Dawson
Director of Administration

SAMPLE NON-RESIDENTIAL SITE SURVEY ANNOUNCEMENT LETTER

**April 2001**

**Re: Upcoming Water Use Survey**

Dear Customer:

Between May and July 2001 your water provider, the East Bay Municipal Utility District (EBMUD) will be conducting water use surveys as part of its ongoing efforts to ensure high quality water service to all customers. Surveys will involve determining the types of water-using appliances and fixtures used in non-residential facilities in the EBMUD service area. This information will help EBMUD plan for the future water needs of industrial, commercial, and institutional customers.

### Your Participation is Important!

Your water account is one of several randomly selected to participate in this survey, and your input will be vital to helping EBMUD collect accurate information. We would like to conduct this onsite survey with the facility manager or building engineer. Participation is voluntary and will take about one hour during an appointment to be scheduled at your convenience.

### Benefits to You!

The information collected with your help will allow EBMUD to plan for the future with a better understanding of your needs as a consumer of high-quality water. Knowing your needs will help us keep your water and energy costs as low as possible.

### Next Steps

In the next few weeks, an EBMUD representative will call you to schedule an appointment for your water use survey. A surveyor will visit your establishment and examine water-using appliances such as toilets, showerheads, washing machines and irrigation systems to determine their rate of water use and whether any leaks exist.

### For More Information

Please feel free to call the EBMUD project information number at (510)839-6456 if you have any questions about the survey process.

We look forward to your participation in this study. Thank you for your consideration.

Sincerely,

Artis L. Dawson
Director of Administration

# East Bay Municipal Utility District
# Water Conservation Market Penetration Study

## APPENDIX D
## Data Collection Forms

### Telephone Interviews

#### Opening Statement

> Hello, I'm calling from East Bay MUD, your water provider. We are conducting telephone surveys on water usage and you were randomly selected to participate in this study. I would like to ask you a few questions on a confidential basis; your participation is voluntary; this should take under five minutes.

#### Interview Questions – Single-Family

1. What is your guess as to the number of gallons of water your household uses daily both inside and outside your home?

2. How important do you think it is for household consumers in Northern California to conserve water on a regular basis?

I will now read you a list of water conserving actions. Please let me know if any of these actions were taken in your household last year.

3. Take shorter showers
4. Install low-flow showerheads
5. Install displacement devices in toilets
6. Install ultra-low-flush toilets
7. Use garbage disposal less often
8. Use dishwasher less often, and/or fuller loads
9. Use washing machine less often and/or fuller loads
10. Repair leaks or drips in faucet or toilet
11. Wash car less frequently
12. Water lawn and shrubs less often
13. Water lawn and shrubs evenings and early mornings
14. Install drought resistant/low water use landscaping
15. Some other water conservation measure.

16. Overall, how much effort would you say your household makes to conserve water?

17. What is your primary reason for taking action to conserve water?

18. Do you think you need additional information on how to conserve water in and around your home?

Now I am going to read some statements. Please let me know for each one whether you strongly disagree, somewhat disagree, somewhat agree, strongly agree, or don't know. I will remind you of the responses if you need me to.

19. Making efforts to conserve water is an inconvenience.
20. I am willing to make efforts to conserve water if it will save me money on my water bill.
21. I am willing to conserve water to help protect the environment.
22. I am willing to conserve water to prevent future shortages during drought conditions.

If you were to receive a free 'water-saver kit' that contained water and energy saving showerheads, bathroom and kitchen faucet aerators and toilet tank inserts, would you install:

23. The water and energy saving showerheads?
24. The water and energy saving faucet aerators?
25. The toilet tank inserts?

If you received a rebate from EBMUD, would you consider:

26. Changing plant materials in your landscaping
27. Reducing your lawn area
28. Improving the irrigation system efficiency
29. Purchasing and installing an ultra-low-flush toilet, which costs $75-300

30. What level of rebate would motivate you to purchase and install an ultra-low flush toilet?

31. If your water utility would provide a free 'home water survey' program where a trained employee comes to your home and helps to identify water saving opportunities, would you have it done in your household?

32. Would you consider purchasing and installing a high-efficiency clothes washer, which may cost $600, if you received a rebate from EBMUD?

33. What level of rebate would motivate you to purchase and install a high-efficiency clothes washer?

34. Do you know what a graywater system is?
    [Graywater is untreated household waste water which has not come into contact with toilet or kitchen waste and is often used for watering landscaping or gardens]

35. Would you consider installing a graywater system?

36. To conserve water would you prefer to change your household's water use habits or install water-saving equipment?

37. How many people live in your household?

38. Which one of the following categories includes your total annual household income? Please stop me at the right one.

End of Single-Family Interview

**Interview Questions – Multi-Family**

1. Are you the: Building Owner, Building Manager, Tenant, Other?
2. How many housing units are there on this property?

How many units are:

3. Efficiency/studios?
4. One bedroom?
5. Two bedroom?
6. Three bedroom?
7. Four or more bedrooms?

8. What is the average housing unit occupancy rate?
9. How important do you think it is for building owners/managers in Northern California to promote water conservation at their sites?

I will now read you a list of water conserving actions. Please let me know if any of these actions were taken in your building last year.

10. Install low-flow showerheads
11. Install water displacement devices in toilets
12. Install ultra-low-flush toilets
13. Repair leaks or drips in faucets or toilets
14. Restrict car washing on premises
15. Water lawn and shrubs less often
16. Water lawn and shrubs evenings and early mornings
17. Install drought resistant/low water use lansdcaping
18. Limited spa/pool use
19. Some other water conservation measure

20. Overall, how much effort would you say your building management makes to conserve water?
21. What is building management's primary reason for taking action to conserve water?

22. Do you think your building management needs additional information on how to conserve water in and around the property?

Now I am going to read some statements. Please let me know for each one whether you strongly disagree, somewhat disagree, somewhat agree, strongly agree, or don't know. I will remind you of the responses if you need me to.

23. Making efforts to conserve water is an inconvenience.
24. We are willing to make efforts to conserve water if it will save us money on our water bill.
25. We are willing to conserve water to help protect the environment.
26. We are willing to conserve water to prevent future shortages during drought conditions.

If you were to receive free 'water-saver kits' that contained water and energy saving showerheads, faucet aerators and toilet tank inserts, would you install:

27. The water and energy saving showerheads?
28. The water and energy saving faucet aerators?
29. The toilet tank inserts?

If rebates were offered for improved efficient water use, would your management consider taking any of the following actions on your landscaping?

30. Changing plant materials?
31. Reducing the lawn area?
32. Improving irrigation system efficiency?

33. Would your management consider purchasing and installing ultra-low-flush toilets, which costs $75-300, if EBMUD offered a rebate per toilet?
34. What level of rebate per toilet would motivate your management to purchase and install ultra-low flush toilets?
35. Would your management consider purchasing and installing high-efficiency clothes washers, which may cost $600 each, if EBMUD offered a rebate per washer?
36. What level of rebate per washer would motivate your management to purchase and install high efficiency washers?
37. If your water utility would provide a free "home water survey" program where a trained employee comes to your building and helps to identify water saving opportunities, would your management have it done in your building?
38. Do you know what a gray water system is?
    [Gray water is untreated household waste water which has not come into contact with toilet or kitchen waste and is often used for watering landscaping or gardens]
39. Would your management consider installing a gray water system?

## Survey – Fill blank or circle answer where appropriate

1. How many years have you lived at this residence? #_____

2. How many people live in the residence per age group?
_____Under 12 _____12 to 18 _____Over 18

3. List the total number of toilets at this location. #_____

4. For each toilet, list:

| | #1 | #2 | #3 | #4 | #5 |
|---|---|---|---|---|---|
| Make/ Model | | | | | |
| Year Manufactured/ Installed | | | | | |
| Design Flush Volume (1.6, 3.5, or 5+ gallons per flush) | | | | | |
| Tank Volume (L x W x H inches) | | | | | |
| Conservation device? (None=0; Dam=1 Displacement=2 Quick closing flapper=3 Water level adjustment=4) | | | | | |
| Leaks (Yes/No/DK) | | | | | |

5. List the total number of shower stalls at this location. #_____

6. For each shower stall, list:

| Shower Stall # | Showerhead # | Gallons per minute | Showerhead type: *Atomizing = 1 Stream/spray = 2* | Showerhead type: *Fixed = 1 Handheld = 2* | Showerhead shut-off button *(Yes/No/DK)* | Leaks: *None = 0, Showerhead = 1 Diverter Valve = 2 Shutoff Valve = 3* |
|---|---|---|---|---|---|---|
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |

7. List the total number of bathtubs at this location. #_____

8. For each bathtub, list:

| Bathtub # | Length (inches) | Width (inches) | Avg. Depth (inches) | Jacuzzi/Spa *(Yes/No/DK)* |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |

9. List the total number of faucets at this location. #_____

10. For each faucet, list:

| Faucet # | Faucet type: *Kitchen = 1; Bathroom = 2; Utility = 3; Other = 4* | Gallons per minute | Aerator attached *(Yes/No/DK)* | Leaks *(Yes/No/DK)* |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |

11. List the total number of dishwashers at this location. #_____

12. For each dishwasher, list:

| Dishwasher # | Manufacturer/Make/Model | Water efficiency setting: *(Yes/No/DK)* |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |

13. List the total number of clothes washing machines at this location. #_____

14. For each clothes washing machine, list:

| Washing Machine # | Manufacturer/Make/Model | Type of washer: *Standard Efficiency = 1* *High Efficiency = 2* | Water saving/load size selection feature *(Yes/No/DK)* |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

15. Does this location use recirculating hot water? Y / N / DK

16. Does this location use commercially-delivered bottled water? Y / N / DK

17. Does the refrigerator have a built-in water dispenser? Y / N / DK

18. Does the refrigerator have a built-in icemaker? Y / N / DK

19. Does this location have a water softener? Y / N / DK
If yes,
    a. What is the make/model? _____
    b. What is the capacity of unit (tank volume)? ____gal
    c. How often is the unit recharged? _____months

20. Does this location have "hot water on demand" feature (point-source water heaters)? Y / N / DK

21. Does this location operate any water purification units? Y / N / DK
If yes, for each unit list:

| Type: *Reverse Osmosis=1*<br>*Carbon filters=2; Other media filters=3* | Number of units | Location: *Kitchen=1*<br>*Bathroom=2; Other=3* |
|---|---|---|
| | | |
| | | |
| | | |

22. Does this location have any evaporative coolers? Y / N / DK
If yes,
    a. How many months per year are the evaporative coolers most commonly used? #_____
    b. Which months are the evaporative coolers most commonly used?

Jan Feb Mar Apr May June July Aug Sep Oct Nov Dec DK

23. Are there any water pressure regulators off the incoming line at this location? Y / N / DK
If yes,
    a. Where are the pressure regulators used?
    …….Indoor
    …….Outdoor
    …….Both

24. Are there any other indoor water-using appliances/fixtures? Y / N / DK
If yes,
    a. Please list type and quantity

Type Quantity

_____

_____

_____

**Outdoor Water Uses**

25. How many swimming pools are at this location? #_____
    a. If swimming pool, list:

| Swimming Pool # | Length (feet) | Width (feet) | Average depth (feet) | Location: *Indoor = 1; Outdoor = 2* | Pool cover? *(Yes/No/DK)* |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | | | | | |

26. How many outdoor spas/jacuzzis are at this location? #_____
    a. If spa/jacuzzi, list:

| Spa # | Length (feet) | Width (feet) | Average depth (feet) | Location: *Indoor = 1; Outdoor = 2* | Spa cover? *(Yes/No/DK)* |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |

27. How many fountains or ponds are at this location? #_____
    a. If fountain or pond, list:

| Fountain/pond # | Length (feet) | Width (feet) | Average depth (feet) | Recirculating? *(Yes/No/DK)* |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

28. Does this location have a cistern or storm water harvesting system? Y / N / DK

29. Does this location use a graywater system? Y / N / DK
30. Does this location use water from a well? Y / N / DK
    If yes, is the well water used for:
    a. Potable (drinking, sanitary needs) Y / N / DK
    b. Irrigation needs Y / N / DK
    c. Swimming pool/spa Y / N / DK

| **Landscaping** | **Front Yard** | **Back Yard** |
|---|---|---|
| 31. Square footage of total landscapable area? | _____ | _____sq. ft. |
| 32. Square footage of landscapable area that is irrigated? | _____ | _____sq. ft. |
| 33. Square footage of lawn area? | _____ | _____sq. ft. |

34. Percent of landscaped area that uses drip irrigation? _____ _____%

35. Who is responsible for maintaining landscaped areas?
……..Tenant
……..Owner/building manager (if other than tenant)
……..Landscape maintenance service/contracted gardener
……..Other _____

---

**Irrigation Systems** **Front Yard** **Back Yard**

36. What type of irrigation system is used (check most appropriate)

| | Front Yard | Back Yard |
|---|---|---|
| Hose alone | _____ | _____ |
| Hose & sprinkler | _____ | _____ |
| Hose & sprinkler with timer | _____ | _____ |
| In-ground system, with controller | _____ | _____ |
| In-ground system, without controller | _____ | _____ |
| Sprinklers with spray-type head | _____ | _____ |
| Sprinkler of the Impact/Rotor type | _____ | _____ |
| Sprinklers of the Stream/Rotor type | _____ | _____ |
| Drip Irrigation | _____ | _____ |
| Subsurface Irrigation | _____ | _____ |
| Other | _____ | _____ |

37. Water pressure at hose bib? _____PSI/DK

---

**For Automatic System Only** **Front Yard** **Back Yard**

38. If irrigation system has controller, how many controllers _____ _____#

39. For each controller identified in Q. 38, list the following:

| Controller # | Location: *Front = 1 Back = 2* | Manufacturer/ make/model | Type of controller: *Mechanical = 1 Digital = 2 Other = 3* | No. of stations | Programmable multiple start time capabilities: *(Yes/No/DK)* | Type of calendar clock: *7-day = 1 14-day = 2 30-day = 3 other = 4* | Moisture sensor: *(Yes/No/DK)* | Rain Sensor: *(Yes/No/DK)* |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

40. Are there any other outdoor water-using appliances/fixtures? Y / N / DK
If yes,
a. Please list type and quantity

| Type | Quantity |
|---|---|
| | |
| | |
| | |

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41. For statistical purposes, which of the following groups includes your total household income for the last year? Let me know when I get to the right one.

1 …….0 - $20,000
2 ……$20,000 - $40,000
3 ……$40,000 - $60,000
4 ……$60,000 - $80,000
5 ……$80,000 - $100,000
6 ……$100,000 - $150,000
7 ……$150,000 or more
8 ……Don't know
9……..…Declined to respond #_____

42. Number of showerheads left with customer

43. Number of faucet aerators left with customer

**EAST BAY MUNICIPAL UTILITY DISTRICT**
**WATER CONSERVATION MARKET PENETRATION STUDY**
**MULTIFAMILY SITE SURVEY**

## Survey – Fill blank or circle answer where appropriate

1. Name, title, and phone number of person assisting in the survey:

   Name _____ Title _____

   Phone Number _____

2. The person participating in the survey is the:
   1 ……Building Owner
   2 ……Building Manager (if other than owner)
   3 ……Tenant (if other than owner/manager)
   4 ……Other _____ #_____

3. Type of property is:
   1……2-4 units per structure
   2 ……...5-9 units per structure
   3 ……...10 or more units per structure
   4 ……...Mobile homes
   5 ……...Other _____ #_____

4. How many buildings are on the property? #_____

5. How many housing units does this water account represent? #_____

6. How many housing units are:

   a. Efficiency/studios #_____ Avg. Rent $_____
   b. One-bedroom #_____ Avg. Rent $_____
   c. Two- bedroom #_____ Avg. Rent $_____
   d. Three- bedroom #_____ Avg. Rent $_____
   e. More than three-bedroom #_____ Avg. Rent $_____

7. What is the average housing unit occupancy rate? _____%

8. List the total number of toilets at this location? #_____

9. Have any of the existing toilets been retrofitted with either ultra-low-flush toilets or toilet conservation devices? Y / N / DK
   If yes, approximately how many toilets:
   a. Are ultra-low flush? #_____
   b. Have toilet conservation devices? #_____

10. List the total number of shower stalls at this location. #_____

11. Have any of the existing showerheads been retrofitted with low-flow showerheads or flow restrictors? Y / N / DK

If yes, approximately how many showerheads are retrofitted:

a. With low-flow showerheads? #_____

b. With flow restrictors? #_____

12. List the total number of bathtubs at this location. #_____

13. List the total indoor faucets at this location. #_____

14. Are plumbing fixtures regularly inspected for leaks?
……..No, only when tenant vacates premises
……..No, only when problems are reported
……..Yes, periodic inspections scheduled
……..Other_____ #_____

15. List the total number of dishwashers at this location. #_____

16. How many of the housing units have clothes washing machine hook-ups? #_____

17. List the total number of clothes washing machines at this location. #_____

18. Is there a common laundry facility for residents? Y / N / DK
If yes,
a. How many washing machines are available in a commons area? #_____
b. Of the washing machines in the commons area, how many are high-efficiency? #_____
c. Are the clothes washers purchased? ☐ Are they leased? ☐
d. Is the common area leased? Y / N / DK

19. How many reverse osmosis (R/O) units at this location? (0, #, DK) _____

20. Does this location use recirculating hot water? Y / N / DK

21. How many units use commercially-delivered bottled water? (0, #, DK) _____

22. How many refrigerators have built-in water dispensers? (0, #, DK) _____

23. How many refrigerators have built-in icemakers? (0, #, DK) _____

24. How many water softeners at this location? (0, #, DK) _____

25. How many hot tap primers (point source water heaters) at this location? (0, #, DK) _____

26. What types of cooling/air conditioning systems do you use at this location?
☐ Evaporative coolers ☐ Water-cooled system ☐ Air-cooled systems

27. How many evaporative coolers at this location? (0, #, DK) _____
a. How many months per year are the evaporative coolers most commonly used? _____
b. Which months are the evaporative coolers most commonly used?

Jan Feb Mar Apr May June July Aug Sep Oct Nov Dec DK

28. How many cooling tower units are at this location? #_____
    a. Please specify for each cooling tower at location
    b. Which months is the primary unit cooling tower operating at full capacity?

    Jan Feb Mar Apr May June July Aug Sep Oct Nov Dec DK

29. How many water pressure regulators are there off the incoming line? (0, #, DK) _____
    a. For indoor use #_____
    b. For outdoor use #_____
    c. For both indoor and outdoor use #_____

30. Is car washing by tenants permitted on the premises? Y / N / DK

31. Are there any other indoor water-using appliances/fixtures? Y / N / DK
    If yes, please list type and quantity

    Type Quantity

    _____

    _____

*The goal of this study is to survey as many apartments as there are floorplans with different numbers of fixtures/appliances.*

32. For each toilet in a sample of apartment units, list (use back of sheet if necessary):

| | #1 | #2 | #3 | #4 | #5 |
|---|---|---|---|---|---|
| Make/ Model | | | | | |
| Year Manufactured/ Installed | | | | | |
| Design Flush Volume (1.6, 3.5, or 5+ gallons per flush) | | | | | |
| Tank Volume (L x W x H inches) | | | | | |
| Conservation device? (None=0; Dam=1 Displacement=2 Quick closing flapper=3 Water level adjustment=4) | | | | | |
| Leaks (Yes/No/DK) | | | | | |

33. For each shower stall in a sample of apartment units, list:

| Shower Stall # | Showerhead # | Type of unit:<br>*Effic = 1*<br>*1 bedroom = 2*<br>*2 bedroom = 3*<br>*3 + bedroom = 4* | Gallons per minute | Showerhead type:<br>*Atomizing = 1*<br>*Stream/spray = 2* | Showerhead type:<br>*Fixed = 1*<br>*Handheld = 2* | Showerhead shut-off button<br>*(Yes/No/DK)* | Leaks<br>*None = 0*<br>*Head = 1*<br>*Valve = 2*<br>*Diverter = 3* |
|---|---|---|---|---|---|---|---|
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34. For each bathtub in a sample of apartment units, list:

| Bathtub # | Type of unit:<br>*Effic = 1*<br>*1 bedroom = 2*<br>*2 bedroom = 3*<br>*3 + bedroom = 4* | Length (inches) | Width (inches) | Avg. Depth (inches) | Leaks<br>*None = 0*<br>*Diverter = 1* |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
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35. For each faucet in a sample of apartment units, list:

| Faucet # | Location:<br>*Tenant unit = 1*<br>*Common area = 2* | Type of unit:<br>*Effic = 1*<br>*1 bedroom = 2*<br>*2 bedroom = 3*<br>*3 + bedroom = 4* | Faucet type:<br>*Kitchen = 1*<br>*Bathroom = 2*<br>*Utility = 3*<br>*Other = 4* | Gallons per minute | Aerator attached<br>*(Yes/No/DK)* | Leaks<br>*(Yes/No/DK)* |
|---|---|---|---|---|---|---|
| | | | | | | |
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36. For each dishwasher in a sample of apartment units, list:

| Dishwasher # | Type of unit:<br>*Effic = 1; 1 bedroom = 2*<br>*2 bedroom = 3; 3 + bedroom = 4* | Manufacturer/Make/Model | Water efficiency setting |
|---|---|---|---|
| | | | |
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37. For each clothes washing machine in a sample of apartment units, list:

| Washing Machine # | Location:<br>*Tenant unit = 1*<br>*Common area = 2* | Type of unit:<br>*Effic = 1*<br>*1 bedroom = 2*<br>*2 bedroom = 3*<br>*3 + bedroom = 4* | Manufacturer/Make/Model | Type of washer:<br>*Standard Efficiency=1*<br>*High-effic = 2*<br>*Multi-load=3* | Water saving/load size selection feature<br>*(Yes/No/DK)* |
|---|---|---|---|---|---|
| | | | | | |
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38. For each reverse osmosis unit in a sample of apartment units, list:

| R/O # | Type of unit:<br>*Effic = 1; 1 bedroom = 2*<br>*2 bedroom = 3; 3 + bedroom = 4* | Capacity (gallons) | Automatic shutoffs?<br>*(Yes/No/DK)* |
|---|---|---|---|
| | | | |
| | | | |

39. For each water softener in a sample of apartment units, list:

| Water Softener # | Location:<br>*Tenant unit = 1*<br>*Common area = 2* | Type of unit:<br>*Effic = 1; 1 bedroom = 2;*<br>*2 bedroom = 3; 3 + bedroom = 4* | Manufacturer/Make/Model | Capacity of unit (tank volume in gallons) |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

40. For each hot tap primer (point source water heater) in a sample of apartment units, list:

| Hot tap primer # | Location:<br>*Tenant unit = 1*<br>*Common area = 2* | Type of unit:<br>*Effic = 1; 1 bedroom = 2*<br>*2 bedroom = 3; 3 + bedroom = 4* | Location:<br>*Kitchen = 1; Bathroom = 2*<br>*Utility = 3; Other = 4* | Type of System:<br>*Tank = 1*<br>*Other = 2* |
|---|---|---|---|---|
| | | | | |
| | | | | |
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| | | | | |
| | | | | |

**Outdoor Water Uses**

41. How many swimming pools are at this location? #_____
    b. If swimming pool, list:

| Swimming Pool # | Length (feet) | Width (feet) | Average depth (feet) | Location: *Indoor = 1; Outdoor = 2* | Pool; cover? *(Yes/No/DK)* |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

42. How many spas/jacuzzis are at this location? #_____
    b. If spa/jacuzzi, list:

| Spa # | Length (feet) | Width (feet) | Average depth (feet) | Location: *Indoor = 1; Outdoor = 2* | Spa cover? *(Yes/No/DK)* |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

43. How many fountains or ponds are at this location? #_____
    a. If fountain or pond, list:

| Fountain/pond # | Length (feet) | Width (feet) | Average depth (feet) | Recirculating? *(Yes/No/DK)* |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

44. Does this location have a cistern or storm water harvesting system? Y / N / DK

45. Does this location use a graywater system? Y / N / DK

46. Does this location use water from a well? Y / N / DK
If yes, is the well water used for:

a. Potable (drinking, sanitary needs) Y / N / DK

b. Irrigation needs Y / N / DK

c. Swimming pool/spa Y / N / DK

---

**Landscaping**

47. Square footage of total landscapable area? _____sq. ft.

48. Square footage of landscapable area that is irrigated? _____sq. ft.

49. Square footage of lawn area? _____sq. ft.

50. Percent of landscaped area that uses drip irrigation? _____%

51. Who is responsible for maintaining landscaped areas?
……..Tenant
……..Owner/building manager (if other than tenant)
……..Landscape maintenance service/contracted gardener
……..Other _____

---

**Irrigation Systems**

52. What type of irrigation system is used (check most appropriate)

Hose alone _____
Hose & sprinkler _____
Hose & sprinkler with timer _____
In-ground system, with controller _____
In-ground system, without controller _____
Sprinklers with spray-type head _____
Sprinkler of the Impact/Rotor type _____
Sprinklers of the Stream/Rotor type _____
Drip Irrigation _____
Subsurface Irrigation _____
Other _____

53. Water pressure at hose bib? _____PSI/DK

**For Automatic System Only**

54. If irrigation system has controller, how many controllers? _____#

55. For each controller identified in Q. 54, list the following:

| Controller # | Location: *Front = 1 Back = 2* | Manufacturer/ make/model | Type of controller: *Mechanical = 1 Digital = 2 Other = 3* | No. of stations | Programmable multiple start time capabilities: *(Yes/No/DK)* | Type of calendar clock: *7-day = 1; 14-day = 2; 30-day = 3; other = 4* | Moisture sensor: *(Yes/No/ DK)* | Rain Sensor: *(Yes/No /DK)* |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
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| | | | | | | | | |

56. Are there any other outdoor water-using appliances/fixtures? Y / N / DK
If yes, please list type and quantity

| Type | Quantity |
|---|---|
| | |
| | |
| | |

57. Number of showerheads left with customer

58. Number of faucet aerators left with customer

**EAST BAY MUNICIPAL UTILITY DISTRICT**
**WATER CONSERVATION MARKET PENETRATION STUDY**
**MASTER NONRESIDENTIAL SITE SURVEY**

## Survey – Fill blank or circle answer where appropriate

1. Name, title, and phone number of person assisting in the survey:

   Name _____ Title _____

   Phone Number _____

2. Please circle primary type of establishment:

   Warehouse  Retail Trade  Food Sales  Fast Food  Restaurant  Offices

3. Check type of use:
   _____Mixed residential/commercial
   _____ Mixed commercial
   _____Other _____

Please note (with a checkmark) if the establishment has any of the specified water uses/appliances:

| 4. Domestic/sanitary use (drinking fountains, sinks, rest rooms, etc.) | YES | NO | DK |
|---|---|---|---|
| a. For employee use | | | |
| b. For customer or public use | | | |
| 5. Facility cooling and heating | | | |
| a. Cooling towers | | | |
| b. Evaporative coolers | | | |
| c. Air washers | | | |
| d. Humidifiers | | | |
| e. Boilers | | | |
| 6. Once-through cooling | | | |
| a. Air conditioners | | | |
| b. Air compressors | | | |
| c. Other | | | |
| d. Other | | | |
| 7. Laundry | | | |
| a. Commercial washing machines | | | |
| b. Self-service washing machines (for customers or public use) | | | |
| c. Dry cleaning | | | |
| 8. Kitchen facilities | | | |
| a. Dishwashing machines | | | |
| b. Garbage disposers | | | |

| 9. Ice-making machines | YES | NO | DK |
|---|---|---|---|
| a. Water-cooled ice-making machines | | | |
| b. Air-cooled ice-making machines | | | |
| 10. Landscape and decorative uses | | | |
| 11. Water features | YES | NO | DK |
| a. Swimming pools | | | |
| b. Jacuzzis/Spas | | | |
| c. Fountains | | | |
| 12. Washing and Sanitation | | | |
| a. General facility washdown and clean-up | | | |
| b. Vehicle washes | | | |
| 13. Process water purification equipment | | | |
| a. Water softeners | | | |
| b. Water filters | | | |
| c. Reverse osmosis units | | | |
| d. Deionization/ion exchange units | | | |
| 14. Wastewater pretreatment equipment | | | |

15. Are there any other purposes/appliances for which water is used at this facility? Y / N / DK
a. If yes, please specify:

_____

_____

16. Does this facility recycle water for any purpose? Y / N / DK
a. If yes, for what purpose is water recycled?

_____

_____

_____

## Domestic/Sanitary Plumbing Features

17. How many bathroom facilities does this location have? #_____

18. Number of toilets:
Gravity Flush #_____
Pressure Assisted #_____
Flushometer Valve #_____

19. Number of urinals:
    Siphon #_____
    Washdown #_____
    Waterless #_____

20. Number of bathroom faucets? #_____

21. Number of kitchen faucets? #_____

22. Number of utility (general cleaning) faucets? #_____

22b. Number of showers? #_____

23. Number of drinking fountains? #_____

24. For a sample of toilets (up to 6), list:

| | #1 | #2 | #3 | #4 | #5 | #6 |
|---|---|---|---|---|---|---|
| Make/ Model | | | | | | |
| Year Made/ Installed | | | | | | |
| Design Flush Volume (1.6, 3.5, or 5+ gallons per flush) | | | | | | |
| Tank Volume (L x W x H inches) | | | | | | |
| Conservation device? (None=0; Dam=1 Displacement=2 Quick closing flapper=3 Water level adjustment=4) | | | | | | |
| Type: Gravity Flush=1 Pressure Assisted=2 Flushometer=3 | | | | | | |
| Leaks (Yes/No/DK) | | | | | | |

25. For a sample of urinals (up to 8), list:

| Urinal # | Location: *Private = 1; Common area = 2* | Gallons per flush | Type: *Siphon=1; Washdown=2; Waterless=3* | Leaks (Yes/No/DK) |
|---|---|---|---|---|
| | | | | |
| | | | | |
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| | | | | |
| | | | | |

26. For a sample of faucets (up to 8), list:

| Faucet # | Location:<br>Private = 1<br>Common area = 2 | Faucet type:<br>Kitchen = 1<br>Bathroom = 2<br>Utility = 3<br>Other = 4 | Gallons per minute | Aerator attached (Yes/No/DK) | Leaks (Yes/No/DK) |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
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| | | | | | |
| | | | | | |

27. For a sample of shower stalls (up to 8), list:

| Shower Stall # | Showerhead # | Gallons per minute | Showerhead type:<br>Atomizing = 1<br>Stream/spray = 2 | Showerhead type:<br>Fixed = 1<br>Handheld = 2 | Showerhead shut-off button (Yes/No/DK) | Leaks: *None = 0*<br>*Head = 1*<br>*Valve = 2*<br>*Diverter = 3* |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

28. Are there any water pressure regulators off the incoming line at this location? Y / N / DK
    a. If yes, are the pressure regulators for indoor or outdoor water use?
        _____ Indoor
        _____ Outdoor
        _____ Both

29. What is the water pressure at the highest available indoor fixture (if more than one building floor)? _____PSI

## Cooling

30. What type of space cooling is used at this facility (check one or more)?
    _____Evaporative coolers
    _____Central mechanical system with cooling towers
    _____Central mechanical system with air cooling
    _____Individual air conditioning units

31. Equipment/Process cooling: what type of equipment is cooled?

_____Computer/other electronic devices

_____Process or other

_____None

32. If equipment/process cooling exists, does the system use:

_____Evaporative coolers

_____Cooling towers

_____Air cooling

**Refer this customer to Water Conservation office? YES NO**

## RESTAURANT SUPPLEMENT

31. Year building structure originally built? Yr.____

32. Has there been any major remodeling of the original facilities? Y / N / DK
If yes, please describe:

_____

_____

34. Total (annual average, including part-time) number of employees #_____

35. What is the average number of meals served per day? #_____

36. Does the restaurant have banquet facilities? Y / N / DK

37. If restaurant has dishwashers, list:

| Dishwasher # | Manufacturer/Make/Model | Dishwasher type:<br>Stationary rack = 1<br>Conveyor rack = 2<br>Other (specify) = 3 | Rinse:<br>Water = 1; Chemical = 2 | Incoming pressure regulator:<br>(Yes/No/DK) |
|---|---|---|---|---|
| | | | | |
| | | | | |

38. If restaurant has garbage disposer, list:

| Disposer # | Manufacturer/Make/Model | Disposer type: Disposer = 1;<br>Scrapper/disposer = 2; Conveyor/disposer = 3 |
|---|---|---|
| | | |
| | | |
| | | |

39. If location has clothes washing machines, list:

| Washing Machine # | Manufacturer/Make/Model | Type of washer: *Standard efficiency=1; High efficiency=2 Large capacity (multi-load)=3* | Water saving/load size selection feature (Yes/No/DK) |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

## OFFICE BUILDING SUPPLEMENT

32. Year building structure originally built? Yr.____

33. Has there been any major remodeling of the original facilities? Y / N / DK
If yes, please describe:

_____

34. Total (annual average, including part-time) number of employees #_____

35. Number of floors in building #_____

36. Average occupancy rate: (note response below)

a. Winter_____% b. Spring_____% c. Summer_____% d. Fall_____%

37. Square footage of total building #_____

38. Of the total building square footage, what percent is for:
a. Living quarters _____%
b. Retail establishment _____%
c. Restaurant/food service _____%
d. Professional or government services offices _____%
e. Other, specify _____ _____%
f. Other, specify _____ _____%

39. If some of the building square footage is for retail establishment, please describe the types of retail establishments (e.i. photo lab, clothing stores, gift shops, etc)

_____

_____

_____

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# East Bay Municipal Utility District
# Water Conservation Market Penetration Study

## APPENDIX E
## Quality Control Guidelines

### Telephone Interviewers

- Do not initiate any calls until you are absolutely certain that you know how to operate the "*Interview*" computer program used to select customers and enter data. Ask trainer to go over the details of computer program operation as many times as necessary to feel comfortable with its use.
- Do not attempt to make any changes or circumvent the operations of the "*Interview*" computer program.
- Contact the survey coordinator or WRE project manager immediately should computer program malfunction. The main number for WRE is (415)538-7838; you may alternately use WRE's Oakland number, (510) 839-6456. Discontinue work on telephone interviews until a WRE representative declares the program usable.
- Consistently use the same greeting in every call:

  > Hello, my name is _____ with the East Bay Municipal Utility District. We are conducting telephone surveys on water usage and you were randomly selected to participate in this study. I would like to ask you a few questions on a confidential basis; your participation is voluntary; this should take under five minutes.

- Be cordial, professional, and polite in every call, even when customers decline to participate in study.
- Always have referral numbers on hand for customers who request them. Customers should be referred first to the Oakland number set up specifically for this study. If they insist on a District number, refer them to Mike Hazinski at (510)287-1802 or ask them to dial the main EBMUD number and ask for the Water Conservation Division.
- Do not skip any question and do not prompt customer unless called for in the questionnaire.
- Copy the "*Interview*" program data files into a floppy disk or other backup device every time you move from your workstation.
- Make a backup copy of the "*Interview*" program data files at the end of each work session and put aside for pickup by a WRE representative.
- Provide questions/comments/suggestions to survey coordinator or project manager.

### Site Survey Personnel

- Review your route the night before and locate all addresses in the Thomas Guide. If necessary, write out directions to each location.
- Make an inventory of necessary supplies and equipment each day before initiating survey activities. You should have:
    - the day's appointment forms with attached survey sheets;
    - clipboard;
    - pens and pencils;
    - ultrasonic distance measurer;
    - pressure gage;
    - tape measure;
    - flow measuring bags;
    - timer;
    - picture ID;
    - informational flyer with referral numbers.
- Arrive promptly to every appointment. Should unexpected delays occur, contact the parties affected immediately and notify them of the length of the delay.
- Be cordial, professional, and polite when introducing yourself to customers. Conduct yourself professionally and perform all tasks expeditiously but make sure to take time to answer customers' questions and address their concerns. Do not, however, engage customers in unnecessary dialog.
- Be extremely careful when making flow measurements; avoid spills and splashes; clean up after yourself as necessary.
- Fill out every field in survey form; it is preferable to spend a few extra minutes finding an answer than to have to re-visit the same site later to complete the survey.
- Drop off completed survey forms and pick up next day's appointments and forms at the end of every shift. Field personnel shall not keep any survey forms past the day the data were collected; if forms are incomplete or visits have to be re-scheduled for any reason, field personnel shall advise survey coordinator of the problems encountered.
- Provide questions/comments/suggestions to survey coordinator or project manager.

## Appointment Schedulers

- Do not initiate any calls until you are absolutely certain that you know how to operate the "*Appointments*" computer program used to select customers and schedule appointments. Ask trainer to go over the details of computer program operation as many times as necessary to feel comfortable with its use.
- Do not attempt to make any changes or circumvent the operations of the "*Appointments*" computer program.
- Contact the survey coordinator or WRE project manager immediately should computer program malfunction. Discontinue work on appointment scheduling until the project manager declares the program usable.
- Consistently use the same greeting in every call:

  Hello, my name is _____. As you were recently notified by mail, the East Bay Municipal Utility District is visiting customers to collect data on water-using fixtures and appliances. I would like to set up an appointment to have one of our field people visit your home (building, business). Your participation in the study is of course voluntary. We will be happy to set up an appointment at your convenience; our field people will be making house calls every day of the week, including Saturdays and Sundays. What day and time would be convenient for you?

- Be cordial, professional, and polite in every call, even when customers decline to participate in study.
- Always have referral numbers on hand for customers who request them. Customers should be referred first to the Oakland number set up specifically for this study. If they insist on a District number, refer them to Mike Hazinski at (510)287-1802 or ask them to dial the main EBMUD number and ask for the Water Conservation Division.
- Fill out the date and time of the appointment very carefully. Read both back to the customer to confirm accuracy, indicating which day of the week the appointment is for.
- Print out the appointment form immediately after hanging up with customer. Do not proceed to any other task until the appointment form is printed and entered into the daily log.
- Provide questions/comments/suggestions to survey coordinator or project manager.

### Administrative Assistant

- You will be responsible for distributing appointment and survey forms to field personnel. Make sure each appointment form has the appropriate survey form stapled to it. Write the account number (second line of appointment form) on the top right hand corner of every page of survey form.
- You will be responsible for keeping a log of all appointment forms that go out of the office. Forms returned by field personnel will be checked off against the same log.
- You will be responsible for storing survey forms. Three groups of forms shall be stored: pending (yet to go out), received (completed in the field and not yet entered into computer), and completed. These files shall be up to date at all times. The survey coordinator will make quality control spot checks from these files.
- Survey forms for weekend work will have to be handed out to field personnel no later than Friday afternoon. Each Friday you will need to have packages ready for Saturday, Sunday, and Monday appointments.
- You will be responsible for entering data on survey forms into the computer database. Do not initiate data entry until you are absolutely certain that you know how to operate the "*Field Data*" computer program. Ask trainer to go over the details of computer program operation as many times as necessary to feel comfortable with its use.
- Review all entries into the computer to verify they coincide with the information on the survey form; make all necessary edits before saving the file.
- Do not attempt to make any changes or circumvent the operations of the "*Field Data*" computer program.
- Contact the survey coordinator or WRE project manager immediately should the "*Field Data*" computer program malfunction. Discontinue work on data entry until the project manager declares the program usable.
- Provide questions/comments/suggestions to survey coordinator or project manager.

# East Bay Municipal Utility District
# Water Conservation Market Penetration Study

## APPENDIX F
## Training Programs

### Telephone Surveys

District and contractor personnel were trained on how to conduct the telephone surveys. Training for the telephone surveys concentrated on the proper use of the computer program designed for that purpose. A two-hour training session was scheduled for District survey personnel. Training was conducted by the consulting team's project manager.

### Single/Multi-Family Site Surveys

Residential site surveys were assigned to consulting team personnel. They performed from four to seven surveys per day per person, working seven days a week during daylight hours. Field personnel received one day of intensive training. The survey coordinator and the project manager provided additional training during the surveyors' first day of fieldwork. The one-day training session had the following agenda:

### Introduction

- Introductions: project manager, survey coordinator, field personnel, EBMUD representatives
- Scope of water conservation market penetration study (Mike Hazinski, EBMUD)
- Scope of residential site surveys (Julie Ortiz, consulting team)

### Data Collection Program

- Study logistics and coordination (Richard Grassetti, consulting team)
- Survey forms, differences between single-family and multi-family site surveys (Gustavo Arboleda, consulting team)
- Use of field instruments: ultrasonic distance measurer, tape measure, flow bags, pressure gage (Gustavo Arboleda, consulting team)
- Field measurements: faucet and showerhead flow rates, toilet flush volume, landscapable areas, irrigated areas (Gustavo Arboleda, consulting team)

### Hands-on Practice

- Review of survey procedures
- Mock surveys at single-family residence
- Review of survey results for accuracy and consistency
- Q&A session

## Non-Residential Site Surveys

Non-residential site surveys were assigned to District Field Service representatives. They performed eight to ten surveys per day, working only on weekdays during normal working hours. Field Service personnel training centered on the use of the survey forms designed for the study. A two-hour session provided the necessary training, with the following agenda:

### Introduction

- Introduction of consulting team to Field Service representatives (Thomas Fox, EBMUD)
- Scope of water conservation market penetration study (Mike Hazinski, EBMUD)

### Data Collection Program

- Study logistics and coordination (Richard Grassetti, consulting team)
- Survey forms (Gustavo Arboleda, consulting team)
- Q&A session

Field Service personnel had additional training sessions led by the District's Project Manager. The additional training sessions included practice on flow measurements for faucets and showerheads, measurement of toilet flush volumes, and identification of various appliances, fixtures, and water-using equipment.

**EAST BAY MUNICIPAL UTILITY DISTRICT**
**WATER CONSERVATION MARKET PENETRATION STUDY**
**APPENDIX G**

**Table G-1: Single-Family Attitudes Survey Sample Configuration**

| Group: Location, Year-Built, Tenancy, Ratio of Summer to Winter Water Use | Number of Accounts | Percent of Service Area | Target Number of Survey Respondents | Number of Actual Survey Respondents |
|---|---|---|---|---|
| East, <1950, Tenant, High | 389 | 0.14 | 1 | 1 |
| East, 1950-1959, Tenant, High | 433 | 0.15 | 1 | 1 |
| East, 1960-1969, Tenant, High | 311 | 0.11 | 0 | 0 |
| East, 1970-1979, Tenant, High | 624 | 0.22 | 1 | 1 |
| East, 1980-1989, Tenant, High | 461 | 0.16 | 1 | 1 |
| East, 1990-2001, Tenant, High | 230 | 0.08 | 0 | 0 |
| | | | | |
| East, <1950, Tenant, Low | 388 | 0.14 | 1 | 1 |
| East, 1950-1959, Tenant, Low | 432 | 0.15 | 1 | 1 |
| East, 1960-1969, Tenant, Low | 319 | 0.11 | 0 | 0 |
| East, 1970-1979, Tenant, Low | 633 | 0.22 | 1 | 1 |
| East, 1980-1989, Tenant, Low | 468 | 0.16 | 1 | 1 |
| East, 1990-2001, Tenant, Low | 225 | 0.08 | 0 | 0 |
| | | | | |
| West, <1950, Tenant, High | 15643 | 5.46 | 21 | 22 |
| West, 1950-1959, Tenant, High | 2185 | 0.76 | 3 | 4 |
| West, 1960-1969, Tenant, High | 877 | 0.31 | 1 | 1 |
| West, 1970-1979, Tenant, High | 272 | 0.09 | 0 | 0 |
| West, 1980-1989, Tenant, High | 1224 | 0.43 | 2 | 2 |
| West, 1990-2001, Tenant, High | 377 | 0.13 | 1 | **1** |
| | | | | |
| West, <1950, Tenant, Low | 16300 | 5.69 | 22 | 22 |
| West, 1950-1959, Tenant, Low | 2186 | 0.76 | 3 | 3 |
| West, 1960-1969, Tenant, Low | 902 | 0.31 | 1 | 1 |
| West, 1970-1979, Tenant, Low | 265 | 0.09 | 0 | 0 |
| West, 1980-1989, Tenant, Low | 1226 | 0.43 | 2 | 2 |
| West, 1990-2001, Tenant, Low | 376 | 0.13 | 1 | 1 |
| | | | | |
| East, <1950, Owner, High | 2836 | 0.99 | 4 | 4 |
| East, 1950-1959, Owner, High | 2623 | 0.92 | 4 | 4 |
| East, 1960-1969, Owner, High | 2944 | 1.03 | 4 | 4 |
| East, 1970-1979, Owner, High | 4625 | 1.61 | 6 | 6 |
| East, 1980-1989, Owner, High | 5165 | 1.80 | 7 | 7 |
| East, 1990-2001, Owner, High | 4955 | 1.73 | 7 | 7 |
| | | | | |
| East, <1950, Owner, Low | 2863 | 1.00 | 4 | 4 |
| East, 1950-1959, Owner, Low | 2599 | 0.91 | 3 | 3 |
| East, 1960-1969, Owner, Low | 2993 | 1.05 | 4 | 4 |
| East, 1970-1979, Owner, Low | 4650 | 1.62 | 6 | 6 |
| East, 1980-1989, Owner, Low | 5128 | 1.79 | 7 | 7 |
| East, 1990-2001, Owner, Low | 4895 | 1.71 | **7** | **7** |
| | | | | |
| West, <1950, Owner, High | 45702 | 15.96 | 61 | 60 |
| West, 1950-1959, Owner, High | 7842 | 2.74 | 10 | 10 |
| West, 1960-1969, Owner, High | 2567 | 0.90 | 3 | 3 |
| West, 1970-1979, Owner, High | 1687 | 0.59 | 2 | 2 |
| West, 1980-1989, Owner, High | 5075 | 1.77 | 7 | 7 |
| West, 1990-2001, Owner, High | 4554 | 1.59 | 6 | 6 |

**Table G-1: Single-Family Attitudes Survey Sample Configuration**

| Group: Location, Year-Built, Tenancy, Ratio of Summer to Winter Water Use | Number of Accounts | Percent of Service Area | Target Number of Survey Respondents | Number of Actual Survey Respondents |
|---|---|---|---|---|
| West, <1950, Owner, Low | 44742 | 15.62 | 60 | 60 |
| West, 1950-1959, Owner, Low | 7619 | 2.66 | 10 | 10 |
| West, 1960-1969, Owner, Low | 2900 | 1.01 | 4 | 4 |
| West, 1970-1979, Owner, Low | 1646 | 0.57 | 2 | 2 |
| West, 1980-1989, Owner, Low | 5072 | 1.77 | 7 | 7 |
| West, 1990-2001, Owner, Low | 4402 | 1.54 | 6 | 6 |
| | | | | |
| East, <1950, Unknown, High | 1188 | 0.41 | 2 | 2 |
| East, 1950-1959, Unknown, High | 1245 | 0.43 | 2 | 2 |
| East, 1960-1969, Unknown, High | 1492 | 0.52 | 2 | 2 |
| East, 1970-1979, Unknown, High | 1731 | 0.60 | 2 | 2 |
| East, 1980-1989, Unknown, High | 863 | 0.30 | 1 | 1 |
| East, 1990-2001, Unknown, High | 13 | 0.00 | 0 | 0 |
| | | | | |
| East, <1950, Unknown, Low | 1188 | 0.41 | 2 | 2 |
| East, 1950-1959, Unknown, Low | 1268 | 0.44 | 2 | 2 |
| East, 1960-1969, Unknown, Low | 1473 | 0.51 | 2 | 2 |
| East, 1970-1979, Unknown, Low | 1759 | 0.61 | 2 | 2 |
| East, 1980-1989, Unknown, Low | 865 | 0.30 | 1 | 1 |
| East, 1990-2001, Unknown, Low | 14 | 0.00 | 0 | 0 |
| | | | | |
| West, <1950, Unknown, High | 16597 | 5.79 | 22 | 22 |
| West, 1950-1959, Unknown, High | 3680 | 1.28 | 5 | 5 |
| West, 1960-1969, Unknown, High | 1362 | 0.48 | 2 | 2 |
| West, 1970-1979, Unknown, High | 606 | 0.21 | 1 | 1 |
| West, 1980-1989, Unknown, High | 1205 | 0.42 | 2 | 2 |
| West, 1990-2001, Unknown, High | 5 | 0.00 | 0 | 0 |
| | | | | |
| West, <1950, Unknown, Low | 16213 | 5.66 | 22 | 21 |
| West, 1950-1959, Unknown, Low | 3703 | 1.29 | 5 | 5 |
| West, 1960-1969, Unknown, Low | 1332 | 0.47 | 2 | 2 |
| West, 1970-1979, Unknown, Low | 619 | 0.22 | 1 | 1 |
| West, 1980-1989, Unknown, Low | 1238 | 0.43 | 2 | 2 |
| West, 1990-2001, Unknown, Low | 5 | 0.00 | 0 | 0 |
| **Totals** | **286494*** | **100%** | **388** | **388** |

***** 715 accounts that lacked water use data were excluded from consideration.

## Responses to Single Family Telephone Interviews

1. What is your guess as to the number of gallons of water your household uses daily both inside and outside your home?

| No. of Gallons of Water Used Daily | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Under 50 Gallons | 225 | 58.0 |
| 50-99 Gallons | 27 | 7.0 |
| 100-199 Gallons | 10 | 2.6 |
| 200-299 Gallons | 21 | 5.4 |
| 300-399 Gallons | 4 | 1.0 |
| 400-499 Gallons | 2 | 0.5 |
| 500-599 Gallons | 0 | 0.0 |
| 600-699 Gallons | 0 | 0.0 |
| 700-799 Gallons | 1 | 0.3 |
| 800 or More Gallons | 1 | 0.3 |
| Don't Know | 97 | 25.0 |
| Survey Responses | 388 | |

| Statistical Parameters | |
|---|---|
| N | 291 |
| Min | 25 |
| Max | 900 |
| Mean | 63.1 |
| Std Dev | 100.7 |
| Median | 25 |
| Mode | 25 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 18.3 | 11.6 |

2. How important do you think it is for household consumers in Northern California to conserve water on a regular basis?

| Importance of Water Conservation | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Unimportant | 4 | 1.0 |
| Important | 105 | 27.2 |
| Very Important | 277 | 71.8 |
| Survey Responses | 386 | |
| Declined to Respond | 2 | |

3-15. Were any of the following water conserving actions taken in your household last year? (388 survey responses)

| Water-Conserving Action | YES | | NO | | Don't Know or N/A | |
|---|---|---|---|---|---|---|
| | No. of Responses | Frequency of Response (% of Total) | No. of Responses | Frequency of Response (% of Total) | No. of Responses | Frequency of Response (% of Total) |
| Take shorter showers | 288 | 74.2 | 96 | 24.7 | 4 | 1.0 |
| Install low-flow showerheads | 168 | 43.3 | 213 | 54.9 | 7 | 1.8 |
| Install displacement devices in toilets | 100 | 25.8 | 286 | 73.7 | 2 | 0.5 |
| Install ultra-low-flush toilets. | 128 | 33.0 | 255 | 65.7 | 5 | 1.3 |
| Use garbage disposal less often | 182 | 46.9 | 134 | 34.5 | 72 | 18.6 |
| Use dishwasher less often, and/or fuller loads | 248 | 63.9 | 66 | 17.0 | 74 | 19.1 |
| Use washing machine less often and/or fuller loads. | 325 | 83.8 | 53 | 13.7 | 10 | 2.6 |
| Repair leaks or drips in faucets or toilets | 304 | 78.4 | 80 | 20.6 | 4 | 1.0 |
| Wash car less frequently | 285 | 73.5 | 75 | 19.3 | 28 | 7.2 |
| Water lawn and shrubs less often. | 238 | 61.3 | 122 | 31.4 | 28 | 7.2 |
| Water lawn and shrubs evenings and early mornings | 301 | 77.6 | 54 | 13.9 | 33 | 8.5 |
| Install drought resistant/low water use landscaping | 153 | 39.4 | 200 | 51.5 | 35 | 9.0 |
| Some other water conservation measure | 218 | 56.2 | 165 | 42.5 | 5 | 1.3 |

16. Overall, how much effort would you say your household makes to conserve water?

| Effort Made to Conserve Water | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| No Effort | 8 | 2.1 |
| Small Effort | 29 | 7.5 |
| Moderate Effort | 172 | 44.3 |
| Large Effort | 135 | 34.8 |
| Very Large Effort | 43 | 11.1 |
| Don't Know | 1 | 0.3 |
| Survey Responses | 388 | |

17. What is your primary reason for taking action to conserve water?

| Primary Reason for Conserving Water | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Save Money | 93 | 24.3 |
| Protect the Environment | 52 | 13.6 |
| Conserve Water Resources | 220 | 57.4 |
| Other | 18 | 4.7 |
| Survey Responses | 383 | |
| Declined to Respond | 5 | |

18. Do you think you need additional information on how to conserve water in and around your home?

| Additional Information | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 96 | 24.9 |
| No | 290 | 75.1 |
| Survey Responses | 386 | |
| Declined to Respond | 2 | |

19-22 For each of the following statements, do you strongly disagree, somewhat disagree, somewhat agree, strongly agree, or don't know?

| | Making efforts to conserve water is an inconvenience | | I am willing to make efforts to conserve water if it will save me money on my water bill | | I am willing to conserve water to help protect the environment | | I am willing to conserve water to prevent future shortages during drought conditions | |
|---|---|---|---|---|---|---|---|---|
| **Opinion on Conserving Water** | No. of Responses | Percent of Total | No. of Responses | Percent of Total | No. of Responses | Percent of Total | No. of Responses | Percent of Total |
| Strongly Disagree | 204 | 52.6 | 8 | 2.1 | 4 | 1.0 | 3 | 0.8 |
| Somewhat Disagree | 135 | 34.8 | 14 | 3.6 | 5 | 1.3 | 5 | 1.3 |
| Somewhat Agree | 38 | 9.8 | 106 | 27.3 | 90 | 23.2 | 57 | 14.7 |
| Strongly Agree | 6 | 1.5 | 254 | 65.5 | 285 | 73.5 | 321 | 82.7 |
| Don't Know | 5 | 1.3 | 6 | 1.5 | 4 | 1.0 | 2 | 0.5 |
| Survey Responses | 388 | | 388 | | 388 | | 388 | |

23-25 If you were to receive a free 'water-saver kit' that contained water and energy saving showerheads, bathroom and kitchen faucet aerators, and toilet tank inserts, would you install: (388 Survey Responses)

| | YES | | NO | | Need More Information | | Don't Know or N/A | |
|---|---|---|---|---|---|---|---|---|
| Install | No. of Responses | Percent of Total | No. of Responses | Percent of Total | No. of Responses | Percent of Total | No. of Responses | Percent of Total |
| The water and energy saving showerheads | 244 | 62.9 | 107 | 27.6 | 20 | 5.2 | 17 | 4.4 |
| The water and energy saving faucet aerators | 259 | 66.8 | 98 | 25.3 | 16 | 4.1 | 15 | 3.9 |
| The toilet tank inserts | 198 | 51.0 | 161 | 41.5 | 15 | 3.9 | 14 | 3.6 |

26-28 f you received a rebate from EBMUD, would you consider: (388 Survey Responses)

| | YES | | NO | | Don't Know or N/A | |
|---|---|---|---|---|---|---|
| Consider | No. of Responses | Percent of Total | No. of Responses | Percent of Total | No. of Responses | Percent of Total) |
| Changing plant materials in your landscaping? | 141 | 36.3 | 200 | 51.5 | 47 | 12.1 |
| Reducing the lawn area? | 83 | 21.4 | 241 | 62.1 | 64 | 16.5 |
| Improving the irrigation system efficiency? | 124 | 32.0 | 207 | 53.4 | 57 | 14.7 |

29. Purchasing and installing an ultra-low-flush toilet, which costs $75-$300.

| Purchase & Install Ultra-Low-Flush Toilet | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes/Depends on the Amount | 130 | 33.5 |
| No | 206 | 53.1 |
| Don't Know | 52 | 13.4 |
| Survey Responses | 388 | |

30. [IF YES] What level of rebate would motivate you to purchase and install an ultra-low-flush toilet?

| Rebate to Purchase & Install Ultra-Low-Flush Toilet | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| $20 | 7 | 5.4 |
| $30 | 5 | 3.8 |
| $40 | 6 | 4.6 |
| $50 | 15 | 11.5 |
| $60 | 3 | 2.3 |
| $70 | 1 | 0.8 |
| $80 | 7 | 5.4 |
| $90 | 0 | 0.0 |
| $100 | 22 | 16.9 |
| Other | 39 | 30.0 |
| Don't Know | 25 | 19.2 |
| Survey Responses | 130 | |

31. If your water utility would provide a free 'home water survey' program where a trained employee comes to your home and helps to identify water saving opportunities, would you have it done in your household?

| Home Water Survey | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 163 | 42.0 |
| No | 157 | 40.5 |
| Need More Information | 41 | 10.6 |
| Don't Know | 27 | 7.0 |
| Survey Responses | 388 | |

32. Would you consider purchasing and installing a high-efficiency clothes washer, which may cost $600, if you received a rebate from EBMUD?

| Purchase & Install High-Efficiency Clothes Washer | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes/Depends on the Amount | 124 | 32.0 |
| No | 218 | 56.2 |
| Don't Know | 46 | 11.9 |
| Survey Responses | 388 | |

33. [IF YES] What level of rebate would motivate you to purchase and install a high-efficiency clothes washer?

| Rebate to Purchase & Install High-Efficiency Clothes Washer | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| $20 | 0 | 0.0 |
| $30 | 0 | 0.0 |
| $40 | 0 | 0.0 |
| $50 | 5 | 4.0 |
| $60 | 0 | 0.0 |
| $70 | 3 | 2.4 |
| $80 | 2 | 1.6 |
| $90 | 1 | 0.8 |
| $100 | 29 | 23.4 |
| Other | 72 | 58.1 |
| Don't Know | 12 | 9.7 |
| Survey Responses | 124 | |

34. Do you know what a gray water system is?

| Gray Water System | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 128 | 33.3 |
| No | 256 | 66.7 |
| Survey Responses | 384 | |
| Declined to Respond | 4 | |

35. Would you consider installing a gray water system?

| Install Gray Water System | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes/Depends on the Amount | 93 | 24.0 |
| No | 152 | 39.2 |
| Need More Information | 95 | 24.5 |
| Don't Know | 48 | 12.4 |
| Survey Responses | 388 | |

36. To conserve water would you prefer to change your household's water use habits or install water-saving equipment?

| Conservation Preference | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Change Habits | 88 | 22.7 |
| Install Equipment | 78 | 20.1 |
| Neither | 16 | 4.1 |
| Both | 182 | 46.9 |
| Don't Know | 24 | 6.2 |
| Survey Responses | 388 | |

37. How many people live in your household?

| No. of People | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 72 | 18.6 |
| 2 | 115 | 29.6 |
| 3 | 83 | 21.4 |
| 4 | 70 | 18.0 |
| 5 | 25 | 6.4 |
| 6 | 8 | 2.1 |
| 7 | 6 | 1.5 |
| 8 | 1 | 0.3 |
| 9 | 2 | 0.5 |
| Over 10 | 2 | 0.5 |
| Don't Know | 4 | 1.0 |
| Survey Responses | 388 | |

38. Which one of the following categories includes your total annual household income?

| Household Income | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0-$20,000 | 205 | 52.8 |
| $20,000-$40,000 | 36 | 9.3 |
| $40,000-$60,000 | 35 | 9.0 |
| $60,000-$80,000 | 20 | 5.2 |
| $80,000-$100,000 | 11 | 2.8 |
| $100,000-$150,000 | 12 | 3.1 |
| $150,000 or more | 8 | 2.1 |
| Declined to Respond | 61 | 15.7 |
| Survey Responses | 388 | |

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**EAST BAY MUNICIPAL UTILITY DISTRICT**
**WATER CONSERVATION MARKET PENETRATION STUDY**
**APPENDIX H**

**Table H-1: Multi-Family Attitudes Survey Sample Configuration**

| Group: Size of Building, Location, Year-Built | Number of Accounts | Percent of Service Area | Target Number of Survey Respondents | Number of Actual Survey Respondents |
|---|---|---|---|---|
| 2-4 Units, East, <1950 | 247 | 1.13 | 4 | 4 |
| 2-4 Units, East, 1950-1959 | 160 | 0.73 | 3 | 3 |
| 2-4 Units, East, 1960-1969 | 110 | 0.50 | 2 | 2 |
| 2-4 Units, East, 1970-1979 | 198 | 0.91 | 3 | 4 |
| 2-4 Units, East, 1980-1989 | 104 | 0.48 | 2 | 2 |
| 2-4 Units, East, 1990-2001 | 128 | 0.59 | 2 | 2 |
| | | | | |
| 2-4 Units, West, <1950 | 11339 | 52.04 | 196 | 194 |
| 2-4 Units, West, 1950-1959 | 578 | 2.65 | 10 | 10 |
| 2-4 Units, West, 1960-1969 | 1391 | 6.38 | 24 | 23 |
| 2-4 Units, West, 1970-1979 | 233 | 1.07 | 4 | 4 |
| 2-4 Units, West, 1980-1989 | 431 | 1.98 | 7 | 7 |
| 2-4 Units, West, 1990-2001 | 158 | 0.73 | 3 | 3 |
| | | | | |
| 5+ Units, East, <1950 | 42 | 0.19 | 1 | 1 |
| 5+ Units, East, 1950-1959 | 36 | 0.17 | 1 | 1 |
| 5+ Units, East, 1960-1969 | 158 | 0.73 | 3 | 3 |
| 5+ Units, East, 1970-1979 | 241 | 1.11 | 4 | 4 |
| 5+ Units, East, 1980-1989 | 169 | 0.78 | 3 | 3 |
| 5+ Units, East, 1990-2001 | 66 | 0.30 | 1 | 1 |
| | | | | |
| 5+ Units, West, <1950 | 4711 | 21.62 | 82 | 82 |
| 5+ Units, West, 1950-1959 | 68 | 0.31 | 1 | 1 |
| 5+ Units, West, 1960-1969 | 247 | 1.13 | 4 | 4 |
| 5+ Units, West, 1970-1979 | 248 | 1.14 | 4 | 4 |
| 5+ Units, West, 1980-1989 | 505 | 2.32 | 9 | 9 |
| 5+ Units, West, 1990-2001 | 222 | 1.02 | 4 | 4 |
| **Totals** | **21790** | **100%** | **377** | **375** |

## Responses to Multi-Family Telephone Interviews

1. Are you the: Building Owner, Building Manager, Tenant, or Other?

| Title of Survey Taker | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Building Owner | 309 | 82.6 |
| Building Manager | 36 | 9.6 |
| Tenant | 22 | 5.9 |
| Other | 7 | 1.9 |
| Survey Responses | 374 | |
| Declined to Respond | 1 | |

2. How many housing units are on this property?

| No. of Housing Units | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Under 5 | 287 | 77.4 |
| Between 5 and 10 | 44 | 11.9 |
| Between 10 and 20 | 14 | 3.8 |
| Between 20 and 30 | 11 | 3.0 |
| Between 30 and 40 | 3 | 0.8 |
| Between 40 and 50 | 4 | 1.1 |
| Over 50 | 8 | 2.2 |
| Survey Responses | 371 | |
| Declined to Respond | 4 | |

How many units are:

| | 3. Effic./studios | | 4. One Bedroom | | 5. Two Bedroom | | 6. Three Bedroom | | 7. Four or more BR | |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of Units | No. of Responses | % of Total | No. of Responses | % of Total | No. of Responses | % of Total | No. of Responses | % of Total | No. of Responses | % of Total |
| Under 5 | 199 | 95.7 | 215 | 85.3 | 242 | 86.7 | 247 | 98.4 | 201 | 100.0 |
| Between 5-10 | 5 | 2.4 | 12 | 4.8 | 21 | 7.5 | 4 | 1.6 | 0 | 0.0 |
| Between 10-20 | 1 | 0.5 | 12 | 4.8 | 7 | 2.5 | 0 | 0.0 | 0 | 0.0 |
| Between 20-30 | 1 | 0.5 | 3 | 1.2 | 4 | 1.4 | 0 | 0.0 | 0 | 0.0 |
| Between 30-40 | 0 | 0.0 | 1 | 0.4 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Between 40-50 | 0 | 0.0 | 3 | 1.2 | 1 | 0.4 | 0 | 0.0 | 0 | 0.0 |
| Over 50 | 2 | 1.0 | 6 | 2.4 | 4 | 1.4 | 0 | 0.0 | 0 | 0.0 |
| Survey Responses | 208 | | 252 | | 279 | | 251 | | 201 | |
| Declined to Respond/NA | 167 | | 123 | | 96 | | 124 | | 174 | |

8. What is the average housing unit occupancy rate?

| Average Housing Unit Occupancy Rate | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Under 10% | 0 | 0.0 |
| Between 10% and 20% | 0 | 0.0 |
| Between 20% and 30% | 1 | 0.3 |
| Between 30% and 40% | 0 | 0.0 |
| Between 40% and 50% | 1 | 0.3 |
| Between 50% and 60% | 6 | 1.7 |
| Between 60% and 70% | 4 | 1.1 |
| Between 70% and 80% | 10 | 2.8 |
| Between 80% and 90% | 17 | 4.8 |
| Over 90% | 318 | 89.1 |
| Survey Responses | 357 | |
| Declined to Respond | 18 | |

9. How important do you think it is for building owners/managers in Northern California to promote water conservation at their sites?

| Importance of Water Conservation | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Unimportant | 1 | 0.3 |
| Important | 132 | 35.4 |
| Very Important | 240 | 64.3 |
| Survey Responses | 373 | |
| Declined to Respond | 2 | |

10-19. Were any of the following water conserving actions taken in your building last year? (375 responses)

| Water-Conserving Action | YES | | NO | | Don't Know or N/A | |
|---|---|---|---|---|---|---|
| | No. of Responses | Frequency of Response (% of Total) | No. of Responses | Frequency of Response (% of Total) | No. of Responses | Frequency of Response (% of Total) |
| Install low-flow showerheads | 166 | 44.3 | 205 | 54.7 | 4 | 1.1 |
| Install water displacement devices in toilets | 104 | 27.7 | 267 | 71.2 | 4 | 1.1 |
| Install ultra-low-flush toilets | 146 | 38.9 | 225 | 60.0 | 4 | 1.1 |
| Repair leaks or drips in faucets or toilets | 308 | 82.1 | 65 | 17.3 | 2 | 0.5 |
| Restrict car washing on premises | 244 | 65.1 | 126 | 33.6 | 5 | 1.3 |
| Water lawn and shrubs less often. | 232 | 61.9 | 118 | 31.5 | 25 | 6.7 |
| Water lawn and shrubs evenings and early mornings | 284 | 75.7 | 47 | 12.5 | 44 | 11.7 |
| Install drought resistant/low water use landscaping | 147 | 39.2 | 200 | 53.3 | 28 | 7.5 |
| Limited spa/pool use | 30 | 8.0 | 186 | 49.6 | 159 | 42.4 |
| Some other water conservation measure | 147 | 39.2 | 218 | 58.1 | 10 | 2.7 |

20. Overall, how much effort would you say your building management makes to conserve water?

| Effort Made to Conserve Water | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| No Effort | 11 | 2.9 |
| Small Effort | 46 | 12.3 |
| Moderate Effort | 175 | 46.7 |
| Large Effort | 117 | 31.2 |
| Very Large Effort | 24 | 6.4 |
| Don't Know | 2 | 0.5 |
| Survey Responses | 375 | |

21. What is building management's primary reason for taking action to conserve water?

| Primary Reason for Conserving Water | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Save Money | 152 | 41.6 |
| Protect the Environment | 41 | 11.2 |
| Conserve Water Resources | 161 | 44.1 |
| Other | 11 | 3.0 |
| Survey Responses | 365 | |
| Declined to Respond | 10 | |

22. Do you think your building management needs additional information on how to conserve water in and around the property?

| Additional Information | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 119 | 32.2 |
| No | 251 | 67.8 |
| Survey Responses | 370 | |
| Declined to Respond | 5 | |

23-26. For each of the following statements, do you strongly disagree, somewhat disagree somewhat agree, strongly agree, or don't know?

| Opinion on Conserving Water | Making efforts to conserve water is an inconvenience | | We are willing to make efforts to conserve water if it will save me money on my water bill | | We are willing to conserve water to help protect the environment | | We are willing to conserve water to prevent future shortages during drought conditions | |
|---|---|---|---|---|---|---|---|---|
| | **No. of Responses** | **Percent of Total** | **No. of Responses** | **Percent of Total** | **No. of Responses** | **Percent of Total** | **No. of Responses** | **Percent of Total** |
| Strongly Disagree | 175 | 46.7 | 4 | 1.1 | 1 | 0.3 | 1 | 0.3 |
| Somewhat Disagree | 132 | 35.2 | 9 | 2.4 | 2 | 0.5 | 3 | 0.8 |
| Somewhat Agree | 42 | 11.2 | 92 | 24.5 | 80 | 21.3 | 61 | 16.3 |
| Strongly Agree | 13 | 3.5 | 258 | 68.8 | 279 | 74.4 | 296 | 78.9 |
| Don't Know | 13 | 3.5 | 12 | 3.2 | 13 | 3.5 | 14 | 3.7 |
| Survey Responses | 375 | | 375 | | 375 | | 375 | |

27-29. If you were to receive free 'water-saver kits' that contained water and energy saving showerheads, faucet aerators, and toilet tank inserts, would you install: (375 responses)

| Install | YES | | NO | | Need More Information | | Don't Know or N/A | |
|---|---|---|---|---|---|---|---|---|
| | **No. of Responses** | **Percent of Total)** | **No. of Responses** | **Percent of Total)** | **No. of Responses** | **Percent of Total** | **No. of Responses** | **Percent of Total** |
| The water and energy saving showerheads | 278 | 74.1 | 68 | 18.1 | 7 | 1.9 | 22 | 5.9 |
| The water and energy saving faucet aerators | 293 | 78.1 | 50 | 13.3 | 11 | 2.9 | 21 | 5.6 |
| The toilet tank inserts | 248 | 66.1 | 87 | 23.2 | 12 | 3.2 | 28 | 7.5 |

30-32. If rebates were offered for improved efficient water use, would your management consider taking any of the following actions on your landscaping? (375 responses)

| Consider | YES | | NO | | Don't Know or N/A | |
|---|---|---|---|---|---|---|
| | **No. of Responses** | **Percent of Total)** | **No. of Responses** | **Percent of Total)** | **No. of Responses** | **Percent of Total)** |
| Changing plant materials | 144 | 38.4 | 187 | 49.9 | 44 | 11.7 |
| Reducing the lawn area | 98 | 26.1 | 216 | 57.6 | 61 | 16.3 |
| Improving the irrigation system efficiency | 140 | 37.3 | 176 | 46.9 | 59 | 15.7 |

33. Would your management consider purchasing and installing ultra-low-flush toilets, which cost $75-$300, if EBMUD offered a rebate per toilet?

| Purchase & Install Ultra-Low-Flush Toilet | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes/Depends on the Amount | 167 | 46.6 |
| No | 155 | 43.3 |
| Don't Know | 36 | 10.1 |
| Survey Responses | 358 | |
| Declined to Respond | 17 | |

34. [IF YES] What level of rebate per toilet would motivate your management to purchase install ultra-low-flush toilets?

| Rebate to Purchase & Install Ultra-Low-Flush Toilet | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| $20 | 12 | 7.2 |
| $30 | 11 | 6.6 |
| $40 | 6 | 3.6 |
| $50 | 29 | 17.4 |
| $60 | 3 | 1.8 |
| $70 | 4 | 2.4 |
| $80 | 6 | 3.6 |
| $90 | 0 | 0.0 |
| $100 | 34 | 20.4 |
| Other | 40 | 24.0 |
| Don't Know | 22 | 13.2 |
| Survey Responses | 167 | |

35. Would your management consider purchasing and installing high-efficiency clothes washers, which may cost $600 each, if EBMUD offered a rebate per washer?

| Purchase & Install High-Efficiency Clothes Washer | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes/Depends on the Amount | 149 | 39.7 |
| No | 170 | 45.3 |
| Don't Know | 56 | 14.9 |
| Survey Responses | 375 | |

36. [IF YES] What level of rebate per washer would motivate your management to purchase and install high-efficiency clothes washers?

| Rebate to Purchase & Install High-Efficiency Clothes Washer | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| $20 | 2 | 1.3 |
| $30 | 0 | 0.0 |
| $40 | 1 | 0.7 |
| $50 | 8 | 5.4 |
| $60 | 1 | 0.7 |
| $70 | 2 | 1.3 |
| $80 | 2 | 1.3 |
| $90 | 1 | 0.7 |
| $100 | 30 | 20.1 |
| Other | 84 | 56.4 |
| Don't Know | 18 | 12.1 |
| Survey Responses | 149 | |

37. If your water utility would provide a free 'home water survey' program where a trained employee comes to your building and helps to identify water saving opportunities, would your management have it done in your building?

| Home Water Survey | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 195 | 52.0 |
| No | 119 | 31.7 |
| Need More Information | 31 | 8.3 |
| Don't Know | 30 | 8.0 |
| Survey Responses | 375 | |

38. Do you know what a gray water system is?

| Gray Water System | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 153 | 42.3 |
| No | 209 | 57.7 |
| Survey Responses | 362 | |
| Declined to Respond | 13 | |

39. Would your management consider installing a gray water system?

| Install Gray Water System | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes/Depends on the Amount | 100 | 26.7 |
| No | 139 | 37.1 |
| Need More Information | 90 | 24.0 |
| Don't Know | 46 | 12.3 |
| Survey Responses | 375 | |

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**EAST BAY MUNICIPAL UTILITY DISTRICT**
**WATER CONSERVATION MARKET PENETRATION STUDY**
**APPENDIX I**

**Table I-1: Single-Family Site Survey Sample Configuration**

| Group: Location, Year-Built, Tenancy, Ratio of Summer to Winter Water Use | Number of Accounts | Percent of Service Area | Target Number of Survey Respondents | Number of Actual Survey Respondents |
|---|---|---|---|---|
| East, <1950, Tenant, High | 389 | 0.14 | 1 | 1 |
| East, 1950-1959, Tenant, High | 433 | 0.15 | 1 | 1 |
| East, 1960-1969, Tenant, High | 311 | 0.11 | 0 | 0 |
| East, 1970-1979, Tenant, High | 624 | 0.22 | 1 | 1 |
| East, 1980-1989, Tenant, High | 461 | 0.16 | 1 | 0 |
| East, 1990-2001, Tenant, High | 230 | 0.08 | 0 | 0 |
| | | | | |
| East, <1950, Tenant, Low | 388 | 0.14 | 1 | 1 |
| East, 1950-1959, Tenant, Low | 432 | 0.15 | 1 | 1 |
| East, 1960-1969, Tenant, Low | 319 | 0.11 | 0 | 0 |
| East, 1970-1979, Tenant, Low | 633 | 0.22 | 1 | 1 |
| East, 1980-1989, Tenant, Low | 468 | 0.16 | 1 | 1 |
| East, 1990-2001, Tenant, Low | 225 | 0.08 | 0 | 0 |
| | | | | |
| West, <1950, Tenant, High | 15643 | 5.46 | 21 | 22 |
| West, 1950-1959, Tenant, High | 2185 | 0.76 | 3 | 3 |
| West, 1960-1969, Tenant, High | 877 | 0.31 | 1 | 1 |
| West, 1970-1979, Tenant, High | 272 | 0.09 | 0 | 0 |
| West, 1980-1989, Tenant, High | 1224 | 0.43 | 2 | 2 |
| West, 1990-2001, Tenant, High | 377 | 0.13 | 1 | **2** |
| | | | | |
| West, <1950, Tenant, Low | 16300 | 5.69 | 22 | 21 |
| West, 1950-1959, Tenant, Low | 2186 | 0.76 | 3 | 3 |
| West, 1960-1969, Tenant, Low | 902 | 0.31 | 1 | 1 |
| West, 1970-1979, Tenant, Low | 265 | 0.09 | 0 | 0 |
| West, 1980-1989, Tenant, Low | 1226 | 0.43 | 2 | 1 |
| West, 1990-2001, Tenant, Low | 376 | 0.13 | 1 | 1 |
| | | | | |
| East, <1950, Owner, High | 2836 | 0.99 | 4 | 7 |
| East, 1950-1959, Owner, High | 2623 | 0.92 | 4 | 4 |
| East, 1960-1969, Owner, High | 2944 | 1.03 | 4 | 4 |
| East, 1970-1979, Owner, High | 4625 | 1.61 | 6 | 5 |
| East, 1980-1989, Owner, High | 5165 | 1.80 | 7 | 6 |
| East, 1990-2001, Owner, High | 4955 | 1.73 | 7 | 6 |
| | | | | |
| East, <1950, Owner, Low | 2863 | 1.00 | 4 | 11 |
| East, 1950-1959, Owner, Low | 2599 | 0.91 | 3 | 3 |
| East, 1960-1969, Owner, Low | 2993 | 1.05 | 4 | 5 |
| East, 1970-1979, Owner, Low | 4650 | 1.62 | 6 | 5 |
| East, 1980-1989, Owner, Low | 5128 | 1.79 | 7 | 10 |
| East, 1990-2001, Owner, Low | 4895 | 1.71 | **7** | **7** |
| | | | | |
| West, <1950, Owner, High | 45702 | 15.96 | 61 | 62 |
| West, 1950-1959, Owner, High | 7842 | 2.74 | 10 | 10 |
| West, 1960-1969, Owner, High | 2567 | 0.90 | 3 | 4 |
| West, 1970-1979, Owner, High | 1687 | 0.59 | 2 | 2 |
| West, 1980-1989, Owner, High | 5075 | 1.77 | 7 | 6 |
| West, 1990-2001, Owner, High | 4554 | 1.59 | 6 | 5 |

**Table I-1: Single-Family Site Survey Sample Configuration**

| Group: Location, Year-Built, Tenancy, Ratio of Summer to Winter Water Use | Number of Accounts | Percent of Service Area | Target Number of Survey Respondents | Number of Actual Survey Respondents |
|---|---|---|---|---|
| West, <1950, Owner, Low | 44742 | 15.62 | 60 | 57 |
| West, 1950-1959, Owner, Low | 7619 | 2.66 | 10 | 10 |
| West, 1960-1969, Owner, Low | 2900 | 1.01 | 4 | 5 |
| West, 1970-1979, Owner, Low | 1646 | 0.57 | 2 | 0 |
| West, 1980-1989, Owner, Low | 5072 | 1.77 | 7 | 7 |
| West, 1990-2001, Owner, Low | 4402 | 1.54 | 6 | 5 |
| | | | | |
| East, <1950, Unknown, High | 1188 | 0.41 | 2 | 2 |
| East, 1950-1959, Unknown, High | 1245 | 0.43 | 2 | 2 |
| East, 1960-1969, Unknown, High | 1492 | 0.52 | 2 | 2 |
| East, 1970-1979, Unknown, High | 1731 | 0.60 | 2 | 2 |
| East, 1980-1989, Unknown, High | 863 | 0.30 | 1 | 1 |
| East, 1990-2001, Unknown, High | 13 | 0.00 | 0 | 0 |
| | | | | |
| East, <1950, Unknown, Low | 1188 | 0.41 | 2 | 2 |
| East, 1950-1959, Unknown, Low | 1268 | 0.44 | 2 | 2 |
| East, 1960-1969, Unknown, Low | 1473 | 0.51 | 2 | 2 |
| East, 1970-1979, Unknown, Low | 1759 | 0.61 | 2 | 2 |
| East, 1980-1989, Unknown, Low | 865 | 0.30 | 1 | 1 |
| East, 1990-2001, Unknown, Low | 14 | 0.00 | 0 | 0 |
| | | | | |
| West, <1950, Unknown, High | 16597 | 5.79 | 22 | 21 |
| West, 1950-1959, Unknown, High | 3680 | 1.28 | 5 | 4 |
| West, 1960-1969, Unknown, High | 1362 | 0.48 | 2 | 2 |
| West, 1970-1979, Unknown, High | 606 | 0.21 | 1 | 1 |
| West, 1980-1989, Unknown, High | 1205 | 0.42 | 2 | 2 |
| West, 1990-2001, Unknown, High | 5 | 0.00 | 0 | 0 |
| | | | | |
| West, <1950, Unknown, Low | 16213 | 5.66 | 22 | 21 |
| West, 1950-1959, Unknown, Low | 3703 | 1.29 | 5 | 4 |
| West, 1960-1969, Unknown, Low | 1332 | 0.47 | 2 | 2 |
| West, 1970-1979, Unknown, Low | 619 | 0.22 | 1 | 1 |
| West, 1980-1989, Unknown, Low | 1238 | 0.43 | 2 | 1 |
| West, 1990-2001, Unknown, Low | 5 | 0.00 | 0 | 0 |
| **Totals** | **286494*** | **100%** | **388** | **387** |

***** 715 accounts that lacked water use data were excluded from consideration.

## Responses to Single Family Site Survey

1. How many years have you lived at this residence?

| Years Lived In | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 1* | 0.3 |
| 1-5 | 117 | 30.2 |
| 6-10 | 61 | 15.8 |
| 11-15 | 41 | 10.6 |
| 16-20 | 18 | 4.7 |
| 21-25 | 37 | 9.6 |
| 26-30 | 29 | 7.5 |
| 31-35 | 17 | 4.4 |
| 36-40 | 22 | 5.7 |
| 41+ | 44 | 11.4 |
| Survey Responses | 387 | |

| Statistical Parameters | |
|---|---|
| N | 387 |
| Min | 0 |
| Max | 72 |
| Mean | 17.7 |
| Std Dev | 15.6 |
| Median | 12 |
| Mode | 1 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 8.7 | 1.6 |

* House unoccupied.

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| 0 | 0 (0.0%) | 1 (0.3%) | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) |
| 1-5 | 30 (30.6%) | 87 (30.1%) | 76 (30.9%) | 41 (64.1%) | 0 (0.0%) |
| 6-10 | 22 (22.4%) | 39 (13.5%) | 52 (21.1%) | 8 (12.5%) | 1 (1.3%) |
| 11-15 | 8 (8.2%) | 33 (11.4%) | 31 (12.6%) | 6 (9.4%) | 4 (5.2%) |
| 16-20 | 5 (5.1%) | 13 (4.5%) | 8 (3.3%) | 1 (1.6%) | 9 (11.7%) |
| 21-25 | 7 (7.1%) | 30 (10.4%) | 19 (7.7%) | 3 (4.7%) | 15 (19.5%) |
| 26-30 | 8 (8.2%) | 21 (7.3%) | 15 (6.1%) | 1 (1.6%) | 14 (18.2%) |
| 31-35 | 5 (5.1%) | 12 (4.2%) | 10 (4.1%) | 1 (1.6%) | 6 (7.8%) |
| 36-40 | 3 (3.1%) | 19 (6.6%) | 10 (4.1%) | 1 (1.6%) | 11 (14.3%) |
| 41+ | 10 (10.2%) | 34 (11.8%) | 24 (9.8%) | 2 (3.1%) | 18 (23.4%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| 0 | 0 (0.0%) | 0 (0.0%) | 1 (2.5%) | 0 (0.0%) |
| 1-5 | 72 (31.6%) | 22 (21.0%) | 13 (32.5%) | 10 (71.4%) |
| 6-10 | 34 (14.9%) | 15 (14.3%) | 8 (20.0%) | 4 (28.6%) |
| 11-15 | 21 (9.2%) | 8 (7.6%) | 12 (30.0%) | 0 (0.0%) |
| 16-20 | 12 (5.3%) | 5 (4.8%) | 1 (2.5%) | 0 (0.0%) |
| 21-25 | 23 (10.1%) | 13 (12.4%) | 1 (2.5%) | 0 (0.0%) |
| 26-30 | 14 (18.2%) | 15 (14.3%) | 0 (0.0%) | 0 (0.0%) |
| 31-35 | 6 (7.8%) | 5 (4.8%) | 0 (0.0%) | 0 (0.0%) |
| 36-40 | 11 (14.3%) | 6 (5.7%) | 3 (7.5%) | 0 (0.0%) |
| 41+ | 18 (23.4%) | 16 (15.2%) | 1 (2.5%) | 0 (0.0%) |

2a. How many people under 12 years of age live at this residence?

| Under 12 | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 291 | 75.2 |
| 1 | 42 | 10.9 |
| 2 | 38 | 9.8 |
| 3 | 8 | 2.1 |
| 4 | 6 | 1.6 |
| 5 | 1 | 0.3 |
| 6 | 0 | 0.0 |
| 7 | 1 | 0.3 |
| Survey Responses | 387 | |

| Statistical Parameters | |
|---|---|
| N | 387 |
| Min | 0 |
| Max | 7 |
| Mean | 0.5 |
| Std Dev | 0.1 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 20.7 | 0.1 |

2b. How many people between 12 and 18 years of age live at this residence?

| Between 12 & 18 | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 328 | 84.8 |
| 1 | 33 | 8.5 |
| 2 | 19 | 4.9 |
| 3 | 3 | 0.8 |
| 4 | 3 | 0.8 |
| 5 | 1 | 0.3 |
| Survey Responses | 387 | |

| Statistical Parameters | |
|---|---|
| N | 387 |
| Min | 0 |
| Max | 5 |
| Mean | 0.3 |
| Std Dev | 0.7 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 27.5 | 0.1 |

2c. How many people over 18 years of age live at this residence?

| Over 18 | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 6* | 1.6 |
| 1 | 75 | 19.4 |
| 2 | 208 | 53.7 |
| 3 | 61 | 15.8 |
| 4 | 28 | 7.2 |
| 5 | 4 | 1.0 |
| 6 | 2 | 0.5 |
| 7 | 2 | 0.5 |
| 8 | 1 | 0.3 |
| Survey Responses | 387 | |

| Statistical Parameters | |
|---|---|
| N | 381+ |
| Min | 1 |
| Max | 8 |
| Mean | 2.2 |
| Std Dev | 1.0 |
| Median | 2 |
| Mode | 2 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 4.6 | 0.1 |

* Responses of 0 were given at churches, a lodge, a company, a newly built house, and a house that is being remodeled.

3. List the total number of toilets at this location.

| No. of Toilets | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 116 | 30.1 |
| 2 | 145 | 37.6 |
| 3 | 104 | 26.9 |
| 4 | 16 | 4.1 |
| 5 | 3 | 0.8 |
| 6 | 1 | 0.3 |
| 7 | 0 | 0.0 |
| 8 | 1 | 0.3 |
| Surveys Responses | 387 | |
| Surveys with No Response | 0* | |

| Statistical Parameters | |
|---|---|
| N | 386 |
| Min | 1 |
| Max | 8 |
| Mean | 2.1 |
| Std Dev | 1.0 |
| Median | 2 |
| Mode | 2 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 4.6 | 0.1 |

* One value of 25 (collected at a Buddhist monastery) was not included in the determination of statistical parameters as it was considered not representative of single-family dwellings.

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| 1 | 5 (5.2%) | 111 (38.4%) | 67 (27.3%) | 35 (46.8%) | 14 (18.2%) |
| 2 | 35 (36.1%) | 110 (38.1%) | 86 (35.1%) | 23 (35.9%) | 36 (46.8%) |
| 3 | 47 (48.5%) | 57 (19.7%) | 74 (30.2%) | 4 (6.3%) | 26 (33.8%) |
| 4 | 9 (9.3%) | 7 (2.4%) | 13 (5.3%) | 2 (3.1%) | 1 (1.3%) |
| 5 | 1 (1.0%) | 2 (0.7%) | 3 (1.2%) | 0 (0.0%) | 0 (0.0%) |
| 6 | 0 (0.0%) | 1 (0.3%) | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) |
| 7 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 8 | 0 (0.0%) | 1 (0.3%) | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| 1 | 99 (43.6%) | 13 (12.4%) | 4 (10.0%) | 0 (0.0%) |
| 2 | 88 (38.8%) | 46 (43.8%) | 11 (27.5%) | 11 (78.6%) |
| 3 | 32 (14.1%) | 42 (40.0%) | 19 (47.5%) | 3 (21.4%) |
| 4 | 4 (1.8%) | 4 (3.8%) | 5 (12.5%) | 0 (0.0%) |
| 5 | 2 (0.9%) | 0 (0.0%) | 1 (2.5%) | 0 (0.0%) |
| 6 | 1 (0.41%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 7 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 8 | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |

4. For each toilet, list:

| Make/Model of Toilet | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| American Standard | 145 | 17.5 |
| BASA | 1 | 0.1 |
| Bemis | 16 | 1.9 |
| Briggs | 33 | 4.0 |
| Case | 1 | 0.1 |
| Celite | 2 | 0.2 |
| Cidamar | 1 | 0.1 |
| Comco | 1 | 0.1 |
| Crane | 14 | 1.7 |
| Eljer | 46 | 5.6 |
| Illini Vitroware | 1 | 0.1 |
| Incepa | 1 | 0.1 |
| K | 12 | 1.5 |
| Karat | 4 | 0.5 |
| Kilgore | 2 | 0.2 |
| Kohler | 144 | 17.4 |
| KPB | 1 | 0.1 |
| Lamosa | 8 | 1.0 |
| LowBoy | 1 | 0.1 |
| Mansfield | 23 | 2.8 |
| Mansfield/Norris | 3 | 0.4 |
| Matsushita | 1 | 0.1 |
| Murray | 2 | 0.2 |
| NI | 10 | 1.2 |
| Norris | 36 | 4.4 |
| Orion | 2 | 0.2 |
| Pacific | 3 | 0.4 |
| Peerless | 1 | 0.1 |
| Porcelame X | 1 | 0.1 |
| Richmond | 1 | 0.1 |
| Saire | 5 | 0.6 |
| Saneto Vitroware | 1 | 0.1 |
| Sloan | 2 | 0.2 |
| Standard | 142 | 17.2 |
| Sterling | 11 | 1.3 |
| Toto | 5 | 0.6 |
| Trylon | 1 | 0.1 |
| Universal Rundle | 10 | 1.2 |
| UPC | 24 | 2.9 |
| Western Pottery | 1 | 0.1 |
| Don't Know | 108 | 13.1 |
| Inspected Toilets | 827 | |

| Year Toilet Was Manufactured/ Installed | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <1950 | 30 | 3.6 |
| 1950-1959 | 44 | 5.3 |
| 1960-1969 | 52 | 6.3 |
| 1970-1979 | 69 | 8.3 |
| 1980-1989 | 164 | 19.8 |
| 1990-1999 | 225 | 27.2 |
| 2000-2001 | 35 | 4.2 |
| Don't Know | 208 | 25.2 |
| Inspected Toilets | 827 | |

| Statistical Parameters | |
|---|---|
| N | 619 |
| Min | 1920 |
| Max | 2001 |
| Mean | 1982 |
| Std Dev | 16.5 |
| Median | 1988 |
| Mode | 1999 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 0.1 | 1.3 |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| <1950 | 1 (0.4%) | 29 (5.3%) | 18 (3.2%) | 4 (4.0%) | 8 (4.9%) |
| 1950-1959 | 13 (4.7%) | 31 (5.6%) | 31 (5.5%) | 8 (8.0%) | 5 (3.1%) |
| 1960-1969 | 14 (5.1%) | 38 (6.9%) | 25 (4.4%) | 10 (10.0%) | 17 (10.4%) |
| 1970-1979 | 27 (9.7%) | 42 (7.6%) | 31 (5.5%) | 12 (12.0%) | 26 (16.0%) |
| 1980-1989 | 56 (20.2%) | 108 (19.6%) | 122 (21.6%) | 15 (15.0%) | 27 (16.6%) |
| 1990-1999 | 80 (28.9%) | 145 (26.4%) | 156 (27.7%) | 27 (27.0%) | 42 (25.8%) |
| 2000-2001 | 13 (4.7%) | 22 (4.0%) | 25 (4.4%) | 5 (5.0%) | 5 (3.1%) |
| Don't Know | 73 (26.4%) | 135 (24.5%) | 156 (27.7%) | 19 (19.0%) | 33 (20.2%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| <1950 | 26 (5.8%) | 4 (1.7%) | 0 (0.0%) | 0 (0.0%) |
| 1950-1959 | 25 (5.5%) | 17 (7.1%) | 2 (2.1%) | 0 (0.0%) |
| 1960-1969 | 25 (5.5%) | 27 (11.3%) | 0 (0.0%) | 0 (0.0%) |
| 1970-1979 | 29 (6.4%) | 37 (15.4%) | 3 (3.1%) | 0 (0.0%) |
| 1980-1989 | 77 (17.1%) | 44 (18.3%) | 42 (43.3%) | 1 (2.6%) |
| 1990-1999 | 114 (25.3%) | 53 (22.1%) | 27 (27.8%) | 31 (79.5%) |
| 2000-2001 | 20( 4.4%) | 7 (2.9%) | 5 (5.2%) | 3 (7.7%) |
| Don't Know | 135 (29.9%) | 51(21.3%) | 18 (18.6%) | 4 (10.3%) |

| Design Flush Volume of Toilet (gpf) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1.6 | 244 | 29.5 |
| 3.5 | 162 | 19.6 |
| 5+ | 185 | 22.4 |
| Don't Know | 236 | 28.5 |
| Inspected Toilets | 827 | |

**Note:** Cross-checking with data on year toilets were manufactured changed the frequency of responses to:
34.0% for 1.6 gpf toilets
27.9% for 3.5 gpf
22.4% for 5+ gpf
15.7% for Unknown

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| 1.6 | 94 (33.9%) | 150 (27.3%) | 172 (30.5%) | 31 (31.0%) | 41 (25.2%) |
| 3.5 | 63 (22.7%) | 99 (18.0%) | 108 (19.1%) | 24 (24.0%) | 30 (18.4%) |
| 5+ | 58 (20.9%) | 127 (23.1%) | 134 (23.8%) | 19 (19.0%) | 32 (19.6%) |
| Don't Know | 62 (22.4%) | 174 (31.6%) | 150 (26.6%) | 26 (26.0%) | 60 (36.8%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| 1.6 | 124 (27.5%) | 64 (26.7%) | 25 (25.8%) | 31 (79.5%) |
| 3.5 | 68 (15.1%) | 44 (18.3%) | 42 (43.3%) | 8 (20.5%) |
| 5+ | 125 (27.7%) | 46 (19.2%) | 14 (14.4%) | 0 (0.0%) |
| Don't Know | 134 (29.7%) | 86 (35.8%) | 16 (16.5%) | 0 (0.0%) |

| Toilets' Measured Flush Volume (gpf) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0-1.60 | 179 | 21.6 |
| 1.61-2.0 | 78 | 9.4 |
| 2.01-2.50 | 119 | 14.4 |
| 2.51-3.00 | 192 | 23.2 |
| 3.01-3.50 | 115 | 13.9 |
| 3.51-4.00 | 53 | 6.4 |
| 4.01-5.00 | 27 | 3.3 |
| 5.01+ | 41 | 5.0 |
| Unable to Measure | 23 | 2.8 |
| Inspected Toilets | 827 | |

| Statistical Parameters | |
|---|---|
| N | 804 |
| Min | 0.4 |
| Max | 7.3 |
| Mean | 2.6 |
| Std Dev | 1.2 |
| Median | 2.6 |
| Mode | 2.9 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 3.1 | 0.1 |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| 0-1.60 | 57 (20.6%) | 122 (22.2%) | 115 (20.4%) | 26 (26.0%) | 38 (23.3%) |
| 1.61-2.00 | 24 (8.7%) | 54 (9.8%) | 51 (9.0%) | 15 (15.0%) | 12 (7.4%) |
| 2.01-2.50 | 42 (15.2%) | 77 (14.0%) | 90 (16.0%) | 8 (8.0%) | 21 (12.9%) |
| 2.51-3.00 | 54 (19.5%) | 138 (25.1%) | 134 (23.8%) | 22 (22.0%) | 36 (22.1%) |
| 3.01-3.50 | 39 (14.1%) | 76 (13.8%) | 76 (13.5%) | 11 (11.0%) | 28 (17.2%) |
| 3.51-4.00 | 20 (7.2%) | 33 (6.0%) | 33 (5.9%) | 5 (5.0%) | 15 (9.2%) |
| 4.01-5.00 | 9 (3.2%) | 18 (3.3%) | 12 (2.1%) | 7 (7.0%) | 8 (4.9%) |
| 5.01+ | 29 (10.5%) | 12 (2.2%) | 36 (6.4%) | 4 (4.0%) | 1 (0.6%) |
| Unable to Measure | 3 (1.1%) | 20 (3.6%) | 17 (3.0%) | 2 (2.0%) | 4 (2.5%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| 0-1.60 | 92 (20.4%) | 40 (16.7%) | 24 (24.7%) | 23 (59.0%) |
| 1.61-2.00 | 42 (9.3%) | 25 (10.4%) | 3 (3.1%) | 8 (20.5%) |
| 2.01-2.50 | 61 (13.5%) | 39 (16.3%) | 15 (15.5%) | 4 (10.3%) |
| 2.51-3.00 | 106 (23.5%) | 53 (22.1%) | 29 (29.9%) | 4 (10.3%) |
| 3.01-3.50 | 62 (13.7%) | 38 (15.8%) | 15 (15.5%) | 0 (0.0%) |
| 3.51-4.00 | 26 (5.8%) | 22 (9.2%) | 5 (5.2%) | 0 (0.0%) |
| 4.01-5.00 | 12 (2.7%) | 11 (4.6%) | 4 (4.1%) | 0 (0.0%) |
| 5.01+ | 37 (8.2%) | 3 (1.3%) | 1 (1.0%) | 0 (0.0%) |
| Unable to Measure | 13 (2.9%) | 9 (3.8%) | 1 (1.0%) | 0 (0.0%) |

| Conservation Device in Toilet | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| None | 709 | 85.7 |
| Dam | 3 | 0.4 |
| Displacement | 38 | 4.6 |
| Quick Closing Flapper | 63 | 7.6 |
| Water Level Adjustment | 14 | 1.7 |
| Inspected Toilets | 827 | |

| Leaks in Toilet | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 17 | 2.1 |
| No | 806 | 97.5 |
| Don't Know | 4 | 0.5 |
| Inspected Toilets | 827 | |

5. List the total number of shower stalls at this location.

| No. of Shower Stalls | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 4 | 1.0 |
| 1 | 149 | 38.6 |
| 2 | 170 | 44.0 |
| 3 | 51 | 13.2 |
| 4 | 10 | 2.6 |
| 5 | 2 | 0.5 |
| Survey Responses | 386 | |
| Surveys with No Response | 0* | |

| Statistical Parameters | |
|---|---|
| N | 386 |
| Min | 0 |
| Max | 5 |
| Mean | 1.8 |
| Std Dev | 0.8 |
| Median | 2 |
| Mode | 2 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 4.6 | 0.1 |

* One value of 25 (collected at a Buddhist monastery) was removed as not representative of single-family dwellings.

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| 0 | 0 (0.0%) | 4 (1.4%) | 2 (0.8%) | 2 (3.1%) | 0 (0.0%) |
| 1 | 15 (15.5%) | 134 (46.4%) | 88 (35.9%) | 39 (60.9%) | 22 (28.6%) |
| 2 | 46 (47.4%) | 124 (42.9%) | 105 (42.9%) | 21 (32.8%) | 44 (57.1%) |
| 3 | 29 (29.9%) | 22 (7.6%) | 40 (16.3%) | 0 (0.0%) | 11 (14.3%) |
| 4 | 6 (6.2%) | 4 (1.4%) | 8 (3.3%) | 2 (3.1%) | 0 (0.0%) |
| 5 | 1 (1.0%) | 1 (0.3%) | 2 (0.8%) | 0 (0.0%) | 0 (0.0%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| 0 | 3 (1.3%) | 0 (0.0%) | 1 (2.5%) | 0 (0.0%) |
| 1 | 122 (53.7%) | 22 (21.0%) | 5 (12.5%) | 0 (0.0%) |
| 2 | 82 (36.1%) | 63 (60.0%) | 19 (47.5%) | 6 (42.9%) |
| 3 | 17 (7.5%) | 17 (16.2%) | 12 (30.0%) | 5 (35.7%) |
| 4 | 2 (0.9%) | 2 (1.9%) | 3 (7.5%) | 3 (21.4%) |
| 5 | 1 (0.4%) | 1 (1.0%) | 0 (0.0%) | 0 (0.0%) |

6. For each shower stall, list::

| Gallons per Minute for Showerhead | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <1 | 1 | 0.1 |
| 1-1.9 | 72 | 10.4 |
| 2-2.9 | 405 | 58.4 |
| 3-3.9 | 88 | 12.7 |
| 4-4.9 | 77 | 11.1 |
| 5-5.9 | 30 | 4.3 |
| 6-6.9 | 6 | 0.9 |
| 7+ | 2 | 0.3 |
| Unable to Measure | 12 | 1.7 |
| Inspected Showerheads | 693 | |

| Statistical Parameters | |
|---|---|
| N | 681 |
| Min | 0.5 |
| Max | 15 |
| Mean | 2.7 |
| Std Dev | 1.1 |
| Median | 2.5 |
| Mode | 2.5 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 3.1 | 0.1 |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| <1 | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (0.7%) |
| 1-1.9 | 19 (7.8%) | 53 (11.8%) | 48 (10.2%) | 9 (10.2%) | 15 (11.0%) |
| 2-2.9 | 134 (54.7%) | 271 (60.5%) | 267 (56.9%) | 54 (61.4%) | 84 (61.8%) |
| 3-3.9 | 27 (11.0%) | 61 (13.6%) | 56 (11.9%) | 17 (19.3%) | 15 (11.0%) |
| 4-4.9 | 47 (19.2%) | 30 (6.7%) | 60 (12.8%) | 6 (6.8%) | 11 (8.1%) |
| 5-5.9 | 13 (5.3%) | 17 (3.8%) | 25 (5.3%) | 0 (0.0%) | 5 (3.7%) |
| 6-6.9 | 3 (1.2%) | 3 (0.7%) | 6 (1.3%) | 0 (0.0%) | 0 (0.0%) |
| 7+ | 0 (0.0%) | 2 (0.4%) | 2 (0.4%) | 0 (0.0%) | 0 (0.0%) |
| Unable to Measure | 1 (0.4%) | 11 (2.5%) | 5 (1.1%) | 2 (2.3%) | 5 (3.7%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| <1 | 0 (0.0%) | 1 (0.5%) | 0 (0.0%) | 0 (0.0%) |
| 1-1.9 | 43 (11.7%) | 18 (8.7%) | 4 (4.8%) | 7 (19.4%) |
| 2-2.9 | 200 (54.6%) | 122 (58.9%) | 62 (73.8%) | 21 (58.3%) |
| 3-3.9 | 47 (12.8%) | 24 (11.6%) | 9 (10.7%) | 8 (22.2%) |
| 4-4.9 | 53 (14.5%) | 20 (9.7%) | 4 (4.8%) | 0 (0.0%) |
| 5-5.9 | 15 (4.1%) | 12 (5.8%) | 3 (3.6%) | 0 (0.0%) |
| 6-6.9 | 1 (0.3%) | 3 (1.4%) | 2 (2.4%) | 0 (0.0%) |
| 7+ | 0 (0.0%) | 2 (1.0%) | 0 (0.0%) | 0 (0.0%) |
| Unable to Measure | 7 (1.9%) | 5 (2.4%) | 0 (0.0%) | 0 (0.0%) |

| Showerhead Type | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Atomizing | 59 | 8.5 |
| Stream/Spray | 632 | 91.5 |
| Inspected Showerheads | 691 | |
| Surveys with No Response | 2 | |

| Showerhead Style | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Fixed | 546 | 78.9 |
| Handheld | 146 | 21.1 |
| Inspected Showerheads | 692 | |
| Surveys with No Response | 1 | |

| Showerhead Shut-off | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 78 | 11.3 |
| No | 611 | 88.3 |
| Don't Know | 3 | 0.4 |
| Inspected Showerheads | 692 | |
| Surveys with No Response | 1 | |

| Leaks in Shower | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| None | 536 | 77.3 |
| Showerhead | 54 | 7.8 |
| Diverter Valve | 94 | 13.6 |
| Shutoff Valve | 9 | 1.3 |
| Inspected Showers | 693 | |

7. List the total number of bathtubs at this location.

| No. of Bathtubs | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 10 | 2.6 |
| 1 | 276 | 71.3 |
| 2 | 86 | 22.2 |
| 3 | 13 | 3.4 |
| 4 | 1 | 0.3 |
| 5 | 0 | 0.0 |
| 6 | 1 | 0.3 |
| Survey Responses | 387 | |

| Statistical Parameters | |
|---|---|
| N | 387 |
| Min | 0 |
| Max | 6 |
| Mean | 1.3 |
| Std Dev | 0.6 |
| Median | 1 |
| Mode | 1 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 4.8 | 0.1 |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| 0 | 1 (1.0%) | 9 (3.1%) | 8 (3.3%) | 2 (3.1%) | 0 (0.0%) |
| 1 | 58 (59.2%) | 218 (75.4%) | 164 (66.7%) | 52 (81.3%) | 60 (77.9%) |
| 2 | 30 (30.6%) | 56 (19.4%) | 60 (24.4%) | 1 (1.6%) | 16 (20.8%) |
| 3 | 7 (7.1%) | 6 (2.1%) | 12 (4.9%) | 0 (0.0%) | 1 (1.3%) |
| 4 | 1 (1.0%) | 0 (0.0%) | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) |
| 5 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 6 | 1 (1.0%) | 0 (0.0%) | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| 0 | 92 (20.4%) | 40 (16.7%) | 24 (24.7%) | 23 (59.0%) |
| 1 | 42 (9.3%) | 25 (10.4%) | 3 (3.1%) | 8 (20.5%) |
| 2 | 61 (13.5%) | 39 (16.3%) | 15 (15.5%) | 4 (10.3%) |
| 3 | 106 (23.5%) | 53 (22.1%) | 29 (29.9%) | 4 (10.3%) |
| 4 | 62 (13.7%) | 38 (15.8%) | 15 (15.5%) | 0 (0.0%) |
| 5 | 26 (5.8%) | 22 (9.2%) | 5 (5.2%) | 0 (0.0%) |
| 6 | 12 (2.7%) | 11 (4.6%) | 4 (4.1%) | 0 (0.0%) |

8. For each bathtub, list:

| Bathtub Length (in) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <36 | 3 | 0.6 |
| 36-45 | 9 | 1.9 |
| 46-55 | 372 | 78.8 |
| 56-65 | 87 | 18.4 |
| 66-75 | 1 | 0.2 |
| Inspected Bathtubs | 472 | |

| Statistical Parameters | |
|---|---|
| N | 472 |
| Min | 23.5 |
| Max | 72 |
| Mean | 53.2 |
| Std Dev | 4.3 |
| Median | 53 |
| Mode | 54 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 0.7 | 0.4 |

| Bathtub Width (in) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <21 | 12 | 2.5 |
| 21-30 | 433 | 91.7 |
| 31-40 | 19 | 4.0 |
| 41-50 | 4 | 0.8 |
| 51-60 | 3 | 0.6 |
| Unable to Measure | 1 | 0.2 |
| Inspected Bathtubs | 472 | |

| Statistical Parameters | |
|---|---|
| N | 471 |
| Min | 12 |
| Max | 60 |
| Mean | 24.3 |
| Std Dev | 1.3 |
| Median | 24 |
| Mode | 24 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 1.6 | 0.4 |

| Bathtub Depth (in) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <5.5 | 3 | 0.6 |
| 5.5-10 | 229 | 48.5 |
| 10.5-15 | 224 | 47.5 |
| 15.5-20 | 15 | 3.2 |
| 20 Unable to.5-25 | 1 | 0.2 |
| Inspected Bathtubs | 472 | |

| Statistical Parameters | |
|---|---|
| N | 472 |
| Min | 2 |
| Max | 23 |
| Mean | 11.0 |
| Std Dev | 2.0 |
| Median | 11 |
| Mode | 10 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 1.7 | 0.2 |

| Volume of Water in Bathtub (gal) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <40 | 7 | 1.5 |
| 40-49.9 | 95 | 20.2 |
| 50-59.9 | 163 | 34.6 |
| 60-69.9 | 117 | 24.8 |
| 70-79.9 | 48 | 10.2 |
| 80-99.9 | 19 | 4.0 |
| 100+ | 21 | 4.5 |
| Unable to Measure | 1 | 0.2 |
| Inspected Bathtubs | 471 | |

| Statistical Parameters | |
|---|---|
| N | 470 |
| Min | 18.5 |
| Max | 174.6 |
| Mean | 61.8 |
| Std Dev | 19.0 |
| Median | 57.2 |
| Mode | 53.3 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 2.8 | 1.7 |

| Jacuzzi/Spa in Bathtub | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 26 | 5.5 |
| No | 446 | 94.5 |
| Don't Know | 0 | 0.0 |
| Inspected Bathtubs | 472 | |

9. List the total number of faucets at this location.

| No. of Faucets | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 3 | 0.8 |
| 2 | 91 | 23.6 |
| 3 | 117 | 30.3 |
| 4 | 72 | 18.7 |
| 5 | 46 | 11.9 |
| 6 | 26 | 6.7 |
| 7 | 15 | 3.9 |
| 8 | 12 | 3.1 |
| 9 | 3 | 0.8 |
| 10 | 1 | 0.3 |
| Survey Responses | 386 | |
| Surveys with No Response | 0* | |

| Statistical Parameters | |
|---|---|
| N | 386 |
| Min | 1 |
| Max | 10 |
| Mean | 3.8 |
| Std Dev | 1.7 |
| Median | 3 |
| Mode | 3 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 4.4 | 0.2 |

* One value of 30 (collected at a Buddhist monastery) was not included in the determination of statistical parameters as it was considered not representative of single-family dwellings.

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| 1 | 0 (0.0%) | 3 (1.0%) | 3 (1.2%) | 0 (0.0%) | 0 (0.0%) |
| 2 | 7 (7.2%) | 84 (29.1%) | 51 (20.8%) | 31 (48.4%) | 9 (11.7%) |
| 3 | 23 (23.7%) | 94 (32.5%) | 68 (27.8%) | 24 (37.5%) | 25 (32.5%) |
| 4 | 21 (21.6%) | 51 (17.6%) | 45 (18.4%) | 4 (6.3%) | 12 (15.6%) |
| 5 | 14 (14.4%) | 32 (11.1%) | 32 (13.1%) | 3 (4.7%) | 11 (14.3%) |
| 6 | 14 (14.4%) | 12 (4.2%) | 17 (6.9%) | 2 (3.1%) | 7 (9.1%) |
| 7 | 10 (10.3%) | 5 (1.7%) | 14 (5.7%) | 0 (0.0%) | 1 (1.3%) |
| 8 | 5 (5.2%) | 7 (2.4%) | 11 (4.5%) | 0 (0.0%) | 1 (1.3%) |
| 9 | 2 (2.1%) | 1 (0.3%) | 3 (1.2%) | 0 (0.0%) | 0 (0.0%) |
| 10 | 1 (1.0%) | 0 (0.0%) | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| 1 | 3 (1.3%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 2 | 73 (32.2%) | 13 (12.4%) | 5 (12.5%) | 0 (0.0%) |
| 3 | 79 (34.8%) | 31 (29.5%) | 6 (15.0%) | 1 (7.1%) |
| 4 | 36 (15.9%) | 27 (25.7%) | 9 (22.5%) | 0 (0.0%) |
| 5 | 22 (9.7%) | 16 (15.2%) | 5 (12.5%) | 3 (21.4%) |
| 6 | 10 (4.4%) | 10 (9.5%) | 3 (7.5%) | 3 (21.4%) |
| 7 | 1 (0.4%) | 4 (3.8%) | 5 (12.5%) | 5 (35.7%) |
| 8 | 3 (1.3%) | 3 (2.9%) | 6 (15.0%) | 0 (0.0%) |
| 9 | 0 (0.0%) | 1 (1.0%) | 1 (2.5%) | 1 (7.1%) |
| 10 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (7.1%) |

10. For each faucet, list:

| Faucet Type | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Kitchen | 392 | 27.8 |
| Bathroom | 888 | 63.1 |
| Utility | 112 | 8.0 |
| Other | 16 | 1.1 |
| Inspected Faucets | 1408 | |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| Kitchen | 101 (21.0%) | 291 (31.4%) | 249 (26.3%) | 61 (35.7%) | 82 (28.4%) |
| Bathroom | 335 (69.6%) | 553 (59.7%) | 607 (64.0%) | 103 (60.2%) | 178 (61.6%) |
| Utility | 37 (7.7%) | 75 (8.1%) | 81 (8.5%) | 7 (4.1%) | 24 (8.3%) |
| Other | 8 (1.7%) | 8 (0.9%) | 11 (1.2%) | 0 (0.0%) | 5 (1.7%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| Kitchen | 232 (31.7%) | 104 (25.1%) | 42 (23.7%) | 14 (16.5%) |
| Bathroom | 433 (559.2%) | 272 (65.7%) | 119 (67.2%) | 64 (75.3%) |
| Utility | 62 (8.5%) | 31 (7.5%) | 13 (7.3%) | 6 (7.1%) |
| Other | 5 (0.7%) | 7 (1.7%) | 3 (1.7%) | 1 (1.2%) |

| Gallons per Minute for Faucet | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <1 | 4 | 0.3 |
| 1-1.9 | 278 | 19.8 |
| 2-2.9 | 812 | 57.7 |
| 3-3.9 | 156 | 11.1 |
| 4-4.9 | 85 | 6.0 |
| 5-5.9 | 42 | 3.0 |
| 6-6.9 | 24 | 1.7 |
| 7+ | 1 | 0.1 |
| Unable to Measure | 6 | 0.4 |
| Inspected Faucets | 1408 | |

| Statistical Parameters | |
|---|---|
| N | 1402 |
| Min | 0.5 |
| Max | 7 |
| Mean | 2.4 |
| Std Dev | 1.0 |
| Median | 2 |
| Mode | 2 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 2.1 | 0.1 |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| <1 | 1 (0.2%) | 3 (0.3%) | 2 (0.2%) | 1 (0.6%) | 1 (0.3%) |
| 1-1.9 | 88 (18.3%) | 190 (20.5%) | 200 (21.1%) | 29 (17.0%) | 49 (17.0%) |
| 2-2.9 | 317 (65.9%) | 495 (53.4%) | 546 (57.6%) | 94 (55.0%) | 172 (59.5%) |
| 3-3.9 | 37 (7.7%) | 119 (12.8%) | 98 (10.3%) | 24 (14.0%) | 34 (11.8%) |
| 4-4.9 | 25 (5.2%) | 60 (6.5%) | 55 (5.8%) | 11 (6.4%) | 19 (6.6%) |
| 5-5.9 | 6 (1.2%) | 36 (3.9%) | 26 (2.7%) | 8 (4.7%) | 8 (2.8%) |
| 6-6.9 | 5 (1.0%) | 19 (2.0%) | 16 (1.7%) | 4 (2.3%) | 4 (1.4%) |
| 7+ | 1 (0.2%) | 0 (0.0%) | 1 (0.1%) | 0 (0.0%) | 0 (0.0%) |
| Unable to Measure | 1 (0.2%) | 5 (0.5%) | 4 (0.4%) | 0 (0.0%) | 2 (0.7%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| <1 | 3 (0.4%) | 1 (0.2%) | 0 (0.0%) | 0 (0.0%) |
| 1-1.9 | 129 (17.6%) | 76 (18.4%) | 33 (18.6%) | 40 (47.1%) |
| 2-2.9 | 413 (56.4%) | 236 (57.0%) | 123 (69.5%) | 40 (47.1%) |
| 3-3.9 | 83 (11.3%) | 61 (14.7%) | 9 (5.1%) | 3 (3.5%) |
| 4-4.9 | 53 (7.2%) | 22 (5.3%) | 8 (4.5%) | 2 (2.4%) |
| 5-5.9 | 30 (4.1%) | 9 (2.2%) | 3 (1.7%) | 0 (0.0%) |
| 6-6.9 | 15 (2.0%) | 8 (1.9%) | 1 (0.6%) | 0 (0.0%) |
| 7+ | 0 (0.0%) | 1 (0.2%) | 0 (0.0%) | 0 (0.0%) |
| Unable to Measure | 6 (0.8%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |

| Aerator Attached to Faucet | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 1203 | 85.4 |
| No | 205 | 14.6 |
| Don't Know | 0 | 0.0 |
| Inspected Faucets | 1408 | |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| Yes | 436 (90.6%) | 767 (82.7%) | 809 (85.3%) | 131 (76.6%) | 263 (91.0%) |
| No | 45 (9.4%) | 160 (17.3%) | 139 (14.7%) | 40 (23.4%) | 26 (9.0%) |
| Don't Know | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| Yes | 588 (80.3%) | 370 (89.4%) | 162 (91.5%) | 83 (97.6%) |
| No | 144 (19.7%) | 44 (10.6%) | 15 (8.5%) | 2 (2.4%) |
| Don't Know | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |

| Leaks in Faucet | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 31 | 2.2 |
| No | 1372 | 97.4 |
| Don't Know | 5 | 0.4 |
| Inspected Faucets | 1408 | |

11. List the total number of dishwashers at this location.

| No. of Dishwashers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 140 | 36.2 |
| 1 | 246 | 63.6 |
| 2 | 1 | 0.3 |
| Survey Responses | 387 | |

| Statistical Parameters | |
|---|---|
| N | 387 |
| Min | 0 |
| Max | 2 |
| Mean | 0.6 |
| Std Dev | 0.5 |
| Median | 1 |
| Mode | 1 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 7.6 | 0.0 |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| 0 | 7 (7.1%) | 133 (46.0%) | 75 (30.5%) | 45 (70.3%) | 20 (26.0%) |
| 1 | 91 (92.9%) | 155 (53.6%) | 171 (69.5%) | 19 (29.7%) | 56 (72.7%) |
| 2 | 0 (0.0%) | 1 (0.3%) | 0 (0.0%) | 0 (0.0%) | 1 (1.3%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| 0 | 118 (51.8%) | 15 (14.3%) | 7 (17.5%) | 0 (0.0%) |
| 1 | 109 (47.8%) | 91 (85.7%) | 33 (82.5%) | 14 (100.0%) |
| 2 | 1 (1.04%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |

12. For each dishwasher, list::

| Manufacturer/Make/ Model of Dishwasher | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Amana | 3 | 1.2 |
| Bosch | 11 | 4.5 |
| Caloric | 1 | 0.4 |
| Fisher & Paykel | 2 | 0.8 |
| Frigidaire | 5 | 2.1 |
| GE | 53 | 21.8 |
| Glenwood | 1 | 0.4 |
| Hotpoint | 5 | 2.1 |
| Jenn Air | 4 | 1.6 |
| Kenmore | 21 | 8.6 |
| Kitchen Aid | 51 | 21.0 |
| Magic Chef | 3 | 1.2 |
| Maytag | 36 | 14.8 |
| Miele | 2 | 0.8 |
| Montgomery Ward | 3 | 1.2 |
| Tappan | 1 | 0.4 |
| Whirlpool | 34 | 14.0 |
| White-Westinghouse | 1 | 0.4 |
| Don't Know | 6 | 2.5 |
| Inspected Dishwashers | 243 | |

| Water Efficiency Setting on Dishwasher | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 210 | 86.4 |
| No | 26 | 10.7 |
| Don't Know | 7 | 2.9 |
| Inspected Dishwashers | 243 | |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| Yes | 83 (93.3%) | 127 (82.5%) | 150 (89.3%) | 13 (68.4%) | 47 (83.9%) |
| No | 6 (6.7%) | 20 (13.0%) | 14 (8.3%) | 5 (26.3%) | 7 (12.5%) |
| Don't Know | 0 (0.0%) | 7 (4.5%) | 4 (2.4%) | 1 (5.3%) | 2 (3.6%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| Yes | 93 (85.3%) | 74 (84.1%) | 31 (93.9%) | 12 (92.3%) |
| No | 13 (11.9%) | 12 (13.6%) | 1 (3.0%) | 0 (0.0%) |
| Don't Know | 3 (2.8%) | 2 (2.3%) | 1 (3.0%) | 1 (7.7%) |

13. List the total number of clothes washing machines at this location.

| No. of Clothes Washing Machines | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 31 | 8.0 |
| 1 | 350 | 90.4 |
| 2 | 6 | 1.6 |
| Survey Responses | 387 | |

| Statistical Parameters | |
|---|---|
| N | 387 |
| Min | 0 |
| Max | 2 |
| Mean | 0.9 |
| Std Dev | 0.3 |
| Median | 1 |
| Mode | 1 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 3.2 | 0.03 |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| 0 | 0 (0.0%) | 31 (10.7%) | 16 (6.5%) | 12 (18.8%) | 3 (3.9%) |
| 1 | 96 (98.0%) | 254 (87.9%) | 226 (91.9%) | 52 (81.3%) | 72 (93.5%) |
| 2 | 2 (2.0%) | 4 (1.4%) | 4 (1.6%) | 0 (0.0%) | 2 (2.6%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| 0 | 20 (8.8%) | 8 (7.6%) | 3 (7.5%) | 0 (0.0%) |
| 1 | 205 (89.9%) | 95 (90.5%) | 36 (90.0%) | 14 (100.0%) |
| 2 | 3 (1.3%) | 2 (1.9%) | 1 (2.5%) | 0 (0.0%) |

14. For each clothes washing machine, list:

| Manufacturer/Make/ Model of Clothes Washing Machine | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Admiral | 10 | 2.8 |
| Amana | 2 | 0.6 |
| Creda | 2 | 0.6 |
| Equator | 1 | 0.3 |
| Estate | 1 | 0.3 |
| Frigidaire | 6 | 1.7 |
| GE | 27 | 7.6 |
| Hotpoint | 6 | 1.7 |
| Imperial | 3 | 0.8 |
| Jenn Air | 1 | 0.3 |
| Kenmore | 118 | 33.3 |
| Kirkland | 2 | 0.6 |
| Kitchen Aid | 6 | 1.7 |
| Lady Kenmore | 2 | 0.6 |
| Magic Chef | 2 | 0.6 |
| Maytag | 86 | 24.3 |
| Motgomery Ward | 1 | 0.3 |
| Roper | 3 | 0.8 |
| Roper/Whirlpool | 1 | 0.3 |
| Sears & Roebuck | 1 | 0.3 |
| Speed Queen | 5 | 1.4 |
| Whirlpool | 64 | 18.1 |
| White-Westinghouse | 2 | 0.6 |
| Don't Know | 2 | 0.6 |
| Inspected Clothes Washing Machines | 354 | |

| Type of Clothes Washing Machine | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Standard Efficiency | 308 | 87.5 |
| High Efficiency | 43 | 12.2 |
| Don't Know | 1 | 0.3 |
| Inspected Clothes Washing Machines | 352 | |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| Standard Efficiency | 83 (85.6%) | 225 (88.2%) | 198 (87.2%) | 45 (88.2%) | 65 (87.8%) |
| High Efficiency | 13 (13.4%) | 30 (11.8%) | 28 (12.3%) | 6 (11.8%) | 9 (12.2%) |
| Don't Know | 1 (1.0%) | 0 (0.0%) | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| Standard Efficiency | 188 (91.3%) | 79 (83.2%) | 29 (76.3%) | 12 (92.3%) |
| High Efficiency | 18 (8.7%) | 16 (16.8%) | 8 (21.1%) | 1 (7.7%) |
| Don't Know | 0 (0.0%) | 0 (0.0%) | 1 (2.6%) | 0 (0.0%) |

| Water Efficiency Setting for Clothes Washing Machine | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 317 | 90.1 |
| No | 29 | 8.2 |
| Don't Know | 6 | 1.7 |
| Inspected Clothes Washing Machines | 352 | |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| Yes | 92 (94.8%) | 225 (88.2%) | 204 (89.9%) | 46 (90.2%) | 67 (90.5%) |
| No | 2 (2.1%) | 27 (10.6%) | 19 (8.4%) | 4 (7.8%) | 6 (8.1%) |
| Don't Know | 3 (3.1%) | 3 (1.2%) | 4 (1.8%) | 1 (2.0%) | 1 (1.4%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| Yes | 180 (87.4%) | 89 (93.7%) | 37 (97.4%) | 11 (84.6%) |
| No | 23 (11.2%) | 5 (5.3%) | 0 (0.0%) | 1 (7.7%) |
| Don't Know | 3 (1.5%) | 1 (1.1%) | 1 (2.6%) | 1 (7.7%) |

15. Does this location use recirculating hot water?

| Recirculating Hot Water | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 17 | 4.4 |
| No | 356 | 92.0 |
| Don't Know | 14 | 3.6 |
| Survey Responses | 387 | |

16. Does this location use commercially-delivered bottled water?

| Commercially-Delivered Bottled Water | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 31 | 8.0 |
| No | 356 | 92.0 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 387 | |

17. Does the refrigerator have a built-in water dispenser?

| Built-In Water Dispenser | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 100 | 26.4 |
| No | 279 | 73.6 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 379 | |
| Surveys with No Response | 8 | |

18. Does the refrigerator have a built-in icemaker?

| Built-In Icemaker | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 158 | 41.7 |
| No | 220 | 58.0 |
| Don't Know | 1 | 0.3 |
| Survey Responses | 379 | |
| Surveys with No Response | 8 | |

19. Does this location have a water softener?

| Water Softener | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 2* | |
| No | 380 | 99.0 |
| Don't Know | 2 | 0.5 |
| Survey Responses | 384 | |
| Surveys with No Response | 3 | |

* None of the respondents provided information on the make/model, capacity, or number of months elapsed between unit recharging of the water softener.

20. Does this location have "hot water on demand" feature (point-source water heaters)?

| Point-Source Water Heaters | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 30 | 7.8 |
| No | 351 | 91.6 |
| Don't Know | 2 | 0.5 |
| Survey Responses | 383 | |
| Surveys with No Response | 4 | |

21. Does this location operate any water purification units?

| Water Purification Units | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 66 | 17.2 |
| No | 317 | 82.8 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 383 | |
| Surveys with No Response | 4 | |

21a. [IF WATER PURIFICATION UNIT] List:

| Type of Water Purification Units | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Osmosis | 10 | 15.2 |
| Carbon Filters | 44 | 66.7 |
| Other Media Filters | 2 | 3.0 |
| Don't Know | 10 | 15.2 |
| Survey Responses | 66 | |

| No. of Water Purification Units | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 54 | 81.8 |
| 2 | 2 | 3.0 |
| No Response | 10 | 15.2 |
| Survey Responses | 66 | |

| Location of Water Purification Units | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Kitchen | 52 | 78.8 |
| Bathroom | 0 | 0.0 |
| Other | 4 | 6.1 |
| No Response | 10 | 15.2 |
| Survey Responses | 66 | |

22. Does this location have any evaporative coolers?

| Evaporative Coolers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 7 | 1.8 |
| No | 366 | 95.1 |
| Don't Know | 12 | 3.1 |
| Survey Responses | 385 | |
| Surveys with No Response | 2 | |

22a. [IF YES] How many months per year are the evaporative coolers most commonly used?

| No. of Months per Year of Evaporative Cooler Use | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 0 | 0.0 |
| 2 | 0 | 0.0 |
| 3 | 2 | 28.6 |
| 4 | 2 | 28.6 |
| 5 | 1 | 14.3 |
| 6 | 1 | 14.3 |
| No Response | 1 | 14.3 |
| Survey Responses | 7 | |

22b. Which months are the evaporative coolers most commonly used?

| Months | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Jan | 0 | 0.0 |
| Feb | 0 | 0.0 |
| Mar | 0 | 0.0 |
| Apr | 0 | 0.0 |
| May | 3 | 12.0 |
| June | 5 | 20.0 |
| July | 6 | 24.0 |
| August | 5 | 20.0 |
| September | 4 | 16.0 |
| October | 1 | 4.0 |
| November | 0 | 0.0 |
| December | 0 | 0.0 |
| Don't Know | 0 | 0.0 |
| No Response | 1 | 4.0 |
| Survey Responses | 25 | |

23. Are there any water pressure regulators off the incoming line at this location?

| Water Pressure Regulators | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 54 | 15.4 |
| No | 196 | 56.0 |
| Don't Know | 100 | 28.6 |
| Survey Responses | 350 | |
| Surveys with No Response | 37 | |

23a. [IF YES] Where are the pressure regulators used?

| Water Pressure Regulator Use | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Indoor | 12 | 37.5 |
| Outdoor | 12 | 37.5 |
| Both | 8 | 25.0 |
| Survey Responses | 32 | |
| Surveys with No Response | 22 | |

24. Are there any other indoor water-using appliances/fixtures?

| Other Indoor Water-Using Appliances/Fixtures | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 20 | 5.2 |
| No | 362 | 93.8 |
| Don't Know | 4 | 1.0 |
| Survey Responses | 386 | |
| Surveys with No Response | 1 | |

24a. [IF YES] Please list type of water-using appliance/fixture.

| Type of Other Indoor Water-Using Appliances/Fixtures | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Fish Tank | 10 | 50.0 |
| Refrigerator | 1 | 5.0 |
| Extra Water Heater | 2 | 10.0 |
| Ice Maker at Bar | 1 | 5.0 |
| Fountain | 1 | 5.0 |
| Water Fountain | 1 | 5.0 |
| Bidet | 1 | 5.0 |
| Plant | 1 | 5.0 |
| Unidentified | 2 | 10.0 |
| Survey Responses | 20 | |

25. How many swimming pools are at this location?

| No. of Swimming Pools | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 347 | 89.7 |
| 1 | 40 | 10.3 |
| Survey Responses | 387 | |

25a. [IF SWIMMING POOL] List:

| Swimming Pool Length (ft) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 11-20 | 4 | 11.1 |
| 21-30 | 12 | 33.3 |
| 31-40 | 17 | 47.2 |
| 41-50 | 2 | 5.6 |
| 51-60 | 1 | 2.8 |
| Inspected Pools | 36 | |
| Not Inspected | 4 | |

| Statistical Parameters | |
|---|---|
| N | 36 |
| Min | 15 |
| Max | 52.5 |
| Mean | 31.7 |
| Std Dev | 8.6 |
| Median | 32.5 |
| Mode | 25 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 8.8 | 2.8 |

| Swimming Pool Width (ft) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <11 | 4 | 11.1 |
| 11-20 | 27 | 75.0 |
| 21-30 | 3 | 8.3 |
| 31-40 | 2 | 5.6 |
| Inspected Pools | 36 | |
| Not Inspected | 4 | |

| Statistical Parameters | |
|---|---|
| N | 36 |
| Min | 6 |
| Max | 39 |
| Mean | 17.2 |
| Std Dev | 7.1 |
| Median | 15.5 |
| Mode | 12 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 13.5 | 2.3 |

| Average Depth of Swimming Pool (ft) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 2.1-4 | 5 | 13.9 |
| 4.1-6 | 24 | 66.7 |
| 6.1-8 | 6 | 16.7 |
| 8.1-10 | 1 | 2.8 |
| Inspected Pools | 36 | |
| Not Inspected | 4 | |

| Statistical Parameters | |
|---|---|
| N | 36 |
| Min | 3 |
| Max | 10 |
| Mean | 5.5 |
| Std Dev | 1.3 |
| Median | 5.25 |
| Mode | 6 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 7.7 | 0.4 |

| Swimming Pool Volume (gal) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <10,000 | 3 | 8.3 |
| 10,000-19,999 | 13 | 36.1 |
| 20,000-29,999 | 13 | 36.1 |
| 30,000+ | 7 | 19.4 |
| Inspected Pools | 36 | |
| Not Inspected | 4 | |

| Statistical Parameters | |
|---|---|
| N | 36 |
| Min | 2692.8 |
| Max | 61395.84 |
| Mean | 22857.3 |
| Std Dev | 11954.0 |
| Median | 23562 |
| Mode | 13464 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 17.1 | 3905.0 |

| Swimming Pool Location | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Indoor | 0 | 0.0 |
| Outdoor | 40 | 100.0 |
| Inspected Pools | 40 | |

| Pool Cover on Swimming Pool | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 16 | 40.0 |
| No | 20 | 50.0 |
| Don't Know | 4 | 10.0 |
| Inspected Pools | 40 | |

26. How many spas/jacuzzis are at this location?

| No. of Spas/Jacuzzis | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 340 | 87.9 |
| 1 | 47 | 12.1 |
| Survey Responses | 387 | |

26a. [IF SPA/JACUZZI] List:

| Spa/Jacuzzi Length (ft) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <3.1 | 2 | 5.3 |
| 3.1-6 | 22 | 57.9 |
| 6.1-9 | 10 | 26.3 |
| 9.1-12 | 4 | 10.5 |
| Inspected Spas | 38 | |
| Not Inspected | 9 | |

| Statistical Parameters | |
|---|---|
| N | 38 |
| Min | 3 |
| Max | 12 |
| Mean | 6.2 |
| Std Dev | 2.0 |
| Median | 6 |
| Mode | 6 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 10.3 | 0.6 |

| Spa/Jacuzzi Width (ft) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <2.1 | 0 | 0.0 |
| 2.1-4 | 15 | 39.5 |
| 4.1-6 | 14 | 36.8 |
| 6.1-8 | 8 | 21.1 |
| 8.1-10 | 1 | 2.6 |
| Inspected Spas | 38 | |
| Not Inspected | 9 | |

| Statistical Parameters | |
|---|---|
| N | 38 |
| Min | 2.5 |
| Max | 10 |
| Mean | 5.2 |
| Std Dev | 1.8 |
| Median | 5.25 |
| Mode | 6 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 11.1 | 0.6 |

| Average Spa/Jacuzzi Depth (ft) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <1.1 | 1 | 2.6 |
| 1.1-2 | 6 | 15.8 |
| 2.1-3 | 20 | 52.6 |
| 3.1-4 | 10 | 26.3 |
| 4.1-5 | 1 | 2.6 |
| Inspected Spas | 38 | |
| Not Inspected | 9 | |

| Statistical Parameters | |
|---|---|
| N | 38 |
| Min | 1 |
| Max | 5 |
| Mean | 2.9 |
| Std Dev | 0.9 |
| Median | 2.5 |
| Mode | 2.5 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 9.8 | 0.3 |

| Water in Spa/Jacuzzi (gal) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <1000 | 31 | 81.6 |
| 1000-2000 | 6 | 15.8 |
| 2000+ | 1 | 2.6 |
| Inspected Spas | 38 | |
| Not Inspected | 9 | |

| Statistical Parameters | |
|---|---|
| N | 38 |
| Min | 75 |
| Max | 3740 |
| Mean | 766 |
| Std Dev | 785 |
| Median | 673 |
| Mode | 673.2 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 26.8 | 205 |

| Spa/Jacuzzi Location | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Indoor | 5 | 12.5 |
| Outdoor | 35 | 87.5 |
| Inspected Spas | 40 | |
| Not Inspected | 7 | |

| Cover on Spa/Jacuzzi | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 24 | 60.0 |
| No | 16 | 40.0 |
| Inspected Spas | 40 | |
| Not Inspected | 7 | |

27. How many fountains or ponds are at this location?

| No. of Fountains/Ponds | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 358 | 92.5 |
| 1 | 24 | 6.2 |
| 2 | 4 | 1.0 |
| 3 | 1 | 0.3 |
| Survey Responses | 387 | |

27a. [IF FOUNTAIN OR POND] List:

| Fountain/Pond Length (ft) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <5.1 | 20 | 60.6 |
| 5.1-10 | 5 | 15.2 |
| 10.1-15 | 1 | 3.0 |
| 15.1-20 | 3 | 9.1 |
| 20.1+ | 2 | 6.1 |
| Unable to Measure | 2 | 6.1 |
| Inspected Fountains\Ponds | 33 | |
| Not Inspected | 2 | |

| Statistical Parameters | |
|---|---|
| N | 31 |
| Min | 1 |
| Max | 45 |
| Mean | 7.6 |
| Std Dev | 9.2 |
| Median | 4 |
| Mode | 3 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 42.6 | 3.2 |

| Fountain/Pond Width (ft) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <2.1 | 9 | 27.3 |
| 2.1-4 | 13 | 39.4 |
| 4.1-6 | 6 | 18.2 |
| 6.1-8 | 1 | 3.0 |
| 8.1-10 | 0 | 0.0 |
| 10.1+ | 2 | 6.1 |
| Unable to Measure | 2 | 6.1 |
| Fountains\Ponds | 33 | |
| Not Inspected | 2 | |

| Statistical Parameters | |
|---|---|
| N | 31 |
| Min | 0.5 |
| Max | 21 |
| Mean | 4.5 |
| Std Dev | 4.4 |
| Median | 4 |
| Mode | 4 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 34.2 | 1.5 |

| Average Depth of Fountain/Pond (ft) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <2.1 | 23 | 69.7 |
| 2.1-4 | 3 | 9.1 |
| 4.1-6 | 1 | 3.0 |
| 6.1-8 | 2 | 6.1 |
| 8.1+ | 1 | 3.0 |
| Unable to Measure | 3 | 9.1 |
| Inspected Fountains\Ponds | 33 | |
| Not Inspected | 2 | |

| Statistical Parameters | |
|---|---|
| N | 30 |
| Min | 0.5 |
| Max | 16 |
| Mean | 2.5 |
| Std Dev | 3.2 |
| Median | 1.25 |
| Mode | 1 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 45.7 | 1.1 |

| Fountains/Ponds Volume with < 100 gal Capacity | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <15 | 3 | 20.0 |
| 15-30 | 2 | 13.3 |
| 31-45 | 3 | 20.0 |
| 46-60 | 3 | 20.0 |
| 61-75 | 1 | 6.7 |
| Unable to Measure | 3 | 20.0 |
| Inspected Fountains\Ponds | 15 | |

| Statistical Parameters | |
|---|---|
| N | 12 |
| Min | 1.87 |
| Max | 89.76 |
| Mean | 42.9 |
| Std Dev | 27.9 |
| Median | 44.88 |
| Mode | 44.88 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 36.7 | 15.8 |

| Fountain/ Ponds Volume with 100-500 gal Capacity | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 100-200 | 5 | 55.6 |
| 201-300 | 1 | 11.1 |
| 301-400 | 3 | 33.3 |
| 401-500 | 0 | 0.0 |
| Unable to Measure | 0 | 0.0 |
| Inspected Fountains\Ponds | 9 | |

| Statistical Parameters | |
|---|---|
| N | 9 |
| Min | 101.0 |
| Max | 359.0 |
| Mean | 214.2 |
| Std Dev | 108.5 |
| Median | 157.1 |
| Mode | 119.7 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 33.1 | 70.9 |

| Fountain/Ponds Volume with 500-2500 gal Capacity | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 500-1000 | 2 | 28.6 |
| 1001-1500 | 1 | 14.3 |
| 1501-2000 | 4 | 57.1 |
| 2001-2500 | 0 | 0.0 |
| Unable to Measure | 0 | 0.0 |
| Inspected Fountains\Ponds | 7 | |

| Statistical Parameters | |
|---|---|
| N | 7 |
| Min | 748 |
| Max | 1914.9 |
| Mean | 1487.5 |
| Std Dev | 494.9 |
| Median | 1795.2 |
| Mode | 1795.2 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 24.6 | 366.6 |

| Large Ponds Volume (gal) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 6597.4 | 1 | 50.0 |
| 42411.6 | 1 | 50.0 |
| Inspected Fountains/Ponds | 2 | |

| Recirculating Water in Fountain/Pond | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 29 | 87.9 |
| No | 3 | 9.1 |
| Don't Know | 1 | 3.0 |
| Inspected Fountains/Ponds | 33 | |
| Not Inspected | 2 | |

28. Does this location have a cistern or storm water harvesting system?

| Cistern or Storm Water Harvesting System | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 2 | 0.5 |
| No | 384 | 99.2 |
| Don't Know | 1 | 0.3 |
| Survey Responses | 387 | |

29. Does this location use a gray water system?

| Graywater System | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 5 | 1.3 |
| No | 381 | 98.7 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 386 | |
| Surveys with No Response | 1 | |

30. Does this location use water from a well?

| Well Water | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 7 | 1.8 |
| No | 378 | 97.9 |
| Don't Know | 1 | 0.3 |
| Survey Responses | 386 | |
| Surveys with No Response | 1 | |

30a. [IF YES] Is the well water used for potable drinking, sanitary needs?

| Potable Well Water | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 0 | 0.0 |
| No | 5 | 100.0 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 5 | |
| Surveys with No Response | 2 | |

30b. Is the well water used for irrigation needs?

| Well Water for Irrigation | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 6 | 100.0 |
| No | 0 | 0.0 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 6 | |
| Surveys with No Response | 1 | |

30c. Is the well water used for swimming pool/spa?

| Well Water for Swimming Pool/Spa | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 0 | 0.0 |
| No | 5 | 100.0 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 5 | |
| Surveys with No Response | 2 | |

31a. Square footage of total landscapable area in the front yard?

| Landscapable Area - Front Yard ($ft^2$) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 30 | 7.8 |
| 1-1000 | 207 | 53.5 |
| 1001-2000 | 69 | 17.8 |
| 2001-3000 | 39 | 10.1 |
| 3001-4000 | 16 | 4.1 |
| 4001-5000 | 12 | 3.1 |
| 5001-6000 | 3 | 0.8 |
| 6001-7000 | 1 | 0.3 |
| 7001-8000 | 3 | 0.8 |
| 8001-9000 | 1 | 0.3 |
| 9001-10000 | 3 | 0.8 |
| 10001+ | 3 | 0.8 |
| Survey Responses | 387 | |

| Statistical Parameters | |
|---|---|
| N | 387 |
| Min | 0 |
| Max | 40000 |
| Mean | 1439.7 |
| Std Dev | 2654.6 |
| Median | 792 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 18.4 | 264.5 |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| 0 | 4 (4.1%) | 26 (9.0%) | 16 (6.5%) | 10 (15.6%) | 4 (5.2%) |
| 1-1000 | 19 (19.4%) | 188 (65.1%) | 115 (46.7%) | 44 (68.8%) | 48 (62.3%) |
| 1001-2000 | 22 (22.4%) | 47 (16.3%) | 49 (19.9%) | 9 (14.1%) | 11 (14.3%) |
| 2001-3000 | 21 (21.4%) | 18 (6.2%) | 32 (13.0%) | 0 (0.0%) | 7 (9.1%) |
| 3001-4000 | 11 (11.2%) | 5 (1.7%) | 11 (4.5%) | 1 (1.6%) | 4 (5.2%) |
| 4001-5000 | 10 (10.2%) | 2 (0.7%) | 11 (4.5%) | 0 (0.0%) | 1 (1.3%) |
| 5001-6000 | 3 (3.1%) | 0 (0.0%) | 3 (1.2%) | 0 (0.0%) | 0 (0.0%) |
| 6001-7000 | 1 (1.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (1.3%) |
| 7001-8000 | 3 (3.1%) | 0 (0.0%) | 3 (1.2%) | 0 (0.0%) | 0 (0.0%) |
| 8001-9000 | 0 (0.0%) | 1 (0.3%) | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) |
| 9001-10,000 | 1 (1.0%) | 2 (0.7%) | 2 (0.8%) | 0 (0.0%) | 1 (1.3%) |
| 10,001+ | 3 (3.1%) | 0 (0.0%) | 3 (1.2%) | 0 (0.0%) | 0 (0.0%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| 0 | 18 (7.9%) | 5 (4.8%) | 6 (15.0%) | 1 (7.1%) |
| 1-1000 | 149 (65.4%) | 37 (35.2%) | 14 (35.0%) | 7 (50.0%) |
| 1001-2000 | 28 (12.3%) | 23 (21.9%) | 8 (20.0%) | 4 (28.6%) |
| 2001-3000 | 16 (7.0%) | 17 (16.2%) | 5 (12.5%) | 1 (7.1%) |
| 3001-4000 | 7 (3.1%) | 7 (6.7%) | 2 (5.0%) | 0 (0.0%) |
| 4001-5000 | 3 (1.3%) | 6 (5.7%) | 2 (5.0%) | 1 (7.1%) |
| 5001-6000 | 2 (0.9%) | 1 (1.0%) | 0 (0.0%) | 0 (0.0%) |
| 6001-7000 | 0 (0.0%) | 1 (1.0%) | 0 (0.0%) | 0 (0.0%) |
| 7001-8000 | 2 (0.9%) | 0 (0.0%) | 1 (2.5%) | 0 (0.0%) |
| 8001-9000 | 0 (0.0%) | 0 (0.0%) | 1 (2.5%) | 0 (0.0%) |
| 9001-10,000 | 2 (0.9%) | 1 (1.0%) | 0 (0.0%) | 0 (0.0%) |
| 10,001+ | 1 (0.4%) | 1 (1.0%) | 1 (2.5%) | 0 (0.0%) |

31b. Square footage of total landscapable area in the back yard?

| Landscapable Area - Back Yard ($ft^2$) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 39 | 10.1 |
| 1-1000 | 139 | 35.9 |
| 1001-2000 | 85 | 22.0 |
| 2001-3000 | 35 | 9.0 |
| 3001-4000 | 25 | 6.5 |
| 4001-5000 | 18 | 4.7 |
| 5001-6000 | 9 | 2.3 |
| 6001-7000 | 2 | 0.5 |
| 7001-8000 | 5 | 1.3 |
| 8001-9000 | 4 | 1.0 |
| 9001-10000 | 3 | 0.8 |
| 10001+ | 23 | 5.9 |
| Survey Responses | 387 | |

| Statistical Parameters | |
|---|---|
| N | 387 |
| Min | 0 |
| Max | 43800 |
| Mean | 2640.0 |
| Std Dev | 4846.4 |
| Median | 1152 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 18.3 | 482.9 |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| 0 | 4 (4.1%) | 35 (12.1%) | 21 (8.5%) | 16 (25.0%) | 2 (2.6%) |
| 1-1000 | 14 (14.3%) | 125 (43.3%) | 78 (31.7%) | 33 (51.6%) | 28 (36.4%) |
| 1001-2000 | 16 (16.3%) | 69 (23.9%) | 64 (26.0%) | 5 (7.8%) | 16 (20.8%) |
| 2001-3000 | 10 (10.2%) | 25 (8.7%) | 20 (8.1%) | 8 (12.5%) | 7 (9.1%) |
| 3001-4000 | 15 (15.3%) | 10 (3.5%) | 18 (7.3%) | 1 (1.6%) | 6 (7.8%) |
| 4001-5000 | 6 (6.1%) | 12 (4.2%) | 12 (4.9%) | 1 (1.6%) | 5 (6.5%) |
| 5001-6000 | 4 (4.1%) | 5 (1.7%) | 7 (2.8%) | 0 (0.0%) | 2 (2.6%) |
| 6001-7000 | 2 (2.0%) | 0 (0.0%) | 2 (0.8%) | 0 (0.0%) | 0 (0.0%) |
| 7001-8000 | 3 (3.1%) | 2 (0.7%) | 4 (1.6%) | 0 (0.0%) | 1 (1.3%) |
| 8001-9000 | 4 (4.1%) | 0 (0.0%) | 4 (1.6%) | 0 (0.0%) | 0 (0.0%) |
| 9001-10,000 | 2 (2.0%) | 1 (0.3%) | 2 (0.8%) | 0 (0.0%) | 1 (1.3%) |
| 10,001+ | 18 (18.4%) | 5 (1.7%) | 14 (5.7%) | 0 (0.0%) | 9 (11.7%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| 0 | 23 (10.1%) | 9 (8.6%) | 6 (15.0%) | 1 (7.1%) |
| 1-1000 | 99 (43.4%) | 22 (21.0%) | 12 (30.0%) | 6 (42.9%) |
| 1001-2000 | 50 (21.9%) | 22 (21.0%) | 8 (20.0%) | 5 (35.7%) |
| 2001-3000 | 23 (10.1%) | 9 (8.6%) | 2 (5.0%) | 1 (7.1%) |
| 3001-4000 | 11 (4.8%) | 11 (10.5%) | 3 (7.5%) | 0 (0.0%) |
| 4001-5000 | 6 (2.6%) | 10 (9.5%) | 2 (5.0%) | 0 (0.0%) |
| 5001-6000 | 3 (1.3%) | 3 (2.9%) | 3 (7.5%) | 0 (0.0%) |
| 6001-7000 | 0 (0.0%) | 0 (0.0%) | 1 (2.5%) | 1 (7.1%) |
| 7001-8000 | 2 (0.9%) | 3 (2.9%) | 0 (0.0%) | 0 (0.0%) |
| 8001-9000 | 1 (0.4%) | 1 (1.0%) | 2 (5.0%) | 0 (0.0%) |
| 9001-10,000 | 2 (0.9%) | 1 (1.0%) | 0 (0.0%) | 0 (0.0%) |
| 10,001+ | 8 (3.5%) | 14 (13.3%) | 1 (2.5%) | 0 (0.0%) |

32a. Square footage of landscapable area that is irrigated in the front yard?

| Irrigated Landscapable Area - Front Yard ($ft^2$) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 88 | 22.7 |
| 1-1000 | 196 | 50.6 |
| 1001-2000 | 49 | 12.7 |
| 2001-3000 | 28 | 7.2 |
| 3001-4000 | 11 | 2.8 |
| 4001-5000 | 6 | 1.6 |
| 5001-6000 | 4 | 1.0 |
| 6001-7000 | 0 | 0.0 |
| 7001-8000 | 2 | 0.5 |
| 8001-9000 | 0 | 0.0 |
| 9001-10000 | 2 | 0.5 |
| 10001+ | 1 | 0.3 |
| Survey Responses | 387 | |

| Statistical Parameters | |
|---|---|
| N | 387 |
| Min | 0 |
| Max | 13490 |
| Mean | 933.5 |
| Std Dev | 1492.2 |
| Median | 453 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 15.9 | 148.7 |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| 0 | 12 (12.2%) | 76 (26.3%) | 53 (21.5%) | 23 (35.9%) | 12 (15.6%) |
| 1-1000 | 24 (24.5%) | 172 (59.5%) | 112 (45.5%) | 36 (56.3%) | 48 (62.3%) |
| 1001-2000 | 22 (22.4%) | 27 (9.3%) | 36 (14.6%) | 5 (7.8%) | 8 (10.4%) |
| 2001-3000 | 17 (17.3%) | 11 (3.8%) | 23 (9.3%) | 0 (0.0%) | 5 (6.5%) |
| 3001-4000 | 9 (9.2%) | 2 (0.7%) | 9 (3.7%) | 0 (0.0%) | 2 (2.6%) |
| 4001-5000 | 6 (6.1%) | 0 (0.0%) | 5 (2.0%) | 0 (0.0%) | 1 (1.3%) |
| 5001-6000 | 4 (4.1%) | 0 (0.0%) | 4 (1.6%) | 0 (0.0%) | 0 (0.0%) |
| 6001-7000 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 7001-8000 | 2 (2.0%) | 0 (0.0%) | 1 (0.4%) | 0 (0.0%) | 1 (1.3%) |
| 8001-9000 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 9001-10,000 | 1 (1.0%) | 1 (0.3%) | 2 (0.8%) | 0 (0.0%) | 0 (0.0%) |
| 10,001+ | 1 (1.0%) | 0 (0.0%) | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| 0 | 56 (24.6%) | 22 (21.0%) | 7 (17.5%) | 3 (21.4%) |
| 1-1000 | 132 (57.9%) | 40 (38.1%) | 16 (40.0%) | 8 (57.1%) |
| 1001-2000 | 19 (8.3%) | 22 (21.0%) | 7 (17.5%) | 1 (7.1%) |
| 2001-3000 | 10 (4.4%) | 11 (10.5%) | 6 (15.0%) | 1 (7.1%) |
| 3001-4000 | 3 (1.3%) | 5 (4.8%) | 3 (7.5%) | 0 (0.0%) |
| 4001-5000 | 1 (0.4%) | 4 (3.8%) | 0 (0.0%) | 1 (7.1%) |
| 5001-6000 | 4 (1.8%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 6001-7000 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 7001-8000 | 1 (0.4%) | 0 (0.0%) | 1 (2.5%) | 0 (0.0%) |
| 8001-9000 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 9001-10,000 | 2 (0.9%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 10,001+ | 0 (0.0%) | 1 (1.0%) | 0 (0.0%) | 0 (0.0%) |

32b. Square footage of landscapable area that is irrigated in the back yard?

| Irrigated Landscapable Area - Back Yard ($ft^2$) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 92 | 23.8 |
| 1-1000 | 162 | 41.9 |
| 1001-2000 | 50 | 12.9 |
| 2001-3000 | 29 | 7.5 |
| 3001-4000 | 22 | 5.7 |
| 4001-5000 | 8 | 2.1 |
| 5001-6000 | 4 | 1.0 |
| 6001-7000 | 3 | 0.8 |
| 7001-8000 | 2 | 0.5 |
| 8001-9000 | 3 | 0.8 |
| 9001-10000 | 1 | 0.3 |
| 10001+ | 11 | 2.8 |
| Survey Responses | 387 | |

| Statistical Parameters | |
|---|---|
| N | 387 |
| Min | 0 |
| Max | 43800 |
| Mean | 1576.0 |
| Std Dev | 3556.1 |
| Median | 450 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 22.5 | 354.3 |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| 0 | 11 (11.2%) | 81 (28.0%) | 55 (22.4%) | 25 (39.1%) | 12 (15.6%) |
| 1-1000 | 21 (21.4%) | 141 (48.8%) | 97 (39.4%) | 31 (48.4%) | 34 (44.2%) |
| 1001-2000 | 14 (14.3%) | 36 (12.5%) | 39 (15.9%) | 3 (4.7%) | 8 (10.4%) |
| 2001-3000 | 13 (13.3%) | 16 (5.5%) | 18 (7.3%) | 5 (7.8%) | 6 (7.8%) |
| 3001-4000 | 15 (15.3%) | 7 (2.4%) | 15 (6.1%) | 0 (0.0%) | 7 (9.1%) |
| 4001-5000 | 4 (4.1%) | 4 (1.4%) | 4 (1.6%) | 0 (0.0%) | 4 (5.2%) |
| 5001-6000 | 2 (2.0%) | 2 (0.7%) | 3 (1.2%) | 0 (0.0%) | 1 (1.3%) |
| 6001-7000 | 3 (3.1%) | 0 (0.0%) | 3 (1.2%) | 0 (0.0%) | 0 (0.0%) |
| 7001-8000 | 2 (2.0%) | 0 (0.0%) | 2 (0.8%) | 0 (0.0%) | 0 (0.0%) |
| 8001-9000 | 3 (3.1%) | 0 (0.0%) | 1 (0.4%) | 0 (0.0%) | 2 (2.6%) |
| 9001-10,000 | 1 (1.0%) | 0 (0.0%) | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) |
| 10,001+ | 9 (9.2%) | 2 (0.7%) | 8 (3.3%) | 0 (0.0%) | 3 (3.9%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| 0 | 59 (25.9%) | 23 (21.9%) | 7 (17.5%) | 3 (21.4%) |
| 1-1000 | 111 (48.7%) | 29 (27.6%) | 16 (40.0%) | 6 (42.9%) |
| 1001-2000 | 27 (11.8%) | 14 (13.3%) | 6 (15.0%) | 3 (21.4%) |
| 2001-3000 | 14 (6.1%) | 11 (10.5%) | 3 (7.5%) | 1 (7.1%) |
| 3001-4000 | 7 (3.1%) | 12 (11.4%) | 3 (7.5%) | 0 (0.0%) |
| 4001-5000 | 1 (0.4%) | 6 (5.7%) | 1 (2.5%) | 0 (0.0%) |
| 5001-6000 | 2 (0.9%) | 1 (1.0%) | 1 (2.5%) | 0 (0.0%) |
| 6001-7000 | 0 (0.0%) | 0 (0.0%) | 2 (5.0%) | 1 (7.1%) |
| 7001-8000 | 2 (0.9%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 8001-9000 | 0 (0.0%) | 2 (1.9%) | 1 (2.5%) | 0 (0.0%) |
| 9001-10,000 | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 10,001+ | 4 (1.8%) | 7 (6.7%) | 0 (0.0%) | 0 (0.0%) |

33a. Square footage of lawn area in the front yard?

| Lawn Area – Front Yard ($ft^2$) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 147 | 38.0 |
| 1-500 | 106 | 27.4 |
| 501-1000 | 69 | 17.8 |
| 1001-1500 | 28 | 7.2 |
| 1501-2000 | 17 | 4.4 |
| 2001-2500 | 8 | 2.1 |
| 2501-3000 | 3 | 0.8 |
| 3001-3500 | 4 | 1.0 |
| 3501-4000 | 1 | 0.3 |
| 4001-4500 | 1 | 0.3 |
| 4501-5000 | 0 | 0.0 |
| 5001+ | 3 | 0.8 |
| Survey Responses | 387 | |

| Statistical Parameters | |
|---|---|
| N | 387 |
| Min | 0 |
| Max | 9084 |
| Mean | 551.4 |
| Std Dev | 902.2 |
| Median | 270 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 16.3 | 89.9 |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| 0 | 31 (31.6%) | 116 (40.1%) | 85 (34.6%) | 30 (46.9%) | 32 (41.6%) |
| 1-500 | 12 (12.2%) | 94 (32.5%) | 64 (26.0%) | 21 (32.8%) | 21 (27.3%) |
| 501-1000 | 22 (22.4%) | 47 (16.3%) | 43 (17.5%) | 10 (15.6%) | 16 (20.8%) |
| 1001-1500 | 15 (15.3%) | 16 (4.5%) | 24 (9.8%) | 2 (3.1%) | 2 (2.6%) |
| 1501-2000 | 6 (6.1%) | 11 (3.8%) | 14 (5.7%) | 0 (0.0%) | 3 (3.9%) |
| 2001-2500 | 4 (4.1%) | 4 (1.4%) | 6 (2.4%) | 0 (0.0%) | 2 (2.6%) |
| 2501-3000 | 3 (3.1%) | 0 (0.0%) | 2 (0.8%) | 0 (0.0%) | 1 (1.3%) |
| 3001-3500 | 2 (2.0%) | 2 (0.7%) | 3 (1.2%) | 1 (1.6%) | 0 (0.0%) |
| 3501-4000 | 0 (0.0%) | 1 (0.3%) | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) |
| 4001-4500 | 1 (1.0%) | 0 (0.0%) | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) |
| 4501-5000 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 5001+ | 2 (2.0%) | 1 (0.3%) | 3 (1.2%) | 0 (0.0%) | 0 (0.0%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| 0 | 86 (37.7%) | 43 (41.0%) | 15 (37.5%) | 3 (21.4%) |
| 1-500 | 74 (32.5%) | 19 (18.1%) | 8 (20.0%) | 5 (35.7%) |
| 501-1000 | 43 (18.9%) | 17 (16.2%) | 6 (15.0%) | 3 (21.4%) |
| 1001-1500 | 9 (3.9%) | 11 (10.5%) | 7 (17.5%) | 1 (7.1%) |
| 1501-2000 | 9 (3.9%) | 5 (4.8%) | 2 (5.0%) | 1 (7.1%) |
| 2001-2500 | 4 (1.8%) | 4 (3.8%) | 0 (0.0%) | 0 (0.0%) |
| 2501-3000 | 0 (0.0%) | 3 (2.9%) | 0 (0.0%) | 0 (0.0%) |
| 3001-3500 | 1 (0.4%) | 2 (1.9%) | 0 (0.0%) | 1 (7.1%) |
| 3501-4000 | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 4001-4500 | 0 (0.0%) | 1 (1.0%) | 0 (0.0%) | 0 (0.0%) |
| 4501-5000 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 5001+ | 1 (0.4%) | 0 (0.0%) | 2 (5.0%) | 0 (0.0%) |

33b. Square footage of lawn area in the back yard?

| Lawn Area – Back Yard ($ft^2$) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 183 | 47.3 |
| 1-500 | 83 | 21.4 |
| 501-1000 | 51 | 13.2 |
| 1001-1500 | 28 | 7.2 |
| 1501-2000 | 15 | 3.9 |
| 2001-2500 | 14 | 3.6 |
| 2501-3000 | 3 | 0.8 |
| 3001-3500 | 1 | 0.3 |
| 3501-4000 | 1 | 0.3 |
| 4001-4500 | 2 | 0.5 |
| 4501-5000 | 3 | 0.8 |
| 5001+ | 3 | 0.8 |
| Survey Responses | 387 | |

| Statistical Parameters | |
|---|---|
| N | 387 |
| Min | 0 |
| Max | 6000 |
| Mean | 553.5 |
| Std Dev | 955.3 |
| Median | 125.0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 17.2 | 95.2 |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| 0 | 46 (46.9%) | 137 (47.4%) | 104 (42.3%) | 39 (60.9%) | 40 (51.9%) |
| 1-500 | 12 (12.2%) | 71 (24.6%) | 53 (21.5%) | 13 (20.3%) | 17 (22.1%) |
| 501-1000 | 10 (10.2%) | 41 (14.2%) | 40 (16.3%) | 5 (7.8%) | 6 (7.8%) |
| 1001-1500 | 11 (11.2%) | 17 (5.9%) | 22 (8.9%) | 1 (1.6%) | 5 (6.5%) |
| 1501-2000 | 6 (6.1%) | 9 (3.1%) | 10 (4.1%) | 1 (1.6%) | 4 (5.2%) |
| 2001-2500 | 7 (7.1%) | 7 (2.4%) | 8 (3.3%) | 4 (6.3%) | 2 (2.6%) |
| 2501-3000 | 3 (3.1%) | 0 (0.0%) | 2 (0.8%) | 1 (1.6%) | 0 (0.0%) |
| 3001-3500 | 0 (0.0%) | 1 (0.3%) | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) |
| 3501-4000 | 1 (1.0%) | 0 (0.0%) | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) |
| 4001-4500 | 0 (0.0%) | 2 (0.7%) | 1 (0.4%) | 0 (0.0%) | 1 (1.3%) |
| 4501-5000 | 0 (0.0%) | 3 (1.0%) | 2 (0.8%) | 0 (0.0%) | 1 (1.3%) |
| 5001+ | 2 (2.0%) | 1 (0.3%) | 2 (0.8%) | 0 (0.0%) | 1 (1.3%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| 0 | 102 (44.7%) | 60 (57.1%) | 17 (42.5%) | 4 (28.6%) |
| 1-500 | 53 (23.2%) | 16 (15.2%) | 10 (25.0%) | 4 (28.6%) |
| 501-1000 | 38 (16.7%) | 7 (6.7%) | 4 (10.0%) | 2 (14.3%) |
| 1001-1500 | 9 (3.9%) | 10 (9.5%) | 7 (17.5%) | 2 (14.3%) |
| 1501-2000 | 10 (4.4%) | 5 (4.8%) | 0 (0.0%) | 0 (0.0%) |
| 2001-2500 | 9 (3.9%) | 3 (2.9%) | 1 (2.5%) | 1 (7.1%) |
| 2501-3000 | 0 (0.0%) | 2 (1.9%) | 1 (2.5%) | 0 (0.0%) |
| 3001-3500 | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 3501-4000 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (7.1%) |
| 4001-4500 | 2 (0.9%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 4501-5000 | 2 (0.9%) | 1 (1.0%) | 0 (0.0%) | 0 (0.0%) |
| 5001+ | 2 (0.9%) | 1 (1.0%) | 0 (0.0%) | 0 (0.0%) |

34a. Percent of landscaped area that uses drip irrigation in the front yard?

| Landscaped Area that Uses Drip Irrigation - Front Yard (%) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0% | 320 | 82.7 |
| 1-9% | 6 | 1.6 |
| 10-19% | 12 | 3.1 |
| 20-29% | 11 | 2.8 |
| 30-39% | 10 | 2.6 |
| 40-49% | 4 | 1.0 |
| 50-59% | 6 | 1.6 |
| 60-69% | 1 | 0.3 |
| 70-79% | 1 | 0.3 |
| 80-89% | 1 | 0.3 |
| 90-100% | 15 | 3.9 |
| Survey Responses | 387 | |

| Statistical Parameters | |
|---|---|
| N | 387 |
| Min | 0 |
| Max | 100 |
| Mean | 7.5 |
| Std Dev | 21.7 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 28.9 | 2.2 |

34b. Percent of landscaped area that uses drip irrigation in the back yard?

| Landscaped Area that Uses Drip Irrigation - Back Yard (%) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0% | 312 | 80.6 |
| 1-9% | 8 | 2.1 |
| 10-19% | 8 | 2.1 |
| 20-29% | 16 | 4.1 |
| 30-39% | 12 | 3.1 |
| 40-49% | 4 | 1.0 |
| 50-59% | 5 | 1.3 |
| 60-69% | 4 | 1.0 |
| 70-79% | 3 | 0.8 |
| 80-89% | 6 | 1.6 |
| 90-100% | 9 | 2.3 |
| Survey Responses | 387 | |

| Statistical Parameters | |
|---|---|
| N | 387 |
| Min | 0 |
| Max | 100 |
| Mean | 8.1 |
| Std Dev | 21.4 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 26.3 | 2.1 |

35. Who is responsible for maintaining landscaped areas?

| Responsible for Landscape Maintenance | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Owner/Resident | 284 | 86.9 |
| Landscape Maintenance Service/Contr. Gardener | 41 | 12.5 |
| Other | 2 | 0.6 |
| Survey Responses | 327 | |
| Surveys with No Response | 60 | |

36a. What type of irrigation system is used for the front yard?

| Irrigation System – Front Yard | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Hose Alone | 127 | 32.8 |
| Hose & Sprinkler | 59 | 15.2 |
| Hose & Sprinkler with Timer | 12 | 3.1 |
| In-Ground System, with Controller | 64 | 16.5 |
| In-Ground System, without Controller | 26 | 6.7 |
| Sprinklers with Spray-Type Head | 10 | 2.6 |
| Sprinklers of the Impact/Rotor Type | 2 | 0.5 |
| Sprinklers of the Stream/Rotor Type | 4 | 1.0 |
| Drip Irrigation | 44 | 11.4 |
| No Irrigation | 39 | 10.1 |
| Survey Responses | 387 | |

36b. What type of irrigation system is used for the back yard?

| Irrigation System – Back Yard | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Hose Alone | 131 | 33.9 |
| Hose & Sprinkler | 52 | 13.4 |
| Hose & Sprinkler with Timer | 17 | 4.4 |
| In-Ground System, with Controller | 51 | 13.2 |
| In-Ground System, without Controller | 15 | 3.9 |
| Sprinklers with Spray-Type Head | 11 | 2.8 |
| Sprinklers of the Impact/Rotor Type | 3 | 0.8 |
| Sprinklers of the Stream/Rotor Type | 3 | 0.8 |
| Drip Irrigation | 48 | 12.4 |
| No Irrigation | 56 | 14.5 |
| Survey Responses | 387 | |

37. What is the water pressure at the hose bib (in PSI)?

| Water Presure (psi) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <40 | 9 | 2.7 |
| 41-60 | 91 | 27.0 |
| 61-80 | 129 | 38.3 |
| 81-100 | 72 | 21.4 |
| 101-120 | 29 | 8.6 |
| 121-140 | 4 | 1.2 |
| 141-160 | 2 | 0.6 |
| 161-180 | 1 | 0.3 |
| Survey Responses | 337 | |
| Unable to Measure | 50 | |

| Statistical Parameters | |
|---|---|
| N | 337 |
| Min | 38 |
| Max | 170 |
| Mean | 76.2 |
| Std Dev | 21.8 |
| Median | 70 |
| Mode | 60 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 3.0 | 2.3 |

38. If irrigation system has controllers, do the controllers cover the:

| Irrigation System Controllers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Front Yard | 40 | 25.6 |
| Back Yard | 54 | 34.6 |
| Both | 62 | 39.7 |
| Survey Responses | 156 | |

39. For each controller identified in Question 38, list the following:

| Manufacturer/Make/ Model | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Champion | 1 | 0.6 |
| Dig Corp. | 3 | 1.9 |
| Gardena | 3 | 1.9 |
| Gilmour | 2 | 1.3 |
| Hardie | 11 | 7.1 |
| Hardie Raindial | 7 | 4.5 |
| Hunter | 2 | 1.3 |
| Intermatic | 1 | 0.6 |
| Irritrol | 9 | 5.8 |
| Irritrol Raindial | 4 | 2.6 |
| Oasis | 2 | 1.3 |
| Lawn Genie | 34 | 21.8 |
| Melnor | 1 | 0.6 |
| Nelson | 5 | 3.2 |
| Orbit | 16 | 10.3 |
| Rain Bird | 25 | 16.0 |
| Rain Dial | 2 | 1.3 |
| Rainbow | 1 | 0.6 |
| RainJet | 7 | 4.5 |
| Rainmatic | 2 | 1.3 |
| Superior Controls Sterling 18 | 1 | 0.6 |
| Toro | 8 | 5.1 |
| Watermaster | 3 | 1.9 |
| Weathermatic | 2 | 1.3 |
| Don't Know | 4 | 2.6 |
| Survey Responses | 156 | |

| Type of Irrigation System Controller | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Mechanical | 36 | 23.1 |
| Digital | 118 | 75.6 |
| Other | 2 | 1.3 |
| Survey Responses | 156 | |

| No. of Stations | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 28 | 18.7 |
| 2 | 23 | 15.3 |
| 3 | 22 | 14.7 |
| 4 | 34 | 22.7 |
| 5 | 14 | 9.3 |
| 6 | 9 | 6.0 |
| 7 | 6 | 4.0 |
| 8 | 6 | 4.0 |
| 9 | 2 | 1.3 |
| 10 | 0 | 0.0 |
| 11 | 1 | 0.7 |
| 12 | 3 | 2.0 |
| 13 | 0 | 0.0 |
| 14 | 2 | 1.3 |
| Survey Responses | 150 | |
| Surveys with No Response | 6 | |

| Statistical Parameters | |
|---|---|
| N | 150 |
| Min | 1 |
| Max | 14 |
| Mean | 3.9 |
| Std Dev | 2.7 |
| Median | 4 |
| Mode | 4 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 11.0 | 0.4 |

| Programmable Multiple Start Time Capabilities | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 135 | 86.5 |
| No | 18 | 11.5 |
| Don't Know | 3 | 1.9 |
| Survey Responses | 156 | |

| Type of Calendar Clock | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 7-Day | 128 | 82.6 |
| 14-Day | 4 | 2.6 |
| 30-Day | 3 | 1.9 |
| Other | 20 | 12.9 |
| Survey Responses | 155 | |
| Surveys with No Response | 1 | |

| Moisture Sensor | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 1 | 0.6 |
| No | 149 | 95.5 |
| Don't Know | 6 | 3.8 |
| Survey Responses | 156 | |

| Rain Sensor | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 3 | 1.9 |
| No | 147 | 94.2 |
| Don't Know | 6 | 3.8 |
| Survey Responses | 156 | |

40. Are there any other outdoor water-using appliances/fixtures?

| Other Outdoor Water-Using Appliances/Fixtures | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 6 | 1.6 |
| No | 373 | 98.4 |
| Survey Responses | 379 | |
| Surveys with No Response | 8 | |

40a. [IF YES] Please list type of water-using appliance/fixture.

| Type of Other Outdoor Water-Using Appliances/Fixtures | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Self-Sustained Pond | 1 | 16.7 |
| Small Water Fountain | 1 | 16.7 |
| Plunge Pool | 1 | 16.7 |
| Small Outdoor Fountain | 1 | 16.7 |
| Small Baby Pool | 1 | 16.7 |
| Solar Panels | 1 | 16.7 |
| Survey Responses | 6 | |

41. Which of the following groups includes your total household income for the last year?

| Household Income | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0-$20,000 | 34 | 8.8 |
| $20,000-$40,000 | 46 | 11.9 |
| $40,000-$60,000 | 47 | 12.1 |
| $60,000-$80,000 | 35 | 9.0 |
| $80,000-$100,000 | 24 | 6.2 |
| $100,000-$150,000 | 28 | 7.2 |
| $150,000 or more | 21 | 5.4 |
| Don't Know | 52 | 13.4 |
| Declined to Respond | 100 | 25.8 |
| Survey Responses | 387 | |

| Response | East | West | Owner | Tenant | Unknown |
|---|---|---|---|---|---|
| 0-$20,000 | 1 (1.0%) | 33 (11.4%) | 14 (5.7%) | 8 (12.5%) | 12 (15.6%) |
| $20,000-$40,000 | 5 (5.1%) | 41 (14.2%) | 25 (10.2%) | 13 (20.3%) | 8 (10.4%) |
| $40,000-$60,000 | 10 (10.2%) | 37 (12.8%) | 28 (11.4%) | 11 (17.2%) | 8 (10.4%) |
| $60,000-$80,000 | 9 (9.2%) | 26 (9.0%) | 27 (11.0%) | 4 (6.3%) | 4 (5.2%) |
| $80,000-$100,000 | 14 (14.3%) | 10 (3.5%) | 18 (7.3%) | 1 (1.6%) | 5 (6.5%) |
| $100,000-$150,000 | 12 (12.2%) | 16 (5.5%) | 16 (6.5%) | 4 (6.3%) | 8 (10.4%) |
| 150000+ | 13 (13.3%) | 8 (2.8%) | 18 (7.3%) | 2 (3.1%) | 1 (1.3%) |
| Don't Know | 9 (9.2%) | 43 (14.9%) | 34 (13.8%) | 7 (10.9%) | 11 (14.3%) |
| Declined to Respond | 25 (25.5%) | 75 (26.0%) | 66 (26.8%) | 14 (21.9%) | 20 (26.0%) |

| Response | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|
| 0-$20,000 | 28 (12.3%) | 4 (3.8%) | 2 (5.0%) | 0 (0.0%) |
| $20,000-$40,000 | 28 (12.3%) | 15 (14.3%) | 3 (7.5%) | 0 (0.0%) |
| $40,000-$60,000 | 36 (15.8%) | 10 (9.5%) | 1 (2.5%) | 0 (0.0%) |
| $60,000-$80,000 | 25 (11.0%) | 7 (6.7%) | 1 (2.5%) | 2 (14.3%) |
| $80,000-$100,000 | 9 (3.9%) | 5 (4.8%) | 8 (20.0%) | 2 (14.3%) |
| $100,000-$150,000 | 14 (6.1%) | 10 (9.5%) | 3 (7.5%) | 1 (7.1%) |
| 150000+ | 7 (3.1%) | 6 (5.7%) | 6 (15.0%) | 2 (14.3%) |
| Don't Know | 30 (13.2%) | 13 (12.4%) | 7 (17.5%) | 2 (14.3%) |
| Declined to Respond | 51 (22.4%) | 35 (33.3%) | 9 (22.5%) | 5 (35.7%) |

42. Number of showerheads left with the customer.

| No. of Showerheads Left | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 275 | 71.1 |
| 1 | 74 | 19.1 |
| 2 | 35 | 9.0 |
| 3 | 2 | 0.5 |
| 7 | 1 | 0.3 |

43. Number of faucet aerators left with the customer.

| No. of Faucet Aerators Left | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 279 | 72.1 |
| 1 | 63 | 16.3 |
| 2 | 27 | 7.0 |
| 3 | 5 | 1.3 |
| 4 | 7 | 1.8 |
| 5 | 4 | 1.0 |
| 6 | 1 | 0.3 |
| 7 | 1 | 0.3 |

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**EAST BAY MUNICIPAL UTILITY DISTRICT**
**WATER CONSERVATION MARKET PENETRATION STUDY**

**APPENDIX J**

**Table J-1: Multi-Family Site Survey Sample Configuration**

| Group: Location, Year-Built | Number of Accounts | Percent of Service Area | Target Number of Survey Respondents | Number of Actual Survey Respondents |
|---|---|---|---|---|
| East, <1950 | 42 | 0.63 | 2 | 2 |
| East, 1950-1959 | 36 | 0.54 | 2 | 2 |
| East, 1960-1969 | 158 | 2.35 | 9 | 8 |
| East, 1970-1979 | 241 | 3.59 | 13 | 10 |
| East, 1980-1989 | 169 | 2.52 | 9 | 11 |
| East, 1990-2001 | 66 | 0.98 | 4 | 1 |
| | | | | |
| West, <1950 | 4711 | 70.18 | 255 | 262 |
| West, 1950-1959 | 68 | 1.01 | 4 | 4 |
| West, 1960-1969 | 247 | 3.68 | 13 | 12 |
| West, 1970-1979 | 248 | 3.69 | 13 | 12 |
| West, 1980-1989 | 505 | 7.52 | 27 | 24 |
| West, 1990-2001 | 222 | 3.31 | 12 | 12 |
| **Totals** | **6713** | **100%** | **363** | **360** |

## Responses to Multi-Family Site Survey

1. Name, title, and phone number of respondent.

2. The person participating in the survey is the:

| Survey Participant | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Building Owner | 137 | 39.3 |
| Building Manager (if other than owner) | 141 | 40.4 |
| Tenant (if other than owner/manager) | 27 | 7.7 |
| Other | 44 | 12.6 |
| Survey Responses | 349 | |
| Surveys with No Response | 11 | |

3. Type of property is:

| Type of Property | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 2-4 Units per Structure | 16 | 4.5 |
| 5-9 Units per Structure | 158 | 44.4 |
| 10 or More Units per Structure | 165 | 46.3 |
| Mobile Homes | 3 | 0.8 |
| Other | 14 | 3.9 |
| Survey Responses | 356 | |
| Surveys with No Response | 4 | |

4. How many buildings are on the property?

| No. of Buildings | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 264 | 77.9 |
| 2 | 32 | 9.4 |
| 3 | 17 | 5.0 |
| 4 | 7 | 2.1 |
| 5 | 3 | 0.9 |
| 6 | 1 | 0.3 |
| 7 | 4 | 1.2 |
| 8 | 4 | 1.2 |
| 9 | 2 | 0.6 |
| 10 | 1 | 0.3 |
| 11+ | 4 | 1.2 |
| Survey Responses | 339 | |
| Surveys with No Response | 21 | |

| Statistical Parameters | |
|---|---|
| N | 339 |
| Min | 1 |
| Max | 366 |
| Mean | 3.0 |
| Std Dev | 20.3 |
| Median | 1 |
| Mode | 1 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 72.2 | 2.2 |

5. How many housing units does this water account represent?

| No. of Housing Units | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-10 | 191 | 56.0 |
| 11-20 | 59 | 17.3 |
| 21-30 | 34 | 10.0 |
| 31-40 | 22 | 6.5 |
| 41-50 | 9 | 2.6 |
| 51-100 | 14 | 4.1 |
| 101-250 | 9 | 2.6 |
| 251-400 | 3 | 0.9 |
| Survey Responses | 341 | |
| Surveys with No Response | 19 | |

| Statistical Parameters | |
|---|---|
| N | 341 |
| Min | 1 |
| Max | 366 |
| Mean | 21.3 |
| Std Dev | 38.6 |
| Median | 9 |
| Mode | 6 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 19.2 | 4.1 |

6a. How many housing units are efficiency/studios?

| Efficiency/Studios | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 13 | 15.3 |
| 2 | 8 | 9.4 |
| 3 | 10 | 11.8 |
| 4 | 10 | 11.8 |
| 5 | 5 | 5.9 |
| 6-10 | 19 | 22.4 |
| 11-20 | 15 | 17.6 |
| 21-50 | 2 | 2.4 |
| 51-100 | 3 | 3.5 |
| Survey Responses | 85 | |
| Declined to Respond/ Not Applicable | 275 | |

| Statistical Parameters | |
|---|---|
| N | 85 |
| Min | 1 |
| Max | 97 |
| Mean | 8.9 |
| Std Dev | 14.3 |
| Median | 5 |
| Mode | 1 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 34.3 | 3 |

6b. What is the average rent of an efficiency/studio?

| Average Rent of Efficiency/Studios | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <401 | 8 | 13.1 |
| 401-500 | 7 | 11.5 |
| 501-600 | 11 | 18.0 |
| 601-700 | 11 | 18.0 |
| 701-800 | 8 | 13.1 |
| 801-900 | 10 | 16.4 |
| 901-1000 | 4 | 6.6 |
| 1000+ | 2 | 3.3 |
| Survey Responses | 61 | |
| Declined to Respond/ Not Applicable | 299 | |

| Statistical Parameters | |
|---|---|
| N | 61 |
| Min | 193 |
| Max | 1250 |
| Mean | 672.4 |
| Std Dev | 214.9 |
| Median | 650 |
| Mode | 650 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 8 | 53.9 |

6c. How many housing units are one-bedrooms?

| One-Bedrooms | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 14 | 6.1 |
| 2 | 21 | 9.2 |
| 3 | 22 | 9.6 |
| 4 | 15 | 6.6 |
| 5 | 13 | 5.7 |
| 6 | 36 | 15.8 |
| 7 | 5 | 2.2 |
| 8 | 14 | 6.1 |
| 9 | 11 | 4.8 |
| 10 | 6 | 2.6 |
| 11-20 | 27 | 11.8 |
| 21-50 | 36 | 15.8 |
| 51-100 | 5 | 2.2 |
| 101+ | 3 | 1.3 |
| Survey Responses | 228 | |
| Declined to Respond/ Not Applicable | 132 | |

| Statistical Parameters | |
|---|---|
| N | 228 |
| Min | 1 |
| Max | 235 |
| Mean | 14.2 |
| Std Dev | 26.5 |
| Median | 6 |
| Mode | 6 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 24.2 | 3.4 |

6d. What is the average rent of a one-bedroom?

| Average Rent of One-Bedrooms | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <401 | 4 | 2.2 |
| 401-600 | 25 | 13.9 |
| 601-800 | 60 | 33.3 |
| 801-1000 | 51 | 28.3 |
| 1001-1200 | 33 | 18.3 |
| 1201-2000 | 7 | 3.9 |
| Survey Responses | 180 | |
| Declined to Respond/ Not Applicable | 180 | |

| Statistical Parameters | |
|---|---|
| N | 180 |
| Min | 193 |
| Max | 2000 |
| Mean | 854.6 |
| Std Dev | 256.3 |
| Median | 809 |
| Mode | 1000 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 4.4 | 37.4 |

6e. How many housing units are two-bedrooms?

| Two-Bedrooms | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 38 | 14.7 |
| 2 | 21 | 8.1 |
| 3 | 17 | 6.6 |
| 4 | 38 | 14.7 |
| 5 | 14 | 5.4 |
| 6 | 29 | 11.2 |
| 7 | 8 | 3.1 |
| 8 | 15 | 5.8 |
| 9 | 9 | 3.5 |
| 10 | 5 | 1.9 |
| 11-20 | 29 | 11.2 |
| 21-50 | 25 | 9.7 |
| 51-100 | 8 | 3.1 |
| 101+ | 2 | 0.8 |
| Survey Responses | 258 | |
| Declined to Respond/ Not Applicable | 102 | |

| Statistical Parameters | |
|---|---|
| N | 258 |
| Min | 1 |
| Max | 121 |
| Mean | 11.0 |
| Std Dev | 17.7 |
| Median | 6 |
| Mode | 1 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 19.7 | 2.2 |

6f. What is the average rent of a two-bedroom?

| Average Rent of Two-Bedrooms | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <601 | 11 | 6.0 |
| 601-800 | 37 | 20.2 |
| 801-1000 | 50 | 27.3 |
| 1001-1200 | 28 | 15.3 |
| 1201-1400 | 29 | 15.8 |
| 1401-1600 | 12 | 6.6 |
| 1601-1800 | 12 | 6.6 |
| 1801-2200 | 4 | 2.2 |
| Survey Responses | 183 | |
| Declined to Respond/ Not Applicable | 102 | |

| Statistical Parameters | |
|---|---|
| N | 183 |
| Min | 193 |
| Max | 2200 |
| Mean | 1073.8 |
| Std Dev | 349.4 |
| Median | 1000 |
| Mode | 1000 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 4.7 | 50.6 |

6g. How many housing units are three-bedrooms?

| Three-Bedrooms | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 38 | 55.1 |
| 2 | 14 | 20.3 |
| 3 | 3 | 4.3 |
| 4 | 6 | 8.7 |
| 5 | 1 | 1.4 |
| 6-10 | 5 | 7.2 |
| 12 | 1 | 1.4 |
| 30 | 1 | 1.4 |
| Survey Responses | 69 | |
| Declined to Respond/ Not Applicable | 291 | |

| Statistical Parameters | |
|---|---|
| N | 69 |
| Min | 1 |
| Max | 30 |
| Mean | 2.6 |
| Std Dev | 4.0 |
| Median | 1 |
| Mode | 1 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 35.6 | 0.9 |

6h. What is the average rent of a three-bedroom?

| Average Rent of Three-Bedrooms | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <801 | 4 | 9.3 |
| 801-1000 | 12 | 27.9 |
| 1001-1200 | 12 | 27.9 |
| 1201-1400 | 6 | 14.0 |
| 1401-2100 | 9 | 20.9 |
| Survey Responses | 43 | |
| Declined to Respond/ Not Applicable | 291 | |

| Statistical Parameters | |
|---|---|
| N | 43 |
| Min | 575 |
| Max | 2100 |
| Mean | 1169.1 |
| Std Dev | 332.2 |
| Median | 1100 |
| Mode | 1000 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 8.5 | 99.3 |

6i. How many housing units are more than three-bedrooms?

| More than Three-Bedrooms | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 6 | 75.0 |
| 2 | 1 | 12.5 |
| 90 | 1 | 12.5 |
| Survey Responses | 8 | |
| Declined to Respond/ Not Applicable | 352 | |

| Statistical Parameters | |
|---|---|
| N | 8 |
| Min | 1 |
| Max | 90 |
| Mean | 12.3 |
| Std Dev | 31.4 |
| Median | 1 |
| Mode | 1 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 177.7 | 21.8 |

6j. What is the average rent of a more than three-bedrooms?

| Average Rent of More Than Three-Bedrooms | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1300 | 1 | 50.0 |
| 3000 | 1 | 50.0 |
| Survey Responses | 2 | |
| Declined to Respond/ Not Applicable | 358 | |

| Statistical Parameters | |
|---|---|
| N | 2 |
| Min | 1300 |
| Max | 3000 |
| Mean | 2150.0 |
| Std Dev | 1202.1 |
| Median | 2150 |
| Mode | N/A |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 77.5 | 1666 |

7. What is the average housing unit occupancy rate?

| Average Housing Unit Occupancy Rate | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Under 10% | 0 | 0.0 |
| Between 10% and 19% | 0 | 0.0 |
| Between 20% and 29% | 1 | 0.3 |
| Between 30% and 39% | 0 | 0.0 |
| Between 40% and 49% | 0 | 0.0 |
| Between 50% and 59% | 0 | 0.0 |
| Between 60% and 69% | 0 | 0.0 |
| Between 70% and 79% | 1 | 0.3 |
| Between 80% and 89% | 8 | 2.4 |
| Between 90% and 100% | 319 | 97.0 |
| Survey Responses | 329 | |
| Declined to Respond | 31 | |

| Statistical Parameters | |
|---|---|
| N | 329 |
| Min | 20 |
| Max | 100 |
| Mean | 98.1 |
| Std Dev | 5.9 |
| Median | 100 |
| Mode | 100 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 0.7 | 0.6 |

| Responses | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|---|---|
| <10% | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| Between 10 and 19% | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| Between 20 and 29% | 0 (0.0%) | 1 (0.3%) | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| Between 30 and 39% | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| Between 40 and 49% | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| Between 50 and 59% | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| Between 60 and 69% | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| Between 70 and 79% | 0 (0.0%) | 1 (0.3%) | 1 (0.4%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| Between 80 and 89% | 1 (3.8%) | 7 (2.3%) | 5 (1.9%) | 1 (2.3%) | 2 (7.4%) | 0 (0.0%) |
| Between 90 and 100% | 25 (96.2%) | 294 (97.0%) | 250 (97.3%) | 42 (97.7%) | 25 (92.6%) | 2 (100.00%) |

8. List the total number of toilets at this location.

| No. of Toilets | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-5 | 49 | 14.0 |
| 6-10 | 139 | 39.7 |
| 11-20 | 61 | 17.4 |
| 21-40 | 57 | 16.3 |
| 41-60 | 16 | 4.6 |
| 61-80 | 11 | 3.1 |
| 81-100 | 2 | 0.6 |
| 101-200 | 8 | 2.3 |
| 201+ | 7 | 2.0 |
| Survey Responses | 350 | |
| Surveys with No Response | 10 | |

| Statistical Parameters | |
|---|---|
| N | 350 |
| Min | 1 |
| Max | 732 |
| Mean | 25.7 |
| Std Dev | 56.4 |
| Median | 10 |
| Mode | 6 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 23.0 | 5.9 |

9. Have any of the existing toilets been retrofitted with either ultra-low-flush toilets or toilet conservation devices?

| Retrofitted Toilets | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 174 | 49.4 |
| No | 113 | 32.1 |
| Don't Know | 65 | 18.5 |
| Survey Responses | 352 | |
| Surveys with No Response | 8 | |

9a. [IF YES] Approximately how many toilets are:

| Ultra-Low-Flush Toilets | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 25 | 16.1 |
| 2 | 21 | 13.5 |
| 3 | 17 | 11.0 |
| 4 | 16 | 10.3 |
| 5 | 6 | 3.9 |
| 6-10 | 33 | 21.3 |
| 11-20 | 18 | 11.6 |
| 21-50 | 11 | 7.1 |
| 51-100 | 4 | 2.6 |
| 101+ | 4 | 2.6 |
| Survey Responses | 155 | |

| Statistical Parameters | |
|---|---|
| N | 155 |
| Min | 1 |
| Max | 159 |
| Mean | 12.0 |
| Std Dev | 24.0 |
| Median | 4 |
| Mode | 1 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 31.5 | 3.8 |

| Toilets with Conservation Devices | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 0 | 0.0 |
| 2 | 2 | 11.8 |
| 3 | 2 | 11.8 |
| 4 | 3 | 17.6 |
| 5 | 2 | 11.8 |
| 6 | 0 | 0.0 |
| 7 | 1 | 5.9 |
| 8 | 2 | 11.8 |
| 9 | 0 | 0.0 |
| 10 | 0 | 0.0 |
| 11+ | 5 | 29.4 |
| Survey Responses | 17 | |

| Statistical Parameters | |
|---|---|
| N | 17 |
| Min | 2 |
| Max | 220 |
| Mean | 27.6 |
| Std Dev | 55.0 |
| Median | 5 |
| Mode | 4 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 94.6 | 26.2 |

10. List the total number of shower stalls at this location.

| Shower Stalls | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-5 | 60 | 19.1 |
| 6-10 | 110 | 35.0 |
| 11-20 | 52 | 16.6 |
| 21-40 | 49 | 15.6 |
| 41-60 | 16 | 5.1 |
| 61-80 | 11 | 3.5 |
| 81-100 | 2 | 0.6 |
| 101-200 | 9 | 2.9 |
| 201+ | 5 | 1.6 |
| Survey Responses | 314 | |
| Surveys with No Response | 46 | |

| Statistical Parameters | |
|---|---|
| N | 314 |
| Min | 1 |
| Max | 366 |
| Mean | 24.5 |
| Std Dev | 45.1 |
| Median | 9 |
| Mode | 6 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 20.4 | 5.0 |

| Responses | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|---|---|
| 1-5 | 6 (20.0%) | 54 (19.0%) | 43 (18.9%) | 5 (10.9%) | 11 (28.9%) | 1 (50.0%) |
| 6-10 | 9 (30.0%) | 101 (35.6%) | 88 (38.6%) | 16 (34.8%) | 6 (15.8%) | 0 (0.0%) |
| 11-20 | 4 (13.3%) | 48 (16.9%) | 41 (18.0%) | 4 (8.7%) | 6 (15.8%) | 1 (50.0%) |
| 21-40 | 6 (20.0%) | 43 (15.1%) | 30 (13.2%) | 8 (17.4%) | 11 (28.9%) | 0 (0.0%) |
| 41-60 | 2 (6.7%) | 14 (4.9%) | 12 (5.3%) | 3 (6.5%) | 1 (2.6%) | 0 (0.0%) |
| 61-80 | 0 (0.0%) | 11 (3.9%) | 4 (1.8%) | 5 (10.9%) | 2 (5.3%) | 0 (0.0%) |
| 81-100 | 0 (0.0%) | 2 (0.7%) | 2 (0.9%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 101-200 | 0 (0.0%) | 9 (3.2%) | 6 (2.6%) | 3 (6.5%) | 0 (0.0%) | 0 (0.0%) |
| 201+ | 3 (10.0%) | 2 (0.7%) | 2 (0.9%) | 2 (4.3%) | 1 (2.6%) | 0 (0.0%) |

11. Have any of the existing showers been retrofitted with low-flow showerheads or flow restrictors?

| Retrofitted Shower Stalls | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 163 | 47.1 |
| No | 88 | 25.4 |
| Don't Know | 95 | 27.5 |
| Survey Responses | 346 | |
| Surveys with No Response | 14 | |

11a. [IF YES] Approximately how many shower stalls are retrofitted with:

| Low-Flow Showerheads | | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-5 | 53 | 37.6 |
| 6-10 | 46 | 32.6 |
| 11-20 | 16 | 11.3 |
| 21-50 | 13 | 9.2 |
| 51-100 | 7 | 5.0 |
| 101+ | 6 | 4.3 |
| Survey Responses | 141 | |

| Statistical Parameters | |
|---|---|
| N | 141 |
| Min | 1 |
| Max | 232 |
| Mean | 18.5 |
| Std Dev | 33.5 |
| Median | 7 |
| Mode | 6 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 30.0 | 5.5 |

| Showerheads with Flow Restrictors | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-5 | 4 | 33.3 |
| 6-10 | 3 | 25.0 |
| 11-20 | 2 | 16.7 |
| 21-50 | 1 | 8.3 |
| 51-100 | 2 | 16.7 |
| Survey Responses | 12 | |

| Statistical Parameters | |
|---|---|
| N | 12 |
| Min | 3 |
| Max | 85 |
| Mean | 19.8 |
| Std Dev | 26.4 |
| Median | 7.5 |
| Mode | 5 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 75.3 | 14.9 |

12. List the total number of bathtubs at this location.

| Bathtubs | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 21 | 5.8 |
| 1-5 | 76 | 21.1 |
| 6-10 | 120 | 33.3 |
| 11-20 | 49 | 13.6 |
| 21-40 | 54 | 15.0 |
| 41-60 | 17 | 4.7 |
| 61-100 | 10 | 2.8 |
| 101-200 | 9 | 2.5 |
| 201+ | 4 | 1.1 |
| Survey Responses | 360 | |

| Statistical Parameters | |
|---|---|
| N | 360 |
| Min | 0 |
| Max | 366 |
| Mean | 21.2 |
| Std Dev | 41.8 |
| Median | 8 |
| Mode | 6 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 20.4 | 4.3 |

| Responses | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|---|---|
| 0 | 3 (8.8%) | 18 (5.5%) | 13 (4.9%) | 3 (5.8%) | 5 (11.9%) | 0 (0.0%) |
| 1-5 | 14 (41.2%) | 62 (19.0%) | 52 (19.7%) | 12 (23.1%) | 11 (26.2%) | 1 (50.0%) |
| 6-10 | 2 (5.9%) | 118 (36.2%) | 102 (38.6%) | 12 (23.1%) | 6 (14.3%) | 0 (0.0%) |
| 11-20 | 5 (14.7%) | 44 (13.5%) | 38 (14.4%) | 5 (9.6%) | 5 (11.9%) | 1 (50.0%) |
| 21-40 | 5 (14.7%) | 49 (15.0%) | 33 (12.5%) | 10 (19.2%) | 11 (26.2%) | 0 (0.0%) |
| 41-60 | 2 (5.9%) | 15 (4.6%) | 13 (4.9%) | 3 (5.8%) | 1 (2.4%) | 0 (0.0%) |
| 61-100 | 0 (0.0%) | 10 (3.1%) | 6 (2.3%) | 2 (3.8%) | 2 (4.8%) | 0 (0.0%) |
| 101-200 | 1 (2.9%) | 8 (2.5%) | 6 (2.3%) | 3 (5.8 %) | 0 (0.0%) | 0 (0.0%) |
| 201+ | 2 (5.9%) | 2 (0.6%) | 1 (0.4%) | 2 (3.8%) | 1 (2.4%) | 0 (0.0%) |

13. List the total number of indoor faucets at this location.

| Indoor Faucets | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-5 | 12 | 3.5 |
| 6-10 | 42 | 12.3 |
| 11-15 | 84 | 24.6 |
| 16-20 | 56 | 16.4 |
| 21-4 | 58 | 17.0 |
| 41-60 | 25 | 7.3 |
| 61-100 | 30 | 8.8 |
| 101-200 | 21 | 6.2 |
| 201-500 | 9 | 2.6 |
| 501+ | 4 | 1.2 |
| Survey Responses | 341 | |
| Surveys with No Response | 19 | |

| Statistical Parameters | |
|---|---|
| N | 341 |
| Min | 2 |
| Max | 1098 |
| Mean | 48.4 |
| Std Dev | 102.4 |
| Median | 18 |
| Mode | 12 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 22.4 | 10.9 |

| Responses | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|---|---|
| 1- | 5 (16.1%) | 7 (2.3%) | 5 (2.0%) | 3 (6.1%) | 4 (11.4%) | 0 (0.0%) |
| 6-10 | 2 (6.5%) | 40 (12.9%) | 33 (12.9%) | 1 (2.0%) | 7 (20.0%) | 1 (50.0%) |
| 11-15 | 8 (25.8%) | 76 (24.5%) | 66 (25.9%) | 14 (28.6%) | 4 (11.4%) | 0 (0.0%) |
| 16-20 | 1 (3.2%) | 55 (17.7%) | 48 (18.8%) | 6 (12.2%) | 2 (5.7%) | 0 (0.0%) |
| 21-40 | 4 (12.9%) | 54 (17.4%) | 47 (18.4%) | 4 (8.2%) | 6 (17.1%) | 1 (50.0%) |
| 41-60 | 4 (12.9%) | 21 (6.8%) | 12 (4.7%) | 5 (10.2%) | 8 (22.9%) | 0 (0.0%) |
| 61-100 | 3 (9.7%) | 27 (8.7%) | 23 (9.0%) | 6 (12.2%) | 1 (2.9%) | 0 (0.0%) |
| 101-200 | 1 (3.2%) | 20 (6.5%) | 14 (5.5%) | 5 (10.2%) | 2 (5.7%) | 0 (0.0%) |
| 201-500 | 1 (3.2%) | 8 (2.6%) | 6 (2.4%) | 3 (6.1%) | 0 (0.0%) | 0 (0.0%) |
| 501+ | 2 (6.5%) | 2 (0.6%) | 1 (0.4%) | 2 (4.1%) | 1 (2.9%) | 0 (0.0%) |

14. Are plumbing fixtures regularly inspected at this location?

| Regular Inspection | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| No, Only When Tenant Vacates Premises | 17 | 4.9 |
| No, Only When Problems Are Reported | 259 | 74.9 |
| Yes, Periodic Inspections Scheduled | 67 | 19.4 |
| Other | 3 | 0.9 |
| Survey Responses | 346 | |
| Surveys with No Response | 14 | |

15. List the total number of dishwashers at this location.

| Dishwashers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 240 | 66.7 |
| 1-5 | 65 | 18.1 |
| 6-10 | 11 | 3.1 |
| 11-20 | 14 | 3.9 |
| 21-50 | 20 | 5.6 |
| 51-100 | 3 | 0.8 |
| 101-200 | 4 | 1.1 |
| 201+ | 3 | 0.8 |
| Survey Responses | 360 | |

| Statistical Parameters | |
|---|---|
| N | 360 |
| Min | 0 |
| Max | 301 |
| Mean | 7.3 |
| Std Dev | 30.6 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 43.5 | 3.2 |

| Responses | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|---|---|
| 0 | 13 (38.2%) | 227 (69.6%) | 204 (77.3%) | 21 (40.4%) | 15 (35.7%) | 0 (0.0%) |
| 1-5 | 11 (32.4%) | 54 (16.6%) | 41 (15.5%) | 14 (26.9%) | 9 (21.4%) | 1 (50.0%) |
| 6-10 | 1 (2.9%) | 10 (3.1%) | 6 (2.3%) | 2 (3.8%) | 2 (4.8%) | 1 (50.0%) |
| 11-20 | 4 (11.8%) | 10 (3.1%) | 7 (2.7%) | 2 (3.8%) | 5 (11.9%) | 0 (0.0%) |
| 21-50 | 2 (5.9%) | 18 (5.5%) | 3 (1.1%) | 8 (15.4%) | 9 (21.4%) | 0 (0.0%) |
| 51-100 | 0 (0.0%) | 3 (0.9%) | 1 (0.4%) | 1 (1.9%) | 1 (2.4%) | 0 (0.0%) |
| 101-200 | 1 (2.9%) | 3 (0.9%) | 2 (0.8%) | 2 (3.8%) | 0 (0.0%) | 0 (0.0%) |
| 201+ | 2 (5.9%) | 1 (0.3%) | 0 (0.0%) | 2 (3.8%) | 1 (2.4%) | 0 (0.0%) |

16. How many of the housing units have clothes washing machine hook-ups?
*Note: Responses to questions 16, 17, 18a, 18b (all dealing with clothes washers) and 5 (number of apartments in property) were cross referenced to determine number of in-unit and common area washers, as well as the number of units served by each common area washer. See Page J-49 for results of cross referencing analysis.*

| Clothes Washing Machine Hook-Ups | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 294 | 81.7 |
| 1 | 27 | 7.5 |
| 2 | 8 | 2.2 |
| 3 | 4 | 1.1 |
| 4 | 9 | 2.5 |
| 5 | 3 | 0.8 |
| 6-10 | 4 | 1.1 |
| 11-20 | 5 | 1.4 |
| 21-50 | 5 | 1.4 |
| 180 | 1 | 0.3 |
| Survey Responses | 360 | |

| Statistical Parameters | |
|---|---|
| N | 360 |
| Min | 0 |
| Max | 180 |
| Mean | 1.5 |
| Std Dev | 10.3 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 70.5 | 1.1 |

17. List the total number of clothes washing machines at this location.
*Note: Responses to questions 16, 17, 18a, 18b (all dealing with clothes washers) and 5 (number of apartments in property) were cross referenced to determine number of in-unit and common area washers, as well as the number of units served by each common area washer. See Page J-49 for results of cross referencing analysis.*

| Clothes Washing Machines | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 162 | 45.0 |
| 1 | 89 | 24.7 |
| 2 | 40 | 11.1 |
| 3 | 14 | 3.9 |
| 4 | 19 | 5.3 |
| 5 | 6 | 1.7 |
| 6-10 | 13 | 3.6 |
| 11-20 | 8 | 2.2 |
| 21-50 | 8 | 2.2 |
| 180 | 1 | 0.3 |
| Survey Responses | 360 | |

| Statistical Parameters | |
|---|---|
| N | 360 |
| Min | 0 |
| Max | 180 |
| Mean | 2.8 |
| Std Dev | 11.0 |
| Median | 1 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 41.1 | 1.1 |

| Responses | East | West | < 1950 | 1950-1982 | 1983-1992 | > 1992 |
|---|---|---|---|---|---|---|
| 0 | 8 (23.5%) | 154 (47.2%) | 117 (44.3%) | 20 (38.5%) | 24 (57.1%) | 1 (50.0%) |
| 1 | 5 (14.7%) | 84 (25.8%) | 77 (29.2%) | 5 (9.6%) | 7 (16.7%) | 0 (0.0%) |
| 2 | 3 (8.8%) | 37 (11.3%) | 32 (12.1%) | 5 (9.6 %) | 3 (7.1%) | 0 (0.0%) |
| 3 | 1 (2.9%) | 13 (4.0%) | 13 (4.9%) | 1 (1.9%) | 0 (0.0%) | 0 (0.0%) |
| 4 | 9 (26.5%) | 10 (3.1%) | 8 (3.0%) | 10 (19.2%) | 1 (2.4%) | 0 (0.0%) |
| 5 | 0 (0.0%) | 6 (1.8%) | 4 (1.5%) | 2 (3.8%) | 0 (0.0%) | 0 (0.0%) |
| 6-10 | 1 (2.9%) | 12 (3.7%) | 9 (3.4%) | 1 (1.9%) | 2 (48%) | 1 (50.0%) |
| 11-20 | 4 (11.8%) | 4 (1.2%) | 2 (0.8%) | 3 (5.8%) | 3 (7.1%) | 0 (0.0%) |
| 21-50 | 3 (8.8%) | 5( 1.5%) | 2 (0.8%) | 5 (9.6%) | 1 (2.4%) | 0 (0.0%) |
| 180 | 0 (0.0%) | 1 (0.3%) | 0 (0.0%) | 0 (0.0%) | 1 (2.4%) | 0 (0.0%) |

18. Is there a common laundry facility for residents?
*Note: Responses to questions 16, 17, 18a, 18b (all dealing with clothes washers) and 5 (number of apartments in property) were cross referenced to determine number of in-unit and common area washers, as well as the number of units served by each common area washer. See Page J-49 for results of cross referencing analysis.*

| Common Laundry Facility | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 239 | 67.5 |
| No | 115 | 32.5 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 354 | |
| Surveys with No Response | 6 | |

18a. [IF YES] How many washing machines are available in a common area?
*Note: Responses to questions 16, 17, 18a, 18b (all dealing with clothes washers) and 5 (number of apartments in property) were cross referenced to determine number of in-unit and common area washers, as well as the number of units served by each common area washer. See Page J-49 for results of cross referencing analysis.*

| Washing Machines - Common Area | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 110 | 48.9 |
| 2 | 48 | 21.3 |
| 3 | 26 | 11.6 |
| 4 | 20 | 8.9 |
| 5 | 5 | 2.2 |
| 6 | 5 | 2.2 |
| 7 | 1 | 0.4 |
| 8 | 1 | 0.4 |
| 9 | 2 | |
| 10 | 3 | |
| Survey Responses | 225 | |

| Statistical Parameters | |
|---|---|
| N | 225 |
| Min | 1 |
| Max | 42 |
| Mean | 2.6 |
| Std Dev | 4.3 |
| Median | 2 |
| Mode | 1 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 21.2 | 0.6 |

18b. Of the washing machines in the common area, how many are high-efficiency?
*Note: Responses to questions 16, 17, 18a, 18b (all dealing with clothes washers) and 5 (number of apartments in property) were cross referenced to determine number of in-unit and common area washers, as well as the number of units served by each common area washer. See Page J-49 for results of cross referencing analysis.*

| High-Efficiency Washing Machines - Common Area | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 11 | 37.9 |
| 2 | 10 | 34.5 |
| 4 | 4 | 13.8 |
| 9 | 2 | 6.9 |
| 10 | 1 | 3.4 |
| 11 | 1 | 3.4 |
| Survey Responses | 29 | |

| Statistical Parameters | |
|---|---|
| N | 29 |
| Min | 1 |
| Max | 11 |
| Mean | 3.0 |
| Std Dev | 2.9 |
| Median | 2 |
| Mode | 1 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 36.2 | 1.1 |

18c. Are the clothes washers leased?

| Leased Clothes Washers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 109 | 47.6 |
| No | 116 | 50.7 |
| Don't Know | 4 | 1.7 |
| Survey Responses | 229 | |

18d. Is the common area leased?

| Leased Common Area | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 17 | 8.3 |
| No | 181 | 88.3 |
| Don't Know | 7 | 3.4 |
| Survey Responses | 205 | |

19. How many reverse osmosis (R/O) units at this location?

| Reverse Osmosis Units | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 348 | 96.7 |
| 1 | 8 | 2.2 |
| 2 | 4 | 1.1 |
| Survey Responses | 360 | |

20. Does this location use recirculating hot water?

| Recirculating Hot Water | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 75 | 21.6 |
| No | 234 | 67.4 |
| Don't Know | 38 | 11.0 |
| Survey Responses | 347 | |
| Surveys with No Response | 13 | |

21. How many units use commercially-delivered bottled water?

| Commercially-Delivered Bottled Water | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 325 | 90.3 |
| 1 | 15 | 4.2 |
| 2 | 12 | 3.3 |
| 3 | 1 | 0.3 |
| 4 | 1 | 0.3 |
| 5 | 1 | 0.3 |
| 6-10 | 4 | 1.1 |
| 20 | 1 | 0.3 |
| Survey Responses | 360 | |

| Statistical Parameters | |
|---|---|
| N | 360 |
| Min | 0 |
| Max | 20 |
| Mean | 0.3 |
| Std Dev | 1.5 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 52.4 | 0.1 |

22. How many refrigerators have built-in water dispensers?

| Built-In Water Dispensers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 343 | 95.3 |
| 1 | 7 | 1.9 |
| 2 | 1 | 0.3 |
| 4 | 7 | 1.9 |
| 5 | 1 | 0.3 |
| 7 | 1 | 0.3 |
| Survey Responses | 360 | |

| Statistical Parameters | |
|---|---|
| N | 360 |
| Min | 0 |
| Max | 7 |
| Mean | 0.1 |
| Std Dev | 0.7 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 55.3 | 0.1 |

23. How many refrigerators have built-in icemakers?

| Built-In Icemakers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 334 | 92.8 |
| 1 | 14 | 3.9 |
| 2 | 1 | 0.3 |
| 3 | 1 | 0.3 |
| 4 | 8 | 2.2 |
| 5 | 1 | 0.3 |
| 6-10 | 1 | 0.3 |
| Survey Responses | 360 | |

| Statistical Parameters | |
|---|---|
| N | 360 |
| Min | 0 |
| Max | 7 |
| Mean | 0.2 |
| Std Dev | 0.8 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 46.0 | 0.1 |

24. How many water softeners at this location?

| Water Softeners | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 359 | 99.7 |
| 1 | 1* | 0.3 |
| Survey Responses | 360 | |

| Statistical Parameters | |
|---|---|
| N | 360 |
| Min | 0 |
| Max | 1 |
| Mean | 0.0 |
| Std Dev | 0.1 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 196.0 | 0.0 |

* The respondent did not provide information on unit location, type, manufacturer/make/model, or capacity..

25. How many hot tap primers (point source water heaters) at this location?

| Hot Tap Primers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 355 | 98.6 |
| 1 | 1 | 0.3 |
| 2 | 2 | 0.6 |
| 5 | 1 | 0.3 |
| 10 | 1 | 0.3 |
| Survey Responses | 360 | |

| Statistical Parameters | |
|---|---|
| N | 360 |
| Min | 0 |
| Max | 10 |
| Mean | 0.1 |
| Std Dev | 0.6 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 113.1 | 0.1 |

26. The types of cooling/air conditioning systems used at this location are:

| Evaporative Coolers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 1 | 0.5 |
| No | 206 | 96.3 |
| Don't Know | 7 | 3.3 |
| Survey Responses | 214 | |
| Surveys with No Response | 146 | |

| Water-Cooled Systems | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 3 | 1.4 |
| No | 206 | 96.3 |
| Don't Know | 5 | 2.3 |
| Survey Responses | 214 | |
| Surveys with No Response | 146 | |

| Air-Cooled Systems | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 22 | 9.8 |
| No | 196 | 87.5 |
| Don't Know | 6 | 2.7 |
| Survey Responses | 224 | |
| Surveys with No Response | 136 | |

27. How many evaporative coolers are at this location?

| Evaporative Coolers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 359 | 99.7 |
| 6 | 1* | 0.3 |
| Survey Responses | 360 | |

* The respondent did not provide information on the monthly use of the evaporative cooler.

28. How many cooling towers are at this location?

| Cooling Towers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 357 | 99.2 |
| 1 | 1* | 0.3 |
| 2 | 2* | 0.6 |
| Survey Responses | 360 | |

* None of the respondents provided information on the monthly use of the cooling tower units.

29. How many water pressure regulators are there off the incoming line?

| Water Pressure Regulators | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 309 | 85.8 |
| 1 | 45 | 12.5 |
| 2 | 3 | 0.8 |
| 6 | 2 | 0.6 |
| 58 | 1 | 0.3 |
| Survey Responses | 360 | |

| Statistical Parameters | |
|---|---|
| N | 360 |
| Min | 0 |
| Max | 58 |
| Mean | 0.3 |
| Std Dev | 3.1 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 95.3 | 0.3 |

29a. [IF WATER PRESSURE REGULATOR] Is the water pressure regulator for:

| Indoor Use | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 15 | 83.3 |
| 6 | 2 | 11.1 |
| 58 | 1 | 5.6 |
| Survey Responses | 18 | |

| Outdoor Use | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 7 | 100.0 |
| Survey Responses | 7 | |

| Both Indoor and Outdoor Use | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 21 | 100.0 |
| Survey Responses | 21 | |

30. Is car washing by tenants permitted on the premises?

| Car Washing | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 126 | 35.6 |
| No | 221 | 62.4 |
| Don't Know | 7 | 2.0 |
| Survey Responses | 354 | |
| Surveys with No Response | 6 | |

31. Are there any other indoor water-using appliances/fixtures?

| Other Indoor Water-Using Appliances/Fixtures | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 11 | 3.1 |
| No | 307 | 87.5 |
| Don't Know | 33 | 9.4 |
| Survey Responses | 351 | |
| Surveys with No Response | 9 | |

31a. [IF YES] Please list type of water-using appliance/fixture.

| Type of Other Indoor Water-Using Appliances/Fixtures | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Fish Tank | 4 | 57.1 |
| Irrigation/Timer | 1 | 14.3 |
| Water Heater | 1 | 14.3 |
| Indoor Fountain | 1 | 14.3 |
| Survey Responses | 7 | |
| Unidentified | 4 | |

32. For each toilet in a sample of apartment units, list:

| Make/Model of Toilet | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| American Standard | 62 | 21.2 |
| Briggs | 32 | 11.0 |
| Cidamar | 1 | 0.3 |
| Crane | 4 | 1.4 |
| Eljer | 16 | 5.5 |
| GE | 1 | 0.3 |
| Gerber | 6 | 2.1 |
| Haas | 1 | 0.3 |
| Imperial | 1 | 0.3 |
| K | 6 | 2.1 |
| Kilgore | 5 | 1.7 |
| Kohler | 21 | 7.2 |
| Lamosa | 3 | 1.0 |
| LPG | 1 | 0.3 |
| Mansfield | 7 | 2.4 |
| Murray | 1 | 0.3 |
| NI | 4 | 1.4 |
| Norris | 25 | 8.6 |
| Orion | 2 | 0.7 |
| Pacific | 1 | 0.3 |
| Sannix | 1 | 0.3 |
| Sasa | 1 | 0.3 |
| Sloan | 1 | 0.3 |
| Standard | 26 | 8.9 |
| Toto | 5 | 1.7 |
| Universal Rundle | 8 | 2.7 |
| UPC | 5 | 1.7 |
| Vitromex | 1 | 0.3 |
| VRP | 3 | 1.0 |
| Western | 1 | 0.3 |
| Western Pottery | 1 | 0.3 |
| Don't Know | 39 | 13.4 |
| Inspected Toilets | 292 | |

| Year Toilet Was Manufactured/Installed | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <1950 | 1 | 0.3 |
| 1950-1959 | 13 | 4.5 |
| 1960-1969 | 25 | 8.6 |
| 1970-1979 | 39 | 13.4 |
| 1980-1989 | 46 | 15.8 |
| 1990-1999 | 80 | 27.4 |
| 2000-2001 | 18 | 6.2 |
| Don't Know | 70 | 24.0 |
| Inspected Toilets | 292 | |

| Statistical Parameters | |
|---|---|
| N | 218 |
| Min | 1928 |
| Max | 2001 |
| Mean | 1984 |
| Std Dev | 14.0 |
| Median | 1987 |
| Mode | 1999 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 0.1 | 1.9 |

| Design Flush Volume (gpf) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1.6 | 102 | 34.9 |
| 3.5 | 72 | 24.7 |
| 5+ | 52 | 17.8 |
| Don't Know | 66 | 22.6 |
| Inspected Toilets | 292 | |

**Note:** Cross-checking with data on year of toilet manufacture changed the frequency of responses to:
37.0% for 1.6 gpf
29.5% for 3.5 gpf
17.8% for 5+ gpf
16.1% for Unknown

| Tank Volume (gal) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0-1.60 | 58 | 19.9 |
| 1.61-2.00 | 27 | 9.2 |
| 2.01-2.50 | 28 | 9.6 |
| 2.51-3.00 | 66 | 22.6 |
| 3.01-3.50 | 58 | 19.9 |
| 3.51-4.00 | 23 | 7.9 |
| 4.01-5.00 | 13 | 4.5 |
| 5.01+ | 9 | 3.1 |
| Unable to Measure | 10 | 3.4 |
| Inspected Toilets | 292 | |

| Statistical Parameters | |
|---|---|
| N | 282 |
| Min | 0.9 |
| Max | 7.3 |
| Mean | 2.7 |
| Std Dev | 1.1 |
| Median | 2.78 |
| Mode | 1.1 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 4.7 | 0.1 |

| Water Conservation Device | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| None | 258 | 88.4 |
| Dam | 1 | 0.3 |
| Displacement | 6 | 2.1 |
| Quick Closing Flapper | 25 | 8.6 |
| Water Level Adjustment | 2 | 0.7 |
| Inspected Toilets | 292 | |

| Leaks in Toilet | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 7 | 2.4 |
| No | 284 | 97.3 |
| Don't Know | 1 | 0.3 |
| Inspected Toilets | 292 | |

33. For each shower stall in a sample of apartment units, list:

| Type of Unit | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Efficiency/Studio | 22 | 7.5 |
| 1 Bedroom | 88 | 30.1 |
| 2 Bedroom | 143 | 49.0 |
| 3+ Bedroom | 39 | 13.4 |
| Inspected Shower Stalls | 292 | |
| Surveys with No Response | 4 | |

| Gallons per Minute for Showerhead | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <1 | 1 | 0.3 |
| 1-1.9 | 21 | 7.1 |
| 2-2.9 | 188 | 63.5 |
| 3-3.9 | 37 | 12.5 |
| 4-4.9 | 16 | 5.4 |
| 5-5.9 | 22 | 7.4 |
| 6-6.9 | 9 | 3.0 |
| Unable to measure | 2 | 0.7 |
| Inspected Showerheads | 296 | |

| Statistical Parameters | |
|---|---|
| N | 294 |
| Min | 0.5 |
| Max | 6.5 |
| Mean | 2.8 |
| Std Dev | 1.1 |
| Median | 2.5 |
| Mode | 2.5 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 4.6 | 0.1 |

| Showerhead Type | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Atomizing | 25 | 8.4 |
| Stream/Spray | 271 | 91.6 |
| Inspected Showerheads | 296 | |

| Showerhead Style | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Fixed | 260 | 87.8 |
| Handheld | 36 | 12.2 |
| Inspected Showerheads | 296 | |

| Showerhead Shut-off Button | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 13 | 4.4 |
| No | 283 | 95.6 |
| Don't Know | 0 | 0.0 |
| Inspected Showerheads | 296 | |

| Leaks in Shower | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| None | 194 | 65.5 |
| Showerhead | 18 | 6.1 |
| Valve | 17 | 5.7 |
| Diverter | 67 | 22.6 |
| Inspected Showerheads | 296 | |

34. For each bathtub in a sample of apartment units, list:

| Type of Unit | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Efficiency/Studio | 24 | 9.5 |
| 1 Bedroom | 83 | 32.8 |
| 2 Bedroom | 120 | 47.4 |
| 3+ Bedroom | 26 | 10.3 |
| Inspected Bathtubs | 253 | |

| Bathtub Length (in) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <46 | 2 | 0.8 |
| 46-50 | 8 | 3.2 |
| 51-55 | 216 | 85.4 |
| 56-60 | 27 | 10.7 |
| Inspected Bathtubs | 253 | |

| Statistical Parameters | |
|---|---|
| N | 253 |
| Min | 41 |
| Max | 60 |
| Mean | 53.5 |
| Std Dev | 2.1 |
| Median | 54 |
| Mode | 54 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 0.5 | 0.3 |

| Bathtub Width (in) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <21 | 7 | 2.8 |
| 21-25 | 241 | 95.3 |
| 25.5-30 | 4 | 1.6 |
| 30-35 | 1 | 0.4 |
| Inspected Bathtubs | 253 | |

| Statistical Parameters | |
|---|---|
| N | 253 |
| Min | 12 |
| Max | 34 |
| Mean | 23.1 |
| Std Dev | 1.8 |
| Median | 23.5 |
| Mode | 24 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 1.0 | 0.2 |

| Bathtub Depth (in) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <8.5 | 9 | 3.6 |
| 8.5-10 | 113 | 44.7 |
| 10.5-12 | 67 | 26.5 |
| 12.5-14 | 60 | 23.7 |
| 14.5-16 | 4 | 1.6 |
| Inspected Bathtubs | 253 | |

| Statistical Parameters | |
|---|---|
| N | 253 |
| Min | 8 |
| Max | 16 |
| Mean | 11.1 |
| Std Dev | 1.7 |
| Median | 11 |
| Mode | 10 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 1.9 | 0.2 |

| Bathtub Volume (gal) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <40 | 4 | 1.6 |
| 40-49.9 | 50 | 19.8 |
| 50-59.9 | 82 | 32.4 |
| 60-69.9 | 69 | 27.3 |
| 70-79.9 | 43 | 17.0 |
| 80-89.9 | 5 | 2.0 |
| Inspected Bathtubs | 253 | |

| Statistical Parameters | |
|---|---|
| N | 253 |
| Min | 89.1 |
| Max | 89.8 |
| Mean | 59.2 |
| Std Dev | 10.7 |
| Median | 58.1 |
| Mode | 49.5 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 2.2 | 1.3 |

| Leaks in Bathtub | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| None | 247 | 97.6 |
| Diverter | 6 | 2.4 |
| Inspected Bathtubs | 253 | |

35. For each faucet in a sample of apartment units, list:

| Faucet Location | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Tenant Unit | 532 | 93.0 |
| Common Area | 40 | 7.0 |
| Inspected Faucets | 572 | |

| Type of Unit | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Efficiency/Studio | 46 | 8.3 |
| 1 Bedroom | 172 | 31.2 |
| 2 Bedroom | 265 | 48.0 |
| 3+ Bedroom | 69 | 12.5 |
| Inspected Faucets | 552 | |
| Surveys with No Response | 20 | |

| Faucet Type | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Kitchen | 256 | 44.8 |
| Bathroom | 296 | 51.7 |
| Utility | 18 | 3.1 |
| Other | 2 | 0.3 |
| Inspected Faucets | 572 | |

| Gallons per Minute for Faucet | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <2 | 61 | 10.7 |
| 2-2.9 | 386 | 67.5 |
| 3-3.9 | 55 | 9.6 |
| 4-4.9 | 46 | 8.0 |
| 5-5.9 | 16 | 2.8 |
| 6+ | 7 | 1.2 |
| Unable to Measure | 1 | 0.2 |
| Inspected Faucets | 572 | |

| Statistical Parameters | |
|---|---|
| N | 572 |
| Min | 1 |
| Max | 8 |
| Mean | 2.5 |
| Std Dev | 0.9 |
| Median | 2.5 |
| Mode | 2 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 3.0 | 0.1 |

| Aerator Attached | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 479 | 83.7 |
| No | 93 | 16.3 |
| Don't Know | 0 | 0.0 |
| Inspected Faucets | 572 | |

| Leaks in Faucet | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 19 | 3.3 |
| No | 552 | 96.5 |
| Don't Know | 1 | 0.2 |
| Inspected Faucets | 572 | |

36. For each dishwasher in a sample of apartment units, list:

| Type of Unit | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Efficiency/Studio | 8 | 10.3 |
| 1 Bedroom | 13 | 16.7 |
| 2 Bedroom | 43 | 55.1 |
| 3+ Bedroom | 14 | 17.9 |
| Inspected Dishwashers | 78 | |
| Surveys with No Response | 1 | |

| Manufacturer/Make/ Model | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Bosch | 3 | 3.8 |
| Frigidaire | 2 | 2.5 |
| GE | 14 | 17.7 |
| Hotpoint | 13 | 16.5 |
| Jenn Air | 1 | 1.3 |
| Kenmore | 9 | 11.4 |
| Kitchen Aid | 12 | 15.2 |
| Magic Chef | 2 | 2.5 |
| Maytag | 2 | 2.5 |
| Montgomery Ward | 1 | 1.3 |
| Stero | 1 | 1.3 |
| Whirlpool | 16 | 20.3 |
| White-Westinghouse | 1 | 1.3 |
| Don't Know | 2 | 2.5 |
| Inspected Dishwashers | 79 | |

| Water Efficiency Setting on Dishwasher | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 58 | 73.4 |
| No | 20 | 25.3 |
| Don't Know | 1 | 1.3 |
| Inspected Dishwashers | 79 | |

37. For each clothes washing machine in a sample of apartment units, list:

| Clothes Washing Machine Location | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Tenant Unit | 41 | 15.0 |
| Common Area | 233 | 85.0 |
| Inspected Clothes Washing Machines | 274 | |

| Type of Unit | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Efficiency/Studio | 0 | 0.0 |
| 1 Bedroom | 3 | 1.1 |
| 2 Bedroom | 25 | 9.1 |
| 3+ Bedroom | 13 | 4.7 |
| Common Area | 233 | 85.0 |
| Inspected Clothes Washing Machines | 274 | |

| Manufacturer/Make/ Model | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Amana | 1 | 0.4 |
| Bosch | 1 | 0.4 |
| Frigidaire | 1 | 0.4 |
| GE | 16 | 5.8 |
| Kenmore | 68 | 24.8 |
| Kitchen Aid | 1 | 0.4 |
| Maytag | 88 | 32.1 |
| Speed Queen | 56 | 20.4 |
| Tappan | 1 | 0.4 |
| Web | 22 | 8.0 |
| Whirlpool | 13 | 4.7 |
| White-Westinghouse | 1 | 0.4 |
| Don't Know | 5 | 1.8 |
| Inspected Clothes Washing Machines | 274 | |

| Type of Clothes Washing Machine | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Standard Efficiency | 259 | 94.9 |
| High Efficiency | 13 | 4.8 |
| Multi-Load | 1 | 0.4 |
| Inspected Clothes Washing Machines | 273 | |
| Surveys with No Response | 1 | |

| Water Saving/Load Size Selection Feature | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 64 | 23.4 |
| No | 209 | 76.3 |
| Don't Know | 1 | 0.4 |
| Inspected Clothes Washing Machines | 274 | |

38. For each reverse osmosis unit in a sample of apartment units, list:

| Type of Unit | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Efficiency/Studio | 0 | 0.0 |
| 1 Bedroom | 0 | 0.0 |
| 2 Bedroom | 0 | 0.0 |
| 3+ Bedroom | 1 | 100.0 |
| Survey Responses | 1 | |

* The respondent did not provide information on the capacity of the reverse osmosis unit.

| Automatic Shutoffs on Reverse Osmosis Unit | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 0 | 0.0 |
| No | 1 | 100.0 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 1 | |

39. For each water softener in a sample of apartment units, list:
(No Responses)

40. For each hot tap primer (point source water heater) in a sample of apartment units, list:

| Hot Tap Primer Location | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Tenant Unit | 2 | 100.0 |
| Common Area | 0 | 0.0 |
| Survey Responses | 2 | |

| Type of Unit | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Efficiency/Studio | 0 | 0.0 |
| 1 Bedroom | 0 | 0.0 |
| 2 Bedroom | 1 | 50.0 |
| 3+ Bedroom | 1 | 50.0 |
| Survey Responses | 2 | |

| Hot Tap Primer Location within Unit | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Kitchen | 2 | 100.0 |
| Bathroom | 0 | 0.0 |
| Utility | 0 | 0.0 |
| Other | 0 | 0.0 |
| Survey Responses | 2 | |

| Type of System | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Tank | 2 | 100.0 |
| Other | 0 | 0.0 |
| Survey Responses | 2 | |

41. How many swimming pools are at this location?

| Swimming Pools | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 313 | 86.9 |
| 1 | 42 | 11.7 |
| 2 | 3 | 0.8 |
| 4 | 2 | 0.6 |
| Survey Responses | 360 | |

41a. [IF SWIMMING POOL] List:

| Swimming Pool Length (ft) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <26 | 7 | 18.9 |
| 26-30 | 7 | 18.9 |
| 31-35 | 11 | 29.7 |
| 36-40 | 7 | 18.9 |
| 41-45 | 5 | 13.5 |
| Inspected Pools | 37 | |
| Not Inspected | 19 | |

| Statistical Parameters | |
|---|---|
| N | 37 |
| Min | 20 |
| Max | 45 |
| Mean | 33.6 |
| Std Dev | 6.7 |
| Median | 35 |
| Mode | 35 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 6.4 | 2.2 |

| Swimming Pool Width (ft) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <11 | 1 | 2.7 |
| 11-45 | 6 | 16.2 |
| 16-20 | 15 | 40.5 |
| 21-25 | 13 | 35.1 |
| 26-30 | 2 | 5.4 |
| Inspected Pools | 37 | |
| Not Inspected | 19 | |

| Statistical Parameters | |
|---|---|
| N | 37 |
| Min | 10 |
| Max | 28 |
| Mean | 19.7 |
| Std Dev | 4.8 |
| Median | 19 |
| Mode | 18 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 7.8 | 1.5 |

| Average Depth of Swimming Pool (ft) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <4.1 | 7 | 18.9 |
| 4.1-5 | 25 | 67.6 |
| 5.1-6 | 3 | 8.1 |
| 6.1-7 | 2 | 5.4 |
| Inspected Pools | 37 | |
| Not Inspected | 19 | |

| Statistical Parameters | |
|---|---|
| N | 37 |
| Min | 3.5 |
| Max | 7 |
| Mean | 4.9 |
| Std Dev | 0.7 |
| Median | 5 |
| Mode | 5 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 4.6 | 0.2 |

| Swimming Pool Volume (gal) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <10001 | 1 | 2.7 |
| 10001-19999 | 10 | 27.0 |
| 20000-29999 | 17 | 45.9 |
| 30000-39999 | 7 | 18.9 |
| 40000-49999 | 2 | 5.4 |
| Inspected Pools | 37 | |
| Not Inspected | 19 | |

| Statistical Parameters | |
|---|---|
| N | 37 |
| Min | 7480 |
| Max | 42411.6 |
| Mean | 24546.2 |
| Std Dev | 8282.2 |
| Median | 23375 |
| Mode | 23375 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 10.9 | 2668.7 |

| Swimming Pool Location | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Indoor | 1 | 2.7 |
| Outdoor | 36 | 97.3 |
| Inspected Pools | 37 | |
| Not Inspected | 19 | |

| Pool Cover on Swimming Pool | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 1 | 2.7 |
| No | 36 | 97.3 |
| Don't Know | 0 | 0.0 |
| Inspected Pools | 37 | |
| Not Inspected | 19 | |

42. How many spas/jacuzzis are at this location?

| Spas/Jacuzzis | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 338 | 93.9 |
| 1 | 14 | 3.9 |
| 2 | 8 | 2.2 |
| Survey Responses | 360 | |

42a. [IF SPA/JACUZZI] List:

| Spa/Jacuzzi Length (ft) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <5 | 1 | 14.3 |
| 5-8 | 5 | 71.4 |
| 9-12 | 1 | 14.3 |
| Inspected Spas | 7 | |
| Not Inspected | 23 | |

| Statistical Parameters | |
|---|---|
| N | 7 |
| Min | 4 |
| Max | 12 |
| Mean | 6.7 |
| Std Dev | 2.8 |
| Median | 5 |
| Mode | 5 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 31.0 | 2.1 |

| Spa/Jacuzzi Width (ft) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <5 | 1 | 14.3 |
| 5-8 | 5 | 71.4 |
| 9-12 | 1 | 14.3 |
| Inspected Spas | 7 | |
| Not Inspected | 23 | |

| Statistical Parameters | |
|---|---|
| N | 7 |
| Min | 4 |
| Max | 12 |
| Mean | 6.7 |
| Std Dev | 2.8 |
| Median | 5 |
| Mode | 5 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 31.0 | 2.1 |

| Average Depth of Spa/Jacuzzi (ft) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <3 | 1 | 14.3 |
| 3-3.9 | 3 | 42.9 |
| 4-4.9 | 3 | 42.9 |
| Inspected Spas | 7 | |
| Not Inspected | 23 | |

| Statistical Parameters | |
|---|---|
| N | 7 |
| Min | 2 |
| Max | 4 |
| Mean | 3.4 |
| Std Dev | 0.7 |
| Median | 3.5 |
| Mode | 4 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 15.8 | 0.5 |

| Spa/Jacuzzi Volume (gal) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <1000 | 4 | 57.1 |
| 1000-2000 | 2 | 28.6 |
| 2001+ | 1 | 14.3 |
| Inspected Spas | 7 | |
| Not Inspected | 23 | |

| Statistical Parameters | |
|---|---|
| N | 7 |
| Min | 359 |
| Max | 2154.2 |
| Mean | 1158.3 |
| Std Dev | 667.2 |
| Median | 748 |
| Mode | 748 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 42.7 | 494.3 |

| Spa/Jacuzzi Location | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Indoor | 0 | 0.0 |
| Outdoor | 7 | 100.0 |
| Inspected Spas | 7 | |
| Not Inspected | 23 | |

| Cover on Spa/Jacuzzi | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 1 | 14.3 |
| No | 6 | 85.7 |
| Don't Know | 0 | 0.0 |
| Inspected Spas | 7 | |
| Not Inspected | 23 | |

43. How many fountains or ponds are at this location?

| Fountains/Ponds | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 338 | 93.9 |
| 1 | 19 | 5.3 |
| 2 | 2 | 0.6 |
| 3 | 1 | 0.3 |
| Survey Responses | 360 | |

43a. [IF FOUNTAIN OR POND] List:

| Fountain/Pond Length (ft) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <11 | 5 | 45.5 |
| 11-20 | 4 | 36.4 |
| 21-30 | 2 | 18.2 |
| Inspected Fountains/Ponds | 11 | |
| Not Inspected | 15 | |

| Statistical Parameters | |
|---|---|
| N | 11 |
| Min | 3.5 |
| Max | 30 |
| Mean | 13.0 |
| Std Dev | 10.1 |
| Median | 12 |
| Mode | 4 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 6.0 | 45.7 |

| Fountain/Pond Width (ft) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <6 | 5 | 45.5 |
| 6-10 | 2 | 18.2 |
| 11-20 | 2 | 18.2 |
| 21-30 | 2 | 18.2 |
| Inspected Fountains/Ponds | 11 | |
| Not Inspected | 15 | |

| Statistical Parameters | |
|---|---|
| N | 11 |
| Min | 1 |
| Max | 27 |
| Mean | 10.9 |
| Std Dev | 9.7 |
| Median | 9 |
| Mode | 3 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 52.5 | 5.7 |

| Average Depth of Fountain/Pond (ft) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <1.1 | 4 | 36.4 |
| 1.1-3 | 4 | 36.4 |
| 3.1-5 | 2 | 18.2 |
| 5.1-7 | 1 | 9.1 |
| Inspected Fountains/Ponds | 11 | |
| Not Inspected | 15 | |

| Statistical Parameters | |
|---|---|
| N | 11 |
| Min | 0.5 |
| Max | 6 |
| Mean | 2.2 |
| Std Dev | 1.9 |
| Median | 1.5 |
| Mode | 0.5 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 52.2 | 1.1 |

| Fountains/Ponds Volume with < 100 Gallons Capacity | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 45.8 | 1 | 50.0 |
| 59.8 | 1 | 50.0 |
| Inspected Fountains/Ponds | 2 | |

| Statistical Parameters | |
|---|---|
| N | 2 |
| Min | 45.8 |
| Max | 59.8 |
| Mean | 52.8 |
| Std Dev | 9.9 |
| Median | 52.8 |
| Mode | N/A |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 26.0 | 13.7 |

| Fountain/ Ponds Volume with 100-500 Gallon Capacity | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 112.2 | 1 | 50.0 |
| 179.5 | 1 | 50.0 |
| Inspected Fountains/Ponds | 2 | |

| Statistical Parameters | |
|---|---|
| N | 2 |
| Min | 112.2 |
| Max | 179.5 |
| Mean | 145.9 |
| Std Dev | 47.6 |
| Median | 145.86 |
| Mode | N/A |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 45.2 | 66.0 |

| Fountain/Ponds Volume with 500 + Gallon Capacity | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 500-2500 | 3 | 42.9 |
| 2501-5000 | 1 | 14.3 |
| 5001-10000 | 2 | 28.6 |
| 10001+ | 1 | 14.3 |
| Inspected Fountains/Ponds | 7 | |

| Statistical Parameters | |
|---|---|
| N | 7 |
| Min | 538.6 |
| Max | 17952 |
| Mean | 5975.5 |
| Std Dev | 6516.1 |
| Median | 4039.2 |
| Mode | 561 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 80.8 | 4827.2 |

| Recirculating Water in Fountain/Pond | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 10 | 90.9 |
| No | 1 | 9.1 |
| Don't Know | 0 | 0.0 |
| Inspected Fountains/Ponds | 11 | |
| Not Inspected | 15 | |

44. Does this location have a cistern or storm water harvesting system?

| Cistern or Storm Water Harvesting System | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 1 | 0.3 |
| No | 345 | 98.3 |
| Don't Know | 5 | 1.4 |
| Survey Responses | 351 | |
| Surveys with No Response | 9 | |

45. Does this location use a gray water system?

| Gray water System | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 1 | 0.3 |
| No | 347 | 98.9 |
| Don't Know | 3 | 0.9 |
| Survey Responses | 351 | |
| Surveys with No Response | 9 | |

46. Does this location use water from a well?

| Well Water | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 4 | 1.1 |
| No | 346 | 98.6 |
| Don't Know | 1 | 0.3 |
| Survey Responses | 351 | |
| Surveys with No Response | 9 | |

46a. [IF YES] Is the well water used for potable (drinking, sanitary needs)?

| Potable Well Water | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 0 | 0.0 |
| No | 2 | 100.0 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 2 | |
| Surveys with No Response | 2 | |

46b. Is the well water used for irrigation needs?

| Irrigation Well Water | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 3 | 100.0 |
| No | 0 | 0.0 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 3 | |
| Surveys with No Response | 1 | |

46c. Is the well water used for swimming pool/spa?

| Swimming Pool/Spa Well Water | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 2 | 100.0 |
| No | 0 | 0.0 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 2 | |
| Surveys with No Response | 2 | |

47. Square footage of total landscapable area?

| Total Landscapable Area ($ft^2$) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 81 | 22.5 |
| 1-1000 | 150 | 41.7 |
| 1001-2000 | 56 | 15.6 |
| 2001-3000 | 19 | 5.3 |
| 3001-4000 | 14 | 3.9 |
| 4001-5000 | 15 | 4.2 |
| 5001-6000 | 1 | 0.3 |
| 6001-7000 | 1 | 0.3 |
| 7001-8000 | 4 | 1.1 |
| 8001-10000 | 2 | 0.6 |
| 10001-50000 | 13 | 3.6 |
| 50001-100000 | 2 | 0.6 |
| 100001+ | 2 | 0.6 |
| Survey Responses | 360 | |

| Statistical Parameters | |
|---|---|
| N | 360 |
| Min | 0 |
| Max | 806436 |
| Mean | 4857.6 |
| Std Dev | 43538.1 |
| Median | 577 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 92.6 | 4497.5 |

48. Square footage of landscapable area that is irrigated?

| Irrigated Landscapable Area ($ft^2$) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 155 | 43.1 |
| 1-1000 | 115 | 31.9 |
| 1001-2000 | 41 | 11.4 |
| 2001-3000 | 16 | 4.4 |
| 3001-4000 | 9 | 2.5 |
| 4001-6000 | 10 | 2.8 |
| 6001-8000 | 3 | 0.8 |
| 8001-10000 | 0 | 0.0 |
| 10001-50000 | 10 | 2.8 |
| 50001+ | 1 | 0.3 |
| Survey Responses | 360 | |

| Statistical Parameters | |
|---|---|
| N | 360 |
| Min | 0 |
| Max | 806436 |
| Mean | 3545.7 |
| Std Dev | 42644.7 |
| Median | 97.5 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 124.2 | 4405.2 |

49. Square footage of lawn area?

| Lawn Area ($ft^2$) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 234 | 65.0 |
| 1-1000 | 74 | 20.6 |
| 1001-2000 | 24 | 6.7 |
| 2001-4000 | 13 | 3.6 |
| 4001-6000 | 4 | 1.1 |
| 6001-10000 | 6 | 1.7 |
| 10001-15000 | 3 | 0.8 |
| 15001+ | 2 | 0.6 |
| Survey Responses | 360 | |

| Statistical Parameters | |
|---|---|
| N | 360 |
| Min | 0 |
| Max | 18000 |
| Mean | 645.1 |
| Std Dev | 1941.9 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 31.1 | 200.6 |

50. Percent of landscaped area that uses drip irrigation?

| Landscaped Area that Uses Drip Irrigation (%) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 339 | 94.2 |
| Under 10% | 4 | 1.1 |
| Between 10% and 20% | 1 | 0.3 |
| Between 20% and 30% | 4 | 1.1 |
| Between 30% and 40% | 3 | 0.8 |
| Between 40% and 50% | 1 | 0.3 |
| Between 50% and 60% | 0 | 0.0 |
| Between 60% and 70% | 1 | 0.3 |
| Between 70% and 80% | 0 | 0.0 |
| Between 80% and 90% | 0 | 0.0 |
| Over 90% | 7 | 1.9 |
| Survey Responses | 360 | |

| Statistical Parameters | |
|---|---|
| N | 360 |
| Min | 0 |
| Max | 100 |
| Mean | 3.0 |
| Std Dev | 15.1 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 51.9 | 1.6 |

51. Who is responsible for maintaining landscaped areas?

| Responsible for Landscape Maintenance | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Tenant | 37 | 12.5 |
| Owner/ Building Manager | 164 | 55.4 |
| Landscape Maintenance Service/ Contracted Gardener | 89 | 30.1 |
| Other | 6 | 2.0 |
| Survey Responses | 296 | |
| Surveys with No Response | 64 | |

52. What type of irrigation system is used?

| Irrigation System | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Hose Alone | 154 | 55.8 |
| Hose & Sprinkler | 29 | 10.5 |
| Hose & Sprinkler with Timer | 5 | 1.8 |
| In-Ground System, with Controller | 62 | 22.5 |
| In-Ground System, without Controller | 7 | 2.5 |
| Sprinklers with Spray-Type Head | 13 | 4.7 |
| Sprinklers of the Impact/Rotor Type | 0 | 0.0 |
| Sprinklers of the Stream/Rotor Type | 0 | 0.0 |
| Drip Irrigation | 6 | 2.2 |
| Subsurface Irrigation | 0 | 0.0 |
| Other | 0 | 0.0 |
| Survey Responses | 276 | |
| Surveys with No Response | 84 | |

53. What is the water pressure at the hose bib (in PSI)?

| Water Pressure (psi) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-20 | 1 | 0.4 |
| 21-40 | 2 | 0.9 |
| 41-60 | 58 | 25.3 |
| 61-80 | 114 | 49.8 |
| 81-100 | 36 | 15.7 |
| 101-120 | 17 | 7.4 |
| 121-140 | 1 | 0.4 |
| Survey Responses | 229 | |
| Unable to Measure | 131 | |

| Statistical Parameters | |
|---|---|
| N | 229 |
| Min | 1 |
| Max | 125 |
| Mean | 74.2 |
| Std Dev | 17.6 |
| Median | 70 |
| Mode | 60 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 3.1 | 2.3 |

54. If irrigation system has controllers, do the controllers cover:

| Coverage of Irrigation System | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Front | 31 | 57.4 |
| Back | 14 | 25.9 |
| Both | 9 | 16.7 |
| Survey Responses | 54 | |

55. For each controller identified in Question 54, list the following:

| Manufacturer/Make/ Model of Irrigation System Controller | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Dig Corp. | 1 | 1.9 |
| Galcon | 1 | 1.9 |
| Gardena | 1 | 1.9 |
| Hardie | 4 | 7.4 |
| Hydro Rain | 1 | 1.9 |
| Intermatic | 1 | 1.9 |
| Irritrol | 11 | 20.4 |
| Lawn Genie | 3 | 5.6 |
| Melnor | 1 | 1.9 |
| Orbit | 2 | 3.7 |
| Rain Dial | 1 | 1.9 |
| Rain Dial/Hardie | 1 | 1.9 |
| RainJet | 1 | 1.9 |
| Rain Master | 2 | 3.7 |
| Rain Bird | 5 | 9.3 |
| Toro | 6 | 11.1 |
| Watermaster | 3 | 5.6 |
| Don't Know | 9 | 16.7 |
| Survey Responses | 54 | |

| Type of Irrigation System Controller | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Mechanical | 15 | 27.8 |
| Digital | 38 | 70.4 |
| Other | 1 | 1.9 |
| Survey Responses | 54 | |

| No. of Stations | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 16 | 29.6 |
| 2 | 11 | 20.4 |
| 3 | 4 | 7.4 |
| 4 | 2 | 3.7 |
| 5 | 3 | 5.6 |
| 6 | 4 | 7.4 |
| 7 | 2 | 3.7 |
| 8 | 1 | 1.9 |
| 10 | 2 | 3.7 |
| 11 | 1 | 1.9 |
| 12 | 2 | 3.7 |
| 17 | 3 | 5.6 |
| 18 | 1 | 1.9 |
| Don't Know | 2 | 3.7 |
| Survey Responses | 54 | |

| Statistical Parameters | |
|---|---|
| N | 52 |
| Min | 1 |
| Max | 18 |
| Mean | 4.7 |
| Std Dev | 4.8 |
| Median | 2 |
| Mode | 1 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 27.9 | 1.3 |

| Programmable Multiple Start Time Capabilities | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 43 | 79.6 |
| No | 10 | 18.5 |
| Don't Know | 1 | 1.9 |
| Survey Responses | 54 | |

| Type of Calendar Clock | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 7-Day | 39 | 75.0 |
| 14-Day | 2 | 3.8 |
| 30-Day | 1 | 1.9 |
| Other | 10 | 19.2 |
| Survey Responses | 52 | |
| Surveys with No Response | 2 | |

| Moisture Sensor | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 0 | 0.0 |
| No | 52 | 96.3 |
| Don't Know | 2 | 3.7 |
| Survey Responses | 54 | |

| Rain Sensor | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 1 | 1.9 |
| No | 51 | 94.4 |
| Don't Know | 2 | 3.7 |
| Survey Responses | 54 | |

56. Are there any other outdoor water-using appliances/fixtures?

| Other Outdoor Water-Using Appliances/Fixtures | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 0 | 0.0 |
| No | 285 | 100.0 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 285 | |
| Surveys with No Response | 75 | |

57. Number of showerheads left with the customer.

| Showerheads Left | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 297 | 82.5 |
| 1 | 22 | 6.1 |
| 2 | 9 | 2.5 |
| 3 | 14 | 3.9 |
| 4 | 4 | 1.1 |
| 5 | 11 | 3.1 |
| 6 | 2 | 0.6 |
| 7 | 1 | 0.3 |

58. Number of faucet aerators left with the customer.

| Faucet Aerators Left | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 298 | 82.8 |
| 1 | 18 | 5.0 |
| 2 | 11 | 3.1 |
| 3 | 11 | 3.1 |
| 4 | 3 | 0.8 |
| 5 | 4 | 1.1 |
| 6 | 4 | 1.1 |
| 7 | 1 | 0.3 |
| 8 | 4 | 1.1 |
| 9 | 3 | 0.8 |
| 10 | 1 | 0.3 |
| 13 | 1 | 0.3 |
| 20 | 1 | 0.3 |

**Cross-Referencing Analysis of Answers to Clothes Washer Questions in Multi-Family Survey**

*16. (Question ID #34 in database) How many of the housing units have clothes washing machine hook-ups?*
*17. (Question ID #35 in database) How many clothes washing machines at this location?*
*18. (Question ID #36 in database) Is there a common laundry facility for residents? (1= yes, 2=no)*
*18a. (Question ID #37 in database) How many washing machines are available in the common area?*
*18b. (Question ID #38 in database) How many of the washing machines in the common area are high-efficiency?*

5. *(Question ID #9 in database) How many housing units does this water account represent?*

Analysis of responses to the above questions indicated:

- The responses to question 16, number of washing machine hook-ups, did not necessarily reflect the number of in-unit washers; in some cases there are apparently some hookups without machines connected to them (i.e. response to number of washers was zero when number of hook-ups was positive).
- Respondents interpreted question 17, total number of clothes washers in the property, different ways: some answers reflect total of in-unit washers only, others reflect combined total of in-unit and common area washers.

The number of apartment units served by each common area washer was determined assuming that in-unit washers served one apartment each:

Units served by one common area washer = (Number of units in property) – (Number of in-unit washers) / (Number of common area washers)

Making the necessary corrections, survey data indicate:

| | | |
|---|---|---|
| Number of buildings surveyed | 360 | |
| Number of sites with in-unit washers | 60 | 16.67% |
| Number of sites with common area washers | 233 | 64.72% |
| Number of sites with no clothes washers | 79 | 21.94% |
| Sites with both in-unit and common area washers | 12 | -3.33% |
| | | 100% |
| Number of in-unit clothes washers | 539 | 46.87% |
| Number of common area washers | 611 | 53.13% |
| Total washers | **1150** | **100%** |
| Number of sites with high efficiency washers | 29 | |
| Number of high-efficiency washers (all but one in common areas) | 86 | |
| Number of apartment units served by each common area washer | | |
| Min | 0.75 | |
| Max | 40 | |
| Avg | 9.04 | |

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**EAST BAY MUNICIPAL UTILITY DISTRICT**
**WATER CONSERVATION MARKET PENETRATION STUDY**

## APPENDIX K
## Responses to Non-Residential Site Surveys

1. Name, title and phone number of participant.

2. The primary type of establishment is:

| Primary Type of Establishment | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Warehouse | 52 | 9.5 |
| Retail Trade | 59 | 11.0 |
| Food Sales | 73 | 13.6 |
| Fast Food | 47 | 8.8 |
| Restaurant | 70 | 13.2 |
| Offices | 235 | 43.8 |
| Survey Responses | 536 | |

3. The type of use for this establishment is:

| Type of Use | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Mixed Residential/ Commercial | 49 | 9.1 |
| Mixed Commercial | 289 | 53.9 |
| Other | 198 | 36.9 |
| Survey Responses | 536 | |

Please note if the establishment has any of the specified water uses/appliances:

4. Domestic/sanitary use (drinking fountains, sinks, rest rooms, etc.):

| Domestic/Sanitary Use for Employees | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 501 | 93.5 |
| No | 33* | 6.2 |
| Don't Know | 2* | 0.4 |
| Survey Responses | 536 | |

* When cross-checked with responses to number of toilets, faucets, and urinals these responses were found to be in error; all respondents have some type of domestic use.

| Domestic/Sanitary Use for Customers/Public | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 293 | 54.7 |
| No | 241 | 45.0 |
| Don't Know | 2 | 0.4 |
| Survey Responses | 536 | |

5. Facility cooling and heating

| Cooling Towers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 47 | 8.8 |
| No | 466 | 86.9 |
| Don't Know | 23 | 4.3 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 1 (1.9%) | 6 (10.2%) | 10 (13.7%) | 3 (6.4%) | 4 (5.7%) | 23 (9.8%) |
| No | 48 (92.3%) | 50 (84.7%) | 61 (83.6%) | 41 (87.2%) | 63 (90.0%) | 202 (86.0%) |
| Don't Know | 3 (5.8%) | 3 (5.1%) | 2 (2.7%) | 3 (6.4%) | 3 (4.3%) | 10 (4.3%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Evaporative Coolers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 32 | 6.0 |
| No | 474 | 88.4 |
| Don't Know | 30 | 5.6 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 3 (5.8%) | 4 (6.8%) | 4 (5.5%) | 3 (6.4%) | 8 (11.4%) | 10 (4.3%) |
| No | 46 (88.5%) | 53 (89.8%) | 65 (89.0%) | 40 (85.1%) | 61 (87.1%) | 207 (88.1%) |
| Don't Know | 3 (5.8%) | 2 (3.4%) | 4 (5.5%) | 4 (8.5%) | 1 (1.4%) | 18 (7.7%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Air Washers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 8 | 1.5 |
| No | 512 | 95.5 |
| Don't Know | 16 | 3.0 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 0 (0.0%) | 0 (0.0%) | 5 (6.8%) | 1 (2.1%) | 2 (2.9%) | 0 (0.0%) |
| No | 52 (100%) | 58 (98.3%) | 67 (91.8%) | 45 (95.7%) | 66 (94.3%) | 223 (94.9%) |
| Don't Know | 0 (0.0%) | 1 (1.7%) | 1 (1.4%) | 1 (2.1%) | 2 (2.9%) | 12 (5.1%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Humidifiers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 12 | 2.2 |
| No | 510 | 95.1 |
| Don't Know | 14 | 2.6 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 1 (1.9%) | 1 (1.7%) | 1 (1.4%) | 3 (6.4%) | 1 (1.4%) | 5 (2.1%) |
| No | 51 (98.1%) | 57 (96.6%) | 70 (95.9%) | 42 (89.4%) | 67 (95.7%) | 222 (94.5%) |
| Don't Know | 0 (0.0%) | 1 (1.7%) | 2 (2.7%) | 2 (4.3%) | 2 (2.9%) | 8 (3.4%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Boilers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 36 | 6.7 |
| No | 489 | 91.2 |
| Don't Know | 11 | 2.1 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 2 (3.8%) | 5 (8.5%) | 4 (5.5%) | 2 (4.3%) | 5 (7.1%)` | 18 (7.7%) |
| No | 50 (96.2%) | 52 (88.1%) | 68 (93.2%) | 44 (93.6%) | 64 (91.4%) | 208 (88.5%) |
| Don't Know | 0 (0.0%) | 2 (3.4%) | 1 (1.4%) | 1 (2.1%) | 1 (1.4%) | 9 (3.8%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

6. Other cooling:

| Air Conditioners | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 182 | 34.0 |
| No | 346 | 64.6 |
| Don't Know | 8 | 1.5 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 9 (17.3%) | 14 (23.7%) | 31 (42.5%) | 26 (55.3%) | 19 (27.1%) | 83 (35.3%) |
| No | 42 (80.3%) | 44 (74.6%) | 42 (57.5%) | 20 (42.6%) | 50 (71.4%) | 147 (62.6%) |
| Don't Know | 1 (1.9%) | 1 (1.7%) | 0 (0.0%) | 1 (2.1%) | 1 (1.4%) | 5 (2.1%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Air Compressors | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 64 | 11.9 |
| No | 452 | 84.3 |
| Don't Know | 20 | 3.7 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 9 (17.3%) | 6 (10.2%) | 12 (16.4%) | 9 (19.1%) | 3 (4.3%) | 25 (10.6%) |
| No | 42 (80.8%) | 52 (88.1%) | 58 (79.5%) | 36 (76.6%) | 65 (92.9%) | 199(84.7%) |
| Don't Know | 1(1.9%) | 1 (1.7%) | 3 (4.1%) | 2 (4.3%) | 2 (2.9%) | 11 (4.7%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Other Once-Through Cooling System | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 5 | 0.9 |
| No | 524 | 97.8 |
| Don't Know | 7 | 1.3 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 0 (0.0%) | 0 (0.0%) | 1 (1.4%) | 0 (0.0%) | 1 (1.4%) | 3 (1.3%) |
| No | 49 (94.2%) | 57 (96.6%) | 72 (98.6%) | 47 (100%) | 68 (97.1%) | 227 (96.6%) |
| Don't Know | 3 (5.8%) | 2 (3.4%) | 0 (0.0%) | 0 (0.0%) | 1 (1.4%) | 5 (2.1%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

7. Laundry:

| Commercial Washing Machines | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 16 | 3.0 |
| No | 518 | 96.6 |
| Don't Know | 2 | 0.4 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 2 (3.8%) | 3 (5.1%) | 0 (0.0%) | 4 (8.5%) | 3 (4.3%) | 4 (1.7%) |
| No | 49 (94.2) | 56 (94.9%) | 73 (100%) | 43 (91.5%) | 65 (92.9%) | 231 (98.3%) |
| Don't Know | 1 (1.9%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 2 (2.9%) | 0 (0.0%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Self-Service Washing Machines | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 8 | 1.5 |
| No | 528 | 98.5 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 3 (5.8%) | 1 (1.7%) | 1 (1.4%) | 0 (0.0%) | 1 (1.4%) | 2 (0.9%) |
| No | 49 (94.2%) | 58 (98.3%) | 72 (98.6%) | 47 (100%) | 68 (97.1%) | 233 (99.1%) |
| Don't Know | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (1.4%) | 0 (0.0%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Dry Cleaning | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 3 | 0.6 |
| No | 533 | 99.4 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 0 (0.0%) | 3 (5.1%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| No | 52 (100%) | 56 (94.9%) | 73 (100%) | 47 (100%) | 69 (98.6%) | 235 (100%) |
| Don't Know | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (1.4%) | 0 (0.0%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

8. Kitchen facilities:

| Dishwashing Machines | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 109 | 20.3 |
| No | 426 | 79.5 |
| Don't Know | 1 | 0.2 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 9 (17.3%) | 3 (5.1%) | 6 (8.2%) | 14 (29.8%) | 38 (54.3%) | 39 (16.6%) |
| No | 43 (82.7%) | 56 (94.9%) | 67 (91.8%) | 33 (70.2%) | 30 (42.9%) | 196 (83.4%) |
| Don't Know | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 2 (2.9%) | 0 (0.0%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Garbage Disposers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 75 | 14.0 |
| No | 455 | 84.9 |
| Don't Know | 6 | 1.1 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 10 (19.2%) | 3 (5.1%) | 10 (13.7%) | 4 (8.5%) | 10 (14.3%) | 38 (16.2%) |
| No | 41 (78.8%) | 55 (93.2%) | 63 (86.3%) | 43 (91.5%) | 58 (82.9%) | 193 (82.1%) |
| Don't Know | 1 (1.9%) | 1 (1.7%) | 0 (0.0%) | 0 (0.0%) | 2 (2.9%) | 4 (1.7%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

9. Ice-making machines.

| Water-Cooled Ice-Making Machines | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 68 | 12.7 |
| No | 462 | 86.2 |
| Don't Know | 6 | 1.1 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 0 (0.0%) | 3 (5.1%) | 15 (20.5%) | 22 (46.8%) | 19 (27.1%) | 9 (3.8%) |
| No | 52 (100%) | 55 (93.2%) | 55 (75.3%) | 24 (51.1%) | 49 (70.0%) | 224 (95.3%) |
| Don't Know | 0 (0.0%) | 1 (1.7%) | 3 (4.1%) | 1 (2.1%) | 2 (2.9%) | 2 (0.9%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Air-Cooled Ice-Making Machines | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 85 | 15.9 |
| No | 444 | 82.8 |
| Don't Know | 7 | 1.3 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 2 (3.8%) | 3 (5.1%) | 17 (23.3%) | 19 (40.4%) | 32 (45.7%) | 12 (5.1%) |
| No | 50 (96.2%) | 55 (93.2%) | 51 (69.9%) | 26 (55.3%) | 36 (51.4%) | 220 (93.6%) |
| Don't Know | 0 (0.0%) | 1 (1.7%) | 5 (6.8%) | 2 (4.3%) | 2 (2.9%) | 3 (1.3%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

10. Landscape and decorative uses?

| Landscape and Decorative Uses | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 101 | 18.8 |
| No | 431 | 80.4 |
| Don't Know | 4 | 0.7 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 5 (9.6%) | 5 (8.5%) | 6 (8.2%) | 10 (21.3%) | 8 (11.4%) | 67 (28.5%) |
| No | 38 (73.1%) | 47 (79.7%) | 56 (76.7%) | 29 (61.7%) | 53 (75.7%) | 132 (56.2%) |
| Don't Know | 9 (17.3%) | 7 (11.9%) | 11 (15.1%) | 8 (17.0%) | 9 (12.9%) | 36 (15.3%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

11. Water features:

| Swimming Pools | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 1 | 0.2 |
| No | 534 | 99.6 |
| Don't Know | 1 | 0.2 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 1 (1.9%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| No | 51 (98.1%) | 58 (98.3%) | 73 (100%) | 46 (97.9%) | 69 (98.6%) | 234 (99.6%) |
| Don't Know | 0 (0.0%) | 1 (1.7%) | 0 (0.0%) | 1 (2.1%) | 1 (1.4%) | 1 (0.4%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Jacuzzis/Spas | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 4 | 0.7 |
| No | 532 | 99.3 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 1 (1.9%) | 0 (0.0%) | 0 (0.0%0 | 0 (0.0%) | 0 (0.0%) | 3 (1.3%) |
| No | 51 (98.1%) | 58 (98.3%) | 73 (100%) | 47 (100%) | 70 (100%) | 231 (98.3%) |
| Don't Know | 0 (0.0%) | 1 (1.7%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (0.4%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Fountains | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 17 | 3.2 |
| No | 519 | 96.8 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 2 (3.8%) | 4 (6.8%) | 0 (0.0%) | 0 (0.0%) | 1 (1.4%) | 10 (4.3%) |
| No | 50 (96.2%) | 53 (89.8%) | 72 (98.6%) | 47 (100%) | 69 (98.6%) | 225 (95.7%) |
| Don't Know | 1 (1.9%) | 2 (3.4%) | 1 (1.4%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

12. Washing and sanitation:

| General Facility Washdown and Clean-Up | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 124 | 23.1 |
| No | 412 | 76.9 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 13 (25.0%) | 15(25.4%) | 29 (39.7%) | 16 (34.0%) | 14 (20.0%) | 37 (15.7%) |
| No | 39 (75.0%) | 43 (72.9%) | 44 (60.3%) | 31 (66.0%) | 54 (77.1%) | 198 (84.3%) |
| Don't Know | 0 (0.0%) | 1 (1.7%) | 0 (0.0%) | 0 (0.0%) | 2 (2.9%) | 0 (0.0%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Vehicle Washes | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 20 | 3.7 |
| No | 516 | 96.3 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 3 (5.8%) | 1 (1.7%) | 3 (4.1%) | 0 (0.0%) | 0 (0.0%) | 13 (5.5%) |
| No | 49 (94.2%) | 57 (96.6%) | 70 (95.9%) | 47 (100%) | 69 (98.6%) | 221 (94.0%) |
| Don't Know | 0 (0.0%) | 1 (1.7%) | 0 (0.0%) | 0 (0.0%) | 1 (1.4%) | 1 (0.4%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

13. Process water purification equipment:

| Water Softeners | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 9 | 1.7 |
| No | 522 | 97.4 |
| Don't Know | 5 | 0.9 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 1 (1.9%) | 1 (1.7%) | 2 (2.7%) | 0 (0.0%) | 3 (4.3%) | 2 (0.9%) |
| No | 50 (96.2%) | 57 (96.6%) | 70 (95.9%) | 46 (97.9%) | 67 (95.7%) | 230 (97.9%) |
| Don't Know | 1 (1.9%) | 1 (1.7%) | 1 (1.4%) | 1 (2.1%) | 0 (0.0%) | 3 (1.3%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Water Filters | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 39 | 7.3 |
| No | 487 | 90.9 |
| Don't Know | 10 | 1.9 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 6 (11.5%) | 3 (5.1%) | 4 (5.5%) | 2 (4.3%) | 7 (10.0%) | 17 (7.2%) |
| No | 44 (84.6%) | 55 (93.2%) | 66 (90.4%) | 44 (93.6%) | 63 (90.0%) | 214 (91.1%) |
| Don't Know | 2 (3.8%) | 1 (1.7%) | 3 (4.1%) | 1 (2.1%) | 0 (0.0%) | 4 (1.7%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Reverse Osmosis Units | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 3 | 0.6 |
| No | 523 | 97.6 |
| Don't Know | 10 | 1.9 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 3 (1.3%) |
| No | 52 (100%) | 57 (96.6%) | 70 (95.9%) | 46 (97.9%) | 69 (98.6%) | 224 (95.3%) |
| Don't Know | 0 (0.0%) | 2 (3.4%) | 3 (4.1%) | 1 (2.1%) | 1 (1.4%) | 8 (3.4%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Deionization/Ion Exchange Units | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 1 | 0.2 |
| No | 526 | 98.1 |
| Don't Know | 9 | 1.7 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 1(1.9%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| No | 51 (98.1%) | 57 (96.6%) | 70 (95.9%) | 46 (97.9%) | 68 (97.1%) | 226 (96.2%) |
| Don't Know | 0 (0.0%) | 2 (3.4%) | 3 (4.1%) | 1 (2.1%) | 2 (2.9%) | 9 (3.8%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

14. Wastewater pretreatment equipment?

| Wastewater Pretreatment Equipment | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 1 | 0.2 |
| No | 531 | 99.1 |
| Don't Know | 4 | 0.7 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (0.4%) |
| No | 47 (90.4%) | 56 (94.9%) | 67 (91.8%) | 44 (93.6%) | 64 (91.4%) | 210 (89.4%) |
| Don't Know | 5 (9.6%) | 3 (5.1%) | 6 (8.2%) | 3 (6.4%) | 6 (8.6%) | 24 (10.2%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

15. Are there any other purposes/appliances for which water is used at this facility?

| Other Water-Using Purposes/Appliances | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 45 | 8.4 |
| No | 487 | 90.9 |
| Don't Know | 4 | 0.7 |
| Survey Responses | 536 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 5 (9.6%) | 5 (8.5%) | 12 (16.4%) | 7 (14.9%) | 4 (5.7%) | 12 (5.1%) |
| No | 44 (84.6%) | 52 (88.1%) | 59 (80.8%) | 39 (83.0%) | 65 (92.9%) | 220 (93.6%) |
| Don't Know | 3 (5.8%) | 2 (3.4%) | 2 (2.7%) | 1 (22.1%) | 1 (1.4%) | 3 (1.3%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

15a. [IF YES] Please specify other water-using purposes/appliances:

| Other Water-Using Purposes/Appliances | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 50-Gallon Water Tank | 1 | 1.7 |
| Outdoor Tap | 1 | 1.7 |
| Baking | 2 | 3.4 |
| Coffee | 9 | 15.5 |
| Tea | 1 | 1.7 |
| Bathroom | 1 | 1.7 |
| Cleaning | 2 | 3.4 |
| Cleaning and Embalming | 1 | 1.7 |
| Soda Fountain | 5 | 8.6 |
| Dental Equipment | 2 | 3.4 |
| Eye Wash | 1 | 1.7 |
| Film Processor | 1 | 1.7 |
| Fish Tank | 1 | 1.7 |
| Flow Wash | 1 | 1.7 |
| Freezer | 1 | 1.7 |
| Refrigerator | 4 | 6.9 |
| Hose | 1 | 1.7 |
| Humidifier | 1 | 1.7 |
| Ice Machine | 5 | 8.6 |
| Landscape | 1 | 1.7 |
| Manufacturing | 1 | 1.7 |
| Parts Washer | 3 | 5.2 |
| Personal Use | 1 | 1.7 |
| Point Hot Water Tap | 1 | 1.7 |
| Printer Press | 1 | 1.7 |
| Sprayer System for Vegetables | 1 | 1.7 |
| Sprinkler System | 1 | 1.7 |
| Wash Equipment | 1 | 1.7 |

| Other Water-Using Purposes/Appliances | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Portable Dishwasher | 1 | 1.7 |
| Water Baby Duck and Chicken | 1 | 1.7 |
| Water Cooler | 1 | 1.7 |
| Water Wash Spray Booth | 1 | 1.7 |
| Survey Responses | 58 | |

16. Does this facility recycle water for any purpose?

| Water Recycling | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 6 | 1.1 |
| No | 526 | 98.1 |
| Don't Know | 4 | 0.7 |
| Survey Responses | 536 | |

16a. [IF YES] For what purpose is water recycled?

| Purpose for Water Recycling | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Fish Tank | 1 | 20.0 |
| Packaging Machines | 1 | 20.0 |
| Manufacturing Machines | 1 | 20.0 |
| Fountain | 1 | 20.0 |
| Propellant | 1 | 20.0 |
| Survey Responses | 5 | |

17. How many bathroom facilities does this location have?

| Bathroom Facilities | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 17 | 3.2 |
| 1 | 133 | 24.8 |
| 2 | 228 | 42.5 |
| 3 | 64 | 11.9 |
| 4 | 49 | 9.1 |
| 5 | 7 | 1.3 |
| 6 | 20 | 3.7 |
| 7 | 5 | 0.9 |
| 8 | 3 | 0.6 |
| 9 | 0 | 0.0 |
| 10 | 2 | 0.4 |
| 11-20 | 4 | 0.7 |
| 21-50 | 4 | 0.7 |
| Survey Responses | 536 | |

| Statistical Parameters | |
|---|---|
| N | 536 |
| Min | 0 |
| Max | 48 |
| Mean | 2.6 |
| Std Dev | 3.4 |
| Median | 2 |
| Mode | 2 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 10.9 | 0.3 |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| 0 | 2 (3.8%) | 3 (5.1%) | 0 (0.0%) | 3 (6.4%) | 2 (2.9%) | 7 (3.0%) |
| 1 | 8 (15.4%) | 23 (39.0%) | 36 (49.3%) | 9 (19.1%) | 15 (21.4%) | 42 17.9%) |
| 2 | 22 (42.3%) | 23 (39.0%) | 22 (30.1%) | 32 (68.1%) | 43 (61.4%) | 86 (36.6%) |
| 3 | 10 (19.2%) | 4 (6.8%) | 8 (11.0%) | 3 (6.4%) | 8 (11.4%) | 31 (13.2%) |
| 4 | 5 (9.6%) | 1 (1.7%) | 5 (6.8%) | 0 (0.0%) | 2 (2.9%) | 36 (15.3%) |
| 5 | 0 (0.0%) | 3 (5.1%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 4 (1.7%) |
| 6-10 | 4 (7.7%) | 1 (1.7%) | 2 (2.7%) | 0 (0.0%) | 0 (0.0%) | 23 (9.8%) |
| 11+ | 1 (1.9%) | 1 (1.7%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 6 (2.6%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

18. Number of toilets:

| Gravity Flush Toilets | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 118 | 22.0 |
| 1 | 138 | 25.7 |
| 2 | 147 | 27.4 |
| 3 | 59 | 11.0 |
| 4 | 27 | 5.0 |
| 5 | 18 | 3.4 |
| 6 | 10 | 1.9 |
| 7 | 6 | 1.1 |
| 8 | 1 | 0.2 |
| 9 | 2 | 0.4 |
| 10 | 4 | 0.7 |
| 11-20 | 5 | 0.9 |
| 21-50 | 1 | 0.2 |
| Survey Responses | 536 | |

| Statistical Parameters | |
|---|---|
| N | 536 |
| Min | 0 |
| Max | 28 |
| Mean | 2.0 |
| Std Dev | 2.4 |
| Median | 2 |
| Mode | 2 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 10.1 | 0.2 |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| 0 | 7 (13.5%) | 6 (10.2%) | 10 (13.7%) | 18 (38.3%) | 18 (25.7%) | 59 (25.1%) |
| 1 | 12 (23.1%) | 19 (32.2%) | 35 (47.9%) | 12 (25.5%) | 17 (24.3%) | 43 (18.3%) |
| 2 | 18 (34.6%) | 24 (40.7%) | 16 (21.9%) | 13 (27.7%) | 23 (32.9%) | 53 (22.6%) |
| 3 | 7 (13.5%) | 5 (8.5%) | 6 (8.2%) | 3 (6.4%) | 10 (14.3%) | 28 (11.9%) |
| 4 | 1 (1.9%) | 0 (0.0%) | 5 (6.8%) | 1 (2.1%) | 1 (1.4%) | 20 (8.5%) |
| 5 | 2 (3.8%) | 3 (5.1%) | 1 (1.4%) | 0 (0.0%) | 2 (2.9%) | 10 (4.3%) |
| 6-10 | 3 (5.8%) | 2 (3.4%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 18 (7.7%) |
| 11+ | 2 (3.8%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 4 1.7%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Pressure Assisted Toilets | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 485 | 90.5 |
| 1 | 10 | 1.9 |
| 2 | 19 | 3.5 |
| 3 | 6 | 1.1 |
| 4 | 3 | 0.6 |
| 5 | 3 | 0.6 |
| 6 | 2 | 0.4 |
| 7 | 3 | 0.6 |
| 8 | 0 | 0.0 |
| 9 | 0 | 0.0 |
| 10 | 0 | 0.0 |
| 11-20 | 3 | 0.6 |
| 21-50 | 1 | 0.2 |
| 51-100 | 1 | 0.2 |
| Survey Responses | 536 | |

| Statistical Parameters | |
|---|---|
| N | 536 |
| Min | 0 |
| Max | 69 |
| Mean | 0.5 |
| Std Dev | 3.5 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 59.2 | 0.3 |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| 0 | 49 (94.2%) | 53 (89.8%) | 67 (91.8%) | 39 (83.0%) | 64 (91.4%) | 213 (90.6%) |
| 1 | 0 (0.0%) | 4 (6.8%) | 1 (1.4%) | 1 (2.1%) | 2 (2.9%) | 2 (0.9%) |
| 2 | 1 (1.9%) | 1 (1.7%) | 3 (4.1%) | 5 (10.6%) | 2 (2.9%) | 7 (3.0%) |
| 3 | 1 (1.9%) | 0 (0.0%) | 0 (0.0%) | 2 (4.3%) | 2 (2.9%) | 1 (0.4%) |
| 4 | 1(1.9%) | 0 (0.05%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%0 | 2 (0.9%) |
| 5 | 0 (0.0%) | 0 (0.0%) | 1 (1.4%) | 0 (0.0%) | 0 (0.0%) | 2 (0.9%) |
| 6-10 | 0 (0.0%) | 0 (0.0%) | 1 (1.4%) | 0 (0.0%) | 0 (0.0%) | 4 (1.7%) |
| 11+ | 0 (0.0%) | 1 (1.7%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 4 (1.7%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Flushometer Valve Toilets | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 446 | 83.2 |
| 1 | 16 | 3.0 |
| 2 | 14 | 2.6 |
| 3 | 23 | 4.3 |
| 4 | 7 | 1.3 |
| 5 | 8 | 1.5 |
| 6 | 7 | 1.3 |
| 7 | 0 | 0.0 |
| 8 | 1 | 0.2 |
| 9 | 4 | 0.7 |
| 10 | 3 | 0.6 |
| 11-20 | 3 | 0.6 |
| 21-50 | 3 | 0.6 |
| 51-100 | 1 | 0.2 |
| Survey Responses | 536 | |

| Statistical Parameters | |
|---|---|
| N | 536 |
| Min | 0 |
| Max | 64 |
| Mean | 0.9 |
| Std Dev | 4.2 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 37.7 | 0.4 |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| 0 | 44 (84.6%) | 57 (96.6%) | 67 (91.8%) | 33 (70.2%) | 53 (75.7%) | 192 (81.7%) |
| 1 | 4 (7.7%) | 0 (0.0%) | 1 (1.4%) | 3 (6.4%) | 2 (2.9%) | 6 (2.6%) |
| 2 | 1 (1.9%) | 0 (0.0%) | 1 (1.4%) | 5 (10.6%) | 4 (5.7%) | 3 (1.3%) |
| 3 | 0 (0.0%) | 0 (0.0%) | 1 (1.4%) | 5 (10.6%) | 6 (8.6%) | 11 (4.7%) |
| 4 | 1 (1.9%) | 1 (1.7%) | 1 (1.4%) | 1 (2.1%) | 2 (2.9%) | 1 (0.4%) |
| 5 | 0 (0.0%) | 1 (1.7%) | 1 (1.4%) | 0 (0.0%) | 2 (2.9%) | 4 (1.7%) |
| 6-10 | 1 (1.9%) | 0 (0.0%) | 1 (1.4%) | 0 (0.0%0 | 1 (1.4%) | 12 (5.1%) |
| 11+ | 1 (1.9%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 6 (2.6%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

19. Number of urinals

| Siphon Urinals | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 441 | 82.3 |
| 1 | 58 | 10.8 |
| 2 | 23 | 4.3 |
| 3 | 4 | 0.7 |
| 4 | 4 | 0.7 |
| 5 | 0 | 0.0 |
| 6 | 2 | 0.4 |
| 7 | 0 | 0.0 |
| 8 | 1 | 0.2 |
| 9 | 0 | 0.0 |
| 10 | 1 | 0.2 |
| 11-20 | 2 | 0.4 |
| Survey Responses | 536 | |

| Statistical Parameters | |
|---|---|
| N | 536 |
| Min | 0 |
| Max | 16 |
| Mean | 0.4 |
| Std Dev | 1.3 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 30.5 | 0.1 |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| 0 | 44 (84.6%) | 55 (93.2%) | 64 (87.7%) | 35 (74.5%) | 56 (80.0%) | 187 (79.6%) |
| 1 | 6 (11.5%) | 4 (6.8%) | 6 (8.2%) | 12 (25.5%) | 9 (12.9%) | 21 (8.9%) |
| 2 | 0 (0.0%) | 0 (0.0%) | 3 (4.1%) | 0 ((0.0%) | 4 (5.7%) | 16 (6.8%) |
| 3 | 2 (3.8%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (1.4%) | 1 (0.4%) |
| 4 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%0 | 4 (1.7%) |
| 5 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 6-10 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%0 | 0 (0.0%) | 4 (1.7%) |
| 11+ | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%0 | 0 (0.0%) | 2 (0.9%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Washdown Urinals | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 418 | 78.0 |
| 1 | 71 | 13.2 |
| 2 | 25 | 4.7 |
| 3 | 9 | 1.7 |
| 4 | 4 | 0.7 |
| 5 | 2 | 0.4 |
| 6 | 1 | 0.2 |
| 7 | 1 | 0.2 |
| 8 | 1 | 0.2 |
| 9 | 1 | 0.2 |
| 10 | 0 | 0.0 |
| 11-20 | 1 | 0.2 |
| 21-50 | 2 | 0.4 |
| Survey Responses | 536 | |

| Statistical Parameters | |
|---|---|
| N | 536 |
| Min | 0 |
| Max | 34 |
| Mean | 0.5 |
| Std Dev | 2.3 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 36.9 | 0.2 |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| 0 | 38 (73.1%) | 52 (88.1%) | 61 (83.6%) | 40 (85.1%) | 53 (75.7%) | 174 (74.0%) |
| 1 | 10 (19.2%) | 5 (8.5%) | 10 (13.7%) | 5 (10.6%) | 13 (18.6%) | 28 (11.9%) |
| 2 | 2 (3.8%) | 1 (1.7%) | 2 (2.7%) | 2 (4.3%) | 3 (4.3%) | 15 (6.4%) |
| 3 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (1.4%) | 8 (3.4%) |
| 4 | 1 (1.9%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 3 (1.3%) |
| 5 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%0 | 0 (0.0%) | 0 (0.0%) | 2 (0.9%) |
| 6-10 | 1 (1.9%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 3 (1.3%) |
| 11+ | 0 (0.0%) | 1 (1.7%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 2 (0.9%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

| Waterless Urinals | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 518 | 96.6 |
| 1 | 9 | 1.7 |
| 2 | 5 | 0.9 |
| 3 | 2 | 0.4 |
| 4 | 0 | 0.0 |
| 5 | 1 | 0.2 |
| 24 | 1 | 0.2 |
| Survey Responses | 536 | |

| Statistical Parameters | |
|---|---|
| N | 536 |
| Min | 0 |
| Max | 24 |
| Mean | 0.1 |
| Std Dev | 1.1 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 92.1 | 0.1 |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| 0 | 50 (96.2%) | 58 (98.3%) | 70 (95.9%) | 47 (100%) | 69 (98.6%) | 224 (95.3%) |
| 1 | 1 (1.9%) | 0 (0.0%) | 3 (4.1%) | 0 (0.0%) | 0 (0.0%) | 5 (2.1%) |
| 2 | 1 (1.9%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 4 (1.7%) |
| 3 | 0 (0.0%) | 1 (1.7%) | 0 (0.0%) | 0 (0.0%) | 1 (1.4%) | 0 (0.0%) |
| 4 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 5 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (0.4%) |
| 6-10 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 11+ | 0 (0.0%) | 0 (0.0%) | 0 (0.0%0 | 0 (0.0%) | 0 (0.0%) | 1 (0.4%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

20. Number of bathroom faucets?

| Bathroom Faucets | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 28 | 5.2 |
| 1 | 133 | 24.8 |
| 2 | 189 | 35.3 |
| 3 | 48 | 9.0 |
| 4 | 58 | 10.8 |
| 5 | 24 | 4.5 |
| 6 | 13 | 2.4 |
| 7 | 9 | 1.7 |
| 8 | 8 | 1.5 |
| 9 | 2 | 0.4 |
| 10 | 3 | 0.6 |
| 11-20 | 12 | 2.2 |
| 21-50 | 6 | 1.1 |
| 51+ | 3 | 0.6 |
| Survey Responses | 536 | |

| Statistical Parameters | |
|---|---|
| N | 536 |
| Min | 0 |
| Max | 142 |
| Mean | 3.5 |
| Std Dev | 8.1 |
| Median | 2 |
| Mode | 2 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 19.5 | 0.7 |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| 0 | 3 (5.8%) | 5 (8.5%) | 6 (8.2%) | 0 (0.0%) | 5 (7.1%) | 9 (3.8%) |
| 1 | 11 (21.2%) | 20 (33.9%) | 32 (43.8%) | 11 (23.4%) | 14 (20.0%) | 45 (19.1%) |
| 2 | 16 (30.8%) | 24 (40.7%) | 21 (28.8%) | 30 (63.8%) | 32 (45.7%) | 66 (28.1%) |
| 3 | 8 (15.4%) | 2 (3.4%) | 6 (8.2%0 | 4 (8.5%) | 6 (8.6%) | 22 (9.4%) |
| 4 | 4 (7.7%) | 1 (1.7%) | 3 (4.1%) | 2 (4.3%) | 9 (12.9%) | 39 (16.6%) |
| 5 | 4 (7.7%) | 6 (10.2%) | 3 (4.1%) | 0 (0.0%0 | 2 (2.9%) | 9 (3.8%) |
| 6-10 | 4 (7.7%) | 0 (0.0%) | 2 (2.7%) | 0 (0.0%) | 2 (2.9%) | 27 (11.5%) |
| 11+ | 2 (3.8%) | 1 (1.7%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 18 (7.7%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

21. Number of kitchen faucets?

| Kitchen Faucets | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 173 | 32.3 |
| 1 | 194 | 36.2 |
| 2 | 87 | 16.2 |
| 3 | 31 | 5.8 |
| 4 | 20 | 3.7 |
| 5 | 10 | 1.9 |
| 6 | 7 | 1.3 |
| 7 | 1 | 0.2 |
| 8 | 3 | 0.6 |
| 9 | 1 | 0.2 |
| 10 | 2 | 0.4 |
| 11-20 | 5 | 0.9 |
| 21-50 | 2 | 0.4 |
| Survey Responses | 536 | |

| Statistical Parameters | |
|---|---|
| N | 536 |
| Min | 0 |
| Max | 40 |
| Mean | 1.6 |
| Std Dev | 3.0 |
| Median | 1 |
| Mode | 1 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 16.2 | 0.3 |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| 0 | 28 53.8%) | 36 (61.0%) | 23 (31.5%) | 5 (10.6%) | 7 (10.0%0 | 74 (31.5%) |
| 1 | 16 (30.8%) | 1830.5%) | 25 (34.2%) | 15 (31.9%) | 14 (20.0%) | 106 (45.1%) |
| 2 | 6 (11.5%) | 4 (6.8%) | 13 (17.8%) | 11 (23.4%) | 24 (34.3%) | 29 (12.3%) |
| 3 | 2 (3.8%) | 0 (0.0%) | 6 (8.2%) | 10 (21.3%) | 5 (7.1%) | 8 (3.4%) |
| 4 | 0 (0.0&) | 0 (0.0%) | 3 (4.1%) | 4 (8.5%) | 9 (12.9%) | 4 (1.7%) |
| 5 | 0 (0.0%) | 0 (0.0%) | 1 (1.4%) | 1 (2.1%) | 6 (8.6%) | 2 (0.9%0 |
| 6-10 | 0 (0.0%) | 1 (1.7%) | 2 (2.7%) | 1 (2.1%) | 5 (7.1%) | 5 (2.1%) |
| 11+ | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 7 (3.0%0 |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

22. Number of utility (general cleaning) faucets?

| Utility Faucets | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 280 | 52.2 |
| 1 | 185 | 34.5 |
| 2 | 35 | 6.5 |
| 3 | 17 | 3.2 |
| 4 | 6 | 1.1 |
| 5 | 1 | 0.2 |
| 6 | 2 | 0.4 |
| 7 | 5 | 0.9 |
| 8 | 0 | 0.0 |
| 9 | 1 | 0.2 |
| 10 | 0 | 0.0 |
| 11-20 | 4 | 0.7 |
| 21-50 | | 0.0 |
| Survey Responses | 536 | |

| Statistical Parameters | |
|---|---|
| N | 536 |
| Min | 0 |
| Max | 20 |
| Mean | 0.8 |
| Std Dev | 1.6 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 16.7 | 0.1 |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| 0 | 26 (50.0%) | 40 (67.8%) | 27 (37.0%) | 18 (38.3%) | 34 (48.6%) | 135 (57.4%) |
| 1 | 16 (30.8%) | 16 (27.1%) | 34 (46.6%) | 27 (57.4%) | 30 (42.9%) | 62 (26.4%) |
| 2 | 5 (9.6%) | 2 (3.4%) | 6 (8.2%) | 2 (4.3%) | 3 (4.3%) | 17 (7.2%) |
| 3 | 4 (7.7%) | 0 (0.0%) | 3 (4.1%) | 0 (0.0%) | 2 (2.9%) | 8 (3.4%) |
| 4 | 1 (1.9%) | 0 (0.0%) | 1 (1.4%) | 0 (0.0%) | 1 (1.4%) | 3 (1.3%) |
| 5 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (0.4%) |
| 6-10 | 0 (0.0%) | 0 (0.0%) | 2 (2.7%) | 0 (0.0%) | 0 (0.0%) | 6 (2.6%) |
| 11+ | 0 (0.0%0 | 1 (1.7%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 3 (1.3%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

22b. Number of showers

| Showers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 377 | 84.0 |
| 1 | 55 | 12.2 |
| 2 | 7 | 1.6 |
| 3 | 5 | 1.1 |
| 4 | 2 | 0.4 |
| 6 | 1 | 0.2 |
| 8 | 1 | 0.2 |
| 26 | 1 | 0.2 |
| Survey Responses | 449 | |
| Surveys with No Response | 87 | |

| Statistical Parameters | |
|---|---|
| N | 449 |
| Min | 0 |
| Max | 26 |
| Mean | 0.3 |
| Std Dev | 1.4 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 44.5 | 0.1 |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| 0 | 25 (64.1%) | 47 (92.2%) | 53 (89.8%) | 38 (100%) | 54 (98.2%) | 160 (77.3%) |
| 1 | 11 (28.2%) | 4 (7.8%) | 6 (10.2%) | 0 (0.0%) | 1 (1.8%) | 33 (15.9%) |
| 2 | 3 (7.7%) | 0 (0.0%) | 0 (0.0%0 | 0 (0.0%) | 0 (00%) | 4 (1.9%) |
| 3 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%0 | 0 (0.0%) | 0 (0.0%) | 5 (2.4%) |
| >3 | 0 (0.0%) | 0 (.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 5 (2.4%) |
| Survey Responses | 39(100%) | 51 (100%) | 59 (100%) | 38 (100%) | 55 (100%) | 207 (100%) |

23. Number of drinking fountains?

| Drinking Fountains | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 408 | 76.1 |
| 1 | 84 | 15.7 |
| 2 | 21 | 3.9 |
| 3 | 6 | 1.1 |
| 4 | 7 | 1.3 |
| 5 | 2 | 0.4 |
| 6 | 2 | 0.4 |
| 7 | 2 | 0.4 |
| 8 | 1 | 0.2 |
| 9 | 1 | 0.2 |
| 11 | 1 | 0.2 |
| 34 | 1 | 0.2 |
| Survey Responses | 536 | |

| Statistical Parameters | |
|---|---|
| N | 536 |
| Min | 0 |
| Max | 34 |
| Mean | 0.5 |
| Std Dev | 1.9 |
| Median | 0 |
| Mode | 0 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 31.2 | 0.2 |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| 0 | 37 (71.2%) | 45 (76.3%) | 60 (82.2%) | 45 (95.7%) | 65 (92.9%) | 156 (66.4%) |
| 1 | 11 (21.2%) | 12 (30.3%) | 12 (16.4%) | 2 (4.3%0 | 3 (4.3%) | 44 (18.7%) |
| 2 | 1 (1.9%) | 2 (3.4%) | 1 (1.4%) | 0 (0.0%) | 0 (0.0%0 | 17 (7.2%) |
| >2 | 3 (5.8%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%0 | 2 (2.9%) | 18 (7.7%) |
| Survey Responses | 52 (100%) | 59 (100%) | 73 (100%) | 47 (100%) | 70 (100%) | 235 (100%) |

24. For a sample of toilets, list:

| Make/Model of Toilet | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| American Standard | 640 | 36.7 |
| Bemis | 7 | 0.4 |
| Briggs | 75 | 4.3 |
| Bolton | 1 | 0.1 |
| Case | 3 | 0.2 |
| Cadet | 1 | 0.1 |
| Celite | 4 | 0.2 |
| Colton | 9 | 0.5 |
| Crane | 41 | 2.3 |
| Eljer | 41 | 2.3 |
| Embassy | 3 | 0.2 |
| Gerber | 9 | 0.5 |
| K | 14 | 0.8 |
| Kilgore | 8 | 0.5 |
| Kohler | 123 | 7.0 |
| Lamosa | 8 | 0.5 |
| Mancesa | 1 | 0.1 |
| Mansfield | 34 | 1.9 |
| Montgomery Ward | 6 | 0.3 |
| Murray | 1 | 0.1 |
| NI | 11 | 0.6 |
| Norris | 61 | 3.5 |
| Orion | 5 | 0.3 |
| Pacific | 1 | 0.1 |
| Royal | 13 | 0.7 |
| Universal Rundle | 47 | 2.7 |
| SA | 4 | 0.2 |
| Sasa | 1 | 0.1 |
| Sibley | 1 | 0.1 |
| Sloan | 168 | 9.6 |
| Standard | 157 | 9.0 |
| Sterling | 1 | 0.1 |
| Toto | 7 | 0.4 |
| Trent | 1 | 0.1 |
| Universal Rundle | 9 | 0.5 |
| UPC | 45 | 2.6 |
| VHP | 1 | 0.1 |
| Vitromex | 1 | 0.1 |
| Western Pottery | 2 | 0.1 |
| Western Pottery | 1 | 0.1 |
| Zafiro | 1 | 0.1 |
| Zuran | 6 | 0.3 |
| Don't Know | 172 | 9.9 |
| Inspected Toilets | 1745 | |

| Year Toilet Was Manufactured/ Installed | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <1950 | 19 | 1.1 |
| 1950-1959 | 43 | 2.5 |
| 1960-1969 | 60 | 3.4 |
| 1970-1979 | 93 | 5.3 |
| 1980-1989 | 306 | 17.5 |
| 1990-1999 | 416 | 23.8 |
| 2000-2001 | 46 | 2.6 |
| Don't Know | 762 | 43.7 |
| Inspected Toilets | 1745 | |

| Statistical Parameters | |
|---|---|
| N | 983 |
| Min | 1911 |
| Max | 2001 |
| Mean | 1985 |
| Std Dev | 13.6 |
| Median | 1989 |
| Mode | 1997 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 0.04 | 0.8 |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| <1950 | 2 (0.9%) | 3 (2.0%) | 6 (3.1%) | 0 (0.0%) | 1 (0.5%) | 6 (0.7%) |
| 1950 to 1982 | 60 (28.4%) | 16 (10.5%) | 20 (10.3%) | 6 (4.9%) | 24 (12.3%) | 146 (16.8%) |
| 1983 to 1992 | 37 (17.5%) | 53 (34.9%) | 50 (25.6%) | 26 (21.3%) | 31 (15.9%) | 139 (16.0%) |
| >1992 | 34 (16.1%) | 34 (22.4%) | 39 (20.0%) | 27 (22.1%) | 29 (14.9%) | 189 (21.7%) |
| Don't Know | 78 (37.0%) | 46 (30.3%) | 80 (41.0%) | 63 (51.6%) | 110 (56.4%) | 390 (21.7%) |
| Inspected Toilets | 211(100%) | 152 (100%) | 195 (100%) | 122 (100%) | 195 (100%) | 870 (100%) |

| Rated Flush Volume of Toilet (gpf) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1.6 | 744 | 42.6 |
| 3.5 | 366 | 21.0 |
| 5+ | 247 | 14.2 |
| Don't Know | 388 | 22.2 |
| Inspected Toilets | 1745 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| 1.6 | 63 (29.9%) | 63 (41.4%) | 76 (39.0%) | 81 (66.4%) | 86 (44.1%) | 374 (43.0%) |
| 3.5 | 54 (25.6%) | 43 (28.3%) | 33 (16.9%) | 19 (15.6%) | 44 (22.6%) | 173 (19.9%) |
| 5+ | 63 (29.9%) | 14 (9.2%) | 21 (10.8%) | 2 (1.6%) | 21 (10.8%) | 127 (14.6%) |
| Don't Know | 31 (14.7%) | 32 (21.1%) | 65 (33.3%) | 20 (16.4%) | 44 (22.6%) | 196 (22.5%) |
| Inspected Toilets | 211 (100%) | 152 (100%) | 195 (100%) | 122 (100%) | 195 (100%) | 870 (100%) |

**Note:** Data on type of toilet was cross-referenced with data on rated flush volumes. The database was queried for toilets that were pressure-assisted AND not rated as ultra-low flush. If these toilets are added to those rated as ultra-low flush, the percentages in the first row of the table above change to: 31.8% for warehouses, 45.4% for retail trade, 47.2% for food sales, 68.0% for fast food, 44.1% for restaurants, and 49.8% for offices

| Measured Volume of Water Used per Flush (gal) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0-1.60 | 230 | 13.2 |
| 1.61-2.0 | 113 | 6.5 |
| 2.01-2.50 | 134 | 7.7 |
| 2.51-3.00 | 239 | 13.7 |
| 3.01-3.50 | 189 | 10.8 |
| 3.51-4.00 | 107 | 6.1 |
| 4.01-5.00 | 72 | 4.1 |
| 5.01+ | 43 | 2.5 |
| Unable to Measure | 618 | 35.4 |
| Inspected Toilets | 1745 | |

| Statistical Parameters | |
|---|---|
| N | 1127 |
| Min | 0.4 |
| Max | 7.9 |
| Mean | 2.7 |
| Std Dev | 1.2 |
| Median | 2.7 |
| Mode | 1 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 2.6 | 0.1 |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| 1.6 or less | 51 (24.2%) | 21 (13.8%) | 31 (15.9%) | 9 (7.4%) | 24 (12.3%) | 92 (10.6%) |
| 1.61 to 3.5 | 91 (43.1%) | 76 (50.0%) | 70 (35.9%) | 52 (42.6%) | 78 (40.4%) | 308 (35.4%) |
| >3.5 | 34 (16.1%) | 15 (9.9%) | 29 (14.9%) | 6 (4.9%) | 16 (8.2%) | 124 (14.3%) |
| Unable to Measure | 35 (16.6%) | 40 (16.6%) | 65 (33.3%) | 55 (45.1%) | 77 (39.5%) | 346 (39.8%) |
| Inspected Toilets | 211 (100%) | 152 (100%) | 195 (100%) | 122 (100%) | 195 (100%) | 870 (100%) |

| Water Conservation Device | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| None | 1535 | 372.6 |
| Dam | 15 | 3.6 |
| Displacement | 17 | 4.1 |
| Quick Closing Flapper | 150 | 36.4 |
| Water Level Adjustment | 28 | 6.8 |
| Inspected Toilets | 1745 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| None | 207 (98.1%) | 133 (87.5%) | 162 (83.1%) | 108 (88.5%) | 164 (84.1%) | 761 (87.5%) |
| Dam | 0 (0.0%) | 4 (2.6%) | 1 (0.5%) | 0 (0.0%) | 2 (1.0%) | 8 (0.9%) |
| Displacement | 1 (0.5%) | 2 (1.3%) | 0 (0.0%) | 4 (3.3%) | 5 (2.6%) | 5 (0.6%) |
| Quick Closing Flapper | 2 (0.9%) | 11 (7.2%) | 30 (15.4%) | 10 (8.2%) | 23 (11.8%) | 74 (8.5%) |
| Water Level Adjustment | 1 (0.5%) | 2 (1.3%) | 2 (1.0%) | 0 (0.0%) | 1 (0.5%) | 22 (2.5%) |
| Inspected Toilets | 211 (100%) | 152 (100%) | 195 (100%) | 122 (100%) | 195 (100%) | 870 (100%) |

| Type of Toilet | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Gravity Flush | 1176 | 67.4 |
| Pressure Assisted | 213 | 12.2 |
| Flushometer | 356 | 20.4 |
| Inspected Toilets | 1745 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Gravity Flush | 176 (83.4%) | 114 (75.0%) | 139 (71.3%) | 71 (58.2%) | 121 (62.1%) | 555 (63.8%0 |
| Pressure Assisted | 10 (4.7%) | 28 (18.4%) | 25 (12.8%) | 21 (17.2%) | 14 (7.2%) | 115 (13.2%) |
| Flushometer | 25 (11.8%) | 10 (6.6%) | 31 (15.9%) | 30 (24.6%) | 60 (30.8%) | 200 (23.0%) |
| Inspected Toilets | 211 (100%) | 152 (100%) | 195 (100%) | 122 (100%) | 195 (100%) | 870 (100%) |

| Leaks in Toilet | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 82 | 4.7 |
| No | 1649 | 94.5 |
| Don't Know | 14 | 0.8 |
| Inspected Toilets | 1745 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 15 (7.1%) | 6 (3.9%) | 1 (0.5%) | 0 (0.0%) | 17 (8.7%) | 43 (4.9%) |
| No | 190 (90.0%) | 144 (94.7%) | 194 (99.5%) | 120 (98.4%) | 178 (91.3%) | 823 (94.6%) |
| Don't Know | 6 (2.8%) | 2 (1.3%) | 0 (0.0%) | 2 (1.6%) | 0 (0.0%) | 4 (0.5%) |
| Inspected Toilets | 211(100%) | 152 (100%) | 195 (100%) | 122 (100%) | 195 (100%) | 870(100%) |

25. For a sample of urinals, list:

| Urinal Location | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Private | 151 | 43.6 |
| Common Area | 195 | 56.4 |
| Inspected Urinals | 346 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Private | 28 (75.7%) | 5 (29.4%) | 12 (48.0%) | 5 (27.8%) | 5 (11.4%) | 96 (46.8%) |
| Common Area | 9 (24.3%) | 12 (70.6%) | 13 (52.0%) | 13 (72.2%) | 39 (88.6%) | 109 (53.2%) |
| Inspected Urinals | 37 (100%) | 17 (100%) | 25 (100%) | 18 (100%) | 44 (100%) | 205 (100%) |

| Urinal (gpf) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <1.1 | 79 | 22.8 |
| 1.1-2.0 | 71 | 20.5 |
| 2.1-3.0 | 14 | 4.0 |
| 3.1-4.0 | 6 | 1.7 |
| 4.1-5.0 | 3 | 0.9 |
| 5.1+ | 1 | 0.3 |
| Unable to Measure | 172 | 49.7 |
| Inspected Urinals | 346 | |

| Statistical Parameters | |
|---|---|
| N | 174 |
| Min | 0.1 |
| Max | 8 |
| Mean | 1.6 |
| Std Dev | 1.1 |
| Median | 1.6 |
| Mode | 1 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 9.7 | 0.2 |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| <1.1 | 8 (21.6%) | 1 (5.9%) | 6 (24.0%) | 4 (22.2%) | 10 (22.7%) | 50 (24.4%) |
| 1.1-2.0 | 2 (5.4%) | 9 (52.9%) | 3 (12.0%) | 0 (0.0%) | 15 (34.1%) | 42 (20.5%) |
| 2.1-3.0 | 5 (133.5%) | 0 (0.0%) | 2 (8.0%) | 1 (5.6%) | 0 (0.0%) | 6 (2.9%) |
| >3 | 3 (8.1%) | 0 (0.0%) | 0 (0.0%) | 1 (5.6%) | 0 (0.0%) | 6 (2.9%) |
| Unable to Measure | 19 (51.4%) | 7 (41.2 | 14 (56.0%) | 12 (66.7%) | 19 (43.2%) | 101 (49.3%) |
| Inspected Urinals | 37 (100%) | 17 (100%) | 25 (100%) | 18 (100%) | 44 (100%) | 205 (100%) |

| Urinal Type | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Siphon | 130 | 37.6 |
| Washdown | 210 | 60.7 |
| Waterless | 6 | 1.7 |
| Inspected Urinals | 346 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Siphon | 10 (27.0%) | 3 (17.6%) | 7 (28.0%) | 8 (44.4%) | 10 (22.7%) | 92 (44.9%) |
| Washdown | 27 (82.4%) | 14 (82.4%) | 17 (68.0%) | 10 (55.6%) | 30 (68.2%) | 112 (54.6%) |
| Waterless | 0 (0.0%) | 0 (0.0%) | 1 (4.0%) | 0 (0.0%) | 4 (9.1%) | 1 (0.5%) |
| Inspected Urinals | 37 (100%) | 17 (100%) | 25 (100%) | 18 (100%) | 44 (100%) | 205 (100%) |

| Leaks in Urinal | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 6 | 1.7 |
| No | 338 | 97.7 |
| Don't Know | 2 | 0.6 |
| Inspected Urinals | 346 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 0 (0.0%) | 0 (0.0%) | 2 (8.0%) | 0 (0.0%) | 2 (4.5%) | 2 (1.0%) |
| No | 37 (100%) | 16 (94.1%) | 23 (92.0%) | 18100%) | 42 (95.5%) | 202 (98.5%) |
| Don't Know | 0 (0.0%) | 1 (5.9%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (0.5%) |
| Inspected Urinals | 37 (100%) | 17 (100%) | 25 (100%) | 18 (100%) | 44 (100%) | 205 (100%) |

26. For a sample of faucets, list:

| Faucet Location | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Private | 1243 | 54.4 |
| Common Area | 1044 | 45.6 |
| Inspected Faucets | 2287 | |

| Faucet Type | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Kitchen | 570 | 24.9 |
| Bathroom | 1405 | 61.4 |
| Utility | 231 | 10.1 |
| Other | 81 | 3.5 |
| Inspected Faucets | 2287 | |

| Faucet (gpm) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <1.1 | 253 | 11.1 |
| 1.1-2.0 | 832 | 36.4 |
| 2.1-3.0 | 683 | 29.9 |
| 3.1-4.0 | 240 | 10.5 |
| 4.1-5.0 | 119 | 5.2 |
| 5.1-6.0 | 100 | 4.4 |
| 6.1-7.0 | 25 | 1.1 |
| 7.1-8.0 | 16 | 0.7 |
| 8.1-10.0 | 3 | 0.1 |
| Unable to Measure | 16 | 0.7 |
| Inspected Faucets | 2287 | |

| Statistical Parameters | |
|---|---|
| N | 2271 |
| Min | 0.25 |
| Max | 10 |
| Mean | 2.7 |
| Std Dev | 1.4 |
| Median | 2.5 |
| Mode | 2 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 2.2 | 0.1 |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| <1.1 | 5 (2.3%) | 28 (15.6%) | 42 (13.5%) | 17 (7.8%) | 44 (12.3%) | 117 (11.6%) |
| 1.1-2.0 | 86 (39.8%) | 73 (40.8%) | 105 (33.8%) | 64 (29.4%) | 111 (31.0%) | 393 (39.1%) |
| 2.1-3.0 | 88 (40.7%) | 39 (21.8%) | 89 (28.6%) | 64 (29.4%) | 101 (28.2%) | 302 (30.0%) |
| 3.1-4.0 | 20 (9.3%) | 25 (14.0%) | 30 (9.6%) | 24 (11.0%) | 38 (10.6%) | 103 (10.2%) |
| 4.1-5.0 | 5 (2.3%) | 8 (4.5%) | 19 (6.1%) | 17 (7.8%) | 25 (7.0%) | 45 (4.5%) |
| 5.1-6.0 | 8 (3.7%) | 5 (2.8%) | 17 (5.5%) | 20 (9.2%) | 28 (7.8%) | 21 (2.1%) |
| >6 | 4 (1.9%) | 0 (0.0%) | 7 (2.3%) | 7 (3.2%) | 11 (3.1%) | 16 (1.6%) |
| Unable to Measure | 0 (0.0%) | 1 (0.6%) | 2 (0.6%) | 5 (2.3%) | 0 (0.0%) | 8 (0.8%) |
| Inspected Faucets | 216 (100%) | 179 (100%) | 311 (100%) | 218 (100%) | 358 (100%) | 1005 (100%) |

| Aerator Attached | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 1587 | 69.4 |
| No | 700 | 30.6 |
| Don't Know | 0 | 0.0 |
| Inspected Faucets | 2287 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 156 (72.2%) | 118 (65.9%) | 189 (60.8%) | 131 (60.1%) | 206 (57.5) | 787 (78.3%) |
| No | 60 (27.8%) | 61 (34.1%) | 122 (39.2%) | 87 (39.9%) | 152 (42.5%) | 218 (21.7%) |
| Don't Know | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| Inspected Faucets | 216 (100%) | 179 (100%) | 311 (100%) | 218 (100%) | 358 (100%) | 1005 (100%) |

| Leaks in Faucet | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 40 | 1.7 |
| No | 2227 | 97.4 |
| Don't Know | 20 | 0.9 |
| Inspected Faucets | 2287 | |

27. For a sample of shower stalls, list:

| Showerhead (gpm) | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <1.1 | 6 | 6.3 |
| 1.1-2.0 | 28 | 29.2 |
| 2.1-3.0 | 38 | 39.6 |
| 3.1-4.0 | 9 | 9.4 |
| 4.1-5.0 | 4 | 4.2 |
| 5.1-6.0 | 3 | 3.1 |
| 6.1+ | 1 | 1.0 |
| Unable to Measure | 7 | 7.3 |
| Inspected Showerheads | 96 | |

| Statistical Parameters | |
|---|---|
| N | 89 |
| Min | 1 |
| Max | 17 |
| Mean | 2.8 |
| Std Dev | 1.9 |
| Median | 2.5 |
| Mode | 3 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 14.0 | 0.4 |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| <1.1 | 0 (0.0%) | 2 (15.4%) | 1 (16.7%) | 0 (0.0%) | 0 (0.0%) | 3 (5.7%) |
| 1.1-2.0 | 7 (36.8%) | 10 (76.9%) | 1 (16.7%) | 2 (50.0%) | 0 (0.0%) | 8 (15.1%) |
| 2.1-3.0 | 9 (47.4%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 29 (54.7%) |
| 3.1-4.0 | 1 (5.3%) | 1 (7.7%) | 2 (33.3%) | 0 (0.0%) | 0 (0.0%) | 5 (9.4%) |
| 4.1-5.0 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%)) | 0 (0.0%) | 0 (0.0%) | 4 (7.5%) |
| 5.1-6.0 | 0 (0.0%) | 0 (0.0%) | 1 (16.7%) | 0 (0.0%) | 1 (100.0%) | 1 (1.9%) |
| 6.1+ | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (1.9%) |
| Unable to Measure | 2 (10.5%) | 0 (0.0%) | 1 (16.7%) | 2 (50.0%) | 0 (0.0%) | 2 (3.8%) |
| Inspected Showerheads | 19 (100.0%) | 13 (100.0%) | 6 (100.0%) | 4 (100.0%) | 1 (100.0%) | 53 (100.0%) |

| Showerhead Type | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Atomizing | 21 | 21.9 |
| Stream/Spray | 75 | 78.1 |
| Inspected Showerheads | 96 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Atomizing | 4 (21.1%) | 2 (15.4%) | 3 (50.0%) | 0 (0.0%) | 0 (0.0%) | 12 (22.6%) |
| Stream/Spray | 15 (78.9%) | 11 (84.6%) | 3 (50.0%) | 4 (100.0%) | 1 (100.0%) | 41 (77.4%) |
| Inspected Showerheads | 19 (100.0%) | 13 (100.0%) | 6 (100.0%) | 4 (100.0%) | 1 (100.0%) | 53 (100.0%) |

| Showerhead Style | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Fixed | 85 | 88.5 |
| Handheld | 11 | 11.5 |
| Inspected Showerheads | 96 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Fixed | 18 (94.7%) | 13 (100.0%) | 5 (83.3%) | 4 (100.0%) | 1 (100.0%) | 44 (83.0%) |
| Handheld | 1 (5.3%) | 0 (0.0%) | 1 (16.7%) | 0 (0.0%) | 0 (0.0%) | 9 (17.0%) |
| Inspected Showerheads | 19 (100.0%) | 13 (100.0%) | 6 (100.0%) | 4 (100.0%) | 1 (100.0%) | 53 (100.0%) |

| Showerhead Shut-off | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 13 | 13.5 |
| No | 80 | 83.3 |
| Don't Know | 3 | 3.1 |
| Inspected Showerheads | 96 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 2 (10.5%) | 2 (15.4%) | 2 (33.3%) | 0 (0.0%) | 0 (0.0%) | 7 (13.2%) |
| No | 17 (89.5%) | 10 (76.9%) | 4 (66.7%) | 4 (100.0%) | 1 (100.0%) | 44 (83.0%) |
| Don't Know | 0 (0.0%) | 1 (7.7%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 2 (3.8%) |
| Inspected Showerheads | 19 (100.0%) | 13 (100.0%) | 6 (100.0%) | 4 (100.0%) | 1 (100.0%) | 53 (100.0%) |

| Leaks in Shower | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| None | 87 | 90.6 |
| Showerhead | 5 | 5.2 |
| Diverter Valve | 2 | 2.1 |
| Shutoff Valve | 2 | 2.1 |
| Inspected Showers | 96 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| None | 16 (84.2%) | 10 (76.9%) | 6 (100.0%) | 2 (50.0%) | 1 (100.0%) | 52 (98.1%) |
| Showerhead | 3 (15.8%) | 1 (7.7%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (1.9%) |
| Diverter Valve | 0 (0.0%) | 2 (15.4%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| Shutoff Valve | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 2 (50.0%) | 0 (0.0%) | 0 (0.0%) |
| Inspected Showerheads | 19 (100.0%) | 13 (100.0%) | 6 (100.0%) | 4 (100.0%) | 1 (100.0%) | 53 (100.0%) |

28. Are there any water pressure regulators off the incoming line at this location?

| Water Pressure Regulators | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 49 | 9.6 |
| No | 353 | 69.2 |
| Don't Know | 108 | 21.2 |
| Survey Responses | 510 | |
| Surveys with No Response | 26 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 7 (14.3%) | 4 (7.0%) | 4 (7.5%) | 2 (4.4%) | 6 (9.1%) | 26 (11.7%) |
| No | 34 (69.4%) | 49 (86.0%) | 49 (70.0%) | 26 (57.8%) | 48 (72.7%) | 147 (65.9%) |
| Don't Know | 8 (16.3%) | 4 (7.0%) | 17 (24.3%) | 17 (37.8%) | 12 (18.2%) | 50 (22.4%) |
| Survey Responses | 49 (100.0%) | 57 (100.0%) | 70 (100.0%) | 45 (100.0%) | 66 (100.0%) | 223(100.0%) |

28a. [IF YES] Are the pressure regulators for indoor or outdoor water use?

| Water Pressure Regulator Use | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Indoor | 9 | 31.0 |
| Outdoor | 9 | 31.0 |
| Both | 11 | 37.9 |
| Survey Responses | 29 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Indoor | 0 (0.0%) | 0 (0.0%) | 1 (33.3%) | 1 (50.0%) | 1 (50.0%) | 6 (33.3%) |
| Outdoor | 2 (50.0%) | 0 (0.0%) | 1 (33.3%) | 1 (50.0%) | 1 (50.0%) | 4 (22.2%) |
| Both | 2 (50.0%) | 0 (0.0%) | 1 (33.3%) | 0 (0.0%) | 0 (0.0%) | 8 (44.4%) |
| Survey Responses | 4 (100.0%) | 0 (100.0%) | 3 (100.0%) | 2 (100.0%) | 2 (100.0%) | 18 (100.0%) |

29. What is the water pressure at the highest available indoor fixture (if more than one building floor)?

| Water Pressure | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-20 | 0 | 0.0 |
| 21-40 | 5 | 2.1 |
| 41-60 | 46 | 19.7 |
| 61-80 | 137 | 58.8 |
| 81-100 | 28 | 12.0 |
| 101-120 | 15 | 6.4 |
| 121+ | 2 | 0.9 |
| Survey Responses | 233 | |
| Unable to Measure | 303 | |

| Statistical Parameters | |
|---|---|
| N | 233 |
| Min | 4 |
| Max | 165 |
| Mean | 74.4 |
| Std Dev | 17.7 |
| Median | 70 |
| Mode | 70 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 3.1 | 2.3 |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| 1-20 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 21-40 | 0 (0.0%) | 1 (3.4%) | 0 (0.0%) | 1 (5.0%) | 1 (4.3%) | 2 (2.2%) |
| 41-60 | 2 (5.0%) | 6 (20.7%) | 8 (25.8%) | 4 (20.0%) | 6 (26.1%) | 20 (22.2%) |
| 61-80 | 31 (77.5%) | 17 (58.6%) | 21 (67.7%) | 12 (60.0%) | 10 (43.5%) | 46 (51.1%) |
| 81-100 | 6 (15.0%) | 3 (10.3%) | 2 (6.5%) | 2 (10.0%) | 3 (13.0%) | 12 (13.3%) |
| 101-120 | 1 (2.5%) | 2 (6.9%) | 0 (0.0%) | 1 (5.0%) | 3 (13.0%) | 8 (8.9%) |
| 121+ | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 2 (2.2%) |
| Survey Responses | 40 (100.0%) | 29 (100.0%) | 31 (100.0%) | 20 (100.0%) | 23 (100.0%) | 90 (100.0%) |

30. Type of space cooling that is used at this facility:

| Evaporative Coolers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 17 | 13.6 |
| No | 97 | 77.6 |
| Don't Know | 11 | 8.8 |
| Survey Responses | 125 | |
| Surveys with No Response | 411 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 2 (14.3%) | 2 (10.0%) | 2 (9.5%) | 3 (25.0%) | 3 (15.8%) | 5 (12.8%) |
| No | 12 (85.7%) | 17 (85.0%) | 15 (71.4%) | 7 (58.3%) | 15 (78.9%) | 31 (79.5%) |
| Don't Know | 0 (0.0%) | 1 (5.0%) | 4 (19.0%) | 2 (16.7%) | 1 (5.3%) | 3 (7.7%) |
| Survey Responses | 14 (100.0%) | 20 (100.0%) | 21 (100.0%) | 12 (100.0%) | 19 (100.0%) | 39 (100.0%) |

| Central Mechanical System with Cooling Towers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 34 | 23.9 |
| No | 97 | 68.3 |
| Don't Know | 11 | 7.7 |
| Survey Responses | 142 | |
| Surveys with No Response | 394 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 2 (13.3%) | 2 (9.1%) | 6 (26.1%) | 2 (18.2%) | 3 (16.7%) | 19 (35.8%) |
| No | 13 (86.7%) | 20 (90.9%) | 13 (56.5%) | 7 (63.6%) | 14 (77.8%) | 30 (56.6%) |
| Don't Know | 0 (0.0%) | 0 (0.0%) | 4 (17.4%) | 2 (18.2%) | 1 (5.6%) | 4 (7.5%) |
| Survey Responses | 15 (100.0%) | 22 (100.0%) | 23 (100.0%) | 11 (100.0%) | 18 (100.0%) | 53 (100.0%) |

| Central Mechanical System with Air Cooling | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 153 | 62.4 |
| No | 80 | 32.7 |
| Don't Know | 12 | 4.9 |
| Survey Responses | 245 | |
| Surveys with No Response | 291 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 10 (50.0%) | 13 (43.3%) | 19 (50.0%) | 16 (80.0%) | 14 (50.0%) | 81 (74.3%) |
| No | 10 (50.0%) | 17 (56.7%) | 14 (36.8%) | 2 (10.0%) | 13 (46.4%) | 24 (22.0%) |
| Don't Know | 0 (0.0%) | 0 (0.0%) | 5 (13.2%) | 2 (10.0%) | 1 (3.6%) | 4 (3.7%) |
| Survey Responses | 20 (100.0%) | 30 (100.0%) | 38 (100.0%) | 20 (100.0%) | 28 (100.0%) | 109 (100.0%) |

| Individual Air Conditioning Units | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 78 | 43.3 |
| No | 87 | 48.3 |
| Don't Know | 15 | 8.3 |
| Survey Responses | 180 | |
| Surveys with No Response | 356 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 14 (66.7%) | 5 (20.8%) | 4 (18.2%) | 6 (40.0%) | 6 (28.6%) | 43 (55.8%) |
| No | 7 (33.3%) | 19 (79.2%) | 12 (54.5%) | 7 (46.7%) | 14 (66.7%) | 28 (36.4%) |
| Don't Know | 0 (0.0%) | 0 (0.0%) | 6 (27.3%) | 2 (13.3%) | 1 (4.8%) | 6 (7.8%) |
| Survey Responses | 21 (100.0%) | 24 (100.0%) | 22 (100.0%) | 15 (100.0%) | 21 (100.0%) | 77 (100.0%) |

31. Equipment/process cooling: what type of equipment is cooled?

| Equipment/Process Cooling | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Computer/Other Electronic Devices | 17 | 4.5 |
| Process or Other | 23 | 6.1 |
| None | 335 | 89.3 |
| Survey Responses | 375 | |
| Surveys with No Response | 161 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Computer/Other Electronic Devices | 0 (0.0%) | 0 (0.0%) | 3 (6.1%) | 0 (0.0%) | 1 (2.0%) | 13 (7.7%) |
| Process or Other | 0 (0.0%) | 4 (8.7%) | 8 (16.3%) | 3 (10.7%) | 2 (3.9%) | 6 (3.6%) |
| None | 32 (100.0%) | 42 (91.3%) | 38 (77.6%) | 25 (89.3%) | 48 (94.1%) | 150 (88.8%) |
| Survey Responses | 32 (100.0%) | 42 (100.0%) | 49 (100.0%) | 28 (100.0%) | 51 (100.0%) | 169(100.0%) |

32. If equipment/process cooling exists, does the system use:

| Evaporative Coolers-Equipment/Process Cooling | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 6 | 4.3 |
| No | 124 | 89.9 |
| Don't Know | 8 | 5.8 |
| Survey Responses | 138 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 3 (21.4%) | 2 (15.4%) | 1 (1.8%) |
| No | 12 (92.3%) | 20 (95.2%) | 19 (90.5%) | 9 (64.3%) | 11 (84.6%) | 53 (94.6%) |
| Don't Know | 1 (7.7%) | 1 (4.8%) | 2 (9.5%) | 2 (14.3%) | 0 (0.0%) | 2 (3.6%) |
| Survey Responses | 13 (100.0%) | 21 (100.0%) | 21 (100.0%) | 14 (100.0%) | 13 (100.0%) | 56 (100.0%) |

| Cooling Towers-Equipment/Process Cooling | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 11 | 7.5 |
| No | 128 | 87.7 |
| Don't Know | 7 | 4.8 |
| Survey Responses | 146 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 0 (0.0%) | 0 (0.0%) | 5 (19.2%) | 1 (9.1%) | 1 (7.7%) | 4 (6.3%) |
| No | 12 (100.0%) | 19 (95.0%) | 19 (73.1%) | 8 (72.7%) | 12 (92.3%) | 58 (90.6%) |
| Don't Know | 0 (0.0%) | 1 (5.0%) | 2 (7.7%) | 2 (18.2%) | 0 (0.0%) | 2 (3.1%) |
| Survey Responses | 12 (100.0%) | 20 (100.0%) | 26 (100.0%) | 11 (100.0%) | 13 (100.0%) | 64 (100.0%) |

| Air Cooling-Equipment/Process Cooling | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 27 | 17.0 |
| No | 125 | 78.6 |
| Don't Know | 7 | 4.4 |
| Survey Responses | 159 | |

| Responses | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| Yes | 0 (0.0%) | 2 (8.7%) | 6 (22.2%) | 2 (15.4%) | 1 (7.7%) | 16 (22.9%) |
| No | 13 (100.0%) | 20 (87.0%) | 19 (70.4%) | 9 (69.2%) | 12 (92.3%) | 52 (74.3%) |
| Don't Know | 0 (0.0%) | 1 (4.3%) | 2 (7.4%) | 2 (15.4%) | 0 (0.0%) | 2 (2.9%) |
| Survey Responses | 13 (100.0%) | 23 (100.0%) | 27 (100.0%) | 13 (100.0%) | 13 (100.0%) | 70 (100.0%) |

| Refer to Water Conservation office | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 34 | 6.5 |
| No | 486 | 93.5 |
| Survey Responses | 520 | |
| Surveys with No Response | 16 | |

33. Year building structure was originally built?

| Year Building Structure Was Originally Built | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| <1920 | 11 | 9.9 |
| 1920-1929 | 7 | 6.3 |
| 1930-1939 | 9 | 8.1 |
| 1940-1949 | 5 | 4.5 |
| 1950-1959 | 12 | 10.8 |
| 1960-1969 | 10 | 9.0 |
| 1970-1979 | 15 | 13.5 |
| 1980-1989 | 24 | 21.6 |
| 1990-1999 | 17 | 15.3 |
| 2000-2001 | 1 | 0.9 |
| Survey Responses | 111 | |

| Statistical Parameters | |
|---|---|
| N | 111 |
| Min | 1890 |
| Max | 2000 |
| Mean | 1960 |
| Std Dev | 29.7 |
| Median | 1970 |
| Mode | 1950 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 0.3 | 5.5 |

34. Has there been any major remodeling of the original facilities?

| Major Remodeling | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 64 | 32.5 |
| No | 104 | 52.8 |
| Don't Know | 29 | 14.7 |
| Survey Responses | 197 | |

34a. [IF YES] Please describe the remodeling that was done.

| List of Major Remodeling | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Totally remodeled | 6 | 14.0 |
| Rooms | 1 | 2.3 |
| Floors | 1 | 2.3 |
| Renovations | 1 | 2.3 |
| Plumbing | 2 | 4.7 |
| Electrical Wiring | 2 | 4.7 |
| Turned Into Chevy's | 1 | 2.3 |
| Toilets | 1 | 2.3 |
| Hot Water Heater | 1 | 2.3 |
| ADA Compliance | 1 | 2.3 |
| Added Second Story | 1 | 2.3 |
| Attic Space | 1 | 2.3 |
| Back Office Redone | 1 | 2.3 |
| Bathrooms | 4 | 9.3 |
| Changed from Sports Store | 1 | 2.3 |
| Converted from Warehouse | 1 | 2.3 |
| Drainage | 1 | 2.3 |
| Earthquake Retrofit | 1 | 2.3 |
| Front Portion | 1 | 2.3 |
| Interior Changes | 1 | 2.3 |
| Dining Area | 1 | 2.3 |
| Modernization | 1 | 2.3 |
| New Foundation | 1 | 2.3 |
| New Kitchen Area | 1 | 2.3 |
| New Offices | 1 | 2.3 |
| Original Building Demolished | 1 | 2.3 |
| Partitions (Cubicles) | 1 | 2.3 |
| Residential Property Converted | 1 | 2.3 |
| Rooms Enlarged | 1 | 2.3 |
| Stucco Exterior | 1 | 2.3 |
| Changed to Retail Building | 1 | 2.3 |
| Updated Office | 1 | 2.3 |
| Knocked Down Wall | 1 | 2.3 |
| Survey Responses | 43 | |

34b. Total (annual average, including part-time) number of employees?

| No. of Employees | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-20 | 108 | 58.4 |
| 21-50 | 49 | 26.5 |
| 51-100 | 12 | 6.5 |
| 101-500 | 14 | 7.6 |
| 501+ | 2 | 1.1 |
| Survey Responses | 185 | |

| Statistical Parameters | |
|---|---|
| N | 185 |
| Min | 1 |
| Max | 1400 |
| Mean | 44.1 |
| Std Dev | 121.7 |
| Median | 15 |
| Mode | 6 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 39.8 | 17.5 |

**Restaurant Supplement**

35. What is the average number of meals served per day?

| No. of Meals Served per Day | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-100 | 16 | 26.7 |
| 101-200 | 18 | 30.0 |
| 201-400 | 10 | 16.7 |
| 401-600 | 5 | 8.3 |
| 601-800 | 5 | 8.3 |
| 801-1000 | 2 | 3.3 |
| 1001-1500 | 1 | 1.7 |
| 1501-2500 | 3 | 5.0 |
| Survey Responses | 60 | |

| Statistical Parameters | |
|---|---|
| N | 60 |
| Min | 20 |
| Max | 2500 |
| Mean | 409.7 |
| Std Dev | 531.3 |
| Median | 200 |
| Mode | 200 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 32.8 | 134.4 |

36. Does the restaurant have banquet facilities?

| Banquet Facilities | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 11 | 14.5 |
| No | 65 | 85.5 |
| Don't Know | 0 | 0.0 |
| Survey Responses | 76 | |

37. Are there any dishwashers at this location?

| Dishwashers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 51 | 72.9 |
| No | 19 | 27.1 |
| Survey Responses | 70 | |

37a. [IF DISHWASHER] List:

| Manufacturer/Make/ Model of Dishwasher | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| American | 1 | 2.1 |
| Auto Chlor | 19 | 39.6 |
| EcoLab | 5 | 10.4 |
| GE | 1 | 2.1 |
| Glass Washer | 1 | 2.1 |
| Hobart | 4 | 8.3 |
| Jackson | 6 | 12.5 |
| Metcraft | 1 | 2.1 |
| Rykoff Sexton | 1 | 2.1 |
| Stero | 3 | 6.3 |
| Wash King | 1 | 2.1 |
| Don't Know | 5 | 10.4 |
| Inspected Dishwashers | 48 | |

| Dishwasher Type | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Stationary Rack | 42 | 87.5 |
| Conveyor Rack | 6 | 12.5 |
| Other | 0 | 0.0 |
| Inspected Dishwashers | 48 | |

| Dishwasher Rinse | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Water | 22 | 45.8 |
| Chemical | 26 | 54.2 |
| Inspected Dishwashers | 48 | |

| Incoming Pressure Regulators | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 13 | 27.1 |
| No | 16 | 33.3 |
| Don't Know | 19 | 39.6 |
| Inspected Dishwashers | 48 | |

38. Are there any garbage disposers at this location?

| Garbage Disposers | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 11 | 23.4 |
| No | 36 | 76.6 |
| Survey Responses | 47 | |

38a. [IF GARBAGE DISPOSER] List:

| Manufacturer/Make/ Model | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Badger | 1 | 11.1 |
| Dahl Back | 1 | 11.1 |
| Emerson | 1 | 11.1 |
| In-Sink-Erator | 1 | 11.1 |
| Marathon | 1 | 11.1 |
| Montgomery Ward | 1 | 11.1 |
| Waste King | 1 | 11.1 |
| Don't Know | 2 | 22.2 |
| Inspected Garbage Disposers | 9 | |

| Garbage Disposer Type | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Disposer | 5 | 55.6 |
| Scrapper/Disposer | 3 | 33.3 |
| Conveyor/Disposer | 1 | 11.1 |
| Inspected Garbage Disposers | 9 | |

39. Are there any clothes washing machines at this location?

| Clothes Washing Machines | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 4 | 9.5 |
| No | 38 | 90.5 |
| Survey Responses | 42 | |

39a. [IF CLOTHES WASHING MACHINES] List:

| Manufacturer/Make/ Model | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Maytag | 2 | 33.3 |
| Roper | 2 | 33.3 |
| Whirlpool | 2 | 33.3 |
| Inspected Clothes Washing Machines | 6 | |

| Type of Clothes Washing Machine | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Standard Efficiency | 4 | 66.7 |
| High Efficiency | 2 | 33.3 |
| Large Capacity (Multi-Load) | 0 | 0.0 |
| Inspected Clothes Washing Machines | 6 | |

| Water Saving/Load Size Selection Feature for Clothes Washing Machine | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 4 | 66.7 |
| No | 2 | 33.3 |
| Don't Know | 0 | 0.0 |
| Inspected Clothes Washing Machines | 6 | |

### Office Supplement

35. Number of floors in the building?

| No. of Floors | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1 | 43 | 36.8 |
| 2 | 57 | 48.7 |
| 3 | 7 | 6.0 |
| 4 | 3 | 2.6 |
| 5 | 0 | 0.0 |
| 6 | 0 | 0.0 |
| 7 | 1 | 0.9 |
| 8 | 2 | 1.7 |
| 9+ | 4 | 3.4 |
| Survey Responses | 117 | |

| Statistical Parameters | |
|---|---|
| N | 117 |
| Min | 1 |
| Max | 100 |
| Mean | 3.8 |
| Std Dev | 13.0 |
| Median | 2 |
| Mode | 2 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 61.3 | 2.3 |

36. Average occupancy rate:

| Winter | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-10% | 0 | 0.0 |
| 11-20% | 0 | 0.0 |
| 21-30% | 4 | 3.6 |
| 31-40% | 0 | 0.0 |
| 41-50% | 0 | 0.0 |
| 51-60% | 0 | 0.0 |
| 61-70% | 0 | 0.0 |
| 71-80% | 2 | 1.8 |
| 81-90% | 3 | 2.7 |
| 91-100% | 102 | 91.9 |
| Survey Responses | 111 | |

| Statistical Parameters | |
|---|---|
| N | 111 |
| Min | 25 |
| Max | 100 |
| Mean | 96.6 |
| Std Dev | 14.3 |
| Median | 100 |
| Mode | 100 |

| Relative Error | |
|---|---|
| 2.7 | 2.7 |

| Spring | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-10% | 1 | 0.9 |
| 11-20% | 0 | 0.0 |
| 21-30% | 4 | 3.7 |
| 31-40% | 0 | 0.0 |
| 41-50% | 0 | 0.0 |
| 51-60% | 0 | 0.0 |
| 61-70% | 0 | 0.0 |
| 71-80% | 2 | 1.8 |
| 81-90% | 3 | 2.8 |
| 91-100% | 99 | 90.8 |
| Survey Responses | 109 | |

| Statistical Parameters | |
|---|---|
| N | 109 |
| Min | 10 |
| Max | 100 |
| Mean | 95.7 |
| Std Dev | 16.6 |
| Median | 100 |
| Mode | 100 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 3.3 | 3.1 |

| Summer | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-10% | 0 | 0.0 |
| 11-20% | 0 | 0.0 |
| 21-30% | 4 | 3.6 |
| 31-40% | 0 | 0.0 |
| 41-50% | 0 | 0.0 |
| 51-60% | 1 | 0.9 |
| 61-70% | 3 | 2.7 |
| 71-80% | 3 | 2.7 |
| 81-90% | 3 | 2.7 |
| 91-100% | 98 | 87.5 |
| Survey Responses | 112 | |

| Statistical Parameters | |
|---|---|
| N | 112 |
| Min | 25 |
| Max | 100 |
| Mean | 95.1 |
| Std Dev | 15.6 |
| Median | 100 |
| Mode | 100 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 3.0 | 2.9 |

| Fall | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-10% | 0 | 0.0 |
| 11-20% | 0 | 0.0 |
| 21-30% | 4 | 3.7 |
| 31-40% | 0 | 0.0 |
| 41-50% | 0 | 0.0 |
| 51-60% | 0 | 0.0 |
| 61-70% | 0 | 0.0 |
| 71-80% | 1 | 0.9 |
| 81-90% | 4 | 3.7 |
| 91-100% | 98 | 91.6 |
| Survey Responses | 107 | |

| Statistical Parameters | |
|---|---|
| N | 107 |
| Min | 25 |
| Max | 100 |
| Mean | 96.6 |
| Std Dev | 14.4 |
| Median | 100 |
| Mode | 100 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 2.8 | 2.7 |

37. Square footage of total building?

| Square Footage of Building | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-5000 | 34 | 45.9 |
| 5001-10000 | 13 | 17.6 |
| 10001-25000 | 13 | 17.6 |
| 25001-50000 | 5 | 6.8 |
| 50001-100000 | 3 | 4.1 |
| 100001-500000 | 6 | 8.1 |
| Survey Responses | 74 | |

| Statistical Parameters | |
|---|---|
| N | 74 |
| Min | 900 |
| Max | 465000 |
| Mean | 28859.1 |
| Std Dev | 69197.8 |
| Median | 5500 |
| Mode | 2500 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 54.6 | 15766.4 |

38. Of the total building square footage, what percent is for:

| Living Quarters | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-10% | 0 | 0.0 |
| 11-20% | 0 | 0.0 |
| 21-30% | 0 | 0.0 |
| 31-40% | 0 | 0.0 |
| 41-50% | 4 | 100.0 |
| 51-60% | 0 | 0.0 |
| 61-70% | 0 | 0.0 |
| 71-80% | 0 | 0.0 |
| 81-90% | 0 | 0.0 |
| 91-100% | 0 | 0.0 |
| Survey Responses | 4 | |

| Statistical Parameters | |
|---|---|
| N | 4 |
| Min | 50 |
| Max | 50 |
| Mean | 50.0 |
| Std Dev | 0.0 |
| Median | 50 |
| Mode | 50 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 0.0 | 0.0 |

| Retail Establishment | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-10% | 4 | 17.4 |
| 11-20% | 1 | 4.3 |
| 21-30% | 1 | 4.3 |
| 31-40% | 1 | 4.3 |
| 41-50% | 6 | 26.1 |
| 51-60% | 0 | 0.0 |
| 61-70% | 1 | 4.3 |
| 71-80% | 0 | 0.0 |
| 81-90% | 0 | 0.0 |
| 91-100% | 9 | 39.1 |
| Survey Responses | 23 | |

| Statistical Parameters | |
|---|---|
| N | 23 |
| Min | 2 |
| Max | 100 |
| Mean | 59.2 |
| Std Dev | 37.3 |
| Median | 50 |
| Mode | 100 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 25.8 | 15.3 |

| Restaurant/Food Service | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-10% | 4 | 36.4 |
| 11-20% | 0 | 0.0 |
| 21-30% | 0 | 0.0 |
| 31-40% | 0 | 0.0 |
| 41-50% | 1 | 9.1 |
| 51-60% | 0 | 0.0 |
| 61-70% | 1 | 9.1 |
| 71-80% | 0 | 0.0 |
| 81-90% | 0 | 0.0 |
| 91-100% | 5 | 45.5 |
| Survey Responses | 11 | |

| Statistical Parameters | |
|---|---|
| N | 11 |
| Min | 1 |
| Max | 100 |
| Mean | 57.4 |
| Std Dev | 45.7 |
| Median | 67 |
| Mode | 100 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 47.1 | 27.0 |

| Professional or Government Services Offices | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-10% | 3 | 3.8 |
| 11-20% | 1 | 1.3 |
| 21-30% | 0 | 0.0 |
| 31-40% | 1 | 1.3 |
| 41-50% | 4 | 5.1 |
| 51-60% | 0 | 0.0 |
| 61-70% | 1 | 1.3 |
| 71-80% | 3 | 3.8 |
| 81-90% | 0 | 0.0 |
| 91-100% | 65 | 83.3 |
| Survey Responses | 78 | |

| Statistical Parameters | |
|---|---|
| N | 78 |
| Min | 3 |
| Max | 100 |
| Mean | 90.7 |
| Std Dev | 23.3 |
| Median | 100 |
| Mode | 100 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 5.7 | 5.2 |

| Other | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-10% | 4 | 18.2 |
| 11-20% | 1 | 4.5 |
| 21-30% | 0 | 0.0 |
| 31-40% | 1 | 4.5 |
| 41-50% | 3 | 13.6 |
| 51-60% | 5 | 22.7 |
| 61-70% | 0 | 0.0 |
| 71-80% | 0 | 0.0 |
| 81-90% | 1 | 4.5 |
| 91-100% | 7 | 31.8 |
| Survey Responses | 22 | |

| Statistical Parameters | |
|---|---|
| N | 22 |
| Min | 2 |
| Max | 100 |
| Mean | 60.5 |
| Std Dev | 34.7 |
| Median | 60 |
| Mode | 100 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 23.9 | 14.5 |

[IF OTHER] Specify other use of square footage.

| List of Other Uses | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Church | 1 | 5.0 |
| Flora & Gift Shop | 1 | 5.0 |
| Law Offices | 1 | 5.0 |
| Manufacturing | 2 | 10.0 |
| Mechanic Shop | 1 | 5.0 |
| Nail Salon | 1 | 5.0 |
| Office(s) | 5 | 25.0 |
| Parking | 1 | 5.0 |
| Roofing Company | 1 | 5.0 |
| Storage | 2 | 10.0 |
| Travel Agent | 1 | 5.0 |
| Warehouse | 2 | 10.0 |
| Whole Sale Food Processing | 1 | 5.0 |
| Survey Responses | 20 | |

| Other | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 1-10% | 0 | 0.0 |
| 11-20% | 1 | 11.1 |
| 21-30% | 1 | 11.1 |
| 31-40% | 3 | 33.3 |
| 41-50% | 0 | 0.0 |
| 51-60% | 1 | 11.1 |
| 61-70% | 0 | 0.0 |
| 71-80% | 0 | 0.0 |
| 81-90% | 2 | 22.2 |
| 91-100% | 1 | 11.1 |
| Survey Responses | 9 | |

| Statistical Parameters | |
|---|---|
| N | 9 |
| Min | 20 |
| Max | 97 |
| Mean | 56.3 |
| Std Dev | 29.0 |
| Median | 40 |
| Mode | 40 |

| Relative Error | |
|---|---|
| ± Percent | ± Value |
| 33.7 | 19.0 |

[IF OTHER] Specify other use of square footage.

| List of Other Uses | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Laser Skin Care Facility | 1 | 12.5 |
| Real Estate Office | 1 | 12.5 |
| Warehouse | 6 | 75.0 |
| Survey Responses | 8 | |

39. Is some of the building square footage used for retail establishments?

| Retail Establishments | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Yes | 23 | 47.9 |
| No | 25 | 52.1 |
| Survey Responses | 48 | |

39a. [IF YES] Describe the type of retail establishment.

| List of Retail Establishments | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| Bank | 3 | 9.7 |
| Bike Shop | 1 | 3.2 |
| Kitchen | 1 | 3.2 |
| Café | 1 | 3.2 |
| Clothing Store | 2 | 6.5 |
| Gift Shop | 3 | 9.7 |
| General Store | 1 | 3.2 |
| Computer Sales & Repair | 1 | 3.2 |
| Convenience Store | 1 | 3.2 |
| Deli | 1 | 3.2 |
| Donuts | 1 | 3.2 |
| Floral & Gift Shop | 1 | 3.2 |
| Food | 3 | 9.7 |
| Food Processing | 1 | 3.2 |
| Grocery Store | 1 | 3.2 |
| Kitchenware Shop | 1 | 3.2 |
| Law Offices | 1 | 3.2 |
| Offices | 1 | 3.2 |
| Optomitrist | 1 | 3.2 |
| Photo Gallery | 1 | 3.2 |
| Pottery Whole Sale | 1 | 3.2 |
| Realtors | 1 | 3.2 |
| Record Store | 1 | 3.2 |
| Coffee Shop | 1 | 3.2 |
| Survey Responses | 31 | |

40. Number of showerheads left with the customer

| Showerheads Left | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 518 | 133.9 |
| 1 | 15 | 3.9 |
| 2 | 3 | 0.8 |

| Showerheads | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| 0 | 47 (90.4%) | 56 (94.9%) | 71 (97.3%) | 47 (100.0%) | 68 (97.1%) | 229 (97.4%) |
| 1 | 5 (9.6%) | 2 (3.4%) | 2 (2.7%) | 0 (0.0%) | 0 (0.0%) | 6 (2.6%) |
| 2 | 0 (0.0%) | 1 (1.7%) | 0 (0.0%) | 0 (0.0%) | 2 (2.9%) | 0 (0.0%) |
| Showerheads Left | 52 (100.0%) | 59 (100.0%) | 73 (100.0%) | 47 (100.0%) | 70 (100.0%) | 235 (100.0%) |

41. Number of faucet aerators left with the customer.

| Faucet Aerators Left | No. of Responses | Frequency of Response (Percent of Total) |
|---|---|---|
| 0 | 466 | 120.4 |
| 1 | 30 | 7.8 |
| 2 | 23 | 5.9 |
| 3 | 7 | 1.8 |
| 4 | 5 | 1.3 |
| 5 | 2 | 0.5 |
| 6 | 2 | 0.5 |
| 8 | 1 | 0.3 |

| Faucet Aerators | Warehouses | Retail | Food Sales | Fast Food | Restaurants | Offices |
|---|---|---|---|---|---|---|
| 0 | 47 (90.4%) | 50 (84.7%) | 63 (86.3%) | 38 (80.9%) | 60 (85.7%) | 208 (88.5%) |
| 1 | 2 (3.8%) | 4 (6.8%) | 5 (6.8%) | 7 (14.9%) | 1 (1.4%) | 11 (4.7%) |
| 2 | 2 (3.8%) | 2 (3.4%) | 5 (6.8%) | 1 (2.1%) | 4 (5.7%) | 9 (3.8%) |
| 3 | 0 (0.0%) | 1 (1.7%) | 0 (0.0%) | 0 (0.0%) | 3 (4.3%) | 3 (1.3%) |
| 4 | 0 (0.0%) | 2 (3.4%) | 0 (0.0%) | 0 (0.0%) | 1 (1.4%) | 2 (0.9%) |
| 5 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (2.1%) | 1 (1.4%) | 0 (0.0%) |
| 6 | 1 (1.9%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (0.4%) |
| 8 | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (0.4%) |
| Aerators Left | 52 (100.0%) | 59 (100.0%) | 73 (100.0%) | 47 (100.0%) | 70 (100.0%) | 235 (100.0%) |