2015 URBAN WATER MANAGEMENT PLAN

for the City and County of San Francisco

APPENDICES

Prepared by: The San Francisco Public Utilities Commission
June 2016

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

APPENDICES

APPENDIX A

California Urban Water Management Planning Act of 1983 (Last amended: 2015)

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CALIFORNIA WATER CODE DIVISION 6
PART 2.6. URBAN WATER MANAGEMENT PLANNING [10610 - 10656]

All codes have been updated to include the 2015 Statutes, effective January 1, 2016.

CHAPTER 1. General Declaration and Policy [10610 - 10610.4]

10610.
This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2.
(a) The Legislature finds and declares all of the following:
(1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.
(2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.
(3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.
(4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.
(5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.
(6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.
(7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.
(8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.
(9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.
(b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

10610.4.
The Legislature finds and declares that it is the policy of the state as follows:
(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.
(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.
(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

CHAPTER 2. Definitions [10611 - 10617]

10611.
Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5.
"Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612.
"Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613.
“Efficient use” means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614.
“Person” means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615.
“Plan” means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area’s characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616.
“Public agency” means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10616.5.
‛Recycled water” means the reclamation and reuse of wastewater for beneficial use.

10617.
“Urban water supplier” means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

CHAPTER 3. Urban Water Management Plans [10620 - 10645]

ARTICLE 1. General Provisions [10620 - 10621]

10620.
(a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).
(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.
(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.
(d) (1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.
(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.
(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.
(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

10621.
(a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero, except as provided in subdivisions (d) and (e).
(b) Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days before the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.
(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).
(d) Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.
(e) Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.

ARTICLE 2. Contents of Plans [10630 - 10634]

10630.
It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631.
A plan shall be adopted in accordance with this chapter that shall do all of the following:
(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier’s water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.
(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:
(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.
(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For basins that a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.
(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.
(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.
(c) (1) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:
(A) An average water year.
(B) A single-dry water year.
(C) Multiple-dry water years.
(2) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.
(e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses:
(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.
(J) Distribution system water loss.
(2) The water use projections shall be in the same five-year increments described in subdivision (a).
(3) (A) For the 2015 urban water management plan update, the distribution system water loss shall be quantified for the most recent 12-month period available. For all subsequent updates, the distribution system water loss shall be quantified for each of the five years preceding the plan update.
(B) The distribution system water loss quantification shall be reported in accordance with a worksheet approved or developed by the department through a public process. The water loss quantification worksheet shall be based on the water system balance methodology developed by the American Water Works Association.
(4) (A) If available and applicable to an urban water supplier, water use projections may display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans identified by the urban water supplier, as applicable to the service area.
(B) To the extent that an urban water supplier reports the information described in subparagraph (A), an urban water supplier shall do both of the following:
(i) Provide citations of the various codes, standards, ordinances, or transportation and land use plans utilized in making the projections.
(ii) Indicate the extent that the water use projections consider savings from codes, standards, ordinances, or transportation and land use plans. Water use projections that do not account for these water savings shall be noted of that fact.
(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:
(1) (A) For an urban retail water supplier, as defined in Section 10608.12, a narrative description that addresses the nature and extent of each water demand management measure implemented over the past five years. The narrative shall describe the water demand management measures that the supplier plans to implement to achieve its water use targets pursuant to Section 10608.20.
(B) The narrative pursuant to this paragraph shall include descriptions of the following water demand management measures:
(i) Water waste prevention ordinances.
(ii) Metering.
(iii) Conservation pricing.
(iv) Public education and outreach.
(v) Programs to assess and manage distribution system real loss.
(vi) Water conservation program coordination and staffing support.
(vii) Other demand management measures that have a significant impact on water use as measured in gallons per capita per day, including innovative measures, if implemented.
(2) For an urban wholesale water supplier, as defined in Section 10608.12, a narrative description of the items in clauses (ii), (iv), (vi), and (vii) of subparagraph (B) of paragraph (1), and a narrative description of its distribution system asset management and wholesale supplier assistance programs.
(g) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use, as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The

description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.
(h) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.
(i) For purposes of this part, urban water suppliers that are members of the California Urban Water Conservation Council shall be deemed in compliance with the requirements of subdivision (f) by complying with all the provisions of the “Memorandum of Understanding Regarding Urban Water Conservation in California,” dated December 10, 2008, as it may be amended, and by submitting the annual reports required by Section 6.2 of that memorandum.
(j) An urban water supplier that relies upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier’s plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).

10631.1.
(a) The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.
(b) It is the intent of the Legislature that the identification of projected water use for single-family and multifamily residential housing for lower income households will assist a supplier in complying with the requirement under Section 65589.7 of the Government Code to grant a priority for the provision of service to housing units affordable to lower income households.

10631.2.
(a) In addition to the requirements of Section 10631, an urban water management plan may, but is not required to, include any of the following information:
(1) An estimate of the amount of energy used to extract or divert water supplies.
(2) An estimate of the amount of energy used to convey water supplies to the water treatment plants or distribution systems.
(3) An estimate of the amount of energy used to treat water supplies.
(4) An estimate of the amount of energy used to distribute water supplies through its distribution systems.
(5) An estimate of the amount of energy used for treated water supplies in comparison to the amount used for nontreated water supplies.
(6) An estimate of the amount of energy used to place water into or withdraw from storage.
(7) Any other energy-related information the urban water supplier deems appropriate.
(b) The department shall include in its guidance for the preparation of urban water management plans a methodology for the voluntary calculation or estimation of the energy intensity of urban water systems. The department may consider studies and calculations conducted by the Public Utilities Commission in developing the methodology.

10631.5.
(a) (1) Beginning January 1, 2009, the terms of, and eligibility for, a water management grant or loan made to an urban water supplier and awarded or administered by the department, state board, or California Bay-Delta Authority or its successor agency shall be conditioned on the implementation of the water demand management measures described in Section 10631, as determined by the department pursuant to subdivision (b).
(2) For the purposes of this section, water management grants and loans include funding for programs and projects for surface water or groundwater storage, recycling, desalination, water conservation, water

supply reliability, and water supply augmentation. This section does not apply to water management projects funded by the federal American Recovery and Reinvestment Act of 2009 (Public Law 111-5).

(3) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if the urban water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for implementation of the water demand management measures. The supplier may request grant or loan funds to implement the water demand management measures to the extent the request is consistent with the eligibility requirements applicable to the water management funds.

(4) (A) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if an urban water supplier submits to the department for approval documentation demonstrating that a water demand management measure is not locally cost effective. If the department determines that the documentation submitted by the urban water supplier fails to demonstrate that a water demand management measure is not locally cost effective, the department shall notify the urban water supplier and the agency administering the grant or loan program within 120 days that the documentation does not satisfy the requirements for an exemption, and include in that notification a detailed statement to support the determination.

(B) For purposes of this paragraph, “not locally cost effective” means that the present value of the local benefits of implementing a water demand management measure is less than the present value of the local costs of implementing that measure.

(b) (1) The department, in consultation with the state board and the California Bay-Delta Authority or its successor agency, and after soliciting public comment regarding eligibility requirements, shall develop eligibility requirements to implement the requirement of paragraph (1) of subdivision (a). In establishing these eligibility requirements, the department shall do both of the following:

(A) Consider the conservation measures described in the Memorandum of Understanding Regarding Urban Water Conservation in California, and alternative conservation approaches that provide equal or greater water savings.

(B) Recognize the different legal, technical, fiscal, and practical roles and responsibilities of wholesale water suppliers and retail water suppliers.

(2) (A) For the purposes of this section, the department shall determine whether an urban water supplier is implementing all of the water demand management measures described in Section 10631 based on either, or a combination, of the following:

(i) Compliance on an individual basis.

(ii) Compliance on a regional basis. Regional compliance shall require participation in a regional conservation program consisting of two or more urban water suppliers that achieves the level of conservation or water efficiency savings equivalent to the amount of conservation or savings achieved if each of the participating urban water suppliers implemented the water demand management measures. The urban water supplier administering the regional program shall provide participating urban water suppliers and the department with data to demonstrate that the regional program is consistent with this clause. The department shall review the data to determine whether the urban water suppliers in the regional program are meeting the eligibility requirements.

(B) The department may require additional information for any determination pursuant to this section.

(3) The department shall not deny eligibility to an urban water supplier in compliance with the requirements of this section that is participating in a multiagency water project, or an integrated regional water management plan, developed pursuant to Section 75026 of the Public Resources Code, solely on the basis that one or more of the agencies participating in the project or plan is not implementing all of the water demand management measures described in Section 10631.

(c) In establishing guidelines pursuant to the specific funding authorization for any water management grant or loan program subject to this section, the agency administering the grant or loan program shall include in the guidelines the eligibility requirements developed by the department pursuant to subdivision (b).

(d) Upon receipt of a water management grant or loan application by an agency administering a grant and loan program subject to this section, the agency shall request an eligibility determination from the department with respect to the requirements of this section. The department shall respond to the request within 60 days of the request.

(e) The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities. In addition, for urban water suppliers that are signatories to the Memorandum of Understanding Regarding Urban Water Conservation in California and submit biennial reports to the California Urban Water Conservation Council in accordance with the memorandum, the department may use these reports to assist in tracking the implementation of water demand management measures.
(f) This section shall remain in effect only until July 1, 2016, and as of that date is repealed, unless a later enacted statute, that is enacted before July 1, 2016, deletes or extends that date.

10631.7.
The department, in consultation with the California Urban Water Conservation Council, shall convene an independent technical panel to provide information and recommendations to the department and the Legislature on new demand management measures, technologies, and approaches. The panel shall consist of no more than seven members, who shall be selected by the department to reflect a balanced representation of experts. The panel shall have at least one, but no more than two, representatives from each of the following: retail water suppliers, environmental organizations, the business community, wholesale water suppliers, and academia. The panel shall be convened by January 1, 2009, and shall report to the Legislature no later than January 1, 2010, and every five years thereafter. The department shall review the panel report and include in the final report to the Legislature the department’s recommendations and comments regarding the panel process and the panel’s recommendations.

10632.
(a) The plan shall provide an urban water shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier:
(1) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions that are applicable to each stage.
(2) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency’s water supply.
(3) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.
(4) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.
(5) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.
(6) Penalties or charges for excessive use, where applicable.
(7) An analysis of the impacts of each of the actions and conditions described in paragraphs (1) to (6), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.
(8) A draft water shortage contingency resolution or ordinance.
(9) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.
(b) Commencing with the urban water management plan update due July 1, 2016, for purposes of developing the water shortage contingency analysis pursuant to subdivision (a), the urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.

10632.5.
(a) In addition to the requirements of paragraph (3) of subdivision (a) of Section 10632, beginning January 1, 2020, the plan shall include a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities.

(b) An urban water supplier shall update the seismic risk assessment and mitigation plan when updating its urban water management plan as required by Section 10621.
(c) An urban water supplier may comply with this section by submitting, pursuant to Section 10644, a copy of the most recent adopted local hazard mitigation plan or multihazard mitigation plan under the federal Disaster Mitigation Act of 2000 (Public Law 106-390) if the local hazard mitigation plan or multihazard mitigation plan addresses seismic risk.

10633.
The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier’s service area, and shall include all of the following:
(a) A description of the wastewater collection and treatment systems in the supplier’s service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.
(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.
(c) A description of the recycled water currently being used in the supplier’s service area, including, but not limited to, the type, place, and quantity of use.
(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.
(e) The projected use of recycled water within the supplier’s service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.
(f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.
(g) A plan for optimizing the use of recycled water in the supplier’s service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

10634.
The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

ARTICLE 2.5. Water Service Reliability [10635 - 10635.]

10635.
(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.
(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.
(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier’s obligation to provide water service to its existing customers or to any potential future customers.

ARTICLE 3. Adoption and Implementation of Plans [10640 - 10645]

10640.

Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630).

The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641.

An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642.

Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643.

An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644.

(a) (1) An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.

(2) The plan, or amendments to the plan, submitted to the department pursuant to paragraph (1) shall be submitted electronically and shall include any standardized forms, tables, or displays specified by the department.

(b) (1) (A) Notwithstanding Section 10231.5 of the Government Code, and except as provided in subparagraph (B), the department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the exemplary elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has submitted its plan to the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

(B) The department shall submit the report to the Legislature for the 2015 plans by July 1, 2017, and the report to the Legislature for the 2020 plans by July 1, 2022.

(2) A report to be submitted pursuant to paragraph (1) shall be submitted in compliance with Section 9795 of the Government Code.

(c) (1) For the purpose of identifying the exemplary elements of the individual plans, the department shall identify in the report water demand management measures adopted and implemented by specific urban water suppliers, and identified pursuant to Section 10631, that achieve water savings significantly above the levels established by the department to meet the requirements of Section 10631.5.

(2) The department shall distribute to the panel convened pursuant to Section 10631.7 the results achieved by the implementation of those water demand management measures described in paragraph (1).
(3) The department shall make available to the public the standard the department will use to identify exemplary water demand management measures.

10645.
Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

CHAPTER 4. Miscellaneous Provisions [10650 - 10656]

10650.
Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:
(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.
(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.
(Amended by Stats. 1995, Ch. 854, Sec. 15. Effective January 1, 1996.)

10651.
In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652.
The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653.
The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654.
An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the “Memorandum of Understanding Regarding Urban Water Conservation in California” is deemed to be reasonable for the purposes of this section.

10655.
If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656.
An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

APPENDIX B

UWMP Standardized Tables

2015 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

Prepared by: The San Francisco Public Utilities Commission

June 2016

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

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Table 2-1 Retail Only: Public Water Systems

Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Volume of Water Supplied 2015
CA3810011	SFPUC - CITY DISTRIBUTION DIVISION	173,774	71,570
CA0110018	SFPUC - PLEASANTON WELLS	1	360
CA0110012	SFPUC - TOWN OF SUNOL	119	60
	TOTAL	173,894	71,990

NOTES:
Data for the Town of Sunol are for calendar year 2015, but are used to approximate data for FY 2014-15.

Table 2-2: Plan Identification

Select Only One	Type of Plan		Name of RUWMP or Regional Alliance *if applicable*
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		

NOTES:

Table 2-3: Agency Identification	
Type of Agency (select one or both)	
☑	Agency is a wholesaler
☑	Agency is a retailer
Fiscal or Calendar Year (select one)	
☐	UWMP Tables Are in Calendar Years
☑	UWMP Tables Are in Fiscal Years
If Using Fiscal Years Provide Month and Date that the Fiscal Year Begins (mm/dd)	
01/07	
Units of Measure Used in UWMP (select from Drop down)	
Unit	AF
NOTES: Values are rounded to the nearest 10 AF in the standardized tables. The units of measure used in the body of the UWMP are millions of gallons per day (mgd).	

Table 2-4 Retail: Water Supplier Information Exchange
The retail supplier has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.
Wholesale Water Supplier Name
Not applicable. The SFPUC does not receive water from any wholesale supplier.

Table 2-4 Wholesale: Water Supplier Information Exchange (select one)	
☑	Supplier has informed more than 10 other water suppliers of water supplies available in accordance with CWC 10631. Completion of the table below is optional. If not completed include a list of the water suppliers that were informed.
Appendix C	Provide page number for location of the list.
☐	Supplier has informed 10 or fewer other water suppliers of water supplies available in accordance with CWC 10631. **Complete the table below.**
Water Supplier Name *(Add additional rows as needed)*	
1	City of Brisbane
2	City of Burlingame
3	City of Daly City
4	City of East Palo Alto
5	City of Hayward
6	City of Menlo Park
7	City of Millbrae
8	City of Milpitas
9	City of Mountain View
10	City of Palo Alto
11	City of Redwood City
12	City of San Bruno
13	City of San Jose
14	City of Santa Clara
15	City of Sunnyvale
16	Town of Hillsborough
17	Alameda County Water District
18	Coastside County Water District
19	Cordilleras Mutual Water Company
20	Estero Municipal Improvement District
21	Guadalupe Valley Municipal Improvement District
22	Mid-Peninsula Water District
23	North Coast County Water District
24	Purissima Hills Water District
25	Westborough Water District
26	California Water Service Company
27	Stanford University
28	Groveland Community Services District(1)

NOTES:
(1) Groveland Community Services District (CSD) is contractually defined as a retail customer of the SFPUC and is accounted as such in SFPUC's previous planning documents. However, for the purpose of the 2015 UWMP update, SFPUC was directed by DWR to report Groveland CSD as a wholesale customer.

Table 3-1 Retail: Population - Current and Projected

	2015	2020	2025	2030	2035	2040*(opt)*
Population Served	859,276	892,168	936,568	983,568	1,034,268	1,087,468

NOTES:
Population projections reflect the total population of in-City and suburban retail customers.
Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore reported in Table 3-1 Wholesale instead of this table. However, the corresponding retail table in the UWMP includes Groveland CSD.

Table 3-1 Wholesale: Population - Current and Projected

Population Served	2015	2020	2025	2030	2035	2040*(opt)*
	1,800,897	1,883,343	1,972,308	2,062,427	2,157,465	2,242,606

NOTES:
Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is included this table. However, the corresponding wholesale table in the UWMP excludes Groveland CSD.

Table 4-1 Retail: Demands for Potable and Raw Water - Actual

Use Type *(Add additional rows as needed)*	2015 Actual		
Use Drop down list *May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool*	Additional Description *(as needed)*	Level of Treatment When Delivered *Drop down list*	Volume
Single Family		Drinking Water	16,350
Multi-Family		Drinking Water	24,870
Other	Non-residential: Commercial, Industrial, and Institutional	Drinking Water	28,300
Other	Groundwater for Castlewood CSA	Drinking Water	360
Other	Groundwater for irrigation purposes	Raw Water	2,090
Losses	Includes both apparent loss and real loss (see Appendix G for AWWA audit worksheet)	Drinking Water	5,940
		TOTAL	77,910

NOTES:
Per DWR direction, Groveland CSD is not accounted for as a retail customer, but rather wholesale customer in all the standardized tables. Their demand is included in Table 4-1 Wholesale. However, the corresponding retail table in the UWMP includes Groveland CSD.

Table 4-1 Wholesale: Demands for Potable and Raw Water - Actual

Use Type *(Add additional rows as needed)*	2015 Actual		
Use Drop down list *May select each use multiple times* *These are the only use types that will be recognized by the WUE data online submittal tool*	Additional Description *(as needed)*	Level of Treatment When Delivered *Drop down list*	Volume
Sales to other agencies		Drinking Water	143,790
		TOTAL	143,790

NOTES:
Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is included in this table. However, the corresponding wholesale table in the UWMP excludes Groveland CSD.

Table 4-2 Retail: Demands for Potable and Raw Water - Projected

Use Type *(Add additional rows as needed)*	Additional Description *(as needed)*	Projected Water Use *Report To the Extent that Records are Available*				
Use Drop down list *May select each use multiple times* *These are the only Use Types that will be recognized by the WUEdata online submittal tool*		2020	2025	2030	2035	2040-opt
Single Family		17,470	18,370	20,050	21,950	23,740
Multi-Family		24,750	25,540	26,880	28,000	29,340
Other	All non-residential	35,170	35,160	33,600	34,610	35,960
Losses		6,720	6,720	6,720	6,720	6,720
	TOTAL	84,110	85,790	87,250	91,280	95,760

NOTES:
Per DWR direction, Groveland CSD is not accounted for as a retail customer, but rather wholesale customer. Their demand is included in Table 4-2 Wholesale. However, the corresponding retail table in the UWMP includes Groveland CSD.

Table 4-2 Wholesale: Demands for Potable and Raw Water - Projected

Use Type *(Add additional rows as needed)*	Additional Description *(as needed)*	Projected Water Use *Report To the Extent that Records are Available*				
Drop down list *May select each use multiple times* *These are the only Use Types that will be recognized by the WUEdata online submittal tool.*		2020	2025	2030	2035	2040 *(opt)*
Sales to other agencies	Contract obligations.	206,640	206,640	206,640	206,640	206,640
	TOTAL	206,640	206,640	206,640	206,640	206,640

NOTES:
Per DWR direction, Groveland CSD is accounted for as a wholesale customer in this standardized table. However, the corresponding wholesale table in the UWMP excludes Groveland CSD.

Table 4-3 Retail: Total Water Demands

	2015	2020	2025	2030	2035	2040 *(opt)*
Potable and Raw Water *From Tables 4-1 and 4-2*	77,910	84,110	85,790	87,250	91,280	95,760
Recycled Water Demand *From Table 6-4*	280	2,130	2,130	4,370	4,370	4,370
TOTAL WATER DEMAND	78,190	86,240	87,920	91,620	95,650	100,130

***Recycled water demand fields will be blank until Table 6-4 is complete.*

NOTES:
Recycled water use for landscape irrigation in 2015 reflects a very small amount of recycled water dispensed from the Southeast Water Pollution Control Plant recycled water truck-fill station for various approved uses (e.g., street tree irrigation, sewer flushing, etc.). Future projections reflect recycled water supply served by the Westside Recycled Water Project.
Also note that per DWR direction, Groveland CSD is not accounted for as a retail customer, but rather wholesale customer in all standardized tables. Their demand is included in Table 4-3 Wholesale. However, the corresponding retail table in the UWMP includes Groveland CSD.

Table 4-3 Wholesale: Total Water Demands

	2015	2020	2025	2030	2035	2040 *(opt)*
Potable and Raw Water *From Tables 4-1 and 4-2*	143,790	206,640	206,640	206,640	206,640	206,640
Recycled Water Demand *From Table 6-4*	0	0	0	0	0	0
TOTAL WATER DEMAND	143,790	206,640	206,640	206,640	206,640	206,640

**Recycled water demand fields will be blank until Table 6-4 is complete.*

NOTES:
Demand in 2015 reflects actual deliveries in FY 14/15. Future demands reflect SFPUC's contractual obligations to its wholesale customers. Per DWR direction, Groveland CSD is accounted for as a wholesale customer in all the standardized tables and is therefore included in this table. However, the corresponding wholesale table in the UWMP excludes Groveland CSD.

Table 4-4 Retail: 12 Month Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss
07/2014	5,940
** Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.*	
NOTES:	

Table 4-4 Wholesale: 12 Month Water Loss Audit Reporting

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss
07/2014	0

** Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.*

NOTES:
For this 2015 UWMP, the SFPUC conducted a detailed water audit of its wholesale transmission system for the first time. Using the AWWA M36 method and associated worksheets (Appendix I), the audit resulted in a negative water loss value of -510 AF (-165.35 MG/Yr or -0.45 mgd) and is therefore considered to be inconclusive. However, this audit serves as an informative initial assessment to which future audits may be compared.

Table 4-5 Retail Only: Inclusion in Water Use Projections

Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook) *Drop down list (y/n)*	Yes
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, etc... utilized in demand projections are found.	Appendix H
Are Lower Income Residential Demands Included In Projections? *Drop down list (y/n)*	Yes
NOTES:	

Table 5-1 Baselines and Targets Summary
Retail Agency or Regional Alliance Only

Baseline Period	Start Years	End Years	Average GPCD	2015 Interim Target	Confirmed 2020 Target
10-15 year	2001	2010	107	102	96
5 Year	2006	2010	101		

NOTES:
Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore excluded from SB X7-7 calculations.

Table 5-2: 2015 Compliance
Retail Agency or Regional Alliance Only

Actual 2015 GPCD*	2015 Interim Target GPCD*	**Optional Adjustments to 2015 GPCD** Enter "0" if no adjustment is made *From Methodology 8*					2015 GPCD* *(Adjusted if applicable)*	Did Supplier Achieve Targeted Reduction for 2015? Y/N
		Extraordinary Events*	Economic Adjustment*	Weather Normalization*	TOTAL Adjustments*	Adjusted 2015 GPCD*		
81	102	0	0	0	0	81	81	Yes

**All values are in Gallons per Capita per Day (GPCD)*

NOTES:
Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore excluded from SB X7-7 calculations.

Table 6-1 Retail: Groundwater Volume Pumped

☐	Supplier does not pump goundwater. The supplier will not complete the table below.					
Groundwater Type *Drop Down List* *May use each category multiple times*	Location or Basin Name	2011	2012	2013	2014	2015
Alluvial Basin	Westside Basin (1)	1,430	1,340	1,650	1,670	1,670
Alluvial Basin	Livermore Valley Basin, Central Groundwater Sub Basin (2)	410	460	360	460	360
Alluvial Basin	Sunol Infiltration Gallery (3)	380	410	490	490	420
TOTAL		2,220	2,210	2,500	2,620	2,450

NOTES:
(1) Data for the Westside Basin are obtained from the 2014 Annual Groundwater Monitoring Report, Westside Basin (SFPUC, April 2015). Pumping volumes are reported on a calendar year basis, but are used to approximate fiscal year data for this table. Data for 2015 were not available as of the publication of this document, so data for calendar year 2014 is applied to 2015.
(2) The Livermore Valley Basin and Central Groundwater Sub Basin are the source of water for the Castlewood Well System. Pumping volumes are assumed to be equivalent to billed consumption for Castlewood CSA.
(3) Subsurface diversions from the Sunol Filter Gallery are assumed to be equivalent to billed consumption for Sunol Valley Golf Course.

Table 6-1 Wholesale: Groundwater Volume Pumped

☑	Supplier does not pump goundwater. The supplier will not complete the table below.					
Groundwater Type *Drop Down List May use each category multiple times*	Location or Basin Name	2011	2012	2013	2014	2015
TOTAL		0	0	0	0	0
NOTES:						

Table 6-2 Retail: Wastewater Collected Within Service Area in 2015

☐	There is no wastewater collection system. The supplier will not complete the table below.
100%	Percentage of 2015 service area covered by wastewater collection system *(optional)*
100%	Percentage of 2015 service area population covered by wastewater collection system *(optional)*

Wastewater Collection			Receiving Wastewater Treatment			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? *Drop Down List*	Volume of Wastewater Collected in 2015	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area? *Drop Down List*	Is WWTP Operation Contracted to a Third Party? *(optional)* *Drop Down List*
SFPUC	Metered	68,120	SFPUC	Southeast Water Pollution Control Plant and North Point Wet Weather Facility	Yes	No
SFPUC	Metered	14,420	SFPUC	Oceanside Water Pollution Control Plant	Yes	No
City and County of San Francisco (1)	Estimated	710	City and County of San Francisco	Mel Leong Treatment Plant	Yes	No
Total Wastewater Collected from Service Area in 2015:		83,250				

NOTES:
(1) Volumetric data for Mel Leong Treatment Plant are obtained from its NPDES permit, which provides estimates of volumes in 2011. Per the permit, up to 0.72 mgd can be diverted from the treatment plant to an onsite recycled water facility, which provides tertiary-treated recycled water for irrigation and other non-potable uses at SFO as needed.

Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2015

☐ No wastewater is treated or disposed of within the UWMP service area.
The supplier will not complete the table below.

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)*	Method of Disposal *Drop down list*	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level *Drop down list*	2015 volumes			
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
Southeast Water Pollution Control Plant and North Point Wet Weather Facility (1)	Discharge Point No. 001; Discharge Point No. 002; Discharge Point Nos. 003-006	Lower San Francisco Bay; Islais Creek; Central San Francisco Bay	2 386010001	Bay or estuary outfall	Yes	Secondary, Undisinfected	68,120	57,070	0	0
Oceanside Water Pollution Control Plant (2)	Discharge Point No. 001	Pacific Ocean, Offshore	2 386009001	Ocean outfall	Yes	Secondary, Undisinfected	14,420	14,420	0	0
Mel Leong Treatment Plant (3)	North Bayside System Unit	Lower San Francisco Bay	2 417033001	Bay or estuary outfall	No	Secondary, Disinfected - 23	710	710	0	0
						Total	83,250	72,200	0	0

NOTES:
(1) A small volume of the discharged wastewater at the Southeast Water Pollution Control Plant and North Point Wet Weather Facility is treated to secondary disinfected 23 level for other purposes, including the recycled water truck-fill stations.
(2) Values reported for the Oceanside Water Pollution Control Plant does not include approximately 616 AFY of recycled water stream. The corresponding table in the body of the UWMP (Table 6-6), however, shows a higher volume of discharge treated wastewater compared to wastewater treated for Oceanside Water Pollution Control Plant. This is because the discharged volume includes the additional plant recycle streams.
(3) Volumetric data for Mel Leong Treatment Plant are obtained from its NPDES permit, which provides estimates of volumes in 2011. Per the permit, up to 0.72 mgd can be diverted from the treatment plant to an onsite recycled water facility, which provides tertiary-treated recycled water for irrigation and other non-potable uses at SFO as needed.

Table 6-3 Wholesale: Wastewater Treatment and Discharge Within Service Area in 2015

☑ Wholesale supplier does not provide supplemental treatment to recycled water it distributes.
The supplier will not complete the table below.

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)*	Method of Disposal *Drop down list*	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level *Drop down list*	2015 volumes			
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
Add additional rows as needed										
							Total	0	0	0	0

NOTES:

Table 6-4a Retail: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area

☐ Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.

Name of Agency Producing (Treating) the Recycled Water:	SFPUC
Name of Agency Operating the Recycled Water Distribution System:	SFPUC
Supplemental Water Added in 2015	0
Source of 2015 Supplemental Water	Not applicable

Beneficial Use Type *These are the only Use Types that will be recognized by the DWR online submittal tool*	General Description of 2015 Uses	Level of Treatment *Drop down list*	2015	2020	2025	2030	2035	2040 (opt)
Landscape irrigation (excludes golf courses)	Recycled water dispensed from truck-fill station for various approved uses.	Secondary, Disinfected - 23	0.0	0.0	0.0	0.0	0.0	0.0
		Total:	0	0	0	0	0	0

IPR - Indirect Potable Reuse

NOTES:
Recycled water use for landscape irrigation in 2015 reflects a very small amount of recycled water dispensed from the Southeast Water Pollution Control Plant recycled water truck-fill station for various approved uses, which were primarily public uses for street tree irrigation and street cleaning. Other uses for the recycled water dispensed by the truck-fill station include dust control, soil compaction, and sewer flushing.

Table 6-4b Retail: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area

☐ Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.

Name of Agency Producing (Treating) the Recycled Water:	SFPUC
Name of Agency Operating the Recycled Water Distribution System:	SFPUC
Supplemental Water Added in 2015	0
Source of 2015 Supplemental Water	Not applicable

Beneficial Use Type *These are the only Use Types that will be recognized by the DWR online submittal tool*	General Description of 2015 Uses	Level of Treatment *Drop down list*	2015	2020	2025	2030	2035	2040 (opt)
Landscape irrigation (excludes golf courses)	No uses in 2015. See note 1 for future uses.	Advanced	0	1,510	1,510	1,510	1,510	1,510
Golf course irrigation	No uses in 2015. See note 2 for future uses.	Advanced	0	270	270	270	270	270
Commercial use	No uses in 2015. See note 3 for future uses.	Secondary, Disinfected - 23	0	0	0	2,240	2,240	2,240
		Total:	0	1,780	1,780	4,020	4,020	4,020

IPR - Indirect Potable Reuse

NOTES:
(1) Recycled water use for landscape irrigation in the future reflects planned use at Golden Gate Park and non-golf portions of the Presidio served by the Westside Recycled Water Project.
(2) Recycled water use for golf course irrigation in the future reflects planned use at Lincoln Park Golf Course and Presidio Golf Course served by the Westside Recycled Water Project.
(3) Recycled water for commercial uses in the future reflects a mixture of non-potable uses by customers in the east side of San Francisco served by the Eastside Recycled Water Project.

Table 6-4c Retail: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area								
☐	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.							
Name of Agency Producing (Treating) the Recycled Water:		North San Mateo County Sanitation District (NSMCSD)						
Name of Agency Operating the Recycled Water Distribution System:		NSMCSD (portion of transmission line within the City and County of San Francisco is operated by SFPUC)						
Supplemental Water Added in 2015		0						
Source of 2015 Supplemental Water		Not applicable						
Beneficial Use Type *These are the only Use Types that will be recognized by the DWR online submittal tool*	General Description of 2015 Uses	Level of Treatment *Drop down list*	2015	2020	2025	2030	2035	2040 (opt)
Golf course irrigation	Harding Park and Fleming Golf Courses	Tertiary	270	260	260	260	260	260
		Total:	270	260	260	260	260	260
IPR - Indirect Potable Reuse								
NOTES: Recycled water use for landscape irrigation in 2015 and the future reflects use at Harding Park and Fleming Golf Courses served by the Harding Park Recycled Water Project.								

Table 6-4d Retail: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area								
☐	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.							
Name of Agency Producing (Treating) the Recycled Water:		North Coast County Water District						
Name of Agency Operating the Recycled Water Distribution System:		North Coast County Water District						
Supplemental Water Added in 2015		0						
Source of 2015 Supplemental Water		Not applicable						
Beneficial Use Type *These are the only Use Types that will be recognized by the DWR online submittal tool*	General Description of 2015 Uses	Level of Treatment *Drop down list*	2015	2020	2025	2030	2035	2040 (opt)
Golf course irrigation	Sharp Park Golf Course	Tertiary	10	90	90	90	90	90
		Total:	10	90	90	90	90	90
IPR - Indirect Potable Reuse								
NOTES: Recycled water use for golf course irrigation in 2015 and the future reflects use at Sharp Park Golf Course served by the Pacifica Recycled Water Project. Recycled water delivery to the eastern portion of the golf course began in October 2014.								

Table 6-4 Wholesale: Current and Projected Retailers Provided Recycled Water Within Service Area							
☑	Recycled water is not directly treated or distributed by the supplier. The supplier will not complete the table below.						
Name of Receiving Supplier or Direct Use by Wholesaler	Level of Treatment *Drop down list*	2015	2020	2025	2030	2035	2040 *(opt)*
	Total:	0	0	0	0	0	0

NOTES:

Table 6-5 Retail: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual

☐ Recycled water was not used in 2010 nor projected for use in 2015. The supplier will not complete the table below.

Use Type *These are the only Use Types that will be recognized by the WUEdata online submittal tool*		2010 Projection for 2015	2015 actual use
Agricultural irrigation			
Landscape irrigation (exc golf courses)			
Golf course irrigation		340	280
Commercial use			
Industrial use			
Geothermal and other energy production			
Seawater intrusion barrier			
Recreational impoundment			
Wetlands or wildlife habitat			
Groundwater recharge (IPR)			
Surface water augmentation (IPR)			
Direct potable reuse			
Other	*Type of Use*		
	Total	**340**	**280**

NOTES:
Recycled water use for golf course irrigation in 2015, both projected and actual use, reflects use at Harding Park, Fleming, and Sharp Park Golf Courses.

Table 6-5 Wholesale: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual		
☑	Recycled water was not used or distributed by the supplier in 2010, nor projected for use or distribution in 2015. The wholesale supplier will not complete the table below.	
Name of Receiving Supplier or Direct Use by Wholesaler	2010 Projection for 2015	2015 actual use
Total	0	0
NOTES:		

Table 6-6 Retail: Methods to Expand Future Recycled Water Use

Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
Non-potable Water Program (Mandatory Onsite Reuse)	Amendment to Non-potable Water Ordinance requiring new large construction in designated recycled water use area in San Francisco to install onsite water reuse systems starting November 2015. Requirements will apply to new large construction Citywide starting November 2016.	2016	450
Westside Recycled Water Project	Construction of a Recycled Water Treatment Plant at the Oceanside Water Pollution Control Plant to serve recycled water for landscape irrigation at Golden Gate Park, Lincoln Park Golf Course, Presidio Golf Course, and other irrigated areas in the Presidio.	2019	2,240
Eastside Recycled Water Project	This project would consists of treatment, storage, and delivery of up to 2 mgd, annual average, of high-quality recycled water to a variety of customers on the east side of the City for non-potable irrigation, commercial, and industrial uses.	2030	2,240
Pacifica Recycled Water Project	Extension of recycled water irrigation system to the west side of Sharp Park Golf Course.	2020	90
Daly City Recycled Water Expansion	This project would add a new tertiary treatment facility located at the Daly City wastewater treatment plant to increase recycled water treatment capacity to up to 3.4 mgd. Currently, flows that exceed the capacity of the existing treatment plant are discharged into the Pacific Ocean. Through this project, some of the discharge may be used beneficially.	2022	3,810
Ordinances, Programs, and Services	The SFPUC administers or helps to administer various ordinances, programs, and services in the City related to recycled water and water reuse. The majority of these ordinances, programs, and services have been established for many years and are ongoing, resulting in increased water reuse. These include Soil Compaction and Dust Control Ordinance, Recycled Water Ordinance, Recycled Water Truck-Fill Station, and Large Landscape Grant Program.	2022	0
		Total	**8,830**

Notes:
See UWMP Section 6.2.2 for more information.

Table 6-7 Retail: Expected Future Water Supply Projects or Programs						
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☐	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
Page 6-15	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other agencies?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type *Drop Down List*	Expected Increase in Water Supply to Agency *This may be a range*
	Drop Down List	*If Yes, Agency Name*				
San Francisco Groundwater Supply Project	No	--	Groundwater for potable supply.	2017	All Year Types	3,140
Pacifica Recycled Water Project	Yes	North Coast County Water District	Extension of recycled water irrigation system to the west side of Sharp Park Golf Course.	0	All Year Types	90
Westside Recycled Water Project	No	--	--	2019	All Year Types	Up to 2,240
Eastside Recycled Water Project	No		Treatment, storage, and delivery of up to 2 mgd of high-quality recycled water to a variety of customers on the east side of the City for non-potable irrigation, commercial, and industrial uses.	2030	All Year Types	Up to 2,240

NOTES:
The San Francisco Groundwater Supply Project would yield a total of 4.0 MGD (4,480 AF); about 1.2 MGD (1,340 AF) of which is existing supply for non-potable use that would be converted for potable use, and the remaining 2.8 MGD (3,140 AF) is considered net new supply. Phase 1 would be completed in 2017, and Phase 2 would be completed in 2020.

Table 6-7 Wholesale: Expected Future Water Supply Projects or Programs

☐ No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.

☑ Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.

Sections 6.2.2 and 7.2 — Provide page location of narrative in the UWMP

Name of Future Projects or Programs	Joint Project with other agencies?		Description *(if needed)*	Planned Implementation Year	Planned for Use in Year Type *Drop Down list*	Expected Increase in Water Supply to Agency
	Drop Down Menu	*If Yes, Agency Name*				

NOTES:

Table 6-8 Retail: Water Supplies — Actual

Water Supply	Additional Detail on Water Supply	2015		
Drop down list *May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool*		Actual Volume	Water Quality *Drop Down List*	Total Right or Safe Yield *(optional)*
Surface water		75,460	Drinking Water	
Groundwater		2,450	Raw Water	
Recycled Water	Recycled water dispensed from truck-fill station for various approved uses (e.g., street tree irrigation, street cleaning, dust control)	0	Recycled Water	
Purchased or Imported Water	Recycled water produced by North San Mateo County Sanitation District to serve Harding Park	270	Recycled Water	
Purchased or Imported Water	Recycled water produced by North Coast County Water District to serve Sharp Park	10	Recycled Water	
Total		78,190		-

NOTES:
Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore reported in Table 6-8 Wholesale instead of this table. However, the corresponding retail table in the UWMP includes Groveland CSD.

Table 6-8 Wholesale: Water Supplies — Actual

Water Supply *Drop down list* *May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool*	Additional Detail on Water Supply	2015		
		Actual Volume	Water Quality *Drop Down List*	Total Right or Safe Yield *(optional)*
Surface water		143,790	Drinking Water	
	Total	143,790		0

NOTES:
Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is included in this table. However, the corresponding wholesale table in the UWMP excludes Groveland CSD.

Table 6-9 Retail: Water Supplies — Projected

Water Supply *Drop down list* *May use each category multiple times.* *These are the only water supply categories that will be recognized by the WUEdata online submittal tool*	Additional Detail on Water Supply	**Projected Water Supply** *Report To the Extent Practicable*									
		2020		**2025**		**2030**		**2035**		**2040** *(opt)*	
		Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*
Surface water		78,510		80,190		81,650		85,680		90,160	
Groundwater	See Table 6-1 Retail for groundwater sources	5,600		5,600		5,600		5,600		5,600	
Recycled Water	See Table 6-4 Retail for recycled water sources	2,130		2,130		4,370		4,370		4,370	
	Total	86,240	-	87,920	-	91,620	-	95,650	-	100,130	-

NOTES:
Per DWR direction, Groveland CSD is reported as a wholesale customer in all standardized tables. As such, their supply projections are included in Table 6-9 Wholesale. Also per DWR direction, onsite non-potable water supplies produced in compliance with the Non-potable Water Ordinance cannot be reported in the standardized tables. Therefore, although non-potable supplies are included in the corresponding table in the UWMP, the equivalent quantity is included in this table as surface water (i.e., Regional Water System) supplies in lieu of non-potable water supplies.

Table 6-9 Wholesale: Water Supplies — Projected

Water Supply	Additional Detail on Water Supply	**Projected Water Supply** *Report To the Extent Practicable*									
		2020		**2025**		**2030**		**2035**		**2040** *(opt)*	
Drop down list *May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool*		Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*
Surface water	Bay Area Wholesale Customers	206,640		206,640		206,640		206,640		206,640	
	Total	206,640	0	206,640	0	206,640	0	206,640	0	206,640	0

NOTES:
Per DWR direction, Groveland CSD is accounted for as a wholesale customer in all the standardized tables. Their supply projections are included in this table.

Table 7-1 Retail: Bases of Water Year Data

<table>
<tr><th rowspan="4">Year Type</th><th rowspan="4">Base Year <i>If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 1999-2000, use 2000</i></th><th colspan="2">Available Supplies if Year Type Repeats</th></tr>
<tr><td colspan="2">☑ Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP.
Location UWMP Tables 7-1 and 8-2</td></tr>
<tr><td colspan="2">☐ Quantification of available supplies is provided in this table as either volume only, percent only, or both.</td></tr>
<tr><td>Volume Available</td><td>% of Average Supply</td></tr>
<tr><td>Average Year</td><td>2015</td><td></td><td>100%</td></tr>
<tr><td>Single-Dry Year</td><td>2015</td><td></td><td></td></tr>
<tr><td>Multiple-Dry Years 1st Year</td><td>2015</td><td></td><td></td></tr>
<tr><td>Multiple-Dry Years 2nd Year</td><td>2015</td><td></td><td></td></tr>
<tr><td>Multiple-Dry Years 3rd Year</td><td>2015</td><td></td><td></td></tr>
<tr><td>Multiple-Dry Years 4th Year <i>Optional</i></td><td></td><td></td><td></td></tr>
<tr><td>Multiple-Dry Years 5th Year <i>Optional</i></td><td></td><td></td><td></td></tr>
<tr><td>Multiple-Dry Years 6th Year <i>Optional</i></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">Agency may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If an agency uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.</td></tr>
<tr><td colspan="4">NOTES:</td></tr>
</table>

Table 7-1 Wholesale: Bases of Water Year Data

Year Type	Base Year	Available Supplies if Year Type Repeats	
		☑	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location UWMP Tables 7-1 and 8-5
		☐	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
Average Year	2015		100%
Single-Dry Year	2015		
Multiple-Dry Years 1st Year	2015		
Multiple-Dry Years 2nd Year	2015		
Multiple-Dry Years 3rd Year	2015		
Multiple-Dry Years 4th Year *Optional*			
Multiple-Dry Years 5th Year *Optional*			
Multiple-Dry Years 6th Year *Optional*			

Agency may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If an agency uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table. Suppliers may create an additional worksheet for the additional tables.

NOTES:

Table 7-2 Retail: Normal Year Supply and Demand Comparison

	2020	2025	2030	2035	2040 *(Opt)*
Supply totals *(autofill fm Table 6-9)*	86,240	87,920	91,620	95,650	100,130
Demand totals *(autofill fm Table 4-3)*	86,240	87,920	91,620	95,650	100,130
Difference	0	0	0	0	0

NOTES:
Per DWR direction, Groveland CSD is reported as a wholesale customer in the standardized tables. Their supplies and demands are included in Table 7-2 Wholesale.

Table 7-2 Wholesale: Normal Year Supply and Demand Comparison

	2020	2025	2030	2035	2040 *(Opt)*
Supply totals *(autofill fm Table 6-9)*	206,640	206,640	206,640	206,640	206,640
Demand totals *(autofill fm Table 4-3)*	206,640	206,640	206,640	206,640	206,640
Difference	0	0	0	0	0

NOTES:
Per DWR direction, Groveland CSD is reported as a wholesale customer in the standardized tables. Their supplies and demands are included in this table.

Table 7-3 Retail: Single Dry Year Supply and Demand Comparison

	2020	2025	2030	2035	2040 (Opt)
Supply totals	86,240	87,920	91,620	95,650	100,130
Demand totals	86,240	87,920	91,620	95,650	100,130
Difference	0	0	0	0	0

NOTES:
Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore included in Table 7-3 Wholesale.

Table 7-3 Wholesale: Single Dry Year Supply and Demand Comparison

	2020	2025	2030	2035	2040 (Opt)
Supply totals	171,470	171,470	171,470	171,470	171,470
Demand totals	206,640	206,640	206,640	206,640	206,640
Difference	(35,170)	(35,170)	(35,170)	(35,170)	(35,170)

NOTES:
Groveland CSD is accounted for as a wholesale customer and is included in this table.

Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison

		2020	2025	2030	2035	2040 (Opt)
First year	Supply totals	86,240	87,920	91,620	95,650	100,130
	Demand totals	86,240	87,920	91,620	95,650	100,130
	Difference	0	0	0	0	0
Second year	Supply totals	86,240	87,920	91,620	95,650	98,900
	Demand totals	86,240	87,920	91,620	95,650	100,130
	Difference	0	0	0	0	(1,230)
Third year	Supply totals	86,240	87,920	91,620	95,650	98,900
	Demand totals	86,240	87,920	91,620	95,650	100,130
	Difference	0	0	0	0	(1,230)

NOTES:
Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore reported in Table 7-4 Wholesale instead of this table. However, the corresponding retail table in the UWMP includes Groveland CSD.
Also per DWR direction, onsite non-potable water supplies produced in compliance with the Non-potable Water Ordinance cannot be reported in the standardized tables. Therefore, although non-potable supplies are included in the corresponding table in the UWMP, the equivalent quantity is included in this table as surface water (i.e., Regional Water System) supplies in lieu of non-potable water supplies.

Table 7-4 Wholesale: Multiple Dry Years Supply and Demand Comparison

		2020	2025	2030	2035	2040 (Opt)
First year	Supply totals	171,470	171,470	171,470	171,470	171,470
	Demand totals	206,640	206,640	206,640	206,640	206,640
	Difference	(35,170)	(35,170)	(35,170)	(35,170)	(35,170)
Second year	Supply totals	148,960	148,960	148,960	148,960	148,960
	Demand totals	206,640	206,640	206,640	206,640	206,640
	Difference	(57,680)	(57,680)	(57,680)	(57,680)	(57,680)
Third year	Supply totals	148,960	148,960	148,960	148,960	148,960
	Demand totals	206,640	206,640	206,640	206,640	206,640
	Difference	(57,680)	(57,680)	(57,680)	(57,680)	(57,680)

NOTES:
Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is included in this table. However, the corresponding wholesale table in the UWMP excludes Groveland CSD.

Table 8-1 Retail
Stages of Water Shortage Contingency Plan

Stage	Complete Both	
	Percent Supply Reduction[1] *Numerical value as a percent*	Water Supply Condition (*Narrative description)*
1	*10-20%*	*10% Reduction in System Supply*
2	21-50%	*21-50% Reduction in System Supply*
3	> 50%	*Over 50% Reduction in System Supply*

[1] *One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.*

NOTES:

Table 8-1 Wholesale:
Stages of Water Shortage Contingency Plan

Stage	Complete Both	
	Percent Supply Reduction[1]	Water Supply Condition
1	*12%*	*5% or less system-wide reduction*
2	*17%*	6-10% system-wide reduction
3	*23%*	11-15% system-wide reduction
4	*28%*	16-20% system-wide reduction
N/A	*55%*	50% system-wide reduction

[1] One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.

NOTES:
The Water Shortage Allocation Plan (WSAP) does not have a stage specific to a water supply reduction condition of 50%. This condition is addressed narratively in Section 2.3 of the WSAP, which describes actions to be taken by the SFPUC and its wholesale customers if system-wide shortage exceeds stage 4.

Table 8-2 Retail Only: Restrictions and Prohibitions on End Uses

Stage	Restrictions and Prohibitions on End Users *Drop down list* *These are the only categories that will be accepted by the WUEdata online submittal tool*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? *Drop Down List*
See notes	Landscape - Restrict or prohibit runoff from landscape irrigation	"Water waste, including but not limited to, any flooding or runoff into the street, sidewalk or gutter"	Yes
See notes	Other - Require automatic shut of hoses	"Using hoses for any purpose without a positive shut-off valve"	Yes
See notes	CII - Restaurants may only serve water upon request	"Serving water at a restaurant, café, or food counter without waiting for a request by a customer or customers"	Yes
See notes	Water Features - Restrict water use for decorative water features, such as fountains	"Potable water was not to be used to clean, fill or maintain levels in decorative fountains"	Yes
See notes	Other - Prohibit use of potable water for construction and dust control	"Use of potable water for consolidation of backfill, dust control or other nonessential construction purposes if groundwater or recycled water is available and approved by the San Francisco Department of Public Health"	Yes
See notes	CII - Other CII restriction or prohibition	"Use of single-pass cooling systems, fountains, and commercial car washes"	Yes
2, 3	Other - Prohibit use of potable water for washing hard surfaces	"Washing sidewalks, driveways, plazas and other outdoor hardscapes for reasons other than health and safety needs"	Yes
2, 3	Landscape - Prohibit certain types of landscape irrigation	"Outdoor irrigation of ornamental landscapes or turf with potable water that is not reduced by at least the amount (percentage) specified in the drought response plan"	Yes
2, 3	Landscape - Other landscape restriction or prohibition	"Watering outdoor landscapes with potable water during and within 48 hours after a rain event"	Yes
2, 3	CII - Lodging establishment must offer opt out of linen service	"Not providing guests the option to refuse daily laundering of towels and linens at hotels and motels, and not prominently displaying notice of this option in each guestroom"	Yes
2, 3	Landscape - Prohibit certain types of landscape irrigation	"Irrigation with potable water of ornamental turf on public street medians"	Yes
2, 3	Landscape - Prohibit certain types of landscape irrigation	"Use of additional water for new landscaping or expansion of existing facilities unless low water use landscaping designs and irrigation systems are employed"	Yes
2, 3	Other	"Water service connections for new construction not incorporating water-saving fixtures or devices into the plumbing system"	Yes
2, 3	Other	"Verified water waste as determined by the Water Department would serve as prima facie evidence that the allocation assigned to the water account is excessive; therefore, the allocation was subject to review and possible reduction, including termination of serviced"	Yes
2, 3	Landscape - Prohibit certain types of landscape irrigation	"Use of supplies other than groundwater and/or recycled water for irrigation of golf courses, median strips, and similar turf areas"	Yes
2, 3	Landscape - Prohibit certain types of landscape irrigation	"Use of potable water on golf courses outside irrigation of putting greens"	Yes
2, 3	Other - Prohibit use of potable water for washing hard surfaces	"Use of potable water for street sweepers/washers"	Yes
2, 3	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	"The washing of all automobiles, motorcycles, RVS, trucks, transit vehicles, trailers, boats, trains, and airplanes outside of a commercial washing facility; unless required to clean windows on all vehicles and such commercial or safety vehicles for health and safety reasons"	Yes
2, 3	Other water feature or swimming pool restriction	"The filling of new swimming pools, spas, hot tubs, or the draining and refilling of existing pools, etc."	Yes

NOTES:
Permanent restriction or prohibition in place regardless of water shortage.

Table 8-3 Retail Only: Stages of WSCP - Consumption Reduction Methods

Stage	Consumption Reduction Methods by Water Supplier *Drop down list* *These are the only categories that will be accepted by the WUEdata online submittal tool*	Additional Explanation or Reference *(optional)*
	Expand Public Information Campaign	See UWMP Section 8.3.1.4 for details
	Improve Customer Billing	See UWMP Section 8.3.1.4 for details
	Increase Frequency of Meter Reading	See UWMP Section 8.3.1.4 for details
	Offer Water Use Surveys	See UWMP Section 8.3.1.4 for details
	Provide Rebates on Plumbing Fixtures and Devices	See UWMP Section 8.3.1.4 for details
	Provide Rebates for Landscape Irrigation Efficiency	See UWMP Section 8.3.1.4 for details
	Provide Rebates for Turf Replacement	See UWMP Section 8.3.1.4 for details
	Decrease Line Flushing	See UWMP Section 8.3.1.4 for details
	Reduce System Water Loss	See UWMP Section 8.3.1.4 for details
	Increase Water Waste Patrols	See UWMP Section 8.3.1.4 for details
	Implement or Modify Drought Rate Structure or Surcharge	See UWMP Section 8.3.1.4 for details
	Other	See UWMP Section 8.3.1.4 for details

NOTES:
The listed consumption reduction methods are implemented on a continuous basis, regardless of water shortage. However, mandatory rationing with corresponding allocations and excess use charges (i.e., "Implement or Modify Drought Rate Stucture or Surcharge") is the only method that may be implemented in response to a shortage.

Table 8-4 Retail: Minimum Supply Next Three Years

	2016	2017	2018
Available Water Supply	92,850	88,930	88,930

NOTES:
Per DWR direction, Groveland CSD is not included in this table as it needs to be accounted for as a wholesale customer. Supplies to Groveland CSD are included in Table 8-4 Wholesale.

Table 8-4 Wholesale: Minimum Supply Next Three Years

	2016	2017	2018
Available Water Supply	171,810	145,260	145,260

NOTES:
Per DWR direction, Groveland CSD is included in this table as a wholesale customer.

Table 10-1 Retail: Notification to Cities and Counties

City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
San Francisco	☑	☑
	☐	☐
	☐	☐
County Name *Drop Down List*	**60 Day Notice**	**Notice of Public Hearing**
Add additional rows as needed		
Alameda County	☑	☑
San Mateo County	☑	☑
Santa Clara County	☑	☑
San Joaquin County	☑	☑
	☐	☐

NOTES:
In addition to the cities and counties listed above, the SFPUC also notified various private organizations and communities that may be interested in participating in the UWMP process. A complete list of these entities can be found in Appendix C.

Table 10-1 Wholesale: Notification to Cities and Counties (select one)		
☑	Supplier has notified more than 10 cities or counties in accordance with CWC 10621 (b) and 10642. **Completion of the table below is not required. Provide a separate list of the cities and counties that were notified.**	
Appendix C	Provide the page or location of this list in the UWMP.	
☐	Supplier has notified 10 or fewer cities or counties. **Complete the table below.**	
City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
	☐	☐
	☐	☐
	☐	☐
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
	☐	☐
	☐	☐
	☐	☐
NOTES:		

APPENDIX C

Evidence of Compliance with Outreach Requirements

2015 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

Prepared by: The San Francisco Public Utilities Commission

June 2016

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

Summary Table of SFPUC Compliance with
Public Notification Elements of the Urban Water Management Plan Act

Code Section	Code Requirement	Summary of Action Taken	Documentation (Attached after this Table)
Water Code Section 10620	Notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes.	✓ January 29 and March 7, 2016: Sent notification letters via email to City agencies, wholesale customers of the SFPUC Regional Water System, suburban retail customers (e.g., SFO), large regional water agencies (e.g., EBMUD), Bay Area Water Supply Conservation Agency (BAWSCA), and a larger distribution list of parties known by the SFPUC to be interested in water resources planning issues. ✓ April 14, 2016: Sent emails to all parties listed above regarding the availability of the Draft 2015 UWMP.	• Example of 1/29/16 letter sent via email (same letter sent via email on 3/7/16 to additional recipients) • Example of 4/14/16 email • Recipient list
Water Code Section 10642	Encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	✓ January 29 and March 7, 2016: Sent emails to a larger distribution list of parties known by the SFPUC to be interested in water resources planning issues. ✓ April 14, 2016: Posted the Draft 2015 UWMP on the SFPUC website at www.sfwater.org ✓ April 25 and May 2, 2016: Posted advertisement in local community newspaper(s) in English, Chinese and Spanish regarding the availability of the Draft 2015 UWMP, as well as the time and location of the public hearing.	• Example of 1/29/16 letter sent via email (same letter sent via email on 3/7/16 to additional recipients) • Copy of web posting • Declaration of publication of San Francisco Chronicle and copy of advertisement
Water Code Section 10642	Prior to the required hearing, publish the notice of time and place of hearing within the jurisdiction of the supplier pursuant to Section 6066 of the Government Code.	✓ April 25 and May 2, 2016: Posted Notification of Public Hearing in local community newspaper meeting requirement of Section 6066 of the Government Code.	• Declaration of publication in San Francisco Chronicle and copy of advertisement

Code Section	Code Requirement	Summary of Action Taken	Documentation (Attached after this Table)
Water Code Section 10642	Prior to the required hearing, provide notice of time and place of hearing to any city of county within which the supplier provides water.	✓ January 29 and March 7, 2016: Provided notification of public hearing, including time and place of the hearing, in the same notification letter regarding the preparation of the 2015 UWMP Update.	• Example of 1/29/16 letter sent via email (see page 2 for notification of public hearing; same letter sent via email on 3/7/16 to additional recipients) • Recipient list (same as recipient list listed earlier)
Water Code Section 10642	Prior to adoption, make the plan available for public inspection.	✓ April 14, 2016: Posted the Draft 2015 UWMP on the SFPUC website at www.sfwater.org ✓ April 14, 2016: Hand delivered two copies of the Draft 2015 UWMP to the San Francisco Main Library.	• Copy of web posting • Copy of delivery confirmation to the San Francisco Public Library and copy of library catalog record
Water Code Section 10642	Prior to adoption, hold a public hearing.	✓ May 10, 2016: Held public hearing during the meeting of the San Francisco Public Utilities Commission.	• Copy of Commission Meeting Agenda including public hearing
Water Code Section 10642	After the hearing, the plan shall be adopted as prepared or as modified after the meeting.	✓ June 14, 2016: Adopted the SFPUC 2015 UWMP (as amended) during the meeting of the San Francisco Public Utilities Commission.	• Copy of draft Resolution to Adopt the 2015 UWMP – Provided in Appendix P (final, signed resolution to be inserted after adoption)
Water Code Section 10644(a)	Within 30 days of plan adoption, submit a copy to DWR.	✓ By July 1, 2016 (exact date to be determined): Submitted the adopted 2015 UWMP electronically via the WUEdata Online Submittal Tool.	• *On file with the SFPUC:* Copy of DWR submittal confirmation
Water Code Section 10644(a)	Within 30 days of plan adoption, submit a copy to the California State Library.	✓ By July 14, 2016 (exact date to be determined): Mailed an electronic copy of the adopted 2015 UWMP on compact disc to the California State Library.	• *On file with the SFPUC:* Copy of delivery confirmation to the California State Library
Water Code Section 10644(a)	Within 30 days of plan adoption, submit a copy to any city or county within which the supplier provides water.	✓ By July 14, 2016 (exact date to be determined): Emailed the adopted 2015 UWMP to all wholesale customers of the SFPUC Regional Water System, and cities or counties within which the SFPUC provides water.	• *On file with the SFPUC:* Copy of 7/14/16 email (exact date to be determined)

Code Section	**Code Requirement**	**Summary of Action Taken**	**Documentation (Attached after this Table)**
Water Code Section 10645	Within 30 days of submittal to DWR, make the plan available for public review during normal business hours.	✓ By July 30, 2016 (exact date to be determined): Provided two copies of the adopted 2015 UWMP to the San Francisco Main Library. ✓ By July 30, 2016 (exact date to be determined): Posted the adopted 2015 UWMP on the SFPUC website at www.sfwater.org	• *On file with the SFPUC:* Copy of delivery confirmation to the San Francisco Public Library and copy of library catalog record • *On file with the SFPUC:* Copy of web posting

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

525 Golden Gate Avenue, 10th Floor
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January 29, 2016

Subject: **Notification of the City and County of San Francisco Urban Water Management Plan 2015 Update and Public Hearing**

The Urban Water Management Planning Act (Water Code Section 10610-10657) requires each urban water supplier to update its Urban Water Management Plan (UWMP) and submit the completed plan to the California Department of Water Resources (DWR) every 5 years. The City and County of San Francisco is currently reviewing its 2010 UWMP and will be considering amendments or changes to the document. We invite your agency's or organization's participation in this process.

State law requires that, at least 60 days prior to the public hearing, the City and County of San Francisco provide notice to any city and county within which it provides water supplies that it intends to update the UWMP. This letter serves as the required notification.

The UWMP will provide an overview of our water deliveries and uses, water supply sources, and water conservation programs. It will also include discussions on supply and demand projections over a 25-year planning horizon (from 2015 to 2040), available water supplies to meet existing and future demands under a range of water supply conditions, and our water demand management measures to reduce long-term water demand.

Proposed revisions to the UWMP will be available for public review and comment starting mid-April 2016. The Draft UWMP 2015 Update will be available on the SFPUC website at www.sfwater.org (enter "UWMP" in the search field located in the upper right hand corner of the homepage). A copy of the document will also be available for review at the San Francisco Public Library:

San Francisco Public Library
Government Information Center, 5th Floor
100 Larkin Street
San Francisco, CA 94102
(415) 557-4400

Notice of Public Hearing

A public hearing will be held on May 10, 2016 to allow interested members of the public to participate in the review process. The hearing will be held at the Commission meeting which begins at 1:30 p.m. in City Hall, Room 400, 1 Dr. Carlton B. Goodlett Place, San Francisco, California. All interested parties are invited to attend the public hearing and present their views. Persons who are unable to attend the public hearing may also submit to the City, by the time the proceedings begin, written comments regarding the subject of the hearing. These comments will be brought to the attention of the Commission and will become part of the official public record. Written comments can be sent to:

Donna Hood
Commission Secretary
San Francisco Public Utilities Commission
525 Golden Gate Avenue, 13th Floor
San Francisco, CA 94102

In the meantime, if you have any questions about our UWMP, or the process of updating it, please contact:

Fan Lau
Water Resources Specialist
San Francisco Public Utilities Commission
525 Golden Gate Avenue, 10th Floor
San Francisco, CA 94102
(415) 554-2498
FLau@sfwater.org

Sincerely,

Paula

Paula Kehoe
Director of Water Resources

Lau, Fan

From:	Lau, Fan
Sent:	Thursday, April 14, 2016 1:10 PM
Subject:	San Francisco Urban Water Management Plan 2015 Update -- Now Available for Review

The Draft 2015 Urban Water Management Plan (UWMP) for the City and County of San Francisco, prepared by the San Francisco Public Utilities Commission (SFPUC), is now available for review and comment. This UWMP update presents supply and demand projections through 2040, available supplies to meet existing and future demands under a range of water supply conditions, and demand management measures to reduce long-term water demand. In addition, the UWMP includes a discussion of the conservation requirement set forth in Senate Bill X7-7, also known as the Water Conservation Act of 2009, which mandated a statewide 20% reduction in per capita water use by 2020. This UWMP update includes a quantification of the SFPUC's water use reduction targets and progress towards meeting these targets.

The Draft 2015 UWMP can be viewed at and printed from the SFPUC website at www.sfwater.org/localwater (or enter "UWMP" in the search field located in the upper right hand corner of the homepage). A copy of the document is also available for review at the San Francisco Public Library:

San Francisco Public Library
Government Information Center, 5th Floor
100 Larkin Street
San Francisco, CA 94102
(415) 557-4400

The public review and comment period for this document begins on Thursday, April 14, 2016 and ends close of business Friday, May 13, 2016. Written comments may be submitted to the SFPUC as part of the public hearing process described below, or via email to Fan Lau at FLau@sfwater.org.

A public hearing will be held on May 10, 2016 to allow interested members of the public to participate in the review process. The hearing will be held at the Commission meeting which begins at 1:30 p.m. in City Hall, Room 400, 1 Dr. Carlton B. Goodlett Place, San Francisco, California. All interested parties are invited to attend the public hearing and present their views. Persons who are unable to attend the public hearing may also submit to the SFPUC, by the time the proceedings begin, written comments regarding the subject of the hearing. These comments will be brought to the attention of the Commission and will become part of the official public record. Written comments can be sent to:

Donna Hood
Commission Secretary
San Francisco Public Utilities Commission
525 Golden Gate Avenue, 13th Floor
San Francisco, CA 94102

Thank you for your interest.

Fan Lau, P.E.
Water Resources Division
San Francisco Public Utilities Commission
525 Golden Gate Ave., 10th Floor | San Francisco, CA 94102
(415) 554-2498 | FLau@sfwater.org

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Recipients of 2015 UWMP Update Notification
(sent via e-mail on January 29, 2016 and March 7, 2016)

NO.	ORGANIZATION	CONTACT
1	City College of San Francisco	Robert Gabriner
2	Mayor's Office of Neighborhood Services	David Miree
3	Port of San Francisco	Monique Moyer
4	San Francisco Board of Supervisors	Aaron Peskin
5	San Francisco Board of Supervisors	David Campos
6	San Francisco Board of Supervisors	Eric Mar
7	San Francisco Board of Supervisors	Jane Kim
8	San Francisco Board of Supervisors	John Avalos
9	San Francisco Board of Supervisors	Katy Tang
10	San Francisco Board of Supervisors	London Breed
11	San Francisco Board of Supervisors	Malia Cohen
12	San Francisco Board of Supervisors	Mark Farrell
13	San Francisco Board of Supervisors	Norman Yee
14	San Francisco Board of Supervisors	Scott Wiener
15	San Francisco Department of Building Inspection	Lily Madjus-Wu
16	San Francisco Department of Building Inspection	Tom Hui
17	San Francisco Department of Public Health	Barbara Garcia
18	San Francisco Department of Public Works	Mohammed Nuru
19	San Francisco Department of the Environment	Debbie Raphael
20	San Francisco Fire Department	Joanne Hayes-White
21	San Francisco International Airport	John Martin
22	San Francisco International Airport	Mark Costanzo
23	San Francisco Municipal Transportation Agency	Edward Reiskin
24	San Francisco Office of Community Investment and Infrastructure	Darshan Singh
25	San Francisco Office of Community Investment and Infrastructure	Tiffany Bohee
26	San Francisco Office of Small Business	Regina Dick-Endrizzi
27	San Francisco Office of the City Attorney	Dennis Herrera
28	San Francisco Planning Department	Gil Kelley
29	San Francisco Planning Department	John Rahaim
30	San Francisco Planning Department	Sarah B. Jones
31	San Francisco Public Library	Luis Herrera
32	San Francisco Recreation and Park Department	Dennis Kern
33	San Francisco Recreation and Park Department	Phil Ginsburg
34	San Francisco Sheriff's Department	Vicki L. Hennessy
35	SFPUC Citizens' Advisory Committee (CAC)	Amy Zock
36	SFPUC Citizens' Advisory Committee (CAC)	Art Taylor
37	SFPUC Citizens' Advisory Committee (CAC)	Avni Jamdar
38	SFPUC Citizens' Advisory Committee (CAC)	Eli Saddler
39	SFPUC Citizens' Advisory Committee (CAC)	Jennifer Clary
40	SFPUC Citizens' Advisory Committee (CAC)	Kelly Groth
41	SFPUC Citizens' Advisory Committee (CAC)	Marjorie Goodwin
42	SFPUC Citizens' Advisory Committee (CAC)	Mark Connors
43	SFPUC Citizens' Advisory Committee (CAC)	Rebecca Lee
44	SFPUC Citizens' Advisory Committee (CAC)	Shalini Swaroop
45	SFPUC Citizens' Advisory Committee (CAC)	Suki Kott
46	SFPUC Citizens' Advisory Committee (CAC)	Tamar Barlev
47	SFPUC Citizens' Advisory Committee (CAC)	Ted Loewenberg
48	SFPUC Citizens' Advisory Committee (CAC)	Tracy Zhu

Recipients of 2015 UWMP Update Notification
(sent via e-mail on January 29, 2016 and March 7, 2016)

NO.	ORGANIZATION	CONTACT
49	SFPUC Citizens' Advisory Committee (CAC)	Wendolyn Aragon
50	Sunshine Ordinance Task Force	Louise Fischer
51	Alameda County Water District	Doug Chun
52	Alameda County Water District	Robert Shaver
53	Alameda County Water District	Steven Inn
54	California Water Service Company	Darin Duncan
55	California Water Service Company	Dawn Smithson
56	California Water Service Company	Tony Carrasco
57	City of Brisbane	Jerry Flanagan
58	City of Brisbane/Guadalupe Valley Municipal Improvement District	Randy Breault
59	City of Burlingame	Art Morimoto
60	City of Burlingame	George J. Bagdon
61	City of Daly City	Patrick Sweetland
62	City of East Palo Alto	Carlos Martinez
63	City of East Palo Alto	Maziar Bozorginia
64	City of Hayward	Alex Ameri
65	City of Hayward	Corinne Ferreyra
66	City of Menlo Park	Pam Lowe
67	City of Menlo Park	Ruben Nino
68	City of Millbrae	Khee Lim
69	City of Millbrae	Peter Vorametsanti
70	City of Millbrae	Shelley Reider
71	City of Milpitas	Nina Hawk
72	City of Milpitas	Steven Machida
73	City of Mountain View	Elizabeth Flegel
74	City of Mountain View	Gregg Hosfeldt
75	City of Palo Alto	Jane Ratchye
76	City of Palo Alto	Karla Dailey
77	City of Redwood City, Public Works Services Department	Justin Chapel
78	City of Redwood City, Public Works Services Department	Melissa Stevenson Diaz
79	City of Redwood City, Public Works Services Department	Terrence Kyaw
80	City of San Bruno	Jim Burch
81	City of San Bruno	Jimmy Tan
82	City of San Jose	Jeff Provenzano
83	City of San Jose	Mansour Nasser
84	City of Santa Clara	Chris DeGroot
85	City of Santa Clara	Robin Saunders
86	City of Sunnyvale	James Craig
87	City of Sunnyvale	John Stufflebean
88	City of Sunnyvale	Mansour Nasser
89	Coastside County Water District	David Dickson
90	Cordilleras Water District	Rick Thall
91	East Palo Alto Water District	Anthony Docto
92	Estero Municipal Improvement District	Jeff Moneda
93	Groveland Community Service	Jon Sterling
94	Mid-Peninsula Water District	Rene Ramirez
95	Mid-Peninsula Water District	Tammy Rudock
96	North Coast County Water District	Cari Lemke

Recipients of 2015 UWMP Update Notification
(sent via e-mail on January 29, 2016 and March 7, 2016)

NO.	ORGANIZATION	CONTACT
97	Purissima Hills Water District	Patrick Walter
98	Stanford University	Julia Nussbaum
99	Town of Hillsborough	Paul Willis
100	Westborough Water District	Darryl Barrow
101	BAWSCA	Adrianne Carr
102	BAWSCA	Andree Johnson
103	BAWSCA	Christina Tang
104	BAWSCA	Michael Hurley
105	BAWSCA	Nicole Sandkulla
106	California State Assembly, AD12	Kristin Olsen
107	California State Coastal Conservancy	Matt Gerhart
108	California State Library Government Publications Section	Janet Coles
109	California State Seismic Safety Commission	Fred Turner
110	Department of Water Resources Office of Water Use Efficiency & Transfer	David Todd
111	U.S. EPA Region 9	David W. Smith
112	U.S. EPA Region 9	Dena Vallano
113	U.S. EPA Region 9	Nancy Woo
114	Contra Costa Water District	Jerry Brown
115	East Bay Municipal Utility District	Alexander Coate
116	East Bay Municipal Utility District	Priyanka Jain
117	Los Trancos County Water District	Stanley R. Gage
118	Marin Municipal Water District	Krishna Kumar
119	Santa Clara Valley Water District	Jim Fiedler
120	Santa Clara Valley Water District	Jerry De La Piedra
121	Zone 7 Water Agency	Jill Duerig
122	Zone 7 Water Agency	Amparo Flores
123	Turlock Irrigation District	Tou Her
124	County of San Mateo	Ed Garcia
125	Alameda County	Susan S. Muranishi
126	County of Santa Clara	Jeffrey V. Smith
127	San Joaquin County	Monica Nino
128	Tuolumne County	Craig Pedro
129	Castlewood Country Club	John Vest
130	Golden Gate National Cemetery	Bradley Phillips
131	Lawrence Livermore National Laboratory	Ellen Raber
132	Lawrence Livermore National Laboratory	Jackie Angell
133	Menlo Country Club	Christopher Robinson
134	National Park Service GGNRA	Allison Cryns
135	San Francisco State University	Barbara Holzman
136	San Francisco State University	Caitlin Steele
137	San Francisco State University	Charles A. Meyer
138	San Francisco State University	Davin Wentworth-Thrasher
139	San Francisco State University	Ryszard Dziadur
140	San Francisco Zoo	Tanya Peterson
141	The Villas Parkmerced	General e-mail address
142	American True / True Youth	Ward Latimer
143	Bay Area Water Stewards (BAWS)	Multiple members
144	Bayview Merchants Association	Al Norman

Recipients of 2015 UWMP Update Notification
(sent via e-mail on January 29, 2016 and March 7, 2016)

NO.	ORGANIZATION	CONTACT
145	California Native Plant Society - Yerba Buena Chapter	Ellen Edelson
146	California Trout	Curtis Knight
147	Coalition for a Better Wastewater Solution	Jeff Marmer
148	Coalition For San Francisco Neighborhoods	Joan Girardot
149	Golden Gate Audubon Society	Cindy Margulis
150	Golden Gate Audubon Society	Dan Murphy
151	Golden Gate Heights Neighborhood Association	Frank Noto
152	Golden Gate Restaurant Association	Gwyneth Borden
153	Greater West Portal Neighborhood Association	Avum Shepard
154	Greater West Portal Neighborhood Association	General e-mail address
155	Greater West Portal Neighborhood Association	Rae Doyle
156	Lakeshore Acres Improvement Club	Jim Stark
157	North of the Panhandle Neighborhood Association	Tim Hickey
158	Oceanview, Merced Heights, Ingleside - Neighbors in Action (OMI-NIA)	Al Harris
159	Oceanview, Merced Heights, Ingleside - Neighbors in Action (OMI-NIA)	Mary Harris
160	Pacific Institute	Heather Cooley
161	Pacific Institute	Peter Gleick
162	Planning Association for the Richmond (PAR)	Ray Holland
163	Planning Association for the Richmond (PAR)	Richard Corriea
164	Plumbers Union Local 38	Larry Mazzola Jr.
165	Restore Hetch Hetchy	Spreck Rosekrans
166	San Francisco Beautiful	Darcy Brown
167	San Francisco Chamber of Commerce	Bob Linscheid
168	San Francisco Chamber of Commerce	Dee Dee Workman
169	San Francisco Chamber of Commerce	Jim Lazarus
170	San Francisco Council of District Merchants	Stephen Cornell
171	San Francisco Democratic County Central Committee	Alexandra Medina
172	San Francisco Parks Alliance	Matthew O'Grady
173	San Francisco Parks Alliance	Rachel Norton
174	San Francisco Republican Central Committee	Mike Denunzio
175	San Francisco Republican County Central Committee	Christine Hughes
176	San Francisco Small Business Network	Pat Christensen
177	San Francisco Tomorrow	Jennifer Clary
178	San Francisco Tomorrow	Jennifer Clary
179	Sierra Club	Ruth Gravanis
180	Sierra Club, San Francisco Bay Chapter	Michelle Meyers
181	Small Business Network	Paul Pendergast
182	Southeast Community Facility	Toye Moses
183	SPUR	Laura Tam
184	Sunset Beacon/Richmond Review	Paul Kozakiewicz
185	Sunset Heights Associaton of Responsible People	J. Barry
186	Sunset Neighborhood Beacon Center	Matt Pemberton
187	Sunset Parkside Education and Action Committee (SPEAK)	Marc Duffet
188	Sunset Parkside Education and Action Committee (SPEAK)	Marc Duffett
189	Taraval Parkside Merchants Association	Yumi Sam
190	Tuolumne River Trust	Peter Drekmeier
191	Urban Resource Systems	Isabel Wade
192	West of Twin Peaks Central Council	Roger Ritter

Recipients of 2015 UWMP Update Notification
(sent via e-mail on January 29, 2016 and March 7, 2016)

NO.	ORGANIZATION	CONTACT
193	West of Twin Peaks Observer	Mitch Bull
194	Westwood Park Association	Kate Favetti
195	Presidio Trust	Craig Middleton
196	Presidio Trust	Mark Hurley
197	Presidio Trust	Paula R. Collins

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Sources and Supply Planning

San Franciscans enjoy great drinking water from the Hetch Hetchy Regional Water System, and to protect our precious water from disruption of supply due to climate change, drought and natural disaster, we must develop new high-quality local water sources and diversify our water supplies. That's why the City is taking steps to supplement our water supplies through groundwater wells, recycled water for irrigation and an aggressive water conservation program. We have also developed guidelines for the use of graywater through the Laundry to Landscape program.

Using local water sources reduces the vulnerability that comes from being heavily dependent on distant reservoirs, while at the same time limiting the amount of water we need from the Tuolumne River and keeping our commitment to protect and preserve our watersheds.

Water Resources Annual Report

Each year, the Water Resources Division issues an annual report on local water supply and water conservation program achievements for the previous Fiscal Year. The reports present a high-level snapshot of SFPUC water sources and uses; a description of water conservation assistance provided to customers; and local water supply program achievements in groundwater, recycled water and non-potable water reuse.

- SFPUC Water Resources 2014-15 Annual Report
- SFPUC Water Resources 2013-14 Annual Report
- SFPUC Water Resources 2012-13 Annual Report

Urban Water Management Plan

On June 14, 2011, the SFPUC adopted the 2010 Urban Water Management Plan (UWMP) for the City and County of San Francisco. The 2010 UWMP update includes county-wide demand projections to the year 2035, compares available water supplies to meet demands and presents water demand management measures to reduce long-term water demand. Additionally, the UWMP update includes a discussion of the conservation requirement set forth in Senate Bill 7 (SBx7-7) as passed in November 2009 mandating a statewide 20% reduction in per capita water use by 2020. The updated UWMP includes a quantification of the SFPUC's water use reduction targets and plan for meeting these objectives.

- 2013 Water Availability Study
- 2010 Urban Water Management Plan for San Francisco
- 2010 Urban Water Management Plan for San Francisco Appendices
- 2009 Water Supply Agreement

Urban Water Management Plan Update

The Urban Water Management Planning Act (Water Code Section 10610-10657) requires each urban water supplier to update its UWMP and submit the completed plan to the California Department of Water Resources every 5 years. The Draft 2015 UWMP is now available below as well as at the San Francisco Public Library, Government Information Center, 5th Floor. The public review and comment period begins Thursday, April 14, 2016 and ends close of business Friday, May 13, 2016.

2015 Urban Water Management Plan – Public Review Draft

2015 Urban Water Management Plan Appendices – Public Review Draft

A public hearing will be held on May 10, 2016 to allow interested members of the public to participate in the review process. The hearing will be held at the Commission meeting which begins at 1:30 p.m. in City Hall, Room 400, 1 Dr. Carlton B. Goodlett Place, San Francisco, California. All interested parties are invited to attend the public hearing and present their views. Persons who are unable to attend the public hearing may also submit to the SFPUC, by the time the proceedings begin, written comments regarding the subject of the hearing. These comments will be brought to the attention of the Commission and will become part of the official public record. Written comments can be sent to:

Donna Hood
Commission Secretary
San Francisco Public Utilities Commission
525 Golden Gate Avenue, 13th Floor
San Francisco, CA 94102

If you have any questions about the UWMP or the process of updating it, please contact Fan Lau, Water Resources Specialist, at (415) 554-2498 or FLau@sfwater.org.

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DECLARATION

I am a resident of Los Angeles County, over the age of eighteen years and not a party to any or interested in the matter noticed.

The notice, of which the annexed is a printed copy appeared in the:

SAN FRANCISCO CHRONICLE

On the following dates:

APRIL 25, & MAY 02, 2016

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Dated at Los Angeles, California, this

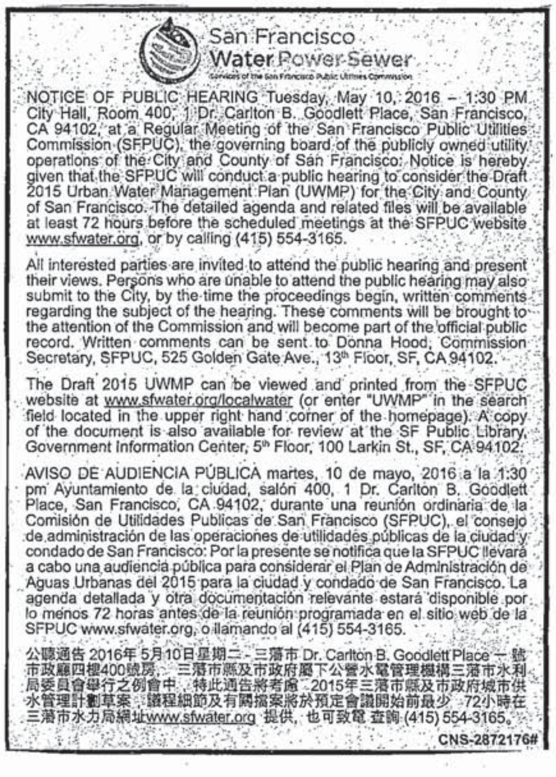
12 day **Of MAY,** 2016

Johnson

Signature

2872176

"The only Public Notice which is justifiable from the standpoint of true economy and the public interest, is that which reaches those who are affected by it"



San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

NOTICE OF PUBLIC HEARING Tuesday, May 10, 2016 – 1:30 PM City Hall, Room 400, 1 Dr. Carlton B. Goodlett Place, San Francisco, CA 94102, at a Regular Meeting of the San Francisco Public Utilities Commission (SFPUC), the governing board of the publicly owned utility operations of the City and County of San Francisco: Notice is hereby given that the SFPUC will conduct a public hearing to consider the Draft 2015 Urban Water Management Plan (UWMP) for the City and County of San Francisco. The detailed agenda and related files will be available at least 72 hours before the scheduled meetings at the SFPUC website www.sfwater.org, or by calling (415) 554-3165.

All interested parties are invited to attend the public hearing and present their views. Persons who are unable to attend the public hearing may also submit to the City, by the time the proceedings begin, written comments regarding the subject of the hearing. These comments will be brought to the attention of the Commission and will become part of the official public record. Written comments can be sent to Donna Hood, Commission Secretary, SFPUC, 525 Golden Gate Ave., 13th Floor, SF, CA 94102.

The Draft 2015 UWMP can be viewed and printed from the SFPUC website at www.sfwater.org/localwater (or enter "UWMP" in the search field located in the upper right hand corner of the homepage). A copy of the document is also available for review at the SF Public Library, Government Information Center, 5th Floor, 100 Larkin St., SF, CA 94102.

AVISO DE AUDIENCIA PÚBLICA martes, 10 de mayo, 2016 a la 1:30 pm Ayuntamiento de la ciudad, salón 400, 1 Dr. Carlton B. Goodlett Place, San Francisco, CA 94102, durante una reunión ordinaria de la Comisión de Utilidades Publicas de San Francisco (SFPUC), el consejo de administración de las operaciones de utilidades públicas de la ciudad y condado de San Francisco: Por la presente se notifica que la SFPUC llevará a cabo una audiencia pública para considerar el Plan de Administración de Aguas Urbanas del 2015 para la ciudad y condado de San Francisco. La agenda detallada y otra documentación relevante estará disponible por lo menos 72 horas antes de la reunión programada en el sitio web de la SFPUC www.sfwater.org, o llamando al (415) 554-3165.

公聽通告 2016年 5月10日星期二 - 三藩市 Dr. Carlton B. Goodlett Place 一號市政廳四樓400號房，三藩市縣及市政府屬下公營水電管理機構三藩市水利局委員會舉行之例會中，特此通告將考慮 2015年三藩市縣及市政府城市供水管理計劃草案，議程細節及有關檔案將於預定會議開始前最少 72小時在三藩市水力局網址www.sfwater.org 提供，也可致電 查詢 (415) 554-3165。

CNS-2872176#

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CHRONICLE | CNET REVIEWS

Fitness trackers, watches Mom might like

Fitbit Charge HR

Cnet rating: 4 stars out of 5 (Excellent)

The good: Continuous heart rate tracking. Slim design. Affordable price. Works with Windows, iPhone and Android phones. Fitbit's popularity means you'll be able to join up and compete with friends. Connects with many third-party fitness apps. Automatic sleep and activity tracking. Five-day battery life.

The bad: Design and fit aren't ideal for glancing at heart rate. Not shower- or swim-friendly. OLED display turns off after a few seconds, which gets annoying. Heart-rate coaching and goal-setting aren't intuitive.

The cost: $129 to $150

The bottom line: Fitbit's Charge HR combines heart rate tracking, sleep tracking and fitness in an affordable, slim band with good battery life. It's a hard combination to beat.

Jawbone Up2

Cnet rating: 4 stars out of 5 (Excellent)

The good: The Up2 provides simple activity and automatic sleep tracking in a slim and fashionable design. The band has good battery life and can be worn in the shower. The Jawbone mobile app includes smart coaching and can be paired with many popular third-party apps.

The bad: It doesn't have a display for quickly checking fitness progress, and there's no heart-rate tracking. The sleep tracking tends to overestimate and the band can't be worn while swimming.

The cost: $68 to $100

The bottom line: A better fit and superior software make the redesigned Jawbone Up2 our favorite everyday fitness band.

Fitbit Alta

Cnet rating: 3.5 stars out of 5 (Very good)

The good: The Fitbit Alta is a stylish fitness tracker with swappable bands, basic phone notifications and weeklong battery life. The Move alerts bring something new. Fitbit's software interface is still one of our favorites, and has the largest social base as well.

The bad: There's no heart rate sensor, and it can't be worn in the shower. The tracker is expensive for what it can do and so are the accessory straps. The display is susceptible to scratches, and notifications are hard to read.

The cost: $130

The bottom line: While ultimately a more stylish (but heart rate-free) version of the older Charge HR, the Fitbit Alta is a winning fitness tracker with solid style appeal.

Apple Watch

Cnet rating: 3.5 stars out of 5 (Very good)

The good: The Apple Watch is a beautifully constructed, compact smartwatch. It's feature-packed, with solid fitness software, hundreds of apps and the ability to send and receive calls via an iPhone.

The bad: Battery lasts only a little more than a day; most models and configurations cost more than they should; requires an iPhone 5 or later to work; interface can be confusing; sometimes slow to communicate with a paired iPhone.

The cost: $649

The bottom line: The Apple Watch was the most ambitious, well-constructed smartwatch ever seen at the time of its release. The smaller 38mm model recently received a price cut to $299.

These Cnet staff contributed to this report: Dan Graziano, Scott Stein and Laura K. Cucullu. For more reviews of personal technology products, visit www.cnet.com.

Push for diversity continues

Jackson from page D1

eral such Oakland organizations were on hand Friday to make their presence known to tech leaders.

"You would think companies that have been around for a while, since the 1990s, would not be where they are when it comes to diversity because they've had time to catch up," Jackson said. "But the good news is there's time now to catch up, and it will open up a whole new world of opportunity."

Other programs are working to build bridges with athletes (SportsTech2020), churches (FaithTech2020) and historically black colleges and universities, where Jackson said Bay Area technology companies should look first when recruiting.

"Unfortunately, a lot of companies are not going to change without some kind of social or economic pressure, so what we're trying to say is look, you're missing out on whole markets, growth, talent," Jackson said of what he calls the "2 percent problem" — a nod to the percentage of black and Latino people many companies have in their workforce or in leadership roles. "These changes come slowly, and we want to makes sure they're not just symbolic."

Pressure to boost diversity at tech companies and remain publicly accountable by disclosure of companies' personnel data has grown over the past several years. Several firms — including Airbnb, Dropbox, Pinterest, Twitter and Yelp — even hired individuals to oversee and coordinate diversity efforts.

Others have begun offering implicit-bias training to their employees or broadening their corporate definition of diversity to include intersectional identities — how various attributes combine to create unique experiences for certain people.

Earlier this year, group-chat company Slack updated its diversity report to include more intersectional data on women of color and LGBT people.

Intel CEO Brian Krzanich, who announced last year that the company would improve its diversity to reflect the percentage of women and underrepresented minorities in the United States by 2020, and pledged $300 million to aid in the effort, acknowledged at the Rainbow Push conference Friday that the company has received criticism for its outspoken commitment to diversity, according to reports.

"There's no reason why there cannot be a change now," Jackson said. "When I think about this culture of exclusion and how unchallenged it has been for so long — we need to end that. There's responsibility at every level, and we all need to apply social pressure to change things because this is the future: America cannot improve without fully realizing its assets. Imagine baseball without Jackie Robinson. That's where we are."

Marissa Lang is a San Francisco Chronicle staff writer. Email: mlang@sfchronicle.com Twitter: @Marissa_Jae

LEGAL NOTICES

legalnotice.org/pl/sfgate

PUBLIC NOTICES

PORTOLA VALLEY SCHOOL DISTRICT
4575 Alpine Road
Portola Valley, CA 94028

REQUEST FOR QUALIFICATIONS AND PROPOSALS FOR FACILITIES MASTER PLAN SERVICES

NOTICE IS HEREBY GIVEN that the Board of Trustees of the Portola Valley School District, located in San Mateo County, California hereby invites and will receive proposals for Facilities Master Plan services.

The Portola Valley School District ("District") will be considering proposals to provide facility master planning services from qualified consultant teams to assist the District with the preparation of a comprehensive Facilities Master Plan to guide facilities planning and improvements for the next five years. The plan will address short and long term District goals and objectives and facilitate the Board of Trustees' ranking of priorities and consideration of future facility investments and improvements.

Proposal Due Date:
Thursday, May 26, 2016 at 2:00 p.m.

Mandatory Pre-Submittal Conference and Tour:
Tuesday, May 10, 2016
9:30 –11:30 a.m.

All questions received by May 5, 2016 will be answered at this conference.

Finalist Interviews:
Thursday, June 2, 2016 and Thursday, June 9, 2016

Portola Valley School District Office
Attention: Jonathan Barth, CBO
4575 Alpine Road
Portola Valley, CA 94028
Tel: 650-851-1777, ext. 2560
Email: rfp@pvsd.net
Website:http://www.pvsd.net/Page/468

Submitting firms shall have an office within 50 driving miles of the School District.

THE MacArthur Transit Community Partners, LLC ("MTCP"), is advertising for Bids for Plaza Improvements at MacArthur BART Station- General Contractor Selection, Bid Opening on April 22nd, 2016. The estimated value of this Contract is $2,600,000 to $2,800,000. BIDDERS MAY OBTAIN BID DOCUMENTS & INFORMATION ON THE MTCP WEBSITE: www.macarthurstation.com

PUBLIC NOTICES (NON-GOVERNMENT)

NOTICE OF PUBLIC UCC SALE
May 5, 2016

Please take notice that on May 5, 2016 at 10:00 a.m. prevailing Pacific Standard Time, at the offices of McGuireWoods LLP, 505 Sansome Street, Suite 700, San Francisco, California 94111, MidCap Financial Trust, a Delaware statutory trust, (as successor agent to MidCap Funding V, LLC, a Delaware limited liability company, "Agent"), will conduct a public auction for the sale of all of the right, title and interest of KineMed, Inc. ("Borrower") in certain assets of Borrower (the "Collateral", as defined more particularly herein) to the highest qualified bidder, pursuant to Section 9-610 et seq. of the Revised Uniform Commercial Code as adopted by the State of Maryland, other applicable law, the Credit Agreement (as defined herein) and other Financing Documents (as defined in the Credit Agreement). The sale may also be adjourned from time to time by announcement made at the time of the scheduled sale.

TERMS OF SALE
The Collateral is being sold by Agent, as the secured party on behalf of Lenders (as defined in the Credit Agreement) pursuant to that certain Credit and Security Agreement dated as of December 9, 2014 (as amended, restated, supplemented or otherwise modified from time to time, the "Credit Agreement") by and among Agent, Lenders (as defined therein) and Borrower.

The Collateral shall be sold as a whole lot, on a strictly "AS IS, WHERE IS" basis, with all faults, and without recourse to Agent or Lenders. The Collateral will be sold subject to any and all superior liens, including but not limited to, taxes and special assessments. Agent and Lenders make no representation or warranty, express or implied, as to the title, value, condition, merchantability or fitness for use of any of the Collateral or any other representation or warranty with respect to the Collateral whatsoever. The transfer of title of the Collateral will specifically state that "there is no warranty relating to title, possession, quiet enjoyment or the like in this disposition."

Prospective purchasers must be prepared to pay the full purchase price at the time of sale in cash or by bank cashier's check. Should the successful bidder fail to so deliver the purchase price, Agent reserves the right, in its sole discretion, to re-sell the Collateral, and any expenses or losses incurred from such sale shall be the responsibility of the defaulting successful bidder. The sale may be subject to such further conditions and provisions as may be announced at the start of the sale.

Agent fully reserves the right to bid at the sale and to credit bid all or any part of the total amount of the secured claims in partial or full satisfaction of the purchase price. Agent further reserves its right, on or prior to the sale date, to modify, waive or amend any terms or conditions of any sale or impose any other terms or conditions on any sale, and, if Agent deems appropriate, to reject any bids and/or to adjourn, delay or terminate the foreclosure sale.

DESCRIPTION OF COLLATERAL
The Collateral is described as follows:

The Collateral means all property, now existing or hereafter acquired, mortgaged or pledged to, or purported to be subjected to a Lien in favor of, Agent, for the benefit of Agent and Lenders, pursuant to the Credit Agreement and the other Financing Documents, including, without limitation, all of the following:

The Collateral consists of all assets of Borrower, including all of Borrower's right, title and interest in and to the following personal property:

(a) all goods, Accounts (including health-care insurance receivables), Equipment, Inventory, contract rights or rights to payment of money, leases, license agreements, franchise agreements, General Intangibles, commercial tort claims, documents, instruments (including any promissory notes), chattel paper (whether tangible or electronic), cash, deposit accounts, investment accounts, commodity accounts and other Collateral Accounts, all certificates of deposit, fixtures, letters of credit rights (whether or not the letter of credit is evidenced by a writing), securities, and all other investment property, supporting obligations, and financial assets, whether now owned or hereafter acquired, wherever located; and

(b) all Borrower's Books relating to the foregoing, and any and all claims, rights and interests in any of the above and all substitutions for, additions, attachments, accessories, accessions and improvements to and replacements, products, proceeds and insurance proceeds of any or all of the foregoing.

Pursuant to the terms of a certain negative pledge arrangement with Agent and Lenders, Borrower has agreed not to encumber any of its Intellectual Property without Agent's and Lenders' prior written consent.

Notwithstanding the foregoing, the Collateral shall not include any trademark or service mark applications pending in an intent-to-use phase until such time as a specimen of use is filed.

Capitalized terms used hereinabove, and not otherwise defined in this notice, shall have the meaning ascribed to them in the Credit Agreement.

INFORMATION
Any questions regarding the foregoing, including a request for more information, may be directed to counsel for the Agent, J. Trevor Johnston, McGuireWoods LLP, 201 N. Tryon St., Suite 3000, Charlotte, NC 28202, 704.343.2246 (phone) or **tjohnston@mcguirewoods.com** (email).

OPTUM Bank, Inc., 2525 Lake Park Blvd., West Valley City, UT, 84120 has submitted an application subject to the public notification requirements of the Bank Merger Act, whereby Optum Bank will acquire substantially all of the health savings account deposits of Wells Fargo Bank, N.A. 420 Montgomery Street, San Francisco, California 94101.

Any person wishing to comment on this application may file his or her comments in writing with the regional director of the Federal Deposit Insurance Corporation at the FDIC San Francisco Regional office at 25 Jessie Street at Ecker Square, Suite 2300, San Francisco, CA, 94105 not later than May 12, 2016. The nonconfidential portions of the application are on file at the appropriate FDIC office and are available for public inspection during regular business hours. Photocopies of the nonconfidential portion of the application file will be made available upon request.

PUBLIC NOTICES CITY

San Francisco Water Power Sewer

NOTICE OF PUBLIC HEARING Tuesday, May 10, 2016 – 1:30 PM City Hall, Room 400, 1 Dr. Carlton B. Goodlett Place, San Francisco, CA 94102, at a Regular Meeting of the San Francisco Public Utilities Commission (SFPUC), the governing board of the publicly owned utility operations of the City and County of San Francisco: Notice is hereby given that the SFPUC will conduct a public hearing to consider the Draft 2015 Urban Water Management Plan (UWMP) for the City and County of San Francisco. The detailed agenda and related files will be available at least 72 hours before the scheduled meetings at the SFPUC website www.sfwater.org, or by calling (415) 554-3165.

All interested parties are invited to attend the public hearing and present their views. Persons who are unable to attend the public hearing may also submit to the City, by the time the proceedings begin, written comments regarding the subject of the hearing. These comments will be brought to the attention of the Commission and will become part of the official public record. Written comments can be sent to Donna Hood, Commission Secretary, SFPUC, 525 Golden Gate Ave., 13th Floor, SF, CA 94102.

The Draft 2015 UWMP can be viewed and printed from the SFPUC website at www.sfwater.org/localwater (or enter "UWMP" in the search field located in the upper right hand corner of the homepage). A copy of the document is also available for review at the SF Public Library, Government Information Center, 5th Floor, 100 Larkin St., SF, CA 94102.

AVISO DE AUDIENCIA PÚBLICA martes, 10 de mayo, 2016 a la 1:30 pm Ayuntamiento de la ciudad, salón 400, 1 Dr. Carlton B. Goodlett Place, San Francisco, CA 94102, durante una reunión ordinaria de la Comisión de Utilidades Publicas de San Francisco (SFPUC), el consejo de administración de las operaciones de utilidades públicas de la ciudad y condado de San Francisco: Por la presente se notifica que la SFPUC llevará a cabo una audiencia pública para considerar el Plan de Administración de Aguas Urbanas del 2015 para la ciudad y condado de San Francisco. La agenda detallada y otra documentación relevante estará disponible por lo menos 72 horas antes de la reunión programada en el sitio web de la SFPUC www.sfwater.org, o llamando al (415) 554-3165.

公聽通告 2016年 5月10日星期二 - 三藩市 Dr. Carlton B. Goodlett Place 一 號市政廳四樓400號房， 三藩市縣及市政府屬下公營水電管理機構三藩市水利局委員會舉行之例會中，特此通告將考慮 2015年三藩市縣及市政府城市供水管理計劃草案，議程細節及有關擋案將於預定會議開始前最少 72小時在三藩市水力局網址www.sfwater.org 提供，也可致電 查詢 (415) 554-3165。

CNS-2872176#

ADVERTISEMENT FOR BIDS
CITY & COUNTY OF SAN FRANCISCO
PUBLIC UTILITIES COMMISSION
INFRASTRUCTURE DIVISION
Cathodic Protection for Transmission Pipelines at Various Locations, Phase I
Contract No. WD-2770

Sealed bids will be received at 525 Golden Gate Avenue, 3rd Floor-Tuolumne Room, San Francisco, CA 94102, until 2:00 P.M. on 6/2/2016. Hard copy versions of plans, specifications and bidding documents are available at 525 Golden Gate Avenue, 1st Floor, Customer Service Desk, San Francisco, CA 94102 for a non-refundable $150 fee paid by cash or by check payable to "SFPUC." Call (415) 551-4603 for further information. A CD version is available to paid Plan holders only for an additional fee of $10. Visit http://sfwater.org/contracts for updates. Please be advised that prior to receiving these materials, all purchasers will be required to complete, sign and fully comply with a Confidentiality Agreement.

This Project is subject to compliance monitoring and enforcement of prevailing wage requirements by the California Department of Industrial Relations ("DIR") and the San Francisco Office of Labor Standards Enforcement. No contractor or subcontractor may be listed in a bid for a public works project and no contractor or subcontractor may be awarded a contract for public work on a public works project unless registered with the DIR per California Labor Code Section 1725.5 [with limited exceptions from this requirement for bid purposes only under California Labor Code Section 1771.1(a)].

The objective of the project is to install an impressed current cathodic protection at 10 different locations as shown on the drawings. The work for each location will include the installation of the AC power to the rectifier, installation of a 300-ft deep anode, excavation to expose the pipeline to connect the 2 test leads from the pipe to the rectifier, miscellaneous items and associated conduits and wirings, and restoration of the excavated areas to match existing.. The work is to be performed in San Francisco and San Mateo County. The Engineer's estimate is $1,500,000. The Contract will be awarded to the lowest responsible and responsive bidder.

Bid discounts may be applied as per San Francisco Administrative Code Chapter 14B. The LBE Subcontracting Participation Requirement is 4% and ONLY San Francisco (Local) Small & Micro-LBEs can be utilized to meet this requirement (Firms certified by SF Contract Monitoring Division). SFPUC-LBEs cannot be utilized to meet the 4% LBE Subcontracting Participation Requirement. Please contact Jason Chow at 415-554-3103 for further information.

Interested bidders are encouraged to attend a pre-bid and contractor networking conference to be held at 525 Golden Gate Ave, 2th Floor, Conference Room, at 10:00am on May 10, 2016. Prime bidder's attendance at this conference is worth 15 points toward Chapter 14B "Good Faith Outreach" requirements. Bidders must achieve at least 80 points (out of a possible 100 points), as determined by CMD, to be deemed compliant with the "Good Faith Outreach" requirements, except those who exceed the above stated LBE subcontracting participation requirement by 35% under Section 14B.8(B) of the Administrative Code. A site inspection will be held at Bowdoin St & Woolsey St, San Francisco, at 1:00 PM on 5/10/2016.

A Class "A, C-10, C-57" California Contractors License is required to bid. Furthermore, each listed subcontractor must possess appropriate active licenses for the work each subcontractor will be performing.

In accordance with San Francisco Administrative Code ("Administrative Code") Chapter 6, no bid is accepted and no contract in excess of $600,000 is awarded by the City and County of San Francisco until such time as (a) the General Manager, SFPUC recommends the contract for award and (b) the SFPUC then adopts a resolution awarding the contract. Pursuant to Charter Section 3.105, all contract awards are subject to certification by the Controller as to the availability of funds.

Bidders are hereby advised that the Contractor to whom the Contract is awarded must be certified by the Contract Monitoring Division as being in compliance with the Equal Benefits Provisions of Chapter 12B of the City's Administrative Code within two weeks after notification of award by the SFPUC General Manager.

This Project is subject to the requirements of the San Francisco Local Hiring Policy for Construction ("Policy") as set forth in Section 6.22(g) of the Administrative Code. Bidders are hereby advised that the requirements of the Policy will be incorporated as a material term of any contract awarded for the Project. Refer to Contract Section 00 73 30 for more information.

If a bidder objects on any ground to any bid specification or legal requirement imposed by this Advertisement for Bids, the bidder shall, no later than the 10th working day prior to the date of Bid opening, provide written notice to the Manager, Contract Administration Bureau, setting forth with specificity the grounds for the objection.

FICTITIOUS BUSINESS NAMES

FICTITIOUS BUSINESS
NAME STATEMENT
FILE NO. A-0370082-00

The following person is doing business as: BQ Yumi, 1417 Powell St., S.F., CA, San Francisco County, CA 94133. Full name of registrant: Ya Mei Li, 2691 Northern Cross Rd., Hayward, CA 94545. This business is conducted by an individual.

The registrant commenced to transact business under the above-listed fictitious business name on: 3/23/16.

This statement was filed with the County Clerk of San Francisco on Mar 23, 2016.

Publication dates:
April 4, 11, 18, 25, 2016

FICTITIOUS BUSINESS
NAME STATEMENT
FILE NO. A-0322663-00

The following person is doing business as: Coin-Op Game Room, 508 4th Street, San Francisco, CA 94107. Full name of registrant #1: Lettuce Turnip Beet Enterprises, LLC (CA), 633 Kettner Blvd, San Diego, CA 92101. This business is conducted by an individual.

The registrant commenced to transact business under the above listed fictitious business name on 04/01/2016.

This statement was filed with the County Clerk of San Francisco on: April 5, 2016.

April 11, 18, 25, May 2.

Unseen dangers of ransomware

Hackers from page D1

only a criminal hacker holding the key can unlock them. Typically, a digital extortionist charges between $200 and $10,000 to decrypt the files, often asking for payment in bitcoin, a virtual currency which is hard to trace.

At Catholic Charities, the malware began encrypting files on the receptionist's machine almost immediately. But the nonprofit was lucky: It had been testing a device from Darktrace that scans the network for unusual behavior — like a desktop in San Jose contacting a server in Ukraine.

A Darktrace analyst in New York City swiftly noticed that something was amiss and alerted the charity's information-technology staff. A colleague disconnected Perez's computer from the charity's network. A few of the files on the computer had been encrypted but no real harm was done.

When ransomware isn't caught early, it can be extremely costly. From January to the end of March, the FBI received reports of more than $209 million in losses due to such attacks. Two large complaints accounted for most of that amount.

In some cases, the FBI has even recommended that ransomware victims who haven't backed up their files pay up rather than try to crack the encryption. In February, Hollywood Presbyterian Medical Center administrators paid digital ransomers about $17,000 to gain back control of their network.

Darktrace, a cybersecurity startup with headquarters in San Francisco and the United Kingdom, does not think it — or anyone — will be able to identify the sender of the suspicious email.

"I'd be really surprised if … you traced back the attackers and (they) were actually in the same country," said Dave Palmer, the director of technology for Darktrace, referring to the Eastern European origins of the attack. "They could have just as easily been American citizens that were using infrastructure in Romania, or Ukraine."

Ransomware often contains code that frequently changes the location of the servers it connects to, making it hard to trace. Thieves sometimes place hostile code for short periods on machines paid for with stolen credit cards, quickly moving between legitimate providers before any malicious activity is reported.

"You'll be gone 14 hours later," Palmer said. "So it doesn't matter if the feds track you down, because you've already moved on. It's just quite a neat way of not really worrying about the law enforcement side of things."

Gangs that typically use the type of ransomware that attacked the charity often just email entire lists of potential victims, said Palmer.

Nonprofits, schools and municipalities — organizations traditionally without big budgets for cybersecurity — are especially vulnerable.

Catholic Charities has an annual budget of about $35 million, according to Will Bailey, its director of information technology, who said it spends roughly $600,000 on IT. That mostly goes for salaries of Bailey and several other full-time staff members.

That team is responsible for more than 500 employees and 300-plus devices. Some work remotely, while others are spread out in churches and offices from San Jose to Gilroy.

In September, the Arc of Winnebago, Boone and Ogle Counties, an Illinois nonprofit, reportedly paid a $700 ransom in bitcoin in order to rescue 10 computers and an in-house server.

And last week, a public utility in Lansing, Mich., had its email, phones, printers and other equipment shut down by ransomware, according to the Lansing State Journal.

Had the infection spread beyond that one desktop PC at Catholic Charities, the nonprofit could have spent thousands of dollars restoring its files, Bailey said.

If it hadn't caught it and stopped it in its tracks by taking the machine offline, he said, "Who knows what could have happened?"

Sean Sposito is a San Francisco Chronicle staff writer. Email: ssposito@sfchronicle.com Twitter: @seansposito

PayPal's Venmo getting investigated by the FTC

Venmo from page D1

Mayfield confirmed that the company is under investigation but declined to provide additional details.

PayPal spokeswoman Amanda Miller said the company is cooperating with the commission.

"We are completely aligned with regulators in their efforts to ensure that consumers have positive experiences when using our services," Miller said in an email. "We consult and collaborate with regulators and work hard to comply with laws and regulations in the markets where we do business, around the world."

The Federal Trade Commission Act generally prohibits unfair and deceptive practices across a wide range of industries. Often, violations of the act amount to a lack of disclosure about fees or other practices.

In the case of Venmo, there's little indication of what the commission could be looking for.

The service, which allows users to send money to each other using a smartphone app, is free for users who link their Venmo accounts to bank accounts or most debit cards. Venmo charges a 3 percent fee to transfer money from credit cards and some debit cards.

The investigation comes as California and federal regulators, including the Consumer Financial Protection Bureau and the Office of the Comptroller of the Currency, which oversees banks, have taken a more active interest in financial technology firms.

Though much of regulators' focus so far has been on online lenders, Venmo has attracted regulatory scrutiny before. In 2014, the company was reprimanded by the California Department of Business Oversight in connection with consumer privacy issues and fraud-prevention practices.

Venmo is one of PayPal's fastest-growing business lines, with the volume of money transferred through the service hitting $3.2 billion in the first three months of this year — up more than 150 percent from the same period in 2015.

But PayPal brings in relatively little revenue from Venmo, given that many users pay no fees. The company reported that the FTC investigation could lead to "substantial costs" in the form of legal fees, fines and other expenses.

Ship traffic

Due to arrive Monday

SHIP	FROM	PORT
CAP Palliser	Long Beach	OAK
CAP Taputapu	Long Beach	OAK
Manoa	Seattle	OAK
Spring R	Los Angeles	OAK

Due to depart Monday

SHIP	TO	PORT
CAP Taputapu	Papeete, Tahiti	OAK
Ever Sigma	Tacoma, Wash.	OAK
OOCL Luxembourg	Hong Kong	OAK
Seaspan Chiwan	Seattle	OAK
Spring R	Tokyo	OAK

Source: San Francisco Marine Exchange

LEGAL NOTICES

legalnotice.org/pl/sfgate

PUBLIC NOTICES

1. NOTICE TO DESIGN BUILD ENTITIES

NOTICE IS HEREBY GIVEN that the San Mateo County Community College District of San Mateo, California, acting through its Governing Board, hereinafter the District, invites Design-Build Entities (DBE) to a Pre-Qualification Conference for an upcoming Design-Build project.

RFSOQ 86730
CAÑADA BUILDING 1, NEW KINESIOLOGY AND WELLNESS BUILDING AND AQUATICS CENTER PROJECT
Cañada College
Redwood City, CALIFORNIA

The project generally consists of the demolition of an existing athletics building of approximately 41,000 SF, followed by the construction of a new 85,000 SF kinesiology and wellness building on the same site, with two swimming pools. Potential Applicants may access the RFSOQ documents through the District's Online Vendor Portal (PlanetBids) at: **https://www.planetbids.com/portal/portal.cfm?CompanyID=20507&BidID=26180.**

A representative from the General Contractor and/or Architect of Record member of a proposed DBE must attend one of two mandatory conferences to discuss this Request for Statement of Qualifications (RFSOQ) and the delivery process. Other potential members of DBEs, such as design consultants and specialty trade contractors are encouraged to attend. These conferences will be held in the Board Room at the District Office, 3401 CSM Drive, San Mateo, California, 94402 at 2:30 PM, on Tuesday, May 10, 2016 and at 2:30 PM on Thursday, May 12, 2016. The doors to the meeting will be secured at 15 minutes past the start of the meeting. Those who arrive after that time will be turned away. Interested parties are advised to arrive early in order to park and obtain a parking pass from parking permit machines.

The District intends to solicit proposals from the three (3) most highly qualified Design-Build Entities for the project. The District intends to contract with the Design-Build Entity that can clearly demonstrate the Best Value to the District for the project.

The San Mateo County Community College District is an equal opportunity employer.

Board of Trustees
San Mateo County Community College District
Tom Mohr, Vice President-Clerk

Published: May 2, 2016
May 9, 2016

PORTOLA VALLEY SCHOOL DISTRICT
4575 Alpine Road
Portola Valley, CA 94028

REQUEST FOR QUALIFICATIONS AND PROPOSALS FOR FACILITIES MASTER PLAN SERVICES

NOTICE IS HEREBY GIVEN that the Board of Trustees of the Portola Valley School District, located in San Mateo County, California hereby invites and will receive proposals for Facilities Master Plan services.

The Portola Valley School District ("District") will be considering proposals to provide facility master planning services from qualified consultant teams to assist the District with the preparation of a comprehensive Facilities Master Plan to guide facilities planning and improvements for the next five years. The plan will address short and long term District goals and objectives and facilitate the Board of Trustees' ranking of priorities and consideration of future facility investments and improvements.

Proposal Due Date:
Thursday, May 26, 2016 at 2:00 p.m.

Mandatory Pre-Submittal Conference and Tour:
Tuesday, May 10, 2016
9:30 –11:30 a.m.

PUBLIC NOTICES

All questions received by May 5, 2016 will be answered at this conference.

Finalist Interviews:
Thursday, June 2, 2016 and Thursday, June 9, 2016

Portola Valley School District Office
Attention: Jonathan Barth, CBO
4575 Alpine Road
Portola Valley, CA 94028
Tel: 650-851-1777, ext. 2560
Email: rfp@pvsd.net
Website:http://www.pvsd.net/Page/468

Submitting firms shall have an office within 50 driving miles of the School District.

PUBLIC NOTICES CITY

NOTICE OF PUBLIC HEARING Tuesday, May 10, 2016 – 1:30 PM City Hall, Room 400, 1 Dr. Carlton B. Goodlett Place, San Francisco, CA 94102, at a Regular Meeting of the San Francisco Public Utilities Commission (SFPUC), the governing board of the publicly owned utility operations of the City and County of San Francisco: Notice is hereby given that the SFPUC will conduct a public hearing to consider the Draft 2015 Urban Water Management Plan (UWMP) for the City and County of San Francisco. The detailed agenda and related files will be available at least 72 hours before the scheduled meetings at the SFPUC website www.sfwater.org, or by calling (415) 554-3165.

All interested parties are invited to attend the public hearing and present their views. Persons who are unable to attend the public hearing may also submit to the City, by the time the proceedings begin, written comments regarding the subject of the hearing. These comments will be brought to the attention of the Commission and will become part of the official public record. Written comments can be sent to Donna Hood, Commission Secretary, SFPUC, 525 Golden Gate Ave., 13th Floor, SF, CA 94102.

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CNS-2872176#

PUBLIC NOTICES (NON-GOVERNMENT)

NOTICE OF PUBLIC UCC SALE
May 5, 2016

Please take notice that on May 5, 2016 at 10:00 a.m. prevailing Pacific Standard Time, at the offices of McGuireWoods LLP, 505 Sansome Street, Suite 700, San Francisco, California 94111, MidCap Financial Trust, a Delaware statutory trust, (as successor agent to MidCap Funding V, LLC, a Delaware limited liability company, "Agent"), will conduct a public auction for the sale of all of the right, title and interest of KineMed, Inc. ("Borrower") in certain assets of Borrower (the "Collateral", as defined more particularly herein) to the highest qualified bidder, pursuant to Section 9-610 et seq. of the Revised Uniform Commercial Code as adopted by the State of Maryland, other applicable law, the Credit Agreement (as defined herein) and other Financing Documents (as defined in the Credit Agreement). The sale may also be adjourned from time to time by announcement made at the time of the scheduled sale.

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The Collateral is being sold by Agent, as the secured party on behalf of Lenders (as defined in the Credit Agreement) pursuant to that certain Credit and Security Agreement dated as of December 9, 2014 (as amended, restated, supplemented or otherwise modified from time to time, the "Credit Agreement") by and among Agent, Lenders (as defined therein) and Borrower.

The Collateral shall be sold as a whole lot, on a strictly "AS IS, WHERE IS" basis, with all faults, and without recourse to Agent or Lenders. The Collateral will be sold subject to any and all superior liens, including but not limited to, taxes and special assessments. Agent and Lenders make no representation or warranty, express or implied, as to the title, value, condition, merchantability or fitness for use of any of the Collateral or any other representation or warranty with respect to the Collateral whatsoever. The transfer of title of the Collateral will specifically state that "there is no warranty relating to title, possession, quiet enjoyment or the like in this disposition."

Prospective purchasers must be prepared to pay the full purchase price at the time of sale in cash or by bank cashier's check. Should the successful bidder fail to so deliver the purchase price, Agent reserves the right, in its sole discretion, to re-sell the Collateral, and any expenses or losses incurred from such sale shall be the responsibility of the defaulting successful bidder. The sale may be subject to such further conditions and provisions as may be announced at the start of the sale.

Agent fully reserves the right to bid at the sale and to credit bid all or any part of the total amount of the secured claims in partial or full satisfaction of the purchase price. Agent further reserves its right, on or prior to the sale date, to modify, waive or amend any terms or conditions of any sale or impose any other terms or conditions on any sale, and, if Agent deems appropriate, to reject any bids and/or to adjourn, delay or terminate the foreclosure sale.

DESCRIPTION OF COLLATERAL

PUBLIC NOTICES (NON-GOVERNMENT)

The Collateral is described as follows:

The Collateral means all property, now existing or hereafter acquired, mortgaged or pledged to, or purported to be subjected to a Lien in favor of, Agent, for the benefit of Agent and Lenders, pursuant to the Credit Agreement and the other Financing Documents, including, without limitation, all of the following:

The Collateral consists of all assets of Borrower, including all of Borrower's right, title and interest in and to the following personal property:

(a) all goods, Accounts (including health-care insurance receivables), Equipment, Inventory, contract rights or rights to payment of money, leases, license agreements, franchise agreements, General Intangibles, commercial tort claims, documents, instruments (including any promissory notes), chattel paper (whether tangible or electronic), cash, deposit accounts, investment accounts, commodity accounts and other Collateral Accounts, all certificates of deposit, fixtures, letters of credit rights (whether or not the letter of credit is evidenced by a writing), securities, and all other investment property, supporting obligations, and financial assets, whether now owned or hereafter acquired, wherever located; and

(b) all Borrower's Books relating to the foregoing, and any and all claims, rights and interests in any of the above and all substitutions for, additions, attachments, accessories, accessions and improvements to and replacements, products, proceeds and insurance proceeds of any or all of the foregoing.

Pursuant to the terms of a certain negative pledge arrangement with Agent and Lenders, Borrower has agreed not to encumber any of its Intellectual Property without Agent's and Lenders' prior written consent.

Notwithstanding the foregoing, the Collateral shall not include any trademark or service mark applications pending in an intent-to-use phase until such time as a specimen of use is filed.

Capitalized terms used hereinabove, and not otherwise defined in this notice, shall have the meaning ascribed to them in the Credit Agreement.

INFORMATION
Any questions regarding the foregoing, including a request for more information, may be directed to counsel for the Agent, J. Trevor Johnston, McGuireWoods LLP, 201 N. Tryon St., Suite 3000, Charlotte, NC 28202, 704.343.2246 (phone) or **tjohnston@mcguirewoods.com** (email).

PUBLIC NOTICES CITY

NOTICE OF FUNDS AVAILABILITYTRAINING FAMILY SUPPORT WORKFORCE

First 5 San Francisco announces the Availability of Funds for Training Family Support Workforce. Approximately $158,000 is available for the period of 07/01/2016 to 06/30/2017 and provisionally renewable up to one year. Funding supports training of human service agencies serving San Francisco families. Final awards and renewals are subject to availability of funds, grant terms, negotiations and rights reserved to funder.

The Request for Qualifications will be released on or about 05/02/2016. The RFQ may be downloaded from www.first5sf.org or picked up in person 9 am – 4:30 pm, Monday – Friday, at First 5 San Francisco, 1390 Market St, Ste 318, San Francisco. A non-mandatory bidder's conference will take place on May 16, 2016 at 10:30 a.m. at 1390 Market St., San Francisco, Suite 318. A mandatory letter of intent to apply is due May 20, 2016. Proposals are due no later than 5 p.m. on 06/02/2016. Guidelines are noted in the RFQ.

For more information, contact Derik Aoki at derik@first5sf.org.

ADVERTISEMENT FOR BIDS CITY & COUNTY OF SAN FRANCISCO

PUBLIC NOTICES CITY

PUBLIC UTILITIES COMMISSION - INFRASTRUCTURE DIVISION

Job Order Contracts, General Building (B-license), San Francisco, San Mateo, and Alameda Counties Contract No. JOC-63 and JOC-64

Sealed bids will be received at 525 Golden Gate Avenue, 3rd Floor, Tuolumne Conference Room, San Francisco, CA 94102, until 2:00 P.M. on 6/16/2016. Bids that are hand-delivered, mailed, or sent by messenger prior to 12:00 P.M. on the day of bid shall be delivered to: SFPUC Contract Administration Bureau, 525 Golden Gate Avenue, 8th Floor, San Francisco, CA 94102, Attention: Pauline Lam. These two Job Order Contracts (JOC) are being advertised simultaneously, utilizing the same Project Manual, Construction Task Catalog, CD, and bid opening time, but with separate bid form packages that can be found on http://sfwater.org/contracts. While a contractor may submit bids on both contracts, according to Chapter 6 of the San Francisco Administrative Code, a contractor may be awarded only one JOC with the SFPUC. The Contract will be awarded to the lowest responsible responsive bidder.

A JOC is an indefinite quantity contract in which the SFPUC may accomplish a series of projects with a single, competitively bid contract awarded before the projects are identified. The bid documents include a Construction Task Catalog® with preset Unit Prices. All Unit Prices are based on local labor, material and equipment prices and for the direct cost of construction. Contractors bid two Adjustment Factors to the pre-set Unit Prices for performing work during Normal Working Hours and Other Than Normal Working Hours. Work is accomplished by issuing Task Orders during the four year term of this contract.

The Maximum Contract Amount for each is $5,000,000.00. The cumulative value of Task Orders will not exceed the Maximum Contract Amount. A bid bond in the amount of 10% of the Maximum Contract Amount will be required with your bid package.

Eligible bidders must hold an active and current "B" California Contractors License to bid. In addition to a B-License, the prime bidder must have successfully completed five public works projects within the past five years, each project with a minimum construction value of $1,000,000. Furthermore, each listed subcontractor must possess appropriate active licenses for the work that will be performed.

Per Administrative Code Chapter 14B, LBE bid discounts may be applied. For each Contract, the LBE Subcontracting Participation Requirement is 20.00% for Small and Micro-LBEs. Only Contract Monitoring Division (CMD) certified San Francisco Small and Micro-LBEs can be utilized to meet this requirement. The subcontractors designated as LBEs must be certified for the listed trade in order to count towards the participation requirement. For more information, please contact Regina Chan at (415) 551-4335 for JOC-63 and Mindy Lee at (415) 554-3136 for JOC-64. Please refer to http://sfwater.org/contracts for subcontracting opportunities.

Interested bidders are encouraged to attend a pre-bid and contractor networking conference to be held on Wednesday, May 18, 2016, at 9AM, 525 Golden Gate Ave., 3rd Floor, Tuolumne Conference Room, SF, CA 94102. Prime bidder's attendance at this conference is worth 15 points toward Chapter 14B "Good Faith Outreach" requirements. Bidders must achieve at least 80 points (out of a possible 100 points), as determined by CMD, to be deemed compliant with the "Good Faith Outreach" requirements, except those who exceed the above stated LBE subcontracting participation requirement by 35% under Section 14B.8(B) of the Administrative Code.

In accordance with Administrative Code Chapter 6, no bid is accepted and no contract in excess of $600,000 is awarded by the City and County of San Francisco until such time as (a) the General Manager, SFPUC recommends the contract for award and (b) the SFPUC then adopts a resolution awarding the contract. Pursuant to Charter Section 3.105, all contract awards are subject to certification by the Controller as to the availability of funds.

PUBLIC NOTICES CITY

Bidders are advised that the Contractor to whom the Contract is awarded must be certified by CMD as being in compliance with the Equal Benefits Provisions of Chapter 12B of the City's Administrative Code within fourteen calendar days after notification of award by the SFPUC General Manager.

This Project is subject to compliance monitoring and enforcement of prevailing wage requirements by the California Department of Industrial Relations ("DIR") and the San Francisco Office of Labor Standards Enforcement. No contractor or subcontractor may be listed in a bid for a public works project, and no contractor or subcontractor may be awarded a contract for public work on a public works project unless registered with the DIR per California Labor Code Section 1725.5 [with limited exceptions from this requirement for bid purposes only under California Labor Code Section 1771.1(a)].

This Project is subject to the requirements of the San Francisco Local Hiring Policy for Construction ("Policy") as set forth in Section 6.22(g) of the Administrative Code. Bidders are hereby advised that the requirements of the Policy will be incorporated as a material term of any contract awarded for the Project. Refer to Contract Document 00820 for more information

If a bidder objects on any ground to any bid specification or legal requirement imposed by this Advertisement for Bids, the bidder shall, not more than the 10th working day prior to the date of Bid opening, provide written notice to the Manager, Contract Administration Bureau, setting forth with specificity the grounds for the objection.

FICTITIOUS BUSINESS NAMES

FICTITIOUS BUSINESS NAME STATEMENT
FILE NO. A-0370737-00

The following person is doing business as: Viva Beauti 990 Plymouth Avenue San Francisco CA 94112. Full name of registrant #1: Vivian Leung 990 Plymouth Avenue San Francisco CA 94112. This business is conducted by an individual.

The registrant commenced to transact business under the above-listed fictitious business name on not applicable.

This statement was filed with the County Clerk of San Francisco on: April 29, 2016
Publication dates:
May 2, 9, 16, 23 2016

FICTITIOUS BUSINESS
NAME STATEMENT
FILE NO. A-0322663-00

The following person is doing business as: Coin-Op Game Room, 508 4th Street, San Francisco, CA 94107. Full name of registrant #1: Lettuce Turnip Beet Enterprises, LLC (CA), 633 Kettner Blvd, San Diego, CA 92101. This business is conducted by an individual.

The registrant commenced to transact business under the above listed fictitious business name on 04/01/2016.

This statement was filed with the County Clerk of San Francisco on: April 5, 2016.

April 11, 18, 25, May 2.

Lau, Fan

From: Davis, Matthew (LIB) <Matthew.Davis@sfpl.org>
Sent: Thursday, April 14, 2016 2:53 PM
To: Lau, Fan
Subject: RE: Please confirm receipt of Draft 2015 UWMP

Hi Fan Lau,
I have received the 2 copies of the Public Review Draft of the San Francisco Public Utilities Commission (SFPUC) 2015 Urban Water Management Plan (UWMP). The copies are available for viewing now. The catalog record is in the process of being created for them, but they are at the Government Information reference desk.
Thanks,
Matthew

Matthew Davis
San Francisco Documents Librarian
San Francisco Public Library, Government Information Center
100 Larkin Street, 5th Floor
San Francisco, CA 94102
415-557-4473
I work a Sunday to Thursday schedule.

From: Lau, Fan [mailto:FLau@sfwater.org]
Sent: Thursday, April 14, 2016 1:40 PM
To: Davis, Matthew (LIB)
Subject: Please confirm receipt of Draft 2015 UWMP

Hi Matthew,

Concerning the Public Review Draft of the San Francisco Public Utilities Commission (SFPUC) 2015 Urban Water Management Plan (UWMP), please confirm that the Government Information Center at the San Francisco Public Library:

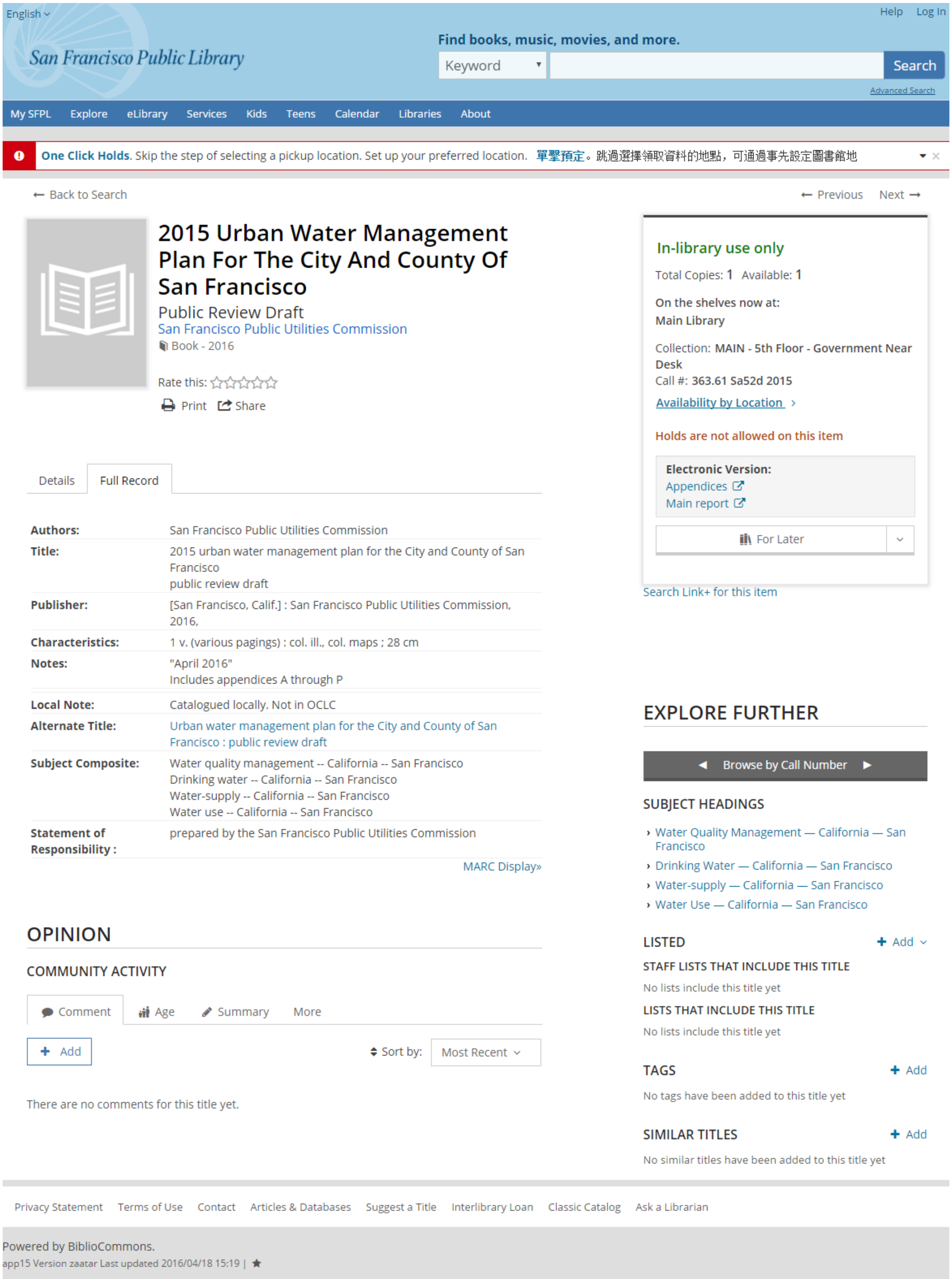
(1) Has received via hand-delivery two printed copies of the document
(2) Will make these copies available for public review starting today, Thursday, April 14, 2016, through close of business Friday, May 13, 2016.

In addition, the document is available online at the SFPUC's web site. Feel free to provide any of the following URLs through the library's catalog:

- Web page announcement: http://sfwater.org/index.aspx?page=75
- Direct link to UWMP: http://www.sfwater.org/Modules/ShowDocument.aspx?documentID=8839
- Direct link to UWMP Appendices: http://www.sfwater.org/Modules/ShowDocument.aspx?documentID=8838

Thank you!

Fan Lau, P.E.
Water Resources Division
San Francisco Public Utilities Commission
525 Golden Gate Ave., 10th Floor | San Francisco, CA 94102
(415) 554-2498 | FLau@sfwater.org



One Click Holds. Skip the step of selecting a pickup location. Set up your preferred location. 單擊預定。跳過選擇領取資料的地點，可通過事先設定圖書館地

2015 Urban Water Management Plan For The City And County Of San Francisco

Public Review Draft

San Francisco Public Utilities Commission

Book - 2016

Authors:	San Francisco Public Utilities Commission
Title:	2015 urban water management plan for the City and County of San Francisco public review draft
Publisher:	[San Francisco, Calif.] : San Francisco Public Utilities Commission, 2016,
Characteristics:	1 v. (various pagings) : col. ill., col. maps ; 28 cm
Notes:	"April 2016" Includes appendices A through P
Local Note:	Catalogued locally. Not in OCLC
Alternate Title:	Urban water management plan for the City and County of San Francisco : public review draft
Subject Composite:	Water quality management -- California -- San Francisco Drinking water -- California -- San Francisco Water-supply -- California -- San Francisco Water use -- California -- San Francisco
Statement of Responsibility :	prepared by the San Francisco Public Utilities Commission

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Collection: MAIN - 5th Floor - Government Near Desk
Call #: 363.61 Sa52d 2015

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Electronic Version:
Appendices
Main report

Search Link+ for this item

OPINION

COMMUNITY ACTIVITY

There are no comments for this title yet.

EXPLORE FURTHER

SUBJECT HEADINGS

- Water Quality Management — California — San Francisco
- Drinking Water — California — San Francisco
- Water-supply — California — San Francisco
- Water Use — California — San Francisco

LISTED

STAFF LISTS THAT INCLUDE THIS TITLE

No lists include this title yet

LISTS THAT INCLUDE THIS TITLE

No lists include this title yet

TAGS

No tags have been added to this title yet

SIMILAR TITLES

No similar titles have been added to this title yet

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

SAN FRANCISCO PUBLIC UTILITIES COMMISSION
City and County of San Francisco

Edwin M. Lee
MAYOR

AGENDA
Tuesday, May 10, 2016

1:30 P.M.
1 Dr. Carlton B. Goodlett Place
City Hall, Room 400
San Francisco, CA 94102

Commissioners
Francesca Vietor, President
Anson Moran, Vice President
Ann Moller Caen
Vince Courtney
Ike Kwon

Harlan L. Kelly, Jr.
General Manager

Donna Hood
Secretary

For information, contact the Commission Secretary at 554-3165.
Minutes and other information are available on the SFPUC web site:
www.sfwater.org
Gavel-to-Gavel coverage available at:
http://sanfrancisco.granicus.com/ViewPublisher.php?view_id=22

Accessible Meeting Policy: The San Francisco Public Utilities Commission meeting will be held in Room 400, at 1 Dr. Carlton B. Goodlett Place (400 Van Ness Ave.), San Francisco, CA. The closest accessible BART station is the Civic Center Station at United Nations Plaza and Market Street. Accessible MUNI lines serving this location are: MUNI Metro Lines J-Church, K-Ingleside, L-Taraval, M-Ocean View, N-Judah and T-Third at Van Ness and Civic Center Stations; F-Market; 19-Polk, 47-Van Ness; 49-Mission-Van Ness; 5-Fulton; 6-Parnassus, 21-Hayes; 9-San Bruno; and 71-Haight Noriega. For information about MUNI accessible services call 701.4485.

The meeting room is wheelchair accessible. Accessible curbside parking spaces have been designated on the Van Ness Avenue and McAllister Street perimeters of City Hall for mobility-impaired persons. There is accessible parking available within the Civic Center Underground Parking Garage at the corner of McAllister and Polk Streets, and within the Performing Arts Parking Garage at Grove and Franklin Streets.

To obtain a disability-related accommodation, including auxiliary aids or services, or to obtain meeting materials in alternative format, please contact Donna Hood at 415.554.0761. Providing at least 72 hours notice will help to ensure availability. Written reports or background materials for calendar items are available for public inspection and copying at 525 Golden Gate Ave., 13th Floor during regular business hours and are available on-line at http://www.sfwater.org/index.aspx?page=167.

To assist the City's efforts to accommodate persons with severe allergies, environmental illnesses, multiple chemical sensitivity or related disabilities, attendees at public meetings are reminded that other attendees may be sensitive to various chemical based products. Please help the City to accommodate these individuals.

The ringing of and use of cell phones, pagers and similar sound-producing electronic devices are prohibited at this meeting. Please be advised that the President may order the removal from the meeting room of any person(s) responsible for the ringing or use of a cell phone, pager, or other similar sound-producing electronic devices.

Know Your Rights Under the Sunshine Ordinance: Government's duty is to serve the public, reaching its decision in full view of the public. Commissions, boards, councils and other agencies of the City and County exist to conduct the people's business. This ordinance assures that deliberations are conducted before the people and that City operations are open to the people's review. For more information on your rights under the Sunshine Ordinance or to report a violation of the ordinance, contact Administrator, by mail to Sunshine Ordinance Task Force, 1 Dr. Carlton B. Goodlett Place, Room 244, San Francisco, CA 94102.4689; by phone at 554.7724; by fax at 554.7854; or by email at sotf@sfgov.org.

Copies of the Sunshine Ordinance can be obtained from the Clerk of the Sunshine Task Force, the San Francisco Public Library and on the City's website at http://www.sfgov.org.

☎ **311 Free Language Assistance**: 免費語言協助 / Ayuda gratuita con el idioma / Бесплатная помощь переводчиков / Trợ giúp Thông dịch Miễn phí / Assistance linguistique gratuite / 無料の言語支援 / 무료 언어 / 지원 / คว“มชว่ ยเหลอื ท“งภ“ษ“โดยไมเ่ ส’ยคาใชจ้ าย / Libreng tulong para sa wikang Tagalog ยเหลอื

Lobbyist Registration and Reporting Requirements: Individuals and entities that influence or attempt to influence local legislative or administrative action may be required by the San Francisco Lobbyist Ordinance [SF Campaign & Governmental Conduct Code §2.100] to register and report lobbying activity. For more information about the Lobbyist Ordinance, please contact the San Francisco Ethics Commission at 25 Van Ness Avenue, Suite 220, San Francisco, CA 94102; telephone (415) 252-3100; fax (415) 252-3112; web site at www.sfgov.org/ethics.

CEQA Appeal Rights under Chapter 31 of the San Francisco Administrative Code: If the Commission's action on a project constitutes the Approval Action for that project (as defined in S.F. Administrative Code Chapter 31, as amended, Board of Supervisors Ordinance Number 161-13), then the CEQA determination prepared in support of that Approval Action is thereafter subject to appeal within the time frame specified in S.F. Administrative Code Section 31.16. Typically, an appeal must be filed within 30 calendar days of the Approval Action for a project that has received an exemption or negative declaration pursuant to CEQA. For information on filing an appeal under Chapter 31, contact the Clerk of the Board of Supervisors at City Hall, 1 Dr. Carlton B. Goodlett Place, Room 244, San Francisco, CA 94102, or call (415) 554-5184. If the Planning Department's Environmental Review Officer has deemed a project to be exempt from further environmental review, an exemption determination has been prepared and can be obtained on-line at http://www.sf-planning.org/index.aspx?page=3447.Under CEQA, in a later court challenge, a litigant may be limited to raising only those issues previously raised at a hearing on the project or in written correspondence delivered to the Board of Supervisors, Planning Commission, Planning Department or San Francisco Public Utilities Commission at, or prior to, such hearing, or as part of the appeal hearing process on the CEQA decision.

ORDER OF BUSINESS

1. Call to Order

2. Roll Call

3. Approval of the Minutes of April 26, 2016

4. General Public Comments
   Members of the public may address the Commission on matters that are within the Commission's jurisdiction and are not on today's agenda.

5. Communications
   a) Advance Calendar
   b) Contract Advertisement Report
   c) PG&E Retail Rate Changes, March 2016
   d) Water System Improvement Program Status of Construction Change Orders

6. Other Commission Business

7. Citizens' Advisory Committee Resolutions (Aragon)

8. Report of the General Manager
   a) Employee Retirement: Herbert Dang (Moala)
   b) Drought Update (Ritchie)
   c) CleanPowerSF Update (Hale)
   d) Update on Outreach and Engagement for the Southeast Community Facility and Greenhouses (Ellis)
   e) Update on State Legislation Regarding CalEnviroScreen (Ellis)
   f) Water Enterprise Capital Improvement Program Quarterly Reports (How)
   g) Quarterly Budget Status Report (Sandler)
   h) Quarterly Audit and Performance Review Report (Hom)
      - FY 2014-15 Wholesale Revenue Requirement, Statement of Changes in Balancing Account
      - FY 2014-15 City and County of San Francisco Basic Financial Statements and Single Audit Report
      - WSIP: Sunol Valley Water Treatment Plant Change Order Review

9. Water System Improvement Program Quarterly Update and Report (Wade)
   - Regional Report
   - Local Report

The following matters before the San Francisco Public Utilities Commission are recommended for action as stated by the General Manager and City Attorney here applicable. Explanatory documents provided to the Commission in connection with this agenda are available for public inspection and copying at the Office of the Commission Secretary, 525 Golden Gate Avenue, 13th Floor, San Francisco, CA 94102, Telephone: (415) 554-3165; Fax: (415) 554-3424.

CONSENT CALENDAR

10. *All matters listed hereunder constitute a Consent Calendar, are considered to be routine by the San Francisco Public Utilities Commission, and will be acted upon by a single vote of the Commission. There will be no separate discussion of these items unless a member of the Commission or the public so requests, in which event the matter will be removed from the Calendar and considered as a separate item.*

    a) **Accept** work performed by NTK Construction, Inc., for **Contract No. WW-525**, Southeast Water Pollution Control Plant Northside Facility Reliability Upgrades Phase II, for a total contract amount of $12,948,553; **Approve** Modification No. 13 (Final), **extending the contract duration by 231 consecutive calendar days** (eight months) for a total contract duration of 1,237 consecutive calendar days (three years and five months); and **authorize** final payment to the contractor. (How)

    b) **Approve** the plans and specifications and **award Contract No. WW-570**, Oceanside Water Pollution Control Plant and Westside Pump Station HVAC Upgrades, **in the amount of $6,138,000**, to the lowest, qualified, responsible and responsive bidder, Blocka Construction, Inc., to replace and upgrade the existing deficient and deteriorated Heating, Ventilation, and Air Conditioning systems and associated equipment at Oceanside Water Pollution Control Plant and Westside Pump Station. (How)

    c) **Approve** the plans and specifications and **award Contract No. WW-623**, SOMA/Bernal Heights/Excelsior Districts Sewer Replacement and Pavement Renovation, **in the amount of $5,476,828**, to the lowest, qualified, responsible and responsive bidder, Precision Engineering, Inc., to replace the existing sewers and street pavement on the subject streets in San Francisco. This proposed action constitutes the Approval Action for the project for purposes of the California Environmental Quality Act, pursuant to Section 31.04(h) of the San Francisco Administrative Code. (How)

REGULAR SESSION

11. **Public Hearing: Discussion and possible action to adopt a proposed new schedule of rates, fees and charges for Hetch Hetchy Power Enterprise electric utility service for certain municipal customers or other public or governmental agencies, to be applied to meter readings on or after July 1, 2016**. (Sandler)

12. **Public Hearing: Discussion and possible action to adopt a proposed new schedule of retail electric rates, fees and charges for residential, commercial and industrial customers where the Hetch Hetchy Power Enterprise has been designated as the power provider for retail customers (not municipal or certain existing public agency customers), to be applied to meter readings on or after July 1, 2016.** (Sandler)

13. **Public Hearing: Discussion and possible action to adopt a Customer Self-Generation Program Implementing Net Energy Metering (NEM) and Shared Renewable Energy (ShaRE) Schedule**, which would:

(1) Direct the General Manager to implement a NEM schedule for SFPUC retail electricity customers as required by Public Utilities Code 2827;
(2) Find that based on the results of the Customer Generation Pilot Program (at Pier 1 and Fort Mason), ShaRE will not increase the expected revenue requirement from non-participating customers (i.e., cause cost shifting) beyond what would otherwise occur under standard NEM;
(3) Direct the General Manager to implement the proposed ShaRE program, extending the benefits of NEM to SFPUC electricity customers with multi-tenant and multi-meter facilities located on the same or contiguous properties;
(4) Direct the General Manager to develop a Net Surplus Electricity Compensation Rate, based on determination of the SFPUC's generation rate, for eligible SFPUC electricity on the NEM schedule if they are net electricity producers over the course of a 12-month period; and
(5) Direct the General Manager to report back to the Commission annually on: (a) the status of the Customer Self-Generation Program, including total participating generating capacity and annual Net Surplus Electricity Compensation; and (b) any needed program refinements to protect non-participants from cost-shifts and promote the development of local renewable energy resources. (Hale)

14. **Consider and adopt** the proposed **Wholesale Revenue Requirement and rate schedule for FYE 2017**, as applied to meter readings on or after July 1, 2016. This rate schedule reflects the terms of the 2009 Water Supply Agreement between the City and County of San Francisco and the Wholesale Customers, which was approved on April 28, 2009 by Commission Resolution No. 09-0069. (Sandler)

15. **Public Hearing: Discussion** of the **Draft 2015 Urban Water Management Plan** (UWMP) for the City and County of San Francisco. The Commission will consider approval of the UWMP at the June 14, 2016 Commission meeting. (Ritchie)

16. **Approve Amendment No. 2 to Agreement No. CS-968**, Environmental Analysis Services for the Upper Alameda Creek Filter Gallery Project (now the Alameda Creek Recapture Project), with Environmental Science Associates, to provide environmental analysis services and permitting support; and **authorize** the General Manager to execute this amendment, with **a time extension of one year and 11 months**, for a total agreement duration of eight years and two months, with no change to the agreement amount. (How)

17. **Authorize** the General Manager to execute, on behalf of the City and County of San Francisco, a **Memorandum of Agreement with the United States Department of the Interior, National Park Service Yosemite National Park**, for an **amount not to exceed $12,500,000,** and with a **duration of two years**, which will allow for comprehensive management, collaborative environmental stewardship studies, and security for the Yosemite National Park watersheds that supply water to the San Francisco Regional Water System. (Ritchie)

18. **Authorize** the General Manager to negotiate and execute **an Extension Agreement to apply the terms of the Water System Improvement Program Project Labor Agreement to Sewer System Improvement Program (SSIP)**

projects, and to the Auxiliary Water Supply System Pumping Station 2 project, for contracts awarded after May 10, 2016, per modified terms that: (1) update the list of arbitrators; (2) update the jurisdictional dispute resolution procedures and exemptions for work covered by national agreements; (3) exempt: (a) SSIP Micro Local Business Enterprise (LBE) Set Aside awards to a Micro LBE contractor; and/or (b) LBE subcontractors when awarded and/or listed to perform work, until such time that the aggregate total of the work for which the Micro LBE prime contractor and/or LBE subcontractor is awarded and/or listed totals five million dollars ($5,000,000) or more across all SSIP projects covered by the terms of the Extension Agreement; and (4) update the construction trucking section to be consistent with the requirements of California prevailing wage law. (How)

19. Public Comments on matters to be discussed in Closed Session.

20. Motion on whether to assert the attorney-client privilege regarding the matters listed below as Conference with Legal Counsel.

CLOSED SESSION

The Commission will go into Closed Session to discuss the following items:

21. Conference with Legal Counsel – Pursuant to California Government Code Section 549569. (d) (2) and San Francisco Administrative Code Section 67.10 (d) (2) (Ambrose)

    Anticipated Litigation as Defendant

22. Conference with Legal Counsel – Pursuant to California Government Code Section 54956.9 (d) (1) and San Francisco Administrative Code Section 67.10 (d) (1) (Ambrose)

    Existing Litigation
    Matt Pear et al v City and County of San Francisco, Court of Appeals, Sixth Appellate District
    Date Filed: July 5, 2012
    City Attorney File No.: 130094

23. Conference with Real Property Negotiator pursuant to Government Code Section 54956.8 and Administrative Code Section 67.8(a) (2) (Ambrose)

    Property: 1653 – 1657 Rollins Road, San Francisco

    Persons Negotiating:
    SFPUC: Michael Carlin and Rosanna Russell
    Seller: Clemco Properties, LLC

    Under Discussion ___Terms of Payment ___Price___Both__X___

24. Conference with Legal Counsel – Pursuant to California Government Code Section 54956.9 (d) (1) and San Francisco Administrative Code Section 67.10 (d) (1) (Ambrose)

    Unlitigated Claim

500 Sansome Street Investors, LLC v. CCSF
City Attorney File No.: 15-03421
Date Filed: June 29, 2015

25. Conference with Legal Counsel – Pursuant to California Government Code Section 54956.9 (d) (1) and San Francisco Administrative Code Section 67.10 (d) (1)
(Ambrose)
<u>Unlitigated Claim</u>
Tamsyn Waterhouse v. City and County of San Francisco
City Attorney File No.: 15-03175
Date Filed: June 6, 2015

26. Conference with Legal Counsel – Pursuant to California Government Code Section 54956.9 (d) (1) and San Francisco Administrative Code Section 67.10 (d) (1)
(Ambrose)
<u>Existing Litigation</u>
Restore Hetch Hetchy v. City and County of San Francisco
Tuolumne County Superior Court, Case No.: CV-59426
City Law Number 151139/Date Filed: April 21, 2015

27. Conference with Legal Counsel - Pursuant to California Government Code Section 54956.9 (d) (1) and San Francisco Administrative Code Section 67.10 (d) (1)
(Mueller)
<u>Existing Litigation</u>:
City and County of San Francisco v. Pacific Gas & Electric
Federal Energy Regulatory Commission
Case No.: EL15-3-000/Date Filed: October 10, 2014

28. Conference with Legal Counsel - Pursuant to California Government Code Section 54956.9 (d) (1) and San Francisco Administrative Code Section 67.10 (d) (1)
(Mueller)
<u>Existing Litigation</u>:
Pacific Gas & Electric
Federal Energy Regulatory Commission
Tariff Withdrawal per 35.15: Notice of Termination of the 1987 CCSF Interconnection Agreement – PG&E Rate Schedule FERC No. 114 to be effective June 30, 2015.
Case No.: ER15-702-000/Date Filed: December 23, 2014

29. Conference with Legal Counsel - Pursuant to California Government Code Section 54956.9 (d) (1) and San Francisco Administrative Code Section 67.10 (d) (1)
(Mueller)
<u>Existing Litigation</u>:
Pacific Gas & Electric
Tariff Withdrawal per 35.15: Notice of Termination of The CCSF Facilities Charge Agreement for Moscone to be effective June 30, 2015.
Case No.: ER15-703-000/Date Filed December 23, 2014

30. Conference with Legal Counsel - Pursuant to California Government Code Section 54956.9 (d) (1) and San Francisco Administrative Code Section 67.10 (d) (1)

(Mueller)

Existing Litigation:
Pacific Gas & Electric
Federal Energy Regulatory Commission
§205(d) rate filing per 35.13 (a)(2)(iii): City and County of San Francisco Transmission Owner Tariff Replacement Agreements to be effective July 1, 2015
Case No.: ER15-705-000/Date Filed: December 23, 2014

31. Conference with Legal Counsel - Pursuant to California Government Code Section 54956.9 (d) (1) and San Francisco Administrative Code Section 67.10 (d) (1) (Mueller)

    Existing Litigation:
    Pacific Gas & Electric
    Federal Energy Regulatory Commission
    §205(d) rate filing per 35.13 (a)(2)(iii): City and County of San Francisco Wholesale Distribution Tariff Replacement Agreements to be effective July 1, 2015
    Case No.: ER15-704-000/Date Filed: December 23, 2014

32. Conference with Legal Counsel - Pursuant to California Government Code Section 54956.9 (d) (1) and San Francisco Administrative Code Section 67.10 (d) (1) (Mueller)

    Existing Litigation:
    Pacific Gas & Electric
    Federal Energy Regulatory Commission
    Notice of Termination of Facilities Charge Agreements between PG&E and the City and County of San Francisco
    Case No.: ER15-735-000/Date Filed: December 23, 2014

33. Threat to Public Services or Facilities – Pursuant to California Government Code Section 54957 and San Francisco Administrative Code 67.10 (a)(Carroll)

    Consultation with Agency Chief of Security concerning security of SFPUC Water and Power Systems.

Following Closed Session, the Commission will reconvene in Open Session

34. Announcement following Closed Session

35. Motion regarding whether to disclose the discussions during Closed Session

36. Other New Business

37. Adjournment

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

NOTICE OF PUBLIC HEARING

NOTICE OF PUBLIC HEARING Tuesday, April 26, 2016 – 1:30 PM City Hall, Room 400, 1 Dr. Carlton B. Goodlett Place, San Francisco, CA 94102, at a Regular Meeting of the SAN FRANCISCO PUBLIC UTILITIES COMMISSION (SFPUC), and Tuesday, May 10, 2016 – 1:30 PM City Hall, Room 400, 1 Dr. Carlton B. Goodlett Place, San Francisco, CA 94102, at a Regular Meeting of the SAN FRANCISCO PUBLIC UTILITIES COMMISSION, and if necessary, Tuesday, May 24, 2016 – 1:30 PM City Hall, Room 400, 1 Dr. Carlton B. Goodlett Place, San Francisco, CA 94102, at a Regular Meeting of the SAN FRANCISCO PUBLIC UTILITIES COMMISSION: Public Hearing, discussion, and possible action to adopt proposed new Electric Service schedule of rates, fees and charges to be applied to meter readings on or after July 1, 2016 for certain municipal and public agency customers; retail residential, commercial, and industrial customers; and net energy metering customers, where the SFPUC Power Enterprise has been designated as the primary provider. The detailed agenda and related files will be available at least 72 hours before the scheduled meetings at the SFPUC website www.sfwater.org, or by calling (415) 554-3165.

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

NOTICE OF PUBLIC HEARING

NOTICE OF PUBLIC HEARING Tuesday, May 10, 2016 – 1:30 PM City Hall, Room 400, 1 Dr. Carlton B. Goodlett Place, San Francisco, CA 94102, at a Regular Meeting of the San Francisco Public Utilities Commission (SFPUC), the governing board of the publicly owned utility operations of the City and County of San Francisco: Notice is hereby given that the SFPUC will conduct a public hearing to consider the Draft 2015 Urban Water Management Plan (UWMP) for the City and County of San Francisco. The detailed agenda and related files will be available at least 72 hours before the scheduled meetings at the SFPUC website www.sfwater.org, or by calling (415) 554-3165.

All interested parties are invited to attend the public hearing and present their views. Persons who are unable to attend the public hearing may also submit to the City, by the time the proceedings begin, written comments regarding the subject of the hearing. These comments will be brought to the attention of the Commission and will become part of the official public record. Written comments can be sent to Donna Hood, Commission Secretary, SFPUC, 525 Golden Gate Ave., 13th Floor, SF, CA 94102. The Draft 2015 UWMP can be viewed and printed from the SFPUC website at www.sfwater.org/localwater (or enter “UWMP” in the search field located in the upper right hand corner of the homepage). A copy of the document is also available for review at the SF Public Library, Government Information Center, 5th Floor, 100 Larkin St., SF, CA 94102.

AVISO DE AUDIENCIA PÚBLICA martes, 10 de mayo, 2016 a la 1:30 pm Ayuntamiento de la ciudad, salón 400, 1 Dr. Carlton B. Goodlett Place, San Francisco, CA 94102, durante una reunión ordinaria de la Comisión de Utilidades Publicas de San Francisco (SFPUC), el consejo de administración de las operaciones de utilidades públicas de la ciudad y condado de San Francisco: Por la presente se notifica que la SFPUC llevará a cabo una audiencia pública para considerar el Plan de Administración de Aguas Urbanas del 2015 para la ciudad y condado de San Francisco. La agenda detallada y otra documentación relevante estará disponible por lo menos 72 horas antes de la reunión programada en el sitio web de la SFPUC www.sfwater.org, o llamando al (415) 554-3165.

公聽通告 2016年5月10日星期二 - 三藩市 Dr. Carlton B. Goodlett Place 一
號市政廳四樓400號房,
三藩市縣及市政府屬下公營水電管理機構三藩市水利局委員會舉行之例會中，特此通告
將考慮
2015年三藩市縣及市政府城市供水管理計劃草案，議程細節及有關擋案將於預定會議開始
前最少72小時在三藩市水力局網址www.sfwater.org 提供, 也可致電
查詢 (415) 554-3165。
San Francisco Public Utilities Commission

525 Golden Gate Avenue, 13TH Floor
San Francisco, CA 94102

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San Francisco
Water Power Sewer
Operator of the Hetch Hetchy Regional Water System

525 Golden Gate Avenue, 10th Floor
San Francisco, CA 94102
T 415.554.3271
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January 5, 2016

Andree Johnson
Water Resources Specialist
Bay Area Water Supply and Conservation Agency
155 Bovet Road, Suite 650
San Mateo, CA 94402

Dear Ms. Johnson,

Attached please find the information you requested on the Regional Water System's supply reliability for use in the Wholesale Customer's 2015 Urban Water Management Plan (UWMP) updates. The SFPUC has assessed the water supply reliability under the following planning scenarios:

- Projected single dry year supply for base year 2015[1],
- Projected multiple dry year supply beginning with base year 2015, and
- Projected supply reliability for base year 2015 through 2040.

Table 1 summarizes deliveries to the Wholesale Customers for projected single dry year supply for base year 2015 and projected multiple dry year supply beginning base year 2015.

With regards to future demands, the SFPUC proposes to expand their water supply portfolio by increasing the types of water supply resources. Table 2 summarizes the water supply resources assumed to be available by 2040, as well as other assumptions affecting supply. These assumptions differ from those used in the reliability analysis for the previous 2010 UWMP update, and lead to slightly different reliability projections explained further below.

Concerning allocation of supply during dry years, the Water Shortage Allocation Plan (WSAP) was utilized to allocate shortages between the SFPUC and the Wholesale Customers collectively. The WSAP implements a method for allocating water between the SFPUC retail customers and wholesale customers collectively which has been adopted by the Wholesale Customers

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[1] Fiscal Year 2015 is used as the base year to run the water supply reliability analysis in the Hetch Hetchy Local Simulation Model (HHLSM). This base year reflects a wholesale Supply Assurance of 184 million gallons per day, as well as Regional Water System reservoir and pipeline capacities and instream flow requirements as they exist in 2015 (pre-Water System Improvement Program [WSIP] completion).

per the July 2009 Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County, and Santa Clara County. The wholesale customers have adopted the Tier Two Plan, the second component of the WSAP, which allocates the collective wholesale customer share among each of the 26 wholesale customers.

Finally, the SFPUC estimated the frequency and severity of anticipated shortages for the period 2015 (base year) through 2040. For this analysis, we assumed that the historical hydrologic period is indicative of future events and evaluated the supply reliability assuming a repeat of the actual historic hydrologic period 1921 through 2011. The results of this analysis are summarized in Table 3.

Compared to the reliability projections that were provided previously for the 2010 UWMP update, Table 1 indicates slightly higher shortages and lower Wholesale allocations for dry years 2 and 3. Also, Table 3 shows slightly higher estimates of required rationing in multi-year droughts as compared to those provided previously. These differences are due to the inclusion of a temporary constraint on Crystal Springs Reservoir storage and an in-stream flow requirement below Crystal Springs Reservoir, which are shown in Table 2, but were not included in the previous reliability analysis.

It is our understanding that you will pass this information on to the Wholesale Customers. If you have any questions or need additional information, please do not hesitate to contact me at (415) 554-0792.

Sincerely,

Paula Kehoe

Paula Kehoe
Director of Water Resources

Table 1: Projected Deliveries for Three Multiple Dry Years

	Base Year 2015 (Non-Dry)	One Critical Dry Year	Deliveries During Multiple Dry Years		
			Year 1	Year 2	Year 3
System-Wide Shortage	0%	10%	10%	22%	22%
Wholesale Allocation (MGD)	184.0	152.6	152.6	129.2	129.2

MGD = million gallons per day

Table 2: Water Supply Modeling Assumptions for Fiscal Years 2015 through 2040

	2015	2020	2025	2030	2035	2040
Water Supply Resource						
Westside Basin Groundwater (AF/yr)		8,100	8,100	8,100	8,100	8,100
Districts Transfer (AF/yr)		2,240	2,240	2,240	2,240	2,240
Crystal Springs Reservoir Capacity (20.3 BG) [1]			x	x	x	x
Calaveras Reservoir at Full Capacity		x	x	x	x	x
Alameda Creek Recapture (9.3 MGD)		x	x	x	x	x
Reservoir Operation Affecting Supply						
Crystal Springs Reservoir Release for In-Stream Flow to San Mateo Creek (3.5 MGD) [2]	x	x	x	x	x	x
Calaveras Reservoir Release and Alameda Creek Diversion Dam Bypass for In-Stream Flow to Alameda Creek (9.3 MGD)		x	x	x	x	x

AF/yr = acre-feet per year, BG = billion gallons, MGD = million gallons per day, x = in operation

Notes:

1. Schedule for restoration of Crystal Springs Reservoir storage is tied to permitting requirements for endangered plants.
2. Release from Crystal Springs Reservoir to meet minimum in-stream flow requirement in San Mateo Creek began in January 2015.

Table 3: Projected System Supply Reliability Based on Hydrologic Period

	Wholesale Demand (MGD)					
	184.0	184.0	184.0	184.0	184.0	184.0
	Projected Wholesale Allocation (MGD)					
Fiscal Year	2015	2020	2025	2030	2035	2040
1920-21	184.0	184.0	184.0	184.0	184.0	184.0
1921-22	184.0	184.0	184.0	184.0	184.0	184.0
1922-23	184.0	184.0	184.0	184.0	184.0	184.0
1923-24	184.0	184.0	184.0	184.0	184.0	184.0
1924-25	152.6	184.0	184.0	184.0	184.0	184.0
1925-26	184.0	184.0	184.0	184.0	184.0	184.0
1926-27	184.0	184.0	184.0	184.0	184.0	184.0
1927-28	184.0	184.0	184.0	184.0	184.0	184.0
1928-29	184.0	184.0	184.0	184.0	184.0	184.0
1929-30	184.0	184.0	184.0	184.0	184.0	184.0
1930-31	184.0	184.0	184.0	184.0	184.0	184.0
1931-32	129.2	152.6	152.6	152.6	152.6	152.6
1932-33	184.0	184.0	184.0	184.0	184.0	184.0
1933-34	184.0	184.0	184.0	184.0	184.0	184.0
1934-35	152.9	184.0	184.0	184.0	184.0	184.0
1935-36	184.0	184.0	184.0	184.0	184.0	184.0
1936-37	184.0	184.0	184.0	184.0	184.0	184.0
1937-38	184.0	184.0	184.0	184.0	184.0	184.0
1938-39	184.0	184.0	184.0	184.0	184.0	184.0
1939-40	184.0	184.0	184.0	184.0	184.0	184.0
1940-41	184.0	184.0	184.0	184.0	184.0	184.0
1941-42	184.0	184.0	184.0	184.0	184.0	184.0
1942-43	184.0	184.0	184.0	184.0	184.0	184.0
1943-44	184.0	184.0	184.0	184.0	184.0	184.0
1944-45	184.0	184.0	184.0	184.0	184.0	184.0
1945-46	184.0	184.0	184.0	184.0	184.0	184.0
1946-47	184.0	184.0	184.0	184.0	184.0	184.0
1947-48	184.0	184.0	184.0	184.0	184.0	184.0
1948-49	184.0	184.0	184.0	184.0	184.0	184.0
1949-50	184.0	184.0	184.0	184.0	184.0	184.0
1950-51	184.0	184.0	184.0	184.0	184.0	184.0
1951-52	184.0	184.0	184.0	184.0	184.0	184.0
1952-53	184.0	184.0	184.0	184.0	184.0	184.0
1953-54	184.0	184.0	184.0	184.0	184.0	184.0
1954-55	184.0	184.0	184.0	184.0	184.0	184.0
1955-56	184.0	184.0	184.0	184.0	184.0	184.0
1956-57	184.0	184.0	184.0	184.0	184.0	184.0
1957-58	184.0	184.0	184.0	184.0	184.0	184.0
1958-59	184.0	184.0	184.0	184.0	184.0	184.0
1959-60	184.0	184.0	184.0	184.0	184.0	184.0
1960-61	152.6	184.0	184.0	184.0	184.0	184.0

Fiscal Year	**Wholesale Demand (MGD)**					
	184.0	184.0	184.0	184.0	184.0	184.0
	Projected Wholesale Allocation (MGD)					
	2015	**2020**	**2025**	**2030**	**2035**	**2040**
1961-62	129.2	152.6	152.6	152.6	152.6	152.6
1962-63	184.0	184.0	184.0	184.0	184.0	184.0
1963-64	184.0	184.0	184.0	184.0	184.0	184.0
1964-65	184.0	184.0	184.0	184.0	184.0	184.0
1965-66	184.0	184.0	184.0	184.0	184.0	184.0
1966-67	184.0	184.0	184.0	184.0	184.0	184.0
1967-68	184.0	184.0	184.0	184.0	184.0	184.0
1968-69	184.0	184.0	184.0	184.0	184.0	184.0
1969-70	184.0	184.0	184.0	184.0	184.0	184.0
1970-71	184.0	184.0	184.0	184.0	184.0	184.0
1971-72	184.0	184.0	184.0	184.0	184.0	184.0
1972-73	184.0	184.0	184.0	184.0	184.0	184.0
1973-74	184.0	184.0	184.0	184.0	184.0	184.0
1974-75	184.0	184.0	184.0	184.0	184.0	184.0
1975-76	184.0	184.0	184.0	184.0	184.0	184.0
1976-77	152.6	184.0	184.0	184.0	184.0	184.0
1977-78	129.2	152.6	152.6	152.6	152.6	152.6
1978-79	184.0	184.0	184.0	184.0	184.0	184.0
1979-80	184.0	184.0	184.0	184.0	184.0	184.0
1980-81	184.0	184.0	184.0	184.0	184.0	184.0
1981-82	184.0	184.0	184.0	184.0	184.0	184.0
1982-83	184.0	184.0	184.0	184.0	184.0	184.0
1983-84	184.0	184.0	184.0	184.0	184.0	184.0
1984-85	184.0	184.0	184.0	184.0	184.0	184.0
1985-86	184.0	184.0	184.0	184.0	184.0	184.0
1986-87	184.0	184.0	184.0	184.0	184.0	184.0
1987-88	152.6	184.0	184.0	184.0	184.0	184.0
1988-89	129.2	152.6	152.6	152.6	152.6	152.6
1989-90	129.2	152.6	152.6	152.6	152.6	152.6
1990-91	129.2	132.5	132.5	132.5	132.5	132.5
1991-92	129.2	132.5	132.5	132.5	132.5	132.5
1992-93	129.2	132.5	132.5	132.5	132.5	132.5
1993-94	184.0	184.0	184.0	184.0	184.0	184.0
1994-95	184.0	184.0	184.0	184.0	184.0	184.0
1995-96	184.0	184.0	184.0	184.0	184.0	184.0
1996-97	184.0	184.0	184.0	184.0	184.0	184.0
1997-98	184.0	184.0	184.0	184.0	184.0	184.0
1998-99	184.0	184.0	184.0	184.0	184.0	184.0
1999-00	184.0	184.0	184.0	184.0	184.0	184.0
2000-01	184.0	184.0	184.0	184.0	184.0	184.0
2001-02	184.0	184.0	184.0	184.0	184.0	184.0
2002-03	184.0	184.0	184.0	184.0	184.0	184.0
2003-04	184.0	184.0	184.0	184.0	184.0	184.0

	Wholesale Demand (MGD)					
	184.0	184.0	184.0	184.0	184.0	184.0
	Projected Wholesale Allocation (MGD)					
Fiscal Year	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
2004-05	184.0	184.0	184.0	184.0	184.0	184.0
2005-06	184.0	184.0	184.0	184.0	184.0	184.0
2006-07	184.0	184.0	184.0	184.0	184.0	184.0
2007-08	184.0	184.0	184.0	184.0	184.0	184.0
2008-09	184.0	184.0	184.0	184.0	184.0	184.0
2009-10	184.0	184.0	184.0	184.0	184.0	184.0
2010-11	184.0	184.0	184.0	184.0	184.0	184.0

MGD = million gallons per day

APPENDIX D

SB X7-7 Verification Form

2015 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

Prepared by: The San Francisco Public Utilities Commission

June 2016

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

SB X7-7 Table 0: Units of Measure Used in UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent with Table 2-3*
NOTES: The units of measure used in the body of the UWMP are millions of gallons per day (mgd).

SB X7-7 Table-1: Baseline Period Ranges

Baseline	Parameter	Value	Units
10- to 15-year baseline period	2008 total water deliveries	90,250	Acre Feet
	2008 total volume of delivered recycled water	0	Acre Feet
	2008 recycled water as a percent of total deliveries	0.00%	Percent
	Number of years in baseline period[1]	10	Years
	Year beginning baseline period range	2001	
	Year ending baseline period range[2]	2010	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2006	
	Year ending baseline period range[3]	2010	

[1] *If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period.*

[2] *The ending year must be between December 31, 2004 and December 31, 2010.*

[3] *The ending year must be between December 31, 2007 and December 31, 2010.*

NOTES:
Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore excluded from SB X7-7 calculations.

SB X7-7 Table 2: Method for Population Estimates

Method Used to Determine Population (may check more than one)	
☑	**1. Department of Finance** (DOF) DOF Table E-8 (1990 - 2000 and 2000-2010) and DOF Table E-5 (2011 - 2015) when available
☑	**2. Persons-per-Connection Method**
☑	**3. DWR Population Tool**
☑	**4. Other** DWR recommends pre-review
NOTES:	

SB X7-7 Table 3: Service Area Population		
Year		Population
10 to 15 Year Baseline Population		
Year 1	2001	782,248
Year 2	2002	784,398
Year 3	2003	784,229
Year 4	2004	782,934
Year 5	2005	781,806
Year 6	2006	782,906
Year 7	2007	788,913
Year 8	2008	796,775
Year 9	2009	801,990
Year 10	2010	806,982
5 Year Baseline Population		
Year 1	2006	782,906
Year 2	2007	788,913
Year 3	2008	796,775
Year 4	2009	801,990
Year 5	2010	806,982
2015 Compliance Year Population		
2015		859,276

NOTES:
Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore excluded from SB X7-7 calculations.

SB X7-7 Table 4: Annual Gross Water Use *

	Baseline Year *Fm SB X7-7 Table 3*	**Volume Into Distribution System** *Fm SB X7-7 Table(s) 4-A*	**Deductions**					**Annual Gross Water Use**
			Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water *Fm SB X7-7 Table 4-B*	Water Delivered for Agricultural Use	Process Water *Fm SB X7-7 Table(s) 4-D*	
10 to 15 Year Baseline - Gross Water Use								
Year 1	2001	101,860	0	-8	0	0	0	101,868
Year 2	2002	102,090	0	-1	0	0	0	102,091
Year 3	2003	98,570	0	173	0	0	0	98,397
Year 4	2004	95,850	0	27	0	0	0	95,823
Year 5	2005	95,870	0	-100	0	0	0	95,970
Year 6	2006	94,020	0	-5	0	0	0	94,025
Year 7	2007	92,160	0	31	0	0	0	92,129
Year 8	2008	90,240	0	5	0	0	0	90,235
Year 9	2009	88,220	0	-16	0	0	0	88,236
Year 10	2010	86,130	0	71	0	0	0	86,059
10 - 15 year baseline average gross water use								**94,483**
5 Year Baseline - Gross Water Use								
Year 1	2006	94,020	0	-5	0	0	0	94,025
Year 2	2007	92,160	0	31	0	0	0	92,129
Year 3	2008	90,240	0	5	0	0	0	90,235
Year 4	2009	88,220	0	-16	0	0	0	88,236
Year 5	2010	86,130	0	71	0	0	0	86,059
5 year baseline average gross water use								**90,137**
2015 Compliance Year - Gross Water Use								
2015		77,910	0	0	0	0	0	**77,910**

* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3

NOTES: Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore excluded from SB X7-7 calculations.

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)

Complete one table for each source.

Name of Source Regional Water System

This water source is:

☑ The supplier's own water source

☐ A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional* *(+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	2001	99,410	0	99,410
Year 2	2002	99,640	0	99,640
Year 3	2003	96,120	0	96,120
Year 4	2004	93,400	0	93,400
Year 5	2005	93,420	0	93,420
Year 6	2006	91,570	0	91,570
Year 7	2007	89,710	0	89,710
Year 8	2008	87,790	0	87,790
Year 9	2009	85,770	0	85,770
Year 10	2010	83,680	0	83,680
5 Year Baseline - Water into Distribution System				
Year 1	2006	91,570	0	91,570
Year 2	2007	89,710	0	89,710
Year 3	2008	87,790	0	87,790
Year 4	2009	85,770	0	85,770
Year 5	2010	83,680	0	83,680
2015 Compliance Year - Water into Distribution System				
2015		75,460	0	75,460

** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:
Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore excluded from SB X7-7 calculations.

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)

Complete one table for each source.

Name of Source Groundwater

This water source is:

☑ The supplier's own water source

☐ A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional* *(+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	2001	2,450		2,450
Year 2	2002	2,450		2,450
Year 3	2003	2,450		2,450
Year 4	2004	2,450		2,450
Year 5	2005	2,450		2,450
Year 6	2006	2,450		2,450
Year 7	2007	2,450		2,450
Year 8	2008	2,450		2,450
Year 9	2009	2,450		2,450
Year 10	2010	2,450		2,450
5 Year Baseline - Water into Distribution System				
Year 1	2006	2,450		2,450
Year 2	2007	2,450		2,450
Year 3	2008	2,450		2,450
Year 4	2009	2,450		2,450
Year 5	2010	2,450		2,450
2015 Compliance Year - Water into Distribution System				
2015		2,450		2,450

** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES: Groundwater use has found to be constant throughout the years, which consists of 1.5 mgd (1,680 AF) of in-city irrigation use, 0.4 mgd (450 AF) for Castlewood CSA, and another 0.3 mgd (340 AF) for the Sunol Valley Golf Course.

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)

Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Annual Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	2001	782,248	101,868	116
Year 2	2002	784,398	102,091	116
Year 3	2003	784,229	98,397	112
Year 4	2004	782,934	95,823	109
Year 5	2005	781,806	95,970	110
Year 6	2006	782,906	94,025	107
Year 7	2007	788,913	92,129	104
Year 8	2008	796,775	90,235	101
Year 9	2009	801,990	88,236	98
Year 10	2010	806,982	86,059	95
10-15 Year Average Baseline GPCD				**107**
5 Year Baseline GPCD				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use
Year 1	2006	782,906	94,025	107
Year 2	2007	788,913	92,129	104
Year 3	2008	796,775	90,235	101
Year 4	2009	801,990	88,236	98
Year 5	2010	806,982	86,059	95
5 Year Average Baseline GPCD				**101**
2015 Compliance Year GPCD				
2015		859,276	77,910	81

NOTES:
Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore excluded from SB X7-7 calculations.

SB X7-7 Table 6: Gallons per Capita per Day *Summary From Table SB X7-7 Table 5*	
10-15 Year Baseline GPCD	107
5 Year Baseline GPCD	101
2015 Compliance Year GPCD	81
NOTES:	

SB X7-7 Table 7: 2020 Target Method *Select Only One*		
Target Method		Supporting Documentation
☐	Method 1	SB X7-7 Table 7A
☐	Method 2	SB X7-7 Tables 7B, 7C, and 7D *Contact DWR for these tables*
☑	Method 3	SB X7-7 Table 7-E
☐	Method 4	Method 4 Calculator
NOTES:		

SB X7-7 Table 7-E: Target Method 3				
Agency May Select More Than One as Applicable	Percentage of Service Area in This Hydrological Region	Hydrologic Region	"2020 Plan" Regional Targets	Method 3 Regional Targets (95%)
☐		North Coast	137	130
☐		North Lahontan	173	164
☐		Sacramento River	176	167
☑	100%	San Francisco Bay	131	124
☐		San Joaquin River	174	165
☐		Central Coast	123	117
☐		Tulare Lake	188	179
☐		South Lahontan	170	162
☐		South Coast	149	142
☐		Colorado River	211	200
Target *(If more than one region is selected, this value is calculated.)*				**124**

NOTES:
Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore excluded from SB X7-7 calculations.

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target			
5 Year Baseline GPCD *From SB X7-7 Table 5*	Maximum 2020 Target*	Calculated 2020 Target *Fm Appropriate Target Table*	Confirmed 2020 Target
101	96		96
** Maximum 2020 Target is 95% of the 5 Year Baseline GPCD*			
NOTES:			

SB X7-7 Table 8: 2015 Interim Target GPCD		
Confirmed 2020 Target *Fm SB X7-7 Table 7-F*	10-15 year Baseline GPCD *Fm SB X7-7 Table 5*	2015 Interim Target GPCD
96	107	102
NOTES:		

SB X7-7 Table 9: 2015 Compliance

Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments *(in GPCD)*					2015 GPCD *(Adjusted if applicable)*	Did Supplier Achieve Targeted Reduction for 2015?
		Extraordinary Events	Weather Normalization	Economic Adjustment	TOTAL Adjustments	Adjusted 2015 GPCD		
81	102	*From Methodology 8 (Optional)*	*From Methodology 8 (Optional)*	*From Methodology 8 (Optional)*	0	81	81	YES

NOTES:

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APPENDIX E

2015 Retail Demand Model and Projections Technical Memorandum

2015 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

Prepared by: The San Francisco Public Utilities Commission

June 2016

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

Technical Memorandum:

SFPUC Retail Demand Model and Projections through Fiscal Year 2039-40

PREPARED FOR

San Francisco Public Utilities Commission

PREPARED BY

Steven Buck, Ph.D.
David Sunding, Ph.D.

December 21, 2015

THE Brattle GROUP

This report was prepared for the San Francisco Public Utilities Commission. All results and any errors are the responsibility of the authors and do not represent the opinion of The Brattle Group, Inc. or its clients.

Acknowledgement: We acknowledge the valuable contributions of many individuals to this report and to the underlying analysis.

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1 SUMMARY

The models described in this Technical Memo develop the water demand projections for the San Francisco Public Utilities Commission (SFPUC) in-City retail service area[1], herein referred as the City and County of San Francisco (CCSF). These models consist of two parts, which we summarize.

First, we make assumptions about CCSF specific growth in demand drivers and demand factors. Demand *drivers* reference the number of users in each sector; specifically, we make assumptions about the percentage growth in the number of single family residential households, multi-family households and employees. Demand *factors* reference a host of factors that affect consumer consumption per user in each of the single family residential (SFR), multi-family residential (MFR) and commercial and industrial (CI) sectors. In this analysis the demand factors of interest for the SFR sector are water price and household income; the demand factor of interest for the MFR and CI sectors is price. CCSF-specific growth projections for the demand drivers (i.e., the number of water users in each sector) and demand factors (i.e., water price and household income) are based on planning projections for CCSF through the year 2040.

Second, we make assumptions regarding how users change consumption in response to CCSF-specific projected changes in the demand factors of water price and household income. These user-level consumption responses to changes in price and income are referenced as price elasticities and income elasticities, respectively. The price elasticity tells us how much consumption per user changes in response to a percentage change in price; the income elasticity tells us how much consumption per user changes in response to a percentage change in household income. These response parameters are very useful for the purpose of projecting

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[1] The SFPUC's retail service area is nearly contiguous with the CCSF jurisdictional boundary except for a small portion of suburban retail customers outside of CCSF, including the Town of Sunol, Castlewood Country Club, Groveland Community Services District, Lawrence Livermore National Laboratory, and portions of the Redwood City and Daly City. Suburban retail demands are projected separately and are not the subject of this document.

changes over time in consumption per user. Using standard methods from economics and data on real water users in CCSF and the surrounding San Francisco Bay Area we estimate these response parameters. Their estimation requires we develop separate statistical models of consumption per user for the SFR, MFR and CI sectors; these are the sectorial regression models. The results of the regression analyses are robust and statistically significant at the conventional level used for hypothesis testing.[2] The results are also generally consistent with other, similar studies in the academic literature.[3] An advantage of using regression models to estimate consumption per user is that the price and income elasticities can be identified based on historic variations in relevant variables, and on the actual behavior of users, while taking into account differences in other demand factors (e.g., lot size or average temperature) between CCSF users and other users in the Bay Area. More detailed justification and description of the assumptions entailed in using data from non-CCSF utilities to develop the regression models are described in subsequent sections.

The estimated price and income elasticities, which tell us how much user-level consumption changes in response to a percentage changes in price and income, are used to (i) adjust average consumption per user in the baseline period to account for atypical demand conditions in the fiscal year (FY) 2009-10 and (ii) project how average consumption per user will change in future periods from the baseline period. The baseline period used in this analysis is the fiscal year FY2009-10 which, once again, is adjusted for atypical conditions. Projections of future demand are prepared in five year increments for FY2014-15 through FY2039-40. Table 1 below summarizes the demand projections in millions gallons per day (mgd) for CCSF and reflects growth in the demand drivers (i.e., the number of water users in each sector) and growth in consumption per user in each sector due to projected changes in the demand factors of price and income.

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[2] The significance level indicates the probability of falsely detecting a statistically significant effect.

[3] Espey, M., J. Espey, and W. D. Shaw. 1997. Price Elasticity of Residential Demand for Water: A Meta-Analysis. *Water Resources Research* 33: 1367–1374.

Table 1. Summary of Demand Projections by Sector (million gallons per day)

	FY2014-5	FY2019-20	FY2024-25	FY2029-30	FY2034-35	FY2039-40
Single Family Residential	15.85	15.71	16.54	17.95	19.50	21.08
Multi-Family Residential	20.46	20.32	20.95	22.05	23.15	24.29
Commercial and Industrial	21.88	22.55	22.55	23.02	23.90	24.98

The remainder of this technical memo is organized as follows. Sections 2 summarizes the general data requirements for development of the regression models that quantify the relationship between consumption and demand factors, justifies the use of data from CCSF and non-CCSF utilities to develop the regression models, and describes the assumptions entailed in using non-CCSF data for model development. Sections 3, 4 and 5 present the sectorial regression models that are used for (i) adjusting the base period consumption to serve as a launch point from which future demand is projected to grow and (ii) projecting growth in demand due to changing demand factors. Sections 6 and 7 summarize the method, data and calculation of the adjusted baseline demands and the demand forecasts going in to the future, respectively.

2 DATA REQUIREMENTS FOR DEVELOPMENT OF STATISTICAL MODELS THAT QUANTIFY THE RELATIONSHIP BETWEEN CONSUMPTION PATTERNS AND DEMAND FACTORS

In order to predict how water demand in CCSF will change over time, it is necessary to assess the relationship between water use and the demand factors used in this analysis (price and income). Generally, water use and water price are negatively correlated. In other words, as water becomes more expensive, users will reduce their demands to offset the higher costs. Oppositely, water use and household income are usually positively correlated, suggesting that water use increases as income increases. These relationships exist simultaneously and are integral to understanding water use and assessing how water demand will change over time; further, these relationships may depend on each other. For example, consider households A and B. Household A has an annual income of $100,000 per year, while household B takes in $50,000 each year. If the price of water doubles, both households are likely to curtail water demand (each house will cut back to the point where the value of the additional unit of water equals the cost of that unit). However, household B may be more sensitive to water prices than household A since the cost of water represents a larger share of household expenses. The relationship between water price and water demand is known as the price elasticity of demand and is calculated as the percent change in water demand for a given percent change in water price. For example, a price elasticity of -0.2 implies that users reduce water demand by 0.2% for each 1% increase in price. Similarly, income elasticity is defined as a percent change in water demand given a percent change in household income.

Quantifying the relationship between water price and the demand factors can be accomplished using a statistical technique called regression analysis. Generally, regression analysis is used to explain how observed changes in one or more explanatory variables (e.g., water price) impact a response variable (e.g., water consumption). Developing regression models requires the collection of data that varies over space, time, or both. If sufficient variation in the observed data does not exist, regression analysis will be incapable of accurately assessing how the response variable is impacted by the demand factor. Since water prices within a utility do not change frequently, this analysis makes use of water consumption and water price data from multiple California retailers between 1996 and 2009.[4] By controlling for differences across water utilities and variation due to other factors (such as lot size and weather patterns), this analysis isolates the impact that water price and household income have on water demand.

To be clear, the regression models used in this technical memo allow the analyst to forecast future changes in consumption *per user* in response to future changes in demand factors (e.g., price and income). The regression models do not model aggregate consumption growth in each sector; that is, they do not take into account forecasted growth in the number of households or

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[4] There are some utilities which are notable exceptions and, in fact, CCSF does have historical variation in prices. The analysis is able to take advantage of the year-to-year changes in CCSF prices as an additional source of variation, and this is discussed in subsequent sections.

employment—growth in these demand drivers is addressed in a separate step described later in the main text of this Technical Memo.

Further Discussion: Why does the development of the regression models require historical data on non-CCSF utilities?

The regression model for the SFR sector estimates parameters for (i) the rate of change in household consumption in response to changes in price and for (ii) the rate of change of household consumption in response to changes in household income. The estimation of the price and income elasticities (consumption response parameters) in the SFR sector requires historical data on these factors from both the CCSF service area but also other Bay Area service areas. Data from non-CCSF utilities is required in order to estimate these elasticities because without it there would be no variation in price or income to recover an estimate since CCSF represents only one data point. An analyst can only make an inference about the effect of price on consumption if the analyst observes consumers facing different prices. The average change in household consumption per percentage change in price cannot be calculated without observing differences in consumption corresponding to differences in price. At least two data points per year are required in order to net out the idiosyncratic effects on consumption due to demand conditions of a particular year. Further, more than two data points by year will enhance the statistical accuracy and precision of the estimated price and income elasticities. For these reasons, the regression model development benefits from inclusion of historical data from non-CCSF utilities. To be sure, no assumptions are made that CCSF is identical to non-CCSF utilities in terms of demand drivers or demand factors.

While data from non-CCSF utilities are utilized in the estimation of the regression model, no assumption is made that CCSF users face similar demand conditions in terms of price, weather or have similar demand factors in terms of household income, lot size or the average number of household members. Nor is it assumed that CCSF users will face identical growth patterns in price, household income or other factors.

A key assumption of the analysis for the SFR sector is that, after accounting for other demand factors (e.g., lot size and average temperature), areas forecasted to experience similar percentage changes in household income are predicted to experience similar percentage changes in consumption. It is only in this regard that users in CCSF and non-CCSF areas are assumed to be identical, and the assumption is only made after accounting for differences in other demand factors.

In the case of price, this assumption of uniform consumption response across CCSF and non-CCSF areas is relaxed. Year-to-year changes in price faced by SFR users in CCSF is used as an additional source of variation to identify how users change consumption in response to a price change. Therefore, unlike the income response, we are estimating a CCSF specific consumer response to a change in price that is distinct from the responses of customers in the non-CCSF service areas; CCSF consumers in the SFR sector tend to be somewhat less responsive to price changes relative to other areas of California.

The regression models for the MFR sector and CI sector estimate price elasticities (the sector-specific parameters for the rate of change in consumption in response to changes in price). For the same reasons as discussed for the analysis of the SFR sector, the estimation of the price elasticities in the MFR and CI sectors requires historical data from both CCSF and non-CCSF utilities. Once again, this is not an assumption that CCSF users in the MFR or CI sectors face similar demand conditions or have similar demand factors; nor is it assumed that CCSF users in the MFR or CI sectors will face identical growth patterns in demand factors as experienced in non-CCSF service areas. The key assumption of the analysis for these two sectors is that, after accounting for differences in other demand factors, areas forecasted to experience similar percentage changes in price are predicted to experience similar percentage changes in consumption.

Finally, income elasticities are not estimated for the MFR and CI sectors. No statistically significant relationship is found between income and consumption in the MFR sector, and there is no clear theoretical justification to include income in the regression model for the CI sector.

3 SINGLE FAMILY RESIDENTIAL DEMAND REGRESSION MODEL

The regression model of SFR household demand is developed based on historical price and water consumption from CCSF and other utilities in the San Francisco Bay Area. SFPUC provided accounts and consumption data for the CCSF service area, while data for non-CCSF utilities were obtained from Bay Area Water Supply & Conservation Agency (BAWSCA) Annual Surveys (FY1996-96 through FY2010-11)[5]. Monthly household consumption is calculated in terms of hundred cubic feet (ccf) by dividing annual consumption at the utility level by the number of SFR accounts, and then dividing the resulting quantity by 12 months.

The price of water is an important factor determining the amount of water demanded by SFR users, and the responsiveness of water consumption to price is a major component of developing projections of future demand. Utility level historical data on rates faced by residential consumers of non-CCSF utilities are obtained from the BAWSCA Annual Surveys. SFPUC provided rate data for the CCSF service area. The marginal price of water is measured using the median tier on a utility's rate schedule. Prices are adjusted for inflation so consumer response to real[6] price changes is measured.

In addition to the price factor, SFR consumption per household is modeled as function of household income, the age of the housing stock, household size, residential density (i.e., the inverse of lot size), precipitation and temperature. For all variables the most recent data available that covers all of the service areas at a spatial layer at or beneath utility-specific boundaries is

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[5] SFPUC's Wholesale Customers were used for the regression analysis as opposed to other Bay Area utilities due to their proximity to CCSF and accessibility of data available. Historical data on annual SFR consumption and SFR metered accounts are taken from the BAWSCA Annual Surveys.

[6] When comparing prices across years it is important to account for inflation. For example, suppose the price of a unit of water is $1.00 USD on January 1st in the year 2000 and $1.03 USD on January 1st in the year 2001. If there was 3% inflation between these dates, then real price of water has not changed. Consistent with this, we say that the real price of a unit of water on January 1st, 2001 in terms of year 2000 USD is $1.00. In summary, in order to compare the price of a good across years without the effect of inflation, it is common to convert prices across all years to a common base year's real price. In the current analysis we convert all prices to year 2000 real USD.

used. In this way, utility-specific average consumption per user is related to measures of utility-specific demand factors.

Household income, household size and housing vintage variables are based on Census tract level data. The average utility level values of these variables were calculated by intersecting Census tract boundaries with utility-specific boundaries using ArcView and then taking an area- and housing-density-weighted average of the Census tracts that comprise each utility's service area. The average value of the lot size variable within a utility is based on ZIP-code level data that is used to construct an area- and housing-density weighted average of lot size.

The weather variables used in developing the regression model are average maximum daily temperature during the summer months of July, August, and September; and total annual precipitation. These variables are ZIP-code based[7], and were used to construct area- and housing-density weighted averages of the precipitation and temperature variables for each specific utility.

In addition to accounting for the above demand factors, the regression model of SFR household demand accounts for unobserved differences in demand factors across counties (e.g., average adoption of best management practices) so that the price and income elasticities are estimated taking into account CCSF-specific unobserved demand characteristics. Fixed effects are considered at a county level, instead of at a utility level, because this generated more precise estimates in the regression model without sacrificing accuracy. Also, using county fixed effects instead of utility fixed effects permitted estimation of the income elasticity, which is not considered in the other sectorial models. The SFR regression model also allows for the relationship between average household consumption and price to depend on household income and location by interacting the price variable with household income, and interacting the price

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[7] PRISM Climate Group, "Near-Real-Time High-Resolution Monthly Average Maximum/Minimum Temperature for the Conterminous United States", raster digital data, accessible: http://www.prism.oregonstate.edu/.

variable with county indicator variables. Therefore, we are able to model a CCSF-specific price elasticity based on CCSF-specific household income measure and location. Household consumption and all demand factors are transformed into logarithmic form for the regression analysis. The natural logarithmic transformation simplifies the interpretation of the regression results, which report a coefficient for each demand factor. The benefit of logarithmic form is that each coefficient can be interpreted as an elasticity. An elasticity measure represents the percentage change in household water consumption resulting from a one percent change in a particular demand factor.

In summary, the estimating equation for the SFR demand regression model is described by the following equation:

$$\ln\left(q_{ijt}\right) = \beta_0 + \beta_1 * p_{it} + \beta_2 * p_{it} * inc_i + \sum_{j=2}^{4} \gamma_j * p_{it} * I_{cnty} + \beta_3 * X_{it} + \mu_j + \varepsilon_{ijt} \quad \text{(eq. 1)}$$

where i is the utility, j is the county, and t is the year; q_{it} is average monthly household consumption; p_{it} is median tier price; inc_i is the median household income; I_{cnty} is an indicator variable denoting whether or not an observation belongs to county j; X_{it} represents the covariates of median household income, median lot size, average household size, median housing age, annual precipitation, and average summer maximum daily temperature[8]; μ_j is a county fixed effect[9]; and ε_{ijt} represents all unobservable factors affecting consumption. The results of the regression estimation in terms of the relevant elasticities for use in sections 6 and 7 are presented Table 2. Data sources are summarized in Appendix B.

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[8] Annual precipitation and average daily summer maximum temperature varies across utilities and years; the other covariates are time invariant and only vary across utilities.

[9] A county fixed effect is a county specific intercept and models unobserved demand factors varying by county. Said differently, a dummy variable representing each county is included in the regression equation. Therefore, the SFR regression model takes into account unobserved demand factors specific to CCSF.

Table 2. Results of the Single Family Residential Demand Regression

Demand factor	Elasticity (the average demand response to a 1% increase in the demand factor)	Example: % change in water consumption in response to a 10% increase in the demand factor
Retail price	-0.24	-2.4%
Median household income	1.02	10.2%
Annual precipitation	-0.09	-0.9%
Average daily summer maximum temperature	0.11	1.1%

4 MULTI-FAMILY RESIDENTIAL DEMAND REGRESSION MODEL

A model of MFR aggregate demand is developed based on historical water consumption in CCSF and non-CCSF service areas. Demand is not modeled at the household level because there is no data source available which tracks the number of MFR households in each service area on an annual basis. Similar to the SFR sector, aggregate consumption is recorded by fiscal year at the utility level. SFPUC billing is the source of historical consumption data for the CCSF service area, and the BAWSCA Annual Surveys are the source for non-CCSF service areas.

The MFR price variable is identical to that used in the SFR demand model and reports the price of water for each utility. Consumption and price are transformed into logarithmic form for the regression analysis. Once again, this transformation of the data simplifies the interpretation of the regression analysis, which reports a coefficient (i.e., an elasticity) that defines the percentage change in utility-level water consumption in the MFR sector resulting from a one percent change in price. The MFR regression model indicates a price elasticity of demand of -0.17, which is less elastic than that estimated for the SFR sector (-0.24). This result is intuitive in that MFR housing units have relatively little outdoor water-use and utilize a variety of shared appliances. As a consequence, MFR users are more likely to be directing their current water consumption towards higher priority uses than users in the SFR sector because they have less discretionary water use such as landscaping. In addition, if occupants of MFR housing units are likely to have lower incomes than SFR customers, then they may have fewer water-using appliances and, therefore, less discretionary water use.

In summary, the estimating equation for the MFR demand regression model is described by the following equation:

$$\ln(Q_{it}) = \beta_0 + \beta_1 * p_{it} + \mu_i + \varepsilon_{it} \qquad \text{(eq. 2)}$$

where i is the utility and t is the year; Q_{it} is aggregate household consumption; p_{it} is median tier price; μ_i is a utility fixed effect[10]; and ε_{it} represents all unobservable factors affecting consumption.[11] The results of the regression estimation in terms of the relevant elasticities for use in sections 6 and 7 are presented Table 3. Data sources are summarized in Appendix B.

Table 3. Results of the Multi-Family Residential Demand Regression

Demand factor	Elasticity (the average demand response to a 1% increase in the demand factor)	Example: % change in water consumption in response to a 10% increase in the demand factor
Retail price	-0.17	-1.7%

---

[10] A utility fixed effect is a utility specific intercept that accounts for differences between utilities in unobserved demand factors. From a statistical standpoint, an indicator variable representing each service area is included in the regression equation.

[11] Using a county fixed effect for the non-SFR models would enhance precision but sacrifice the accuracy of the estimates. Therefore, in these other sectorial models we use utility fixed effects which account for more unobserved factors than models with county fixed effects.

5 COMMERCIAL AND INDUSTRIAL DEMAND REGRESSION MODEL

The third water demand regression model is for CI water use. Consistent with much of the academic literature on water demand, the econometric model of CI water demand analyzes water-use per employee. This measure is developed based on historical CI water consumption in CCSF and non-CCSF service areas. Notably, institutional, governmental and municipal sector consumption is not included with CI demand because their inclusion makes the statistical model less precise and tractable. This may be due to significant heterogeneity in consumption (e.g., type of water use, outdoor versus indoor use) and/or supply sources (e.g., these accounts may be serviced by alternative water supplies such as recycled water which often faces a different price). Similar to the residential sectors, aggregate CI consumption is recorded by fiscal year at the utility level.

Employment data needed to calculate water-use per employee is taken from the Quarterly Census of Employment and Wages, which is a census of all establishments that pay payroll taxes. The California Employment Development Department (EDD) has complete access to the establishment level (employer by location) raw data from the year 2005 to present. Electronic files of the CCSF and non-CCSF retail service area boundaries were submitted to EDD; and their GIS specialists aggregated the establishment level employment counts to the level of each utility's service area based on the service area boundaries.

The CI water-use per employee is modeled based on price and utility level measures of precipitation, temperature, and cooling degree-days. The model also accounts for different levels of base consumption across agencies through the inclusion of utility fixed effects, which account for baseline differences in unobserved demand factors. The price and weather variables in the CI model are identical to those used in the residential sectors.

Consumption and all demand factors are transformed into logarithmic form for the regression analysis. Once again, this transformation simplifies the interpretation of the regression analysis, which reports a coefficient (i.e., an elasticity) for each demand factor. The elasticity defines the percentage change in CI water consumption resulting from a one percent change in a particular demand factor.

All else being equal, individual water agencies with higher prices have lower water-use per employee. CI customers located in areas with more precipitation consume less water while those areas with warmer temperatures consume more. The regression accounts for cooling degree-days, which has a negligible estimated effect on water-use per employee.

In summary, the estimating equation for the CI demand regression model is described by the following equation:

$$\ln(q_{it}) = \beta_0 + \beta_1 * p_{it} + \beta_3 * X_{it} + \mu_i + \varepsilon_{it} \qquad \text{(eq. 3)}$$

where i is the utility and t is the year; q_{it} is water-use per employee; p_{it} is median tier price; X_{it} represents the weather covariates of annual precipitation, average summer maximum daily temperature, and cooling degree days; μ_i is a utility fixed effect; and ε_{it} represents all unobservable factors affecting consumption. Table 4 presents the results of the CI regression analysis in terms of elasticities. Data sources are summarized in Appendix B.

Table 4: Summary of CI Estimation Results

Demand factor	Elasticity (the average demand response to a 1% increase in the demand factor)	Example: % change in water consumption in response to a 10% increase in the demand factor
Retail price	-0.15	-1.5%
Annual precipitation	-0.04	-0.4%
Average daily summer maximum temperature	0.48	4.8%

6 ADJUSTING BASELINE CONSUMPTION IN FY2010-11

This section summarizes the method of adjusting the baseline consumption period in FY2010-11 to account for atypical demand conditions.

A natural measure of baseline demand is consumption in the most recent year for which there is comprehensive consumption data, FY2010-11. The drawback to utilizing actual FY2010-11 demand as baseline consumption, in fact any specific year, is that there are idiosyncracies that make any given year different than an average year. This is especially true for FY2010-11 which was an unusual year in terms of weather and economic conditions. Temperatures were lower, total precipitation was higher, and the Bay Area economy was still lagging from the effects of the housing crisis and global recession. Together, these factors depressed water demand in the Bay Area, with the result that utilities recorded low levels of water sales. CCSF aggregate demand was down 11.8% in FY2010-11 relative to the three-year average between FY2005-06 to FY2007-08. Some of this reduction is likely due to increased conservation so the next step is to determine what portion of the reduction is due to conservation (which may be permanent) versus the portion due to atypical economic and weather conditions.

To account for the anomalous demand conditions of FY2010-11, it is necessary to determine what water demand would have been under 'normal' economic and weather conditions. This normalized level of demand is then taken as the basis for projecting future demands. The method for estimating normalized FY2010-11 demand takes actual demand in this year and adjusts for the effect of abnormal economic and weather conditions on the SFR and CI demands[12]. The resulting incremental amount of demand is calculated using the estimated demand factor elasticities from the sectorial regression models described in Section 3, 4 and 5.

---

[12] Normalization of MFR demands was considered, although they were found to be identical to actual MFR. Thus, we assume actual MFR demands to be unaffected by the abnormal conditions.

The FY2010-11 SFR demand adjustment takes into account precipitation, temperature and household income under normal conditions. Normal weather is taken to be the 30-year historical average (1980-2010) for a given utility's retail service area and is acquired from the PRISM Climate Group[13]. Normal income is measured as the average median household income in the three years immediately preceding the global recession (2005 – 2007). Annual data for median household income is obtained from the American Community Survey maintained by the Census Bureau and are measured at the county level.

Examination of the data for FY2010-11 confirms that this year was anomalous. For CCSF, average daily summer maximum temperature was down approximately 1% and annual precipitation was up close to 7%. Household income was 0.5% lower than in the three years preceding the housing crisis and resulting economic downturn. Adjusting for these unusual weather and economic conditions, estimated SFR demand in CCSF would have been approximately 0.21 mgd higher under 'normal' conditions than actual conditions in FY2010-11. We observe no significant difference when comparing the normalized and actual demands in the MFR sector. Thus, the normalized MFR demand is modeled as actual demand. In the CI sector we estimate demand for CCSF would have been approximately 0.5 mgd higher under 'normal' weather conditions

6.1 Detailed Description of Calculation for SFR Baseline Demand Adjustment

The SFR baseline demand adjustment is completed in the following way. First, aggregate annual demand in the SFR sector is divided by the total number of SFR accounts and divided by 12 months to arrive at the average monthly consumption per household (under the assumption that SFR account is equivalent to an SFR Household). This is the actual level of average monthly

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[13] PRISM Climate Group, "Near-Real-Time Monthly High-Resolution Precipitation Climate Data Set for the Conterminous United States", raster digital data, accessible: http://www.prism.oregonstate.edu/.

household demand that occurred under unusual economic and weather conditions, which is referenced as q_{actual}^{SFR}.

Second, the incremental percentage increase in demand that would have occurred under normal economic and weather conditions is calculated. To calculate this incremental percentage increase in demand, the factor elasticities for income (ε_{inc}), average summer maximum daily temperature (ε_{temp}) and precipitation (ε_{rain}), are required. These factor elasticities are based on the SFR demand regression results.

The factor elasticities are multiplied by the difference in the corresponding factor (in logarithmic form) under actual FY2010-11 conditions compared to normal conditions. The difference between two values in logarithmic form is a measure of percentage change (%Δ) in the factor.

With the calculation of the q_{actual}^{SFR}, the factor elasticities and the percent changes in factors, the normalized value of household demand in logarithmic form can be calculated using the following equation:

$$\ln(q_{normal}^{SFR}) = \ln(q_{actual}^{SFR}) + (\varepsilon_{inc} \times \%\Delta income) + \left(\varepsilon_{rain}^{SFR} \times \%\Delta rain\right) + \left(\varepsilon_{rain}^{SFR} \times \%\Delta temp\right)$$

(eq. 4)

The normalized monthly household demand in levels is given by

$$q_{normal}^{SFR} = e^{\ln(q_{normal}^{SFR})} \qquad \text{(eq. 5)}$$

The aggregate SFR demand is given by

$$Q_{normal}^{SFR} = \#\ of\ SFR\ accounts\ \times q_{normal}^{SFR} \qquad \text{(eq. 6)}$$

6.2 Detailed Description of Calculation for CI Baseline Demand Adjustment

The CI baseline demand adjustment is similar to the SFR calculation with the following exceptions:

- The demand variable is consumption per employee.
- The relevant demand factors conditioning the normalization are only precipitation and average summer daily maximum temperature, which reflects the distribution of employment across zip codes in CCSF.
- The relevant demand factor elasticities are based on the CI demand regression results.
- Aggregate normalized demand is calculated by multiplying by normalized employment levels, which corresponds to average employment in 2005, 2006 and 2007.

Thus, the normalized value of CI demand in logarithmic form can be calculated using the following equation:

$$\ln(q_{normal}^{CI}) = \ln(q_{actual}^{CI}) + (\varepsilon_{rain}^{CI} \times \%\Delta rain) + \left(\varepsilon_{temp}^{CI} \times \%\Delta temp\right) \qquad \text{(eq. 7)}$$

The normalized consumption per employee in levels is given by

$$q_{normal}^{CI} = e^{\ln(q_{normal}^{CI})} \qquad \text{(eq. 8)}$$

The aggregate CI demand is given by

$$Q_{normal}^{CI} = Average\ Employment\ in\ 2005 - 2007 \times q_{normal}^{CI} \qquad \text{(eq. 9)}$$

7 DEMAND PROJECTIONS THROUGH FY2039-40

The method for forecasting FY2039-40 demand begins with the adjusted demands in FY2010-11 and adds an incremental amount of demand based on (i) growth in demand drivers and factors between the year 2010 and 2040 and (ii) the estimated elasticities for each of the demand factors resulting from the sectorial regression models. The demand drivers included in the forecast models are the number of SFR and MFR housing units and employment; the demand factors considered are household income and price.

Overall, the method for calculating the demand forecasts is similar to the method used for the demand normalization exercise with the following exceptions:

- 2010 baseline demand is considered the adjusted "normalized" demand rather than the actual demand for FY2010-11 (i.e., incremental FY2039-40 demand is relative to this normalized demand level).
- Normalized demand assumes historical weather patterns, which are also assumed for the year 2040. Therefore, the weather variables are no longer among the changing demand factors.
- Price is projected to increase in the future and so is considered among the changing demand factors.
- To recover aggregate demand in FY2039-2040 in the SFR and CI sectors, the predicted SFR household and employee demands are multiplied by the year 2035 projections of SFR accounts and employees, respectively.
- Because price enters as a changing factor, the MFR sector is expected to respond according to the elasticity estimated in the MFR demand regression. Thus, the MFR future demand is not held constant.
- Due to lack of historical data on MFR households, MFR household level demand cannot be estimated using the regression results. Instead, the aggregate demand estimate (under the year 2040 price conditions) are escalated according to the projected growth in MFR households.

It should also be noted that the demand forecasts are not intended to quantify the following:

- The demand model does not directly incorporate conservation-related codes, standards, or ordinances, nor does it explicitly quantify passive conservation savings. However, because demands are driven by socioeconomic factors, such as the price of water, passive conservation is imbedded in the demand projections.

For instance, as the price of water increases homeowners will respond by reducing consumption; a natural choice for this reduction are conservation measures like the adoption of water efficient fixtures and/or other water efficiency standards. As a consequence, the demand projections are assumed to reflect passive conservation.

- Active conservation savings (i.e., water savings due to conservation programs beyond codes, standards, and ordinances) are forecasted separately by the SFPUC.
- SFPUC water accounts classified as "Suburban," "Combination", "Fire" and "Irrigation" accounts are not included in the sectorial regression models described in this document (see Appendix A for a full list). Demands for these classes are forecasted separately by the SFPUC.
- Water loss and non-revenue and unmetered demands resulting from distribution system leaks, breaks, flushing, firefighting, steet cleaning, etc. are estimated separately by the SFPUC.

Table 5 presents the anticipated growth for SFR households, MFR households, employment and median household income for CCSF. Growth in retail water rates are reported in Table 6.

Table 5. Summary of Projected Growth in the Demand Factors Used to Generate Demand Projections

	Fiscal Year					
	2014-15	**2019-20**	**2024-25**	**2029-30**	**2034-35**	**2039-40**
Number of Households[1]	361,452	377,684	393,630	410,227	426,235	442,905
Single Family Households[2, 3]	112,109	113,475	114,857	116,257	117,674	119,108
Multi Family Households[4]	249,343	264,209	278,773	293,970	308,561	323,797
Number of Jobs[5]	621,772	677,531	691,342	706,848	733,858	766,955
Percentage Growth in Median Household Income relative to FY2010-11[6]	3.0%	7.4%	12.2%	17.7%	23.3%	28.8%

Notes:

1. Projected number of in-city households is from the San Francisco Planning Department's Land Use Allocation (LUA) 2012.

2. Historic number of single family households is equivalent to the number of City Paying Single-family accounts in SFPUC's billing system (CC&B).

3. Projected number of single family households is based on average growth rate for 1990-2010.

4. Multi family households is calculated as the difference between total households and single family households.

5. Number of in-city jobs is from the San Francisco Planning Department's Land Use Allocation (LUA) 2012.

6. Refer to ABAG Projections 2009. For FY2039-40, growth is extrapolated FY2014-15 to FY2034-35 projections.

Table 6. Summary of Price Projections

Fiscal Year	Projected CPI assuming 2% inflation[a]	SFPUC Retail--Nominal Prices	SFPUC Retail--rate projections	SFPUC Retail--2010 Real Prices	CPI conversion factor	SFPUC Retail--2000 Real Prices
2010-11	$218.06	$4.12		$4.12	0.79	$3.25
2014-15	$238.87	$6.52	6.5%	$5.95	0.79	$4.70
2019-20	$263.73	$10.43	10.0%	$8.62	0.79	$6.81
2024-25	$291.18	$13.17	3.0%	$9.86	0.79	$7.79
2029-30	$321.49	$14.68	2.0%	$9.96	0.79	$7.87
2034-35	$354.95	$16.21	2.0%	$9.96	0.79	$7.87
2039-40	$391.89	$17.90	2.0%	$9.96	0.79	$7.87

Source: Federal Reserve. "Economic Projections of Federal Reserve Board Members and Federal Reserve Bank Presidents, December 2012", (http://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20121212.pdf)

APPENDIX A

Billing Class by Sector

Sector	**Billing Class**
Single Family Residential	Single Family Residential
Multi-Family Residential	Multi-Family Residential
Commercial and Industrial	Builders & Contractors Commercial Docks & Ships Industrial
Not included in sectorial regression models	Suburban accounts (including airport, San Bruno Jail, Sharp Park, Lawrence Livermore National Laboratory) Irrigation accounts Fire service accounts Combination accounts Non-potable accounts Municipal accounts Treasure Island

APPENDIX B

The data used to generate the demand projections come from several sources, we summarize these data sources below:

- **SFPUC Customer Care & Billing System (CC&B):** Unadjusted baseline 2010 consumption data is based on observed consumption by sector. See Appendix A for how SFPUC billing classes are aggregated into the SFR, MFR and CI sectors.
- Adjustments to baseline consumption due to atypical demand conditions in the year 2010 rely on the following sources:
    - **PRISM Climate Group[14]:** Weather data to measure 2010 deviation from historical climate in the CCSF service area.
    - **California Employment Development Department:** Employment data to measure 2010 deviation from historical average employment between 2005-2007.
    - **American Community Survey, U.S. Census:** 2010 median household income to measure 2010 deviation from historical average income between 2005-2007.
- Projected changes in consumption by sector rely on the following sources:
    - **SFPUC CC&B:** Number of SFR accounts to approximate number of SFR households. Number of MFR households is calculated as the difference between total households and SFR households. See Table 5.
    - **Department of Finance E-8 data:** Total number of households is obtained from the Department of Finance. This is combined with the administrative data from SFPUC on the number of SFR accounts to recover an estimate of households in the MFR sector. See Table 5.
    - **San Francisco Planning Department's Land Use Allocation (LUA) Plan 2012:** Number of jobs. See Table 5.
    - **ABAG Projections 2009[15]:** Median household income in five year increments through the year 2035. The year 2040 projection was extrapolated using the 2015-2035 projections.
    - **SFPUC Division of Finance:** Nominal rate projections in five year increments between 2010 and 2040. All nominal rate projections were converted to the year 2010 real prices using the Bureau of Labor Statistics consumer price index (CPI)

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[14] PRISM Climate Group, "Near-Real-Time Monthly High-Resolution Precipitation Climate Data Set for the Conterminous United States", raster digital data, accessible: http://www.prism.oregonstate.edu/.

[15] Association of Bay Area Governments (ABAG), Building Momentum: Projections and Priorities 2009 (*Projections 2009)*, August 2009.

    and by assuming 2% inflation based economic projections prepared by the Federal Reserve[16]. See Table 6.

    - **BAWSCA Annual Surveys (FY1995-96 through FY2010-11):** Historical data on annual SFR and MFR consumption and metered accounts in non-CCSF utility service areas.

- **The Brattle Group:** Estimated regression coefficients that relate price and income to consumption. See discussion in sections 2, 3, 4 and 5 for more details on the historical data used to develop the regression models.

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[16] Source: Federal Reserve. "Economic Projections of Federal Reserve Board Members and Federal Reserve Bank Presidents, December 2012", (http://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20121212.pdf).

CAMBRIDGE
NEW YORK
SAN FRANCISCO
WASHINGTON
LONDON
MADRID
ROME

THE Brattle GROUP

APPENDIX F

2015-2016 Drought Program

2015 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

Prepared by: The San Francisco Public Utilities Commission

June 2016

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

SAN FRANCISCO PUBLIC UTILITIES COMMISSION

2015-2016 DROUGHT PROGRAM

May 2015, amended June 2015

SECTION 1. INTRODUCTION AND BACKGROUND

California is currently experiencing its fourth year of drought, which may continue into a fifth year and beyond. The State Water Resources Control Board (State Water Board) has taken a series of actions to address the increasing severity of water supply conditions across the State. Many of these actions impose specific restrictions on urban water suppliers and outdoor water use. The City and County of San Francisco and the San Francisco Public Utilities Commission (SFPUC) have also taken action to respond to the drought not only by implementing the State's directives locally, but also by adopting regulations of its own. A selection of State and local actions are summarized on the next page.

Even before the onset of the current drought, San Francisco had one of the lowest per capita water uses in the State thanks to the successful implementation of water conservation over several decades. The longevity of conservation in San Francisco has also resulted in hardening of indoor demands. During the period of June 2014 through February 2015 – the period that was evaluated by the State Water Board in developing a framework for the mandatory Statewide 25% reduction – SFPUC reduced retail water deliveries by about 8% as compared to the same period in 2013. This reduction is substantial given how difficult it is to reduce not just indoor water use, but also outdoor water use in a dense urban area with relatively low outdoor water use to begin with. Also during this period, residential water use has consistently been one of the lowest in the State hovering around 45 gallons per capita per day. Taking these achievements into consideration, the State Water Board placed the SFPUC in an 8% conservation standard tier, the lowest tier in its May 2015 emergency regulations.

The State Water Board may issue information orders, conservation orders, or cease and desist orders to water suppliers who do not meet their assigned conservation standard. Violation of cease and desist orders are subject to a civil liability of up to $10,000 a day.

A Brief Timeline of State and Local Drought Actions

State

January 17, 2014
The Governor declares a drought State of Emergency (Proclamation 1-17-2014).

April 25, 2014
The Governor declares a Continued State of Emergency and calls on all Californians to redouble their efforts to conserve water.

July 15, 2014
The State Water Board adopts emergency regulations requiring urban water suppliers to impose mandatory restrictions on outdoor irrigation. (Resolution 2014-0038)

March 17, 2015
The State Water Board adopts an update to its emergency regulations with additional water use restrictions. (Resolution 2014-0013)

April 1, 2015
The Governor directs the State Water Board to implement a mandatory Statewide water reduction of 25% among other directives and prohibitions. (Executive Order B-29-15)

May 5, 2015
The State Water Board adopts an update to its emergency regulations, including conservation standards for all urban water suppliers and additional prohibitions. A conservation standard of 8% is assigned to the SFPUC. (Resolution 2015-0032)

San Francisco

January 31, 2014
The SFPUC asks all customers to voluntarily curtail water consumption by at least 10% system-wide. (Press Release 3-14)

February 10, 2014
The Mayor directs City departments to reduce water consumption by 10%. (Executive Directive 14-01)

August 12, 2014
The SFPUC imposes a mandatory 10% reduction on outdoor irrigation consistent with the State Water Board's emergency regulations. (Resolution 14-0121)

August 26, 2014
The SFPUC adopts regulations and restrictions for administering allocations and excess use charges on irrigation customers. (Resolution 14-0140)

April 28, 2015
The SFPUC imposes additional water use restrictions consistent with the State Water Board's emergency regulations. (Resolution 15-0102)

May 26, 2015
The SFPUC adopts the 2015-2016 Drought Program described herein (Resolution 15-0119).

June 23, 2015
The SFPUC amends rules and regulations for interruptible water service as part of the 2015-2016 Drought Program described herein. (Resolution 15-0149)

SECTION 2. PROGRAM OBJECTIVES

The objectives of the 2015-2016 Drought Program ("Program") are to:

1. Effective June 1, 2015, **reduce retail system-wide water use by 10%** as compared to the corresponding baseline period in 2013;
2. Effective July 1, 2015, **reduce retail potable[1] water outdoor irrigation by 25%** as compared to the corresponding baseline period in 2013;
3. Effective July 1, 2015, adjust existing wastewater flow factors to reflect a 25% reduction in irrigation; and
4. Prohibit water use practices that are wasteful and/or unnecessary for health and safety.

The Program will be in effect until the water shortage emergency is lifted by the General Manager. In addition, the SFPUC will continually evaluate whether or not the above objectives are being met and if more stringent measures will need to be taken.

Specific Program components that will meet the above objectives are described in the following sections.

SECTION 3. REDUCTION FOR NON-IRRIGATION CUSTOMERS

3.1 Description of Program Component

All non-irrigation accounts in the SFPUC retail service area must strive to reduce water use by 10% as compared to 2013. This goal is in effect starting June 1, 2015 and will remain in effect until the water shortage emergency is lifted by the General Manager .

3.2 Implementation

This water use reduction will be communicated to all customers through a multi-faceted outreach plan that is briefly described in Section 7, Communications and Outreach. One of the communications tools that is currently available to SFPUC customers is My Account, SFPUC's web self-service application. My Account shows each customer his or her account's daily water usage in a chart. For the current drought, a "Drought Water Use Target" bar will be added to the chart to show an average daily water usage that the customer should be striving to meet.

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[1] Raw water accounts that serve dedicated irrigation are subject to the 25% reduction because raw water is not a drought-resistant supply. Raw water accounts receive untreated water from the SFPUC Regional Water System to serve non-potable purposes.

SECTION 4. REDUCTION FOR DEDICATED IRRIGATION CUSTOMERS

4.1 Description of Program Component

In August 2014, the SFPUC imposed a mandatory reduction of 10% on outdoor irrigation of ornamental landscapes or turf with potable water by retail customers. To enforce this reduction, the SFPUC assigned monthly water use allocations to approximately 1,600 dedicated irrigation accounts in its retail service area. Allocations were set to 90% of an account's water use from the corresponding billing month in 2013.The effective period, or restriction period, of this 10% Mandatory Allocation Program began with the October 2014 billing period for each affected account and continues through the June 2015 billing period. For each account that exceeds its allocation during the course of the restriction period, a one-time excess use charge will be applied on its June 2015 bill.

Starting July 1, 2015, the reduction will be increased from 10% to 25%. Allocations will be set to 75% of an account's water use from the corresponding billing month in 2013. Any excess use charges incurred will be applied on a monthly (i.e., billing period) basis instead of one time at the end of the restriction period. This 25% reduction will remain in effect until the water shortage emergency is lifted by the General Manager.

For the initial 10% Mandatory Allocation Program, only accounts that were classified in the SFPUC billing system as dedicated irrigation accounts were automatically included unless exempted. However, upon further investigation by SFPUC staff and due to increased focus by the State Water Board on reducing outdoor irrigation, accounts that are not classified as dedicated irrigation but are identified to be serving irrigation for the majority of their water use may be included in the 25% Mandatory Allocation Program. For instance, a golf course with a commercial water account that serves mainly irrigation uses may be identified as being subject to the 25% mandatory reduction. Inclusion of such accounts in the 25% Mandatory Allocation Program will be at the discretion of the General Manager. If an account is identified for inclusion, the SFPUC will notify the account holder in advance.

For both the 10% and 25% reduction periods, allocations and excess use charges are applied at the account level except for accounts held by City and County of San Francisco departments. For these municipal irrigation accounts, a department's account allocations are aggregated and applied at the department level.

For the regulations pertaining to the 25% reduction and resulting allocations and excess use charges, refer to the amendments adopted by the Commission on May 26, 2015, Resolution 15-0119. These regulations amend those that were adopted by the Commission on August 26, 2014, Resolution 14-014, for the initial 10% reduction.

4.2 Interruptible Water Service

Rules and regulations for Interruptible Water Service were adopted by the SFPUC in February 2015 to allow participating dedicated irrigation customers to receive water service at a reduced rate, which is about 9% lower than regular commercial water rates. By opting into the Interruptible Water Service Program, customers are subject to service interruption and/or greater mandatory water use reductions, along with greater excess use charges, during water shortages and other emergencies at the discretion of the SFPUC Water Enterprise.

The rules and regulations for Interruptible Water Service describe excess use charges applicable during each stage of a water shortage emergency as outlined in SFPUC's Retail Water Shortage Allocation Plan. During Stage 1, corresponding to a system-wide reduction of 5-10%, Interruptible Water Service customers would be subject to a 10% mandatory water use reduction and associated excess use charges of 200% ("2x") of the applicable water rate. During Stage 2, corresponding to a system-wide reduction of 11-20%, Interruptible Water Service customers would be subject to a 25% reduction and corresponding excess use charges of 400% ("4x").

The Interruptible Water Service Program will continue while the 2015-2016 Drought Program is in effect. However, the 2015-2016 Drought Program does not neatly align with Stage 1 or Stage 2 as described in the rules and regulations. Therefore, as an amendment to the rules to reflect the current drought conditions for which a 10% system-wide reduction and 25% irrigation reduction will be in effect, Interruptible Water Service customers shall be subject to a more stringent 30% reduction and excess use charges of 300% ("3x") of the applicable water rate. In comparison, dedicated irrigation customers not participating in the Interruptible Water Service Program are subject excess use charges of 100% ("1x").

For the complete rules and regulations pertaining to Interruptible Water Service, refer to the amended rules and regulations adopted by the Commission on June 23, 2015, Resolution 15-0149.

4.3 Exceptions and Appeals

A customer may appeal for an exemption or a revised allocation if his or her account meets any of the criteria below by completing and submitting an Irrigation Allocation Appeals Form, which is available at sfwater.org. Appeals will be received and reviewed by the SFPUC Water Conservation Section. For the complete regulations pertaining to exceptions, refer to the amended excess use charge regulations adopted by the Commission on May 26, 2015, Resolution 15-0119.

Criteria to appeal for an exemption:

1. Irrigation demand consists of 100% edible plantings for individual consumption or commercial purposes;
2. Irrigation demand served by raw water consists of 100% plantings grown for commercial sales, such as nurseries and tree farms;
3. Irrigation demand consists of 100% community gardens or demonstration projects that are accessible or beneficial to the community and public; or

4. Irrigation demand is provided by recycled water.

Criteria to appeal for a revised allocation:

1. Circumstances concerning the customer's irrigation practices have changed during the baseline period or since the implementation of the 25% reduction, warranting a modification to the customer's water use allocation; or
2. The customer oversees multiple irrigation accounts that are subject to mandatory reductions and opts to redistribute the account-level allocations among the irrigation accounts to achieve the same overall reduction. Each of the following criteria must be met:
    a. The properties must be owned by one entity;
    b. Each account in the group must serve a hospital, university, cemetery, State or Federal governmental facility, or otherwise serve a space that is accessible or beneficial to the community and public; and
    c. Each account in the group must comply with applicable outdoor water use restrictions.

4.4 Implementation

Allocations and excess use charges will be administered by the SFPUC Customer Service Bureau through the Customer Care and Billing (CC&B) system. Inquiries from customers about allocations, methodologies, baseline water use data, and the appeals process will also be addressed by the SFPUC Customer Service Bureau.

The SFPUC will send each dedicated irrigation customer a notification letter of their monthly allocations for July 2015 through February 2016. It is anticipated that the letters will be sent to customers in early June 2015 to allow time for customers to review their allocations and potentially appeal before the 25% reduction takes effect on July 1, 2015. Revised and/or additional allocations will be sent to customers should the drought conditions change or continue beyond February 2016.

4.5 Enforcement

The 25% reduction will be enforced through administration of allocations and excess use charges. Flow restrictions and shut offs are not included in the Program at this time, but may be subject to change.

SECTION 5. FLOW FACTOR ADJUSTMENT

5.1 Description of Program Component

In addition to calling for all non-irrigation customers to reduce water use by 10%, customers presently receiving reduced wastewater flow factors will also be required to reduce irrigation water use by 25%. Accordingly, these reduced wastewater flow factors will be adjusted to reflect an anticipated 25% reduction in outdoor irrigation water use. This flow factor adjustment is intended to help meet the Program objective of reducing retail potable water irrigation by 25% by holding non-irrigation customers accountable for their outdoor water use. Adjusted flow factors will be in effect starting July 1, 2015 and remain in effect until the water shortage emergency is lifted by the General Manager. Furthermore, this 25% reduction of irrigation of water use will also apply to new wastewater flow factor appeals during this restriction period.

Sewer service accounts are charged a sewer rate based on a flow factor. A flow factor represents the portion of water consumed that is discharged to the sewer system as wastewater. When a new account is opened, the SFPUC assigns a standard flow factor of 90% to single family residential accounts, 95% to multi-family residential accounts, and 90% to non-residential accounts. However, a customer may appeal to reduce his or her assigned flow factor if the customer can substantiate that less than the assumed standard water use is discharged to the sewer system. Customers with reduced flow factors tend to be those with large irrigation use, but non-residential customers may also appeal due to non-irrigation use such as recirculating water used in cooling towers. Currently, approximately 14,000 residential accounts and 400 non-residential accounts have reduced flow factors.

For the duration of the 2015-2016 Drought Program, reduced flow factors will be adjusted as follows. Adjusted flow factors will be rounded down to the nearest whole integer.

- For single family residential and non-residential customers:

  Adjusted Flow Factor = (90% - Reduced Flow Factor) x (% Mandatory Reduction) + Reduced Flow Factor

- For multi-family residential customers:

  Adjusted Flow Factor = (95% - Reduced Flow Factor) x (% Mandatory Reduction) + Reduced Flow Factor

An example of a flow factor adjustment is provided below:

> A multi-family residential customer currently has a flow factor of 80%. A 25% mandatory reduction on irrigation is in effect.
>
> Adjusted Flow Factor = (95% - Reduced Flow Factor) x (% Mandatory Reduction) + Reduced Flow Factor
>
> = (95% - 80%) x 25% + 80%
>
> = 83.75%
>
> = 83% (rounded down to nearest whole integer)

For the complete rules pertaining to the residential flow factor appeals process, refer to the amendments adopted by the Commission on May 26, 2015, Resolution 15-0119. These regulations amend those that were adopted by the Commission on June 10, 2003, Resolution 03-0112. Non-residential customers may also appeal the standard flow factor of 90% using similar criteria.

5.2 Exceptions and Appeals

Customers who currently have reduced flow factors may be exempted from adjustments or may submit an appeal if any of the following criteria apply:

1. A residential customer with irrigation demand consisting of 100% edible plantings for individual consumption or commercial purposes; or
2. A non-residential customer with a reduced flow factor due to non-irrigation water use such as cooling towers.

New appeals for reduced flow factors must provide proof of compliance with San Francisco’s Water Efficient Irrigation Ordinance (Administrative Code, Chapter 63) if over 1,000 square feet of landscape have been modified or newly installed since January 2011.

5.3 Implementation

Flow factor adjustments will be administered by the SFPUC Customer Service Bureau through the Customer Care and Billing (CC&B) system. Adjustments will be effective-dated so that a recorded history is maintained. When the restriction period ends, flow factors may be reverted back to the values that were in place prior to July 1, 2015.

The SFPUC will send all affected customers a notification letter of their flow factor adjustments. It is anticipated that the letters will be sent to customers in early June 2015 to allow time for customers to review their adjustments and potentially appeal before the adjusted flow factors take effect on July 1, 2015.

Inquiries from customers about the adjustment method and the appeals process will be addressed by the SFPUC Customer Service Bureau.

SECTION 6. WATER USE RESTRICTIONS

6.1 Description of Program Component

Permanent water use restrictions have been in place in the SFPUC retail service area since before the current drought. Due to the increasing severity of the drought and in response to the end-user requirements by the State Water Board, the SFPUC has adopted additional mandatory restrictions to impose the State’s prohibitions in the SFPUC retail service area if they had not already been addressed by existing SFPUC water use restrictions. At this time, the additional restrictions are temporary and in effect until the General Manager declares that the water shortage emergency is over.

All retail paying and nonpaying customers within and outside of the City and County of San Francisco, including but not limited to federal, state, and local governments, shall be in violation of the SFPUC's Water Use Restrictions, if the customer is found to be using water excessively in the following ways:

Permanent Restrictions	**Effective Date and Resolution(s)**
(a) Water waste, including but not limited to, any flooding or runoff into the street, sidewalk or gutter	January 1, 1960 (SFPUC Resolution 19.786)
(b) Using hoses for any purpose without a positive shut-off valve	
(c) Serving water at a restaurant, café or food counter without waiting for a request by a customer or customers	
(d) Use of potable water for consolidation of backfill, dust control or other nonessential construction purposes if groundwater or reclaimed water is available and approved by the Department of Health	
(e) Use of single-pass cooling systems, fountains and commercial car washes	

Temporary Restrictions **(mandatory until the water shortage emergency is lifted by the General Manager)**	**Effective Date and Resolution(s)**
(f) Washing sidewalks, driveways, plazas and other outdoor hardscapes for reasons other than health and safety needs	July 28, 2014 (State Water Board Resolution 2014-0038)
(g) Outdoor irrigation of ornamental landscapes or turf with potable water that is not reduced by at least ten percent (10%)	August 12, 2014 (SFPUC Resolution 14-0121)
(h) Watering outdoor landscapes with potable water during and within forty-eight (48) hours after a rain event	March 17, 2015 (State Water Board Resolution 2015-0013); April 28, 2015 (SFPUC Resolution 2015-0102)
(i) Not providing guests the option to refuse daily laundering of towels and linens at hotels and motels, and not prominently displaying notice of this option in each guestroom	
(j) Irrigation with potable water of ornamental turf on public street medians	May 5, 2015 (State Water Board Resolution 2015-0032); May 26, 2015 (SFPUC Resolution 15-0119)

It should also be noted that in addition to the above water use restrictions, the City and County of San Francisco has policies and ordinances already in place that encourage the reduction of potable water use. More information about these ordinances is available at sfwater.org/reqs.

- Residential Water Conservation Ordinance (Housing Code, Chapter 12A)
- Commercial Water Conservation Ordinance (Building Code, Article 13A)
- Water Efficient Irrigation Ordinance (Administrative Code, Chapter 63)
- Recycled Water Use Ordinance (Public Works Code, Article 22)
- Restriction of Use of Potable Water for Soil Compaction and Dust Control Activities Ordinance (Public Works Code, Article 21)
- Alternate Water Sources for Non-potable Applications Ordinance (Health Code, Article 12C)

6.4 Exceptions and Appeals

As stated above under item (f), using water to wash sidewalks and hardscapes is prohibited except to address immediate health and safety needs. Otherwise, no exceptions to the above restrictions are allowed.

6.5 Implementation

Through the Retail Water Shortage Allocation Plan, the SFPUC may impose any additional water use prohibitions applicable to retail customers regardless of whether or not the prohibitions were mandated by the State. The SFPUC will continue to inform customers of the water use restrictions through sfwater.org, flyers, postcards, community meetings, the media, etc. See Section 7, Communications and Outreach, or other methods of communication through which the water use restrictions will be shared. Preparation and dissemination of resources and materials will be facilitated by the SFPUC Water Conservation Section, Customer Service Bureau, and Communications Department.

6.6 Water Waste Reporting

A public system for reporting incidents of potential water waste is maintained through sf311.org and the 311 service request call line. The SFPUC reviews reports of potential water waste submitted through 311. If the report contains sufficient information and reflects a restricted outdoor water use, the SFPUC issues a written notice to the water account holder, property owner, and occupant. If reports of waste continue, the SFPUC will call or visit the site to try to verify waste. If water waste is verified and continues, the SFPUC will issue additional warning letters to the account holder. Account holders that receive multiple warnings of verified water waste may be subject to additional action.

SECTION 7. COMMUNICATIONS AND OUTREACH

Customers will be informed of the Program components through a variety of ways. Planned outreach and communication activities include both holistic as well as targeted outreach. These activities include, but are not limited to, the following.

7.1 Ongoing Communications

The SFPUC will continue to communicate water use restrictions through sfwater.org, flyers, postcards, community meetings, the media, etc. The SFPUC will also continue efforts to promote retrofits of plumbing fixtures through its incentive programs. San Francisco's water efficiency requirements and related ordinances will continue to be communicated to the development community and implemented through existing planning and building review processes.

7.2 Notification of Allocations and Adjustments

The SFPUC will send notification letters to irrigation customers, both private and municipal, regarding the 25% reduction and resulting allocations. Letters will also be sent to customers with reduced flow factors notifying them of the forthcoming flow factor adjustment.

7.3 Top Users by Customer

The SFPUC will conduct targeted outreach to top water users, focusing on those who have not participated in SFPUC's conservation incentive programs in the past and have increased water usage since 2013. It is important to note that for this group of customers, high water use does not necessarily mean inefficient water use or that reducing use would be feasible. This outreach will help the SFPUC better understand the water use practices of these top customers and serve as a continuation of ongoing efforts to educate customers about water efficiency and the tools, services, and incentives the SFPUC provides. In-City retail customers will be encouraged to sign up for My Account to track their account's water use and how it relates to a 10 percent reduction over 2013 use.

In addition, SFPUC will continue to work regularly with City departments who were required to submit water conservation plans and plumbing fixture inventories to the SFPUC. Soon the SFPUC will launch a new direct installation program targeted at replacing inefficient plumbing fixtures in City-owned facilities. SFPUC will continue to issue departments periodic updates on their overall department and account-specific progress toward reducing water usage by 10% for standard water service accounts and 25% for irrigation accounts.

The SFPUC will also send letters to top single family and multi-family residential customers notifying them that their usage is among the top of their customer class and building size. Through these letters, the SFPUC will request that these customers evaluate and try to lower their usage, and encourage them to sign up for My Account and to contact the SFPUC for conservation assistance.

7.4 Top Users by Sector

In addition to direct customer-specific contact, the SFPUC will continue and expand efforts to provide information about the drought and ways to save to high water-using business sectors and business sectors for which water is a major part of their operations or whose water use could increase during the drought. Specific sectors that will be targeted include hotels, restaurants, office buildings, laundromats, beauty salons, car washes, and gyms.

7.5 Leak Detection and Notification

The SFPUC launched a pilot Leak Detection Program in April 2015 to notify single family residential customers about potential plumbing leaks that may be occurring at their homes. The SFPUC analyzes hourly water consumption data collected through its automated meter reading system. If continuous water usage is recorded every hour for a 3-day period, the SFPUC will send a courtesy postcard to notify the customer that he or she may have a leak.

7.6 My Account

Customers are encouraged to sign up for and track their water use through My Account, the SFPUC’s on-line bill management system. My Account provides a chart showing the customer account’s daily water usage. For the current drought, a “Drought Water Use Target” bar will be added to the chart to show an average daily water usage that the customer should be striving to meet. This target bar represents 90% of the account’s average water use during the months of January, February, and June through December of 2013. If the customer’s account was not open during these months in 2013, the target bar will represent 90% of the average water use for their account type (e.g., single family residential, multi-family residential, and non-residential). For dedicated irrigation accounts, the target bar will represent 75% of the average water use. The target bar is anticipated to be launched in June 2015 and will remain active through February 2016. As with the overall the 2015-2016 Drought Program, the target bar is subject to change.

7.7 Fractional Billing

Currently, SFPUC customers are billed in whole units, where one unit equals 748 gallons or 100 cubic feet or 1 CCF. A typical home may consume between 1 and 2 units per month or less. Because the billing units are rounded up or down to the whole unit, real-time and incremental savings cannot be communicated to the customer through their monthly bills. The SFPUC is preparing to implement fractional billing into CC&B so that customers will be billed for their actual water consumption and can view their water use down to the 0.01 unit or 1 cubic foot level on their bills. Implementation of fractional billing is anticipated for January 2016.

APPENDIX G

In-City Retail Water Audit Worksheet (Draft)

2015 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

Prepared by: The San Francisco Public Utilities Commission

June 2016

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

AWWA Free Water Audit Software v5.0

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits
for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person: Chris Hewes and Ryker Brown
Email Address: chewes@rmcwater.com and rbrown@rmcwater.com
Telephone | Ext.: 415-321-3422 |
Name of City / Utility: San Francisco Public Utilities Commission
City/Town/Municipality: San Francisco
State / Province: California (CA)
Country: USA
Year: 2015 Financial Year
Start Date: 07/2014 Enter MM/YYYY numeric format
End Date: 06/2015 Enter MM/YYYY numeric format
Audit Preparation Date: 2/9/2016
Volume Reporting Units: Million gallons (US)
PWSID / Other ID:

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

☐	Value can be entered by user
🟨	Value calculated based on input data
🟪	These cells contain recommended default values

Use of Option (Radio) Buttons:	Pcnt:			Value:
	0.25%	●	○	

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the right

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
\+ Click to add a comment

Water Audit Report for: San Francisco Public Utilities Commission
Reporting Year: 2015 7/2014 - 6/2015

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED <----------- Enter grading in column 'E' and 'J' ---------->

									Pcnt:		Value:	
Volume from own sources:	+	?	10	23,363.680	MG/Yr	+	?	8	0.00%	● ○		MG/Yr
Water imported:	+	?	n/a	0.000	MG/Yr	+	?			● ○		MG/Yr
Water exported:	+	?	n/a	0.000	MG/Yr	+	?			● ○		MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: **23,363.680** MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

						Pcnt:		Value:	
Billed metered:	+	?	9	21,088.150	MG/Yr				
Billed unmetered:	+	?	n/a	0.000	MG/Yr				
Unbilled metered:	+	?	10	264.170	MG/Yr				
Unbilled unmetered:	+	?	8	74.960	MG/Yr		○ ●	74.960	MG/Yr

Use buttons to select percentage of water supplied
OR
value

AUTHORIZED CONSUMPTION: ? **21,427.280** MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) **1,936.400** MG/Yr

Apparent Losses

						Pcnt:		Value:	
Unauthorized consumption:	+	?	6	29.205	MG/Yr		○ ●	29.205	MG/Yr
Customer metering inaccuracies:	+	?	7	438.828	MG/Yr		○ ●	438.828	MG/Yr
Systematic data handling errors:	+	?	9	13.180	MG/Yr		○ ●	13.180	MG/Yr

Apparent Losses: ? **481.213** MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? **1,455.187** MG/Yr

WATER LOSSES: **1,936.400** MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: ? **2,275.530** MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+	?	8	1,241.0	miles
Number of active AND inactive service connections:	+	?	7	174,854	
Service connection density:		?		141	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: + ? 7 76.1 psi

COST DATA

Total annual cost of operating water system:	+	?	9	$268,504,152	$/Year
Customer retail unit cost (applied to Apparent Losses):	+	?	9	$14.38	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+	?	8	$285.47	$/Million gallons ☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 90 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Customer metering inaccuracies

2: Unauthorized consumption

3: Variable production cost (applied to Real Losses)

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0

Water Audit Report for: San Francisco Public Utilities Commission
Reporting Year: 2015 | 7/2014 - 6/2015

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 90 out of 100 ***

System Attributes:

Apparent Losses:	481.213	MG/Yr
+ Real Losses:	1,455.187	MG/Yr
= Water Losses:	1,936.400	MG/Yr
? Unavoidable Annual Real Losses (UARL):	915.49	MG/Yr
Annual cost of Apparent Losses:	$9,250,486	
Annual cost of Real Losses:	$415,412	Valued at **Variable Production Cost** Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	9.7%	
	Non-revenue water as percent by cost of operating system:	3.6%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	7.54	gallons/connection/day
	Real Losses per service connection per day:	22.80	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.30	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	1,455.19	million gallons/year
	? Infrastructure Leakage Index (ILI) [CARL/UARL]:	1.59	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software: Water Balance

WAS v5.0

Water Audit Report for: **San Francisco Public Utilities Commission**

Reporting Year: **2015** **7/2014 - 6/2015**

Data Validity Score: **90**

Own Sources **(Adjusted for known errors)** *23,363.680*	**System Input** *23,363.680*	**Water Exported** *0.000*	**Billed Water Exported**			**Revenue Water** **0.000**
		Water Supplied *23,363.680*	**Authorized Consumption** *21,427.280*	**Billed Authorized Consumption** *21,088.150*	**Billed Metered Consumption (water exported is removed)** *21,088.150*	**Revenue Water** **21,088.150**
					Billed Unmetered Consumption *0.000*	
				Unbilled Authorized Consumption *339.130*	**Unbilled Metered Consumption** *264.170*	**Non-Revenue Water (NRW)** **2,275.530**
					Unbilled Unmetered Consumption *74.960*	
			Water Losses *1,936.400*	**Apparent Losses** *481.213*	**Unauthorized Consumption** *29.205*	
					Customer Metering Inaccuracies *438.828*	
					Systematic Data Handling Errors *13.180*	
Water Imported *0.000*				**Real Losses** *1,455.187*	**Leakage on Transmission and/or Distribution Mains** *Not broken down*	
					Leakage and Overflows at Utility's Storage Tanks *Not broken down*	
					Leakage on Service Connections *Not broken down*	

AWWA Free Water Audit Software:
Dashboard

WAS v5.0

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

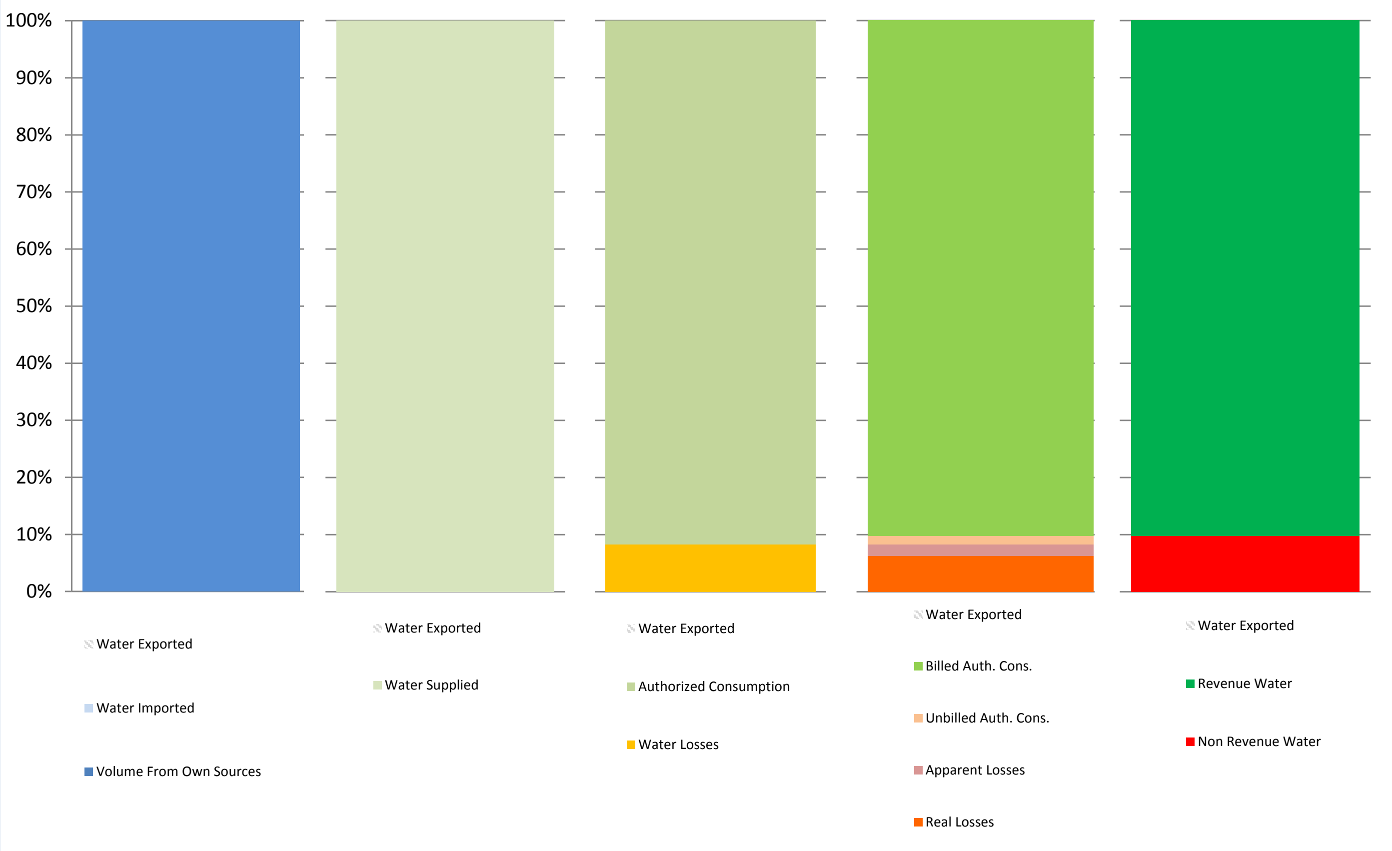
Water Audit Report for: **San Francisco Public Utilities Commission**

Reporting Year: **2015** **7/2014 - 6/2015**

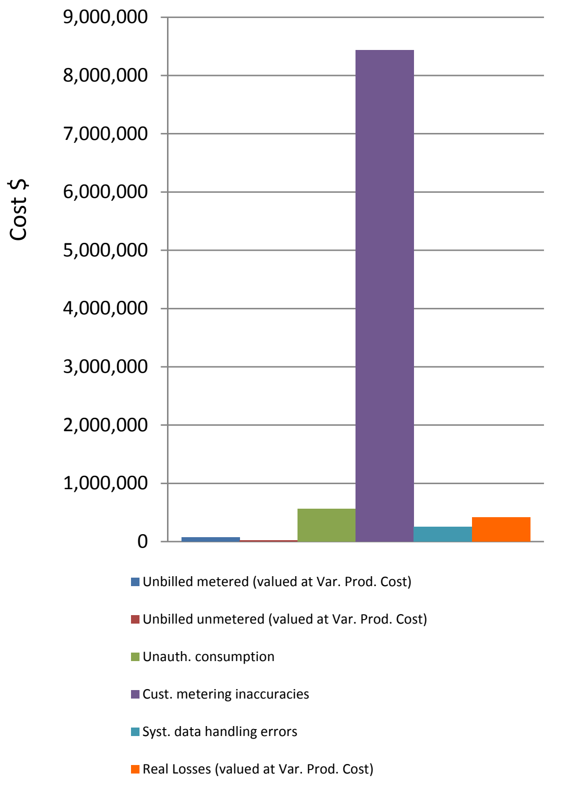
Data Validity Score: **90**

○ Show me the VOLUME of Non-Revenue Water

● Show me the COST of Non-Revenue Water



Total Cost of NRW =$9,762,710



AWWA Free Water Audit Software: Grading Matrix

WAS 5.0

The grading assigned to each audit component and the corresponding recommended improvements and actions are highlighted in yellow. Audit accuracy is likely to be improved by prioritizing those items shown in red

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
WATER SUPPLIED											
Volume from own sources:	Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)	Less than 25% of water production sources are metered, remaining sources are estimated. No regular meter accuracy testing or electronic calibration conducted.	25% - 50% of treated water production sources are metered; other sources estimated. No regular meter accuracy testing or electronic calibration conducted.	Conditions between 2 and 4	50% - 75% of treated water production sources are metered, other sources estimated. Occasional meter accuracy testing or electronic calibration conducted.	Conditions between 4 and 6	At least 75% of treated water production sources are metered, or at least 90% of the source flow is derived from metered sources. Meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually, with less than 10% found outside of +/- 3% accuracy. Procedures are reviewed by a third party knowledgeable in the M36 methodology.
Improvements to attain higher data grading for "Volume from own Sources" component:		to qualify for 2: Organize and launch efforts to collect data for determining volume from own sources	to qualify for 4: Locate all water production sources on maps and in the field, launch meter accuracy testing for existing meters, begin to install meters on unmetered water production sources and replace any obsolete/defective meters.		to qualify for 6: Formalize annual meter accuracy testing for all source meters; specify the frequency of testing. Complete installation of meters on unmetered water production sources and complete replacement of all obsolete/defective meters.		to qualify for 8: Conduct annual meter accuracy testing and calibration of related instrumentation on all meter installations on a regular basis. Complete project to install new, or replace defective existing, meters so that entire production meter population is metered. Repair or replace meters outside of +/- 6% accuracy.		to qualify for 10: Maintain annual meter accuracy testing and calibration of related instrumentation for all meter installations. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to further improve meter accuracy.		to maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.
Volume from own sources master meter and supply error adjustment:	Select n/a only if the water utility fails to have meters on its sources of supply	Inventory information on meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined	No automatic datalogging of production volumes; daily readings are scribed on paper records without any accountability controls. Flows are not balanced across the water distribution system: tank/storage elevation changes are not employed in calculating the "Volume from own sources" component and archived flow data is adjusted only when grossly evident data error occurs.	Conditions between 2 and 4	Production meter data is logged automatically in electronic format and reviewed at least on a monthly basis with necessary corrections implemented. "Volume from own sources" tabulations include estimate of daily changes in tanks/storage facilities. Meter data is adjusted when gross data errors occur, or occasional meter testing deems this necessary.	Conditions between 4 and 6	Hourly production meter data logged automatically & reviewed on at least a weekly basis. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and/or error is confirmed by meter accuracy testing. Tank/storage facility elevation changes are automatically used in calculating a balanced "Volume from own sources" component, and data gaps in the archived data are corrected on at least a weekly basis.	Conditions between 6 and 8	Continuous production meter data is logged automatically & reviewed each business day. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and/or results of meter accuracy testing. Tank/storage facility elevation changes are automatically used in "Volume from own sources" tabulations and data gaps in the archived data are corrected on a daily basis.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically balances flows from all sources and storages; results are reviewed each business day. Tight accountability controls ensure that all data gaps that occur in the archived flow data are quickly detected and corrected. Regular calibrations between SCADA and sources meters ensures minimal data transfer error.
Improvements to attain higher data grading for "Master meter and supply error adjustment" component:		to qualify for 2: Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature.	to qualify for 4: Install automatic datalogging equipment on production meters. Complete installation of level instrumentation at all tanks/storage facilities and include tank level data in automatic calculation routine in a computerized system. Construct a computerized listing or spreadsheet to archive input volumes, tank/storage volume changes and import/export flows in order to determine the composite "Water Supplied" volume for the distribution system. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps.		to qualify for 6: Refine computerized data collection and archive to include hourly production meter data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Use daily net storage change to balance flows in calculating "Water Supplied" volume. Necessary corrections to data errors are implemented on a weekly basis.		to qualify for 8: Ensure that all flow data is collected and archived on at least an hourly basis. All data is reviewed and detected errors corrected each business day. Tank/storage levels variations are employed in calculating balanced "Water Supplied" component. Adjust production meter data for gross error and inaccuracy confirmed by testing.		to qualify for 10: Link all production and tank/storage facility elevation change data to a Supervisory Control & Data Acquisition (SCADA) System, or similar computerized monitoring/control system, and establish automatic flow balancing algorithm and regularly calibrate between SCADA and source meters. Data is reviewed and corrected each business day.		to maintain 10: Monitor meter innovations for development of more accurate and less expensive flowmeters. Continue to replace or repair meters as they perform outside of desired accuracy limits. Stay abreast of new and more accurate water level instruments to better record tank/storage levels and archive the variations in storage volume. Keep current with SCADA and data management systems to ensure that archived data is well-managed and error free.
Water Imported:	Select n/a if the water utility's supply is exclusively from its own water resources (no bulk purchased/ imported water)	Less than 25% of imported water sources are metered, remaining sources are estimated. No regular meter accuracy testing.	25% - 50% of imported water sources are metered; other sources estimated. No regular meter accuracy testing.	Conditions between 2 and 4	50% - 75% of imported water sources are metered, other sources estimated. Occasional meter accuracy testing conducted.	Conditions between 4 and 6	At least 75% of imported water sources are metered, meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually for all meter installations. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of imported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of imported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually for all meter installations, with less than 10% of accuracy tests found outside of +/- 3% accuracy.
Improvements to attain higher data grading for "Water Imported Volume" component: *(Note: usually the water supplier selling the water - "the Exporter" - to the utility being audited is responsible to maintain the metering installation measuring the imported volume. The utility should coordinate carefully with the Exporter to ensure that adequate meter upkeep takes place and an accurate measure of the Water Imported volume is quantified.)*		to qualify for 2: Review bulk water purchase agreements with partner suppliers; confirm requirements for use and maintenance of accurate metering. Identify needs for new or replacement meters with goal to meter all imported water sources.	To qualify for 4: Locate all imported water sources on maps and in the field, launch meter accuracy testing for existing meters, begin to install meters on unmetered imported water interconnections and replace obsolete/defective meters.		to qualify for 6: Formalize annual meter accuracy testing for all imported water meters, planning for both regular meter accuracy testing and calibration of the related instrumentation. Continue installation of meters on unmetered imported water interconnections and replacement of obsolete/defective meters.		to qualify for 8: Complete project to install new, or replace defective, meters on all imported water interconnections. Maintain annual meter accuracy testing for all imported water meters and conduct calibration of related instrumentation at least annually. Repair or replace meters outside of +/- 6% accuracy.		to qualify for 10: Conduct meter accuracy testing for all meters on a semi-annual basis, along with calibration of all related instrumentation. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.		to maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Continue to conduct calibration of related instrumentation on a semi-annual basis. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Water imported master meter and supply error adjustment:	Select n/a if the Imported water supply is unmetered, with Imported water quantities estimated on the billing invoices sent by the Exporter to the purchasing Utility.	Inventory information on imported meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined Written agreement(s) with water Exporter(s) are missing or written in vague language concerning meter management and testing.	No automatic datalogging of imported supply volumes; daily readings are scribed on paper records without any accountability controls to confirm data accuracy and the absence of errors and data gaps in recorded volumes. Written agreement requires meter accuracy testing but is vague on the details of how and who conducts the testing.	Conditions between 2 and 4	Imported supply metered flow data is logged automatically in electronic format and reviewed at least on a monthly basis by the Exporter with necessary corrections implemented. Meter data is adjusted by the Exporter when gross data errors are detected. A coherent data trail exists for this process to protect both the selling and the purchasing Utility. Written agreement exists and clearly states requirements and roles for meter accuracy testing and data management.	Conditions between 4 and 6	Hourly Imported supply metered data is logged automatically & reviewed on at least a weekly basis by the Exporter. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and to correct for error confirmed by meter accuracy testing. Any data gaps in the archived data are detected and corrected during the weekly review. A coherent data trail exists for this process to protect both the selling and the purchasing Utility.	Conditions between 6 and 8	Continuous Imported supply metered flow data is logged automatically & reviewed each business day by the Exporter. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and/or results of meter accuracy testing. Any data errors/gaps are detected and corrected on a daily basis. A data trail exists for the process to protect both the selling and the purchasing Utility.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically records data which is reviewed each business day by the Exporter. Tight accountability controls ensure that all error/data gaps that occur in the archived flow data are quickly detected and corrected. A reliable data trail exists and contract provisions for meter testing and data management are reviewed by the selling and purchasing Utility at least once every five years.
Improvements to attain higher data grading for "Water imported master meter and supply error adjustment" component:	▨	to qualify for 2: Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature. Review the written agreement between the selling and purchasing Utility.	to qualify for 4: Install automatic datalogging equipment on Imported supply meters. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps. Launch discussions with the Exporters to jointly review terms of the written agreements regarding meter accuracy testing and data management; revise the terms as necessary.		to qualify for 6: Refine computerized data collection and archive to include hourly Imported supply metered flow data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Make necessary corrections to errors/data errors on a weekly basis.		to qualify for 8: Ensure that all Imported supply metered flow data is collected and archived on at least an hourly basis. All data is reviewed and errors/data gaps are corrected each business day.		to qualify for 10: Conduct accountability checks to confirm that all Imported supply metered data is reviewed and corrected each business day by the Exporter. Results of all meter accuracy tests and data corrections should be available for sharing between the Exporter and the purchasing Utility. Establish a schedule for a regular review and updating of the contractual language in the written agreement between the selling and the purchasing Utility; at least every five years.		to maintain 10: Monitor meter innovations for development of more accurate and less expensive flowmeters; work with the Exporter to help identify meter replacement needs. Keep communication lines with Exporters open and maintain productive relations. Keep the written agreement current with clear and explicit language that meets the ongoing needs of all parties.
Water Exported:	Select n/a if the water utility sells no bulk water to neighboring water utilities (no exported water sales)	Less than 25% of exported water sources are metered, remaining sources are estimated. No regular meter accuracy testing.	25% - 50% of exported water sources are metered; other sources estimated. No regular meter accuracy testing.	Conditions between 2 and 4	50% - 75% of exported water sources are metered, other sources estimated. Occasional meter accuracy testing conducted.	Conditions between 4 and 6	At least 75% of exported water sources are metered, meter accuracy testing and/or electronic calibration conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of exported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of exported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually for all meter installations, with less than 10% of accuracy tests found outside of +/- 3% accuracy.
Improvements to attain higher data grading for "Water Exported Volume" component: (*Note: usually, if the water utility being audited sells (Exports) water to a neighboring purchasing Utility, it is the responsibility of the utility exporting the water to maintain the metering installation measuring the Exported volume. The utility exporting the water should ensure that adequate meter upkeep takes place and an accurate measure of the Water Exported volume is quantified.*)	▨	to qualify for 2: Review bulk water sales agreements with purchasing utilities; confirm requirements for use & upkeep of accurate metering. Identify needs to install new, or replace defective meters as needed.	To qualify for 4: Locate all exported water sources on maps and in field, launch meter accuracy testing for existing meters, begin to install meters on unmetered exported water interconnections and replace obsolete/defective meters		to qualify for 6: Formalize annual meter accuracy testing for all exported water meters. Continue installation of meters on unmetered exported water interconnections and replacement of obsolete/defective meters.		to qualify for 8: Complete project to install new, or replace defective, meters on all exported water interconnections. Maintain annual meter accuracy testing for all exported water meters. Repair or replace meters outside of +/- 6% accuracy.		to qualify for 10: Maintain annual meter accuracy testing for all meters. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.		to maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.
Water exported master meter and supply error adjustment:	Select n/a only if the water utility fails to have meters on its exported supply interconnections.	Inventory information on exported meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined Written agreement(s) with the utility purchasing the water are missing or written in vague language concerning meter management and testing.	No automatic datalogging of exported supply volumes; daily readings are scribed on paper records without any accountability controls to confirm data accuracy and the absence of errors and data gaps in recorded volumes. Written agreement requires meter accuracy testing but is vague on the details of how and who conducts the testing.	Conditions between 2 and 4	Exported metered flow data is logged automatically in electronic format and reviewed at least on a monthly basis, with necessary corrections implemented. Meter data is adjusted by the utility selling (exporting) the water when gross data errors are detected. A coherent data trail exists for this process to protect both the utility exporting the water and the purchasing Utility. Written agreement exists and clearly states requirements and roles for meter accuracy testing and data management.	Conditions between 4 and 6	Hourly exported supply metered data is logged automatically & reviewed on at least a weekly basis by the utility selling the water. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and to correct for error found by meter accuracy testing. Any data gaps in the archived data are detected and corrected during the weekly review. A coherent data trail exists for this process to protect both the selling (exporting) utility and the purchasing Utility.	Conditions between 6 and 8	Continuous exported supply metered flow data is logged automatically & reviewed each business day by the utility selling (exporting) the water. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and any error confirmed by meter accuracy testing. Any data errors/gaps are detected and corrected on a daily basis. A data trail exists for the process to protect both the selling (exporting) Utility and the purchasing Utility.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically records data which is reviewed each business day by the utility selling (exporting) the water. Tight accountability controls ensure that all error/data gaps that occur in the archived flow data are quickly detected and corrected. A reliable data trail exists and contract provisions for meter testing and data management are reviewed by the selling Utility and purchasing Utility at least once every five years.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Improvements to attain higher data grading for "Water exported master meter and supply error adjustment" component:	▨	to qualify for 2: Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature. Review the written agreement between the utility selling (exporting) the water and the purchasing Utility.	to qualify for 4: Install automatic datalogging equipment on exported supply meters. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps. Launch discussions with the purchasing utilities to jointly review terms of the written agreements regarding meter accuracy testing and data management; revise the terms as necessary.		to qualify for 6: Refine computerized data collection and archive to include hourly exported supply metered flow data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Make necessary corrections to errors/data errors on a weekly basis.		to qualify for 8: Ensure that all exported metered flow data is collected and archived on at least an hourly basis. All data is reviewed and errors/data gaps are corrected each business day.		to qualify for 10: Conduct accountability checks to confirm that all exported metered flow data is reviewed and corrected each business day by the utility selling the water. Results of all meter accuracy tests and data corrections should be available for sharing between the utility and the purchasing Utility. Establish a schedule for a regular review and updating of the contractual language in the written agreements with the purchasing utilities; at least every five years.		to maintain 10: Monitor meter innovations for development of more accurate and less expensive flowmeters; work with the purchasing utilities to help identify meter replacement needs. Keep communication lines with the purchasing utilities open and maintain productive relations. Keep the written agreement current with clear and explicit language that meets the ongoing needs of all parties.
AUTHORIZED CONSUMPTION											
Billed metered:	n/a (not applicable). Select n/a only if the entire customer population is not metered and is billed for water service on a flat or fixed rate basis. In such a case the volume entered must be zero.	Less than 50% of customers with volume-based billings from meter readings; flat or fixed rate billing exists for the majority of the customer population	At least 50% of customers with volume-based billing from meter reads; flat rate billing for others. Manual meter reading is conducted, with less than 50% meter read success rate, remaining accounts' consumption is estimated. Limited meter records, no regular meter testing or replacement. Billing data maintained on paper records, with no auditing.	Conditions between 2 and 4	At least 75% of customers with volume-based, billing from meter reads; flat or fixed rate billing for remaining accounts. Manual meter reading is conducted with at least 50% meter read success rate; consumption for accounts with failed reads is estimated. Purchase records verify age of customer meters; only very limited meter accuracy testing is conducted. Customer meters are replaced only upon complete failure. Computerized billing records exist, but only sporadic internal auditing conducted.	Conditions between 4 and 6	At least 90% of customers with volume-based billing from meter reads; consumption for remaining accounts is estimated. Manual customer meter reading gives at least 80% customer meter reading success rate; consumption for accounts with failed reads is estimated. Good customer meter records eixst, but only limited meter accuracy testing is conducted. Regular replacement is conducted for the oldest meters. Computerized billing records exist with annual auditing of summary statistics conducting by utility personnel.	Conditions between 6 and 8	At least 97% of customers exist with volume-based billing from meter reads. At least 90% customer meter reading success rate; or at least 80% read success rate with planning and budgeting for trials of Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) in one or more pilot areas. Good customer meter records. Regular meter accuracy testing guides replacement of statistically significant number of meters each year. Routine auditing of computerized billing records for global and detailed statistics occurs annually by utility personnel, and is verified by third party at least once every five years.	Conditions between 8 and 10	At least 99% of customers exist with volume-based billing from meter reads. At least 95% customer meter reading success rate; or minimum 80% meter reading success rate, with Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) trials underway. Statistically significant customer meter testing and replacement program in place on a continuous basis. Computerized billing with routine, detailed auditing, including field investigation of representative sample of accounts undertaken annually by utility personnel. Audit is conducted by third party auditors at least once every three years.
Improvements to attain higher data grading for "Billed Metered Consumption" component:	If n/a is selected because the customer meter population is unmetered, consider establishing a new policy to meter the customer population and employ water rates based upon metered volumes.	to qualify for 2: Conduct investigations or trials of customer meters to select appropriate meter models. Budget funding for meter installations. Investigate volume based water rate structures.	to qualify for 4: Purchase and install meters on unmetered accounts. Implement policies to improve meter reading success. Catalog meter information during meter read visits to identify age/model of existing meters. Test a minimal number of meters for accuracy. Install computerized billing system.		to qualify for 6: Purchase and install meters on unmetered accounts. Eliminate flat fee billing and establish appropriate water rate structure based upon measured consumption. Continue to achieve verifiable success in removing manual meter reading barriers. Expand meter accuracy testing. Launch regular meter replacement program. Launch a program of annual auditing of global billing statistics by utility personnel.		to qualify for 8: Purchase and install meters on unmetered accounts. If customer meter reading success rate is less than 97%, assess cost-effectiveness of Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) system for portion or entire system; or otherwise achieve ongoing improvements in manual meter reading success rate to 97% or higher. Refine meter accuracy testing program. Set meter replacement goals based upon accuracy test results. Implement annual auditing of detailed billing records by utility personnel and implement third party auditing at least once every five years.		to qualify for 10: Purchase and install meters on unmetered accounts. Launch Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) system trials if manual meter reading success rate of at least 99% is not achieved within a five-year program. Continue meter accuracy testing program. Conduct planning and budgeting for large scale meter replacement based upon meter life cycle analysis using cumulative flow target. Continue annual detailed billing data auditing by utility personnel and conduct third party auditing at least once every three years.		to maintain 10: Continue annual internal billing data auditing, and third party auditing at least every three years. Continue customer meter accuracy testing to ensure that accurate customer meter readings are obtained and entered as the basis for volume based billing. Stay abreast of improvements in Automatic Meter Reading (AMR) and Advanced Metering Infrastructure (AMI) and information management. Plan and budget for justified upgrades in metering, meter reading and billing data management to maintain very high accuracy in customer metering and billing.
Billed unmetered:	Select n/a if it is the policy of the water utility to meter all customer connections and it has been confirmed by detailed auditing that all customers do indeed have a water meter; i.e. no intentionally unmetered accounts exist	Water utility policy does not require customer metering; flat or fixed fee billing is employed. No data is collected on customer consumption. The only estimates of customer population consumption available are derived from data estimation methods using average fixture count multiplied by number of connections, or similar approach.	Water utility policy does not require customer metering; flat or fixed fee billing is employed. Some metered accounts exist in parts of the system (pilot areas or District Metered Areas) with consumption read periodically or recorded on portable dataloggers over one, three, or seven day periods. Data from these sample meters are used to infer consumption for the total customer population. Site specific estimation methods are used for unusual buildings/water uses.	Conditions between 2 and 4	Water utility policy does require metering and volume based billing in general. However, a liberal amount of exemptions and a lack of clearly written and communicated procedures result in up to 20% of billed accounts believed to be unmetered by exemption; or the water utility is in transition to becoming fully metered, and a large number of customers remain unmetered. A rough estimate of the annual consumption for all unmetered accounts is included in the annual water audit, with no inspection of individual unmetered accounts.	Conditions between 4 and 6	Water utility policy does require metering and volume based billing but established exemptions exist for a portion of accounts such as municipal buildings. As many as 15% of billed accounts are unmetered due to this exemption or meter installation difficulties. Only a group estimate of annual consumption for all unmetered accounts is included in the annual water audit, with no inspection of individual unmetered accounts.	Conditions between 6 and 8	Water utility policy does require metering and volume based billing for all customer accounts. However, less than 5% of billed accounts remain unmetered because meter installation is hindered by unusual circumstances. The goal is to minimize the number of unmetered accounts. Reliable estimates of consumption are obtained for these unmetered accounts via site specific estimation methods.	Conditions between 8 and 10	Water utility policy does require metering and volume based billing for all customer accounts. Less than 2% of billed accounts are unmetered and exist because meter installation is hindered by unusual circumstances. The goal exists to minimize the number of unmetered accounts to the extent that is economical. Reliable estimates of consumption are obtained at these accounts via site specific estimation methods.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Improvements to attain higher data grading for "Billed Unmetered Consumption" component:		to qualify for 2: Conduct research and evaluate cost/benefit of a new water utility policy to require metering of the customer population; thereby greatly reducing or eliminating unmetered accounts. Conduct pilot metering project by installing water meters in small sample of customer accounts and periodically reading the meters or datalogging the water consumption over one, three, or seven day periods.	to qualify for 4: Implement a new water utility policy requiring customer metering. Launch or expand pilot metering study to include several different meter types, which will provide data for economic assessment of full scale metering options. Assess sites with access difficulties to devise means to obtain water consumption volumes. Begin customer meter installation.		to qualify for 6: Refine policy and procedures to improve customer metering participation for all but solidly exempt accounts. Assign staff resources to review billing records to identify errant unmetered properties. Specify metering needs and funding requirements to install sufficient meters to significant reduce the number of unmetered accounts		to qualify for 8: Push to install customer meters on a full scale basis. Refine metering policy and procedures to ensure that all accounts, including municipal properties, are designated for meters. Plan special efforts to address "hard-to-access" accounts. Implement procedures to obtain a reliable consumption estimate for the remaining few unmetered accounts awaiting meter installation.		to qualify for 10: Continue customer meter installation throughout the service area, with a goal to minimize unmetered accounts. Sustain the effort to investigate accounts with access difficulties, and devise means to install water meters or otherwise measure water consumption.		to maintain 10: Continue to refine estimation methods for unmetered consumption and explore means to establish metering, for as many billed remaining unmetered accounts as is economically feasible.
Unbilled metered:	select n/a if all billing-exempt consumption is unmetered.	Billing practices exempt certain accounts, such as municipal buildings, but written policies do not exist; and a reliable count of unbilled metered accounts is unavailable. Meter upkeep and meter reading on these accounts is rare and not considered a priority. Due to poor recordkeeping and lack of auditing, water consumption for all such accounts is purely guesstimated.	Billing practices exempt certain accounts, such as municipal buildings, but only scattered, dated written directives exist to justify this practice. A reliable count of unbilled metered accounts is unavailable. Sporadic meter replacement and meter reading occurs on an as-needed basis. The total annual water consumption for all unbilled, metered accounts is estimated based upon approximating the number of accounts and assigning consumption from actively billed accounts of same meter size.	Conditions between 2 and 4	Dated written procedures permit billing exemption for specific accounts, such as municipal properties, but are unclear regarding certain other types of accounts. Meter reading is given low priority and is sporadic. Consumption is quantified from meter readings where available. The total number of unbilled, unmetered accounts must be estimated along with consumption volumes.	Conditions between 4 and 6	Written policies regarding billing exemptions exist but adherence in practice is questionable. Metering and meter reading for municipal buildings is reliable but sporadic for other unbilled metered accounts. Periodic auditing of such accounts is conducted. Water consumption is quantified directly from meter readings where available, but the majority of the consumption is estimated.	Conditions between 6 and 8	Written policy identifies the types of accounts granted a billing exemption. Customer meter management and meter reading are considered secondary priorities, but meter reading is conducted at least annually to obtain consumption volumes for the annual water audit. High level auditing of billing records ensures that a reliable census of such accounts exists.	Conditions between 8 and 10	Clearly written policy identifies the types of accounts given a billing exemption, with emphasis on keeping such accounts to a minimum. Customer meter management and meter reading for these accounts is given proper priority and is reliably conducted. Regular auditing confirms this. Total water consumption for these accounts is taken from reliable readings from accurate meters.
Improvements to attain higher data grading for "Unbilled Metered Consumption" component:		to qualify for 2: Reassess the water utility's policy allowing certain accounts to be granted a billing exemption. Draft an outline of a new written policy for billing exemptions, with clear justification as to why any accounts should be exempt from billing, and with the intention to keep the number of such accounts to a minimum.	to qualify for 4: Review historic written directives and policy documents allowing certain accounts to be billing-exempt. Draft an outline of a written policy for billing exemptions, identify criteria that grants an exemption, with a goal of keeping this number of accounts to a minimum. Consider increasing the priority of reading meters on unbilled accounts at least annually.		to qualify for 6: Draft a new written policy regarding billing exemptions based upon consensus criteria allowing this occurrence. Assign resources to audit meter records and billing records to obtain census of unbilled metered accounts. Gradually include a greater number of these metered accounts to the routes for regular meter reading.		to qualify for 8: Communicate billing exemption policy throughout the organization and implement procedures that ensure proper account management. Conduct inspections of accounts confirmed in unbilled metered status and verify that accurate meters exist and are scheduled for routine meter readings. Gradually increase the number of unbilled metered accounts that are included in regular meter reading routes.		to qualify for 10: Ensure that meter management (meter accuracy testing, meter replacement) and meter reading activities for unbilled accounts are accorded the same priority as billed accounts. Establish ongoing annual auditing process to ensure that water consumption is reliably collected and provided to the annual water audit process.		to maintain 10: Reassess the utility's philosophy in allowing any water uses to go "unbilled". It is possible to meter and bill all accounts, even if the fee charged for water consumption is discounted or waived. Metering and billing all accounts ensures that water consumption is tracked and water waste from plumbing leaks is detected and minimized.
Unbilled unmetered:		Extent of unbilled, unmetered consumption is unknown due to unclear policies and poor recordkeeping. Total consumption is quantified based upon a purely subjective estimate.	Clear extent of unbilled, unmetered consumption is unknown, but a number of events are randomly documented each year, confirming existence of such consumption, but without sufficient documentation to quantify an accurate estimate of the annual volume consumed.	Conditions between 2 and 4	Extent of unbilled, unmetered consumption is partially known, and procedures exist to document certain events such as miscellaneous fire hydrant uses. Formulae is used to quantify the consumption from such events (time running multiplied by typical flowrate, multiplied by number of events).	Default value of 1.25% of system input volume is employed	Coherent policies exist for some forms of unbilled, unmetered consumption but others await closer evaluation. Reasonable recordkeeping for the managed uses exists and allows for annual volumes to be quantified by inference, but unsupervised uses are guesstimated.	Conditions between 6 and 8	Clear policies and good recordkeeping exist for some uses (ex: water used in periodic testing of unmetered fire connections), but other uses (ex: miscellaneous uses of fire hydrants) have limited oversight. Total consumption is a mix of well quantified use such as from formulae (time running multiplied by typical flow, multiplied by number of events) or temporary meters, and relatively subjective estimates of less regulated use.	Conditions between 8 and 10	Clear policies exist to identify permitted use of water in unbilled, unmetered fashion, with the intention of minimizing this type of consumption. Good records document each occurrence and consumption is quantified via formulae (time running multiplied by typical flow, multiplied by number of events) or use of temporary meters.
Improvements to attain higher data grading for "Unbilled Unmetered Consumption" component:		to qualify for 5: Utilize the accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of this use. to qualify for 2: Establish a policy regarding what water uses should be allowed to remain as unbilled and unmetered. Consider tracking a small sample of one such use (ex: fire hydrant flushings).	to qualify for 5: Utilize accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of this use. to qualify for 4: Evaluate the documentation of events that have been observed. Meet with user groups (ex: for fire hydrants - fire departments, contractors to ascertain their need and/or volume requirements for water from fire hydrants).		to qualify for 5: Utilize accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of all such use. This is particularly appropriate for water utilities who are in the early stages of the water auditing process, and should focus on other components since the volume of unbilled, umetered consumption is usually a relatively small quatity component, and other larger-quantity components should take priority.	to qualify for 6 or greater: Finalize policy and begin to conduct field checks to better establish and quantify such usage. Proceed if top-down audit exists and/or a great volume of such use is suspected.	to qualify for 8: Assess water utility policy and procedures for various unmetered usages. For example, ensure that a policy exists and permits are issued for use of fire hydrants by persons outside of the utility. Create written procedures for use and documentation of fire hydrants by water utility personnel. Use same approach for other types of unbilled, unmetered water usage.		to qualify for 10: Refine written procedures to ensure that all uses of unbilled, unmetered water are overseen by a structured permitting process managed by water utility personnel. Reassess policy to determine if some of these uses have value in being converted to billed and/or metered status.		to maintain 10: Continue to refine policy and procedures with intention of reducing the number of allowable uses of water in unbilled and unmetered fashion. Any uses that can feasibly become billed and metered should be converted eventually.

APPARENT LOSSES

Grading >>>	**n/a**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Unauthorized consumption:	▨	Extent of unauthorized consumption is unknown due to unclear policies and poor recordkeeping. Total unauthorized consumption is guesstimated.	Unauthorized consumption is a known occurrence, but its extent is a mystery. There are no requirements to document observed events, but periodic field reports capture some of these occurrences. Total unauthorized consumption is approximated from this limited data.	conditions between 2 and 4	Procedures exist to document some unauthorized consumption such as observed unauthorized fire hydrant openings. Use formulae to quantify this consumption (time running multiplied typical flowrate, multiplied by number of events).	Default value of 0.25% of volume of water supplied is employed	Coherent policies exist for some forms of unauthorized consumption (more than simply fire hydrant misuse) but others await closer evaluation. Reasonable surveillance and recordkeeping exist for occurrences that fall under the policy. Volumes quantified by inference from these records.	Conditions between 6 and 8	Clear policies and good auditable recordkeeping exist for certain events (ex: tampering with water meters, illegal bypasses of customer meters); but other occurrences have limited oversight. Total consumption is a combination of volumes from formulae (time x typical flow) and subjective estimates of unconfirmed consumption.	Conditions between 8 and 10	Clear policies exist to identify all known unauthorized uses of water. Staff and procedures exist to provide enforcement of policies and detect violations. Each occurrence is recorded and quantified via formulae (estimated time running multiplied by typical flow) or similar methods. All records and calculations should exist in a form that can be audited by a third party.
Improvements to attain higher data grading for "Unauthorized Consumption" component:	▨	to qualify for 5: Use accepted default of 0.25% of volume of water supplied. to qualify for 2: Review utility policy regarding what water uses are considered unauthorized, and consider tracking a small sample of one such occurrence (ex: unauthorized fire hydrant openings)	to qualify for 5: Use accepted default of 0.25% of system input volume to qualify for 4: Review utility policy regarding what water uses are considered unauthorized, and consider tracking a small sample of one such occurrence (ex: unauthorized fire hydrant openings)		to qualify for 5: Utilize accepted default value of 0.25% of volume of water supplied as an expedient means to gain a reasonable quantification of all such use. This is particularly appropriate for water utilities who are in the early stages of the water auditing process.	to qualify for 6 or greater: Finalize policy updates to clearly identify the types of water consumption that are authorized from those usages that fall outside of this policy and are, therefore, unauthorized. Begin to conduct regular field checks. Proceed if the top-down audit already exists and/or a great volume of such use is suspected.	to quality for 8: Assess water utility policies to ensure that all known occurrences of unauthorized consumption are outlawed, and that appropriate penalties are prescribed. Create written procedures for detection and documentation of various occurrences of unauthorized consumption as they are uncovered.		to qualify for 10: Refine written procedures and assign staff to seek out likely occurrences of unauthorized consumption. Explore new locking devices, monitors and other technologies designed to detect and thwart unauthorized consumption.		to maintain 10: Continue to refine policy and procedures to eliminate any loopholes that allow or tacitly encourage unauthorized consumption. Continue to be vigilant in detection, documentation and enforcement efforts.
Customer metering inaccuracies:	select n/a only if the entire customer population is unmetered. In such a case the volume entered must be zero.	Customer meters exist, but with unorganized paper records on meters; no meter accuracy testing or meter replacement program for any size of retail meter. Metering workflow is driven chaotically with no proactive management. Loss volume due to aggregate meter inaccuracy is guesstimated.	Poor recordkeeping and meter oversight is recognized by water utility management who has allotted staff and funding resources to organize improved recordkeeping and start meter accuracy testing. Existing paper records gathered and organized to provide cursory disposition of meter population. Customer meters are tested for accuracy only upon customer request.	Conditions between 2 and 4	Reliable recordkeeping exists; meter information is improving as meters are replaced. Meter accuracy testing is conducted annually for a small number of meters (more than just customer requests, but less than 1% of inventory). A limited number of the oldest meters are replaced each year. Inaccuracy volume is largely an estimate, but refined based upon limited testing data.	Conditions between 4 and 6	A reliable electronic recordkeeping system for meters exists. The meter population includes a mix of new high performing meters and dated meters with suspect accuracy. Routine, but limited, meter accuracy testing and meter replacement occur. Inaccuracy volume is quantified using a mix of reliable and less certain data.	Conditions between 6 and 8	Ongoing meter replacement and accuracy testing result in highly accurate customer meter population. Testing is conducted on samples of meters of varying age and accumulated volume of throughput to determine optimum replacement time for various types of meters.	Ongoing meter replacement and accuracy testing result in highly accurate customer meter population. Statistically significant number of meters are tested in audit year. This testing is conducted on samples of meters of varying age and accumulated volume of throughput to determine optimum replacement time for these meters.	Good records of all active customer meters exist and include as a minimum: meter number, account number/location, type, size and manufacturer. Ongoing meter replacement occurs according to a targeted and justified basis. Regular meter accuracy testing gives a reliable measure of composite inaccuracy volume for the customer meter population. New metering technology is embraced to keep overall accuracy improving. Procedures are reviewed by a third party knowledgeable in the M36 methodology.
Improvements to attain higher data grading for "Customer meter inaccuracy volume" component:	If n/a is selected because the customer meter population is unmetered, consider establishing a new policy to meter the customer population and employ water rates based upon metered volumes.	to qualify for 2: Gather available meter purchase records. Conduct testing on a small number of meters believed to be the most inaccurate. Review staffing needs of the metering group and budget for necessary resources to better organize meter management.	to qualify for 4: Implement a reliable record keeping system for customer meter histories, preferably using electronic methods typically linked to, or part of, the Customer Billing System or Customer Information System. Expand meter accuracy testing to a larger group of meters.		to qualify for 6: Standardize the procedures for meter recordkeeping within an electronic information system. Accelerate meter accuracy testing and meter replacements guided by testing results.		to qualify for 8: Expand annual meter accuracy testing to evaluate a statistically significant number of meter makes/models. Expand meter replacement program to replace statistically significant number of poor performing meters each year.		to qualify for 9: Continue efforts to manage meter population with reliable recordkeeping. Test a statistically significant number of meters each year and analyze test results in an ongoing manner to serve as a basis for a target meter replacement strategy based upon accumulated volume throughput.	to qualify for 10: Continue efforts to manage meter population with reliable recordkeeping, meter testing and replacement. Evaluate new meter types and install one or more types in 5-10 customer accounts each year in order to pilot improving metering technology.	to maintain 10: Increase the number of meters tested and replaced as justified by meter accuracy test data. Continually monitor development of new metering technology and Advanced Metering Infrastructure (AMI) to grasp opportunities for greater accuracy in metering of water flow and management of customer consumption data.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Systematic Data Handling Errors:	Note: all water utilities incur some amount of this error. Even in water utilities with unmetered customer populations and fixed rate billing, errors occur in annual billing tabulations. Enter a positive value for the volume and select a grading.	Policies and procedures for activation of new customer water billing accounts are vague and lack accountability. Billing data is maintained on paper records which are not well organized. No auditing is conducted to confirm billing data handling efficiency. An unknown number of customers escape routine billing due to lack of billing process oversight.	Policy and procedures for activation of new customer accounts and oversight of billing records exist but need refinement. Billing data is maintained on paper records or insufficiently capable electronic database. Only periodic unstructured auditing work is conducted to confirm billing data handling efficiency. The volume of unbilled water due to billing lapses is a guess.	Conditions between 2 and 4	Policy and procedures for new account activation and oversight of billing operations exist but needs refinement. Computerized billing system exists, but is dated or lacks needed functionality. Periodic, limited internal audits conducted and confirm with approximate accuracy the consumption volumes lost to billing lapses.	Conditions between 4 and 6	Policy and procedures for new account activation and oversight of billing operations is adequate and reviewed periodically. Computerized billing system is in use with basic reporting available. Any effect of billing adjustments on measured consumption volumes is well understood. Internal checks of billing data error conducted annually. Reasonably accurate quantification of consumption volume lost to billing lapses is obtained.	Conditions between 6 and 8	New account activation and billing operations policy and procedures are reviewed at least biannually. Computerized billing system includes an array of reports to confirm billing data and system functionality. Checks are conducted routinely to flag and explain zero consumption accounts. Annual internal checks conducted with third party audit conducted at least once every five years. Accountability checks flag billing lapses. Consumption lost to billing lapses is well quantified and reducing year-by-year.	Conditions between 8 and 10	Sound written policy and procedures exist for new account activation and oversight of customer billing operations. Robust computerized billing system gives high functionality and reporting capabilities which are utilized, analyzed and the results reported each billing cycle. Assessment of policy and data handling errors are conducted internally and audited by third party at least once every three years, ensuring consumption lost to billing lapses is minimized and detected as it occurs.
Improvements to attain higher data grading for "Systematic Data Handling Error volume" component:		to qualify for 2: Draft written policy and procedures for activating new water billing accounts and oversight of billing operations. Investigate and budget for computerized customer billing system. Conduct initial audit of billing records by flow-charting the basic business processes of the customer account/billing function.	to qualify for 4: Finalize written policy and procedures for activation of new billing accocunts and overall billing operations management. Implement a computerized customer billing system. Conduct initial audit of billing records as part of this process.		to qualify for 6: Refine new account activation and billing operations procedures and ensure consistency with the utility policy regarding billing, and minimize opportunity for missed billings. Upgrade or replace customer billing system for needed functionality - ensure that billing adjustments don't corrupt the value of consumption volumes. Procedurize internal annual audit process.		to qualify for 8: Formalize regular review of new account activation process and general billing practices. Enhance reporting capability of computerized billing system. Formalize regular auditing process to reveal scope of data handling error. Plan for periodic third party audit to occur at least once every five years.		to qualify for 10: Close policy/procedure loopholes that allow some customer accounts to go unbilled, or data handling errors to exist. Ensure that billing system reports are utilized, analyzed and reported every billing cycle. Ensure that internal and third party audits are conducted at least once every three years.		to maintain 10: Stay abreast of customer information management developments and innovations. Monitor developments of Advanced Metering Infrastructure (AMI) and integrate technology to ensure that customer endpoint information is well-monitored and errors/lapses are at an economic minimum.
SYSTEM DATA											
Length of mains:		Poorly assembled and maintained paper as-built records of existing water main installations makes accurate determination of system pipe length impossible. Length of mains is guesstimated.	Paper records in poor or uncertain condition (no annual tracking of installations & abandonments). Poor procedures to ensure that new water mains installed by developers are accurately documented.	Conditions between 2 and 4	Sound written policy and procedures exist for documenting new water main installations, but gaps in management result in a uncertain degree of error in tabulation of mains length.	Conditions between 4 and 6	Sound written policy and procedures exist for permitting and commissioning new water mains. Highly accurate paper records with regular field validation; or electronic records and asset management system in good condition. Includes system backup.	Conditions between 6 and 8	Sound written policy and procedures exist for permitting and commissioning new water mains. Electronic recordkeeping such as a Geographical Information System (GIS) and asset management system are used to store and manage data.	Conditions between 8 and 10	Sound written policy exists for managing water mains extensions and replacements. Geographic Information System (GIS) data and asset management database agree and random field validation proves truth of databases. Records of annual field validation should be available for review.
Improvements to attain higher data grading for "Length of Water Mains" component:		to qualify for 2: Assign personnel to inventory current as-built records and compare with customer billing system records and highway plans in order to verify poorly documented pipelines. Assemble policy documents regarding permitting and documentation of water main installations by the utility and building developers; identify gaps in procedures that result in poor documentation of new water main installations.	to qualify for 4: Complete inventory of paper records of water main installations for several years prior to audit year. Review policy and procedures for commissioning and documenting new water main installation.		to qualify for 6: Finalize updates/improvements to written policy and procedures for permitting/commissioning new main installations. Confirm inventory of records for five years prior to audit year; correct any errors or omissions.		to qualify for 8: Launch random field checks of limited number of locations. Convert to electronic database such as a Geographic Information System (GIS) with backup as justified. Develop written policy and procedures.		to qualify for 10: Link Geographic Information System (GIS) and asset management databases, conduct field verification of data. Record field verification information at least annually.		to maintain 10: Continue with standardization and random field validation to improve the completeness and accuracy of the system.
Number of active AND inactive service connections:		Vague permitting (of new service connections) policy and poor paper recordkeeping of customer connections/billings result in suspect determination of the number of service connections, which may be 10-15% in error from actual count.	General permitting policy exists but paper records, procedural gaps, and weak oversight result in questionable total for number of connections, which may vary 5-10% of actual count.	Conditions between 2 and 4	Written account activation policy and procedures exist, but with some gaps in performance and oversight. Computerized information management system is being brought online to replace dated paper recordkeeping system. Reasonably accurate tracking of service connection installations & abandonments; but count can be up to 5% in error from actual total.	Conditions between 4 and 6	Written new account activation and overall billing policies and procedures are adequate and reviewed periodically. Computerized information management system is in use with annual installations & abandonments totaled. Very limited field verifications and audits. Error in count of number of service connections is believed to be no more than 3%.	Conditions between 6 and 8	Policies and procedures for new account activation and overall billing operations are written, well-structured and reviewed at least biannually. Well-managed computerized information management system exists and routine, periodic field checks and internal system audits are conducted. Counts of connections are no more than 2% in error.	Conditions between 8 and 10	Sound written policy and well managed and audited procedures ensure reliable management of service connection population. Computerized information management system, Customer Billing System, and Geographic Information System (GIS) information agree; field validation proves truth of databases. Count of connections recorded as being in error is less than 1% of the entire population.
Improvements to attain higher data grading for "Number of Active and Inactive Service Connections" component:	**Note: The number of Service Connections does <u>not</u> include fire hydrant leads/lines connecting the hydrant to the water main**	to qualify for 2: Draft new policy and procedures for new account activation and overall billing operations. Research and collect paper records of installations & abandonments for several years prior to audit year.	to qualify for 4: Refine policy and procedures for new account activation and overall billing operations. Research computerized recordkeeping system (Customer Information System or Customer Billing System) to improve documentation format for service connections.		to qualify for 6: Refine procedures to ensure consistency with new account activation and overall billing policy to establish new service connections or decommission existing connections. Improve process to include all totals for at least five years prior to audit year.		to qualify for 8: Formalize regular review of new account activation and overall billing operations policies and procedures. Launch random field checks of limited number of locations. Develop reports and auditing mechanisms for computerized information management system.		to qualify for 10: Close any procedural loopholes that allow installations to go undocumented. Link computerized information management system with Geographic Information System (GIS) and formalize field inspection and information system auditing processes. Documentation of new or decommissioned service connections encounters several levels of checks and balances.		to maintain 10: Continue with standardization and random field validation to improve knowledge of system.
	Note: if customer water	Gradings 1-9 apply if customer properties are unmetered, if customer meters exist and are located inside the customer building premises, or if the water utility owns and is responsible for the entire service connection piping from the water main to the customer building. In any of these cases the average distance between the curb stop or boundary separating utility/customer responsibility for service connection piping, and the typical first point of use (ex: faucet) or the customer meter must be quantified. Gradings of 1-9 are used to grade the validity of the means to quantify this value. (See the "Service Connection Diagram" worksheet)									Either of two conditions can be met for a grading of 10:

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Average length of customer service line:	meters are located outside of the customer building next to the curb stop or boundary separating utility/customer responsibility, then the auditor should answer "Yes" to the question on the Reporting Worksheet asking about this. If the answer is Yes, the grading description listed under the Grading of 10(a) will be followed, with a value of zero automatically entered at a Grading of 10. See the Service Connection Diagram worksheet for a visual presentation of this distance.	Vague policy exists to define the delineation of water utility ownership and customer ownership of the service connection piping. Curb stops are perceived as the breakpoint but these have not been well-maintained or documented. Most are buried or obscured. Their location varies widely from site-to-site, and estimating this distance is arbitrary due to the unknown location of many curb stops.	Policy requires that the curb stop serves as the delineation point between water utility ownership and customer ownership of the service connection piping. The piping from the water main to the curb stop is the property of the water utility; and the piping from the curb stop to the customer building is owned by the customer. Curb stop locations are not well documented and the average distance is based upon a limited number of locations measured in the field.	Conditions between 2 and 4	Good policy requires that the curb stop serves as the delineation point between water utility ownership and customer ownership of the service connection piping. Curb stops are generally installed as needed and are reasonably documented. Their location varies widely from site-to-site, and an estimate of this distance is hindered by the availability of paper records of limited accuracy.	Conditions between 4 and 6	Clear written policy exists to define utility/customer responsibility for service connection piping. Accurate, well-maintained paper or basic electronic recordkeeping system exists. Periodic field checks confirm piping lengths for a sample of customer properties.	Conditions between 6 and 8	Clearly worded policy standardizes the location of curb stops and meters, which are inspected upon installation. Accurate and well maintained electronic records exist with periodic field checks to confirm locations of service lines, curb stops and customer meter pits. An accurate number of customer properties from the customer billing system allows for reliable averaging of this length.	Conditions between 8 and 10	a) Customer water meters exist outside of customer buildings next to the curb stop or boundary separating utility/customer responsibility for service connection piping. If so, answer "Yes" to the question on the Reporting Working asking about this condition. A value of zero and a Grading of 10 are automatically entered in the Reporting Worksheet . b). Meters exist inside customer buildings, or properties are unmetered. In either case, answer "No" to the Reporting Worksheet question on meter location, and enter a distance determined by the auditor. For a Grading of 10 this value must be a very reliable number from a Geographic Information System (GIS) and confirmed by a statistically valid number of field checks.
Improvements to attain higher data grading for "Average Length of Customer Service Line" component:		to qualify for 2: Research and collect paper records of service line installations. Inspect several sites in the field using pipe locators to locate curb stops. Obtain the length of this small sample of connections in this manner.	to qualify for 4: Formalize and communicate policy delineating utility/customer responsibilities for service connection piping. Assess accuracy of paper records by field inspection of a small sample of service connections using pipe locators as needed. Research the potential migration to a computerized information management system to store service connection data.		to qualify for 6: Establish coherent procedures to ensure that policy for curb stop, meter installation and documentation is followed. Gain consensus within the water utility for the establishment of a computerized information management system.		to qualify for 8: Implement an electronic means of recordkeeping, typically via a customer information system, customer billing system, or Geographic Information System (GIS). Standardize the process to conduct field checks of a limited number of locations.		to qualify for 10: Link customer information management system and Geographic Information System (GIS), standardize process for field verification of data.		to maintain 10: Continue with standardization and random field validation to improve knowledge of service connection configurations and customer meter locations.
Average operating pressure:		Available records are poorly assembled and maintained paper records of supply pump characteristics and water distribution system operating conditions. Average pressure is guesstimated based upon this information and ground elevations from crude topographical maps. Widely varying distribution system pressures due to undulating terrain, high system head loss and weak/erratic pressure controls further compromise the validity of the average pressure calculation.	Limited telemetry monitoring of scattered pumping station and water storage tank sites provides some static pressure data, which is recorded in handwritten logbooks. Pressure data is gathered at individual sites only when low pressure complaints arise. Average pressure is determined by averaging relatively crude data, and is affected by significant variation in ground elevations, system head loss and gaps in pressure controls in the distribution system.	Conditions between 2 and 4	Effective pressure controls separate different pressure zones; moderate pressure variation across the system, occasional open boundary valves are discovered that breech pressure zones. Basic telemetry monitoring of the distribution system logs pressure data electronically. Pressure data gathered by gauges or dataloggers at fire hydrants or buildings when low pressure complaints arise, and during fire flow tests and system flushing. Reliable topographical data exists. Average pressure is calculated using this mix of data.	Conditions between 4 and 6	Reliable pressure controls separate distinct pressure zones; only very occasional open boundary valves are encountered that breech pressure zones. Well-covered telemetry monitoring of the distribution system (not just pumping at source treatment plants or wells) logs extensive pressure data electronically. Pressure gathered by gauges/dataloggers at fire hydrants and buildings when low pressure complaints arise, and during fire flow tests and system flushing. Average pressure is determined by using this mix of reliable data.	Conditions between 6 and 8	Well-managed, discrete pressure zones exist with generally predictable pressure fluctuations. A current full-scale SCADA System or similar realtime monitoring system exists to monitor the water distribution system and collect data, including real time pressure readings at representative sites across the system. The average system pressure is determined from reliable monitoring system data.	Conditions between 8 and 10	Well-managed pressure districts/zones, SCADA System and hydraulic model exist to give very precise pressure data across the water distribution system. Average system pressure is reliably calculated from extensive, reliable, and cross-checked data. Calculations are reported on an annual basis as a minimum.
Improvements to attain higher data grading for "Average Operating Pressure" component:		to qualify for 2: Employ pressure gauging and/or datalogging equipment to obtain pressure measurements from fire hydrants. Locate accurate topographical maps of service area in order to confirm ground elevations. Research pump data sheets to find pump pressure/flow characteristics	to qualify for 4: Formalize a procedure to use pressure gauging/datalogging equipment to gather pressure data during various system events such as low pressure complaints, or operational testing. Gather pump pressure and flow data at different flow regimes. Identify faulty pressure controls (pressure reducing valves, altitude valves, partially open boundary valves) and plan to properly configure pressure zones. Make all pressure data from these efforts available to generate system-wide average pressure.		to qualify for 6: Expand the use of pressure gauging/datalogging equipment to gather scattered pressure data at a representative set of sites, based upon pressure zones or areas. Utilize pump pressure and flow data to determine supply head entering each pressure zone or district. Correct any faulty pressure controls (pressure reducing valves, altitude valves, partially open boundary valves) to ensure properly configured pressure zones. Use expanded pressure dataset from these activities to generate system-wide average pressure.		to qualify for 8: Install a Supervisory Control and Data Acquisition (SCADA) System, or similar realtime monitoring system, to monitor system parameters and control operations. Set regular calibration schedule for instrumentation to insure data accuracy. Obtain accurate topographical data and utilize pressure data gathered from field surveys to provide extensive, reliable data for pressure averaging.		to qualify for 10: Annually, obtain a system-wide average pressure value from the hydraulic model of the distribution system that has been calibrated via field measurements in the water distribution system and confirmed in comparisons with SCADA System data.		to maintain 10: Continue to refine the hydraulic model of the distribution system and consider linking it with SCADA System for real-time pressure data calibration, and averaging.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
COST DATA											
Total annual cost of operating water system:		Incomplete paper records and lack of financial accounting documentation on many operating functions makes calculation of water system operating costs a pure guesstimate	Reasonably maintained, but incomplete, paper or electronic accounting provides data to estimate the major portion of water system operating costs.	Conditions between 2 and 4	Electronic, industry-standard cost accounting system in place. However, gaps in data are known to exist, periodic internal reviews are conducted but not a structured financial audit.	Conditions between 4 and 6	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited periodically by utility personnel, but not a Certified Public Accountant (CPA).	Conditions between 6 and 8	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited at least annually by utility personnel, and at least once every three years by third-party CPA.	Conditions between 8 and 10	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited annually by utility personnel and annually also by third-party CPA.
Improvements to attain higher data grading for "Total Annual Cost of Operating the Water System" component:		to qualify for 2: Gather available records, institute new financial accounting procedures to regularly collect and audit basic cost data of most important operations functions.	to qualify for 4: Implement an electronic cost accounting system, structured according to accounting standards for water utilities		to qualify for 6: Establish process for periodic internal audit of water system operating costs; identify cost data gaps and institute procedures for tracking these outstanding costs.		to qualify for 8: Standardize the process to conduct routine financial audit on an annual basis. Arrange for CPA audit of financial records at least once every three years.		to qualify for 10: Standardize the process to conduct a third-party financial audit by a CPA on an annual basis.		to maintain 10: Maintain program, stay abreast of expenses subject to erratic cost changes and long-term cost trend, and budget/track costs proactively
Customer retail unit cost (applied to Apparent Losses):	Customer population unmetered, and/or only a fixed fee is charged for consumption.	Antiquated, cumbersome water rate structure is used, with periodic historic amendments that were poorly documented and implemented; resulting in classes of customers being billed inconsistent charges. The actual composite billing rate likely differs significantly from the published water rate structure, but a lack of auditing leaves the degree of error indeterminate.	Dated, cumbersome water rate structure, not always employed consistently in actual billing operations. The actual composite billing rate is known to differ from the published water rate structure, and a reasonably accurate estimate of the degree of error is determined, allowing a composite billing rate to be quantified.	Conditions between 2 and 4	Straight-forward water rate structure in use, but not updated in several years. Billing operations reliably employ the rate structure. The composite billing rate is derived from a single customer class such as residential customer accounts, neglecting the effect of different rates from varying customer classes.	Conditions between 4 and 6	Clearly written, up-to-date water rate structure is in force and is applied reliably in billing operations. Composite customer rate is determined using a weighted average residential rate using volumes of water in each rate block.	Conditions between 6 and 8	Effective water rate structure is in force and is applied reliably in billing operations. Composite customer rate is determined using a weighted average composite consumption rate, which includes residential, commercial, industrial, institutional (CII), and any other distinct customer classes within the water rate structure.	Conditions between 8 and 10	Current, effective water rate structure is in force and applied reliably in billing operations. The rate structure and calculations of composite rate - which includes residential, commercial, industrial, institutional (CII), and other distinct customer classes - are reviewed by a third party knowledgeable in the M36 methodology at least once every five years.
Improvements to attain higher data grading for "Customer Retail Unit Cost" component:		to qualify for 2: Formalize the process to implement water rates, including a secure documentation procedure. Create a current, formal water rate document and gain approval from all stakeholders.	to qualify for 4: Review the water rate structure and update/formalize as needed. Assess billing operations to ensure that actual billing operations incorporate the established water rate structure.		to qualify for 6: Evaluate volume of water used in each usage block by residential users. Multiply volumes by full rate structure.	Launch effort to fully meter the customer population and charge rates based upon water volumes	to qualify for 8: Evaluate volume of water used in each usage block by all classifications of users. Multiply volumes by full rate structure.		to qualify for 10: Conduct a periodic third-party audit of water used in each usage block by all classifications of users. Multiply volumes by full rate structure.		to maintain 10: Keep water rate structure current in addressing the water utility's revenue needs. Update the calculation of the customer unit rate as new rate components, customer classes, or other components are modified.
Variable production cost (applied to Real Losses):	Note: if the water utility purchases/imports its entire water supply, then enter the unit purchase cost of the bulk water supply in the Reporting Worksheet with a grading of 10	Incomplete paper records and lack of documentation on primary operating functions (electric power and treatment costs most importantly) makes calculation of variable production costs a pure guesstimate	Reasonably maintained, but incomplete, paper or electronic accounting provides data to roughly estimate the basic operations costs (pumping power costs and treatment costs) and calculate a unit variable production cost.	Conditions between 2 and 4	Electronic, industry-standard cost accounting system in place. Electric power and treatment costs are reliably tracked and allow accurate weighted calculation of unit variable production costs based on these two inputs and water imported purchase costs (if applicable). All costs are audited internally on a periodic basis.	Conditions between 4 and 6	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Pertinent additional costs beyond power, treatment and water imported purchase costs (if applicable) such as liability, residuals management, wear and tear on equipment, impending expansion of supply, are included in the unit variable production cost, as applicable. The data is audited at least annually by utility personnel.	Conditions between 6 and 8	Reliable electronic, industry-standard cost accounting system in place, with all pertinent primary and secondary variable production and water imported purchase (if applicable) costs tracked. The data is audited at least annually by utility personnel, and at least once every three years by a third-party knowledgeable in the M36 methodology.	Conditions between 8 and 10	Either of two conditions can be met to obtain a grading of 10: 1) Third party CPA audit of all pertinent primary and secondary variable production and water imported purchase (if applicable) costs on an annual basis. or: 2) Water supply is entirely purchased as bulk water imported, and the unit purchase cost - including all applicable marginal supply costs - serves as the variable production cost. If all applicable marginal supply costs are not included in this figure, a grade of 10 should not be selected.
Improvements to attain higher data grading for "Variable Production Cost" component:		to qualify for 2: Gather available records, institute new procedures to regularly collect and audit basic cost data and most important operations functions.	to qualify for 4: Implement an electronic cost accounting system, structured according to accounting standards for water utilities		to qualify for 6: Formalize process for regular internal audits of production costs. Assess whether additional costs (liability, residuals management, equipment wear, impending infrastructure expansion) should be included to calculate a more representative variable production cost.		to qualify for 8: Formalize the accounting process to include direct cost components (power, treatment) as well as indirect cost components (liability, residuals management, etc.) Arrange to conduct audits by a knowledgable third-party at least once every three years.		to qualify for 10: Standardize the process to conduct a third-party financial audit by a CPA on an annual basis.		to maintain 10: Maintain program, stay abreast of expenses subject to erratic cost changes and budget/track costs proactively

AWWA Free Water Audit Software: Customer Service Line Diagrams

WAS v5.0

Average Length of Customer Service Line

The three figures shown on this worksheet display the assignment of the Average Length of Customer Service Line, Lp, for the three most common piping configurations.

Figure 1 shows the configuration of the water meter outside of the customer building next to the curb stop valve. In this configuration Lp = 0 since the distance between the curb stop and the customer metering point is essentially zero.

Figure 2 shows the configuration of the customer water meter located inside the customer building, where Lp is the distance from the curb stop to the water meter.

Figure 3 shows the configuration of an unmetered customer building , where Lp is the distance from the curb stop to the first point of customer water consumption, or, more simply, the building line.

In any water system the Lp will vary notably in a community of different structures, therefore the average Lp value is used and this should be approximated or calculated if a sample of service line measurements has been gathered.

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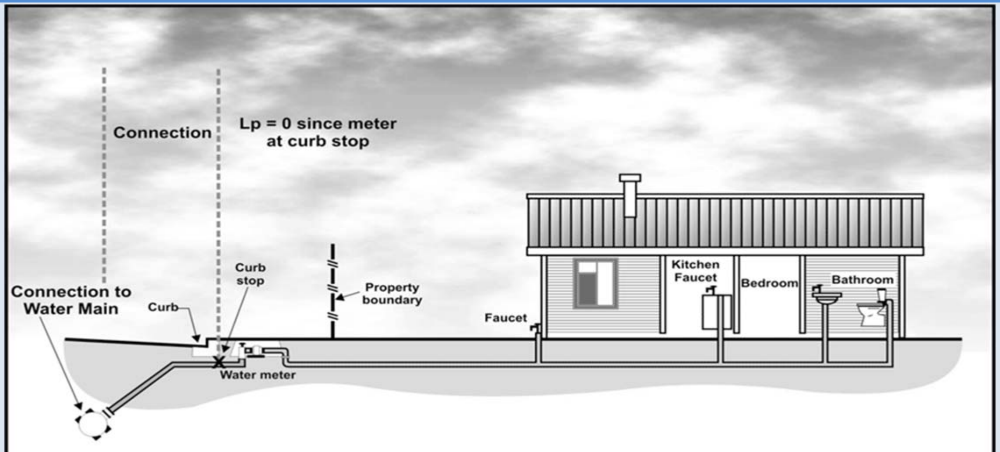


Figure 1

Typical house connection: Meter at curb stop

Not to scale

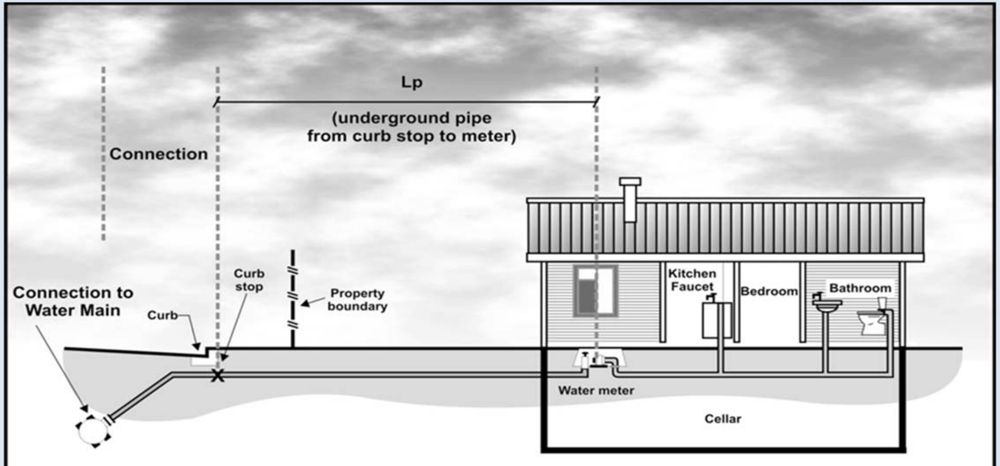


Figure 2

Typical house connection: Meter inside property

Not to scale

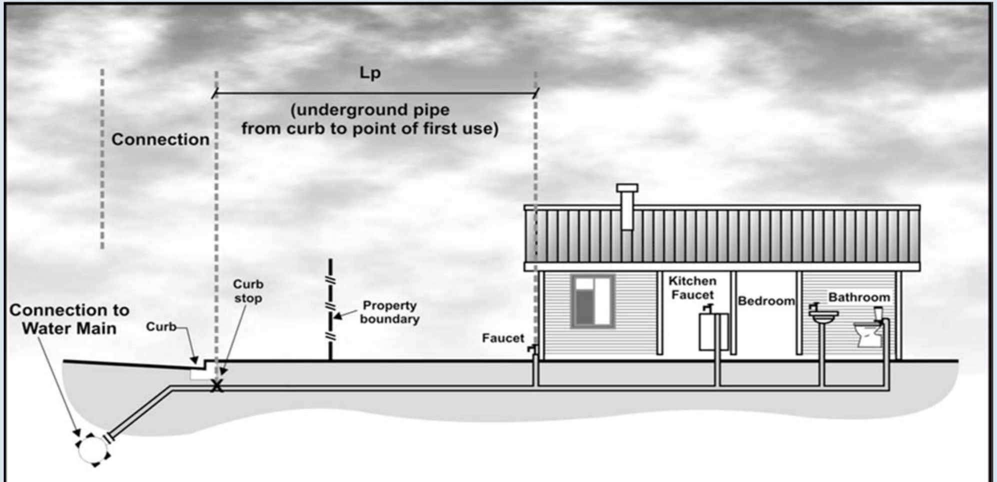


Figure 3

Typical house connection: Unmetered

Not to scale

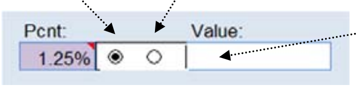
AWWA Free Water Audit Software:
Definitions

WAS v5.0

Item Name	Description
Apparent Losses Find	= unauthorized consumption + customer metering inaccuracies + systematic data handling errors Apparent Losses include all types of inaccuracies associated with customer metering (worn meters as well as improperly sized meters or wrong type of meter for the water usage profile) as well as systematic data handling errors (meter reading, billing, archiving and reporting), plus unauthorized consumption (theft or illegal use). NOTE: Over-estimation of Apparent Losses results in under-estimation of Real Losses. Under-estimation of Apparent Losses results in over-estimation of Real Losses.
AUTHORIZED CONSUMPTION Find	= billed water exported + billed metered + billed unmetered + unbilled metered + unbilled unmetered consumption The volume of metered and/or unmetered water taken by registered customers, the water utility's own uses, and uses of others who are implicitly or explicitly authorized to do so by the water utility; for residential, commercial, industrial and public-minded purposes. Typical retail customers' consumption is tabulated usually from established customer accounts as billed metered consumption, or - for unmetered customers - billed unmetered consumption. These types of consumption, along with billed water exported, provide revenue potential for the water utility. **Be certain to tabulate the water exported volume as a separate component and do not "double-count" it by including in the billed metered consumption component as well as the water exported component.** Unbilled authorized consumption occurs typically in non-account uses, including water for fire fighting and training, flushing of water mains and sewers, street cleaning, watering of municipal gardens, public fountains, or similar public-minded uses. Occasionally these uses may be metered and billed (or charged a flat fee), but usually they are unmetered and unbilled. In the latter case, the water auditor may use a default value to estimate this quantity, or implement procedures for the reliable quantification of these uses. This starts with documenting usage events as they occur and estimating the amount of water used in each event. (See Unbilled unmetered consumption)
View Service Connection Diagram **Average length of customer service line** Find	This is the average length of customer service line, Lp, that is owned and maintained by the customer; from the point of ownership transfer to the customer water meter, or building line (if unmetered). The quantity is one of the data inputs for the calculation of Unavoidable Annual Real Losses (UARL), which serves as the denominator of the performance indicator: Infrastructure Leakage Index (ILI). The value of Lp is multiplied by the number of customer service connections to obtain a total length of customer owned piping in the system. The purpose of this parameter is to account for the unmetered service line infrastructure that is the responsibility of the customer for arranging repairs of leaks that occur on their lines. In many cases leak repairs arranged by customers take longer to be executed than leak repairs arranged by the water utility on utility-maintained piping. Leaks run longer - and lose more water - on customer-owned service piping, than utility owned piping. If the customer water meter exists near the ownership transfer point (usually the curb stop located between the water main and the customer premises) this distance is zero because the meter and transfer point are the same. This is the often encountered configuration of customer water meters located in an underground meter box or "pit" outside of the customer's building. The Free Water Audit Software asks a "Yes/No" question about the meter at this location. If the auditor selects "Yes" then this distance is set to zero and the data grading score for this component is set to 10. If water meters are typically located inside the customer premise/building, or properties are unmetered, it is up to the water auditor to estimate a system-wide average Lp length based upon the various customer land parcel sizes and building locations in the service area. Lp will be a shorter length in areas of high density housing, and a longer length in areas of low density housing and varied commercial and industrial buildings. General parcel demographics should be employed to obtain a composite average Lp length for the entire system. Refer to the "Service Connection Diagram" worksheet for a depiction of the service line/metering configurations that typically exist in water utilities. This worksheet gives guidance on the determination of the Average Length, Lp, for each configuration.
Average operating pressure Find	This is the average pressure in the distribution system that is the subject of the water audit. Many water utilities have a calibrated hydraulic model of their water distribution system. For these utilities, the hydraulic model can be utilized to obtain a very accurate quantity of average pressure. In the absence of a hydraulic model, the average pressure may be approximated by obtaining readings of static water pressure from a representative sample of fire hydrants or other system access points evenly located across the system. A weighted average of the pressure can be assembled; but be sure to take into account the elevation of the fire hydrants, which typically exist several feet higher than the level of buried water pipelines. If the water utility is compiling the water audit for the first time, the average pressure can be approximated, but with a low data grading. In subsequent years of auditing, effort should be made to improve the accuracy of the average pressure quantity. This will then qualify the value for a higher data grading.
Billed Authorized Consumption	All consumption that is billed and authorized by the utility. This may include both metered and unmetered consumption. See "Authorized Consumption" for more information.
Billed metered consumption Find	All metered consumption which is billed to retail customers, including all groups of customers such as domestic, commercial, industrial or institutional. **It does NOT include water supplied to neighboring utilities (water exported) which is metered and billed. Be sure to subtract any consumption for exported water sales that may be included in these billing roles. Water supplied as exports to neighboring water utilities should be included only in the Water Exported component.** The metered consumption data can be taken directly from billing records for the water audit period. The accuracy of yearly metered consumption data can be refined by including an adjustment to account for customer meter reading lag time since not all customer meters are read on the same day of the meter reading period. However additional analysis is necessary to determine the lag time adjustment value, which may or may not be significant.
Billed unmetered consumption Find	All billed consumption which is calculated based on estimates or norms from water usage sites that have been determined by utility policy to be left unmetered. This is typically a very small component in systems that maintain a policy to meter their customer population. However, this quantity can be the key consumption component in utilities that have not adopted a universal metering policy. **This component should NOT include any water that is supplied to neighboring utilities (water exported) which is unmetered but billed. Water supplied as exports to neighboring water utilities should be included only in the Water Exported component.**

Item Name	Description
Customer metering inaccuracies Find	Apparent water losses caused by the collective under-registration of customer water meters. Many customer water meters gradually wear as large cumulative volumes of water are passed through them over time. This causes the meters to under-register the flow of water. This occurrence is common with smaller residential meters of sizes 5/8-inch and 3/4 inch after they have registered very large cumulative volumes of water, which generally occurs only after periods of years. For meters sized 1-inch and larger - typical of multi-unit residential, commercial and industrial accounts - meter under-registration can occur from wear or from the improper application of the meter; i.e. installing the wrong type of meter or the wrong size of meter, for the flow pattern (profile) of the consumer. For instance, many larger meters have reduced accuracy at low flows. If an oversized meter is installed, most of the time the routine flow will occur in the low flow range of the meter, and a significant portion of it may not be registered. It is important to properly select and install all meters, but particularly large customer meters, size 1-inch and larger. The auditor has two options for entering data for this component of the audit. The auditor can enter a percentage under-registration (typically an estimated value), this will apply the selected percentage to the two categories of metered consumption to determine the volume of water not recorded due to customer meter inaccuracy. Note that this percentage is a composite average inaccuracy for all customer meters in the entire meter population. The percentage will be multiplied by the sum of the volumes in the Billed Metered and Unbilled Metered components. Alternatively, if the auditor has substantial data from meter testing activities, he or she can calculate their own loss volumes, and this volume may be entered directly. Note that a value of zero will be accepted but an alert will appear asking if the customer population is unmetered. Since all metered systems have some degree of inaccuracy, a positive value should be entered. A value of zero in this component is valid only if the water utility does not meter its customer population.
Customer retail unit cost Find	The Customer Retail Unit Cost represents the charge that customers pay for water service. This unit cost is applied routinely to the components of Apparent Loss, since these losses represent water reaching customers but not (fully) paid for. Since most water utilities have a rate structure that includes a variety of different costs based upon class of customer, a weighted average of individual costs and number of customer accounts in each class can be calculated to determine a single composite cost that should be entered into this cell. Finally, the weighted average cost should also include additional charges for sewer, storm water or biosolids processing, but only if these charges are based upon the volume of potable water consumed. For water utilities in regions with limited water resources and a questionable ability to meet the drinking water demands in the future, the Customer Retail Unit Cost might also be applied to value the Real Losses; instead of applying the Variable Production Cost to Real Losses. In this way, it is assumed that every unit volume of leakage reduced by leakage management activities will be sold to a customer. Note: the Free Water Audit Software allows the user to select the units that are charged to customers (either $/1,000 gallons, $/hundred cubic feet, or $/1,000 litres) and automatically converts these units to the units that appear in the "WATER SUPPLIED" box. The monetary units are United States dollars, $.
Infrastructure Leakage Index (ILI) Find	The ratio of the Current Annual Real Losses (Real Losses) to the Unavoidable Annual Real Losses (UARL). The ILI is a highly effective performance indicator for comparing (benchmarking) the performance of utilities in operational management of real losses.
Length of mains Find	Length of all pipelines (except service connections) in the system starting from the point of system input metering (for example at the outlet of the treatment plant). It is also recommended to include in this measure the total length of fire hydrant lead pipe. Hydrant lead pipe is the pipe branching from the water main to the fire hydrant. Fire hydrant leads are typically of a sufficiently large size that is more representative of a pipeline than a service connection. The average length of hydrant leads across the entire system can be assumed if not known, and multiplied by the number of fire hydrants in the system, which can also be assumed if not known. This value can then be added to the total pipeline length. Total length of mains can therefore be calculated as: Length of Mains, miles = (total pipeline length, miles) + [{(average fire hydrant lead length, ft) x (number of fire hydrants)} / 5,280 ft/mile] or Length of Mains, kilometres = (total pipeline length, kilometres) + [{(average fire hydrant lead length, metres) x (number of fire hydrants)} / 1,000 metres/kilometre]
NON-REVENUE WATER Find	= Apparent Losses + Real Losses + Unbilled Metered Consumption + Unbilled Unmetered Consumption. This is water which does not provide revenue potential to the utility.
Number of active AND inactive service connections Find	Number of customer service connections, extending from the water main to supply water to a customer. Please note that this includes the actual number of distinct piping connections, including fire connections, whether active or inactive. This may differ substantially from the number of customers (or number of accounts). **Note: this number does not include the pipeline leads to fire hydrants - the total length of piping supplying fire hyrants should be included in the "Length of mains" parameter.**
Real Losses Find	Physical water losses from the pressurized system (water mains and customer service connections) and the utility's storage tanks, up to the point of customer consumption. In metered systems this is the customer meter, in unmetered situations this is the first point of consumption (stop tap/tap) within the property. The annual volume lost through all types of leaks, breaks and overflows depends on frequencies, flow rates, and average duration of individual leaks, breaks and overflows.
Revenue Water	Those components of System Input Volume that are billed and have the potential to produce revenue.
Service Connection Density Find	=number of customer service connections / length of mains

Item Name	Description
Systematic data handling errors Find	Apparent losses caused by accounting omissions, errant computer programming, gaps in policy, procedure, and permitting/activation of new accounts; and any type of data lapse that results in under-stated customer water consumption in summary billing reports. **Systematic Data Handling Errors result in a direct loss of revenue potential. Water utilities can find "lost" revenue by keying on this component.** Utilities typically measure water consumption registered by water meters at customer premises. The meter should be read routinely (ex: monthly) and the data transferred to the Customer Billing System, which generates and sends a bill to the customer. Data Transfer Errors result in the consumption value being less than the actual consumption, creating an apparent loss. Such error might occur from illegible and mis-recorded hand-written readings compiled by meter readers, inputting an incorrect meter register unit conversion factor in the automatic meter reading equipment, or a variety of similar errors. Apparent losses also occur from Data Analysis Errors in the archival and data reporting processes of the Customer Billing System. Inaccurate estimates used for accounts that fail to produce a meter reading are a common source of error. Billing adjustments may award customers a rightful monetary credit, but do so by creating a negative value of consumption, thus under-stating the actual consumption. Account activation lapses may allow new buildings to use water for months without meter readings and billing. Poor permitting and construction inspection practices can result in a new building lacking a billing account, a water meter and meter reading; i.e., the customer is unknown to the utility's billing system. Close auditing of the permitting, metering, meter reading, billing and reporting processes of the water consumption data trail can uncover data management gaps that create volumes of systematic data handling error. Utilities should routinely analyze customer billing records to detect data anomalies and quantify these losses. For example, a billing account that registers zero consumption for two or more billing cycles should be checked to explain why usage has seemingly halted. Given the revenue loss impacts of these losses, water utilities are well-justified in providing continuous oversight and timely correction of data transfer errors & data handling errors. If the water auditor has not yet gathered detailed data or assessment of systematic data handling error, it is recommended that the auditor apply the default value of 0.25% of the the Billed Authorized Consumption volume. However, if the auditor has investigated the billing system and its controls, and has well validated data that indicates the volume from systematic data handling error is substantially higher or lower than that generated by the default value, then the auditor should enter a quantity that was derived from the utility investigations and select an appropriate grading. Note: negative values are not allowed for this audit component. If the auditor enters zero for this component then a grading of 1 will be automatically assigned.
Total annual cost of operating the water system Find	These costs include those for operations, maintenance and any annually incurred costs for long-term upkeep of the drinking water supply and distribution system. It should include the costs of day-to-day upkeep and long-term financing such as repayment of capital bonds for infrastructure expansion or improvement. Typical costs include employee salaries and benefits, materials, equipment, insurance, fees, administrative costs and all other costs that exist to sustain the drinking water supply. Depending upon water utility accounting procedures or regulatory agency requirements, it may be appropriate to include depreciation in the total of this cost. This cost should not include any costs to operate wastewater, biosolids or other systems outside of drinking water.
Unauthorized consumption Find	Includes water illegally withdrawn from fire hydrants, illegal connections, bypasses to customer consumption meters, or tampering with metering or meter reading equipment; as well as any other ways to receive water while thwarting the water utility's ability to collect revenue for the water. Unauthorized consumption results in uncaptured revenue and creates an error that understates customer consumption. In most water utilities this volume is low and, if the water auditor has not yet gathered detailed data for these loss occurrences, it is recommended that the auditor apply a default value of 0.25% of the volume of water supplied. However, if the auditor has investigated unauthorized occurrences, and has well validated data that indicates the volume from unauthorized consumption is substantially higher or lower than that generated by the default value, then the auditor should enter a quantity that was derived from the utility investigations. Note that a value of zero will not be accepted since all water utilities have some volume of unauthorized consumption occurring in their system. Note: if the auditor selects the default value for unauthorized consumption, a data grading of 5 is automatically assigned, but not displayed on the Reporting Worksheet.
Unavoidable Annual Real Losses (UARL) Find	UARL (gallons)=(5.41Lm + 0.15Nc + 7.5Lc) xP, or UARL (litres)=(18.0Lm + 0.8Nc + 25.0Lc) xP where: Lm = length of mains (miles or kilometres) Nc = number of customer service connections Lp = the average distance of customer service connection piping (feet or metres) (see the Worksheet "Service Connection Diagram" for guidance on deterring the value of Lp) Lc = total length of customer service connection piping (miles or km) Lc = Nc X Lp (miles or kilometres) P = Pressure (psi or metres) The UARL is a theoretical reference value representing the technical low limit of leakage that could be achieved if all of today's best technology could be successfully applied. It is a key variable in the calculation of the Infrastructure Leakage Index (ILI). Striving to reduce system leakage to a level close to the UARL is usually not needed unless the water supply is unusually expensive, scarce or both. NOTE: The UARL calculation has not yet been proven as fully valid for very small, or low pressure water distribution systems. If, in gallons: (Lm x 32) + Nc < 3000 or P <35psi in litres: (Lm x 20) + Nc < 3000 or P < 25m then the calculated UARL value may not be valid. The software does not display a value of UARL or ILI if either of these conditions is true.

Item Name	Description
Unbilled Authorized Consumption	All consumption that is unbilled, but still authorized by the utility. This includes Unbilled Metered Consumption + Unbilled Unmetered Consumption. See "Authorized Consumption" for more information. For Unbilled Unmetered Consumption, the Free Water Audit Software provides the auditor the option to select a default value if they have not audited unmetered activities in detail. The default calculates a volume that is 1.25% of the Water Supplied volume. If the auditor has carefully audited the various unbilled, unmetered, authorized uses of water, and has established reliable estimates of this collective volume, then he or she may enter the volume directly for this component, and not use the default value.
Unbilled metered consumption Find	Metered consumption which is authorized by the water utility, but, for any reason, is deemed by utility policy to be unbilled. This might for example include metered water consumed by the utility itself in treatment or distribution operations, or metered water provided to civic institutions free of charge. **It does not include water supplied to neighboring utilities (water exported) which may be metered but not billed.**
Unbilled unmetered consumption Find	Any kind of Authorized Consumption which is neither billed or metered. This component typically includes water used in activities such as fire fighting, flushing of water mains and sewers, street cleaning, fire flow tests conducted by the water utility, etc. In most water utilities it is a small component which is very often substantially overestimated. **It does NOT include water supplied to neighboring utilities (water exported) which is unmetered and unbilled – an unlikely case.** This component has many sub-components of water use which are often tedious to identify and quantify. Because of this, and the fact that it is usually a small portion of the water supplied, it is recommended that the auditor apply the default value, which is 1.25% of the Water Supplied volume. Select the default percentage to enter this value. If the water utility has carefully audited the unbilled, unmetered activities occurring in the system, and has well validated data that gives a value substantially higher or lower than the default volume, then the auditor should enter their own volume. However the default approach is recommended for most water utilities. Note that a value of zero is not permitted, since all water utilities have some volume of water in this component occurring in their system.
Units and Conversions	The user may develop an audit based on one of three unit selections: 1) Million Gallons (US) 2) Megalitres (Thousand Cubic Metres) 3) Acre-feet Once this selection has been made in the instructions sheet, all calculations are made on the basis of the chosen units. Should the user wish to make additional conversions, a unit converter is provided below (use drop down menus to select units from the yellow unit boxes): Enter Units: 1 — Convert From… **Million Gallons (US)** = **Converts to…..** **3.06888329** **Acre-feet** (conversion factor = 3.06888328973723)
Use of Option Buttons	To use the default percent value choose this button To enter a value choose this button and enter the value in the cell to the right  Pcnt: 1.25% ● ○ Value: **NOTE:** For Unbilled Unmetered Consumption, Unauthorized Consumption and Systematic Data Handling Errors, a recommended default value can be applied by selecting the Percent option. The default values are based on fixed percentages of Water Supplied or Billed Authorized Consumption and are recommended for use in this audit unless the auditor has well validated data for their system. Default values are shown by purple cells, as shown in the example above. If a default value is selected, the user does not need to grade the item; a grading value of 5 is automatically applied (however, this grade will not be displayed).
Variable production cost (applied to Real Losses) Find	The cost to produce and supply the next unit of water (e.g., $/million gallons). This cost is determined by calculating the summed unit costs for ground and surface water treatment and all power used for pumping from the source to the customer. It may also include other miscellaneous unit costs that apply to the production of drinking water. It should also include the unit cost of bulk water purchased as an import if applicable. It is common to apply this unit cost to the volume of Real Losses. However, if water resources are strained and the ability to meet future drinking water demands is in question, then the water auditor can be justified in applying the Customer Retail Rate to the Real Loss volume, rather than applying the Variable Production Cost. The Free Water Audit Software applies the Variable Production costs to Real Losses by default. However, the auditor has the option on the Reporting Worksheet to select the Customer Retail Cost as the basis for the Real Loss cost evaluation if the auditor determines that this is warranted.
Volume from own sources Find	The volume of water withdrawn (abstracted) from water resources (rivers, lakes, streams, wells, etc) controlled by the water utility, and then treated for potable water distribution. Most water audits are compiled for utility retail water distribution systems, so this volume should reflect the amount of treated drinking water that entered the distribution system. Often the volume of water measured at the effluent of the treatment works is slightly less than the volume measured at the raw water source, since some of the water is used in the treatment process. Thus, it is useful if flows are metered at the effluent of the treatment works. If metering exists only at the raw water source, an adjustment for water used in the treatment process should be included to account for water consumed in treatment operations such as filter backwashing, basin flushing and cleaning, etc. If the audit is conducted for a wholesale water agency that sells untreated water, then this quantity reflects the measure of the raw water, typically metered at the source.

Item Name	Description
Volume from own sources: Master meter and supply error adjustment Find	An estimate or measure of the degree of inaccuracy that exists in the master (production) meters measuring the annual Volume from own Sources, and any error in the data trail that exists to collect, store and report the summary production data. This adjustment is a weighted average number that represents the collective error for all master meters for all days of the audit year and any errors identified in the data trail. Meter error can occur in different ways. A meter or meters may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Data error can occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some degree of inaccuracy in master meters and data errors in archival systems are common; thus a value of zero should not be entered. Enter a negative percentage or value for metered data under-registration; or, enter a positive percentage or value for metered data over-registration.
Water exported Find	The Water Exported volume is the bulk water conveyed and sold by the water utility to neighboring water systems that exists outside of their service area. Typically this water is metered at the custody transfer point of interconnection between the two water utilities. Usually the meter(s) are owned by the water utility that is selling the water: i.e. the exporter. If the water utility who is compiling the annual water audit sells bulk water in this manner, they are an exporter of water. Note: The Water Exported volume is sold to wholesale customers who are typically charged a wholesale rate that is different than retail rates charged to the retail customers existing within the service area. Many state regulatory agencies require that the Water Exported volume be reported to them as a quantity separate and distinct from the retail customer billed consumption. For these reasons - and others - the Water Exported volume is always quantified separately from Billed Authorized Consumption in the standard water audit. **Be certain not to "double-count" this quantity by including it in both the Water Exported box and the Billed Metered Consumption box of the water audit Reporting Worksheet. This volume should be included only in the Water Exported box.**
Water exported: Master meter and supply error adjustment Find	An estimate or measure of the volume in which the Water Exported volume is incorrect. This adjustment is a weighted average that represents the collective error for all of the metered and archived exported flow for all days of the audit year. Meter error can occur in different ways. A meter may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Error in the metered, archived data can also occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some degree of error in their metered data, particularly if meters are aged and infrequently tested. Occasional errors also occur in the archived data. Thus, a value of zero should not be entered. Enter a negative percentage or value for metered data under-registration; or enter a positive percentage or value for metered data over-registration. If regular meter accuracy testing is conducted on the meter(s) - which is usually conducted by the water utility selling the water - then the results of this testing can be used to help quantify the meter error adjustment. Corrections to data gaps or other errors found in the archived data should also be included as a portion of this meter error adjustment.
Water imported Find	The Water Imported volume is the bulk water purchased to become part of the Water Supplied volume. Typically this is water purchased from a neighboring water utility or regional water authority, and is metered at the custody transfer point of interconnection between the two water utilities. Usually the meter(s) are owned by the water supplier selling the water to the utility conducting the water audit. The water supplier selling the bulk water usually charges the receiving utility based upon a wholesale water rate.
Water imported: Master meter and supply error adjustment Find	An estimate or measure of the volume in which the Water Imported volume is incorrect. This adjustment is a weighted average that represents the collective error for all of the metered and archived imported flow for all days of the audit year. Meter error can occur in different ways. A meter may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Error in the metered, archived data can also occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some level of meter inaccuracy, particularly if meters are aged and infrequently tested. Occasional errors also occur in the archived metered data. Thus, a value of zero should not be entered. Enter a negative percentage or value for metered data under-registration; or, enter a positive percentage or value for metered data over-registration. If regular meter accuracy testing is conducted on the meter(s) - which is usually conducted by the water utility selling the water - then the results of this testing can be used to help quantify the meter error adjustment.
WATER LOSSES Find	= apparent losses + real losses Water Losses are the difference between Water Supplied and Authorized Consumption. Water losses can be considered as a total volume for the whole system, or for partial systems such as transmission systems, pressure zones or district metered areas (DMA); if one of these configurations are the basis of the water audit.

AWWA Free Water Audit Software:
Determining Water Loss Standing

Water Audit Report for: San Francisco Public Utilities Commission
Reporting Year: 2015 | 7/2014 - 6/2015
Data Validity Score: **90**

Water Loss Control Planning Guide

	Water Audit Data Validity Level / Score				
Functional Focus Area	**Level I** (0-25)	**Level II** (26-50)	**Level III** (51-70)	**Level IV** (71-90)	**Level V** (91-100)
Audit Data Collection	Launch auditing and loss control team; address production metering deficiencies	Analyze business process for customer metering and billing functions and water supply operations. Identify data gaps.	Establish/revise policies and procedures for data collection	Refine data collection practices and establish as routine business process	Annual water audit is a reliable gauge of year-to-year water efficiency standing
Short-term loss control	Research information on leak detection programs. Begin flowcharting analysis of customer billing system	Conduct loss assessment investigations on a sample portion of the system: customer meter testing, leak survey, unauthorized consumption, etc.	Establish ongoing mechanisms for customer meter accuracy testing, active leakage control and infrastructure monitoring	Refine, enhance or expand ongoing programs based upon economic justification	Stay abreast of improvements in metering, meter reading, billing, leakage management and infrastructure rehabilitation
Long-term loss control		Begin to assess long-term needs requiring large expenditure: customer meter replacement, water main replacement program, new customer billing system or Automatic Meter Reading (AMR) system.	Begin to assemble economic business case for long-term needs based upon improved data becoming available through the water audit process.	Conduct detailed planning, budgeting and launch of comprehensive improvements for metering, billing or infrastructure management	Continue incremental improvements in short-term and long-term loss control interventions
Target-setting			Establish long-term apparent and real loss reduction goals (+10 year horizon)	Establish mid-range (5 year horizon) apparent and real loss reduction goals	Evaluate and refine loss control goals on a yearly basis
Benchmarking			Preliminary Comparisons - can begin to rely upon the Infrastructure Leakage Index (ILI) for performance comparisons for real losses (see below table)	Performance Benchmarking - ILI is meaningful in comparing real loss standing	Identify Best Practices/ Best in class - the ILI is very reliable as a real loss performance indicator for best in class service

For validity scores of 50 or below, the shaded blocks should not be focus areas until better data validity is achieved.

Once data have been entered into the Reporting Worksheet, the performance indicators are automatically calculated. How does a water utility operator know how well his or her system is performing? The AWWA Water Loss Control Committee provided the following table to assist water utilities is gauging an approximate Infrastructure Leakage Index (ILI) that is appropriate for their water system and local conditions. The lower the amount of leakage and real losses that exist in the system, then the lower the ILI value will be.

<u>Note:</u> this table offers an approximate guideline for leakage reduction target-setting. The best means of setting such targets include performing an economic assessment of various loss control methods. However, this table is useful if such an assessment is not possible.

General Guidelines for Setting a Target ILI
(without doing a full economic analysis of leakage control options)

Target ILI Range	Financial Considerations	Operational Considerations	Water Resources Considerations
1.0 - 3.0	Water resources are costly to develop or purchase; ability to increase revenues via water rates is greatly limited because of regulation or low ratepayer affordability.	Operating with system leakage above this level would require expansion of existing infrastructure and/or additional water resources to meet the demand.	Available resources are greatly limited and are very difficult and/or environmentally unsound to develop.
>3.0 -5.0	Water resources can be developed or purchased at reasonable expense; periodic water rate increases can be feasibly imposed and are tolerated by the customer population.	Existing water supply infrastructure capability is sufficient to meet long-term demand as long as reasonable leakage management controls are in place.	Water resources are believed to be sufficient to meet long-term needs, but demand management interventions (leakage management, water conservation) are included in the long-term
>5.0 - 8.0	Cost to purchase or obtain/treat water is low, as are rates charged to customers.	Superior reliability, capacity and integrity of the water supply infrastructure make it relatively immune to supply shortages.	Water resources are plentiful, reliable, and easily extracted.
Greater than 8.0	Although operational and financial considerations may allow a long-term ILI greater than 8.0, such a level of leakage is not an effective utilization of water as a resource. Setting a target level greater than 8.0 - other than as an incremental goal to a smaller long-term target - is discouraged.		
Less than 1.0	If the calculated Infrastructure Leakage Index (ILI) value for your system is 1.0 or less, two possibilities exist. a) you are maintaining your leakage at low levels in a class with the top worldwide performers in leakage control. b) A portion of your data may be flawed, causing your losses to be greatly understated. This is likely if you calculate a low ILI value but do not employ extensive leakage control practices in your operations. In such cases it is beneficial to validate the data by performing field measurements to confirm the accuracy of production and customer meters, or to identify any other potential sources of error in the data.		

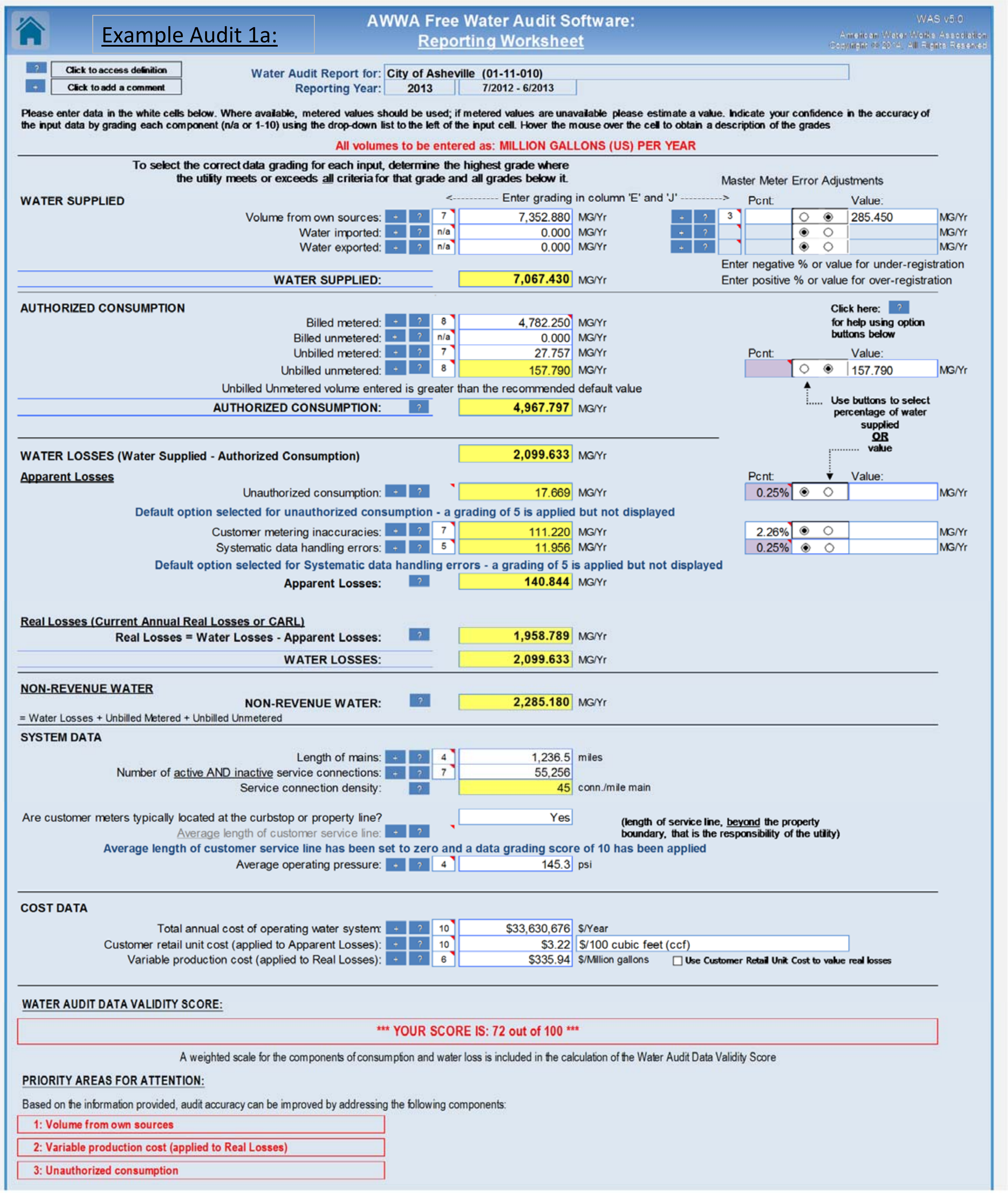
AWWA Free Water Audit Software:
Examples of Completed and Validated Audits

Example 1a: Million Gallons:

Example 1b: Million Gallons: Performance Indicators

Example 2a: Megalitres: Reporting Worksheet

Example 2b: Megalitres: Reporting Worksheet



Example Audit 1a:

AWWA Free Water Audit Software:
Reporting Worksheet

Water Audit Report for: City of Asheville (01-11-010)
Reporting Year: 2013 7/2012 - 6/2013

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<----------- Enter grading in column 'E' and 'J' ---------->

WATER SUPPLIED

Volume from own sources:	7	7,352.880	MG/Yr
Water imported:	n/a	0.000	MG/Yr
Water exported:	n/a	0.000	MG/Yr
WATER SUPPLIED:		7,067.430	MG/Yr

Master Meter Error Adjustments

	Pcnt:		Value:	
3		○ ●	285.450	MG/Yr
		● ○		MG/Yr
		● ○		MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Billed metered:	8	4,782.250	MG/Yr
Billed unmetered:	n/a	0.000	MG/Yr
Unbilled metered:	7	27.757	MG/Yr
Unbilled unmetered:	8	157.790	MG/Yr

Click here: ? for help using option buttons below

Pcnt:		Value:	
	○ ●	157.790	MG/Yr

Use buttons to select percentage of water supplied OR value

Unbilled Unmetered volume entered is greater than the recommended default value

AUTHORIZED CONSUMPTION: 4,967.797 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 2,099.633 MG/Yr

Apparent Losses

				Pcnt:		Value:	
Unauthorized consumption:		17.669	MG/Yr	0.25%	● ○		MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	7	111.220	MG/Yr	2.26%	● ○		MG/Yr
Systematic data handling errors:	5	11.956	MG/Yr	0.25%	● ○		MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 140.844 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 1,958.789 MG/Yr

WATER LOSSES: 2,099.633 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 2,285.180 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	4	1,236.5	miles
Number of active AND inactive service connections:	7	55,256	
Service connection density:		45	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line:

(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 4 145.3 psi

COST DATA

Total annual cost of operating water system:	10	$33,630,676	$/Year
Customer retail unit cost (applied to Apparent Losses):	10	$3.22	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	6	$335.94	$/Million gallons

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 72 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

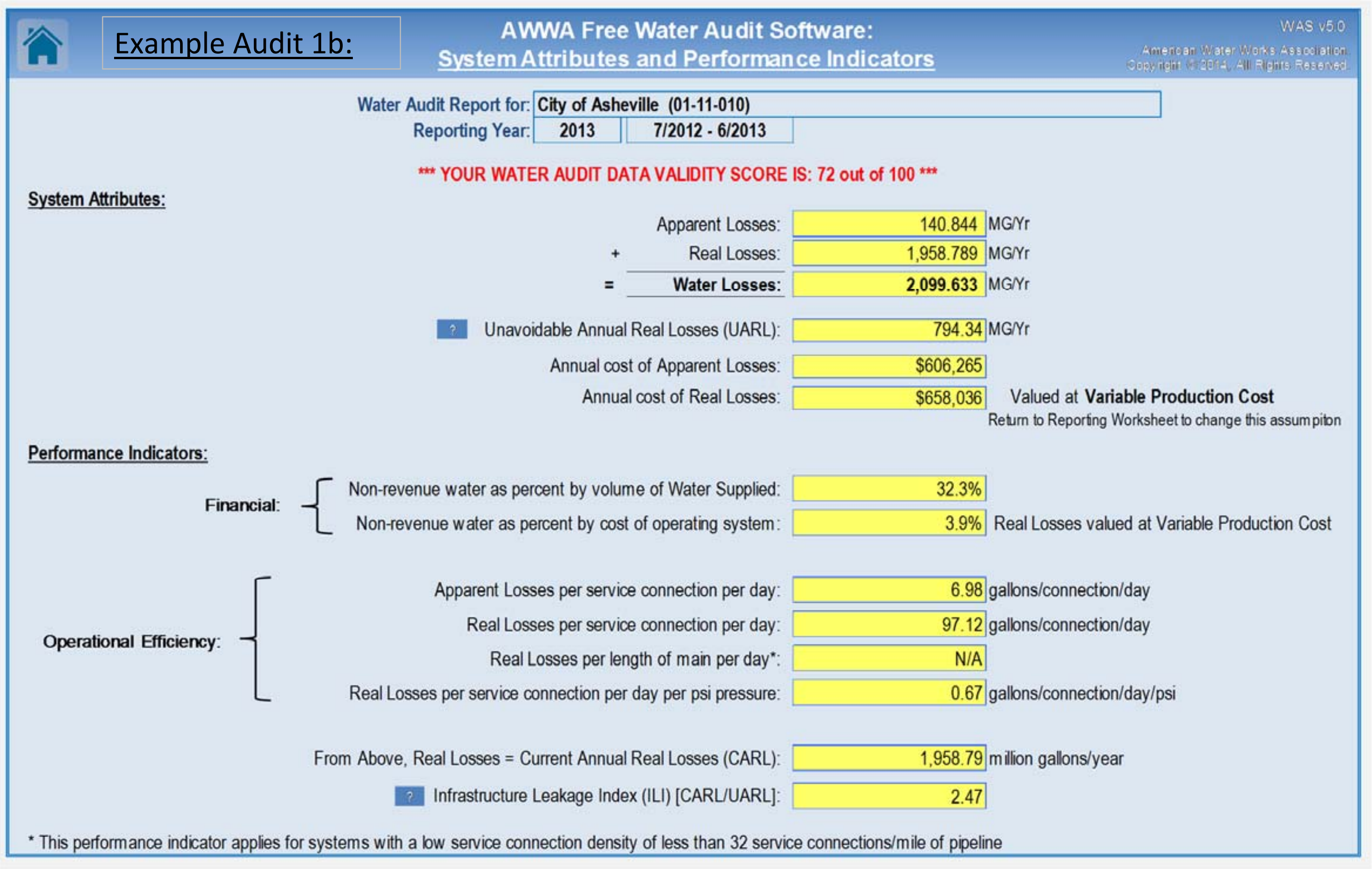
PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources

2: Variable production cost (applied to Real Losses)

3: Unauthorized consumption



Example Audit 1b:

AWWA Free Water Audit Software: System Attributes and Performance Indicators

WAS v5.0
American Water Works Association.
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Water Audit Report for: City of Asheville (01-11-010)
Reporting Year: 2013 7/2012 - 6/2013

***** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 72 out of 100 *****

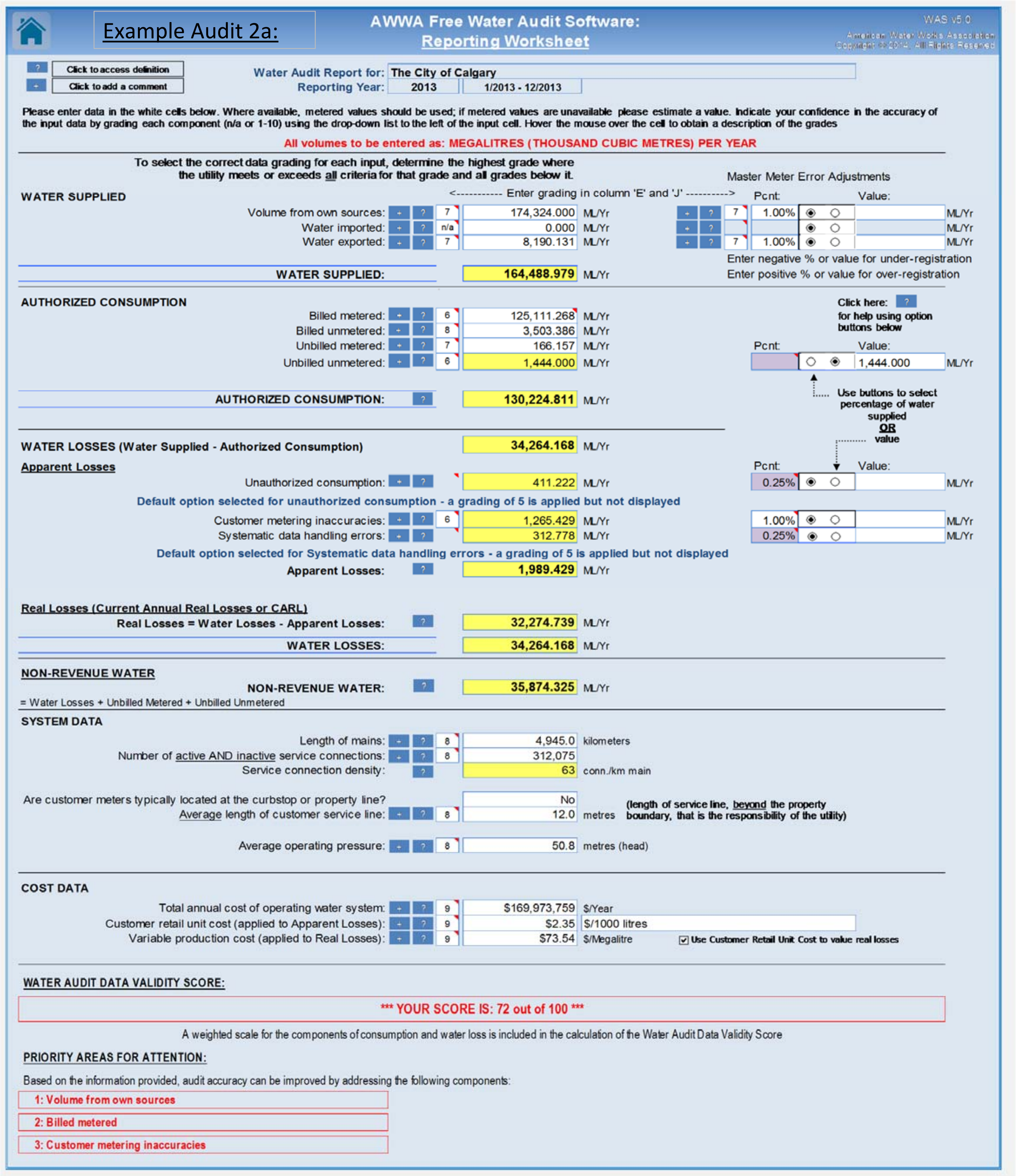
System Attributes:

	Apparent Losses:	140.844	MG/Yr
+	Real Losses:	1,958.789	MG/Yr
=	**Water Losses:**	**2,099.633**	MG/Yr
?	Unavoidable Annual Real Losses (UARL):	794.34	MG/Yr
	Annual cost of Apparent Losses:	$606,265	
	Annual cost of Real Losses:	$658,036	Valued at **Variable Production Cost** Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	32.3%	
	Non-revenue water as percent by cost of operating system:	3.9%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	6.98	gallons/connection/day
	Real Losses per service connection per day:	97.12	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.67	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	1,958.79	million gallons/year
	? Infrastructure Leakage Index (ILI) [CARL/UARL]:	2.47	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline



Example Audit 2a:

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0
American Water Works Association
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Water Audit Report for: The City of Calgary
Reporting Year: 2013 1/2013 - 12/2013

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MEGALITRES (THOUSAND CUBIC METRES) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

WATER SUPPLIED

<----------- Enter grading in column 'E' and 'J' ---------->

Master Meter Error Adjustments

	Grade	Volume		Grade	Pcnt:		Value:	
Volume from own sources:	7	174,324.000	ML/Yr	7	1.00%	● ○		ML/Yr
Water imported:	n/a	0.000	ML/Yr			● ○		ML/Yr
Water exported:	7	8,190.131	ML/Yr	7	1.00%	● ○		ML/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 164,488.979 ML/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

	Grade	Volume		Pcnt:		Value:	
Billed metered:	6	125,111.268	ML/Yr				
Billed unmetered:	8	3,503.386	ML/Yr				
Unbilled metered:	7	166.157	ML/Yr				
Unbilled unmetered:	6	1,444.000	ML/Yr		○ ●	1,444.000	ML/Yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 130,224.811 ML/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 34,264.168 ML/Yr

Apparent Losses

	Grade	Volume		Pcnt:		Value:	
Unauthorized consumption:		411.222	ML/Yr	0.25%	● ○		ML/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

	Grade	Volume		Pcnt:		Value:	
Customer metering inaccuracies:	6	1,265.429	ML/Yr	1.00%	● ○		ML/Yr
Systematic data handling errors:		312.778	ML/Yr	0.25%	● ○		ML/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 1,989.429 ML/Yr

Real Losses (Current Annual Real Losses or CARL)
Real Losses = Water Losses - Apparent Losses: 32,274.739 ML/Yr

WATER LOSSES: 34,264.168 ML/Yr

NON-REVENUE WATER
NON-REVENUE WATER: 35,874.325 ML/Yr
= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

	Grade	Value	
Length of mains:	8	4,945.0	kilometers
Number of active AND inactive service connections:	8	312,075	
Service connection density:		63	conn./km main
Are customer meters typically located at the curbstop or property line?		No	
Average length of customer service line:	8	12.0	metres
Average operating pressure:	8	50.8	metres (head)

(length of service line, beyond the property boundary, that is the responsibility of the utility)

COST DATA

	Grade	Value	
Total annual cost of operating water system:	9	$169,973,759	$/Year
Customer retail unit cost (applied to Apparent Losses):	9	$2.35	$/1000 litres
Variable production cost (applied to Real Losses):	9	$73.54	$/Megalitre

☑ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

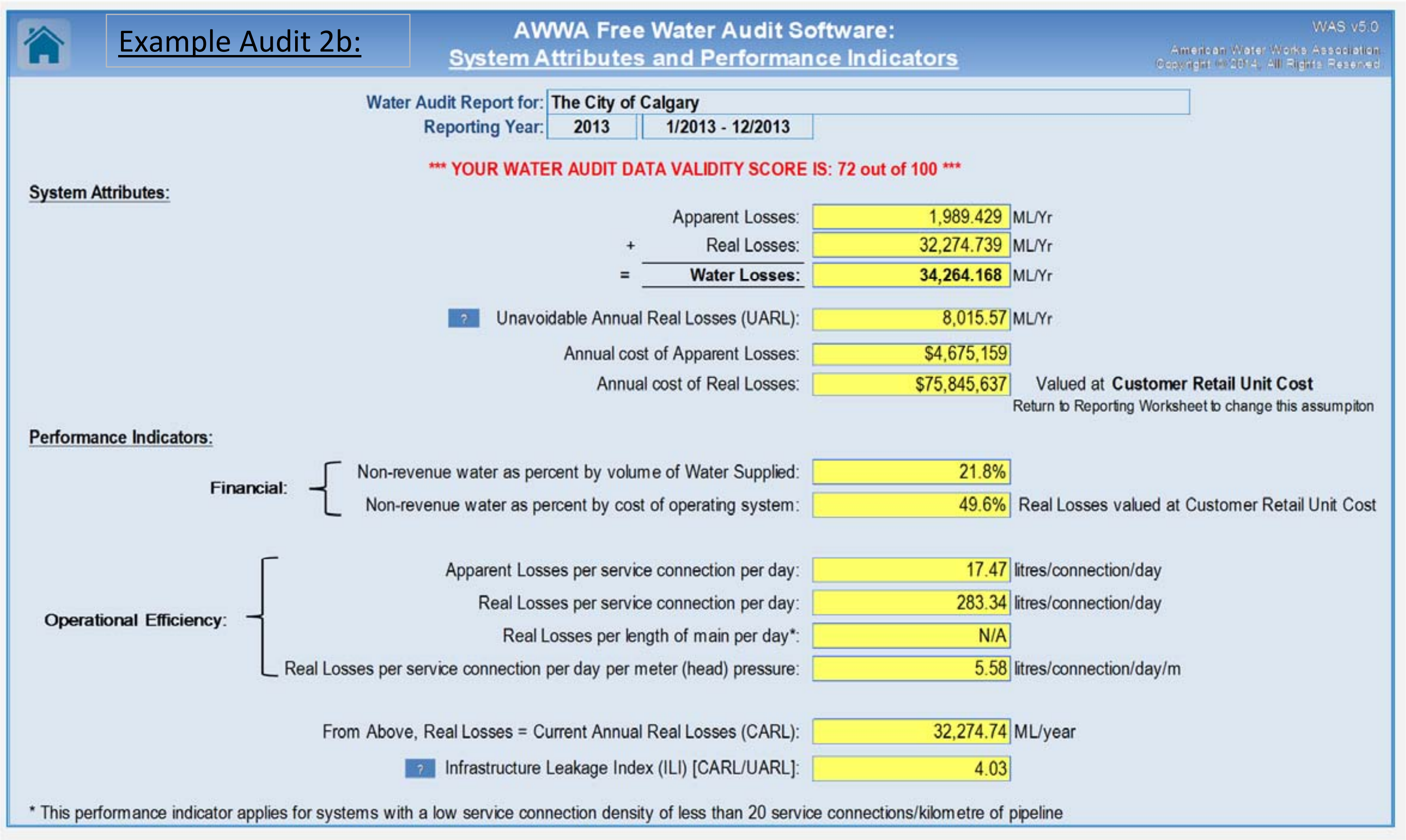
*** YOUR SCORE IS: 72 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Billed metered
3: Customer metering inaccuracies



Example Audit 2b:

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

Water Audit Report for: **The City of Calgary**
Reporting Year: **2013** **1/2013 - 12/2013**

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 72 out of 100 ***

System Attributes:

Apparent Losses:	1,989.429	ML/Yr
+ Real Losses:	32,274.739	ML/Yr
= **Water Losses:**	**34,264.168**	ML/Yr
Unavoidable Annual Real Losses (UARL):	8,015.57	ML/Yr
Annual cost of Apparent Losses:	$4,675,159	
Annual cost of Real Losses:	$75,845,637	Valued at **Customer Retail Unit Cost** Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	21.8%	
	Non-revenue water as percent by cost of operating system:	49.6%	Real Losses valued at Customer Retail Unit Cost
Operational Efficiency:	Apparent Losses per service connection per day:	17.47	litres/connection/day
	Real Losses per service connection per day:	283.34	litres/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per meter (head) pressure:	5.58	litres/connection/day/m
	From Above, Real Losses = Current Annual Real Losses (CARL):	32,274.74	ML/year
	Infrastructure Leakage Index (ILI) [CARL/UARL]:	4.03	

* This performance indicator applies for systems with a low service connection density of less than 20 service connections/kilometre of pipeline

www.awwa.org

AWWA Free Water Audit Software: Acknowledgements

WAS v5.0

AWWA Water Audit Software Version 5.0 Developed by the Water Loss Control Committee of the American Water Works Association   August, 2014

This software is intended to serve as a basic tool to compile a preliminary, or "top-down", water audit. It is recommended that users also refer to the current edition of the AWWA M36 Publication, Water Audits and Loss Control Programs, for detailed guidance on compiling a comprehensive, or "bottom-up", water audit using the same water audit methodology.

DEVELOPED BY:
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REFERENCES:

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- Kunkel, G. et al, 2003. Water Loss Control Committee Report: Applying Worldwide Best Management Practices in Water Loss Control. Journal AWWA, 95:8:65

- AWWA Water Audits and Loss Control Programs, M36 Publication, 3rd Edition, 2009
- Service Connection Diagrams courtesy of Ronnie McKenzie, WRP Pty Ltd.

VERSION HISTORY:

Version:	Release Date:	Number of Worksheets:	Key Features and Developments
v1	2005/ 2006	5	The AWWA Water Audit Software was piloted in 2005 (v1.0 beta). The early versions (1.x) of the software restricted data entry to units of Million Gallons per year. For each entry into the audit, users identified whether the input was measured or estimated.
v2	2006	5	The most significant enhancement in v2 of the software was to allow the user to choose the volumetric units to be used in the audit, Million Gallons or Thousand Cubic Metres (megalitres) per year. Two financial performance indicators were added to provide feedback to the user on the cost of Real and Apparent losses.
v3	2007	7	In v3, the option to report volumetric units in acre-feet was added. Another new feature in v3 was the inclusion of default values for two water audit components (unbilled unmetered and unauthorized consumption). v3 also included two examples of completed audits in units of million gallons and Megalitres. Several checks were added into v3 to provide instant feedback to the user on common data entry problems, in order to help the user complete an accurate water audit.
v4 - v4.2	2010	10	v4 (and versions 4.x) of the software included a new approach to data grading. The simple "estimated" or "measured" approach was replaced with a more granular scale (typically 1-10) that reflected descriptions of utility practices and served to describe the confidence and accuracy of the input data. Each input value had a corresponding scale fully described in the Grading Matrix tab. The Grading Matrix also showed the actions required to move to a higher grading score. Grading descriptions were available on the Reporting Worksheet via a pop-up box next to each water audit input. A water audit data validity score is generated (max = 100) and priority areas for attention (to improve audit accuracy) are identified, once a user completes the requied data grading. A service connection diagram was also added to help users understand the impact of customer service line configurations on water losses and how this information should be entered into the water audit software. An acknoweldgements section was also added. Minor bug fixes resulted in the release of versions 4.1 and 4.2. A French language version was also made available for v4.2.
v5	2014	12	In v5, changes were made to the way Water Supplied information is entered into software, with each major component having a corresponding Master Meter Error Adjustment entry (and data grading requirement). This required changes to the data validity score calculation; v5 of the software uses a weighting system that is, in part, proportional to the volume of input components. The Grading Matrix was updated to reflect the new audit inputs and also to include clarifications and additions to the scale descriptions. The appearance of the software was updated in v5 to make the software more user-friendly and several new features were added to provide more feedback to the user. Notably, a dashboard tab has been added to provide more visual feedback on the water audit results and associated costs of Non-Revenue Water. A comments sheet was added to allow the user to track notes, comments and to cite sources used.

APPENDIX H

Conservation Tracking Model Summary

2015 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

Prepared by: The San Francisco Public Utilities Commission

June 2016

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

SFPUC Conservation Tracking Model

Overview of Model Structure and Calculation of Water Savings

David Mitchell, M.Cubed

Last Updated: 02-26-2016

Overview

The Conservation Tracking Model is a tool developed to track conservation program activity, water savings, and costs and benefits for SFPUC's retail service area conservation programs. The model is a customization of the Alliance for Water Efficiency's Water Conservation Tracking Tool, an Excel-based water conservation tracking model with more than three hundred registered water utility users throughout North America. The model replaces SFPUC's Retail Demand Model for estimating water savings from conservation.

Need for Conservation Tracking Model

The decision to transition to the Conservation Tracking Model was based on two primary considerations. First, SFPUC adopted a new approach to forecasting retail water demand based on econometric demand models developed by Brattle Group. Previously, SFPUC used the Retail Demand Model to forecast future retail water use. The Brattle Group demand forecast models have replaced the Retail Demand Model. However, the Brattle Group forecast models do not project water savings from SFPUC's conservation programs. Those savings have to be estimated separately and then used to adjust the Brattle Group forecast. This requirement led to the second consideration for transitioning to the Conservation Tracking Model. While it would be possible to continue estimating conservation savings using the Retail Demand Model, there were several disadvantages to doing so. First, it would require maintaining and continually updating the Retail Demand Model, which is a complicated and time-intensive task. Second, the structure of the Retail Demand Model makes it difficult to add new conservation programs to it. This meant that anytime SFPUC added new programs to its conservation portfolio it would face a daunting programming task to update the Retail Demand Model. Third, the Retail Demand Model's complex structure limited its usability by SFPUC staff. The Retail Demand Model requires specialized knowledge of its structure and operation which most staff within SFPUC do not possess. By contrast, the Conservation Tracking Model uses a simple data table structure that makes adding, modifying, and deleting conservation programs from the model straightforward. It also has a simpler user interface and where the Retail Demand Model was spread across five separate workbook files, the Conservation Tracking Model resides in one.

Model Structure

The Conservation Tracking Model is an Excel-based model with an extensive Visual Basic backend. Using the model requires completing Model Setup, Program Specification, and Annual Activity data input tasks. Each data input task is contained on a separate worksheet in the model.

Model Setup consists of providing the model with the baseline forecasts of population, housing units, and water demand, as well as other basic system information the model uses to calculate the costs and benefits of conservation programs. The baseline water demand forecast comes from the Brattle Group econometric demand models. The baseline population forecast is from the Association of Bay Area Governments (ABAG).

Program Specification consists of parameterizing the conservation programs in the model. The model can hold up to 75 separate programs. The model can be extended to hold more than 75 programs if needed. Program parameters are grouped into five categories: water saving parameters, utility cost parameters, participant cost parameters, participant non water benefits parameters, and plumbing code parameters. The latter are used to specify interaction effects with plumbing codes to avoid double counting water savings jointly produced by plumbing codes and conservation programs. In terms of forecasting conservation program water savings, the most important parameters are the water savings parameters and the plumbing code interaction parameters.

Annual Activity is simply the number of units of activity that have been done (in the case of historical years) or are expected to be done (in the case of future years). The user enters historical and projected annual activity for each conservation program that was specified during the Program Specification step. For toilets, urinals, and clothes washers, the model includes fixture inventory modules to keep track of how many fixtures have been converted to efficient fixtures due to plumbing codes and conservation programs to ensure the user does not specify levels of fixture replacement that are physically infeasible.

Once the three data input tasks have been completed the model results can be reviewed. Model results are summarized into three categories: (1) program water savings, (2) retail water demand, and (3) costs and benefits.

- Program water savings are the projected annual water savings from each specified conservation program through 2040. Results can be grouped by program category and customer class or shown individually.

- Retail demand results summarize the baseline annual demand forecast with plumbing code and conservation program adjustments through 2040. It is grouped by customer class and shown separately for the in-city and suburban parts of SFPUC's retail service area. Results can be shown in MGD or acre-feet. Gross per capita and residential per capita water use are also reported. In addition, projected per capita water use is compared to per capita water use targets under SBx7-7 and the MOU.

- Costs and benefits of conservation are reported for the utility and program participant perspectives. Unit costs, net present value, and benefit-cost ratios can be reported for the totality of all programs, for individual program categories (e.g. toilet replacement programs), or for individual programs. In addition to financial benefits and costs, the model calculates expected reductions in associated energy use and greenhouse gas emissions.

Model inputs can be saved as scenarios. This allows the model to simultaneously hold more than one set of data inputs. For example, a user could specify scenarios for alternative baseline population and demand forecasts or for alternative levels of conservation program investment. There is no practical limit to the number of scenarios the model can hold.

Comparison with 2011 Conservation Plan

The conservation program savings presented in SFPUC's 2011 Conservation Plan were developed with the Retail Demand Model not the Conservation Tracking Model. While the Conservation Tracking Model can be calibrated to replicate the 2011 estimates, the final estimates developed for the 2015 Conservation Plan, which are based on the Conservation Tracking Model, are generally lower after 2020. There are three main reasons for the lower estimates. First, following the preparation of the 2011 Conservation Plan, SFPUC undertook a review of the water saving estimates and assumptions and made several adjustments. The most significant adjustments were made to the savings estimates for clothes washers and toilets, both of which were lowered to account for new efficiency standards affecting the long-term savings potential of these programs. Second, whereas the 2011 Plan continued implementation of toilet and clothes washer rebate programs through the entire forecast period, the

2015 Plan assumes these programs will be phased out after 2020 due to high fixture saturation levels. In fact, analysis done since the preparation of the 2011 Plan indicates the levels of forecasted activity after 2020 in the 2011 Plan would not be feasible in some cases given the estimated number of remaining inefficient toilets and washers in SFPUC's retail service area. Third, the focus of the 2015 Plan is on the next five years. After 2020 there is much less certainty regarding what conservation programs SFPUC will find most beneficial and cost-effective to implement. Therefore, the estimates only carry forward SFPUC's foundational customer assistance survey, audit, and grant programs after 2020, which when coupled with the phase out of toilet and washer rebate programs causes water savings after 2020 to tail off. The tailing off is somewhat artificial because it is expected SFPUC will implement new programs in addition to its foundational customer assistance programs after 2020, but there is not enough certainty about what these new programs will be or will entail to incorporate them into the forecast. In this regard, the 2015 Plan provides a very conservative estimate of the long-range (post 2020) level of conservation.

Calculation of Plumbing Code Water Savings

The Conservation Tracking Model calculates the water savings associated with plumbing codes and appliance efficiency standards using models of fixture inventory coupled with usage assumptions. These savings are commonly referred to as passive water savings because they occur regardless of the utilities actions. The Tracking Model includes passive savings models for residential toilets, showerheads, and clothes washers, and non-residential toilets, urinals, hotel showerheads, and coin-op clothes washers.

It is important to emphasize that the passive savings estimates do not actually impact the model's estimates of final water demand. This is because the Brattle Group's baseline demand forecasts used in the Tracking Model are supposedly already net of passive water savings. However, the Brattle forecast does not generate an explicit forecast of passive water savings because the adjustment for passive savings is enacted through the model's trend term. Because SFPUC desired explicit estimates of passive water savings, modules for estimating these savings were included in the Tracking Model. These estimates are added to the Brattle Group's baseline forecast before it is used in the model so that they can be represented explicitly. It is the Brattle Group's baseline forecast adjusted for passive savings that is entered on the Model Setup worksheet. The adjusted baseline forecast is:[1]

Adjusted Baseline Forecast = Brattle Baseline Forecast + Passive Water Savings

The final demand forecast generated by the Tracking Model is then:

Final Demand Forecast = Adjusted Baseline Forecast – Passive Water Savings – Program Water Savings

This is also equal to:

Final Demand Forecast = Brattle Baseline Forecast – Program Water Savings

---

[1] The passive water savings adjustment also includes water savings expected to be realized after 2015 from the historical implementation of SFPUC conservation programs prior to the start of the Brattle Group's baseline forecast. This is done to prevent the model from double counting these water savings.

This means the only determinants of the final demand forecast are the Brattle Baseline Forecast and the forecast of programmatic water savings from future implementation of SFPUC conservation programs. While the passive savings forecast is useful because it provides an estimate of how much future demand reduction can be ascribed to plumbing codes and appliance standards, it does not actually affect the final estimate of future demand.

Following are descriptions of how passive savings are calculated for each fixture/appliance category.

Residential Toilets

The population of residential toilets is based on SFPUC's forecasts of single and multi-family housing units. These forecasts are multiplied by the average number of toilets per dwelling unit, which are estimated from recent American Housing Survey data. The model uses an average of 2.21 and 1.38 toilets per dwelling unit for single and multi-family housing, respectively. Toilets installed in new housing constructed between 1991 and 2013 are assumed to be ULFT (1.6 gpf). Toilets installed in new housing constructed after 2013 are assumed to be HET (1.28 gpf). Toilets in existing housing constructed before 1991 are assumed to have an average flush volume of 3.5 gpf. Toilets in existing housing are assumed to be replaced at an annual rate of 3.1% per year. This is the average rate of residential toilet replacement reported in studies done by EBMUD and SCVWD. Existing toilets replaced between 1991 and 2013 are assumed to be replaced by ULFTs. Existing toilets replaced after 2013 are assumed to be replaced by HETs. Using this information, the model calculates the average flush volume for the inventory of new and existing toilets for each year between 1990 and 2064. Water savings per flush is calculated relative to the average flush volume in 1990. Average savings per flush is equal to the average flush volume in 1990 less the average flush volume in each year after 1990. Average savings per flush is multiplied by the estimated number of flushes per year to estimate annual water savings. The estimated number of flushes per year is equal to the residential population multiplied by the average daily per capita flush rate multiplied by 365. The residential population is derived from SFPUC's service area population forecasts. The average daily per capita flush rate of 4.8 is taken from the San Francisco Residential End Uses of Water Study.

Non-Residential Toilets

The population of non-residential toilets for the period 1990-2012 is taken from the Fixture Saturation Task Memo. The population of non-residential toilets for the period 2013-2064 is a linear extrapolation based on the forecast of service area population. The same assumptions used for residential toilets regarding flush volume of new toilets and replacement rate of existing toilets are used for non-residential toilets. The average flush volume of the toilet inventory and the water savings per flush relative to 1990 are calculated the same way as for residential toilets. Average savings per flush is multiplied by the estimated number of flushes per year to estimate annual water savings. To calculate total flushes per year, male and female workers are assumed to have daily flush rates of 1 and 3, respectively, per Vickers (2001). Male workers are assumed to comprise 54% of the labor force, per City of San Francisco (2009). Total employment is taken from SFPUC's employment forecast.

Non-Residential Urinals

The population of non-residential urinals for the period 1990-2012 is taken from the Fixture Saturation Task Memo. The population of non-residential urinals for the period 2013-2064 is a linear extrapolation based on the forecast of service area population. Urinals installed before 2014 are assumed to have a flush volume of 1.0 gpf. Urinals installed in 2014 are assumed to have a flush volume of 0.5 gpf. Urinals installed after 2014 are assumed to have a flush volume of 0.125 gpf. Urinals are assumed to have the same replacement rate as toilets. The average flush volume of the urinal inventory and the water savings per flush relative to 1990 are calculated the same way as for residential and commercial toilets. Average savings per flush is multiplied by the estimated number of flushes per year to estimate annual water savings. To calculate total flushes per year, male workers are assumed to have a daily flush rate of 2, per Vickers (2001). Male workers are assumed to comprise 54% of the labor force, per City of San Francisco (2009). Total employment is taken from SFPUC's employment forecast.

Residential Showerheads

The population of residential showerheads is based on SFPUC's forecasts of single and multi-family housing units. These forecasts are multiplied by the average number of showerheads per dwelling unit, which are estimated from recent American Housing Survey data. The model uses an average of 1.34 and 1.21 showerheads per dwelling unit for single and multi-family housing, respectively. Showerheads installed in new housing constructed before 2005 are assumed to have an average flow rate of 2.3 gpm. Showerheads installed in new housing constructed between 2005 and 2017 are assumed to have an average flow rate of 2.0 gpm. Showerheads installed after 2017 are assumed to have an average flow rate of 1.8 gpm. Showerheads in existing housing are assumed to be replaced at an annual rate of 12% per year, per the Alliance for Water Efficiency. Using this information, the model calculates the average showerhead flow rate for the inventory of new and existing showerheads for each year between 2005 and 2064. Average savings per minute is equal to the average flow rate in 2005 less the average flow rate in each year after 2005. Annual water savings is calculated as the product of the average flow rate and the annual number of minutes for showering. The annual number of minutes for showering is equal to the average number of shower events per household per day multiplied by the average shower duration in minutes multiplied by the number of households multiplied by 365. An average of 2 shower events per day and an average duration of 9 minutes per shower event are taken from the San Francisco Residential End Uses of Water Study.[2] The number of residential housing units is taken from SFPUC's housing forecast.

Hotel Showerheads

The population of hotel showerheads is based on an estimate of the total number of hotel rooms in San Francisco. The model assumes one showerhead per room. Showerheads installed before 2005 are assumed to have an average flow rate of 2.5 gpm. Showerheads installed between 2005 and 2017 are assumed to have an average flow rate of 2.2 gpm. Showerheads installed after 2017 are assumed to have an average flow rate of 1.8 gpm. Showerheads are assumed to be replaced at an annual rate of 12% per year, per the Alliance for Water Efficiency. Using this information, the model calculates the average showerhead flow rate for the inventory of new and existing showerheads for each year between 2005 and 2064. Average savings per minute is equal to the average flow rate in 2005 less the average flow rate in each year after 2005. Annual water savings is calculated as the product of the average flow rate and the annual number of minutes for showering. The annual number of minutes for showering is equal to the average number of shower events per occupied room per day multiplied by the average shower duration in minutes multiplied by the number of occupied rooms multiplied by 365. An average of 1.34 shower events per day per occupied room and an average duration of 10 minutes per shower event are taken from the AWWARF Commercial End Uses of Water Study. The average hotel occupancy rate is based on a review of various estimates published on the internet of hotel occupancy in San Francisco.

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[2] The estimate of average number of shower events per day from the San Francisco Residential End Uses of Water Study is used directly in the single-family residential calculation. For the multi-family calculation, it is scaled by the ratio of multi-family to single-family persons per household to take into account the lower density in multi-family housing.

Residential Clothes Washers

The population of residential clothes washers is based on SFPUC's housing forecast and the average number of washers per dwelling unit. The average number of washers per dwelling unit is taken from the Fixture Saturation Task Memo. The estimate of multi-family includes both in-unit and common room washers. New washers are assumed to be either conventional or high-efficiency based on a forecast of market shares informed by existing and pending federal efficiency standards for residential clothes washers. Existing washers are assumed to be replaced at an annual rate of 7.1%, which is equivalent to assuming washers have an average useful life of 14 years, which is consistent with industry estimates. When a washer is replaced, it is replaced with either a conventional or high efficiency washer according to a forecast of market shares informed by existing and pending federal efficiency standards for residential clothes washers. The Tracking Model allocates new high efficiency washers between top- and front-load models according to a forecast of market shares for top- and front-load washers based on DOE and EPA market forecasts. Under federal appliance efficiency regulations, top-load washers are allowed higher water factors than front-load washers. The water factors for new top- and front-load high-efficiency washers are dictated by existing and pending federal regulations.[3] Conventional washers are assumed to have an average water factor of 11. The average water factor for the inventory of residential washers in each forecast year is a weighted average of new and existing conventional, top-load, and front-load washers in that year. The average water factor for the period 2005-2010 in the single family washer model calibrates almost exactly to the estimate of average water use per single family washer reported in the San Francisco End Uses of Water Study for the same period. Water savings per load in each forecast year is equal to the average water use per load in 2005 minus the average water use per load in the forecast year. This is multiplied by total loads per year to get annual water savings. Total loads per year is equal to the number of washers multiplied by the average number of loads per day per washer multiplied by 365. The average number of loads per day per washer is taken from the San Francisco End Uses of Water Study.[4]

Coin-op Clothes Washers

Estimates of passive water savings for coin-op clothes washers use the same methodology used for residential clothes washers. The population of coin-op clothes washers is based on an internet search of coin-op washer facilities in San Francisco. The average number of washers per coin-op facility is taken from the Fixture Saturation Task Memo. The average number of loads per day is taken from a PG&E study of coin-op washer water and energy consumption. The water factors for new and replaced washers are based on existing and pending federal efficiency regulations for commercial clothes washers.

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[3] The pending regulations take effect in 2018.

[4] The multi-family model scales the single-family estimate of loads per day by the ratio of multi-family to single-family persons per household to account for the lower number of persons per household in multi-family housing. The multi-family model also incorporates loads per day for common room clothes washers. Common room clothes washers are assumed to average 8 loads per day. Average loads per day for the multi-family model is a weighted average of loads per day for in-unit and common room clothes washers.

Calculation of Programmatic Water Savings

The Conservation Tracking Model calculates the water savings associated with a program as the product of the estimated water savings per unit of activity and the amount of activity completed. These savings are commonly referred to as active water savings because they result from the utility's direct investment in conservation programs intended to reduce demand. In other words, the savings result from the utility's active pursuit of demand reduction.

In the Tracking Model, the user specifies a starting unit water savings for each program. The behavior and duration of the unit savings overtime can then be adjusted with the useful life, annual decay, and plumbing code interaction parameters. When the annual decay and plumbing code interaction parameters are both set to 0, annual savings is equal to the product of the initial unit savings and the amount of activity. Annual savings accrue until the measure's useful life is reached, after which annual savings are assumed to be zero. Thus given initial unit savings S_0, measure useful life u, and activity of A_s in year s, water savings in any year t ≥ s are:

$$S_t = A_s S_0 \; if \; t - s + 1 \leq u, 0 \; otherwise$$

When the annual decay parameter takes a value d in the range (0, 1], annual water savings in any year t ≥ s are:

$$S_t = A_s S_0 (1-d)^{t-s} \; if \; t - s + 1 \leq u, 0 \; otherwise$$

When the plumbing code interaction parameter takes a value p in the range (0, 1] and the plumbing code is in effect for any year t ≥ v, annual water savings in any year t ≥ s are:

$$S_t = \begin{cases} A_s S_0 \; if \; u \geq t - s + 1 \; and \; t < v \\ A_s (1-p)^{t-s} S_0 \; if \; t - s + 1 \leq u \; and \; t \geq v \\ 0 \; if \; t - s + 1 > u \end{cases}$$

When the plumbing code interaction parameter takes a value p in the range (0, 1], the plumbing code is in effect for any year t ≥ v, and the annual decay parameter takes a value d in the range (0, 1], annual water savings in any year t ≥ s are:

$$S_t = \begin{cases} A_s S_0 (1-d)^{t-s} \; if \; t - s + 1 \leq u \; and \; t < v \\ A_s (1-p)^{t-s} S_0 (1-d)^{t-s} \; if \; t - s + 1 \leq u \; and \; t \geq v \\ 0 \; if \; t - s + 1 > u \end{cases}$$

The specification of these parameters are based on current state and federal plumbing codes and appliance standards and findings from empirical evaluations of conservation program performance, as compiled by the California Urban Water Conservation Council (CUWCC) and Alliance for Water Efficiency (AWE). The specific data sources and assumptions used to create the water savings and plumbing code specifications for each program are provided in the remainder of this document.

The model's toilet fixture inventory modules for single- and multi-family toilets also estimate water savings from the City's toilet retrofit-on-resale ordinance that started in 2009. These estimates rest on two simplifying assumptions: (1) 3.5+ gpf toilets are uniformly distributed across the housing stock and

(2) each housing unit is equally likely to be put on the market for sale each year. Given these two assumptions, ROR toilet replacements in any year t ≥ 2009 are calculated as:

(Stock of 3.5+ gpf toilets at beginning of year – SFPUC toilet replacements) x housing resale rate

The model assumes ROR toilets are replaced with ULFTs prior to 2014 and HETs thereafter.

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APPENDIX I

Wholesale Water Audit Worksheet

2015 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

Prepared by: The San Francisco Public Utilities Commission
June 2016

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

AWWA Free Water Audit Software v5.0

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person: Chris Hewes
Email Address: chewes@rmcwater.com
Telephone | Ext.: 415-321-3422
Name of City / Utility: San Francisco Public Utilities Commission - Wholesale
City/Town/Municipality: San Francisco
State / Province: California (CA)
Country: USA
Year: 2015 Financial Year
Start Date: 07/2014 Enter MM/YYYY numeric format
End Date: 06/2015 Enter MM/YYYY numeric format
Audit Preparation Date: 2/4/2016
Volume Reporting Units: Million gallons (US)
PWSID / Other ID:

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

☐	Value can be entered by user
🟨	Value calculated based on input data
🟪	These cells contain recommended default values

Use of Option (Radio) Buttons:

Pcnt:			Value:
0.25%	●	○	

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the right

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
\+ Click to add a comment

Water Audit Report for: San Francisco Public Utilities Commission - Wholesale
Reporting Year: 2015 | 7/2014 - 6/2015

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<----------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

									Pcnt:		Value:	
Volume from own sources:	+	?	9	69,478.249	MG/Yr	+	?	8		○ ●	-45.276	MG/Yr
Water imported:	+	?	n/a	0.000	MG/Yr	+	?			● ○		MG/Yr
Water exported:	+	?	8	223.000	MG/Yr	+	?	4		○ ●	-3.396	MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 69,297.129 MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

						Pcnt:		Value:	
Billed metered:	+	?	9	69,334	MG/Yr				
Billed unmetered:	+	?	n/a	0.000	MG/Yr				
Unbilled metered:	+	?	10	22	MG/Yr				
Unbilled unmetered:	+	?	8	106.900	MG/Yr		○ ●	106.900	MG/Yr

Use buttons to select percentage of water supplied
OR
value

AUTHORIZED CONSUMPTION: ? 69,462.479 MG/Yr

Check input values; WATER SUPPLIED should be greater than AUTHORIZED CONSUMPTION

WATER LOSSES (Water Supplied - Authorized Consumption) -165.350 MG/Yr

Apparent Losses

						Pcnt:		Value:	
Unauthorized consumption:	+	?	5	43.311	MG/Yr		○ ●	43.311	MG/Yr
Customer metering inaccuracies:	+	?	4	700.633	MG/Yr		○ ●	700.633	MG/Yr
Systematic data handling errors:	+	?	9	28.755	MG/Yr		○ ●	28.755	MG/Yr

Apparent Losses: ? 772.699 MG/Yr

Check input values; APPARENT LOSSES should be less than WATER LOSSES

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? -938.049 MG/Yr

WATER LOSSES: -165.350 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: ? -36.735 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+	?	8	235.5	miles
Number of active AND inactive service connections:	+	?	8	148	
Service connection density:		?		1	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	+	?	6	104.0	psi

COST DATA

Total annual cost of operating water system:	+	?	9	$200,595,848	$/Year
Customer retail unit cost (applied to Apparent Losses):	+	?	9	$2.93	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+	?	8	$160.39	$/Million gallons

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 83 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Customer metering inaccuracies
2: Volume from own sources
3: Unauthorized consumption

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0

Water Audit Report for: San Francisco Public Utilities Commission - Wholesale
Reporting Year: 2015 | 7/2014 - 6/2015

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 83 out of 100 ***

System Attributes:

Apparent Losses:	772.699	MG/Yr
+ Real Losses:	(938.049)	MG/Yr
= Water Losses:	(165.350)	MG/Yr
? Unavoidable Annual Real Losses (UARL):	49.21	MG/Yr
Annual cost of Apparent Losses:	$3,026,539	
Annual cost of Real Losses:	-$150,454	Valued at **Variable Production Cost**

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	-0.1%	
	Non-revenue water as percent by cost of operating system:	1.4%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	14303.94	gallons/connection/day
	Real Losses per service connection per day:	N/A	gallons/connection/day
	Real Losses per length of main per day*:	-10,912.94	gallons/mile/day
	Real Losses per service connection per day per psi pressure:	N/A	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	-938.05	million gallons/year
	? Infrastructure Leakage Index (ILI) [CARL/UARL]:	-19.06	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

WAS v5.0

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	Provided by daily summed volumes of all relevant meters in the RWS, upkept by SFPUC staff.
Vol. from own sources: Master meter error adjustment:	Individual meter calibration records and other pertinent information provided by SFPUC staff - calculated separately for each meter.
Water imported:	n/a
Water imported: master meter error adjustment:	n/a
Water exported:	Summed from a weekly manual meter read.
Water exported: master meter error adjustment:	Assumed to be 98.5%, same as customer meters.
Billed metered:	Summed from a detailed billing system extract for each service point for each billing period. Prorated to adjust to audit time period. Filtered for non-potable accounts and other duplicate accounts.
Billed unmetered:	n/a
Unbilled metered:	(See Billed Metered)

Audit Item	Comment
Unbilled unmetered:	Summed from NPDES permit reporting which detail planned discharges of potable water to local watersheds.
Unauthorized consumption:	25% of default value used; wholesale system with little water theft expected.
Customer metering inaccuracies:	98.5% chosen for all customer meters (no recent meter testing, preventative maintenance has been relatively low in recent years due to ramped up WSIP construction in the transmission system).
Systematic data handling errors:	25% of default value used; billing system has been shown to be robust.
Length of mains:	Provided by SFPUC staff directly.
Number of active AND inactive service connections:	Provided by SFPUC staff directly.
Average length of customer service line:	n/a
Average operating pressure:	Weighted average of average PSI found in different lengths of transmission lines.
Total annual cost of operating water system:	Provided by SFPUC finance department, annual reporting of system costs.
Customer retail unit cost (applied to Apparent Losses):	Contractually calculated by the Wholesale Water Supply Agreement established in 2009 and audited anually (it is a unit cost, no fixed costs).
Variable production cost (applied to Real Losses):	Provided by SFPUC finance department calculations of treatment chemicals and power used by Water Supply and Treatment division.

AWWA Free Water Audit Software: Water Balance

WAS v5.0

Water Audit Report for: **San Francisco Public Utilities Commission - Wholesale**
Reporting Year: **2015** **7/2014 - 6/2015**
Data Validity Score: **83**

		Water Exported *226.396*	**Billed Water Exported**			**Revenue Water** **226.396**
Own Sources **(Adjusted for known errors)** *69,523.525*	**System Input** *69,523.525*	**Water Supplied** *69,297.129*	**Authorized Consumption** *69,462.479*	**Billed Authorized Consumption** *69,333.864*	**Billed Metered Consumption (water exported is removed)** *69,333.864*	**Revenue Water** **69,333.864**
					Billed Unmetered Consumption *0.000*	
				Unbilled Authorized Consumption *128.615*	**Unbilled Metered Consumption** *21.715*	**Non-Revenue Water (NRW)** **-36.735**
					Unbilled Unmetered Consumption *106.900*	
			Water Losses *-165.350*	**Apparent Losses** *772.699*	**Unauthorized Consumption** *43.311*	
					Customer Metering Inaccuracies *700.633*	
					Systematic Data Handling Errors *28.755*	
Water Imported *0.000*				**Real Losses** *-938.049*	**Leakage on Transmission and/or Distribution Mains** *Not broken down*	
					Leakage and Overflows at Utility's Storage Tanks *Not broken down*	
					Leakage on Service Connections *Not broken down*	

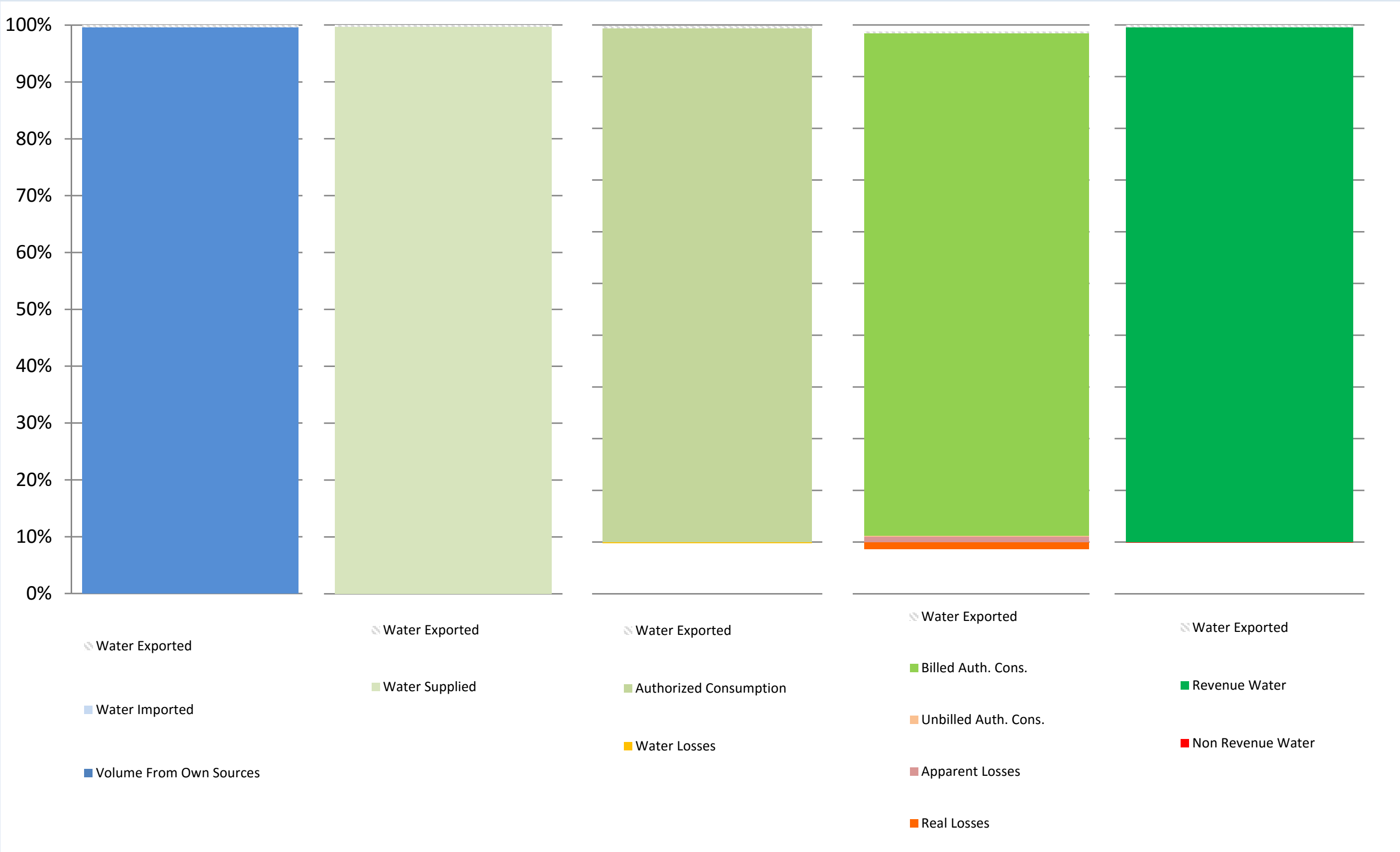
AWWA Free Water Audit Software:
Dashboard

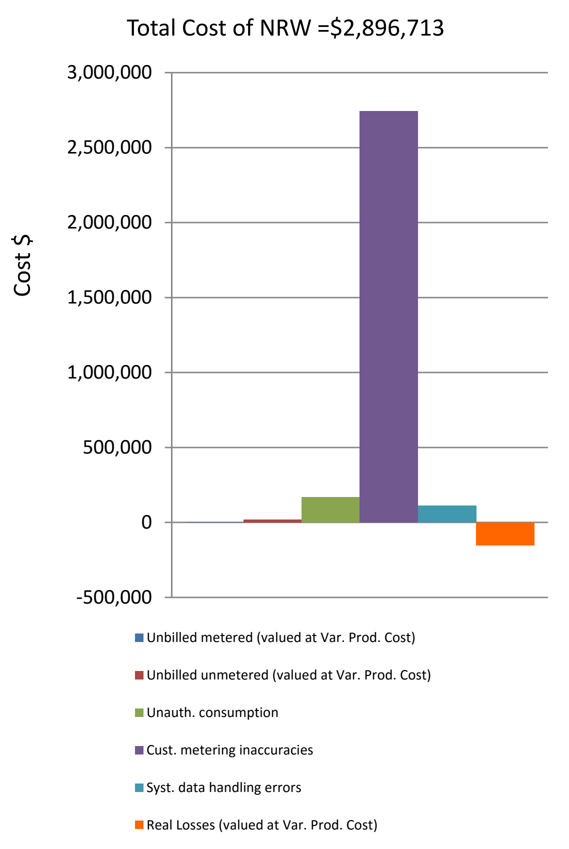
WAS v5.0

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

Water Audit Report for: **San Francisco Public Utilities Commission - Wholesale**
Reporting Year: **2015** **7/2014 - 6/2015**
Data Validity Score: **83**

○ Show me the VOLUME of Non-Revenue Water
● Show me the COST of Non-Revenue Water




Total Cost of NRW =$2,896,713

AWWA Free Water Audit Software: Grading Matrix

WAS 5.0

The grading assigned to each audit component and the corresponding recommended improvements and actions are highlighted in yellow. Audit accuracy is likely to be improved by prioritizing those items shown in red

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
WATER SUPPLIED											
Volume from own sources:	Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)	Less than 25% of water production sources are metered, remaining sources are estimated. No regular meter accuracy testing or electronic calibration conducted.	25% - 50% of treated water production sources are metered; other sources estimated. No regular meter accuracy testing or electronic calibration conducted.	Conditions between 2 and 4	50% - 75% of treated water production sources are metered, other sources estimated. Occasional meter accuracy testing or electronic calibration conducted.	Conditions between 4 and 6	At least 75% of treated water production sources are metered, or at least 90% of the source flow is derived from metered sources. Meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually, with less than 10% found outside of +/- 3% accuracy. Procedures are reviewed by a third party knowledgeable in the M36 methodology.
Improvements to attain higher data grading for "Volume from own Sources" component:		to qualify for 2: Organize and launch efforts to collect data for determining volume from own sources	to qualify for 4: Locate all water production sources on maps and in the field, launch meter accuracy testing for existing meters, begin to install meters on unmetered water production sources and replace any obsolete/defective meters.		to qualify for 6: Formalize annual meter accuracy testing for all source meters; specify the frequency of testing. Complete installation of meters on unmetered water production sources and complete replacement of all obsolete/defective meters.		to qualify for 8: Conduct annual meter accuracy testing and calibration of related instrumentation on all meter installations on a regular basis. Complete project to install new, or replace defective existing, meters so that entire production meter population is metered. Repair or replace meters outside of +/- 6% accuracy.		to qualify for 10: Maintain annual meter accuracy testing and calibration of related instrumentation for all meter installations. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to further improve meter accuracy.		to maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.
Volume from own sources master meter and supply error adjustment:	Select n/a only if the water utility fails to have meters on its sources of supply	Inventory information on meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined	No automatic datalogging of production volumes; daily readings are scribed on paper records without any accountability controls. Flows are not balanced across the water distribution system: tank/storage elevation changes are not employed in calculating the "Volume from own sources" component and archived flow data is adjusted only when grossly evident data error occurs.	Conditions between 2 and 4	Production meter data is logged automatically in electronic format and reviewed at least on a monthly basis with necessary corrections implemented. "Volume from own sources" tabulations include estimate of daily changes in tanks/storage facilities. Meter data is adjusted when gross data errors occur, or occasional meter testing deems this necessary.	Conditions between 4 and 6	Hourly production meter data logged automatically & reviewed on at least a weekly basis. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and/or error is confirmed by meter accuracy testing. Tank/storage facility elevation changes are automatically used in calculating a balanced "Volume from own sources" component, and data gaps in the archived data are corrected on at least a weekly basis.	Conditions between 6 and 8	Continuous production meter data is logged automatically & reviewed each business day. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and/or results of meter accuracy testing. Tank/storage facility elevation changes are automatically used in "Volume from own sources" tabulations and data gaps in the archived data are corrected on a daily basis.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically balances flows from all sources and storages; results are reviewed each business day. Tight accountability controls ensure that all data gaps that occur in the archived flow data are quickly detected and corrected. Regular calibrations between SCADA and sources meters ensures minimal data transfer error.
Improvements to attain higher data grading for "Master meter and supply error adjustment" component:		to qualify for 2: Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature.	to qualify for 4: Install automatic datalogging equipment on production meters. Complete installation of level instrumentation at all tanks/storage facilities and include tank level data in automatic calculation routine in a computerized system. Construct a computerized listing or spreadsheet to archive input volumes, tank/storage volume changes and import/export flows in order to determine the composite "Water Supplied" volume for the distribution system. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps.		to qualify for 6: Refine computerized data collection and archive to include hourly production meter data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Use daily net storage change to balance flows in calculating "Water Supplied" volume. Necessary corrections to data errors are implemented on a weekly basis.		to qualify for 8: Ensure that all flow data is collected and archived on at least an hourly basis. All data is reviewed and detected errors corrected each business day. Tank/storage levels variations are employed in calculating balanced "Water Supplied" component. Adjust production meter data for gross error and inaccuracy confirmed by testing.		to qualify for 10: Link all production and tank/storage facility elevation change data to a Supervisory Control & Data Acquisition (SCADA) System, or similar computerized monitoring/control system, and establish automatic flow balancing algorithm and regularly calibrate between SCADA and source meters. Data is reviewed and corrected each business day.		to maintain 10: Monitor meter innovations for development of more accurate and less expensive flowmeters. Continue to replace or repair meters as they perform outside of desired accuracy limits. Stay abreast of new and more accurate water level instruments to better record tank/storage levels and archive the variations in storage volume. Keep current with SCADA and data management systems to ensure that archived data is well-managed and error free.
Water Imported:	Select n/a if the water utility's supply is exclusively from its own water resources (no bulk purchased/ imported water)	Less than 25% of imported water sources are metered, remaining sources are estimated. No regular meter accuracy testing.	25% - 50% of imported water sources are metered; other sources estimated. No regular meter accuracy testing.	Conditions between 2 and 4	50% - 75% of imported water sources are metered, other sources estimated. Occasional meter accuracy testing conducted.	Conditions between 4 and 6	At least 75% of imported water sources are metered, meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually for all meter installations. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of imported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of imported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually for all meter installations, with less than 10% of accuracy tests found outside of +/- 3% accuracy.
Improvements to attain higher data grading for "Water Imported Volume" component: *(Note: usually the water supplier selling the water - "the Exporter" - to the utility being audited is responsible to maintain the metering installation measuring the imported volume. The utility should coordinate carefully with the Exporter to ensure that adequate meter upkeep takes place and an accurate measure of the Water Imported volume is quantified.)*		to qualify for 2: Review bulk water purchase agreements with partner suppliers; confirm requirements for use and maintenance of accurate metering. Identify needs for new or replacement meters with goal to meter all imported water sources.	To qualify for 4: Locate all imported water sources on maps and in the field, launch meter accuracy testing for existing meters, begin to install meters on unmetered imported water interconnections and replace obsolete/defective meters.		to qualify for 6: Formalize annual meter accuracy testing for all imported water meters, planning for both regular meter accuracy testing and calibration of the related instrumentation. Continue installation of meters on unmetered imported water interconnections and replacement of obsolete/defective meters.		to qualify for 8: Complete project to install new, or replace defective, meters on all imported water interconnections. Maintain annual meter accuracy testing for all imported water meters and conduct calibration of related instrumentation at least annually. Repair or replace meters outside of +/- 6% accuracy.		to qualify for 10: Conduct meter accuracy testing for all meters on a semi-annual basis, along with calibration of all related instrumentation. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.		to maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Continue to conduct calibration of related instrumentation on a semi-annual basis. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Water imported master meter and supply error adjustment:	Select n/a if the Imported water supply is unmetered, with Imported water quantities estimated on the billing invoices sent by the Exporter to the purchasing Utility.	Inventory information on imported meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined Written agreement(s) with water Exporter(s) are missing or written in vague language concerning meter management and testing.	No automatic datalogging of imported supply volumes; daily readings are scribed on paper records without any accountability controls to confirm data accuracy and the absence of errors and data gaps in recorded volumes. Written agreement requires meter accuracy testing but is vague on the details of how and who conducts the testing.	Conditions between 2 and 4	Imported supply metered flow data is logged automatically in electronic format and reviewed at least on a monthly basis by the Exporter with necessary corrections implemented. Meter data is adjusted by the Exporter when gross data errors are detected. A coherent data trail exists for this process to protect both the selling and the purchasing Utility. Written agreement exists and clearly states requirements and roles for meter accuracy testing and data management.	Conditions between 4 and 6	Hourly Imported supply metered data is logged automatically & reviewed on at least a weekly basis by the Exporter. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and to correct for error confirmed by meter accuracy testing. Any data gaps in the archived data are detected and corrected during the weekly review. A coherent data trail exists for this process to protect both the selling and the purchasing Utility.	Conditions between 6 and 8	Continuous Imported supply metered flow data is logged automatically & reviewed each business day by the Exporter. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and/or results of meter accuracy testing. Any data errors/gaps are detected and corrected on a daily basis. A data trail exists for the process to protect both the selling and the purchasing Utility.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically records data which is reviewed each business day by the Exporter. Tight accountability controls ensure that all error/data gaps that occur in the archived flow data are quickly detected and corrected. A reliable data trail exists and contract provisions for meter testing and data management are reviewed by the selling and purchasing Utility at least once every five years.
Improvements to attain higher data grading for "Water imported master meter and supply error adjustment" component:		to qualify for 2: Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature. Review the written agreement between the selling and purchasing Utility.	to qualify for 4: Install automatic datalogging equipment on Imported supply meters. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps. Launch discussions with the Exporters to jointly review terms of the written agreements regarding meter accuracy testing and data management; revise the terms as necessary.		to qualify for 6: Refine computerized data collection and archive to include hourly Imported supply metered flow data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Make necessary corrections to errors/data errors on a weekly basis.		to qualify for 8: Ensure that all Imported supply metered flow data is collected and archived on at least an hourly basis. All data is reviewed and errors/data gaps are corrected each business day.		to qualify for 10: Conduct accountability checks to confirm that all Imported supply metered data is reviewed and corrected each business day by the Exporter. Results of all meter accuracy tests and data corrections should be available for sharing between the Exporter and the purchasing Utility. Establish a schedule for a regular review and updating of the contractual language in the written agreement between the selling and the purchasing Utility; at least every five years.		to maintain 10: Monitor meter innovations for development of more accurate and less expensive flowmeters; work with the Exporter to help identify meter replacement needs. Keep communication lines with Exporters open and maintain productive relations. Keep the written agreement current with clear and explicit language that meets the ongoing needs of all parties.
Water Exported:	Select n/a if the water utility sells no bulk water to neighboring water utilities (no exported water sales)	Less than 25% of exported water sources are metered, remaining sources are estimated. No regular meter accuracy testing.	25% - 50% of exported water sources are metered; other sources estimated. No regular meter accuracy testing.	Conditions between 2 and 4	50% - 75% of exported water sources are metered, other sources estimated. Occasional meter accuracy testing conducted.	Conditions between 4 and 6	At least 75% of exported water sources are metered, meter accuracy testing and/or electronic calibration conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of exported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of exported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually for all meter installations, with less than 10% of accuracy tests found outside of +/- 3% accuracy.
Improvements to attain higher data grading for "Water Exported Volume" component: (*Note: usually, if the water utility being audited sells (Exports) water to a neighboring purchasing Utility, it is the responsibility of the utility exporting the water to maintain the metering installation measuring the Exported volume. The utility exporting the water should ensure that adequate meter upkeep takes place and an accurate measure of the Water Exported volume is quantified.*)		to qualify for 2: Review bulk water sales agreements with purchasing utilities; confirm requirements for use & upkeep of accurate metering. Identify needs to install new, or replace defective meters as needed.	To qualify for 4: Locate all exported water sources on maps and in field, launch meter accuracy testing for existing meters, begin to install meters on unmetered exported water interconnections and replace obsolete/defective meters		to qualify for 6: Formalize annual meter accuracy testing for all exported water meters. Continue installation of meters on unmetered exported water interconnections and replacement of obsolete/defective meters.		to qualify for 8: Complete project to install new, or replace defective, meters on all exported water interconnections. Maintain annual meter accuracy testing for all exported water meters. Repair or replace meters outside of +/- 6% accuracy.		to qualify for 10: Maintain annual meter accuracy testing for all meters. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.		to maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.
Water exported master meter and supply error adjustment:	Select n/a only if the water utility fails to have meters on its exported supply interconnections.	Inventory information on exported meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined Written agreement(s) with the utility purchasing the water are missing or written in vague language concerning meter management and testing.	No automatic datalogging of exported supply volumes; daily readings are scribed on paper records without any accountability controls to confirm data accuracy and the absence of errors and data gaps in recorded volumes. Written agreement requires meter accuracy testing but is vague on the details of how and who conducts the testing.	Conditions between 2 and 4	Exported metered flow data is logged automatically in electronic format and reviewed at least on a monthly basis, with necessary corrections implemented. Meter data is adjusted by the utility selling (exporting) the water when gross data errors are detected. A coherent data trail exists for this process to protect both the utility exporting the water and the purchasing Utility. Written agreement exists and clearly states requirements and roles for meter accuracy testing and data management.	Conditions between 4 and 6	Hourly exported supply metered data is logged automatically & reviewed on at least a weekly basis by the utility selling the water. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and to correct for error found by meter accuracy testing. Any data gaps in the archived data are detected and corrected during the weekly review. A coherent data trail exists for this process to protect both the selling (exporting) utility and the purchasing Utility.	Conditions between 6 and 8	Continuous exported supply metered flow data is logged automatically & reviewed each business day by the utility selling (exporting) the water. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and any error confirmed by meter accuracy testing. Any data errors/gaps are detected and corrected on a daily basis. A data trail exists for the process to protect both the selling (exporting) Utility and the purchasing Utility.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically records data which is reviewed each business day by the utility selling (exporting) the water. Tight accountability controls ensure that all error/data gaps that occur in the archived flow data are quickly detected and corrected. A reliable data trail exists and contract provisions for meter testing and data management are reviewed by the selling Utility and purchasing Utility at least once every five years.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Improvements to attain higher data grading for "Water exported master meter and supply error adjustment" component:		to qualify for 2: Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature. Review the written agreement between the utility selling (exporting) the water and the purchasing Utility.	to qualify for 4: Install automatic datalogging equipment on exported supply meters. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps. Launch discussions with the purchasing utilities to jointly review terms of the written agreements regarding meter accuracy testing and data management; revise the terms as necessary.		to qualify for 6: Refine computerized data collection and archive to include hourly exported supply metered flow data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Make necessary corrections to errors/data errors on a weekly basis.		to qualify for 8: Ensure that all exported metered flow data is collected and archived on at least an hourly basis. All data is reviewed and errors/data gaps are corrected each business day.		to qualify for 10: Conduct accountability checks to confirm that all exported metered flow data is reviewed and corrected each business day by the utility selling the water. Results of all meter accuracy tests and data corrections should be available for sharing between the utility and the purchasing Utility. Establish a schedule for a regular review and updating of the contractual language in the written agreements with the purchasing utilities; at least every five years.		to maintain 10: Monitor meter innovations for development of more accurate and less expensive flowmeters; work with the purchasing utilities to help identify meter replacement needs. Keep communication lines with the purchasing utilities open and maintain productive relations. Keep the written agreement current with clear and explicit language that meets the ongoing needs of all parties.
AUTHORIZED CONSUMPTION											
Billed metered:	n/a (not applicable). Select n/a only if the entire customer population is not metered and is billed for water service on a flat or fixed rate basis. In such a case the volume entered must be zero.	Less than 50% of customers with volume-based billings from meter readings; flat or fixed rate billing exists for the majority of the customer population	At least 50% of customers with volume-based billing from meter reads; flat rate billing for others. Manual meter reading is conducted, with less than 50% meter read success rate, remainding accounts' consumption is estimated. Limited meter records, no regular meter testing or replacement. Billing data maintained on paper records, with no auditing.	Conditions between 2 and 4	At least 75% of customers with volume-based, billing from meter reads; flat or fixed rate billing for remaining accounts. Manual meter reading is conducted with at least 50% meter read success rate; consumption for accounts with failed reads is estimated. Purchase records verify age of customer meters; only very limited meter accuracy testing is conducted. Customer meters are replaced only upon complete failure. Computerized billing records exist, but only sporadic internal auditing conducted.	Conditions between 4 and 6	At least 90% of customers with volume-based billing from meter reads; consumption for remaining accounts is estimated. Manual customer meter reading gives at least 80% customer meter reading success rate; consumption for accounts with failed reads is estimated. Good customer meter records eixst, but only limited meter accuracy testing is conducted. Regular replacement is conducted for the oldest meters. Computerized billing records exist with annual auditing of summary statistics conducting by utility personnel.	Conditions between 6 and 8	At least 97% of customers exist with volume-based billing from meter reads. At least 90% customer meter reading success rate; or at least 80% read success rate with planning and budgeting for trials of Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) in one or more pilot areas. Good customer meter records. Regular meter accuracy testing guides replacement of statistically significant number of meters each year. Routine auditing of computerized billing records for global and detailed statistics occurs annually by utility personnel, and is verified by third party at least once every five years.	Conditions between 8 and 10	At least 99% of customers exist with volume-based billing from meter reads. At least 95% customer meter reading success rate; or minimum 80% meter reading success rate, with Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) trials underway. Statistically significant customer meter testing and replacement program in place on a continuous basis. Computerized billing with routine, detailed auditing, including field investigation of representative sample of accounts undertaken annually by utility personnel. Audit is conducted by third party auditors at least once every three years.
Improvements to attain higher data grading for "Billed Metered Consumption" component:	If n/a is selected because the customer meter population is unmetered, consider establishing a new policy to meter the customer population and employ water rates based upon metered volumes.	to qualify for 2: Conduct investigations or trials of customer meters to select appropriate meter models. Budget funding for meter installations. Investigate volume based water rate structures.	to qualify for 4: Purchase and install meters on unmetered accounts. Implement policies to improve meter reading success. Catalog meter information during meter read visits to identify age/model of existing meters. Test a minimal number of meters for accuracy. Install computerized billing system.		to qualify for 6: Purchase and install meters on unmetered accounts. Eliminate flat fee billing and establish appropriate water rate structure based upon measured consumption. Continue to achieve verifiable success in removing manual meter reading barriers. Expand meter accuracy testing. Launch regular meter replacement program. Launch a program of annual auditing of global billing statistics by utility personnel.		to qualify for 8: Purchase and install meters on unmetered accounts. If customer meter reading success rate is less than 97%, assess cost-effectiveness of Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) system for portion or entire system; or otherwise achieve ongoing improvements in manual meter reading success rate to 97% or higher. Refine meter accuracy testing program. Set meter replacement goals based upon accuracy test results. Implement annual auditing of detailed billing records by utility personnel and implement third party auditing at least once every five years.		to qualify for 10: Purchase and install meters on unmetered accounts. Launch Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) system trials if manual meter reading success rate of at least 99% is not achieved within a five-year program. Continue meter accuracy testing program. Conduct planning and budgeting for large scale meter replacement based upon meter life cycle analysis using cumulative flow target. Continue annual detailed billing data auditing by utility personnel and conduct third party auditing at least once every three years.		to maintain 10: Continue annual internal billing data auditing, and third party auditing at least every three years. Continue customer meter accuracy testing to ensure that accurate customer meter readings are obtained and entered as the basis for volume based billing. Stay abreast of improvements in Automatic Meter Reading (AMR) and Advanced Metering Infrastructure (AMI) and information management. Plan and budget for justified upgrades in metering, meter reading and billing data management to maintain very high accuracy in customer metering and billing.
Billed unmetered:	Select n/a if it is the policy of the water utility to meter all customer connections and it has been confirmed by detailed auditing that all customers do indeed have a water meter; i.e. no intentionally unmetered accounts exist	Water utility policy does not require customer metering; flat or fixed fee billing is employed. No data is collected on customer consumption. The only estimates of customer population consumption available are derived from data estimation methods using average fixture count multiplied by number of connections, or similar approach.	Water utility policy does not require customer metering; flat or fixed fee billing is employed. Some metered accounts exist in parts of the system (pilot areas or District Metered Areas) with consumption read periodically or recorded on portable dataloggers over one, three, or seven day periods. Data from these sample meters are used to infer consumption for the total customer population. Site specific estimation methods are used for unusual buildings/water uses.	Conditions between 2 and 4	Water utility policy does require metering and volume based billing in general. However, a liberal amount of exemptions and a lack of clearly written and communicated procedures result in up to 20% of billed accounts believed to be unmetered by exemption; or the water utility is in transition to becoming fully metered, and a large number of customers remain unmetered. A rough estimate of the annual consumption for all unmetered accounts is included in the annual water audit, with no inspection of individual unmetered accounts.	Conditions between 4 and 6	Water utility policy does require metering and volume based billing but established exemptions exist for a portion of accounts such as municipal buildings. As many as 15% of billed accounts are unmetered due to this exemption or meter installation difficulties. Only a group estimate of annual consumption for all unmetered accounts is included in the annual water audit, with no inspection of individual unmetered accounts.	Conditions between 6 and 8	Water utility policy does require metering and volume based billing for all customer accounts. However, less than 5% of billed accounts remain unmetered because meter installation is hindered by unusual circumstances. The goal is to minimize the number of unmetered accounts. Reliable estimates of consumption are obtained for these unmetered accounts via site specific estimation methods.	Conditions between 8 and 10	Water utility policy does require metering and volume based billing for all customer accounts. Less than 2% of billed accounts are unmetered and exist because meter installation is hindered by unusual circumstances. The goal exists to minimize the number of unmetered accounts to the extent that is economical. Reliable estimates of consumption are obtained at these accounts via site specific estimation methods.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Improvements to attain higher data grading for "Billed Unmetered Consumption" component:		to qualify for 2: Conduct research and evaluate cost/benefit of a new water utility policy to require metering of the customer population; thereby greatly reducing or eliminating unmetered accounts. Conduct pilot metering project by installing water meters in small sample of customer accounts and periodically reading the meters or datalogging the water consumption over one, three, or seven day periods.	to qualify for 4: Implement a new water utility policy requiring customer metering. Launch or expand pilot metering study to include several different meter types, which will provide data for economic assessment of full scale metering options. Assess sites with access difficulties to devise means to obtain water consumption volumes. Begin customer meter installation.		to qualify for 6: Refine policy and procedures to improve customer metering participation for all but solidly exempt accounts. Assign staff resources to review billing records to identify errant unmetered properties. Specify metering needs and funding requirements to install sufficient meters to significant reduce the number of unmetered accounts		to qualify for 8: Push to install customer meters on a full scale basis. Refine metering policy and procedures to ensure that all accounts, including municipal properties, are designated for meters. Plan special efforts to address "hard-to-access" accounts. Implement procedures to obtain a reliable consumption estimate for the remaining few unmetered accounts awaiting meter installation.		to qualify for 10: Continue customer meter installation throughout the service area, with a goal to minimize unmetered accounts. Sustain the effort to investigate accounts with access difficulties, and devise means to install water meters or otherwise measure water consumption.		to maintain 10: Continue to refine estimation methods for unmetered consumption and explore means to establish metering, for as many billed remaining unmetered accounts as is economically feasible.
Unbilled metered:	select n/a if all billing-exempt consumption is unmetered.	Billing practices exempt certain accounts, such as municipal buildings, but written policies do not exist; and a reliable count of unbilled metered accounts is unavailable. Meter upkeep and meter reading on these accounts is rare and not considered a priority. Due to poor recordkeeping and lack of auditing, water consumption for all such accounts is purely guesstimated.	Billing practices exempt certain accounts, such as municipal buildings, but only scattered, dated written directives exist to justify this practice. A reliable count of unbilled metered accounts is unavailable. Sporadic meter replacement and meter reading occurs on an as-needed basis. The total annual water consumption for all unbilled, metered accounts is estimated based upon approximating the number of accounts and assigning consumption from actively billed accounts of same meter size.	Conditions between 2 and 4	Dated written procedures permit billing exemption for specific accounts, such as municipal properties, but are unclear regarding certain other types of accounts. Meter reading is given low priority and is sporadic. Consumption is quantified from meter readings where available. The total number of unbilled, unmetered accounts must be estimated along with consumption volumes.	Conditions between 4 and 6	Written policies regarding billing exemptions exist but adherence in practice is questionable. Metering and meter reading for municipal buildings is reliable but sporadic for other unbilled metered accounts. Periodic auditing of such accounts is conducted. Water consumption is quantified directly from meter readings where available, but the majority of the consumption is estimated.	Conditions between 6 and 8	Written policy identifies the types of accounts granted a billing exemption. Customer meter management and meter reading are considered secondary priorities, but meter reading is conducted at least annually to obtain consumption volumes for the annual water audit. High level auditing of billing records ensures that a reliable census of such accounts exists.	Conditions between 8 and 10	Clearly written policy identifies the types of accounts given a billing exemption, with emphasis on keeping such accounts to a minimum. Customer meter management and meter reading for these accounts is given proper priority and is reliably conducted. Regular auditing confirms this. Total water consumption for these accounts is taken from reliable readings from accurate meters.
Improvements to attain higher data grading for "Unbilled Metered Consumption" component:		to qualify for 2: Reassess the water utility's policy allowing certain accounts to be granted a billing exemption. Draft an outline of a new written policy for billing exemptions, with clear justification as to why any accounts should be exempt from billing, and with the intention to keep the number of such accounts to a minimum.	to qualify for 4: Review historic written directives and policy documents allowing certain accounts to be billing-exempt. Draft an outline of a written policy for billing exemptions, identify criteria that grants an exemption, with a goal of keeping this number of accounts to a minimum. Consider increasing the priority of reading meters on unbilled accounts at least annually.		to qualify for 6: Draft a new written policy regarding billing exemptions based upon consensus criteria allowing this occurrence. Assign resources to audit meter records and billing records to obtain census of unbilled metered accounts. Gradually include a greater number of these metered accounts to the routes for regular meter reading.		to qualify for 8: Communicate billing exemption policy throughout the organization and implement procedures that ensure proper account management. Conduct inspections of accounts confirmed in unbilled metered status and verify that accurate meters exist and are scheduled for routine meter readings. Gradually increase the number of unbilled metered accounts that are included in regular meter reading routes.		to qualify for 10: Ensure that meter management (meter accuracy testing, meter replacement) and meter reading activities for unbilled accounts are accorded the same priority as billed accounts. Establish ongoing annual auditing process to ensure that water consumption is reliably collected and provided to the annual water audit process.		to maintain 10: Reassess the utility's philosophy in allowing any water uses to go "unbilled". It is possible to meter and bill all accounts, even if the fee charged for water consumption is discounted or waived. Metering and billing all accounts ensures that water consumption is tracked and water waste from plumbing leaks is detected and minimized.
Unbilled unmetered:		Extent of unbilled, unmetered consumption is unknown due to unclear policies and poor recordkeeping. Total consumption is quantified based upon a purely subjective estimate.	Clear extent of unbilled, unmetered consumption is unknown, but a number of events are randomly documented each year, confirming existence of such consumption, but without sufficient documentation to quantify an accurate estimate of the annual volume consumed.	Conditions between 2 and 4	Extent of unbilled, unmetered consumption is partially known, and procedures exist to document certain events such as miscellaneous fire hydrant uses. Formulae is used to quantify the consumption from such events (time running multiplied by typical flowrate, multiplied by number of events).	Default value of 1.25% of system input volume is employed	Coherent policies exist for some forms of unbilled, unmetered consumption but others await closer evaluation. Reasonable recordkeeping for the managed uses exists and allows for annual volumes to be quantified by inference, but unsupervised uses are guesstimated.	Conditions between 6 and 8	Clear policies and good recordkeeping exist for some uses (ex: water used in periodic testing of unmetered fire connections), but other uses (ex: miscellaneous uses of fire hydrants) have limited oversight. Total consumption is a mix of well quantified use such as from formulae (time running multiplied by typical flow, multiplied by number of events) or temporary meters, and relatively subjective estimates of less regulated use.	Conditions between 8 and 10	Clear policies exist to identify permitted use of water in unbilled, unmetered fashion, with the intention of minimizing this type of consumption. Good records document each occurrence and consumption is quantified via formulae (time running multiplied by typical flow, multiplied by number of events) or use of temporary meters.
Improvements to attain higher data grading for "Unbilled Unmetered Consumption" component:		to qualify for 5: Utilize the accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of this use. to qualify for 2: Establish a policy regarding what water uses should be allowed to remain as unbilled and unmetered. Consider tracking a small sample of one such use (ex: fire hydrant flushings).	to qualify for 5: Utilize accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of this use. to qualify for 4: Evaluate the documentation of events that have been observed. Meet with user groups (ex: for fire hydrants - fire departments, contractors to ascertain their need and/or volume requirements for water from fire hydrants).		to qualify for 5: Utilize accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of all such use. This is particularly appropriate for water utilities who are in the early stages of the water auditing process, and should focus on other components since the volume of unbilled, umetered consumption is usually a relatively small quatity component, and other larger-quantity components should take priority.	to qualify for 6 or greater: Finalize policy and begin to conduct field checks to better establish and quantify such usage. Proceed if top-down audit exists and/or a great volume of such use is suspected.	to qualify for 8: Assess water utility policy and procedures for various unmetered usages. For example, ensure that a policy exists and permits are issued for use of fire hydrants by persons outside of the utility. Create written procedures for use and documentation of fire hydrants by water utility personnel. Use same approach for other types of unbilled, unmetered water usage.		to qualify for 10: Refine written procedures to ensure that all uses of unbilled, unmetered water are overseen by a structured permitting process managed by water utility personnel. Reassess policy to determine if some of these uses have value in being converted to billed and/or metered status.		to maintain 10: Continue to refine policy and procedures with intention of reducing the number of allowable uses of water in unbilled and unmetered fashion. Any uses that can feasibly become billed and metered should be converted eventually.
APPARENT LOSSES											

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Unauthorized consumption:		Extent of unauthorized consumption is unknown due to unclear policies and poor recordkeeping. Total unauthorized consumption is guesstimated.	Unauthorized consumption is a known occurrence, but its extent is a mystery. There are no requirements to document observed events, but periodic field reports capture some of these occurrences. Total unauthorized consumption is approximated from this limited data.	conditions between 2 and 4	Procedures exist to document some unauthorized consumption such as observed unauthorized fire hydrant openings. Use formulae to quantify this consumption (time running multiplied typical flowrate, multiplied by number of events).	Default value of 0.25% of volume of water supplied is employed	Coherent policies exist for some forms of unauthorized consumption (more than simply fire hydrant misuse) but others await closer evaluation. Reasonable surveillance and recordkeeping exist for occurrences that fall under the policy. Volumes quantified by inference from these records.	Conditions between 6 and 8	Clear policies and good auditable recordkeeping exist for certain events (ex: tampering with water meters, illegal bypasses of customer meters); but other occurrences have limited oversight. Total consumption is a combination of volumes from formulae (time x typical flow) and subjective estimates of unconfirmed consumption.	Conditions between 8 and 10	Clear policies exist to identify all known unauthorized uses of water. Staff and procedures exist to provide enforcement of policies and detect violations. Each occurrence is recorded and quantified via formulae (estimated time running multiplied by typical flow) or similar methods. All records and calculations should exist in a form that can be audited by a third party.
Improvements to attain higher data grading for "Unauthorized Consumption" component:		to qualify for 5: Use accepted default of 0.25% of volume of water supplied. to qualify for 2: Review utility policy regarding what water uses are considered unauthorized, and consider tracking a small sample of one such occurrence (ex: unauthorized fire hydrant openings)	to qualify for 5: Use accepted default of 0.25% of system input volume to qualify for 4: Review utility policy regarding what water uses are considered unauthorized, and consider tracking a small sample of one such occurrence (ex: unauthorized fire hydrant openings)		to qualify for 5: Utilize accepted default value of 0.25% of volume of water supplied as an expedient means to gain a reasonable quantification of all such use. This is particularly appropriate for water utilities who are in the early stages of the water auditing process.	to qualify for 6 or greater: Finalize policy updates to clearly identify the types of water consumption that are authorized from those usages that fall outside of this policy and are, therefore, unauthorized. Begin to conduct regular field checks. Proceed if the top-down audit already exists and/or a great volume of such use is suspected.	to quality for 8: Assess water utility policies to ensure that all known occurrences of unauthorized consumption are outlawed, and that appropriate penalties are prescribed. Create written procedures for detection and documentation of various occurrences of unauthorized consumption as they are uncovered.		to qualify for 10: Refine written procedures and assign staff to seek out likely occurrences of unauthorized consumption. Explore new locking devices, monitors and other technologies designed to detect and thwart unauthorized consumption.		to maintain 10: Continue to refine policy and procedures to eliminate any loopholes that allow or tacitly encourage unauthorized consumption. Continue to be vigilant in detection, documentation and enforcement efforts.
Customer metering inaccuracies:	select n/a only if the entire customer population is unmetered. In such a case the volume entered must be zero.	Customer meters exist, but with unorganized paper records on meters; no meter accuracy testing or meter replacement program for any size of retail meter. Metering workflow is driven chaotically with no proactive management. Loss volume due to aggregate meter inaccuracy is guesstimated.	Poor recordkeeping and meter oversight is recognized by water utility management who has allotted staff and funding resources to organize improved recordkeeping and start meter accuracy testing. Existing paper records gathered and organized to provide cursory disposition of meter population. Customer meters are tested for accuracy only upon customer request.	Conditions between 2 and 4	Reliable recordkeeping exists; meter information is improving as meters are replaced. Meter accuracy testing is conducted annually for a small number of meters (more than just customer requests, but less than 1% of inventory). A limited number of the oldest meters are replaced each year. Inaccuracy volume is largely an estimate, but refined based upon limited testing data.	Conditions between 4 and 6	A reliable electronic recordkeeping system for meters exists. The meter population includes a mix of new high performing meters and dated meters with suspect accuracy. Routine, but limited, meter accuracy testing and meter replacement occur. Inaccuracy volume is quantified using a mix of reliable and less certain data.	Conditions between 6 and 8	Ongoing meter replacement and accuracy testing result in highly accurate customer meter population. Testing is conducted on samples of meters of varying age and accumulated volume of throughput to determine optimum replacement time for various types of meters.	Ongoing meter replacement and accuracy testing result in highly accurate customer meter population. Statistically significant number of meters are tested in audit year. This testing is conducted on samples of meters of varying age and accumulated volume of throughput to determine optimum replacement time for these meters.	Good records of all active customer meters exist and include as a minimum: meter number, account number/location, type, size and manufacturer. Ongoing meter replacement occurs according to a targeted and justified basis. Regular meter accuracy testing gives a reliable measure of composite inaccuracy volume for the customer meter population. New metering technology is embraced to keep overall accuracy improving. Procedures are reviewed by a third party knowledgeable in the M36 methodology.
Improvements to attain higher data grading for "Customer meter inaccuracy volume" component:	If n/a is selected because the customer meter population is unmetered, consider establishing a new policy to meter the customer population and employ water rates based upon metered volumes.	to qualify for 2: Gather available meter purchase records. Conduct testing on a small number of meters believed to be the most inaccurate. Review staffing needs of the metering group and budget for necessary resources to better organize meter management.	to qualify for 4: Implement a reliable record keeping system for customer meter histories, preferably using electronic methods typically linked to, or part of, the Customer Billing System or Customer Information System. Expand meter accuracy testing to a larger group of meters.		to qualify for 6: Standardize the procedures for meter recordkeeping within an electronic information system. Accelerate meter accuracy testing and meter replacements guided by testing results.		to qualify for 8: Expand annual meter accuracy testing to evaluate a statistically significant number of meter makes/models. Expand meter replacement program to replace statistically significant number of poor performing meters each year.		to qualify for 9: Continue efforts to manage meter population with reliable recordkeeping. Test a statistically significant number of meters each year and analyze test results in an ongoing manner to serve as a basis for a target meter replacement strategy based upon accumulated volume throughput.	to qualify for 10: Continue efforts to manage meter population with reliable recordkeeping, meter testing and replacement. Evaluate new meter types and install one or more types in 5-10 customer accounts each year in order to pilot improving metering technology.	to maintain 10: Increase the number of meters tested and replaced as justified by meter accuracy test data. Continually monitor development of new metering technology and Advanced Metering Infrastructure (AMI) to grasp opportunities for greater accuracy in metering of water flow and management of customer consumption data.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Systematic Data Handling Errors:	Note: all water utilities incur some amount of this error. Even in water utilities with unmetered customer populations and fixed rate billing, errors occur in annual billing tabulations. Enter a positive value for the volume and select a grading.	Policies and procedures for activation of new customer water billing accounts are vague and lack accountability. Billing data is maintained on paper records which are not well organized. No auditing is conducted to confirm billing data handling efficiency. An unknown number of customers escape routine billing due to lack of billing process oversight.	Policy and procedures for activation of new customer accounts and oversight of billing records exist but need refinement. Billing data is maintained on paper records or insufficiently capable electronic database. Only periodic unstructured auditing work is conducted to confirm billing data handling efficiency. The volume of unbilled water due to billing lapses is a guess.	Conditions between 2 and 4	Policy and procedures for new account activation and oversight of billing operations exist but needs refinement. Computerized billing system exists, but is dated or lacks needed functionality. Periodic, limited internal audits conducted and confirm with approximate accuracy the consumption volumes lost to billing lapses.	Conditions between 4 and 6	Policy and procedures for new account activation and oversight of billing operations is adequate and reviewed periodically. Computerized billing system is in use with basic reporting available. Any effect of billing adjustments on measured consumption volumes is well understood. Internal checks of billing data error conducted annually. Reasonably accurate quantification of consumption volume lost to billing lapses is obtained.	Conditions between 6 and 8	New account activation and billing operations policy and procedures are reviewed at least biannually. Computerized billing system includes an array of reports to confirm billing data and system functionality. Checks are conducted routinely to flag and explain zero consumption accounts. Annual internal checks conducted with third party audit conducted at least once every five years. Accountability checks flag billing lapses. Consumption lost to billing lapses is well quantified and reducing year-by-year.	Conditions between 8 and 10	Sound written policy and procedures exist for new account activation and oversight of customer billing operations. Robust computerized billing system gives high functionality and reporting capabilities which are utilized, analyzed and the results reported each billing cycle. Assessment of policy and data handling errors are conducted internally and audited by third party at least once every three years, ensuring consumption lost to billing lapses is minimized and detected as it occurs.
Improvements to attain higher data grading for "Systematic Data Handling Error volume" component:		to qualify for 2: Draft written policy and procedures for activating new water billing accounts and oversight of billing operations. Investigate and budget for computerized customer billing system. Conduct initial audit of billing records by flow-charting the basic business processes of the customer account/billing function.	to qualify for 4: Finalize written policy and procedures for activation of new billing acocunts and overall billing operations management. Implement a computerized customer billing system. Conduct initial audit of billing records as part of this process.		to qualify for 6: Refine new account activation and billing operations procedures and ensure consistency with the utility policy regarding billing, and minimize opportunity for missed billings. Upgrade or replace customer billing system for needed functionality - ensure that billing adjustments don't corrupt the value of consumption volumes. Procedurize internal annual audit process.		to qualify for 8: Formalize regular review of new account activation process and general billing practices. Enhance reporting capability of computerized billing system. Formalize regular auditing process to reveal scope of data handling error. Plan for periodic third party audit to occur at least once every five years.		to qualify for 10: Close policy/procedure loopholes that allow some customer accounts to go unbilled, or data handling errors to exist. Ensure that billing system reports are utilized, analyzed and reported every billing cycle. Ensure that internal and third party audits are conducted at least once every three years.		to maintain 10: Stay abreast of customer information management developments and innovations. Monitor developments of Advanced Metering Infrastructure (AMI) and integrate technology to ensure that customer endpoint information is well-monitored and errors/lapses are at an economic minimum.
SYSTEM DATA											
Length of mains:		Poorly assembled and maintained paper as-built records of existing water main installations makes accurate determination of system pipe length impossible. Length of mains is guesstimated.	Paper records in poor or uncertain condition (no annual tracking of installations & abandonments). Poor procedures to ensure that new water mains installed by developers are accurately documented.	Conditions between 2 and 4	Sound written policy and procedures exist for documenting new water main installations, but gaps in management result in a uncertain degree of error in tabulation of mains length.	Conditions between 4 and 6	Sound written policy and procedures exist for permitting and commissioning new water mains. Highly accurate paper records with regular field validation; or electronic records and asset management system in good condition. Includes system backup.	Conditions between 6 and 8	Sound written policy and procedures exist for permitting and commissioning new water mains. Electronic recordkeeping such as a Geographical Information System (GIS) and asset management system are used to store and manage data.	Conditions between 8 and 10	Sound written policy exists for managing water mains extensions and replacements. Geographic Information System (GIS) data and asset management database agree and random field validation proves truth of databases. Records of annual field validation should be available for review.
Improvements to attain higher data grading for "Length of Water Mains" component:		to qualify for 2: Assign personnel to inventory current as-built records and compare with customer billing system records and highway plans in order to verify poorly documented pipelines. Assemble policy documents regarding permitting and documentation of water main installations by the utility and building developers; identify gaps in procedures that result in poor documentation of new water main installations.	to qualify for 4: Complete inventory of paper records of water main installations for several years prior to audit year. Review policy and procedures for commissioning and documenting new water main installation.		to qualify for 6: Finalize updates/improvements to written policy and procedures for permitting/commissioning new main installations. Confirm inventory of records for five years prior to audit year; correct any errors or omissions.		to qualify for 8: Launch random field checks of limited number of locations. Convert to electronic database such as a Geographic Information System (GIS) with backup as justified. Develop written policy and procedures.		to qualify for 10: Link Geographic Information System (GIS) and asset management databases, conduct field verification of data. Record field verification information at least annually.		to maintain 10: Continue with standardization and random field validation to improve the completeness and accuracy of the system.
Number of active AND inactive service connections:		Vague permitting (of new service connections) policy and poor paper recordkeeping of customer connections/billings result in suspect determination of the number of service connections, which may be 10-15% in error from actual count.	General permitting policy exists but paper records, procedural gaps, and weak oversight result in questionable total for number of connections, which may vary 5-10% of actual count.	Conditions between 2 and 4	Written account activation policy and procedures exist, but with some gaps in performance and oversight. Computerized information management system is being brought online to replace dated paper recordkeeping system. Reasonably accurate tracking of service connection installations & abandonments; but count can be up to 5% in error from actual total.	Conditions between 4 and 6	Written new account activation and overall billing policies and procedures are adequate and reviewed periodically. Computerized information management system is in use with annual installations & abandonments totaled. Very limited field verifications and audits. Error in count of number of service connections is believed to be no more than 3%.	Conditions between 6 and 8	Policies and procedures for new account activation and overall billing operations are written, well-structured and reviewed at least biannually. Well-managed computerized information management system exists and routine, periodic field checks and internal system audits are conducted. Counts of connections are no more than 2% in error.	Conditions between 8 and 10	Sound written policy and well managed and audited procedures ensure reliable management of service connection population. Computerized information management system, Customer Billing System, and Geographic Information System (GIS) information agree; field validation proves truth of databases. Count of connections recorded as being in error is less than 1% of the entire population.
Improvements to attain higher data grading for "Number of Active and Inactive Service Connections" component:	**Note: The number of Service Connections does not include fire hydrant leads/lines connecting the hydrant to the water main**	to qualify for 2: Draft new policy and procedures for new account activation and overall billing operations. Research and collect paper records of installations & abandonments for several years prior to audit year.	to qualify for 4: Refine policy and procedures for new account activation and overall billing operations. Research computerized recordkeeping system (Customer Information System or Customer Billing System) to improve documentation format for service connections.		to qualify for 6: Refine procedures to ensure consistency with new account activation and overall billing policy to establish new service connections or decommission existing connections. Improve process to include all totals for at least five years prior to audit year.		to qualify for 8: Formalize regular review of new account activation and overall billing operations policies and procedures. Launch random field checks of limited number of locations. Develop reports and auditing mechanisms for computerized information management system.		to qualify for 10: Close any procedural loopholes that allow installations to go undocumented. Link computerized information management system with Geographic Information System (GIS) and formalize field inspection and information system auditing processes. Documentation of new or decommissioned service connections encounters several levels of checks and balances.		to maintain 10: Continue with standardization and random field validation to improve knowledge of system.
	Note: if customer water	Gradings 1-9 apply if customer properties are unmetered, if customer meters exist and are located inside the customer building premises, or if the water utility owns and is responsible for the entire service connection piping from the water main to the customer building. In any of these cases the average distance between the curb stop or boundary separating utility/customer responsibility for service connection piping, and the typical first point of use (ex: faucet) or the customer meter must be quantified. Gradings of 1-9 are used to grade the validity of the means to quantify this value. (See the "Service Connection Diagram" worksheet)									Either of two conditions can be met for a grading of 10:

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Average length of customer service line:	meters are located outside of the customer building next to the curb stop or boundary separating utility/customer responsibility, then the auditor should answer "Yes" to the question on the Reporting Worksheet asking about this. If the answer is Yes, the grading description listed under the Grading of 10(a) will be followed, with a value of zero automatically entered at a Grading of 10. See the Service Connection Diagram worksheet for a visual presentation of this distance.	Vague policy exists to define the delineation of water utility ownership and customer ownership of the service connection piping. Curb stops are perceived as the breakpoint but these have not been well-maintained or documented. Most are buried or obscured. Their location varies widely from site-to-site, and estimating this distance is arbitrary due to the unknown location of many curb stops.	Policy requires that the curb stop serves as the delineation point between water utility ownership and customer ownership of the service connection piping. The piping from the water main to the curb stop is the property of the water utility; and the piping from the curb stop to the customer building is owned by the customer. Curb stop locations are not well documented and the average distance is based upon a limited number of locations measured in the field.	Conditions between 2 and 4	Good policy requires that the curb stop serves as the delineation point between water utility ownership and customer ownership of the service connection piping. Curb stops are generally installed as needed and are reasonably documented. Their location varies widely from site-to-site, and an estimate of this distance is hindered by the availability of paper records of limited accuracy.	Conditions between 4 and 6	Clear written policy exists to define utility/customer responsibility for service connection piping. Accurate, well-maintained paper or basic electronic recordkeeping system exists. Periodic field checks confirm piping lengths for a sample of customer properties.	Conditions between 6 and 8	Clearly worded policy standardizes the location of curb stops and meters, which are inspected upon installation. Accurate and well maintained electronic records exist with periodic field checks to confirm locations of service lines, curb stops and customer meter pits. An accurate number of customer properties from the customer billing system allows for reliable averaging of this length.	Conditions between 8 and 10	a) Customer water meters exist outside of customer buildings next to the curb stop or boundary separating utility/customer responsibility for service connection piping. If so, answer "Yes" to the question on the Reporting Working asking about this condition. A value of zero and a Grading of 10 are automatically entered in the Reporting Worksheet . b). Meters exist inside customer buildings, or properties are unmetered. In either case, answer "No" to the Reporting Worksheet question on meter location, and enter a distance determined by the auditor. For a Grading of 10 this value must be a very reliable number from a Geographic Information System (GIS) and confirmed by a statistically valid number of field checks.
Improvements to attain higher data grading for "Average Length of Customer Service Line" component:	▨	to qualify for 2: Research and collect paper records of service line installations. Inspect several sites in the field using pipe locators to locate curb stops. Obtain the length of this small sample of connections in this manner.	to qualify for 4: Formalize and communicate policy delineating utility/customer responsibilities for service connection piping. Assess accuracy of paper records by field inspection of a small sample of service connections using pipe locators as needed. Research the potential migration to a computerized information management system to store service connection data.		to qualify for 6: Establish coherent procedures to ensure that policy for curb stop, meter installation and documentation is followed. Gain consensus within the water utility for the establishment of a computerized information management system.		to qualify for 8: Implement an electronic means of recordkeeping, typically via a customer information system, customer billing system, or Geographic Information System (GIS). Standardize the process to conduct field checks of a limited number of locations.		to qualify for 10: Link customer information management system and Geographic Information System (GIS), standardize process for field verification of data.		to maintain 10: Continue with standardization and random field validation to improve knowledge of service connection configurations and customer meter locations.
Average operating pressure:	▨	Available records are poorly assembled and maintained paper records of supply pump characteristics and water distribution system operating conditions. Average pressure is guesstimated based upon this information and ground elevations from crude topographical maps. Widely varying distribution system pressures due to undulating terrain, high system head loss and weak/erratic pressure controls further compromise the validity of the average pressure calculation.	Limited telemetry monitoring of scattered pumping station and water storage tank sites provides some static pressure data, which is recorded in handwritten logbooks. Pressure data is gathered at individual sites only when low pressure complaints arise. Average pressure is determined by averaging relatively crude data, and is affected by significant variation in ground elevations, system head loss and gaps in pressure controls in the distribution system.	Conditions between 2 and 4	Effective pressure controls separate different pressure zones; moderate pressure variation across the system, occasional open boundary valves are discovered that breech pressure zones. Basic telemetry monitoring of the distribution system logs pressure data electronically. Pressure data gathered by gauges or dataloggers at fire hydrants or buildings when low pressure complaints arise, and during fire flow tests and system flushing. Reliable topographical data exists. Average pressure is calculated using this mix of data.	Conditions between 4 and 6	Reliable pressure controls separate distinct pressure zones; only very occasional open boundary valves are encountered that breech pressure zones. Well-covered telemetry monitoring of the distribution system (not just pumping at source treatment plants or wells) logs extensive pressure data electronically. Pressure gathered by gauges/dataloggers at fire hydrants and buildings when low pressure complaints arise, and during fire flow tests and system flushing. Average pressure is determined by using this mix of reliable data.	Conditions between 6 and 8	Well-managed, discrete pressure zones exist with generally predictable pressure fluctuations. A current full-scale SCADA System or similar realtime monitoring system exists to monitor the water distribution system and collect data, including real time pressure readings at representative sites across the system. The average system pressure is determined from reliable monitoring system data.	Conditions between 8 and 10	Well-managed pressure districts/zones, SCADA System and hydraulic model exist to give very precise pressure data across the water distribution system. Average system pressure is reliably calculated from extensive, reliable, and cross-checked data. Calculations are reported on an annual basis as a minimum.
Improvements to attain higher data grading for "Average Operating Pressure" component:	▨	to qualify for 2: Employ pressure gauging and/or datalogging equipment to obtain pressure measurements from fire hydrants. Locate accurate topographical maps of service area in order to confirm ground elevations. Research pump data sheets to find pump pressure/flow characteristics	to qualify for 4: Formalize a procedure to use pressure gauging/datalogging equipment to gather pressure data during various system events such as low pressure complaints, or operational testing. Gather pump pressure and flow data at different flow regimes. Identify faulty pressure controls (pressure reducing valves, altitude valves, partially open boundary valves) and plan to properly configure pressure zones. Make all pressure data from these efforts available to generate system-wide average pressure.		to qualify for 6: Expand the use of pressure gauging/datalogging equipment to gather scattered pressure data at a representative set of sites, based upon pressure zones or areas. Utilize pump pressure and flow data to determine supply head entering each pressure zone or district. Correct any faulty pressure controls (pressure reducing valves, altitude valves, partially open boundary valves) to ensure properly configured pressure zones. Use expanded pressure dataset from these activities to generate system-wide average pressure.		to qualify for 8: Install a Supervisory Control and Data Acquisition (SCADA) System, or similar realtime monitoring system, to monitor system parameters and control operations. Set regular calibration schedule for instrumentation to insure data accuracy. Obtain accurate topographical data and utilize pressure data gathered from field surveys to provide extensive, reliable data for pressure averaging.		to qualify for 10: Annually, obtain a system-wide average pressure value from the hydraulic model of the distribution system that has been calibrated via field measurements in the water distribution system and confirmed in comparisons with SCADA System data.		to maintain 10: Continue to refine the hydraulic model of the distribution system and consider linking it with SCADA System for real-time pressure data calibration, and averaging.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
COST DATA											
Total annual cost of operating water system:		Incomplete paper records and lack of financial accounting documentation on many operating functions makes calculation of water system operating costs a pure guesstimate	Reasonably maintained, but incomplete, paper or electronic accounting provides data to estimate the major portion of water system operating costs.	Conditions between 2 and 4	Electronic, industry-standard cost accounting system in place. However, gaps in data are known to exist, periodic internal reviews are conducted but not a structured financial audit.	Conditions between 4 and 6	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited periodically by utility personnel, but not a Certified Public Accountant (CPA).	Conditions between 6 and 8	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited at least annually by utility personnel, and at least once every three years by third-party CPA.	Conditions between 8 and 10	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited annually by utility personnel and annually also by third-party CPA.
Improvements to attain higher data grading for "Total Annual Cost of Operating the Water System" component:		to qualify for 2: Gather available records, institute new financial accounting procedures to regularly collect and audit basic cost data of most important operations functions.	to qualify for 4: Implement an electronic cost accounting system, structured according to accounting standards for water utilities		to qualify for 6: Establish process for periodic internal audit of water system operating costs; identify cost data gaps and institute procedures for tracking these outstanding costs.		to qualify for 8: Standardize the process to conduct routine financial audit on an annual basis. Arrange for CPA audit of financial records at least once every three years.		to qualify for 10: Standardize the process to conduct a third-party financial audit by a CPA on an annual basis.		to maintain 10: Maintain program, stay abreast of expenses subject to erratic cost changes and long-term cost trend, and budget/track costs proactively
Customer retail unit cost (applied to Apparent Losses):	Customer population unmetered, and/or only a fixed fee is charged for consumption.	Antiquated, cumbersome water rate structure is used, with periodic historic amendments that were poorly documented and implemented; resulting in classes of customers being billed inconsistent charges. The actual composite billing rate likely differs significantly from the published water rate structure, but a lack of auditing leaves the degree of error indeterminate.	Dated, cumbersome water rate structure, not always employed consistently in actual billing operations. The actual composite billing rate is known to differ from the published water rate structure, and a reasonably accurate estimate of the degree of error is determined, allowing a composite billing rate to be quantified.	Conditions between 2 and 4	Straight-forward water rate structure in use, but not updated in several years. Billing operations reliably employ the rate structure. The composite billing rate is derived from a single customer class such as residential customer accounts, neglecting the effect of different rates from varying customer classes.	Conditions between 4 and 6	Clearly written, up-to-date water rate structure is in force and is applied reliably in billing operations. Composite customer rate is determined using a weighted average residential rate using volumes of water in each rate block.	Conditions between 6 and 8	Effective water rate structure is in force and is applied reliably in billing operations. Composite customer rate is determined using a weighted average composite consumption rate, which includes residential, commercial, industrial, institutional (CII), and any other distinct customer classes within the water rate structure.	Conditions between 8 and 10	Current, effective water rate structure is in force and applied reliably in billing operations. The rate structure and calculations of composite rate - which includes residential, commercial, industrial, institutional (CII), and other distinct customer classes - are reviewed by a third party knowledgeable in the M36 methodology at least once every five years.
Improvements to attain higher data grading for "Customer Retail Unit Cost" component:		to qualify for 2: Formalize the process to implement water rates, including a secure documentation procedure. Create a current, formal water rate document and gain approval from all stakeholders.	to qualify for 4: Review the water rate structure and update/formalize as needed. Assess billing operations to ensure that actual billing operations incorporate the established water rate structure.		to qualify for 6: Evaluate volume of water used in each usage block by residential users. Multiply volumes by full rate structure.	Launch effort to fully meter the customer population and charge rates based upon water volumes	to qualify for 8: Evaluate volume of water used in each usage block by all classifications of users. Multiply volumes by full rate structure.		to qualify for 10: Conduct a periodic third-party audit of water used in each usage block by all classifications of users. Multiply volumes by full rate structure.		to maintain 10: Keep water rate structure current in addressing the water utility's revenue needs. Update the calculation of the customer unit rate as new rate components, customer classes, or other components are modified.
Variable production cost (applied to Real Losses):	Note: if the water utility purchases/imports its entire water supply, then enter the unit purchase cost of the bulk water supply in the Reporting Worksheet with a grading of 10	Incomplete paper records and lack of documentation on primary operating functions (electric power and treatment costs most importantly) makes calculation of variable production costs a pure guesstimate	Reasonably maintained, but incomplete, paper or electronic accounting provides data to roughly estimate the basic operations costs (pumping power costs and treatment costs) and calculate a unit variable production cost.	Conditions between 2 and 4	Electronic, industry-standard cost accounting system in place. Electric power and treatment costs are reliably tracked and allow accurate weighted calculation of unit variable production costs based on these two inputs and water imported purchase costs (if applicable). All costs are audited internally on a periodic basis.	Conditions between 4 and 6	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Pertinent additional costs beyond power, treatment and water imported purchase costs (if applicable) such as liability, residuals management, wear and tear on equipment, impending expansion of supply, are included in the unit variable production cost, as applicable. The data is audited at least annually by utility personnel.	Conditions between 6 and 8	Reliable electronic, industry-standard cost accounting system in place, with all pertinent primary and secondary variable production and water imported purchase (if applicable) costs tracked. The data is audited at least annually by utility personnel, and at least once every three years by a third-party knowledgeable in the M36 methodology.	Conditions between 8 and 10	Either of two conditions can be met to obtain a grading of 10: 1) Third party CPA audit of all pertinent primary and secondary variable production and water imported purchase (if applicable) costs on an annual basis. or: 2) Water supply is entirely purchased as bulk water imported, and the unit purchase cost - including all applicable marginal supply costs - serves as the variable production cost. If all applicable marginal supply costs are not included in this figure, a grade of 10 should not be selected.
Improvements to attain higher data grading for "Variable Production Cost" component:		to qualify for 2: Gather available records, institute new procedures to regularly collect and audit basic cost data and most important operations functions.	to qualify for 4: Implement an electronic cost accounting system, structured according to accounting standards for water utilities		to qualify for 6: Formalize process for regular internal audits of production costs. Assess whether additional costs (liability, residuals management, equipment wear, impending infrastructure expansion) should be included to calculate a more representative variable production cost.		to qualify for 8: Formalize the accounting process to include direct cost components (power, treatment) as well as indirect cost components (liability, residuals management, etc.) Arrange to conduct audits by a knowledgable third-party at least once every three years.		to qualify for 10: Standardize the process to conduct a third-party financial audit by a CPA on an annual basis.		to maintain 10: Maintain program, stay abreast of expenses subject to erratic cost changes and budget/track costs proactively

AWWA Free Water Audit Software: Customer Service Line Diagrams

WAS v5.0

Average Length of Customer Service Line

The three figures shown on this worksheet display the assignment of the Average Length of Customer Service Line, Lp, for the three most common piping configurations.

Figure 1 shows the configuration of the water meter outside of the customer building next to the curb stop valve. In this configuration Lp = 0 since the distance between the curb stop and the customer metering point is essentially zero.

Figure 2 shows the configuration of the customer water meter located inside the customer building, where Lp is the distance from the curb stop to the water meter.

Figure 3 shows the configuration of an unmetered customer building , where Lp is the distance from the curb stop to the first point of customer water consumption, or, more simply, the building line.

In any water system the Lp will vary notably in a community of different structures, therefore the average Lp value is used and this should be approximated or calculated if a sample of service line measurements has been gathered.

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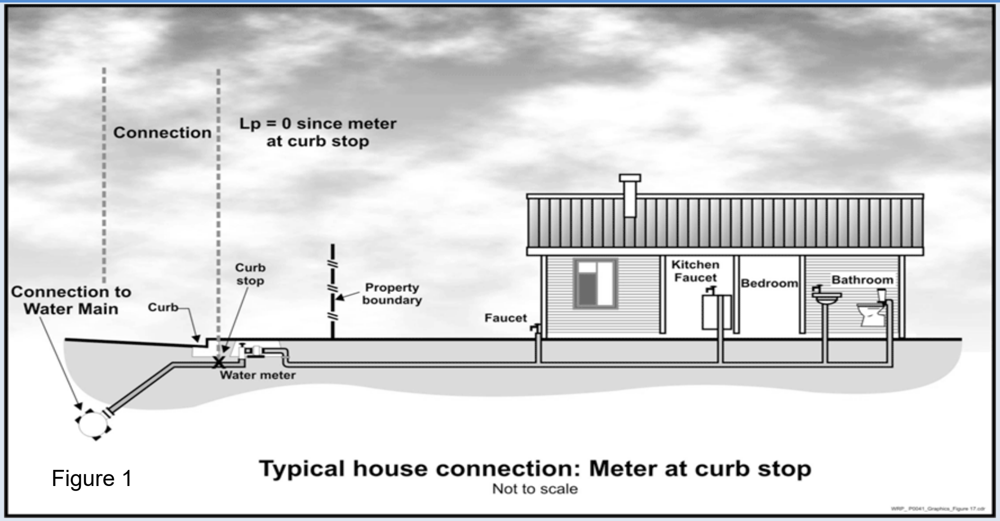


Figure 1 Typical house connection: Meter at curb stop
Not to scale

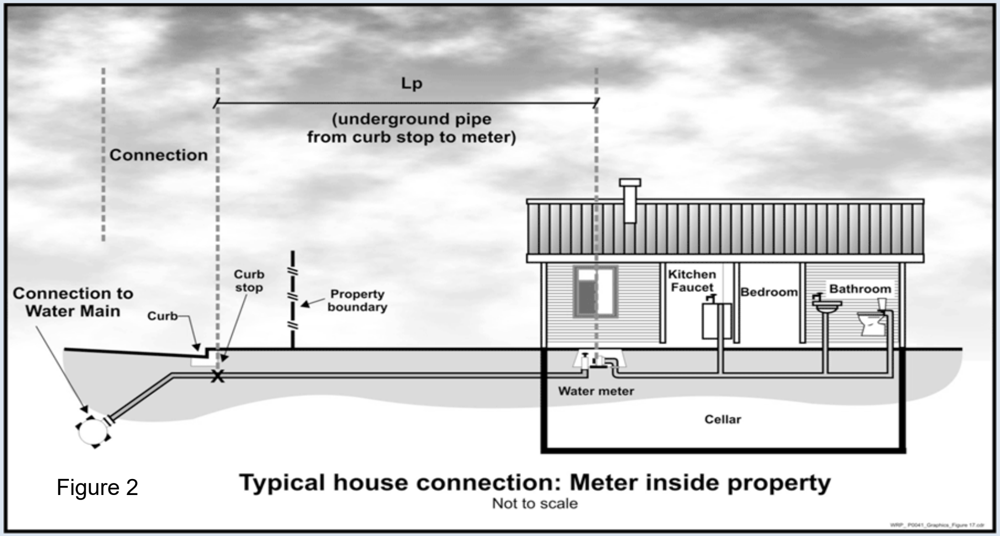


Figure 2 Typical house connection: Meter inside property
Not to scale

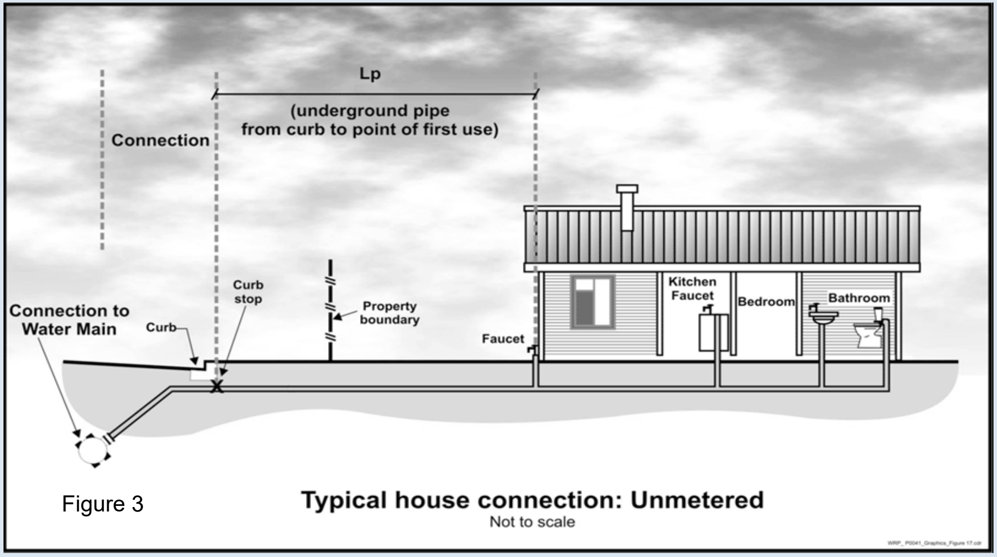


Figure 3 Typical house connection: Unmetered
Not to scale

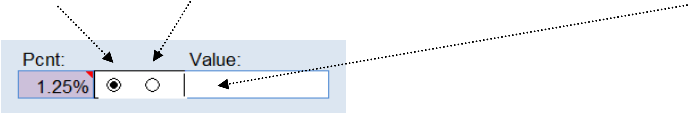
AWWA Free Water Audit Software:
Definitions

WAS v5.0

Item Name	Description
Apparent Losses Find	= unauthorized consumption + customer metering inaccuracies + systematic data handling errors Apparent Losses include all types of inaccuracies associated with customer metering (worn meters as well as improperly sized meters or wrong type of meter for the water usage profile) as well as systematic data handling errors (meter reading, billing, archiving and reporting), plus unauthorized consumption (theft or illegal use). NOTE: Over-estimation of Apparent Losses results in under-estimation of Real Losses. Under-estimation of Apparent Losses results in over-estimation of Real Losses.
AUTHORIZED CONSUMPTION Find	= billed water exported + billed metered + billed unmetered + unbilled metered + unbilled unmetered consumption The volume of metered and/or unmetered water taken by registered customers, the water utility's own uses, and uses of others who are implicitly or explicitly authorized to do so by the water utility; for residential, commercial, industrial and public-minded purposes. Typical retail customers' consumption is tabulated usually from established customer accounts as billed metered consumption, or - for unmetered customers - billed unmetered consumption. These types of consumption, along with billed water exported, provide revenue potential for the water utility. **Be certain to tabulate the water exported volume as a separate component and do not "double-count" it by including in the billed metered consumption component as well as the water exported component.** Unbilled authorized consumption occurs typically in non-account uses, including water for fire fighting and training, flushing of water mains and sewers, street cleaning, watering of municipal gardens, public fountains, or similar public-minded uses. Occasionally these uses may be metered and billed (or charged a flat fee), but usually they are unmetered and unbilled. In the latter case, the water auditor may use a default value to estimate this quantity, or implement procedures for the reliable quantification of these uses. This starts with documenting usage events as they occur and estimating the amount of water used in each event. (See Unbilled unmetered consumption)
View Service Connection Diagram **Average length of customer service line** Find	This is the average length of customer service line, Lp, that is owned and maintained by the customer; from the point of ownership transfer to the customer water meter, or building line (if unmetered). The quantity is one of the data inputs for the calculation of Unavoidable Annual Real Losses (UARL), which serves as the denominator of the performance indicator: Infrastructure Leakage Index (ILI). The value of Lp is multiplied by the number of customer service connections to obtain a total length of customer owned piping in the system. The purpose of this parameter is to account for the unmetered service line infrastructure that is the responsibility of the customer for arranging repairs of leaks that occur on their lines. In many cases leak repairs arranged by customers take longer to be executed than leak repairs arranged by the water utility on utility-maintained piping. Leaks run longer - and lose more water - on customer-owned service piping, than utility owned piping. If the customer water meter exists near the ownership transfer point (usually the curb stop located between the water main and the customer premises) this distance is zero because the meter and transfer point are the same. This is the often encountered configuration of customer water meters located in an underground meter box or "pit" outside of the customer's building. The Free Water Audit Software asks a "Yes/No" question about the meter at this location. If the auditor selects "Yes" then this distance is set to zero and the data grading score for this component is set to 10. If water meters are typically located inside the customer premise/building, or properties are unmetered, it is up to the water auditor to estimate a system-wide average Lp length based upon the various customer land parcel sizes and building locations in the service area. Lp will be a shorter length in areas of high density housing, and a longer length in areas of low density housing and varied commercial and industrial buildings. General parcel demographics should be employed to obtain a composite average Lp length for the entire system. Refer to the "Service Connection Diagram" worksheet for a depiction of the service line/metering configurations that typically exist in water utilities. This worksheet gives guidance on the determination of the Average Length, Lp, for each configuration.
Average operating pressure Find	This is the average pressure in the distribution system that is the subject of the water audit. Many water utilities have a calibrated hydraulic model of their water distribution system. For these utilities, the hydraulic model can be utilized to obtain a very accurate quantity of average pressure. In the absence of a hydraulic model, the average pressure may be approximated by obtaining readings of static water pressure from a representative sample of fire hydrants or other system access points evenly located across the system. A weighted average of the pressure can be assembled; but be sure to take into account the elevation of the fire hydrants, which typically exist several feet higher than the level of buried water pipelines. If the water utility is compiling the water audit for the first time, the average pressure can be approximated, but with a low data grading. In subsequent years of auditing, effort should be made to improve the accuracy of the average pressure quantity. This will then qualify the value for a higher data grading.
Billed Authorized Consumption	All consumption that is billed and authorized by the utility. This may include both metered and unmetered consumption. See "Authorized Consumption" for more information.
Billed metered consumption Find	All metered consumption which is billed to retail customers, including all groups of customers such as domestic, commercial, industrial or institutional. **It does NOT include water supplied to neighboring utilities (water exported) which is metered and billed. Be sure to subtract any consumption for exported water sales that may be included in these billing roles. Water supplied as exports to neighboring water utilities should be included only in the Water Exported component.** The metered consumption data can be taken directly from billing records for the water audit period. The accuracy of yearly metered consumption data can be refined by including an adjustment to account for customer meter reading lag time since not all customer meters are read on the same day of the meter reading period. However additional analysis is necessary to determine the lag time adjustment value, which may or may not be significant.
Billed unmetered consumption Find	All billed consumption which is calculated based on estimates or norms from water usage sites that have been determined by utility policy to be left unmetered. This is typically a very small component in systems that maintain a policy to meter their customer population. However, this quantity can be the key consumption component in utilities that have not adopted a universal metering policy. **This component should NOT include any water that is supplied to neighboring utilities (water exported) which is unmetered but billed. Water supplied as exports to neighboring water utilities should be included only in the Water Exported component.**

Item Name	Description
Customer metering inaccuracies Find	Apparent water losses caused by the collective under-registration of customer water meters. Many customer water meters gradually wear as large cumulative volumes of water are passed through them over time. This causes the meters to under-register the flow of water. This occurrence is common with smaller residential meters of sizes 5/8-inch and 3/4 inch after they have registered very large cumulative volumes of water, which generally occurs only after periods of years. For meters sized 1-inch and larger - typical of multi-unit residential, commercial and industrial accounts - meter under-registration can occur from wear or from the improper application of the meter; i.e. installing the wrong type of meter or the wrong size of meter, for the flow pattern (profile) of the consumer. For instance, many larger meters have reduced accuracy at low flows. If an oversized meter is installed, most of the time the routine flow will occur in the low flow range of the meter, and a significant portion of it may not be registered. It is important to properly select and install all meters, but particularly large customer meters, size 1-inch and larger. The auditor has two options for entering data for this component of the audit. The auditor can enter a percentage under-registration (typically an estimated value), this will apply the selected percentage to the two categories of metered consumption to determine the volume of water not recorded due to customer meter inaccuracy. Note that this percentage is a composite average inaccuracy for all customer meters in the entire meter population. The percentage will be multiplied by the sum of the volumes in the Billed Metered and Unbilled Metered components. Alternatively, if the auditor has substantial data from meter testing activities, he or she can calculate their own loss volumes, and this volume may be entered directly. Note that a value of zero will be accepted but an alert will appear asking if the customer population is unmetered. Since all metered systems have some degree of inaccuracy, a positive value should be entered. A value of zero in this component is valid only if the water utility does not meter its customer population.
Customer retail unit cost Find	The Customer Retail Unit Cost represents the charge that customers pay for water service. This unit cost is applied routinely to the components of Apparent Loss, since these losses represent water reaching customers but not (fully) paid for. Since most water utilities have a rate structure that includes a variety of different costs based upon class of customer, a weighted average of individual costs and number of customer accounts in each class can be calculated to determine a single composite cost that should be entered into this cell. Finally, the weighted average cost should also include additional charges for sewer, storm water or biosolids processing, but only if these charges are based upon the volume of potable water consumed. For water utilities in regions with limited water resources and a questionable ability to meet the drinking water demands in the future, the Customer Retail Unit Cost might also be applied to value the Real Losses; instead of applying the Variable Production Cost to Real Losses. In this way, it is assumed that every unit volume of leakage reduced by leakage management activities will be sold to a customer. Note: the Free Water Audit Software allows the user to select the units that are charged to customers (either $/1,000 gallons, $/hundred cubic feet, or $/1,000 litres) and automatically converts these units to the units that appear in the "WATER SUPPLIED" box. The monetary units are United States dollars, $.
Infrastructure Leakage Index (ILI) Find	The ratio of the Current Annual Real Losses (Real Losses) to the Unavoidable Annual Real Losses (UARL). The ILI is a highly effective performance indicator for comparing (benchmarking) the performance of utilities in operational management of real losses.
Length of mains Find	Length of all pipelines (except service connections) in the system starting from the point of system input metering (for example at the outlet of the treatment plant). It is also recommended to include in this measure the total length of fire hydrant lead pipe. Hydrant lead pipe is the pipe branching from the water main to the fire hydrant. Fire hydrant leads are typically of a sufficiently large size that is more representative of a pipeline than a service connection. The average length of hydrant leads across the entire system can be assumed if not known, and multiplied by the number of fire hydrants in the system, which can also be assumed if not known. This value can then be added to the total pipeline length. Total length of mains can therefore be calculated as: Length of Mains, miles = (total pipeline length, miles) + [{(average fire hydrant lead length, ft) x (number of fire hydrants)} / 5,280 ft/mile] or Length of Mains, kilometres = (total pipeline length, kilometres) + [{(average fire hydrant lead length, metres) x (number of fire hydrants)} / 1,000 metres/kilometre]
NON-REVENUE WATER Find	= Apparent Losses + Real Losses + Unbilled Metered Consumption + Unbilled Unmetered Consumption. This is water which does not provide revenue potential to the utility.
Number of active AND inactive service connections Find	Number of customer service connections, extending from the water main to supply water to a customer. Please note that this includes the actual number of distinct piping connections, including fire connections, whether active or inactive. This may differ substantially from the number of customers (or number of accounts). **Note: this number does not include the pipeline leads to fire hydrants - the total length of piping supplying fire hyrants should be included in the "Length of mains" parameter.**
Real Losses Find	Physical water losses from the pressurized system (water mains and customer service connections) and the utility's storage tanks, up to the point of customer consumption. In metered systems this is the customer meter, in unmetered situations this is the first point of consumption (stop tap/tap) within the property. The annual volume lost through all types of leaks, breaks and overflows depends on frequencies, flow rates, and average duration of individual leaks, breaks and overflows.
Revenue Water	Those components of System Input Volume that are billed and have the potential to produce revenue.
Service Connection Density Find	=number of customer service connections / length of mains

Item Name	Description
Systematic data handling errors Find	Apparent losses caused by accounting omissions, errant computer programming, gaps in policy, procedure, and permitting/activation of new accounts; and any type of data lapse that results in under-stated customer water consumption in summary billing reports. **Systematic Data Handling Errors result in a direct loss of revenue potential. Water utilities can find "lost" revenue by keying on this component.** Utilities typically measure water consumption registered by water meters at customer premises. The meter should be read routinely (ex: monthly) and the data transferred to the Customer Billing System, which generates and sends a bill to the customer. Data Transfer Errors result in the consumption value being less than the actual consumption, creating an apparent loss. Such error might occur from illegible and mis-recorded hand-written readings compiled by meter readers, inputting an incorrect meter register unit conversion factor in the automatic meter reading equipment, or a variety of similar errors. Apparent losses also occur from Data Analysis Errors in the archival and data reporting processes of the Customer Billing System. Inaccurate estimates used for accounts that fail to produce a meter reading are a common source of error. Billing adjustments may award customers a rightful monetary credit, but do so by creating a negative value of consumption, thus under-stating the actual consumption. Account activation lapses may allow new buildings to use water for months without meter readings and billing. Poor permitting and construction inspection practices can result in a new building lacking a billing account, a water meter and meter reading; i.e., the customer is unknown to the utility's billing system. Close auditing of the permitting, metering, meter reading, billing and reporting processes of the water consumption data trail can uncover data management gaps that create volumes of systematic data handling error. Utilities should routinely analyze customer billing records to detect data anomalies and quantify these losses. For example, a billing account that registers zero consumption for two or more billing cycles should be checked to explain why usage has seemingly halted. Given the revenue loss impacts of these losses, water utilities are well-justified in providing continuous oversight and timely correction of data transfer errors & data handling errors. If the water auditor has not yet gathered detailed data or assessment of systematic data handling error, it is recommended that the auditor apply the default value of 0.25% of the the Billed Authorized Consumption volume. However, if the auditor has investigated the billing system and its controls, and has well validated data that indicates the volume from systematic data handling error is substantially higher or lower than that generated by the default value, then the auditor should enter a quantity that was derived from the utility investigations and select an appropriate grading. Note: negative values are not allowed for this audit component. If the auditor enters zero for this component then a grading of 1 will be automatically assigned.
Total annual cost of operating the water system Find	These costs include those for operations, maintenance and any annually incurred costs for long-term upkeep of the drinking water supply and distribution system. It should include the costs of day-to-day upkeep and long-term financing such as repayment of capital bonds for infrastructure expansion or improvement. Typical costs include employee salaries and benefits, materials, equipment, insurance, fees, administrative costs and all other costs that exist to sustain the drinking water supply. Depending upon water utility accounting procedures or regulatory agency requirements, it may be appropriate to include depreciation in the total of this cost. This cost should not include any costs to operate wastewater, biosolids or other systems outside of drinking water.
Unauthorized consumption Find	Includes water illegally withdrawn from fire hydrants, illegal connections, bypasses to customer consumption meters, or tampering with metering or meter reading equipment; as well as any other ways to receive water while thwarting the water utility's ability to collect revenue for the water. Unauthorized consumption results in uncaptured revenue and creates an error that understates customer consumption. In most water utilities this volume is low and, if the water auditor has not yet gathered detailed data for these loss occurrences, it is recommended that the auditor apply a default value of 0.25% of the volume of water supplied. However, if the auditor has investigated unauthorized occurrences, and has well validated data that indicates the volume from unauthorized consumption is substantially higher or lower than that generated by the default value, then the auditor should enter a quantity that was derived from the utility investigations. Note that a value of zero will not be accepted since all water utilities have some volume of unauthorized consumption occurring in their system. Note: if the auditor selects the default value for unauthorized consumption, a data grading of 5 is automatically assigned, but not displayed on the Reporting Worksheet.
Unavoidable Annual Real Losses (UARL) Find	UARL (gallons)=(5.41Lm + 0.15Nc + 7.5Lc) xP, or UARL (litres)=(18.0Lm + 0.8Nc + 25.0Lc) xP where: Lm = length of mains (miles or kilometres) Nc = number of customer service connections Lp = the average distance of customer service connection piping (feet or metres) (see the Worksheet "Service Connection Diagram" for guidance on deterring the value of Lp) Lc = total length of customer service connection piping (miles or km) Lc = Nc X Lp (miles or kilometres) P = Pressure (psi or metres) The UARL is a theoretical reference value representing the technical low limit of leakage that could be achieved if all of today's best technology could be successfully applied. It is a key variable in the calculation of the Infrastructure Leakage Index (ILI). Striving to reduce system leakage to a level close to the UARL is usually not needed unless the water supply is unusually expensive, scarce or both. NOTE: The UARL calculation has not yet been proven as fully valid for very small, or low pressure water distribution systems. If, in gallons: (Lm x 32) + Nc < 3000 or P <35psi in litres: (Lm x 20) + Nc < 3000 or P < 25m then the calculated UARL value may not be valid. The software does not display a value of UARL or ILI if either of these conditions is true.

Item Name	Description
Unbilled Authorized Consumption	All consumption that is unbilled, but still authorized by the utility. This includes Unbilled Metered Consumption + Unbilled Unmetered Consumption. See "Authorized Consumption" for more information. For Unbilled Unmetered Consumption, the Free Water Audit Software provides the auditor the option to select a default value if they have not audited unmetered activities in detail. The default calculates a volume that is 1.25% of the Water Supplied volume. If the auditor has carefully audited the various unbilled, unmetered, authorized uses of water, and has established reliable estimates of this collective volume, then he or she may enter the volume directly for this component, and not use the default value.
Unbilled metered consumption Find	Metered consumption which is authorized by the water utility, but, for any reason, is deemed by utility policy to be unbilled. This might for example include metered water consumed by the utility itself in treatment or distribution operations, or metered water provided to civic institutions free of charge. **It does not include water supplied to neighboring utilities (water exported) which may be metered but not billed.**
Unbilled unmetered consumption Find	Any kind of Authorized Consumption which is neither billed or metered. This component typically includes water used in activities such as fire fighting, flushing of water mains and sewers, street cleaning, fire flow tests conducted by the water utility, etc. In most water utilities it is a small component which is very often substantially overestimated. **It does NOT include water supplied to neighboring utilities (water exported) which is unmetered and unbilled – an unlikely case.** This component has many sub-components of water use which are often tedious to identify and quantify. Because of this, and the fact that it is usually a small portion of the water supplied, it is recommended that the auditor apply the default value, which is 1.25% of the Water Supplied volume. Select the default percentage to enter this value. If the water utility has carefully audited the unbilled, unmetered activities occurring in the system, and has well validated data that gives a value substantially higher or lower than the default volume, then the auditor should enter their own volume. However the default approach is recommended for most water utilities. Note that a value of zero is not permitted, since all water utilities have some volume of water in this component occurring in their system.
Units and Conversions	The user may develop an audit based on one of three unit selections: 1) Million Gallons (US) 2) Megalitres (Thousand Cubic Metres) 3) Acre-feet Once this selection has been made in the instructions sheet, all calculations are made on the basis of the chosen units. Should the user wish to make additional conversions, a unit converter is provided below (use drop down menus to select units from the yellow unit boxes): Enter Units: 1 | Convert From… **Million Gallons (US)** = **Converts to…..** **3.06888329** **Acre-feet** (conversion factor = 3.06888328973723)
Use of Option Buttons	To use the default percent value choose this button To enter a value choose this button and enter the value in the cell to the right  **NOTE:** For Unbilled Unmetered Consumption, Unauthorized Consumption and Systematic Data Handling Errors, a recommended default value can be applied by selecting the Percent option. The default values are based on fixed percentages of Water Supplied or Billed Authorized Consumption and are recommended for use in this audit unless the auditor has well validated data for their system. Default values are shown by purple cells, as shown in the example above. If a default value is selected, the user does not need to grade the item; a grading value of 5 is automatically applied (however, this grade will not be displayed).
Variable production cost (applied to Real Losses) Find	The cost to produce and supply the next unit of water (e.g., $/million gallons). This cost is determined by calculating the summed unit costs for ground and surface water treatment and all power used for pumping from the source to the customer. It may also include other miscellaneous unit costs that apply to the production of drinking water. It should also include the unit cost of bulk water purchased as an import if applicable. It is common to apply this unit cost to the volume of Real Losses. However, if water resources are strained and the ability to meet future drinking water demands is in question, then the water auditor can be justified in applying the Customer Retail Rate to the Real Loss volume, rather than applying the Variable Production Cost. The Free Water Audit Software applies the Variable Production costs to Real Losses by default. However, the auditor has the option on the Reporting Worksheet to select the Customer Retail Cost as the basis for the Real Loss cost evaluation if the auditor determines that this is warranted.
Volume from own sources Find	The volume of water withdrawn (abstracted) from water resources (rivers, lakes, streams, wells, etc) controlled by the water utility, and then treated for potable water distribution. Most water audits are compiled for utility retail water distribution systems, so this volume should reflect the amount of treated drinking water that entered the distribution system. Often the volume of water measured at the effluent of the treatment works is slightly less than the volume measured at the raw water source, since some of the water is used in the treatment process. Thus, it is useful if flows are metered at the effluent of the treatment works. If metering exists only at the raw water source, an adjustment for water used in the treatment process should be included to account for water consumed in treatment operations such as filter backwashing, basin flushing and cleaning, etc. If the audit is conducted for a wholesale water agency that sells untreated water, then this quantity reflects the measure of the raw water, typically metered at the source.

Item Name	Description
Volume from own sources: Master meter and supply error adjustment Find	An estimate or measure of the degree of inaccuracy that exists in the master (production) meters measuring the annual Volume from own Sources, and any error in the data trail that exists to collect, store and report the summary production data. This adjustment is a weighted average number that represents the collective error for all master meters for all days of the audit year and any errors identified in the data trail. Meter error can occur in different ways. A meter or meters may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Data error can occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some degree of inaccuracy in master meters and data errors in archival systems are common; thus a value of zero should <u>not</u> be entered. Enter a negative percentage or value for metered data under-registration; or, enter a positive percentage or value for metered data over-registration.
Water exported Find	The Water Exported volume is the bulk water conveyed and sold by the water utility to neighboring water systems that exists outside of their service area. Typically this water is metered at the custody transfer point of interconnection between the two water utilities. Usually the meter(s) are owned by the water utility that is selling the water: i.e. the exporter. If the water utility who is compiling the annual water audit sells bulk water in this manner, they are an exporter of water. Note: The Water Exported volume is sold to wholesale customers who are typically charged a wholesale rate that is different than retail rates charged to the retail customers existing within the service area. Many state regulatory agencies require that the Water Exported volume be reported to them as a quantity separate and distinct from the retail customer billed consumption. For these reasons - and others - the Water Exported volume is always quantified separately from Billed Authorized Consumption in the standard water audit. **Be certain not to "double-count" this quantity by including it in both the Water Exported box and the Billed Metered Consumption box of the water audit Reporting Worksheet. This volume should be included only in the Water Exported box.**
Water exported: Master meter and supply error adjustment Find	An estimate or measure of the volume in which the Water Exported volume is incorrect. This adjustment is a weighted average that represents the collective error for all of the metered and archived exported flow for all days of the audit year. Meter error can occur in different ways. A meter may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Error in the metered, archived data can also occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some degree of error in their metered data, particularly if meters are aged and infrequently tested. Occasional errors also occur in the archived data. Thus, a value of zero should <u>not</u> be entered. Enter a negative percentage or value for metered data under-registration; or enter a positive percentage or value for metered data over-registration. If regular meter accuracy testing is conducted on the meter(s) - which is usually conducted by the water utility selling the water - then the results of this testing can be used to help quantify the meter error adjustment. Corrections to data gaps or other errors found in the archived data should also be included as a portion of this meter error adjustment.
Water imported Find	The Water Imported volume is the bulk water purchased to become part of the Water Supplied volume. Typically this is water purchased from a neighboring water utility or regional water authority, and is metered at the custody transfer point of interconnection between the two water utilities. Usually the meter(s) are owned by the water supplier selling the water to the utility conducting the water audit. The water supplier selling the bulk water usually charges the receiving utility based upon a wholesale water rate.
Water imported: Master meter and supply error adjustment Find	An estimate or measure of the volume in which the Water Imported volume is incorrect. This adjustment is a weighted average that represents the collective error for all of the metered and archived imported flow for all days of the audit year. Meter error can occur in different ways. A meter may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Error in the metered, archived data can also occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some level of meter inaccuracy, particularly if meters are aged and infrequently tested. Occasional errors also occur in the archived metered data. Thus, a value of zero should <u>not</u> be entered. Enter a negative percentage or value for metered data under-registration; or, enter a positive percentage or value for metered data over-registration. If regular meter accuracy testing is conducted on the meter(s) - which is usually conducted by the water utility selling the water - then the results of this testing can be used to help quantify the meter error adjustment.
WATER LOSSES Find	= apparent losses + real losses Water Losses are the difference between Water Supplied and Authorized Consumption. Water losses can be considered as a total volume for the whole system, or for partial systems such as transmission systems, pressure zones or district metered areas (DMA); if one of these configurations are the basis of the water audit.

AWWA Free Water Audit Software:
Determining Water Loss Standing

WAS v5.0

Water Audit Report for: San Francisco Public Utilities Commission - Wholesale
Reporting Year: 2015 | 7/2014 - 6/2015
Data Validity Score: **83**

Water Loss Control Planning Guide

Functional Focus Area	**Water Audit Data Validity Level / Score**				
	Level I (0-25)	**Level II** (26-50)	**Level III** (51-70)	**Level IV** (71-90)	**Level V** (91-100)
Audit Data Collection	Launch auditing and loss control team; address production metering deficiencies	Analyze business process for customer metering and billing functions and water supply operations. Identify data gaps.	Establish/revise policies and procedures for data collection	Refine data collection practices and establish as routine business process	Annual water audit is a reliable gauge of year-to-year water efficiency standing
Short-term loss control	Research information on leak detection programs. Begin flowcharting analysis of customer billing system	Conduct loss assessment investigations on a sample portion of the system: customer meter testing, leak survey, unauthorized consumption, etc.	Establish ongoing mechanisms for customer meter accuracy testing, active leakage control and infrastructure monitoring	Refine, enhance or expand ongoing programs based upon economic justification	Stay abreast of improvements in metering, meter reading, billing, leakage management and infrastructure rehabilitation
Long-term loss control		Begin to assess long-term needs requiring large expenditure: customer meter replacement, water main replacement program, new customer billing system or Automatic Meter Reading (AMR) system.	Begin to assemble economic business case for long-term needs based upon improved data becoming available through the water audit process.	Conduct detailed planning, budgeting and launch of comprehensive improvements for metering, billing or infrastructure management	Continue incremental improvements in short-term and long-term loss control interventions
Target-setting			Establish long-term apparent and real loss reduction goals (+10 year horizon)	Establish mid-range (5 year horizon) apparent and real loss reduction goals	Evaluate and refine loss control goals on a yearly basis
Benchmarking			Preliminary Comparisons - can begin to rely upon the Infrastructure Leakage Index (ILI) for performance comparisons for real losses (see below table)	Performance Benchmarking - ILI is meaningful in comparing real loss standing	Identify Best Practices/ Best in class - the ILI is very reliable as a real loss performance indicator for best in class service

For validity scores of 50 or below, the shaded blocks should not be focus areas until better data validity is achieved.

Once data have been entered into the Reporting Worksheet, the performance indicators are automatically calculated. How does a water utility operator know how well his or her system is performing? The AWWA Water Loss Control Committee provided the following table to assist water utilities is gauging an approximate Infrastructure Leakage Index (ILI) that is appropriate for their water system and local conditions. The lower the amount of leakage and real losses that exist in the system, then the lower the ILI value will be.

Note: this table offers an approximate guideline for leakage reduction target-setting. The best means of setting such targets include performing an economic assessment of various loss control methods. However, this table is useful if such an assessment is not possible.

General Guidelines for Setting a Target ILI
(without doing a full economic analysis of leakage control options)

Target ILI Range	Financial Considerations	Operational Considerations	Water Resources Considerations
1.0 - 3.0	Water resources are costly to develop or purchase; ability to increase revenues via water rates is greatly limited because of regulation or low ratepayer affordability.	Operating with system leakage above this level would require expansion of existing infrastructure and/or additional water resources to meet the demand.	Available resources are greatly limited and are very difficult and/or environmentally unsound to develop.
>3.0 -5.0	Water resources can be developed or purchased at reasonable expense; periodic water rate increases can be feasibly imposed and are tolerated by the customer population.	Existing water supply infrastructure capability is sufficient to meet long-term demand as long as reasonable leakage management controls are in place.	Water resources are believed to be sufficient to meet long-term needs, but demand management interventions (leakage management, water conservation) are included in the long-term
>5.0 - 8.0	Cost to purchase or obtain/treat water is low, as are rates charged to customers.	Superior reliability, capacity and integrity of the water supply infrastructure make it relatively immune to supply shortages.	Water resources are plentiful, reliable, and easily extracted.
Greater than 8.0	Although operational and financial considerations may allow a long-term ILI greater than 8.0, such a level of leakage is not an effective utilization of water as a resource. Setting a target level greater than 8.0 - other than as an incremental goal to a smaller long-term target - is discouraged.		
Less than 1.0	If the calculated Infrastructure Leakage Index (ILI) value for your system is 1.0 or less, two possibilities exist. a) you are maintaining your leakage at low levels in a class with the top worldwide performers in leakage control. b) A portion of your data may be flawed, causing your losses to be greatly understated. This is likely if you calculate a low ILI value but do not employ extensive leakage control practices in your operations. In such cases it is beneficial to validate the data by performing field measurements to confirm the accuracy of production and customer meters, or to identify any other potential sources of error in the data.		

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AWWA Free Water Audit Software: Acknowledgements

WAS v5.0

AWWA Water Audit Software Version 5.0 Developed by the Water Loss Control Committee of the American Water Works Association August, 2014

This software is intended to serve as a basic tool to compile a preliminary, or “top-down”, water audit. It is recommended that users also refer to the current edition of the AWWA M36 Publication, Water Audits and Loss Control Programs, for detailed guidance on compiling a comprehensive, or “bottom-up”, water audit using the same water audit methodology.

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Alain Lalonde, P.Eng.	*Master Meter Canada Inc.*
Ralph Y. McCord, P.E.	*Louisville Water Company*
David A. Sayers	*Delaware River Basin Commission*
Brian M. Skeens, P.E.	*CH2M HILL*
Reinhard Sturm	*Water Systems Optimization, Inc.*
John H. Van Arsdel	*M.E. Simpson Company, Inc.*

REFERENCES:

- Alegre, H., Hirner, W., Baptista, J. and Parena, R. Performance Indicators for Water Supply Services. IWA Publishing ‘Manual of Best Practice’ Series, 2000. ISBN 1 900222 272

- Kunkel, G. et al, 2003. Water Loss Control Committee Report: Applying Worldwide Best Management Practices in Water Loss Control. Journal AWWA, 95:8:65

- AWWA Water Audits and Loss Control Programs, M36 Publication, 3rd Edition, 2009

- Service Connection Diagrams courtesy of Ronnie McKenzie, WRP Pty Ltd.

VERSION HISTORY:

Version:	Release Date:	Number of Worksheets:	Key Features and Developments
v1	2005/ 2006	5	The AWWA Water Audit Software was piloted in 2005 (v1.0 beta). The early versions (1.x) of the software restricted data entry to units of Million Gallons per year. For each entry into the audit, users identified whether the input was measured or estimated.
v2	2006	5	The most significant enhancement in v2 of the software was to allow the user to choose the volumetric units to be used in the audit, Million Gallons or Thousand Cubic Metres (megalitres) per year. Two financial performance indicators were added to provide feedback to the user on the cost of Real and Apparent losses.
v3	2007	7	In v3, the option to report volumetric units in acre-feet was added. Another new feature in v3 was the inclusion of default values for two water audit components (unbilled unmetered and unauthorized consumption). v3 also included two examples of completed audits in units of million gallons and Megalitres. Several checks were added into v3 to provide instant feedback to the user on common data entry problems, in order to help the user complete an accurate water audit.
v4 - v4.2	2010	10	v4 (and versions 4.x) of the software included a new approach to data grading. The simple "estimated" or "measured" approach was replaced with a more granular scale (typically 1-10) that reflected descriptions of utility practices and served to describe the confidence and accuracy of the input data. Each input value had a corresponding scale fully described in the Grading Matrix tab. The Grading Matrix also showed the actions required to move to a higher grading score. Grading descriptions were available on the Reporting Worksheet via a pop-up box next to each water audit input. A water audit data validity score is generated (max = 100) and priority areas for attention (to improve audit accuracy) are identified, once a user completes the requied data grading. A service connection diagram was also added to help users understand the impact of customer service line configurations on water losses and how this information should be entered into the water audit software. An acknoweldgements section was also added. Minor bug fixes resulted in the release of versions 4.1 and 4.2. A French language version was also made available for v4.2.
v5	2014	12	In v5, changes were made to the way Water Supplied information is entered into software, with each major component having a corresponding Master Meter Error Adjustment entry (and data grading requirement). This required changes to the data validity score calculation; v5 of the software uses a weighting system that is, in part, proportional to the volume of input components. The Grading Matrix was updated to reflect the new audit inputs and also to include clarifications and additions to the scale descriptions. The appearance of the software was updated in v5 to make the software more user-friendly and several new features were added to provide more feedback to the user. Notably, a dashboard tab has been added to provide more visual feedback on the water audit results and associated costs of Non-Revenue Water. A comments sheet was added to allow the user to track notes, comments and to cite sources used.

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APPENDIX J

Estimation of Sunol Population with DWR Population Tool

2015 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

Prepared by: The San Francisco Public Utilities Commission

June 2016

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

WUEdata - San Francisco City And County

Sign Out

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Confirmation Information

Generated By	Water Supplier Name	Confirmation #	Generated On
Winola Cheong	San Francisco City And County	8639310538	1/19/2016 9:11:45 PM

Boundary Information

Census Year	Boundary Filename	Internal Boundary ID
1990	Sunol_11Jan2016.kml	457
2000	Sunol_11Jan2016.kml	457
2010	Sunol_11Jan2016.kml	457

Baseline Period Ranges

10 to 15-year baseline period

2008 total water deliveries[1]:	425311	Hundred Cubic Feet (CCF) ▼
2008 total volume of delivered recycled water[1]:	0	Hundred Cubic Feet (CCF)
2008 recycled water as a percent of total deliveries:	0.00%	
Number of years in baseline period[2]:	10	
Year beginning baseline period range:	2001 ▼	
Year ending baseline period range[3]:	2010	

5-year baseline period

Year beginning baseline period range:	2006 ▼
Year ending baseline period range[4]:	2010

---

[1] The selected units of measure must apply to both the 2008 total water deliveries and the 2008 total volume of delivered recycled water. If the water supplier records use different units of measure for these volumes, the user must make a conversion so that both volumes are in the same units of measure.

[2] If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period.

[3] The ending year must be between December 31, 2004 and December 31, 2010.

[4] The ending year must be between December 31, 2007 and December 31, 2010.

Persons per Connection

Year	Census Block Level Total Population	Number of Connections *	Persons per Connection
1990	198	69	**2.87**
1991	-	-	3.06
1992	-	-	3.25
1993	-	-	3.43
1994	-	-	3.62
1995	-	-	3.81
1996	-	-	4.00
1997	-	-	4.19
1998	-	-	4.37
1999	-	-	4.56
2000	328	69	**4.75**
2001	-	-	4.50
2002	-	-	4.26
2003	-	-	4.01
2004	-	-	3.77
2005	-	-	3.52
2006	-	-	3.28
2007	-	-	3.04
2008	-	-	2.79
2009	-	-	2.54
2010	237	103	**2.30**
2015	-	-	**1.08**

** Number of Connections may be either All Residential Connections (Single Family and Multi-Family combined) or All Service Connections. This will depend on the data available from the water supplier's records, but must remain consistent throughout the table.*

Population Using Persons-Per-Connection

Year		Number of Connections *	Persons per Connection	Total Population
10 to 15 Year Baseline Population Calculations				
Year 1	2001	**63**	4.50	**284**
Year 2	2002	**67**	4.26	**285**
Year 3	2003	**71**	4.01	**285**
Year 4	2004	**75**	3.77	**283**
Year 5	2005	**79**	3.52	**278**
Year 6	2006	**83**	3.28	**272**
Year 7	2007	**89**	3.04	**270**
Year 8	2008	**93**	2.79	**259**
Year 9	2009	**94**	2.54	**239**
Year 10	2010	103	2.30	**237**
5 Year Baseline Population Calculations				
Year 1	2006	**83**	3.28	**272**
Year 2	2007	**89**	3.04	**270**
Year 3	2008	**93**	2.79	**259**
Year 4	2009	**94**	2.54	**239**
Year 5	2010	103	2.30	**237**
2015 Compliance Year Population Calculations				
2015		**112**	1.08	**121**

** Number of Connections may be either All Residential Connections (Single Family and Multi-Family combined) or All Service Connections. This will depend on the data available from the water supplier's records, but must remain consistent throughout the table.*

Hide Print Confirmation

Revision to 2015 population estimate per DWR consultation:

Upon completion of the DWR population tool, it was found that the estimated population for the year 2015 was much lower than expected. Based on the number of service connections and SFPUC staff understanding of local population density, customer population in the Sunol service area should not have changed significantly. After consultation with DWR staff, the SFPUC was directed to use the same persons-per-connection number that was estimated for the year 2010 and apply it to the year 2015. The 2015 population estimate was therefore revised to be 112x2.3=258.

APPENDIX K

Summary of San Francisco's Response to 1987-92 Drought Experience

2015 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

Prepared by: The San Francisco Public Utilities Commission

June 2016

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

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Summary of San Francisco's Response to 1987-92 Drought Experience

Background:

The 1987-92 six year drought provides an example of how the near-term drought management process works in times when the operational capabilities of Hetch Hetchy and other water supplies available to the SFPUC are taxed to a point that forces drastic actions to avoid running out of water. By the sixth year of that drought period, many of the programs and actions identified in San Francisco's current Retail Water Shortage Allocation Plan (adopted in December 2001) had been implemented. The following describes some of the major actions that occurred.

Demand Reductions:

The extended drought forced San Francisco to adopt a mandatory rationing program, enforced by stiff excess use charges and the threat of shut-off for continued violations of water use prohibitions. Mandatory rationing was in effect May of 1988 through May of 1989, re-instituted in May of 1990, and continued until March of 1993. A Water Shortage Emergency Resolution was passed by the SFPUC on April 28, 1988 declaring these rationing periods (Resolution No. 88-0155). A copy of this resolution can be found at the end of this appendix.

The SFPUC's water rationing program was one of the toughest in the state and the most stringent imposed by any major urban water supply agency. Although the specifics of the program varied over time, the basic outline of the mandatory rationing program was to achieve a 25 percent reduction to 1987 (pre-drought) consumption (system-wide), with water allocations set on an account-by-account basis.

To provide a strong incentive for customers to use no more water than their allotment, the SFPUC adopted a rate structure that incorporated excess use charges. Any customer that used less water than its allotment was charged the normal rate per unit of water consumption, while any customer who used more than its allotment was charged a multiple of the normal rate for every unit of consumption above its allotment. As of January 1, 1992 (the last year of the rationing program), the rate structure shown in the table below applied to SFPUC customers.

Excess Use Charges

If Water Consumption Is (Over Allotment)	Excess Use Charge Will Be (Times Normal Rate)
Up to 10%	2
10.01 - 20%	8
20.01% or over	10

In the event that water was used in excess of the customer's specified allotment, the SFPUC could, after one written warning, install a flow restrictor on the customer's service line. The charge to install and remove the restricting device is shown in the table below. If a customer continued to consume water in excess of its allotment, the SFPUC had the authority to discontinue the customer's water service and require the customer to bear the cost for the re-connection of water service.

Fee For Installing Flow Restricting Devices	
Meter Size	Installation/Removal Cost
to 1”	$95
1” to 2”	$149
3” and larger	Actual cost

In addition to pricing disincentives for excess water use, numerous water use restrictions were adopted and enforced. San Francisco retail customers were required to comply with the following water use prohibitions and restrictions:

- Water waste, including but not limited to, any flooding or runoff into the street or gutters, was prohibited.
- Hoses could not be used to clean sidewalks, driveways, patios, plazas, homes, businesses, parking lots, roofs, awnings or other hard surfaces areas.
- Hoses used for any purpose had to have positive shutoff valves.
- Restaurants served water to customers only upon request.
- Potable water was not to be used to clean, fill or maintain levels in decorative fountains.
- Use of additional water was not allowed for new landscaping or expansion of existing facilities unless low water use landscaping designs and irrigation systems were employed.
- Water service connections for new construction were granted only if water saving fixtures or devices were incorporated into the plumbing system.
- Use of potable water for consolidation of backfill, dust control or other non-essential construction purposes was prohibited.
- Irrigation of lawns, play fields, parks, golf courses, cemeteries, and landscaping of any type with potable water would be reduced by at least the amount specified for outside use in the adopted rationing plan.
- Verified water waste as determined by the Water Department would serve as prima facie evidence that the allocation assigned to the water account is excessive; therefore, the allocation was subject to review and possible reduction, including termination of service.
- Water used for all cooling purposes was to be recycled.
- The use of groundwater and/or reclaimed water for irrigation of golf courses, median strips, and similar turf areas was strongly encouraged.
- The use of groundwater and/or reclaimed water for street sweepers/washers was strongly encouraged.

In addition to water use prohibitions and directives specifically responsive to the drought, the SFPUC coincidentally was implementing long-term conservation programs, which also lowered water demands during the drought period (refer to the Demand Management discussion). Following the drought, several of the measures described above were adopted by San Francisco into permanent, on-going programs.

Water Management:

In addition to effecting reductions to water demands, the SFPUC also employed water management activities to control the severity of water shortages to its customers.

During the drought and for the first time in history, the SFPUC utilized a Delta supply within its system. The SFPUC imported water from the Delta through use of State Water Project South Bay Aqueduct facilities. The sources of water transferred included transfers via the California Emergency Water Bank, Placer County and the Modesto Irrigation District. The waters were diverted from the South Bay Aqueduct into the SFPUC's San Antonio Reservoir and then treated and integrated into SFPUC's water distribution system.

The amount of water actually delivered to the SFPUC was constrained due to numerous factors including the lack of willing sellers, allocation procedures, lack of priority in use of the State transmission facilities, storage constraints in San Antonio Reservoir, and water treatment constraints within the SFPUC's system. The total water that was imported into the SFPUC's system amounted to a maximum of approximately 31,000 acre-feet in one year, and in total for the drought period amounted to 59,000 acre-feet.

The importation of additional water into the SFPUC's system allowed the continuation of a 25 percent system-wide rationing program as compared to a potentially higher level of rationing had the transfers not occurred.

System Response and Effects:

The system-wide goal of reducing water use by 25 percent was achieved. However, the reduction was not accomplished without cost or hardship.

To achieve its annual 25 percent system-wide rationing goal, the SFPUC targeted a reduction of indoor consumption by 10 percent and outdoor consumption by 60 percent.

Due to the nature of the allocation formula for water allotments and the level of system-wide reduction goals, instances occurred where individual users or wholesale water customers were burdened with up to twice the system-wide average in delivery reductions.

Some of the costs incurred by individuals, property owners and renters include:

- The cost of installing low-flow toilets, retrofit kits for toilets and showerheads, and special low-water use landscaping and irrigation systems
- The financial losses resulting from loss of lawns, plants and trees due to the 60 percent reduction in water available for irrigation
- The cost of excess use charges ($12,300,000 in excess use charges was billed to retail accounts in fiscal year 1991-92 alone)

The ability of SFPUC's retail customers to achieve a 25 percent reduction in the future is highly unlikely due to the "hardening" of water demands that occurred during and subsequent to the drought. The rationing programs implemented by San Francisco during the 1987-92 drought were measured by comparison to calendar year 1987 water deliveries, i.e., pre-drought conditions.

During the 1987-92 drought San Francisco's retail and wholesale water customers implemented numerous conservation measures that have led to permanent per capita water usage savings. San Francisco's current water demand is likely hardened as compared to the 1987 level of water demand. This situation leads to a conclusion that comparable rationing goals (e.g., up to 25 percent reduction) would be more difficult to achieve since the drought, and would require measures in excess of those implemented during the 1987-92 drought to achieve a comparable percentage of delivery reduction.

As the level of rationing increases, the economic and societal impacts become more severe. The SFPUC has first hand experience in attempting to employ rationing to levels, which are intolerable to citizens and businesses.

In 1991, water storage had deteriorated and the SFPUC was forced to immediately adopt a 45 percent system-wide rationing plan. It was proposed the reduction would be achieved through a 33 percent reduction to inside water use and a 90 percent reduction to outside water use.

San Francisco's plan for meeting its rationing goal included the following minimum and maximum criteria:

- *Maximum Allocation for Single and Multi-family Residences.* No single-family residence shall receive an allocation of more than 300 gallons per day: no multi-family residence shall receive an allocation of more than 150 gallons per day times the number of living units in the building.

- *Minimum Allocation for All Residential Accounts.* A minimum of 50 gallons per day per documented resident will be allowed. However, a minimum allocation will not be approved to increase an allocation above current usage absent a documented change in circumstances.

- *Irrigation Services.* Accounts classified for irrigation only will be reduced by 90 percent.

- *Commercial/Industrial Allocations.* Commercial and industrial allocations will be reduced by 32 percent. Hospitals and other health care facilities may be subject to lesser restrictions subject to verification that all conservation measures are in place; such approval shall require an on-site conservation inspection.

- *Allocations for New Accounts.* Initial allocations will be established at 50 gallons per day. These allocations will be re-evaluated after customers have installed retrofit kits provided by the San Francisco Water Department. After verification of installation, allocations will be calculated on the basis of the number of documented residents within a household, or, in the case of commercial or industrial customers, on the basis of business data supplied to the Department.

Additional water use restrictions and prohibitions were enforced:

- The washing of all automobiles, motorcycles, RVS, trucks, transit vehicles, trailers, boats, trains and airplanes was prohibited outside of a commercial washing facility.

- Exceptions to the above use restriction were windows on all vehicles and such commercial or safety vehicles requiring cleaning for health and safety reasons.

- Water used for all cooling purposes or for commercial car washes had to be recycled.

- The use of potable water on golf courses was limited to the irrigation of putting greens. The use of groundwater and reclaimed water was permitted when approved by the Department of Health.

- The filling of new swimming pools, spas, hot tubs or the draining and refilling of existing pools, etc., was prohibited; topping off was allowed to the extent that the designated allocation was not exceeded.
- The irrigation of median strips with potable water was prohibited. The use of groundwater and reclaimed water was permitted when approved by the Department of Health.
- The use of potable water for street sweepers/washers was prohibited. The use of groundwater and reclaimed water was permitted when approved by the Department of Health.

Public and commercial response to 45 percent rationing was overwhelmingly negative. During the first weeks after notification of the program, SFPUC received over 2,000 appeal letters per day. In the month before rationing was returned to 25 percent, 19,000 appeals, 12,000 telephone calls, and 1,500 walk-in complaints occurred.

Both the allocation levels and new prohibitions required to meet this level of rationing would have had a devastating effect on commercial enterprises. Some water uses would have simply been prohibited. Simply put, rationing had been taken to a level that was considered intolerable to citizens and had become economically disastrous.

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

RESOLUTION No. 88-0155

WHEREAS, The San Francisco Water Department obtains water from the reservoirs operated by the Hetch Hetchy Water and Power and from local Bay Area reservoirs; and

WHEREAS, Due to critically low supplies of water within the reservoirs and anticipated low levels of inflow into the reservoirs, such that unless consumption is decreased there may be insufficient water supplies for human consumption, sanitation and fire protection; and

WHEREAS, Decreases in water consumption may be accomplished by reducing allocations to the Water Department's wholesale customers and by imposing water use restrictions on the Water Department's retail customers, as set forth in the Water Rationing Rules and Regulations, issued on April 21, 1988 and attached hereto as Water Rationing Rules and Regulations; and

WHEREAS, This Commission recognizes the need to declare a Water Shortage Emergency (Water Code Sec. 350, et. seq.) due to critically low water supplies now available, and the need for a reduction in water use by the San Francisco Water Department's Suburban Wholesale Customers; and

WHEREAS, This Commission recognizes the need to adopt a Water Conservation Program (Water Code Sec. 375, et. seq.) due to the critically low water supplies now available, and the need for a reduction in water use by the San Francisco Water Department's retail customers; and

WHEREAS, The City of San Jose is, by Resolution 85-0256, a temporary and interruptible wholesale customer of the Water Department, and the Settlement Agreement and Master Water Sales Contract between the City and County of San Francisco and certain Suburban Purchasers in San Mateo County, Santa Clara County and Alameda County (Settlement Agreement) requires action by the Commission to interrupt service to the City of San Jose (Section 8.17); and

WHEREAS, The City of Santa Clara is, by Resolution 85-0257, a temporary and interruptible wholesale customer of the Water Department, and the Settlement Agreement requires action by the Commission to interrupt service to the City of Santa Clara (Section 8.17); and

WHEREAS, Additional funding in the amount of $648,780 for FY 1988/89 has been identified by the Water Department for implementation of a mandatory water rationing program; and

WHEREAS, on April 21, 1988, the Water Department submitted to this Commission a Water Conservation Program; and

WHEREAS, The Conservation Program shall cease to exist in whole or in part at such time as the Commission finds that the supply of water available to the Water Department's service area has been replenished or augmented so that there are sufficient supplies to meet the needs of the Water Department's customers without the continued implementation of these measures; and

0019I

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission

at its meeting of APRIL 28 1988

Romaine A. Boldridge
Secretary, Public Utilities Commission

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

RESOLUTION No. 88-0155

WHEREAS, The recommended Water Conservation Program has received wide-spread public distribution; and

WHEREAS, Members of the public have been given an opportunity to, and have expressed their views on the recommended Water Conservation Program in a public hearing; now, therefore be it

RESOLVED, That this Commission declares a Water Shortage Emergency; and

BE IT FURTHER RESOLVED, That this Commission adopts a Water Conservation Program; and

BE IT FURTHER RESOLVED, That this Commission approves the Water Conservation Program dated April 21, 1988 as amended April 28, 1988, and directs that it be placed in force on May 1, 1988; and

BE IT FURTHER RESOLVED, That it is not the Commission's intention to interrupt water service to the cities of San Jose and/or Santa Clara; however, pursuant to its obligation under the Settlement Agreement and Master Water Sales Contract this Commission authorizes the General Manager of the Water Department to interrupt water service to the cities of San Jose and/or Santa Clara if necessary to achieve the required water saving, however, prior to actual interruption of service to either the City of San Jose or Santa Clara, the General Manager of the Water Department shall report to the Commission the need for interruption and receive affirmation from the Commission prior to institution of the interruption; and the Commission further directs the General Manager of the Water Department to mitigate the effect of the interruptions to the extent possible and consistent with the needs of San Francisco's permanent customers; and

BE IT FURTHER RESOLVED, That this Commission hereby authorizes the additional budget needs to be added to the Water Department's Conservation Programmatic Budget, thus amending the Water Department's budget request for FY 1988/89; and

BE IT FURTHER RESOLVED, That this Commission hereby designates Tuesday, May 24, 1988 as the date for a public hearing by the Public Utilities Commission for considering proposals for rate increases and additional charges for water service and water supplied by the San Francisco Water Department to retail customers; and

BE IT FURTHER RESOLVED, That this Commission hereby designates Tuesday, May 24, 1988 as the date for a public hearing by the Public Utilities Commission for considering proposals for rate structure adjustments for water service and water supplied by the San Francisco Water Department to wholesale customers; and

BE IT FURTHER RESOLVED, That the revenue requirements and an analysis of the rate increases, rate structure adjustments and additional charges be made available for public inspection and review beginning Monday, May 16, 1988 in Room 287, City Hall, San Francisco.

0019f

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of APRIL 28 1988

Romaine A. Boldridge
Secretary, Public Utilities Commission

APPENDIX L

Retail Water Shortage Allocation Plan

2015 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

Prepared by: The San Francisco Public Utilities Commission

June 2016

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

RETAIL WATER SHORTAGE ALLOCATION PLAN

December 11, 2001

Table of Contents

I. Introduction

A. Purpose and Need for Retail Water Shortage Allocation Plan

The intent of the Retail Water Shortage Allocation Plan (Plan) is to provide the San Francisco Public Utilities Commission (SFPUC) with a guidance tool to be used for allocating water amongst the City and County San Francisco retail customers ("retail customers") in the event of a water shortage due to drought. Additionally, the Plan provides retail customers with a framework for understanding how the SFPUC intends to allocate water resources during times of water shortage due to drought. The expectation is that this Plan can help retail customers better anticipate how their individual water supply will be affected during a drought.

The need for this Plan has come about as a result of a series of actions and experiences including the SFPUC's adoption of the Interim Water Shortage Allocation Plan and the drought of 1987-1992. At the time of the 1987-1992 drought, the SFPUC, in the absence of a drought plan, reacted to the drought by adopting a short-term approach for allocating water resources amongst both retail and wholesale customers. This Plan in combination with the Interim Water Shortage Allocation Plan puts in place a long-term plan for responding to levels of water shortage due drought. The following sections describe these actions and experiences in more detail.

1. Interim Water Shortage Allocation Plan

In October 2000, the SFPUC adopted an Interim Water Shortage Allocation Plan (IWSAP) that provides a method and process by which the SFPUC intends to allocate water resources between its collective retail customers and wholesale customers during system-wide water shortages of up to 20 percent resulting from drought. The IWSAP was subsequently adopted by all 29 wholesale customers between October 2000 and June 2001 thereby officially activating the allocation method and process outlined in the IWASP.

The allocation method adopted in the IWSAP relies on a percentage decrease of inside and outside water use and provides a notification schedule for informing customers of an upcoming drought. The IWSAP also outlines a structure for water transfers between the retail and wholesale customers. Finally, the IWSAP identifies an enforcement process for ensuring that the allocations are adhered to through the application of excess use charges.

This Retail Plan is consistent with the IWSAP in its methodology, schedule and enforcement process.

2. Past Drought Experience

The SFPUC, along with the entire State of California, experienced a significant drought from 1987 to 1992. During this time the SFPUC experienced system-wide shortages of 25 to nearly 45 percent. In response to the drought, the SFPUC instituted mandatory rationing which required retail customers to reduce indoor and outdoor consumption based on specified allocations for those use types. As the drought progressed, SFPUC retail customers were required to reduce total consumption by 14 percent, up to approximately 32 percent. If customers consumed beyond their allotted amount they were faced with excess use charges. For the most part, customers were able to reduce their indoor use through installation of water-conserving devices such as low-flow toilets, showerheads and faucet aerators.

The Customer Service Bureau of the SFPUC created a short-term rationing unit to implement the drought program. The rationing unit's primary responsibility was to enforce mandatory rationing and manage the allocation and appeal process. Throughout the drought, the rationing unit received 131,000 requests for modified allocations. In general, allocations were modified on the basis of increased occupancy, medical exemptions, allowances for past conservation, increased business, and other miscellaneous reasons. Modifications were based on a per capita allotment.

The rationing unit also performed audits on those customers who consumed water beyond their allocations. This was done in an effort to identify the presence of leaks or other system failures that resulted in excess use.

B. Long-term Conservation Programs and Existing Demand Reduction Policies/Ordinances

1. Long-term Conservation Programs

In 1986, prior to the 1987-1992 drought, the SFPUC established a long-term conservation program. A conservation administrator was hired to implement the program. The programs, at that time, included public information and education; a conservation device retrofit program; landscape water audit program; and a low-use landscaping program. During the drought the long-term conservation program continued.

In 1991, the SFPUC elevated its long-term conservation program when it became a signatory to the *Memorandum of Understanding Regarding Urban Water Conservation in California.* This MOU outlined water-conserving Best Management Practices (BMPs) that all signatories agreed to implement. Today's BMPs include:

- Interior and Exterior Water Audits and Incentive for Single Family Residential and Multi-family Residential Customers
- Residential Plumbing Retrofit
- System Water Audits, Leak Detection and Repair
- Metering with Commodity rates for all New Connections and Retrofit of Existing Connections
- Large Landscape Conservation Programs and Incentives
- Horizontal Axis Washer Rebate Programs
- Public Information
- School Education Programs
- Commercial, Industrial and Institutional Water Conservation
- Wholesale Agency Assistance Programs
- Conservation Pricing
- Conservation Coordinator
- Water Waste Prohibition

- Residential Ultra Low Flush Toilet Replacement Programs

Through the implementation of the long-term conservation program, the SFPUC retail residential customers have reduced their per capita per day (pcpd) demand by 12 gallons. That is, prior to the 1987-1992 drought per capita residential demand was at 73 gallons per capita per day (gpcpd) while current demand is at 61 gpcd. Approximately 95 percent of SFPUC retail customers have signed affidavits confirming that they have installed water-conserving devices in their homes to eliminate water waste. Such devices include low flush toilets, faucet aerators and low flow showerheads.

2. *Existing Demand Reduction Policies/Ordinances*

In addition to the long-term conservation programs in place, the SFPUC and Board of Supervisors have implemented several demand reduction policies and ordinances that encourage the reduction of potable water use. These policies and ordinances range from requiring installation of conservation devices at the time of residential resale to development of groundwater and recycled water sources. The following summarizes measures adopted through 2001.

Water Conservation Ordinances

Ordinance 392-90: Water Conservation Fixtures in New and Renovated Buildings [1]. This ordinance changed San Francisco plumbing codes to require all new buildings (and all buildings in which the water drainage system is substantially altered modified or renovated) to install/retrofit toilets and urinals with fixtures using no more than 1.6 gallons per flush and 1 gallon per flush, respectively.

Ordinance 185-91 and *Ordinance 346-91: Plumbing Fixture Retrofit in Multi-family Residential Buildings and Single-Family Residential Buildings*[2]. Collectively these ordinances require water conservation device retrofits within multi-family and single-family residential buildings upon sale, transfer of title, or major improvement to a dwelling. The ordinance also required all applicable fixtures within multi-family residential units to be retrofitted within three years subsequent to the effective date of the ordinances (by the end of 1994).

Retrofit requirements include:

- Installation of Showerheads with a capacity not exceeding 2.5 gallons per minute;
- Installation of aerators attached to sinks and basins where possible; and
- Installation of flush reducers, flow restrictors, volume reducers, or toilets with a capacity not exceeding 3.5 gallons per flush.

Ordinance 359-91: Plumbing Fixture Retrofit of Commercial Buildings, including Tourist Hotels and Motels[3]. This ordinance required the same plumbing retrofit requirements for commercial buildings, including tourist hotels and motels as was required for single and multi-family residential buildings. Compliance of this ordinance was also required by 1994.

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[1] San Francisco Plumbing Code sections 905 and 1001.1

[2] San Francisco Housing Code, Chapter 12A, Section 12A01-12A14

[3] San Francisco Building Code, Chapter 53B, Sections 53B01-53B15

Ordinance 92-91(as amended by Ordinance 192-00): Water Use for Landscaping in New Developments[4]. This ordinance requires particular water-conserving landscape strategies be employed for any new commercial, governmental or residential (two or more units) building on a lot exceeding 3,500 square feet or with a landscaping area of more than 1,000 square feet. The specific requirements of the ordinance include:

- Total area devoted to turf grass; decorative water use and water intensive planting must be limited to 15% of the parcel area. The limitation does not apply to children's play areas, public recreation areas or other such areas;
- Strips of turf less than 8 feet wide are prohibited;
- Water intensive plants must be grouped together and must be irrigated on a separate cycle from turf grass;
- Slopes exceeding 10% adjacent to the hardscape cannot consist of turf grass;
- All large areas must have separately metered irrigation systems;
- Valves and circuits shall be separated based on water use and must be set to operate between 5 p.m. and 10 a.m.; and
- A soil analysis must be done on the soil used for the landscape. A report specifying how the soil deficiencies will be meet must accompany the application for the meter.

Ordinance 148-99: Plumbing Retrofit of Municipal Buildings[5]. This ordinance requires all municipal buildings to replace their water-inefficient toilets with 1.6 gallons per flush toilets and showerheads with 1.5 gallons per minute showerheads by June 6, 2005.

<u>Recycled Water Ordinances</u>

Ordinances 390-91 and *391-91(as amended by Ordinance 393-94): Mandatory Use of Reclaimed Water*[6]. These ordinances require the development of a Recycled Water Master Plan including the designation of recycled (or reclaimed) water use areas within San Francisco and requires the installation of dual plumbing systems within the recycled water use areas for the following situations:

- New or remodeled buildings and all subdivisions (except condominium conversions) with a total area of 40,000 square feet or more; and
- New and existing irrigated areas of 1,000 square feet or more.

Ordinance 175-91: Mandatory Use of Non-Potable Water for Soil Compaction and Dust Control[7]. This ordinance requires the use of non-potable water for soil compaction and dust control during construction and demolition projects.

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[4] San Francisco Administrative Code, Chapter 63, 63-63.11

[5] San Francisco Administrative Code, Chapter 82, Section 4.

[6] San Francisco Public Works Code, Article 22, Sections 1200-1210

[7] San Francisco Public Works Code, Article 21, Sections 1100-1107

Water Waste Prohibitions

The Customer Service Bureau currently enforces several water waste prohibitions through a complaint/inspection process. The following prohibitions are subject to that process:

- Water waste, including but not limited to, any flooding or runoff into the street or gutters is prohibited;
- Hoses used for any purpose must have positive shut-off valves;
- Restaurants shall serve water to customers only upon request; and
- Water used for all cooling purposes and commercial car washes must be recycled.

3. Relationship between Future Demand Reductions and Existing Long-term Conservation Programs

The SFPUC retail customers are facing a hardened demand as a result of long-term conservation programs and installation of water-conserving devices during the 1987-92 drought. As a result of these factors, residential demand has been reduced by 12 gallons per capita per day (gpcpd) since pre-drought demand levels. In addition, approximately 95 percent of residential customers have signed affidavits attesting to the fact that they have installed low-flush toilets, faucet aerators and low-flow showerheads. Furthermore, the SFPUC's consistent implementation of BMPs for water conservation, as identified above, has resulted in hardened demand for commercial, industrial and institutional customers.

This hardened demand means that reducing demand during future droughts will be challenging. As mentioned previously, during the 1987-92 drought there was an opportunity to reduce demand by installing low-flush toilets, faucet aerators and low-flow showerheads. That opportunity has been significantly reduced. This means that during the next drought demand reduction will most likely come from changing the frequency in which water-consuming devices are used. For example, reducing the number of times the toilet is flushed or running the washing machine less frequently.

Despite the challenge, there is a need for the SFPUC to adopt a plan to be implemented during droughts that will result in reducing water delivery from the SFPUC reservoir system. This includes adopting a water shortage allocation plan, the principal objective of this Retail Plan.

C. Components of the Plan

The Retail Plan consists of two primary sections: (1) Declaring a water shortage and (2) Allocation method and process. The former section describes the process for identifying and declaring a water shortage due to drought. The latter section describes the process of allocating water amongst retail customers during a drought, the process of appealing those allocations and enforcement of allocations.

II. Process for Declaring Shortage

A. Timing and Assessment of Water System Conditions

The SFPUC water supply system relies on precipitation and snowmelt stored in its reservoirs from one year to the next. It is this "carry-over" storage that the SFPUC relies on to be able to meet wholesale and retail demand. Because of the importance of "carry-over" storage, the water supply condition of the SFPUC system is constantly monitored and evaluated. Look-ahead forecasts are updated as a year's hydrology and operations change. Generally in early winter of any year, SFPUC staff can begin providing a forecast of water supply conditions for the upcoming year based on known and anticipated winter and spring precipitation and snowpack. The annual precipitation, snowmelt, and "carry-over" storage together constitute the SFPUC's reservoir storage condition. Using data for each of these factors, SFPUC staff is able to determine whether the reservoir system will be capable of serving full deliveries to the SFPUC customers.

Consistent with the Interim Water Shortage Allocation Plan, if the SFPUC reservoir system appears incapable of meeting system-wide demand due to drought, the SFPUC is expected to declare a water shortage by March 31 of that drought year. The General Manager, or designee, is responsible for declaring such a shortage.

B. Delivery Reduction Levels

To aid in balancing the SFPUC supplies with demands during drought, the SFPUC has developed a general protocol that links anticipated total[8] reservoir storage conditions to suggested delivery reductions. The SFPUC total reservoir system has the capacity to store up to 1,627,000 acre-feet. In relation to this storage capacity and a current system-wide demand of 260 million gallons per day (mgd), when it appears the total system storage will not reach above approximately 1,000,000 acre-feet at the end of the spring-summer snowmelt, the SFPUC may begin to evaluate whether the reservoir system will be capable of serving full deliveries to its customers.[9] If the reservoir system is determined incapable of serving full deliveries to SFPUC customers, the SFPUC may impose a level of delivery reduction. As anticipated reservoir storage becomes more depleted during drought, a greater level of delivery reduction may be required. There are three stages of water delivery reduction that correspond to the SFPUC protocol. The three stages are:

(1) Stage 1 – requires system-wide demand reduction of 5 to 10 percent. This stage results in a voluntary rationing request of customers. At this stage, it is likely that retail water customers will be alerted to the status of water supply conditions and reminded of water use prohibitions as well as informed of any incentives and programs available to reduce water demand (i.e. acceleration of long-term conservation programs such as toilet rebate programs, leak detection audits, and the like)

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[8] "total reservoir storage" includes all system reservoirs (Lloyd, Eleanor, Hetch Hetchy, San Anotonio, Calaveras, Crystal Springs, Pilarcitos, and San Andreas) and the water bank at New Don Pedro Reservoir.
[9] This reduction point is subject to change as total system-wide demand increases over time.

(2) Stage 2 – requires system-wide demand reduction of 11 to 20 percent. This stage results in mandatory rationing programs. In addition to implementing Stage 1 actions, all customers will receive an allocation of water. Any use beyond that allocation will become subject to excess use charges, installation of flow restrictor devices or shut-off of water. The latter two consequences may also be imposed if water waste prohibitions are violated.

(3) Stage 3 – requires system-wide demand reduction of 20 percent or greater. This stage results in mandatory rationing programs and results in the same actions identified under Stage 2 with further reduced allocations.

C. Initiation of Delivery Reduction Program

Prior to the initiation of any of water delivery reductions, whether it be initial implementation of reduced delivery or increasing the severity of water shortage, the SFPUC will outline the water supply situation, proposed water use reduction objectives, alternatives to water use reductions, methods to calculate water use allocations and adjustments, compliance methodology and enforcement measures, and budget considerations at a regularly scheduled Commission meeting for public input. The meeting will be advertised and the public will be invited to comment on the SFPUC's intent to reduce deliveries in accordance with the requirements of California Water Code Section 6066 of the Government Code.

Revenue and Expenditure Impacts During Water Shortages. The SFPUC uses a uniform volume charge. As a result, as sales decrease revenues are lost on a per unit basis. Because the marginal cost of water production is miniscule, as production is reduced the cost of service remains the same. Therefore, during a water shortage, as occurred during the 1987-92 drought, the SFPUC may need to raise water rates to make up for lost revenue due to less water use. The SFPUC retail rates, however, are frozen until 2006 due to Proposition H. As a result, retail rates cannot be adjusted to make up for revenue shortfalls unless voters repeal the Proposition or the Mayor declares an emergency as provided for in the City's Charter. The SFPUC does maintain an unappropriated fund balance that can be used to offset the effects of revenue shortfall. Budget considerations will be discussed at the time a drought is declared and revisited as the drought progresses.

III. Allocation Method and Process

A. Types of Allocation Methods

In the event of a mandatory rationing program, the SFPUC must adopt a system for allocating water amongst its retail customers. During the 1987-1992 drought four allocation methods were considered. They were the inside/outside or seasonal allocation method, the per capita allocation method, the uniform allocation method, and the percentage allocation method. The following provides of a description of each method and potential advantages or disadvantages of applying each method.

Inside/Outside allocation method. The Inside/Outside method, also referred to as seasonal method, applies a percent reduction to both indoor and outdoor use. To determine an individual's allocation, a base year is used and reductions are made to both inside and outside usage. Winter usage is identified as typically reflecting inside use. The average of the winter months (November, December, January, February) of the base year is used as the baseline for determining inside use for all 12 months. Usage in excess of the baseline is considered outside use. The monthly or bi-monthly inside/outside allocation is a composite of the inside use and the outside use reduced by their respective percentages. This method distributes water equitably and has been proven effective in achieving prior system-wide consumption goals. However, because this method reduces water allocations for all customers regardless of their current use, there is concern that water users consuming very low amounts of water will be affected disproportionately.

Per capita allocation method. The per capita allocation method applies a fixed amount of daily water for each resident. The allocation method requires that each residential occupant receives a fixed daily amount of water. To implement this method a census of the service area is required. Conducting a census is highly time consuming and the response to the survey is often statistically low and inaccurate. The method does not allow for differences in dwelling type, existing landscaping needs or special individual circumstances. A per capita allocation would prove unworkable with commercial and industrial customers and would require a different method for determining allocations.

Uniform allocation method. The uniform allocation method applies a fixed daily amount per dwelling unit for all residential customers. This method does not distribute water equitably to all customers, especially since it does not take into considerations the number of individuals living in the dwelling unit. As in the per capita plan, this method would prove unworkable for commercial and industrial customers.

Percentage allocation method. The method requires water allocation to be based on a straight percent reduction of past use. As an example to achieve a specified reduction goal, all customers would be allotted a percentage of the amount used in each billing period in the base year. The method requires a much greater reduction in inside use and could cause hardship on residential and commercial customers.

B. Preferred Allocation Method: Inside/Outside Method

During the 1987-92 drought the Inside/Outside method was implemented because it was found to be the most fair and reasonable method amongst the alternatives. At that time for those customers that appealed their allocations a per capita allocation was applied to the account.[10]

The Inside/Outside method will be applied to allocating water amongst retail customers during a water shortage due to drought. The allocation method will be applied to all accounts using more than 3 units of water per two-month billing period. A percentage reduction of inside and outside use will be applied to all accounts using more than 3 units of water during a two-month billing period. The appropriate percentage reductions to inside and outside use will be determined by the General Manager, or designee. The per capita allocation method will be used for customers who appeal their allotments. The formula will be similar in structure to that used during the 1987-92 drought. The General Manager, or designee, will determine at the time of the drought the number of gallons per capita per day to be used for the per capita method.

C. Allocation Process

As discussed previously, if the SFPUC anticipates that the reservoir system will be incapable of serving full deliveries to its customers, the SFPUC will announce a drought by March 31st. Consistent with the Interim Water Shortage Allocation Plan, the SFPUC will inform its retail customers of a water shortage by March 31st. The SFPUC will determine water allocations for each retail customer account using the Inside/Outside allocation method. Average winter and summer use factored into the Inside/Outside methodology will be based on water use for each retail customer from the previous year. For drought periods covering consecutive years, allocations will be based on water use for the last year prior to the drought declaration. The SFPUC will provide water use allocations to all retail customers by May 1st of the drought year. The water use allocations will become effective July 1st.

D. Appeal Process

On or before May 1st, retail customers will be notified of their reduced water allocations. Each retail customer will have the opportunity to appeal the allocation based on increased occupancy, medical exemptions, increased business, or other miscellaneous reasons. The SFPUC will provide retail customers with instructions on how to file appeals at the time the customers are notified of the water use allocations. The SFPUC will also inform customers of the methodology to be used in modifying allocations if they are granted.

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[10] For illustration purposes the following describes how the per capita method was applied to appeals. The per capita allocation was calculated based on the number of occupants and a formula of 63 gpcpd for the first occupant, 55 gpcpd for the second occupant and 50 gpcpd for each additional occupant with a maximum total of 498 gpd per dwelling unit. As the 1987-92 drought worsened, the per capita allocation was based on the number of occupants and a formula of 50 gpcpd and a maximum total of 300 gpd for single family residences. It is important to note that at the time of the drought the average residential use was 74 gpcpd. Current average demand is 61 gpcpd.

E. Enforcement

The primary methods of enforcing mandatory rationing include excess use charges; installation of flow restrictors and/or shut-off of water.

During the 1987-92 drought excess use charges were applied as follows:

- If a customer consumed up to 10% over their allotment they would be charged 2 times the normal rate;
- If a customer consumed 10.01% to 20% over their allotment they would be charged 8 times the normal rate; and
- If a customer consumed 20.01% or over their allotment they would be charges 10 times the normal rate.

In the event of mandatory rationing, the SFPUC will impose excess use charges similar to those described above. The General Manager, or designee, will inform retail customers of the multiplier rate that will be applied for determining excess use charges. The SFPUC will also offer an audit at the first run-over of the allocation to determine if there are any leaks. In some cases, excess use charges may be reversed if leaks are found and repaired immediately.

In the event that water is used in excess of the customer's specified allotment, the SFPUC could, after one written warning, install a flow restrictor on the customer's service line. The customer may be charged to install and remove the flow restrictor, as was done in the 1987-92 drought. The General Manager, or designee, will determine the relevant charge at the time of the drought. If a customer continues to consume water in excess of its allotment, the SFPUC has the authority to discontinue the customer’s water service and require the customer to bear the cost for the re-connection of water service.

The Landlord Pass-through Ordinance[11] allows landlords to pass up to 50 percent of excess use charges on to their tenants under the following conditions:

(a) the landlord must provide written certification that permanently-installed retrofit devices to reduce water use in toilet flushing or low-flow toilets (1.6 gallons per flush), low flow showerheads (no more than 2.5 gallons per minute), and faucet aerators (where installation is physically feasible);

(b) the landlord provides written certification that there are no none plumbing leaks in the building and that any reported leaks have been fixed; and

(c) the landlord provides a copy of the water bill for the period in which the penalty was charged.

Under mandatory rationing, the SFPUC will also specify waste water prohibitions that if violated may result in installation of a flow restrictor and shut-off of water, if the violation continues.

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[11] San Francisco Administrative Code Section 37.3

All or some of the following water waste prohibitions may be enforced during a drought. The General Manager, or designee, will declare and inform customers of all water waste prohibitions at the time of a drought.

Water Waste Prohibitions

- Water waste, including but not limited to, any flooding or runoff into the street or gutters, shall be prohibited.

- Hoses shall not be used to clean sidewalks, driveways, patios, plazas, homes, businesses, parking lots, roofs, awnings or other hard surfaces areas.

- Hoses used for any purpose shall have positive shutoff valves.

- Restaurants shall serve water to customers only upon request.

- Potable water shall not to be used to clean, fill or maintain levels in decorative fountains.

- Use of additional water shall not be allowed for new landscaping or expansion of existing facilities unless low water use landscaping designs and irrigation systems are employed.

- Water service connections for new construction shall be granted only if water saving fixtures or devices are incorporated into the plumbing system.

- Use of potable water for consolidation of backfill, dust control or other non-essential construction purposes shall be prohibited.

- Irrigation of lawns, play fields, parks, golf courses, cemeteries, and landscaping of any type with potable water shall be reduced by at least the amount specified for outside use in the adopted rationing plan.

- Verified water waste as determined by the Water Department would serve as prima facie evidence that the allocation assigned to the water account is excessive; therefore, the allocation shall be subject to review and possible reduction, including termination of service.

- Water used for all cooling purposes shall be recycled.

- The use of groundwater and/or reclaimed water for irrigation of golf courses, median strips, and similar turf areas shall be strongly encouraged.

- The use of groundwater and/or reclaimed water for street sweepers/washers shall be strongly encouraged.

- The washing of all automobiles, motorcycles, RVS, trucks, transit vehicles, trailers, boats, trains and airplanes shall be prohibited outside of a commercial washing facility.

- Exceptions to the above use restriction will apply to windows on all vehicles and such commercial or safety vehicles requiring cleaning for health and safety reasons.

- Water used for all cooling purposes or for commercial car washes shall be recycled.

- The use of potable water on golf courses shall be limited to the irrigation of putting greens. The use of groundwater and reclaimed water shall be permitted when approved by the Department of Health.

- The filling of new swimming pools, spas, hot tubs or the draining and refilling of existing pools, etc., shall be prohibited; topping off shall be allowed to the extent that the designated allocation is not exceeded.

- The irrigation of median strips with potable water shall be prohibited. The use of groundwater and reclaimed water shall be permitted when approved by the Department of Health.

- The use of potable water for street sweepers/washers shall be prohibited. The use of groundwater and reclaimed water shall be permitted when approved by the Department of Health.

APPENDIX M

Sample Water Shortage Contingency Resolution

2015 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

Prepared by: The San Francisco Public Utilities Commission

June 2016

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

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PUBLIC UTILITIES COMMISSION

City and County of San Francisco

RESOLUTION NO. **00-0244**

WHEREAS, The Public Utilities Commission in collaboration with the Bay Area Water Users Association, representing the Suburban Purchasers collectively, developed an Interim Water Shortage Allocation Plan (the Plan) pursuant to Section 7.03(a) of the 1984 Settlement Agreement and Master Water Sales Contract; and

WHEREAS, This Plan identifies a water allocation method to be used to determine the fair and reasonable share of water between the SFPUC and its Suburban Purchasers during times when the SFPUC determines a system-wide water shortage caused by drought; and

WHEREAS, The allocation method described in this Plan will be effective for system-wide shortages up to 20 percent during droughts; and

WHEREAS, This Plan provides for water transfers, banking and excess use charges; now, therefore, be it

RESOLVED, That this Commission adopts the Interim Water Shortage Allocation Plan, as attached; and, be it

FURTHER RESOLVED, That the Interim Water Shortage Allocation Plan does not take effect unless adopted by all 29 Suburban Purchasers.

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of October 24, 2000

Jill R. Thompson

Secretary, Public Utilities Commission

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PUBLIC UTILITIES COMMISSION

City and County of San Francisco

RESOLUTION NO. **01-0245**

WHEREAS, The SFPUC has prepared a Retail Water Shortage Allocation Plan that identifies a process and procedure for allocating water amongst its retail customers during a drought; and

WHEREAS, This Plan identifies a water allocation method to be used to determine the fair and reasonable share of water amongst its retail customers during times when the SFPUC determines a system-wide water shortage caused by drought; and

WHEREAS, The allocation method described in this Plan will be effective for system-wide shortages due to droughts; now, therefore, be it

RESOLVED, That this Commission adopts the Retail Water Shortage Allocation Plan.

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of *December 11, 2001*

Secretary, Public Utilities Commission

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APPENDIX N

Water Shortage Allocation Plan with Wholesale Customers

2015 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

Prepared by: The San Francisco Public Utilities Commission

June 2016

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

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WATER SHORTAGE ALLOCATION PLAN

This Interim Water Shortage Allocation Plan ("Plan") describes the method for allocating water between the San Francisco Public Utilities Commission ("SFPUC") and the Wholesale Customers collectively during shortages caused by drought. The Plan implements a method for allocating water among the individual Wholesale Customers which has been adopted by the Wholesale Customers. The Plan includes provisions for transfers, banking, and excess use charges. The Plan applies only when the SFPUC determines that a system-wide water shortage due to drought exists, and all references to "shortages" and "water shortages" are to be so understood. This Plan was adopted pursuant to Section 7.03(a) of the 1984 Settlement Agreement and Master Water Sales Contract and has been updated to correspond to the terminology used in the June 2009 Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County ("Agreement").

SECTION 1. SHORTAGE CONDITIONS

1.1. Projected Available SFPUC Water Supply. The SFPUC shall make an annual determination as to whether or not a shortage condition exists. The determination of projected available water supply shall consider, among other things, stored water, projected runoff, water acquired by the SFPUC from non-SFPUC sources, inactive storage, reservoir losses, allowance for carryover storage, and water bank balances, if any, described in Section 3.

1.2 Projected SFPUC Purchases. The SFPUC will utilize purchase data, including volumes of water purchased by the Wholesale Customers and by Retail Customers (as those terms are used in the Agreement) in the year immediately prior to the drought, along with other available relevant information, as a basis for determining projected system-wide water purchases from the SFPUC for the upcoming year.

1.3. Shortage Conditions. The SFPUC will compare the available water supply (Section 1.1) with projected system-wide water purchases (Section 1.2). A shortage condition exists if the SFPUC determines that the projected available water supply is less than projected system-wide water purchases in the upcoming Supply Year (defined as the period from July 1 through June 30). When a shortage condition exists, SFPUC will determine whether voluntary or mandatory actions will be required to reduce purchases of SFPUC water to required levels.

1.3.1 Voluntary Response. If the SFPUC determines that voluntary actions will be sufficient to accomplish the necessary reduction in water use throughout its service area, the SFPUC and the Wholesale Customers will make good faith efforts to reduce their water purchases to stay within their annual shortage allocations and associated monthly water use budgets. The SFPUC will not impose excess use charges during periods of voluntary rationing, but may suspend the prospective accumulation of water bank credits, or impose a ceiling on further accumulation of bank credits, consistent with Section 3.2.1 of this Plan.

1.3.2 Mandatory Response. If the SFPUC determines that mandatory actions will be required to accomplish the necessary reduction in water use in the SFPUC service area, the SFPUC may implement excess use charges as set forth in Section 4 of this Plan.

1.4. Period of Shortage. A shortage period commences when the SFPUC determines that a water shortage exists, as set forth in a declaration of water shortage emergency issued by the SFPUC pursuant to California Water Code Sections 350 et seq. Termination of the water shortage emergency will be declared by resolution of the SFPUC.

SECTION 2. SHORTAGE ALLOCATIONS

2.1. Annual Allocations between the SFPUC and the Wholesale Customers. The annual water supply available during shortages will be allocated between the SFPUC and the collective Wholesale Customers as follows:

Level of System Wide Reduction in Water Use Required	Share of Available Water	
	SFPUC Share	Wholesale Customers Share
5% or less	35.5%	64.5%
6% through 10%	36.0%	64.0%
11% through 15%	37.0%	63.0%
16% through 20%	37.5%	62.5%

The water allocated to the SFPUC shall correspond to the total allocation for all Retail Customers.

2.2 Annual Allocations among the Wholesale Customers. The annual water supply allocated to the Wholesale Customers collectively during system wide shortages of 20 percent or less will be apportioned among them based on a methodology adopted by all of the Wholesale Customers, as described in Section 3.11(C) of the Agreement. In any year for which the methodology must be applied, the Bay Area Water Supply and Conservation Agency ("BAWSCA") will calculate each Wholesale Customer's individual percentage share of the amount of water allocated to the Wholesale Customers collectively pursuant to Section 2.1. Following the declaration or reconfirmation of a water shortage emergency by the SFPUC, BAWSCA will deliver to the SFPUC General Manager a list, signed by the President of BAWSCA's Board of Directors and its General Manager, showing each Wholesale Customer together with its percentage share and stating that the list has been prepared in accordance with the methodology adopted by the Wholesale Customers. The SFPUC shall allocate water to each Wholesale Customer, as specified in the list. The shortage allocations so established may be transferred as provided in Section 2.5 of this Plan. If BAWSCA or all Wholesale Customers do not provide the SFPUC with individual allocations, the SFPUC may make a final allocation decision after first meeting and discussing allocations with BAWSCA and the Wholesale Customers.

The methodology adopted by the Wholesale Customers utilizes the rolling average of each individual Wholesale Customer's purchases from the SFPUC during the three immediately preceding Supply Years. The SFPUC agrees to provide BAWSCA by November 1 of each year a list showing the amount of water purchased by each Wholesale Customer during the immediately preceding Supply Year. The list will be prepared using Customer Service Bureau report MGT440 (or comparable official record in use at the time), adjusted as required for any reporting errors or omissions, and will be transmitted by the SFPUC General Manager or his designee.

2.3. Limited Applicability of Plan to System Wide Shortages Greater Than Twenty Percent. The allocations of water between the SFPUC and the Wholesale Customers collectively, provided for in Section 2.1, apply only to shortages of 20 percent or less. The SFPUC and Wholesale Customers recognize the possibility of a drought occurring which could create system-wide shortages greater than 20 percent despite actions taken by the SFPUC aimed at reducing the probability and severity of water shortages in the SFPUC service area. If the SFPUC determines that a system wide water shortage greater than 20 percent exists, the SFPUC and the Wholesale Customers agree to meet within 10 days and discuss whether a change is required to the allocation set forth in Section 2.1 in order to mitigate undue hardships that might otherwise be experienced by individual Wholesale Customers or Retail Customers. Following these discussions, the Tier 1 water allocations set forth in Section 2.1 of this Plan, or a modified version thereof, may be adopted by mutual written consent of the SFPUC and the Wholesale Customers. If the SFPUC and Wholesale Customers meet and cannot agree on an appropriate Tier 1 allocation within 30 days of the SFPUC's determination of water shortage greater than 20 percent, then (1) the provisions of Section 3.11(C) of the Agreement will apply, unless (2) all of the Wholesale Customers direct in writing that a Tier 2 allocation methodology agreed to by them be used to apportion the water to be made available to the Wholesale Customers collectively, in lieu of the provisions of Section 3.11(C).

The provisions of this Plan relating to transfers (in Section 2.5), banking (in Section 3), and excess use charges (in Section 4) shall continue to apply during system-wide shortages greater than 20 percent.

2.4. Monthly Water Budgets. Within 10 days after adopting a declaration of water shortage emergency, the SFPUC will determine the amount of Tier 1 water allocated to the Wholesale Customers collectively pursuant to Section 2.1. The SFPUC General Manager, using the Tier 2 allocation percentages shown on the list delivered by BAWSCA pursuant to Section 2.2, will calculate each Wholesale Customer's individual annual allocation. The SFPUC General Manager, or his designee, will then provide each Wholesale Customer with a proposed schedule of monthly water budgets based on the pattern of monthly water purchases during the Supply Year immediately preceding the declaration of shortage (the "Default Schedule"). Each Wholesale Customer may, within two weeks of receiving its Default Schedule, provide the SFPUC with an alternative monthly water budget that reschedules its annual Tier 2 shortage allocation over the course of the succeeding Supply Year. If a Wholesale Customer does not deliver an alternative monthly water budget to the SFPUC within two weeks of its receipt of the Default Schedule, then its monthly budget for the ensuing Supply Year shall be the Default Schedule proposed by the SFPUC.

Monthly Wholesale Customer water budgets will be derived from annual Tier 2 allocations for purposes of accounting for excess use. Monthly Wholesale Customer water budgets shall be adjusted during the year to account for transfers of shortage allocation under Section 2.5 and transfers of banked water under Section 3.4.

2.5. Transfers of Shortage Allocations. Voluntary transfers of shortage allocations between the SFPUC and any Wholesale Customers, and between any Wholesale Customers, will be permitted using the same procedure as that for transfers of banked water set forth in Section 3.4. The SFPUC and BAWSCA shall be notified of each transfer. Transfers of shortage allocations shall be deemed to be an emergency transfer and shall become effective on the third business day after notice of the transfer has been delivered to the SFPUC. Transfers of shortage allocations shall be in compliance with Section 3.05 of the Agreement. The transferring parties will meet with the SFPUC, if requested, to discuss any effect the transfer may have on its operations.

SECTION 3. SHORTAGE WATER BANKING

3.1. Water Bank Accounts. The SFPUC shall create a water bank account for itself and each Wholesale Customer during shortages in conjunction with its resale customer billing process. Bank accounts will account for amounts of water that are either saved or used in excess of the shortage allocation for each agency; the accounts are not used for tracking billings and payments. When a shortage period is in effect (as defined in Section 1.4), the following provisions for bank credits, debits, and transfers shall be in force. A statement of bank balance for each Wholesale Customer will be included with the SFPUC's monthly water bills.

3.2. Bank Account Credits. Each month, monthly purchases will be compared to the monthly budget for that month. Any unused shortage allocation by an agency will be credited to that agency's water bank account. Credits will accumulate during the entire shortage period, subject to potential restrictions imposed pursuant to Section 3.2.1. Credits remaining at the end of the shortage period will be zeroed out; no financial or other credit shall be granted for banked water.

3.2.1. Maximum Balances. The SFPUC may suspend the prospective accumulation of credits in all accounts. Alternatively, the SFPUC may impose a ceiling on further accumulation of credits in water bank balances based on a uniform ratio of the bank balance to the annual water allocation. In making a decision to suspend the prospective accumulation of water bank credits, the SFPUC shall consider the available water supply as set forth in Section 1.1 of this Plan and other reasonable, relevant factors.

3.3. Account Debits. Each month, monthly purchases will be compared to the budget for that month. Purchases in excess of monthly budgets will be debited against an agency's water bank account. Bank debits remaining at the end of the fiscal year will be subject to excess use charges (see Section 4).

3.4. Transfers of Banked Water. In addition to the transfers of shortage allocations provided for in Section 2.5, voluntary transfers of banked water will also be permitted between the SFPUC and any Wholesale Customer, and among the Wholesale Customers. The volume of transferred water will be credited to the transferee's water bank account and debited against the transferor's water bank account. The transferring parties must notify the SFPUC and BAWSCA of each transfer in writing (so that adjustments can be made to bank accounts), and will meet with the SFPUC, if requested, to discuss any affect the transfer may have on SFPUC operations. Transfers of banked water shall be deemed to be an emergency transfer and shall become effective on the third business day after notice of the transfer has been delivered to the SFPUC.

If the SFPUC incurs extraordinary costs in implementing transfers, it will give written notice to the transferring parties within ten (10) business days after receipt of notice of the transfer. Extraordinary costs means additional costs directly attributable to accommodating transfers and which are not incurred in non-drought years nor simply as a result of the shortage condition itself. Extraordinary costs shall be calculated in accordance with the procedures in the Agreement and shall be subject to the disclosure and auditing requirements in the Agreement. In the case of transfers between Wholesale Customers, such extraordinary costs shall be considered to be expenses chargeable solely to individual Wholesale Customers and shall be borne equally by the parties to the transfer. In the case of transfers between the SFPUC and a Wholesale Customer, the SFPUC's share of any extraordinary transfer costs shall not be added to the Wholesale Revenue Requirement.

3.4.1. Transfer Limitations. The agency transferring banked water will be allowed to transfer no more than the accumulated balance in its bank. Transfers of estimated prospective banked credits and the "overdrafting" of accounts shall not be permitted. The price of transfer water originally derived from the SFPUC system is to be determined by the transferring parties and is not specified herein. Transfers of banked water shall be in compliance with Section 3.05 of the Agreement.

SECTION 4. WHOLESALE EXCESS USE CHARGES

4.1. Amount of Excess Use Charges. Monthly excess use charges shall be determined by the SFPUC at the time of the declared water shortage consistent with the calendar in Section 6 and in accordance with Section 6.03 of the Agreement. The excess use charges will be in the form of multipliers applied to the rate in effect at the time the excess use occurs. The same excess use charge multipliers shall apply to the Wholesale Customers and all Retail Customers. The excess use charge multipliers apply only to the charges for water delivered at the rate in effect at the time the excess use occurred.

4.2 Monitoring Suburban Water Use. During periods of voluntary rationing, water usage greater than a customer's allocation (as determined in Section 2) will be indicated on each SFPUC monthly water bill. During periods of mandatory rationing, monthly and cumulative water usage greater than a Wholesale Customer's shortage allocation and the associated excess use charges will be indicated on each SFPUC monthly water bill.

4.3. Suburban Excess Use Charge Payments. An annual reconciliation will be made of monthly excess use charges according to the calendar in Section 6. Annual excess use charges will be calculated by comparing total annual purchases for each Wholesale Customer with its annual shortage allocation (as adjusted for transfers of shortage allocations and banked water, if any). Excess use charge payments by those Wholesale Customers with net excess use will be paid according to the calendar in Section 6. The SFPUC may dedicate excess use charges paid by Wholesale Customers toward the purchase of water from the State Drought Water Bank or other willing sellers in order to provide additional water to the Wholesale Customers. Excess use charges paid by the Wholesale Customers constitute Wholesale Customer revenue and shall be included within the SFPUC's annual Wholesale Revenue Requirement calculation.

SECTION 5. GENERAL PROVISIONS GOVERNING WATER SHORTAGE ALLOCATION PLAN

5.1. Construction of Terms. This Plan is for the sole benefit of the parties and shall not be construed as granting rights to any person other than the parties or imposing obligations on a party to any person other than another party.

5.2. Governing Law. This Plan is made under and shall be governed by the laws of the State of California.

5.3. Effect on Agreement. This Plan describes the method for allocating water between the SFPUC and the collective Wholesale Customers during system-wide water shortages of 20 percent or less. This Plan also provides for the SFPUC to allocate water among the Wholesale Customers in accordance with directions provided by the Wholesale Customers through BAWSCA under Section 2.2, and to implement a program by which such allocations may be voluntarily transferred among the Wholesale Customers. The provisions of this Plan are intended to implement Section 3.11(C) of the Agreement and do not affect, change or modify any other section, term or condition of the Agreement.

5.4. Inapplicability of Plan to Allocation of SFPUC System Water During Non-Shortage Periods. The SFPUC's agreement in this Plan to a respective share of SFPUC system water during years of shortage shall not be construed to provide a basis for the allocation of water between the SFPUC and the Wholesale Customers when no water shortage emergency exists.

5.5. Termination. This Plan shall expire at the end of the Term of the Agreement.. The SFPUC and the Wholesale Customers can mutually agree to revise or terminate this Plan prior to that date due to changes in the water delivery capability of the SFPUC system, the acquisition of new water supplies, and other factors affecting the availability of water from the SFPUC system during times of shortage.

SECTION 6. ALLOCATION CALENDAR

6.1. Annual Schedule. The annual schedule for the shortage allocation process is shown below. This schedule may be changed by the SFPUC to facilitate implementation.

6.1.1

In All Years	Target Dates
1. SFPUC delivers list of annual purchases by each Wholesale Customer during the immediately preceding Supply Year	November 1
2. SFPUC meets with the Wholesale Customers and presents water supply forecast for the following Supply Year	February
3. SFPUC issues initial estimate of available water supply	February 1
4. SFPUC announces potential first year of drought (if applicable)	February 1
5. SFPUC and Wholesale Customers meet upon request to exchange information concerning water availability and projected system-wide purchases	February 1-May 31
6. SFPUC issues revised estimate of available water supply, and confirms continued potential shortage conditions, if applicable	March 1
7. SFPUC issues final estimate of available water supply	April 15th or sooner if adequate snow course measurement data is available to form a robust estimate on available water supply for the coming year.
8. SFPUC determines amount of water available to Wholesale Customers collectively	April 15th or sooner if adequate snow course measurement data is available to form a robust estimate on available water supply for the coming year.

In Drought Years	Target Dates
9. SFPUC formally declares the existence of water shortage emergency (or end of water shortage emergency, if applicable) under Water Code Sections 350 et. seq.	April 15-31
10. SFPUC declares the need for a voluntary or mandatory response	April 15-31
11. BAWSCA submits calculation to SFPUC of individual Wholesale Customers' percentage shares of water allocated to Wholesale Customers collectively	April 15- 31
12. SFPUC determines individual shortage allocations, based on BAWSCA's submittal of individual agency percentage shares to SFPUC, and monthly water budgets (Default Schedule)	April 25—May 10
13. Wholesale Customers submit alternative monthly water budgets (optional)	May 8-May 24
14. Final drought shortage allocations are issued for the Supply Year beginning July 1 through June 30	June 1
15. Monthly water budgets become effective	July 1
16. Excess use charges indicated on monthly Suburban bills	August 1 (of the beginning year) through June 30 (of the succeeding year)
17. Excess use charges paid by Wholesale Customers for prior year	August of the succeeding year

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APPENDIX O

California Urban Water Conservation Council Best Management Practice Coverage Reports 2013 and 2014

2015 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

Prepared by: The San Francisco Public Utilities Commission

June 2016

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

CUWCC BMP Retail Coverage Report 2013

Foundational Best Managemant Practices for Urban Water Efficiency

BMP 1.1 Operation Practices

ON TRACK

198 San Francisco PUC - Retail

1. Conservation Coordinator provided with necessary resources to implement BMPs?

Name: Julie Ortiz

Title: Water Conservation Manager

Email: jnortiz@sfwater.org

2. Water Waste Prevention Documents

WW Document Name	WWP File Name	WW Prevention URL	WW Prevention Ordinance Terms Description
Option A Describe the ordinances or terms of service adopted by your agency to meet the water waste prevention requirements of this BMP.		http://sfwater.org/modules/showdocument.aspx?documentid=1232	Section E, Rule 12 and Section F, Rule 16 of the SFPUC's Rules and Regulations Governing Water Service to Customers covers water waste prevention. Appendix F of the SFPUC's 2010 UWMP includes the SFPUC's Retail Water Shortage Allocation Plan
Option B Describe any water waste prevention ordinances or requirements adopted by your local jurisdiction or regulatory agencies within your service area.			
Option C Describe any documentation of support for legislation or regulations that prohibit water waste.			
Option D Describe your agency efforts to cooperate with other entities in the adoption or enforcement of local requirements consistent with this BMP.			
Option E Describe your agency support positions with respect to adoption of legislation or regulations that are consistent with this BMP.			
Option F Describe your agency efforts to support local ordinances that establish permits requirements for water efficient design in new development.			

At Least As effective As No

CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.2 Water Loss Control

ON TRACK

198 San Francisco PUC - Retail

Completed Standard Water Audit Using AWWA Software?	Yes
AWWA File provided to CUWCC?	Yes
FY 12-13 AWWA Water Audit Retailv2.xls	
AWWA Water Audit Validity Score?	
Complete Training in AWWA Audit Method	Yes
Complete Training in Component Analysis Process?	Yes
Component Analysis?	Yes
Repaired all leaks and breaks to the extent cost effective?	Yes
Locate and Repar unreported leaks to the extent cost effective?	Yes
Maintain a record keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair.	Yes

Provided 7 Types of Water Loss Control Info

Leaks Repairs	Value Real Losses	Value Apparent Losses	Miles Surveyed	Press Reduction	Cost Of Interventions	Water Saved (AF)
1638	0.18	5.45	265	True	1516743	2.73

At Least As effective As No

Exemption No

Comments:

We are reporting using Version 5 of the AWWA Water Audit spreadsheet, which does not automatically populate the Operational Efficiency Indicator table above. See the spreadsheet for each of the indicators.

BMP 1.3 Metering With Commodity

ON TRACK

198 San Francisco PUC - Retail

Numbered Unmetered Accounts	No
Metered Accounts billed by volume of use	Yes
Number of CII Accounts with Mixed Use Meters	19504
Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	Yes
Feasibility Study provided to CUWCC?	Yes

Date: 4/1/2013

Uploaded file name:

Completed a written plan, policy or program to test, repair and replace meters	Yes

At Least As effective As No

Exemption No

Comments:

CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.4 Retail Conservation Pricing

On Track

198 San Francisco PUC - Retail

Implementation (Water Rate Structure)

Customer Class	Water Rate Type	Conserving Rate?	(V) Total Revenue Comodity Charges	(M) Total Revenue Fixed Carges
Single-Family	Increasing Block	Yes	33756371.88	10075859
Multi-Family	Increasing Block	Yes	49832731.02	4968065.51
Commercial	Uniform	Yes	44718597.91	3052144.27
Industrial	Uniform	Yes	464828.51	45970.95
Institutional	Uniform	Yes	5892309.16	526282.43
Dedicated Irrigation	Allocation Based	Yes	4556749.82	397823.65
Fire Lines	Uniform	Yes	272799.15	3453093.38
Other	Uniform	Yes	9503539.71	1349092.06
			148997927.16	**23868331.25**

Calculate: V / (V + M) **86 %**

Implementation Option: Use Annual Revenue As Reported

☐ Use 3 years average instead of most recent year

Canadian Water and Wastewater Association

Upload file:

Agency Provide Sewer Service: Yes

Customer Class	Rate Type	Conserving Rate?
Single-Family	Increasing Block	Yes
Multi-Family	Increasing Block	Yes
Commercial	Uniform	Yes
Institutional	Uniform	Yes

At Least As effective As No

Exemption No

Comments:

The SFPUC exceeds the 70% volumetric revenue compliance requirement. The database incorrectly notes we are not on track.

CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

198 **San Francisco PUC - Retail** **Retail**

Does your agency perform Public Outreach programs? Yes

The list of wholesale agencies performing public outreach which can be counted to help the agency comply with the BMP

The name of agency, contact name and email address if not CUWCC Group 1 members

Did at least one contact take place during each quater of the reporting year? Yes

Public Outreach Program List	Number
General water conservation information	35
Total	**35**

Did at least one contact take place during each quater of the reporting year? Yes

Number Media Contacts	Number
News releases	2
Newspaper contacts	10
Radio contacts	1
Television contacts	1
Total	**14**

Did at least one website update take place during each quater of the reporting year? Yes

Public Information Program Annual Budget

Annual Budget Category	Annual Budget Amount
Advertising	22039.4
Printing/Postage	11305.29
Sponsorship	2000
Total Amount:	**35344.69**

Public Outreah Additional Programs
Multimedia Advertising/Public Service announcements
Booths at local fairs/events
Low income high-efficiency direct toilet install program direct mail campaign
Retail point of purchase displays for toilet/clothes washer rebate programs
Rainwater harvesting program

Description of all other Public Outreach programs

BMP 2.2 School Education Programs

ON TRACK

198 San Francisco PUC - Retail **Retail**

Does your agency implement School Education programs? No

The list of wholesale agencies performing public outreach which can be counted to help the agency comply with the BMP

Materials meet state education framework requirements? Yes

The SFPUC offers a state standards-aligned curriculum to SF elementary school teachers. The curriculum was developed by the SFPUC and teaches students about water conservation, recycled water, desalination and the history of SF's water system.

Materials distributed to K-6? Yes

The 'Our Water' curriculum is standards aligned for 4th and 5th grades; however it can be adapted for all grade levels. The educational unit includes lesson plans, fact sheets and classroom activities to engage students in California water issues.

Materials distributed to 7-12 students? Yes (Info Only)

The 'Our Water' curriculum is also distributed to a limited number of 7th-12th grade classrooms, providing a resource for English language learning classes and special education teachers.

Annual budget for school education program: 121770.00

Description of all other water supplier education programs

Conservation, watershed protection and pollution prevention presentations; conservation demonstration garden, water pollution control plant, and watershed land field trips; teacher training for water conservation related education; school events.

Comments:

At Least As effective As No

Exemption No 0

CUWCC BMP Retail Coverage Report 2014

Foundational Best Managemant Practices for Urban Water Efficiency

BMP 1.1 Operation Practices

ON TRACK

198 San Francisco PUC - Retail

1. Conservation Coordinator provided with necessary resources to implement BMPs?

Name: Julie Ortiz

Title: Water Conservation Manager

Email: jnortiz@sfwater.org

2. Water Waste Prevention Documents

WW Document Name	WWP File Name	WW Prevention URL	WW Prevention Ordinance Terms Description
Option A Describe the ordinances or terms of service adopted by your agency to meet the water waste prevention requirements of this BMP.		http://sfwater.org/modules/showdocument.aspx?documentid=1232	Section E, Rule 12 and Section F, Rule 16 of the SFPUC's Rules and Regulations Governing Water Service to Customers covers water waste prevention. Appendix F of the SFPUC's 2010 UWMP includes the SFPUC's Retail Water Shortage Allocation Plan
Option B Describe any water waste prevention ordinances or requirements adopted by your local jurisdiction or regulatory agencies within your service area.			
Option C Describe any documentation of support for legislation or regulations that prohibit water waste.			
Option D Describe your agency efforts to cooperate with other entities in the adoption or enforcement of local requirements consistent with this BMP.			
Option E Describe your agency support positions with respect to adoption of legislation or regulations that are consistent with this BMP.			
Option F Describe your agency efforts to support local ordinances that establish permits requirements for water efficient design in new development.			

At Least As effective As No

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.2 Water Loss Control

ON TRACK

198 San Francisco PUC - Retail

Completed Standard Water Audit Using AWWA Software?	Yes
AWWA File provided to CUWCC?	Yes
Copy_of_FY_13-14_AWWA_Water_Audit_Retail_v2.xls	
AWWA Water Audit Validity Score?	
Complete Training in AWWA Audit Method	Yes
Complete Training in Component Analysis Process?	Yes
Component Analysis?	Yes
Repaired all leaks and breaks to the extent cost effective?	Yes
Locate and Repar unreported leaks to the extent cost effective?	Yes
Maintain a record keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair.	Yes

Provided 7 Types of Water Loss Control Info

Leaks Repairs	Value Real Losses	Value Apparent Losses	Miles Surveyed	Press Reduction	Cost Of Interventions	Water Saved (AF)
1686	0.19	5.83	248	True	1387101	1

At Least As effective As No

Exemption No

Comments:

We are reporting using Version 5 of the AWWA Water Audit spreadsheet, which does not automatically populate the Operational Efficiency Indicator table above. See the spreadsheet for each of the indicators.

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.3 Metering With Commodity

ON TRACK

198 San Francisco PUC - Retail

Numbered Unmetered Accounts	No
Metered Accounts billed by volume of use	Yes
Number of CII Accounts with Mixed Use Meters	19607
Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	Yes
Feasibility Study provided to CUWCC?	Yes

Date: 4/1/2013

Uploaded file name:

Completed a written plan, policy or program to test, repair and replace meters	Yes

At Least As effective As No

Exemption No

Comments:

BMP 1.4 Retail Conservation Pricing

On Track

198 San Francisco PUC - Retail

Implementation (Water Rate Structure)

Implementation Option: Use Annual Revenue As Reported

☐ Use 3 years average instead of most recent year

Canadian Water and Wastewater Association

Upload file:

Agency Provide Sewer Service: Yes

Customer Class	Rate Type	Conserving Rate?
Single-Family	Increasing Block	Yes
Multi-Family	Increasing Block	Yes
Commercial	Uniform	Yes
Other	Uniform	Yes

At Least As effective As No

Exemption No

Comments:

The SFPUC exceeds the 70% volumetric revenue compliance requirement. The database incorrectly notes we are not on track.

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

198 **San Francisco PUC - Retail** **Retail**

Does your agency perform Public Outreach programs? Yes

The list of wholesale agencies performing public outreach which can be counted to help the agency comply with the BMP

The name of agency, contact name and email address if not CUWCC Group 1 members

Did at least one contact take place during each quater of the reporting year? Yes

Public Outreach Program List	Number
General water conservation information	39
Flyers and/or brochures (total copies), bill stuffers, messages printed on bill, information packets	4
Total	**43**

Did at least one contact take place during each quater of the reporting year? Yes

Number Media Contacts	Number
News releases	4
Newspaper contacts	30
Radio contacts	5
Television contacts	20
Online Advertisings	3
Total	**62**

Did at least one website update take place during each quater of the reporting year? Yes

Public Information Program Annual Budget

Annual Budget Category	Annual Budget Amount
Advertising	215944.22
Printing/Postage	60984.49
Total Amount:	**276928.71**

Public Outreah Additional Programs
Multimedia Advertising/Public Service announcements
Booths at local fairs/events
Low income high-efficiency direct toilet install program direct mail campaign
Retail point of purchase displays for toilet/clothes washer rebate programs
Rainwater harvesting program

Description of all other Public Outreach programs

BMP 2.2 School Education Programs

ON TRACK

198 San Francisco PUC - Retail **Retail**

Does your agency implement School Education programs? Yes

The list of wholesale agencies performing public outreach which can be counted to help the agency comply with the BMP

Materials meet state education framework requirements? Yes

The SFPUC offers a state standards-aligned curriculum to SF elementary school teachers. The curriculum was developed by the SFPUC and teaches students about water conservation, recycled water, desalination and the history of SF’s water system.

Materials distributed to K-6? Yes

The ‘Our Water’ curriculum is standards aligned for 4th and 5th grades; however it can be adapted for all grade levels. The educational unit includes lesson plans, fact sheets and classroom activities to engage students in California water issues.

Materials distributed to 7-12 students? Yes (Info Only)

The ‘Our Water’ curriculum is also distributed to a limited number of 7th-12th grade classrooms, providing a resource for English language learning classes and special education teachers.

Annual budget for school education program: 118989.00

Description of all other water supplier education programs

Conservation, watershed protection and pollution prevention presentations; conservation demonstration garden, water pollution control plant, and watershed land field trips; teacher training for water conservation related education; school events.

Comments:

At Least As effective As No

Exemption No 0

CUWCC BMP Coverage Report 2014

198 San Francisco PUC - Retail

Baseline GPCD 1997-2006: 107.69

GPCD in 2014: 83.6

GPCD Target for 2018: 88.30

Biennial GPCD Compliance Table

ON TRACK

		Target		Highest Acceptable Bound	
Year	Report	% Base	GPCD	% Base	GPCD
2010	1	96.4%	**103.80**	100%	**107.70**
2012	2	92.8%	**99.90**	96.4%	**103.80**
2014	3	89.2%	**96.10**	92.8%	**99.90**
2016	4	85.6%	**92.20**	89.2%	**96.10**
2018	5	82.0%	88.3	82.0%	**88.30**

CUWCC BMP Wholesale Coverage Report 2013

Foundational Best Managemant Practices for Urban Water Efficiency

BMP 1.1 Wholesale Agency Assistance Programs

ON TRACK

6297 **San Francisco PUC - Wholesale**

Name: Julie Ortiz

Email: jnortiz@sfwater.org

a) Financial Investments and Building Partnerships

b) Technical Support

c) Retail Agency

d) Water Shortage Allocation

Adoption Date: 6/1/2000

File Name: The Wholesale Water Shortage Allocation Plan was adopted pursuant to Section 7.03(a) of the 1984 Settlement Agreement and Master Water Sales Contract and updated in 2009.
http://sfwater.org/modules/showdocument.aspx?documentid=1054

e) Non signatory Reporting of BMP implementation by non-signatory Agencies

f) Encourage CUWCC Membership List Efforts to Recuit Retailers

BAWSCA, who coordinates conservation on behalf of SFPUC wholesalers, is a member of the CUWCC and has raised awareness of the benefits and encouraged CUWCC membership among its members who are wholesalers of the SFPUC

At Least As effective As Yes

BAWSCA represents agencies that purchase water on wholesale basis from SFPUC and coordinates regional water conservation assistance, education and outreach in synch with BMP requirements. See attachment for more detail

Exemption No

Comments:

BAWSCA represents agencies that purchase water on wholesale basis from SFPUC and coordinates regional water conservation assistance, education and outreach in synch with BMP requirements. See attachment uploaded under the ALAEA section above.

CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.2 Water Loss Control

ON TRACK

6297 San Francisco PUC - Wholesale

Completed Standard Water Audit Using AWWA Software?	Yes
AWWA File provided to CUWCC?	Yes
FY 12-13 AWWA Water Audit Wholesale v2.xls	
AWWA Water Audit Validity Score?	
Complete Training in AWWA Audit Method	Yes
Complete Training in Component Analysis Process?	Yes
Component Analysis?	Yes
Repaired all leaks and breaks to the extent cost effective?	Yes
Locate and Repar unreported leaks to the extent cost effective?	Yes
Maintain a record keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair.	Yes

Provided 7 Types of Water Loss Control Info

Leaks Repairs	Value Real Losses	Value Apparent Losses	Miles Surveyed	Press Reduction	Cost Of Interventions	Water Saved (AF)
2			280	False	64330.38	

At Least As effective As No

Exemption No

Comments:

We used Version 5 of the AWWA Water Audit spreadsheet, so the operational efficiency indicators do not automatically populate the table above. Please see the attachment for the individual indicators.

CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.3 Metering With Commodity

ON TRACK

6297 San Francisco PUC - Wholesale

Numbered Unmetered Accounts	No
Metered Accounts billed by volume of use	Yes
Number of CII Accounts with Mixed Use Meters	
Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	No
Feasibility Study provided to CUWCC?	No
Date:	
Uploaded file name:	
Completed a written plan, policy or program to test, repair and replace meters	Yes
At Least As effective As	No
Exemption	No

Comments:

CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

6297 **San Francisco PUC - Wholesale** **Wholesale**

Does your agency perform Public Outreach programs? No

The list of retail agencies your agency assists with public outreach

BAWSCA represents agencies that purchase water on wholesale basis from SFPUC, and BAWSCA manages water conservation public outreach for them.

The name of agency, contact name and email address if not CUWCC Group 1 members

Did at least one contact take place during each quater of the reporting year? Yes

Did at least one contact take place during each quater of the reporting year? No

Did at least one website update take place during each quater of the reporting year? Yes

Public Information Program Annual Budget

Description of all other Public Outreach programs

Comments:

BAWSCA represents agencies that purchase water on wholesale basis from SFPUC and coordinates regional water conservation assistance, education and outreach in synch with BMP requirements. See attachment uploaded under the ALAEA section above.

At Least As effective As Yes

BAWSCA represents agencies that purchase water on wholesale basis from SFPUC and coordinates regional water conservation assistance, education and out

Exemption No 0

BMP 2.2 School Education Programs

ON TRACK

6297 San Francisco PUC - Wholesale **Wholesale**

Does your agency implement School Education programs? Yes

The list of retail agencies your agency assists with public outreach

BAWSCA represents agencies that purchase water on wholesale basis from SFPUC, and BAWSCA manages water conservation for them

Materials meet state education framework requirements? Yes

Materials distributed to K-6? Yes

Materials distributed to 7-12 students? No (Info Only)

Annual budget for school education program:

Description of all other water supplier education programs

Comments:

BAWSCA represents agencies that purchase water on wholesale basis from SFPUC and coordinates regional water conservation assistance, education and outreach in synch with BMP requirements. See attachment uploaded under the ALAEA section above.

At Least As effective As Yes

BAWSCA represents the SFPUC's wholesalers and coordinates regional water conservation assistance, education and outreach in synch with BMP requirement

Exemption No 0

CUWCC BMP Wholesale Coverage Report 2014

Foundational Best Managemant Practices for Urban Water Efficiency

BMP 1.1 Wholesale Agency Assistance Programs

ON TRACK

6297 **San Francisco PUC - Wholesale**

Name: Julie Ortiz Email: jnortiz@sfwater.org

a) Financial Investments and Building Partnerships

BMP Section	Monetary Amount for Financial Incentives	Monetary Amount for Equivalent Resources	
BMP 2.1 Public Outreach		250000	

b) Technical Support

c) Retail Agency

d) Water Shortage Allocation

Adoption Date: 6/1/2000

File Name: The Wholesale Water Shortage Allocation Plan was adopted pursuant to Section 7.03(a) of the 1984 Settlement Agreement and Master Water Sales Contract and updated in 2009.
http://sfwater.org/modules/showdocument.aspx?documentid=1054

e) Non signatory Reporting of BMP implementation by non-signatory Agencies

f) Encourage CUWCC Membership List Efforts to Recuit Retailers

BAWSCA, who coordinates conservation on behalf of SFPUC wholesalers, is a member of the CUWCC and has raised awareness of the benefits and encouraged CUWCC membership among its members who are wholesalers of the SFPUC

At Least As effective As Yes

BAWSCA represents agencies that purchase water on wholesale basis from SFPUC and coordinates regional water conservation assistance, education and outreach in synch with BMP requirements. See attachment for more detail

Exemption No

Comments:

BAWSCA represents agencies that purchase water on wholesale basis from SFPUC and coordinates regional water conservation assistance, education and outreach in synch with BMP requirements. See attachment uploaded under the ALAEA section above.

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.2 Water Loss Control

ON TRACK

6297 San Francisco PUC - Wholesale

Completed Standard Water Audit Using AWWA Software?	Yes
AWWA File provided to CUWCC?	Yes
FY 13-14 AWWA Water Audit Wholesale v2.xls	
AWWA Water Audit Validity Score?	
Complete Training in AWWA Audit Method	Yes
Complete Training in Component Analysis Process?	Yes
Component Analysis?	Yes
Repaired all leaks and breaks to the extent cost effective?	Yes
Locate and Repar unreported leaks to the extent cost effective?	Yes
Maintain a record keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair.	Yes

Provided 7 Types of Water Loss Control Info

Leaks Repairs	Value Real Losses	Value Apparent Losses	Miles Surveyed	Press Reduction	Cost Of Interventions	Water Saved (AF)
9			280	True	35963.95	

At Least As effective As No

Exemption No

Comments:

We used Version 5 of the AWWA Water Audit spreadsheet, so the operational efficiency indicators do not automatically populate the table above. Please see the attachment for the individual indicators.

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.3 Metering With Commodity

ON TRACK

6297 San Francisco PUC - Wholesale

Numbered Unmetered Accounts	No
Metered Accounts billed by volume of use	Yes
Number of CII Accounts with Mixed Use Meters	
Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	No
Feasibility Study provided to CUWCC?	No
Date:	
Uploaded file name:	
Completed a written plan, policy or program to test, repair and replace meters	Yes

At Least As effective As No

Exemption No

Comments:

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

6297 **San Francisco PUC - Wholesale** **Wholesale**

Does your agency perform Public Outreach programs? No

The list of retail agencies your agency assists with public outreach

BAWSCA represents agencies that purchase water on wholesale basis from SFPUC, and BAWSCA manages water conservation public outreach for them.

The name of agency, contact name and email address if not CUWCC Group 1 members

Did at least one contact take place during each quater of the reporting year? Yes

Public Outreach Program List	**Number**
General water conservation information	1000000
Total	**1000000**

Did at least one contact take place during each quater of the reporting year? No

Did at least one website update take place during each quater of the reporting year? Yes

Public Information Program Annual Budget

Description of all other Public Outreach programs

Comments:

BAWSCA represents agencies that purchase water on wholesale basis from SFPUC and coordinates regional water conservation assistance, education and outreach in synch with BMP requirements. See attachment uploaded under the ALAEA section above.

At Least As effective As Yes

BAWSCA represents agencies that purchase water on wholesale basis from SFPUC and coordinates regional water conservation assistance, education and out

Exemption No 0

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.2 School Education Programs

ON TRACK

6297 San Francisco PUC - Wholesale **Wholesale**

Does your agency implement School Education programs? Yes

The list of retail agencies your agency assists with public outreach

BAWSCA represents agencies that purchase water on wholesale basis from SFPUC, and BAWSCA manages water conservation for them

Materials meet state education framework requirements? Yes

Materials distributed to K-6? Yes

Materials distributed to 7-12 students? No (Info Only)

Annual budget for school education program:

Description of all other water supplier education programs

Comments:

BAWSCA represents agencies that purchase water on wholesale basis from SFPUC and coordinates regional water conservation assistance, education and outreach in synch with BMP requirements. See attachment uploaded under the ALAEA section above.

At Least As effective As Yes

BAWSCA represents the SFPUC's wholesalers and coordinates regional water conservation assistance, education and outreach in synch with BMP requirement

Exemption No 0

APPENDIX P

Resolution to Adopt the 2015 Urban Water Management Plan

2015 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

Prepared by: The San Francisco Public Utilities Commission
June 2016

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

PUBLIC UTILITIES COMMISSION

City and County of San Francisco

RESOLUTION NO. **16-0118**

WHEREAS, The Urban Water Management Planning Act of 1983, amended through 2015, (the Act) requires that an urban water supplier serving 3,000 customers or 3,000 acre-feet per year must prepare an Urban Water Management Plan (Plan) update every five years beginning in 1985; and

WHEREAS, The San Francisco Public Utilities Commission (SFPUC), in compliance with the Act, has prepared a 2015 update to its Plan; and

WHEREAS, The preparation of the Plan update has been coordinated with the City's wholesale water customers and other public agencies to the extent practicable, and staff has encouraged the active involvement of diverse social, cultural, and economic elements of the population within the SFPUC's retail water service area during preparation of the Plan; and

WHEREAS, On May 10, 2016, a Draft Plan was presented to the Commission and a Public Hearing was held during the Commission meeting in order to receive public comment on the Draft Plan; and

WHEREAS, Minor revisions to the Draft Plan have been made based on public comments received at the Public Hearing and during the public comment period of April 14, 2016 through May 13, 2016; and

WHEREAS, Preparation and adoption of Urban Watershed Management Plans pursuant to the provisions of Section 10652 of the State Water Code is a statutory exemption under CEQA Guidelines Section 15282(v); and

WHEREAS, A Final 2015 Urban Water Management Plan update has been presented to the Commission for consideration; now, therefore, be it

RESOLVED, That this Commission has reviewed and considered the Final 2015 Plan update, and hereby adopts the Plan.

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of June 14, 2016.

Donna Hood

Secretary, Public Utilities Commission

2015 URBAN WATER MANAGEMENT PLAN

for the City and County of San Francisco

APPENDICES

Prepared by: The San Francisco Public Utilities Commission

June 2016

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission