WaterSense® H_2Otel Challenge Water Assessment Worksheets Introduction

The U.S. Environmental Protection Agency's (EPA's) WaterSense program developed the H_2Otel Water Use and Savings Evaluation (WaterUSE) Tool to help hotel facility managers and building operators **ACT—A**ssess, **C**hange, and **T**rack water use. The WaterUSE Tool, in combination with the following worksheets, can assist hotels in identifying and prioritizing cost-effective water efficiency projects and best management practices to reduce water and energy use and save money. For more information about the H_2Otel Challenge, please visit the WaterSense website.

Getting Started

These worksheets will guide you through a water assessment (e.g., tour or walk-through) of your hotel to help you identify key water use areas. You will need to capture information about your water-using fixtures and equipment to populate the WaterUSE Tool. Here are a few tips to help you get started:

- Prior to conducting the walk-through, print the relevant worksheets (listed below) for the water uses at your hotel. Note: All hotels using the WaterUSE Tool should complete Worksheet 1. The information from Worksheet 1 is designed to ensure that the WaterUSE Tool provides best management practice (BMP) recommendations and calculates potential savings estimates specific to your hotel.
- The text on each worksheet provides guidance to help you identify the major water uses and relevant data and information required by the WaterUSE Tool.
- The tables on each worksheet indicate the data inputs for the WaterUSE Tool that you should gather during the walk-through or through research on building and renovation plans. Manufacturer websites can often be used to verify flow rates, flush volumes, unit capacities, and other product information.
- Shaded cells within worksheet tables indicate data inputs required by the WaterUSE Tool; you must complete these cells for the tool to provide BMP recommendations and calculate potential savings estimates.
- Use the "Additional Notes" section at the end of each worksheet to identify malfunctioning equipment, leaks, or operational improvements that should be addressed immediately following your assessment, as well as any other information you would like to remember that is not captured elsewhere on the worksheet.
- All potential savings estimates and BMP recommendations generated by the tool are intended to provide water-savings project ideas for further consideration. Before initiating a potential project identified by this tool, WaterSense recommends more thoroughly evaluating the project's cost and savings to accurately evaluate its cost-effectiveness.

The worksheets are organized according to the tabs in the WaterUSE Tool and include:

Worksheet 1: Facility Information
- ✓ Required by all users
- ✓ Water and energy rates

Worksheet 2: Metering
- ✓ Water meter data

Worksheet 3: Guest Rooms
- ✓ Toilets
- ✓ Showerheads
- ✓ Faucets

Worksheet 4: Public Restrooms
- ✓ Toilets
- ✓ Urinals
- ✓ Showerheads
- ✓ Faucets

Worksheet 5: Guest Ice and Laundry
- ✓ Ice makers for guest use
- ✓ Clothes washers for guest use

Worksheet 6: Linen Laundry
- ✓ Commercial washers for hotel staff use (e.g., linens, towels, etc.)

Worksheet 7: Commercial Kitchens
- ✓ Ice makers
- ✓ Steam cookers
- ✓ Combination ovens
- ✓ Steam kettles
- ✓ Dipper wells
- ✓ Garbage disposals

Worksheet 8: Dishwashing
- ✓ Commercial dishwashers
- ✓ Pre-rinse spray valves

Worksheet 9: Heating, Ventilation, and Air Conditioning (HVAC) and Mechanical
- ✓ Cooling towers
- ✓ Single-pass cooling
- ✓ Steam boilers

Worksheet 10: Irrigation
- ✓ Outdoor water use and irrigation equipment

Worksheet 11: Pools and Spas
- ✓ Indoor and outdoor pools
- ✓ Hot tubs and spas

Gather the appropriate hotel staff and vendors familiar with specific areas of the hotel to help obtain the information needed for each worksheet. Helpful personnel and vendors might include:

- Facility manager
- Facility engineer
- Maintenance manager
- Facility operations staff
- Plumber
- Housekeeping manager and staff
- Landscaping/outdoor maintenance manager and staff
- Restaurant/kitchen manager
- Laundry services staff
- Accounting manager
- Landscape/irrigation professional
- Laundry equipment vendor
- Cooling tower maintenance/chemical vendor
- Pool maintenance/chemical vendor

You may also want to contact your local water and energy utilities, which may be able to help you with your water assessment and provide rebates for water- and energy-efficient upgrades you identify.

To learn more about developing a water management plan for your facility, including how to establish a water efficiency team, conduct a water assessment, set goals, prioritize projects, and evaluate your progress, review *Section 1.2: Water Management Planning* of *WaterSense at Work: Best Management Practices for Commercial and Institutional Facilities*.

If you need more information about any of the water uses assessed in the WaterUSE Tool, please review relevant chapters in *WaterSense at Work*. *WaterSense at Work* details water-efficient equipment, products, and practices across eight key areas: water management planning, water use monitoring and education, sanitary fixtures and equipment, commercial kitchen equipment, outdoor water use, mechanical systems, laboratory and medical equipment, and onsite alternative water sources.

Worksheet 1: Facility Information

Use the following worksheet to collect the information necessary to complete the WaterUSE Tool's "Facility Info" tab. As a reminder, the data in this worksheet will be used in many calculations throughout the tool. Please enter facility-specific data when available to yield more accurate savings estimates and project payback periods.

Getting Started

To begin this worksheet, fill out the table below with general information about your hotel and its typical occupancy.

Facility Details

WaterUSE Tool Data Inquiry	Facility-Specific Data
Building Size (sq. ft.)	
Construction Year (or Significant Renovation)	
Building Hot Water Fuel Type (electric or natural gas)	
Number of Guest Rooms in the Hotel	
Hotel Operating Days Per Year[1]	
Average Number of Guests per Room[1]	
Average Annual Occupancy Rate[1]	

Utility Bills and Rates

Gather at least one year's worth of water and wastewater bills. It is possible that your wastewater could be billed by the same utility as your water provider or by a separate wastewater treatment utility. Next, find at least one electric bill because some of your water-using equipment might use electricity to function. If you don't have these bills on hand, contact your water, wastewater, and energy utility since they can likely provide this for you.

You should also determine what type of energy is used to heat water at your hotel. Electricity and natural gas are the most common types of energy used to heat water. If your hotel uses more than one type of energy to heat water, focus on the type of energy used to heat the water used by your guest rooms. Find at least one billing statement for the main energy source for hot water heating.

[1] The WaterUSE Tool provides industry averages for the number of operating days per year (365), average number of guests per room (1.4), and average annual occupancy rate (61 percent); however, providing data specific to your hotel will yield more accurate savings estimates and project payback periods.

Key items to gather include:

- At least a year's worth of water supply and wastewater bills
- At least one electric bill
- At least one natural gas bill (if used to heat your water)

Look at your water and wastewater, electricity, and/or natural gas bills to determine your rates in cost per unit ($/unit). You may be billed in one of several units:

Potential Water and Wastewater Rate Units:

- Cost per gallon ($/gal)
- Cost per thousand gallons ($/Kgal)
- Cost per cubic foot ($/cf)
- Cost per hundred cubic feet ($/ccf)
- Cost per thousand cubic feet ($/kcf)
- Cost per liter ($/L)
- Cost per acre-feet ($/ac-ft)
- Flat rate

Potential Electricity Rate Units:

- Cost per kilowatt-hour ($/kWh)
- Cost per megawatt-hour ($/MWh)
- Cost per thousand Btu ($/kBtu)
- Cost per million Btu ($/MMBtu)

Potential Natural Gas Rate Units:

- Cost per million cubic feet ($/MMcf)
- Cost per thousand cubic feet ($/Mcf)
- Cost per hundred cubic feet ($/ccf)
- Cost per cubic foot ($/cf)
- Cost per cubic meter ($/m3)
- Cost per thousand Btu ($/kBtu)
- Cost per million Btu ($/MMBtu)
- Cost per Therm ($/Therm)

Utility Information

WaterUSE Tool Data Inquiry	Facility-Specific Data
Water Rate ($/unit)[2]	
Wastewater Rate ($/unit)[2]	
Electricity Rate ($/unit)[2]	
Natural Gas Rate ($/unit)[2]	

Additional Notes

[2] The WaterUSE Tool provides national averages for the water supply rate ($3.65/kgal), wastewater rate ($5.02/kgal), electricity rate ($0.10/kWh), and natural gas rate ($8.13/Mcf); however providing data specific to your hotel will yield more accurate savings estimates and project payback periods.

Worksheet 2: Metering and Billing

Use the following worksheet to collect the information necessary to complete the WaterUSE Tool's "Facility Info" and "Water Use" tabs. Completing this section is **optional**. The data entered here can be used to plot your data over time to identify and analyze water use trends and can be easily transferred into the ENERGY STAR® Portfolio Manager® tool. For more information on metering and submetering, visit Section 2.2 of *WaterSense at Work*.

Water Meter and Water Use Data

Although not required by the WaterUSE Tool to generate water efficiency projects and best management practices that might benefit your hotel, entering your water meter and water use information provided on your water bills will help you track your water use over time and facilitate recordkeeping. The "Facility Info" tab requests information about your water meters. From your water bills, record the meter ID numbers if provided. In addition, give each meter a name and describe its service area. For example, a meter servicing an outdoor landscape might be named "Irrigation."

Metered Water Usage Information

Meter Name	Meter ID #	Service Area

If you gathered a year's worth of water supply bills, record your water use information on the "Water Use" tab and plot your data over time to identify and analyze water use trends. Plotting and analyzing your data monthly may help you identify seasonal water use patterns, leaks, malfunctioning equipment, or other issues.

In addition, consider entering your water use information into the ENERGY STAR Portfolio Manager tool monthly to help you track and trend your water use. The "Water Use" tab is set up to mimic Portfolio Manager so the data can be easily copied from the WaterUSE Tool to Portfolio Manager using your copy and paste function. Populating Portfolio Manager with water and energy use data is required for participation in the EPA Battle of the Buildings Competition and other aspects of the ENERGY STAR program.

Using the bills you gathered, the "Water Use" tab will prompt you to enter the following information from each bill:

- Start date

- End date
- Usage
- Cost
- Whether the water use was estimated (as opposed to metered)

Additional Notes

Worksheet 3: Guest Rooms

Use the following worksheet to collect the information necessary to complete the WaterUSE Tool's "Guest Rooms" tab. For more information on restroom fixtures, visit Section 3 of *WaterSense at Work*.

Getting Started

To complete the tables in this worksheet, conduct a full inventory of all of the toilets, faucets, and showerheads located in your guest rooms. The "Total Number Installed" column in each table should reflect the entire sum of these fixtures from all guest rooms in your hotel. Fixture types can vary significantly between rooms, particularly if a renovation has occurred for only some of the guestroom bathrooms or if certain rooms have new fixtures due to previous malfunctions. Be sure to visit at least one representative room for each replacement or renovation phase to obtain an accurate inventory.

Toilets

Complete the table below to capture information about toilets in all of your guest rooms. Consider the following when assessing your toilets:

- **Tank-type toilets:** Toilets equipped with a tank that stores and dispenses water to the bowl when flushed.
- **Flushometer-valve toilets:** Toilets attached to a valve activated by a lever or sensor that releases pressurized water to the bowl.

Flush volumes in gallons per flush (gpf) are typically found on the underside of the tank lid for tank-type fixtures. For flushometer-valve toilets, find the flush volume marked on the toilet fixtures. For dual-flush toilets, which flush at one of two predetermined volumes depending upon the need to flush liquid or solid waste, enter the effective flush volume. If not indicated on the toilet fixture, on your stocked replacement parts, or in product documentation (including the manufacturer's website), assume the effective flush volume of a dual flush toilet = ([2 x low flush volume] + [1 x high flush volume]) / 3].

What type of toilets are installed in your guest rooms?

Toilet Type (tank-type or flushometer-valve)	Number Installed	Existing Flush Volume (gpf)[3]

[3] The WaterUSE Tool can estimate your toilet flush volumes based on the year your hotel was built or last renovated (refer to Worksheet 1: Facility Information or the "Facility Info" tab); however, providing data specific to your hotel will yield more accurate savings estimates and project payback periods.

Faucets

Complete the table below to capture information about faucets in all of your guest rooms. Consider the following when assessing your faucets:

- Be sure to account for all faucets in suite-type rooms with multiple bathrooms or sinks.
- The faucet flow rate in gallons per minute (gpm) is typically found etched into the faucet aerator but can also be visible on the faucet body of some models.
- If the flow rate is not visible on the faucet or faucet aerator, the flow rate can be determined using this simple procedure:
    - Turn the faucet on to its full operating position.
    - Place a container under the faucet and collect water for 10 seconds.
    - Measure the volume of water collected in the container. Convert to gallons if necessary.
    - Multiply the measured volume of water by 6 to calculate the flow rate in gpm [e.g., (0.35 gallons collected x 6) = 2.1 gpm].

Water-Saving Tip: During the guestroom assessment, check for leaky faucets and showerheads. Every fixture that drips at a rate of one drip per second could waste nearly 3,200 gallons per year! Your housekeeping staff should be trained to promptly report leaking fixtures or running toilets to your maintenance staff.

What is the flow rate of the lavatory faucets in guest rooms?

Number Installed	Existing Flow Rate (gpm)[4]

Showerheads

Complete the table below to capture information about showerheads in all of your guest rooms. Consider the following when assessing your showerheads:

- Be sure to account for all showerheads in suite-type rooms with multiple bathrooms.
- The showerhead flow rate in gpm is typically marked on the showerhead. If it is not, the showerhead flow rate can be determined using the same process described for faucets.

[4] The WaterUSE Tool can estimate your faucet flow rates based on the year your hotel was built or last renovated (refer to Worksheet 1: Facility Information or the "Facility Info" tab); however, providing data specific to your hotel will yield more accurate savings estimates and project payback periods.

What is the flow rate for the showerheads installed in guest rooms?

Number Installed	Existing Flow Rate (gpm)[5]

Additional Notes

[5] The WaterUSE Tool can estimate your showerhead flow rates based on the year your hotel was built or last renovated (Refer to Worksheet 1: Facility Information or the "Facility Info" tab); however, providing data specific to your hotel will yield more accurate savings estimates and project payback periods.

Worksheet 4: Public Restrooms

Use the following worksheet to collect the information necessary to complete the WaterUSE Tool's "Public Restrooms" tab. For more information on restroom fixtures, visit Section 3 of *WaterSense at Work*.

Getting Started

To complete the tables in this worksheet, determine the number of full-time (or equivalent) employees you have on staff daily, as well as the estimated average number of "non-overnight" daily visitors you host at your facility. Non-overnight visitors might include visitors to your restaurant(s), conference center, pool, casino, or other hotel functions, as applicable.

WaterUSE Tool Data Inquiry	Facility-Specific Data
How many daily full-time equivalent employees do you have at your hotel?	
On average, how many non-overnight visitors does your hotel host per day?	

You will also need to conduct a full inventory of all of the toilets, faucets, showerheads, and urinals in your public and employee-only restrooms. Fixture types can vary significantly in public and employee-only restrooms throughout your facility, particularly if a renovation has occurred for only some areas of your facility. Be sure to closely examine the fixtures in each of your public restrooms. Don't forget to account for restrooms located near fitness rooms, spas, and pool areas.

Toilets

Complete the table on the next page to capture information about toilets in all of your public and employee-only restrooms. Consider the following when assessing your toilets:

- **Tank-type toilets:** Toilets equipped with a tank that stores and dispenses water to the bowl when flushed.
- **Flushometer-valve toilets:** Toilets attached to a valve activated by a lever or sensor that releases pressurized water to the bowl.

Water-Saving Tip: Stock and use flushometer-valve inserts that have a rated flush volume consistent with the manufacturer specifications for the toilet bowl. You can typically find the flush volume on the box of the flushometer-valve insert and marked somewhere on the toilet fixture. Matching the flush volume on the valve and bowl ensures the best flushing performance.

Flush volumes in gallons per flush (gpf) are typically found on the underside of the tank lid for tank-type fixtures. For flushometer-valve toilets, find the flush volume marked on the toilet fixtures. For dual-flush toilets, which flush at one of two predetermined volumes depending upon the need to flush liquid or solid waste, enter the effective flush volume. If not indicated on the toilet fixture, on your stocked replacement parts, or in product documentation (including the manufacturer's website), assume the effective flush volume of a dual flush toilet = ([2 x low flush volume] + [1 x high flush volume]) / 3].

What type of toilets are installed in public and employee-only areas?

Toilet Type (tank-type or flushometer-valve)	Number Installed	Existing Flush Volume (gpf)[6]

Urinals

Complete the table below to capture information about urinals in all of your public and employee-only men's restrooms. Consider the following when assessing your urinals:

- **Flushing urinals:** Urinals that flush using water to remove waste by washing down or washing out the fixture basin.
- **Non-water urinals:** Urinals that remove liquid waste using a specially designed trap that allows it to drain out of the fixture, through a trap-seal, and into the drainage system without the use of water.

What type of urinals are installed in public and employee-only areas?

Urinal Type (flushing or non-water)	Number Installed	Existing Flush Volume (gpf)[6]

Faucets

Complete the table below to capture information about lavatory faucets in all of your public and employee-only restrooms. Consider the following when assessing your faucets:

- The faucet flow rate in gallons per minute (gpm) is typically found etched into the faucet aerator but can also be visible on the faucet body of some models.
- If the flow rate is not visible on the faucet or faucet aerator, the flow rate can be determined by using this simple procedure:
    - Turn the faucet on to its full operating position.
    - Place a container under the faucet and collect water for 10 seconds.
    - Measure the volume of water collected in the container. Convert to gallons if necessary.
    - Multiply the measured volume of water by 6 to calculate the flow rate in gallons per minute [e.g., (0.35 gallons collected x 6) = 2.1 gpm].

[6] The WaterUSE Tool can estimate your toilet and urinal flush volumes based on the year your hotel was built or last renovated (refer to Worksheet 1: Facility Information or the "Facility Info" tab); however, providing data specific to your hotel will yield more accurate savings estimates and project payback periods.

What is the flow rate of lavatory faucets installed in public and employee-only areas?

Number Installed	Existing Flow Rate (gpm)[7]

Showerheads

Complete the table below to capture information about showerheads in all of your public and employee-only restrooms. Consider the following when assessing your showerheads:

- The showerhead flow rate in gpm is typically marked on the showerhead; however, if the flow rate is not visible, it can be determined using the same process described for faucets.

What is the flow rate of showerheads installed in public and employee-only areas?

Number Installed	Existing Flow Rate (gpm)[7]

Additional Notes

[7] The WaterUSE Tool can estimate your faucet and showerhead flow rates based on the year your hotel was built or last renovated (refer to Worksheet 1: Facility Information and the "Facility Info" tab); however, providing data specific to your hotel will yield more accurate savings estimates and project payback periods.

Worksheet 5: Guest Ice and Laundry

Use the following worksheet to collect the information necessary to complete the WaterUSE Tool's "Guest Ice & Laundry" tab. For more information on ice makers and laundry equipment, visit Section 4.2 and Section 3.6, respectively, of *WaterSense at Work*.

Getting Started

To complete the tables in this worksheet, conduct a full inventory of all of the ice makers and clothes washers provided for guest use on all floors of your hotel. Do not record information about laundry equipment used to wash guestroom linens and towels or ice makers used in commercial kitchens on this worksheet. These equipment types will be covered in Worksheet 6: Linen Laundry and Worksheet 7: Commercial Kitchens.

Ice Makers for Guest Use

In the table below, complete one row for each ice maker provided for guest use. If you have more equipment than rows, be sure to print additional copies of this worksheet before conducting your walk-through. Consider the following when assessing your ice makers:

- **Unit type [ice-making head (IMH), remote condensing unit (RCU), or self-contained unit (SCU)]:** Ice-making head units have an ice maker and condenser in a single package with a separate ice storage bin. In remote condensing units, the ice maker and condenser are separate units. In self-contained units, the ice-making mechanism, condenser unit, and ice storage bin are in an integral cabinet. If you are unsure which type of ice maker you have, you might need to look up the details using the manufacturer or model information collected.
- **Equipment type (batch or continuous):** A batch ice maker alternates freezing and harvest periods. A continuous ice maker continually freezes and harvests ice at the same time. If you are unsure which type of ice maker you have, you might need to look up the details using the manufacturer or model information collected.
- **Cooling type [air-cooled, single-pass water-cooled (SPC), recirculating-water-cooled (RWC)]:** Your ice makers might be air-cooled or water-cooled. Air-cooled models usually have an "A" at the end of the model name. Water-cooled models typically have a "W" at the end of the model name. If water-cooled, note in the table under cooling type if you use single-pass potable water or recirculated process water to cool your ice makers.

Inventory of Ice Makers for Guest Use

Floor	Location ID	Ice Maker Type (IMH, RCU, SCU)	Batch/ Continuous	Cooling Type (air, SPC, RWC)	ENERGY STAR Qualified? (yes or no)	Manufacturer	Model Number

Inventory of Ice Makers for Guest Use

Floor	Location ID	Ice Maker Type (IMH, RCU, SCU)	Batch/ Continuous	Cooling Type (air, SPC, RWC)	ENERGY STAR Qualified? (yes or no)	Manufacturer	Model Number

Summarize information about your ice makers by counting those of the same type and grouping them together in the table below. For example, you will need to know how many ice makers are batch-type remote condensing units that are air-cooled and how many of those are ENERGY STAR qualified. The information summarized in the table below will be used in the WaterUSE Tool.

What type(s) of ice makers does your hotel provide for guest use?

Ice Maker Type (IMH, RCU, SCU)	Batch/ Continuous	Cooling Type (air, SPC, RWC)	Number Installed	Number ENERGY STAR

Clothes Washers for Guest Use

In the table below, complete one row for each clothes washer provided for guest use. If you have more equipment than rows, be sure to print additional copies of this worksheet before conducting your walk-through.

Inventory of Clothes Washers for Guest Use

Floor	Location ID	Equipment Type (top-loading or front-loading)	ENERGY STAR Qualified? (yes or no)	Average Weekly Loads per Machine[8]	Manufacturer	Model Number

[8] Estimate the average number of loads that are run in each machine per week. You can do so by estimating the total number of loads that all guests on the floor wash per week and dividing that by the number of machines offered on the floor. If you are unsure, the WaterUSE Tool will provide you with a default of 24 loads per machine per week.

Inventory of Clothes Washers for Guest Use

Floor	Location ID	Equipment Type (top-loading or front-loading)	ENERGY STAR Qualified? (yes or no)	Average Weekly Loads per Machine[8]	Manufacturer	Model Number

Summarize information about your clothes washers by counting those of the same type and grouping them together in the table below. For example, you will need to indicate how many top-loading clothes washers wash approximately the same number of loads per week and how many of those are ENERGY STAR qualified. The information summarized in the table below will be used in the WaterUSE Tool.

What type of clothes washers are currently installed for guest use?

Equipment Type (top-loading or front-loading)	Number Installed	Number ENERGY STAR	Average Weekly Loads per Machine

Additional Notes

Worksheet 6: Linen Laundry

Use the following worksheet to collect the information necessary to complete the WaterUSE Tool's "Linen Laundry" tab. For more information on laundry equipment, visit Section 3.6 of *WaterSense at Work*.

Getting Started

To begin this worksheet, estimate the number of pounds of linen laundry and towels washed per day.

WaterUSE Tool Data Inquiry	Facility-Specific Data
How many pounds of laundry are washed per day, on average?[9]	

Complete the table below to capture information about your linen laundry equipment. Consider the following when assessing your clothes washers:

- **Multi-load washer:** Top- or front-loading machines with programmable controls for varying volumes and cycles.
- **Washer extractor:** Large-capacity washers with horizontal, front-loading configurations that remove water and detergent using centrifugal-force spin cycles.
- **Tunnel washer:** Large-volume, continuous-batch washers with long chambers and a series of compartments through which laundry is pulled for soaking, washing, and rinsing.
- **Water recycling system:** Washing systems that recycle some or all of the water used in cycles from previous loads for the next load.
- **Ozone system:** A system that injects ozone into the wash as a powerful oxidant that reacts with dirt and soil to disinfect and whiten laundry.

What type of laundry equipment does your hotel use?

Laundry Equipment Type (multi-load washer, washer extractor, tunnel washer)	Capacity (lbs.)	Water Recycling System? (yes or no)	Ozone System? (yes or no)	Number Installed

[9] The WaterUSE Tool can estimate the amount of linen laundry washed per day; however, providing data specific to your hotel will yield more accurate savings estimates. The WaterUSE Tool estimates the amount of daily laundry by multiplying the number of occupied rooms per day by an assumed linen weight of 10 pounds per room per day (this weight per room can be altered based on your facility). If your hotel has a linen reuse program, the total weight is then reduced by 17 percent, based on savings estimates from the American Hotel & Lodging Association.

Additional Notes

Worksheet 7: Commercial Kitchens

Use the following worksheet to collect the information necessary to complete the WaterUSE Tool's "Commercial Kitchens" tab. For more information on commercial kitchen equipment, visit Section 4 of *WaterSense at Work*.

Getting Started

To begin this worksheet, record the average number of days per year and average number of hours per day your commercial kitchen(s), restaurant(s), bar(s), and banquet hall(s) operate.

WaterUSE Tool Data Inquiry	Facility-Specific Data
What is the number of operating days per year for your restaurant/commercial kitchen?[10]	
How many hours does your kitchen operate daily, on average?[10]	

To complete the tables in this worksheet, conduct a full inventory of all of the water-using equipment located in your commercial kitchen(s), restaurant(s), bar(s), or banquet hall(s). This includes ice makers, steam cookers (e.g., food steamers), combination ovens, steam kettles, dipper wells, and garbage disposals. Do not record information about your dishwashing equipment (e.g., commercial dishwashers, commercial pre-rinse spray valves) on this worksheet. This equipment will be covered in Worksheet 8: Dishwashing.

Ice Makers in Commercial Kitchens

In the table below, complete one row for each ice maker used in your food service areas. If you have more equipment than rows, be sure to print additional copies of this worksheet before conducting your walk-through. Consider the following when assessing your ice makers:

- **Unit type [ice-making head (IMH), remote condensing unit (RCU), or self-contained unit (SCU)]:** Ice-making head units have an ice maker and condenser in a single package with a separate ice storage bin. In remote condensing units, the ice maker and condenser are separate units. In self-contained units, the ice-making mechanism, condenser unit, and ice storage bin are in an integral cabinet. If you are unsure which type of ice maker you have, you might need to look up the details using the manufacturer or model information collected.
- **Equipment type (batch or continuous):** A batch ice maker alternates freezing and harvest periods. A continuous ice maker continually freezes and harvests ice at the same time. If you are unsure which type of ice maker you have, you might need to look up the details using the manufacturer or model information collected.
- **Cooling type [air-cooled, single-pass water-cooled (SPC), recirculating-water cooled (RWC)]:** Your ice makers might be air-cooled or water-cooled. Air-cooled models usually have an "A" at the end of

[10] The WaterUSE Tool can provide an industry average for the number of operating days per year (365) and the hours per day (12) that your commercial kitchens operate; however, providing data specific to your hotel will yield more accurate savings estimates and project payback periods.

the model name. Water-cooled models typically have a "W" at the end of the model name. If water-cooled, note in the table under cooling type if you use single-pass potable water or recirculated process water to cool your ice makers.

Inventory of Ice Makers in Your Commercial Kitchen/Restaurant

Location ID	Ice Maker Type (IMH, RCU, SCU)	Batch/Continuous	Cooling Type (air, SPC, RWC)	ENERGY STAR Qualified? (yes/no)	Manufacturer	Model Number

Summarize information about your ice makers by counting those of the same type and grouping them together in the table below. For example, you will need to know how many ice makers are batch-type remote condensing units that are air-cooled and how many of those are ENERGY STAR qualified. The information summarized in the table below will be used in the WaterUSE Tool.

What type(s) of ice makers does your hotel use in your hotel commercial kitchen/restaurant?

Ice Maker Type (IMH, RCU, SCU)	Batch/Continuous	Cooling Type (air, SPC, RWC)	Number Installed	Number ENERGY STAR

Steam Cookers

In the table below, complete one row for each steam cooker (e.g., food steamer) used in your food service areas. If you have more equipment than rows, be sure to print additional copies of this worksheet before conducting your walk-through. Consider the following when assessing your steam cookers:

- **Equipment type (boiler-based or connectionless):** Boiler-based steam cookers are connected to a central facility boiler system. Connectionless steam cookers are typically filled with water each day or as needed and generate their own steam.

Inventory of Steam Cookers (Food Steamers)

Location ID	Equipment Type (boiler-based unit or connectionless unit)	ENERGY STAR Qualified? (yes or no)	Daily Use (hours)[11]	Manufacturer	Model Number

Summarize information about your steam cookers by counting those of the same type and usage and grouping them together in the table below. For example, you will need to know how many steam cookers are connectionless and how many of those are ENERGY STAR qualified. The information summarized in the table below will be used in the WaterUSE Tool.

What type of steam cookers (food steamers) are installed in your hotel commercial kitchen/restaurant?

Equipment Type (boiler-based unit or connectionless unit)	Number Installed	Number ENERGY STAR	Daily Use (hours)

Combination Ovens

In the table below, complete one row for each combination oven used in your food service areas. If you have more equipment than rows, be sure to print additional copies of this worksheet before conducting your walk-through. Consider the following when assessing your combination ovens:

- **Equipment type (boiler-based or connectionless):** Boiler-based combination ovens are connected to a central facility boiler system. Connectionless combination ovens are typically filled with water each day or as needed and generate their own steam.

Inventory of Combination Ovens

Location ID	Equipment Type (boiler-based unit or connectionless unit)	Daily Use (hours)[11]	Manufacturer	Model Number

[11] Estimate the average number of hours your steam cookers and combination ovens are operated daily. If you are unsure, the WaterUSE Tool will provide you with a default number of hours based on your kitchen operating hours.

Inventory of Combination Ovens

Location ID	Equipment Type (boiler-based unit or connectionless unit)	Daily Use (hours)[11]	Manufacturer	Model Number

Summarize information about your combination ovens by counting those of the same type and usage and grouping them together in the table on the next page. For example, you will need to know how many combination ovens are connectionless and used for six hours per day. The information summarized in the table below will be used in the WaterUSE Tool.

What type of combination ovens are installed in your hotel commercial kitchen/restaurant?

Equipment Type (boiler-based unit or connectionless unit)	Number Installed	Daily Use (hours)

Steam Kettles

In the table below, complete one row for each steam kettle used in your food service areas. If you have more equipment than rows, be sure to print additional copies of this worksheet before conducting your walk-through. Consider the following when assessing your steam kettles:

- **Equipment type (boiler-based or self-contained unit):** Boiler-based steam kettles are connected to a central facility boiler system. Self-contained units are typically filled with water each day or as needed and generate their own steam.
- **Condensate return system:** This system directs condensate from the steam kettle back into the central boiler system for reuse.

Inventory of Steam Kettles

Location ID	Equipment Type (boiler-based unit or self-contained unit)	Condensate Return System Installed? (yes or no)	Daily Use (hours)[12]	Manufacturer	Model Numbers

[12] Estimate the average number of hours your steam kettles are operated daily. If you are unsure, the WaterUSE Tool will provide you with a default number of hours based on your kitchen operating hours.

Inventory of Steam Kettles

Location ID	Equipment Type (boiler-based unit or self-contained unit)	Condensate Return System Installed? (yes or no)	Daily Use (hours)[12]	Manufacturer	Model Numbers

Summarize information about your steam kettles by counting those of the same type and usage and grouping them together in the table below. For example, you'll need to know how many steam kettles are boiler-based and have a condensate return system. The information summarized in the table below will be used in the WaterUSE Tool.

What type of steam kettles are installed in your hotel commercial kitchen/restaurant?

Equipment Type (boiler-based unit or self-contained unit)	Number Installed	Condensate Return System Installed? (yes or no)	Daily Use (hours)

Dipper Wells

In the table below, complete one row for each dipper well used in your food service areas. A dipper well is a spigot and valve that flows water into a receiving well, typically used to rinse utensils between uses. If you have more equipment than rows, be sure to print additional copies of this worksheet before conducting your walk-through.

If the flow rate is not marked visibly on the dipper well body, it can be determined by using this simple procedure:

- Turn the dipper well on to its full operating position.
- Place a container under the dipper well and collect water for 10 seconds.
- Measure the quantity of water collected in the container. Convert to gallons if necessary.
- Multiply the measured quantity of water by 6 to calculate the flow rate in gallons per minute [e.g., (0.35 gallons collected x 6) = 2.1 gpm].

Inventory of Dipper Wells

Location ID	Flow Rate [(gallons per minute (gpm)]	Daily Use (hours)[13]

Summarize information about your dipper wells by counting those of the same flow rate and daily usage and grouping them together in the table below. For example, you will need to know how many dipper wells flow at 1.0 gallon per minute (gpm) and are used for 12 hours per day. The information summarized in the table below will be used in the WaterUSE Tool.

What is the flow rate of any dipper wells installed?

Number Installed	Flow Rate (gpm)	Daily Use (hours)

Food Disposals

In the table below, complete one row for each food disposal used in your food service areas. If you have more equipment than rows, be sure to print additional copies of this worksheet before conducting your walk-through. During your walk-through, note if your food disposal has a sensor to regular water flow. Consider the following when assessing your food disposals:

- **Food grinder:** Grinders process food waste into pieces small enough to pass through the plumbing system. They do not use water in and of themselves. However, kitchen staff often unnecessarily run water at high flow rates to prevent damage to the grinder blades and to keep food waste from building up in the plumbing system.
- **Food pulper:** Pulpers crush food waste into pulp for solid waste disposal. They extract excess water from the pulp and send it to the drain, collect it for use for pre-rinsing dishes, or use it in the sluice trough. A sluice trough is a channel that passes water through to remove food waste.

[13] Estimate the average number of hours your dipper wells are operated daily. If you are unsure, the WaterUSE Tool will provide you with a default number of hours based on your kitchen operating hours.

- **Food strainer:** Strainers collect food waste in a strainer basket in the bottom of the sink as it is rinsed from dirty dishes. The food waste that is collected in the basket is then put in the garbage or composted.

Inventory of Food Disposals

Location ID	Equipment Type (food grinder, food pulper, food strainer)	Sluice Trough Water Flow Rate (gpm)[14] (for food grinders only)	Total Daily Use (hours)[15] (for food grinders only)	Daily Sluice Trough Idling Hours[16] (for food grinders only)

Summarize information about your food disposals by counting those of the same flow rate and daily usage and grouping them together in the table below. For example, you will need to know how many food grinders have a water flow of 2.0 gpm and are used for 12 hours per day, nine of which the grinder is idle. The information summarized in the table below will be used in the WaterUSE Tool.

What type of food disposal is used in your hotel commercial kitchen/restaurant?

Equipment Type (food grinder, food pulper, food strainer)	Number Installed	Sluice Trough Water Flow Rate (gpm)	Total Daily Use (hours)	Daily Sluice Trough Idling Hours

Additional Notes

[14] Determine the flow rate of water running through your sluice trough. If you are unable to determine it, the WaterUSE Tool estimates a flow rate of 2.0 gpm for food grinders.
[15] Estimate the average number of hours your food disposals are operated daily. If you are unsure, the WaterUSE Tool will provide you with a default number of hours based on your kitchen operating hours.
[16] Estimate the average number of hours your food disposals are idle (e.g., disposal is on, but food is not being processed) daily. If you are unsure, the WaterUSE Tool will provide you with a default number of hours based on your kitchen operating hours.

Worksheet 8: Dishwashing

Use the following worksheet to collect the information necessary to complete the WaterUSE Tool's "Dishwashing" tab. For more information on commercial dishwashers, visit Section 4.10 of *WaterSense at Work*.

Getting Started

To begin this worksheet, record the average number of days per year your commercial kitchen(s), restaurant(s), bar(s), or banquet hall(s) operate.

WaterUSE Tool Data Inquiry	Facility-Specific Data
What is the number of operating days per year for your dishwashing equipment?[17]	

To complete the tables in this worksheet, conduct a full inventory of all of the dishwashing equipment (e.g., commercial dishwashers and commercial pre-rinse spray valves) located in your commercial kitchen(s), restaurant(s), bar(s), and banquet hall(s).

Commercial Dishwashers

In the table below, complete one row for each commercial dishwasher used in your food service areas. If you have more equipment than rows, be sure to print additional copies of this worksheet before conducting your walk-through. Consider the following when assessing your dishwashers:

- **Undercounter:** A stationary rack machine with an overall height of 38 inches or less, designed to be installed under food preparation workspaces.
- **Stationary single-tank door:** A stationary rack machine designed to accept a standard 20-inch-by-20-inch dish rack, which requires raising a door to place the rack into the wash/rinse chamber. Closing the door typically initiates the wash cycle.

Water-Saving Tip: Only run fully loaded dish racks through the dishwasher. Reducing the number of wash cycles you run saves you water, energy, and money.

- **Single-tank conveyor:** A conveyor machine that includes a tank for wash water followed by a sanitizing rinse (e.g., pumped or fresh water). This type of machine does not have a pumped rinse tank. This type of machine might include a pre-washing section ahead of the washing section and an auxiliary rinse section, for purposes of reusing the sanitizing rinse water, between the power rinse and sanitizing rinse sections.
- **Multiple-tank conveyor:** A conveyor-type machine that includes one or more tanks for wash water and one or more tanks for pumped rinse water, followed by a sanitizing rinse. This type of machine might include a pre-washing section before the washing section and an auxiliary rinse section, for purposes of reusing the sanitizing rinse water, between the power rinse and sanitizing rinse section.

[17] The WaterUSE Tool will use the number of days the hotel operates if you do not have a specific number of days your commercial kitchens operate.

- **Pot, pan, and utensil:** A stationary-rack, door-type machine designed to clean and sanitize pots, pans, and kitchen utensils.

Dishwashers are also classified as high-temperature or low-temperature:

- **High-temperature dishwasher:** Applies hot water to the surfaces of dishes to achieve sanitation. Additional heat is produced by an internal or external booster heater.
- **Low-temperature dishwasher:** Applies a chemical sanitizing solution to the surfaces of dishes to achieve sanitation.

Inventory of Commercial Dishwashing Equipment

Location ID	Temperature (low or high)	Dishwashing Equipment Type (see options above)	Manufacturer	Model Number	ENERGY STAR Qualified? (yes or no)	Number of Racks Washed per Day[18]

Summarize information about your dishwashers by counting those of the same type and grouping them together in the table below. For example, you will need to know how many dishwashers are low-temperature, stationary single-tank door models, and how many of those are ENERGY STAR qualified. The information summarized in the table below will be used in the WaterUSE Tool.

What type of commercial dishwashing equipment does your hotel use?

Temperature (low or high)	Dishwashing Equipment Type (see options above)	Number Installed	Number ENERGY STAR	Number of Racks Washed per Day

[18] Estimate the average number of racks run per day per dishwasher. You might be able to do so by talking with your dishwashing staff or kitchen manager. If you are unsure, the WaterUSE Tool will provide you with a default number of racks per day based on the equipment type.

Commercial Pre-Rinse Spray Valves

In the table below, complete one row for each pre-rinse spray valve used in your food service areas. If you have more equipment than rows, be sure to print additional copies of this worksheet before conducting your walk-through. Consider the following when assessing your pre-rinse spray valves:

- The pre-rinse spray valve flow rate in gallons per minute (gpm) is most commonly found labeled on the spray valve body or face.
- If the pre-rinse spray valve is not labeled, the flow rate can also be determined by using this simple procedure:
    - Turn the pre-rinse spray valve on to its full operating position.
    - Place a container under the pre-rinse spray valve and collect water for 10 seconds.
    - Measure the quantity of water collected in the container. Convert to gallons if necessary.
    - Multiply the measured quantity of water by 6 to calculate the flow rate in gpm [e.g., (0.25 gallons collected x 6) = 1.5 gpm].

Inventory of Pre-rinse Spray Valves

Location ID	Existing Flow Rate (gpm)[19]	Average Daily Use (minutes)[20]

Summarize how many pre-rinse spray valves have the same flow rate and usage rate. The information summarized in the table below will be used in the WaterUSE Tool.

[19] The WaterUSE Tool can estimate your pre-rinse spray valve flow rate based on the year your hotel was built or last renovated (refer to Worksheet 1: Facility Information or the "Facility Info" tab); however, providing data specific to your hotel will yield more accurate savings estimates and project payback periods.
[20] Estimate the average number of minutes your pre-rinse spray valve is used daily. If you aren't sure, the WaterUSE Tool will provide you with a default number of minutes (64) based on standard industry data.

What is the flow rate of any pre-rinse spray valves used in your hotel commercial kitchen/restaurant?

Number Installed	Existing Flow Rate (gpm)	Average Daily Use (minutes)

Additional Notes

Worksheet 9: Heating, Ventilation, and Air Conditioning (HVAC) and Mechanical

Use the following worksheet to collect the information necessary to complete the WaterUSE Tool's "HVAC & Mechanical" tab. For more information on mechanical systems, visit Section 6 of *WaterSense at Work*.

Getting Started

To complete the tables in this worksheet, conduct a full inventory of all of the cooling towers, steam boilers, and equipment cooled with single-pass potable water in your hotel.

Cooling Towers

Cooling towers evaporate water to remove heat from the system. Water is also discharged (i.e., blown down) to prevent mineral buildup and scaling in the tower. Make-up water is provided to replace water that is lost in the system.

Water-Saving Tip: Using drift eliminators on your cooling tower helps reduce water losses from "drift" and splashing to negligible amounts.

Many facilities use chemicals or other water treatment to control mineral buildup and scaling in cooling towers. A maintenance and/or water chemistry vendor is used to provide chemicals and monitor the equipment to ensure it is operating correctly. Water chemistry reports, which are typically provided during or shortly after the vendor's periodic visits, might include the cycles of concentration of your cooling tower(s), as well as the total dissolved solids (TDS) or conductivity of your make-up and blowdown water. Cycles of concentration is a parameter commonly used to evaluate cooling tower operation efficiency.

Complete the table below to capture information about your hotel's cooling tower system.

Cooling Tower Water Use Assessment

WaterUSE Tool Data Inquiry	Facility-Specific Data
What is the capacity of your cooling tower(s), expressed as total tons of cooling?[21]	
Does your hotel meter make-up water that is added to the cooling tower system? (yes or no)	
If so, how many gallons of make-up water are added to the cooling tower(s) annually?	
Does your hotel meter water that is discharged (blown down) from the cooling tower? (yes or no)	

[21] If your hotel has multiple cooling towers servicing your building, add the tonnage ratings together to get the total tonnage of cooling provided to your building.

Cooling Tower Water Use Assessment

WaterUSE Tool Data Inquiry	Facility-Specific Data
If so, how many gallons of water are discharged from the cooling tower(s) annually?	
How is your cooling tower discharge (blowdown) controlled? (circle one)	Manually not based on conductivity Manually based on conductivity Timer-based control Automatic control based on conductivity
Do you know your cycles of concentration? (yes or no)	
What is your existing cooling tower cycles of concentration?	
Is cooling tower water treatment used to control scale build-up? (yes or no)	
If so, what is the total dissolved solids (TDS) or conductivity of the make-up water?	
If so, what is the TDS or conductivity of the discharge (blowdown) water?	

Single-Pass Cooling

Determine if any of your hotel's equipment uses single-pass cooling water. Types of equipment that might use single-pass cooling include point-of-use chillers, refrigeration systems, air conditioners, and air compressors. Do not include ice makers that use single-pass cooling in this section as they are covered in other areas of the tool.

Complete the table below to capture information about equipment cooled with single-pass cooling water. If the flow rate of cooling water through the equipment is unknown, the flow rate can be determined using this simple procedure:

Water Saving Tip: If replacing single-pass-cooled equipment with air-cooled models is not possible or economically viable, consider installing a solenoid valve that supplies cooling water only when needed.

- Locate the floor drain where the cooling water is discharging.
- Place a container under the cooling water stream and collect water for 10 seconds.
- Measure the quantity of water collected in the container. Convert to gallons if necessary.

- Multiply the measured quantity of water by 6 to calculate the flow rate in gallons per minute (gpm) [e.g., (0.25 gallons collected x 6) = 1.5 gpm].

Single-Pass Cooling Water Use Assessment

Location ID	Equipment Cooled	Flow Rate (gpm)	Operating Schedule[22]			
			Minutes/Hour	Hours/Day	Days/Week	Weeks/Year

Steam Boilers

Complete the table below to capture information about your hotel's steam boilers.

Steam Boiler Water Use Assessment

WaterUSE Tool Data Input	Facility-Specific Data
Does your hotel meter the make-up water that is added to the steam boiler system? (yes or no)	
If so, how many gallons of make-up water are added to the boiler system annually?	
Does your steam boiler(s) have a condensate recovery system? (yes or no)	
Does your steam boiler(s) have a conductivity controller to control blow-down? (yes or no)	

Additional Notes

[22] If the operating schedule of the single-pass cooling is unknown, the WaterUSE Tool will assume the equipment operates 24 hours per day, seven days per week, 52 weeks per year.

Worksheet 10: Irrigation

Use the following worksheet to collect the information necessary to complete the WaterUSE Tool's "Irrigation" tab. For more information on landscaping and irrigation, visit Section 5.2 and Section 5.3, respectively, of *WaterSense at Work*.

Getting Started

Complete the table below to capture information about your irrigation water use. Consider the following when assessing your irrigation controller(s):

- **Manually activated irrigation system:** Requires the user to begin and end watering cycles by physically turning it on and off.
- **Timer-based irrigation controller:** Equipped with a clock that waters landscape using a pre-determined schedule.
- **Timer-based irrigation controller with a rain sensor:** Equipped with a clock that waters landscape using a pre-determined schedule and includes a rain sensor stops irrigation from occurring during a rain event.
- **Weather-based irrigation controller:** Uses local weather conditions to adjust irrigation watering schedules to account for actual needs of your landscape.
- **Soil moisture-based irrigation controller:** Controls whether the irrigation system operates by measuring the amount of moisture in the soil and tailoring irrigation schedules accordingly.

Water-Saving Tip: Check the performance of your irrigation system by confirming that all sprinkler heads are functioning properly. Make sure that sprinkler heads aren't watering walkways, roads, fences, or other non-landscaped areas.

If you have more than one type of irrigation controller (e.g., a weather-based irrigation controller and a soil moisture-based irrigation controller), indicate the type of irrigation controller that controls irrigation for a majority of your landscape (i.e., is programmed to irrigate the most zones).

Irrigation Water Use Assessment

WaterUSE Tool Data Input	Facility-Specific Data
Is your irrigation water use separately metered? (yes or no)	
If so, based on meter readings, how many gallons of water are used annually for irrigation?	
How much landscape is irrigated at your hotel (square feet)?	

Irrigation Water Use Assessment

WaterUSE Tool Data Input	Facility-Specific Data
What type of irrigation controller is used to control irrigation for a majority of your landscape? (circle one)	Manually activated Timer-based irrigation controller Timer-based irrigation controller with a rain sensor Weather-based irrigation controller Soil moisture-based irrigation controller

Additional Notes

Worksheet 11: Pools and Spas

Use the following worksheet to collect the information necessary to complete the WaterUSE Tool's "Pools & Spas" tab. For more information on commercial pools and spa equipment, visit Section 5.4 of *WaterSense at Work*.

Getting Started

Complete the table below to capture information about your hotel's pool and spa water use. If you have multiple pools or spas, add the values together to get the total surface area and volume. Consider the following when assessing your pool or spa filtration system(s):

- **Sand filter:** Uses sand, zeolite, or crushed recycled glass as the filter media. As pool or spa water passes through the media, particulates are removed. Sand filters can use a significant amount of water for backwashing, which is the process to regularly clean and flush trapped particulates out of the system to restore the filter's cleaning capacity.
- **Sorptive media filter:** Uses diatomaceous earth (DE), cellulose, or perlite as the filter media. Sorptive media filters use less water for backwashing, but the media must be replenished after each backwash, as it is purged from the filter grid along with the debris.
- **Cartridge unit:** Uses pleated filters made from paper-type material that can be reused or disposed. Since these filters do not need to be backwashed, they are the most water-efficient type available for all but the largest pools.
- **Industrial or pre-coat filter:** Uses a specific type of sorptive media filter that can be recycled up to 30 times before the media is discarded and replaced. Industrial filters recycle the water used to backwash the filter. These types of filters are only used for the largest commercial pools.

Pool and Spa Water Use Assessment

	Pool	Spa
What is the square footage of the surface?		
What is the volume in gallons?		
How many days per year is it operating?		
Is a cover used when not in use?		
What type of filtration system is installed? (circle one)	Sand filter Sorptive media filter Cartridge unit Industrial or pre-coat filter	Sand filter Sorptive media filter Cartridge unit

Additional Notes