

Water Conservation Plan

Louviers Water and Sanitation District

April 2011



Adopted: April 28, 2011

Acknowledgements

Louviere Water and Sanitation District Board

Chairman/President: Jason Ingenthron

Vice President: Kevin Kahn

Secretary: Diana Miller

Treasurer: Matt Collitt

Member: Ron Beane

Prepared by Nolte Associates, Inc.



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With Support from The Colorado Water Conservation Board



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List of Abbreviations

Abbreviation	DESCRIPTION
acre-foot (AF)	Unit of volume to measure water, equivalent to an acre of area covered with one foot of water (325,850 gallons)
AFY	Acre-feet per year
AWE	Alliance for Water Efficiency
AWWA	American Water Works Association
BMP	Best Management Practice
BP	Best Practice
CWCB	Colorado Water Conservation Board
GPM	Gallons per minute
GPCD	Gallons per capita per day
HET	High efficiency toilet (no more than 1.28 gallons per flush)
IWA	International Water Association
MG	Million gallons
MGD	Million gallons per day
RWCPP	Regional Water Conservation Planning Program
SMWSA	South Metro Water Supply Authority
SWSI	Statewide Water Supply Initiative
ULFT	Ultra Low Flow Toilet
WTP or WWTP	Water Treatment Plant or Wastewater Treatment Plant
WCP	Water Conservation Plan
WSD	Water and Sanitation District

Section 1: Introduction

1.1 Purpose

The **Louviers Water and Sanitation District (LWSD)** developed this water conservation plan (WCP, the Plan) as part of the Douglas County Regional Water Conservation Planning Program (RWCPP). This program provides assistance for preparing WCPs for as many as 20 water providers, then compiling those plans into a regional WCP for Colorado Water Conservation Board (CWCB) approval.

The LWSD Plan is consistent with the State's emphasis on regional planning in the Statewide Water Supply Initiative (SWSI) efforts, coupled with new developments in the field of water conservation. The Douglas County region is heavily dependent on nonrenewable Denver Basin groundwater; water conservation is essential in helping the region achieve long-term sustainability. To that end, this Plan has been funded by a grant from the CWCB and a contribution by the Douglas County Board of Commissioners.

The purposes of the Plan are to:

- Characterize water use and demand forecasts
- Identify, evaluate, and select conservation measures and programs

Throughout its history, LWSD has delivered reliable potable water to its commercial, residential, and irrigation water users. LWSD is committed to sustainable and efficient use of its water resources and will be implementing this WCP as a key element of an integrated water resources planning. The Plan is also warranted as water conservation technology has improved to the point that water use efficiency can be planned and implemented more reliably and predictably than at any time in the past.

This Plan identifies recommended water conservation measures and programs that will promote, support and sustain efficient water use by the LWSD customers. The Plan identifies the various stages of water conservation for the next five to ten years, and follows the scope of work agreed upon by the Colorado Water Conservation Board (CWCB) and Douglas County in establishing the Douglas County RWCPP.

1.2 Organization

In keeping with that scope of work, this Plan is organized as follows:

1. Introduction
2. Existing system, water sources, and limitations
3. Current water use
4. Pricing structures and existing conservation efforts
5. Identification and screening of proposed conservation measures
6. Demand forecasts with different conservation programs
7. Impacts of conservation programs
8. Implementation and monitoring plan

Section 2: Existing System, Water Sources, and Limitations

2.1 District Formation

The Louviers Water and Sanitation District (LWSD) was formed in November 2008 to provide water and sanitary sewer service to the Louviers area. The District took ownership and responsibility for a system that had been operated since 1968 by Louviers Mutual Service Company to serve Louviers, once a “company town” centered on the DuPont dynamite plant. LWSD is a governmental subdivision of the State of Colorado and a corporate body with the powers of a quasi-municipal corporation. LWSD was created pursuant to Article 1 of Title 32 C.R.S. for the purpose of providing complete water supply and sanitary sewer systems for the LWSD customers.

2.2 Geography and Demographics

The District is located near Plum Creek and Highway 85 in northwest unincorporated Douglas County. LWSD is primarily single family residential with a few commercial customers. The District serves two parks, a church, post office, fire station, and 105 homes. In 2010, Douglas County estimated the population at 320. The service area is shown in Figure 2-1.

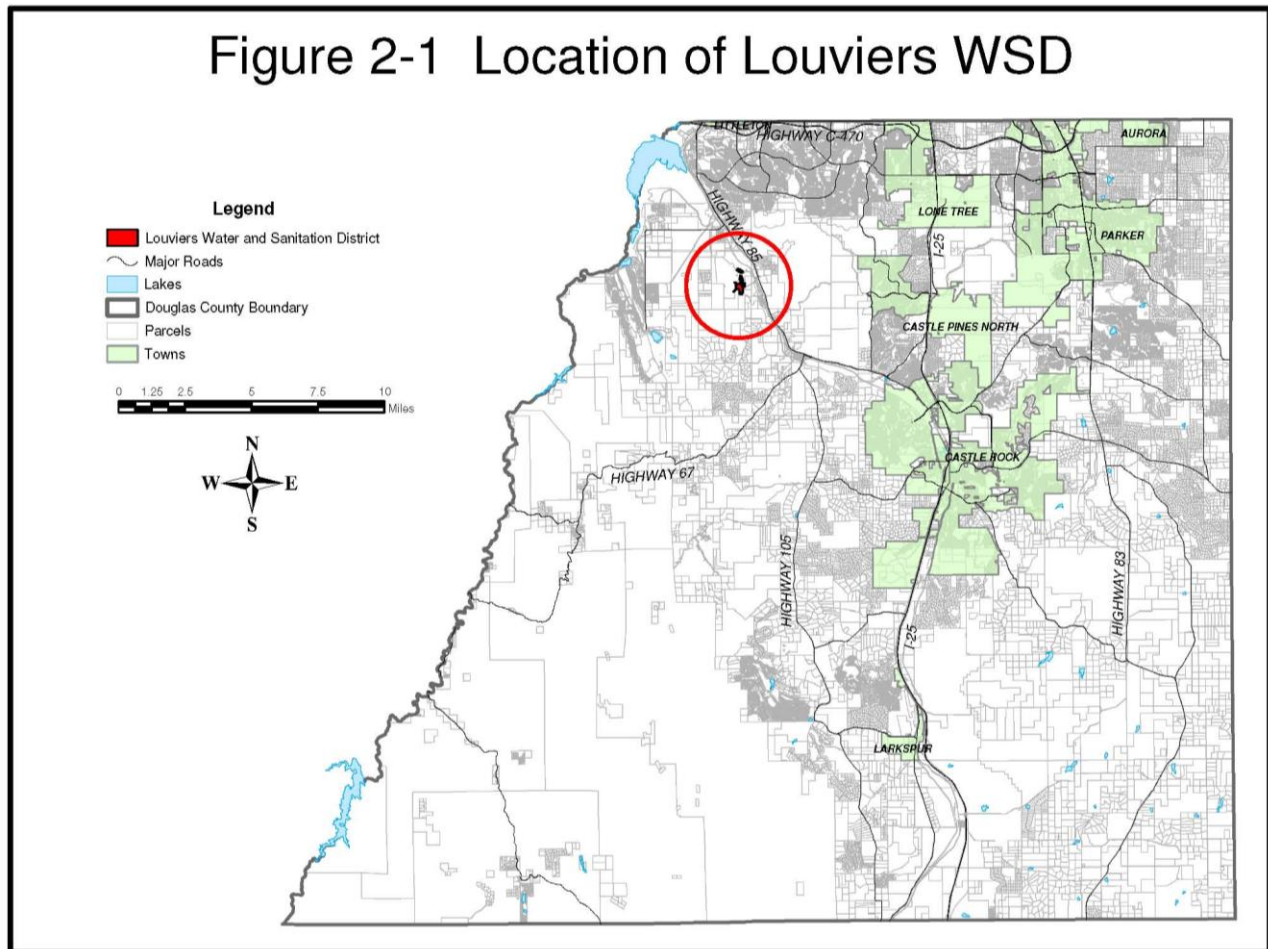


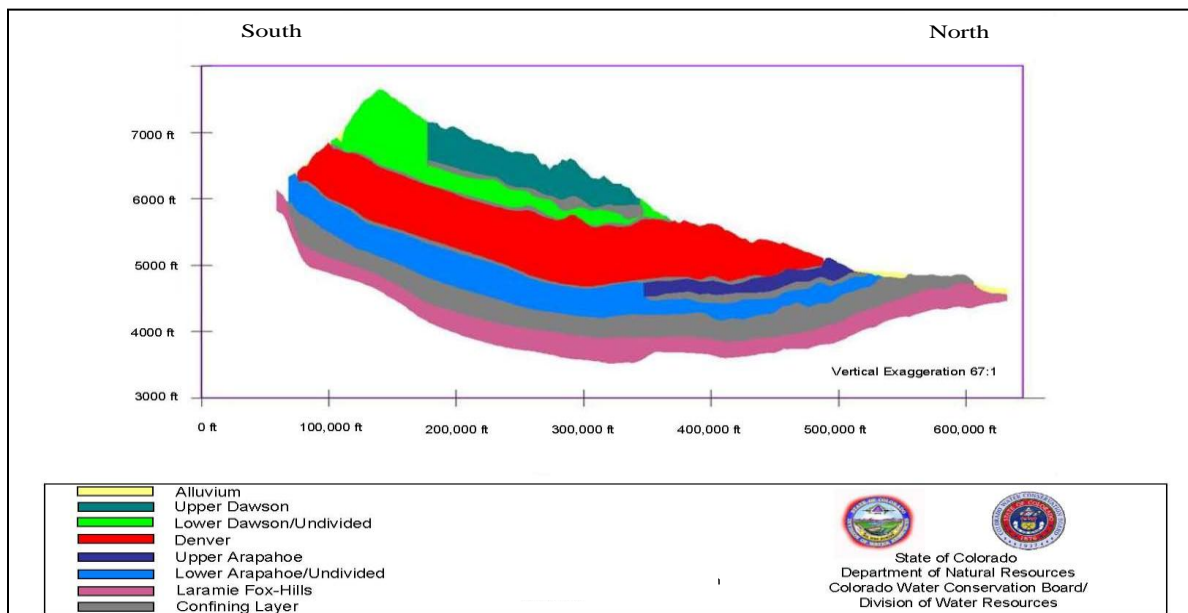
Figure 2-1
Location of LWSD

2.3 Historical Water System Development

LWSD is located in an area of limited and unreliable surface water supplies. Plum Creek, located east of the District, is the largest stream in the area. At the time that DuPont developed the water supply for Louviers, it was more cost effective to use nontributary groundwater than acquire surface water rights and construct the infrastructure necessary to divert, store, convey and treat surface water. Denver Basin groundwater supplies were readily available, drought resistant, and needed minimal treatment.

2.3.1 Nontributary Groundwater

LWSD's nontributary groundwater is from a well drilled in the Denver Basin's Arapahoe aquifer. The Denver Basin formations underlying the service area include the Dawson, Denver, Arapahoe and Laramie-Fox Hills formations. Figure 2-3 is an illustrative cross-section of the Denver Basin aquifer formations.



*Figure 2-2
Denver Basin Aquifer South-North Cross Section
South Platte Basin
(Source: CWCB South Platte DSS)*

Groundwater development to meet LWSD's water demands has all occurred within the district boundaries. The well was drilled to support the original development. Treatment to meet regulatory requirements for disinfection is done at the well site. Table 2-1 provides key information on the LWSD well.

2.3.2 Reuse of Wastewater Return Flows

LWSD collects and treats all of the wastewater flows generated within the District, with the exception of one single family residence that utilizes a septic system. LWSD does not currently have the infrastructure for return and reuse of treated wastewater.

2.4 Water Sources and Yields

A summary of the yield and production capability of LWSD's well is provided in Table 2-1. The District does not currently have surface water rights, reservoir or storage rights.

Water Supply Source	Aquifer	Annual Yield (AFY)	Comments
In-District Groundwater	Well No. 1 (in use since approx. 1975) is an Arapahoe Alluvium Well	30	The District's water rights in the Arapahoe aquifer total 150 AFY
Total	1 Well	30	---

*Table 2-1
Summary of Major Water Sources
Louviere Water and Sanitation District*

2.5 Ability to Serve

LWSD currently relies on its Arapahoe well for its entire water supply. Major components of the water system, including much of the distribution system piping, were constructed in the 1960s. The Arapahoe well was installed in 1975. Water is pumped from the well directly into the distribution system, and a storage tank on the system fills and draws depending on demands.

LWSD has adequate water supplies for its current needs, but the District has an immediate need for two new wells and a treatment facility. The District relies entirely on nonrenewable groundwater like many other suppliers throughout the region, identified in SWSI as a critical water supply area. A summary of system conditions is shown in Table 2-4.

Planning Questions	Yes	No	Comments
Does the system frequently experience shortage of supply emergencies?		x	The majority of the distribution system is oversized and obsolete; sections of the system cannot be isolated for repair. Low pressure exists at certain points of the system.
Does the system have substantial unaccounted-for and lost water?	x		The District has significant unaccounted-for water, but is improving its data collection to determine the cause.
Is the system experiencing a high rate of population and/or growth?		x	The District does not anticipate any growth, but continues to investigate renewable water supply opportunities to serve current customers.
Is the system planning substantial improvements or additions?	X		There is an immediate need for new wells and a treatment facility when funds are available. It is anticipated that these facilities will be constructed within the next 5-10 years. Distribution system upgrades will also be necessary.
Are increases to wastewater system capacity anticipated within the planning horizon?		x	Additional capacity for the District is not needed because the service area is fully built-out.

*Table 2-2
Summary of System Conditions*

2.6 System Limitations

The District's system is limited by the age of much of the infrastructure, with most of the piping constructed in the 1960s. LWSD plans to start pipe replacement as funds are available. In addition to aged piping, the well pump is also in need of replacement. In order for the District to fund these improvements, a larger tax base or increased user fees would be needed. The District does not anticipate additional expansion or population within the service area. The current economy limits the District's ability to increase user fees.

Section 3: Current Water Use

3.1 Annual Water Use by Customer Class

The LWSD customer base, as shown in Table 3-1 and Figure 3-1, consists of single-family residential, commercial, and park irrigation accounts as it did in 2008. Table 3-1 shows customer demands, whereas Figure 3-1 shows production, including water losses. The baseline of 2008 was selected because it was fairly recent, has complete data readily available, and was a relatively average year with regard to precipitation. It is important to note that 2008 water usage was impacted by the post-2002 drought reductions in demand experienced throughout the Front Range. The long-term effects of the “drought shadow” are unknown. Residential demand represents approximately 80 percent of the total demand. When considered on the basis of water production as shown in Figure 3-1, unaccounted-for water represented 12.8 percent of the total (based on a comparison of 2010 production to 2010 metered use). Please see Section 3.3 for a discussion of water loss accounting.

General Class	2008 Total (in 1,000 gal)	% of Total	Number of Taps				Total Taps	Total TEs	Unit Demand (gpd/TE)	GPCD ¹
			5/8"	3/4"	1"	2"				
Single Family ²	5,309	80.5%	65	30	10	---	105	105	139	48
Commercial ³	224	3.4%	1	1	1	---	3	3	205	---
Park Irrigation ⁴	1,062	16.1%	---	---	---	4	4	4	727	---
Total⁵	6,595	100%	66	31	11	4	112	112	161	---

¹ Per Douglas County estimates, there are 2.9 people per residence in LWSD.

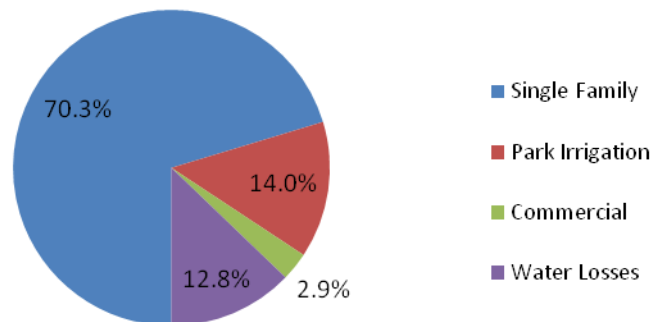
² Single Family Usage was based on the allocation of usage from 2010 meter data.

³ At this time, the District does not record usage by class.

⁴ Triangle Park is currently unmetered, therefore the metered usage of DuPont Park was assumed to be the same for Triangle Park for this analysis.

*Table 3-1
Annual Water Use in 2008 by Customer Class*

Customer Class Demand Shares



*Figure 3-1
Percent of Water Produced in 2008 by Customer Class*

3.2 Historical Water Demand

Total annual water production for 2001 through 2009 is shown in Figure 3-2. As seen in Figure 3-2, demand actually fell 63 percent from 2001 to 2009, dropping from almost 18 MG to a little more than 6 MG; a reduction of more than 12 MG.

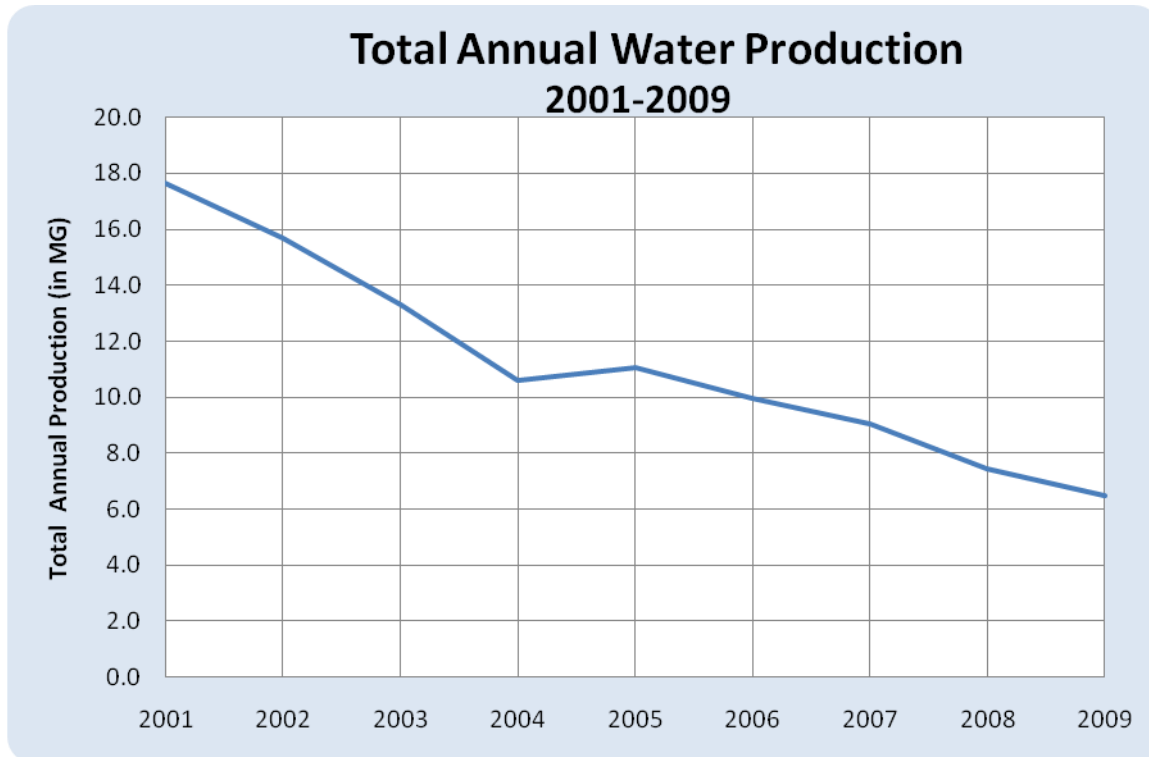


Figure 3-2
Total Annual Water Production

3.2.1 Unit Water Demands

Single-family residential taps vary in size, but all LWSD taps are considered as one single-family equivalent (SFE) or tap equivalent (TE), regardless of the size. An analysis of per capita water demand is a common measurement of water use. LWSD metered water demands are analyzed on the basis of TEs as well as GPCD. Average daily water demand divided by the number of TEs served provides the unit demand in gallons per day per TE (gpd/TE). LWSD's unit demand for all classes combined was 161 gpd/TE. Dividing the residential demand of 139 gpd/TE results in an average of only 48 GPCD. This unit demand is extremely low compared to the 2007 residential demands for Centennial WSD (Douglas County's largest water provider) which averaged 103 GPCD (Centennial WCP, 2007, pg. 22).

3.2.2 Peak Water Demands

Monthly water production for the 2008 baseline year is shown in Figure 3-3. In the case of LWSD, water production draws from a sole source; well production from the Arapahoe aquifer. The peak month production/demand for 2008 occurred in July. That month's production of 1.67 MG was 169 percent higher than the average annual production of 620,000 gallons per month, for a peak month to average month ratio of 2.7 to 1.

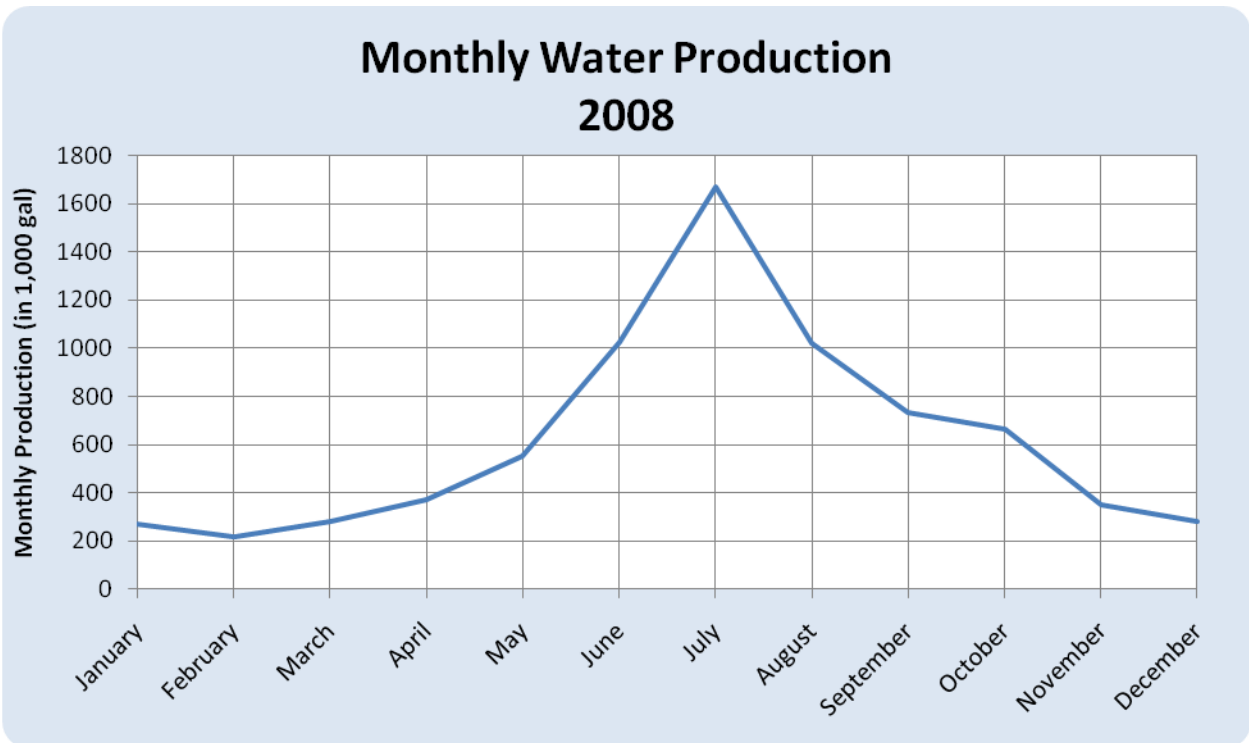


Figure 3-3
Monthly Water Production 2008

3.3 Water Loss Accounting

The description of current water use in this Plan is meant to be consistent with the International Water Association (IWA) and American Water Works Association (AWWA) Water Balance approach, which was published in 2000 as part of the IWA publication Performance Indicators for Water Supply Services to provide utilities a consistent methodology for assessing water loss. Though the full assessment of a water balance is outside the realm of this report, the terminology is consistent. The main categories discussed for LWSD are revenue (metered) and non-revenue (metered and unmetered) water, which are defined in Figure 3-4 below.

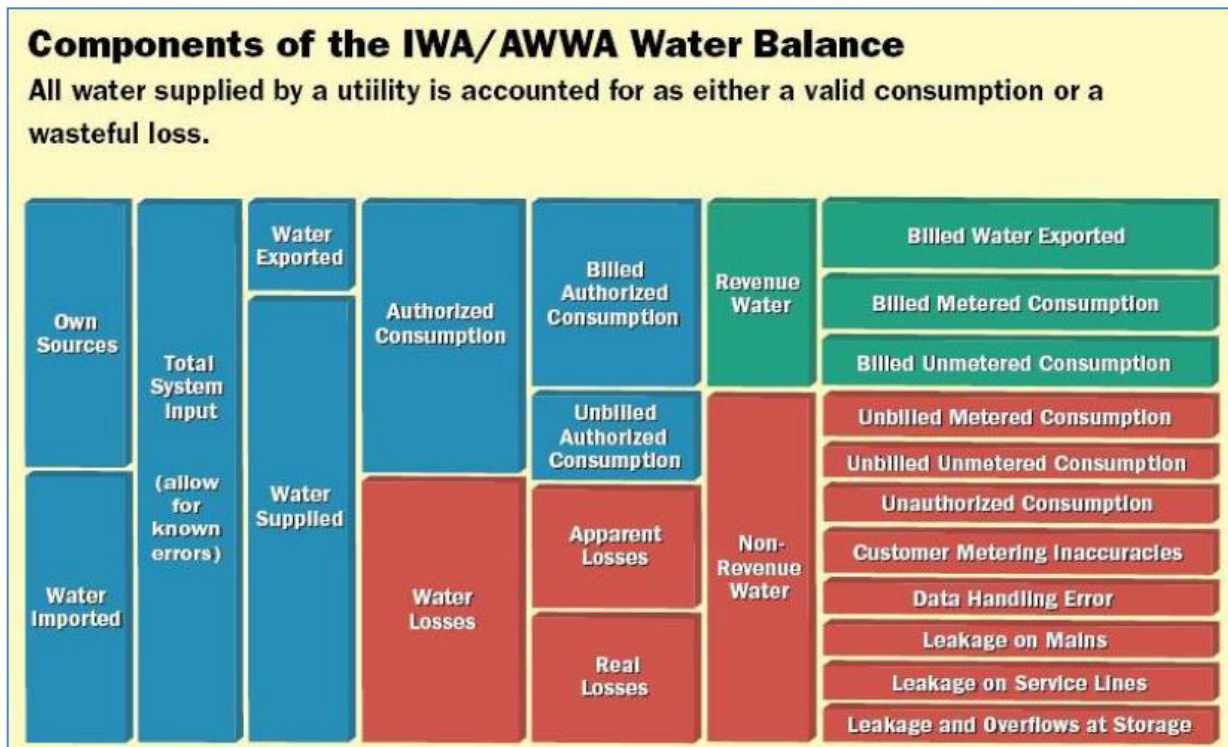


Figure 3-4

IWA/AWWA Water Balance Summary

(Source: AWWA Publication, *Opflow*, October 2007)

All of LWSD's customer water use is metered and billed. There are no customers that receive water that is unbilled, and all metered water use is Revenue Water as defined in the IWA/AWWA Water Balance. The non-revenue water use for the LWSD system includes:

- Unbilled, unmetered consumption (see below)
- Customer metering inaccuracies
- Data handling errors
- Leakage on mains
- Leakage on service lines
- Leakage and overflows at storage

Unbilled, unmetered consumption includes such uses as waterline and fire hydrant flushing conducted by LWSD.

A comparison of estimated total water production vs. total water billed is shown in Figure 3-1, based on 2010 data. The difference between total production and billed is water losses or unaccounted for water. This is the same as the non-revenue categories described above. Although AWWA now recommends evaluating non-revenue (or unaccounted-for) water without reference to percentage of water produced, such a reference has been a standard practice in the industry for many years ("Water Wiser," 2010) (Angers, 2001). At the level of analysis in this water conservation plan, it is helpful to consider the District's water system with respect to the accepted benchmark of up to 15 percent unaccounted-for water. As shown in Figure 3-1, LWSD's unaccounted-for water was estimated at 12.8 percent and within the industry standard.

Section 4: Pricing Structure and Existing Conservation Efforts

LWSD has used water conservation measures to manage water demands and conserve water since it was formed. However, the District does not have a water conservation program that offers a diverse range of measures. Current conservation measures are described in this section and summarized in Table 4-2.

4.1 Pricing Structure

LWSD has implemented a conservation-oriented water rate structure designed to encourage efficient use for all customers.

Modifications to increasing block rate structure – LWSD implemented a tiered, increasing-block rate structure in 2009. Customers are billed every two months at the rates shown in Table 4-1.

Volume (gallons)	Bimonthly Water Rate
Base (Up to 4,000)	\$52.35
4,001-12,000	+\$3.00/1,000 gals
12,001-20,000	+\$4.50/1,000 gals
20,001-60,000	+\$6.00/1,000 gals
60,001 and Over	+\$7.50/1,000 gals

*Table 4-1
Water Rate Tiers*

4.2 Operational Utility Side Measures

Integrated Resources Planning –Water conservation and demand management options are cost-effective and, as a result, incorporated into future supply planning. As implemented by LWSD, water conservation is a key component for meeting future needs.

Full metering – The majority of LWSD customers and associated water use are metered and billed, and the District is working toward full and accurate metering.

Conservation coordinator – Mr. Jason Ingenthron, the LWSD Board President, serves as the District’s water conservation coordinator.

4.3 Water Loss Control Program

Tracking Water Losses –Total water production is compared to total water billed to determine water losses. As LWSD monitors water loss accounting, it will consider a leak detection program if warranted by increasing losses.

4.4 Education and Public Information

Conservation Public Information Campaign – The District has a web link on its bills to direct customers to a website with tips and ideas to help with water conservation.

Summary of Current Water Conservation Measures

Summary of Water Conservation Measures	
Pricing Structure	
	Modifications to Increasing Block Rate Structure
Operational Utility Side Measures	
	Integrated Resources Planning
	Full Metering
	Conservation Coordinator
Water Loss Control Program	
	Tracking of Water Losses
Education and Public Information	
	Conservation Public Information Campaign

*Table 4-2
Current Water Conservation Program*

Section 5: Identification and Screening of Proposed Conservation Measures

Although LWSD has implemented water conservation measures as described in Section 4, the District does not have a water conservation program. As part of this water conservation plan, existing conservation measures and additional programs and measures were evaluated. It is important to note that as a water district, LWSD does not have land use or building permit regulatory authority. As a result, LWSD does not have the regulatory authority to require certain water conservation measures.

In July, 2008, the CWCB awarded an efficiency grant to Colorado Water Wise, a water conservation non-profit group, to create a best management practices guidebook specific to Colorado. The guidebook will assist water providers with the selection and implementation of effective water conservation programs and measures. The Colorado WaterWise Guidebook of Best Practices for Municipal Water Conservation in Colorado (Best Practices Guidebook) (Colorado WaterWise, 2010) is a planning tool prepared for the purpose of improving and enhancing water efficiency in Colorado. The Best Practices Guidebook offers a detailed description of specific water conservation measures, program elements, regulations, policies, and procedures that can be implemented by Colorado water providers to help ensure reliable and sustainable water supplies for future generations.

The existing LWSD water conservation measures were evaluated and compared to the Best Practices Guidebook to determine if there were potential best practices to be considered that are not part of the current LWSD water conservation program. The Best Practices are shown in Table 5-1. The Best Practices Guidebook was also used to evaluate potential additional conservation measures.

Measure	Best Practice	Category or Sector Impacted
Full metering	BP 1	ALL
Conservation oriented rates	BP 1	ALL
Conservation oriented tap fees	BP 1	ALL
Integrated resource planning, goal setting and monitoring	BP 2	Utility
Water loss control	BP 3	Utility
Conservation coordinator	BP 4	ALL
Water waste ordinance	BP 5	ALL
Public information and education	BP 6	ALL
Landscape water budgets	BP 7	Outdoor irrigation
Rules and regulations for landscape design and installation	BP 8	Outdoor irrigation
Certification of landscape professionals	BP 8	Outdoor irrigation

Water efficient design, installation and maintenance practices for new and existing landscapes	BP 9	Outdoor irrigation
Irrigation efficiency evaluations	BP 10	Outdoor irrigation
Rules for new construction (residential and non-residential)	BP 11	ALL
High efficiency fixtures and appliances-Residential	BP 12	Residential
High efficiency fixtures and appliances-Non Residential	BP 12	CII
Residential water surveys and evaluations, targeted at high demand customers	BP 13	Residential
Specialized non-residential surveys, audits, and equipment efficiency improvements	BP 14	CII

¹ Each item and corresponding BP# is from the Best Practices Guidebook (Colorado WaterWise, 2010)

*Table 5-1
Water Conservation Best Practices from Guidebook*

Descriptions of the existing and proposed conservation measures that were evaluated are included below. A summary of the water conservation measures are shown in Table 5-2.

5.1 Pricing Structure

Modifications to increasing block rate structure – LWSD will continue to refine its water rate structure to promote water conservation. **(BP #1)**

5.2 Operational Utility Side Measures

Integrated Resources Planning – This is an existing measure and LWSD will continue its water supply and demand management planning. **(BP #2)**

Full Metering – All LWSD customers and associated water use will be metered and billed in the future. The District will seek grant funding to implement full and accurate metering. **(BP #1)**

Monthly Billing – To increase customer awareness of water use, LWSD will consider the cost/benefit of increasing billing frequency from bi-monthly to monthly for all customers.

Conservation Coordinator – The District will continue to appoint a water conservation coordinator and will consider joining the Douglas County Water Resource Authority (DCWRA) for support. **(BP #4)**

5.3 Water Loss Control Program

Water Loss Control Program – LWSD’s water loss was estimated at 12.8 percent, but should be confirmed with metered data; growing losses would be anticipated with this aged system. The District will continue to monitor its unaccounted-for water and consider a leak detection program if warranted. **(BP #3)**

5.4 Education and Public Information

Conservation Public Information Campaign – The District will continue to disseminate information on water conservation to its customers. If LWSD joins DCWRA, the District would have access to additional educational programs. The District will consider this in the future should funding become available. **(BP #6)**

Summary of Proposed Water Conservation Measures

Water Conservation Measure	Existing - to be Continued	LWSD has Regulatory Authority?	Best Practices Guidebook BP #	Retained for Continued and/or Future Implementation?
Pricing Structure				
Modifications to increasing block rate structure	Yes	Yes	1	Yes
Operational Utility Side Measures				
Integrated Resources Planning	Yes	Yes	2	Yes
Full Metering	Yes	Yes	1	Yes
Monthly Billing		Yes	--	TBD
Conservation Coordinator	Yes	Yes	4	Yes
Water Loss Control Program				
Water Loss Control Program		Yes	3	TBD
Education and Public Information				
Conservation Public Information Campaign		Yes	6	Yes

*Table 5-2
Evaluated Water Conservation Program Activities*

Section 6: Demand Forecasts

The Alliance for Water Efficiency (AWE) Conservation Tracking Tool was used to project water demands. The Water Conservation Tracking Tool is an Excel-based spreadsheet tool for evaluating the water savings, costs, and benefits of urban water conservation programs. In addition to providing users a standardized methodology for water savings and benefit-cost accounting, the tool includes a library of pre-defined, fully parameterized conservation activities from which users can construct conservation programs. Detailed information on the inputs, assumptions and methods used in Water Conservation Tracking Tool can be found in the User Guide.

Three demand forecasts were made using the Water Conservation Tracking Tool:

1. Baseline
2. Baseline + plumbing code savings
3. Baseline + plumbing code savings + existing and planned water conservation program savings

6.1 Baseline Demand Forecast

The baseline forecast represents the LWSD demand forecast based on projecting the 2008 demands shown in Section 3, including unaccounted-for water. The District is currently at full build out, therefore the existing 22.8 AFY demand is considered to remain constant through 2020. This demand forecast includes estimated water losses, but does not include the raw water supply planning water supply safety factors that would increase the treated water demand by approximately 10 percent. For the purposes of this plan, demand forecasts will be treated water forecasts, understanding that firm yield raw water supply requirements could be greater.

6.2 Baseline + Plumbing Code Savings Forecast

The Baseline + Plumbing Code Savings forecast includes forecasted reductions in demand that have or will occur as a result of National Plumbing Code efficiency standards. For example, ULFT toilet requirements included in the National Energy Policy Act took effect in 1994. New efficiency requirements for clothes washers will take effect in 2011.

The Baseline + Plumbing Code Savings demand forecast is approximately 22.6 AFY in 2020, a savings estimated at 0.2 AFY.

6.3 Baseline + Plumbing Code Savings + Program Savings Forecast

The Baseline + Plumbing Code Savings + Program Savings forecast includes forecasted reductions in demand from the existing and planned water conservation program in addition to the savings projected to occur as a result of National Plumbing Code efficiency standards.

The following existing and planned water conservation programs were included as inputs into the AWE Water Tracking Tool to estimate and forecast the water savings. Water savings have been estimated for the major existing programs listed in Table 6.1. These programs are forecast to save an additional 1.2 AFY by 2020 for a total savings of 1.4 AFY. This represents a 6.1 percent total savings over the projected baseline water demand as shown in Table 6.2.

It is estimated that the District’s current conservation measures, particularly its tiered water rates and plumbing code savings, have already saved 0.9 AFY in demand based on 2010 development. Adding the savings to date to the projected savings through 2020, the 2020 demand is expected to be 2.3 AFY less than it would have been with no plumbing code or conservation savings; a total savings of 10.1 percent.

Customer Class	Water Conservation Activity Name
Residential	Residential LF Toilet, SF
Residential	Residential LF Washer, SF
Residential	Residential Increasing Tiered Rates
Commercial	Commercial Increasing Tiered Rates
Residential	Full & Accurate Metering
Commercial	Full & Accurate Metering
Park Irrigation	Full & Accurate Metering

*Table 6-1
Water Conservation Activities included in AWE Tool*

Service Area Water Savings	Units	Average Annual Savings in 2020
Residential LF Washer, SF	AF	0.2
Residential LF Toilet, SF	AF	0
Overall Plumbing Code Water Savings*	AF	0.2
Increasing Tiered Rates (Residential & Commercial)	AF	0.9
Improved Metering (Single Family & Irrigation)	AF	0.3
Overall Program Water Savings	AF	1.2
Total Water Savings*	AF	1.4
% of Baseline Demands	%	6.1%

*Table 6-2
Projected Water Conservation Savings*

Section 7: Impacts of Conservation Programs

7.1 Goal and Projections

LWSD has a water conservation rate structure in place and plans to continue that program for future savings. The program has been very effective, resulting in a reduction of 38 percent in water demands from 2002 to 2008. ***In recognition of accrued conservation benefits and extremely low unit demands reported by the District, LWSD plans to improve its metering and data collection to confirm its current demands. The District can then assess whether some additional climate-adjusted reduction in demands by 2020 is possible.***

The forecast total water savings of 2.3 AFY represents significant benefits. Figure 7-1 shows the projected annual water production to meet demands based on the baseline, baseline + code savings and baseline + code savings + program savings projected beyond 2010. The current limiting factors include a renewable water supply. The continued successful implementation of these measures can delay the need to add capacity.

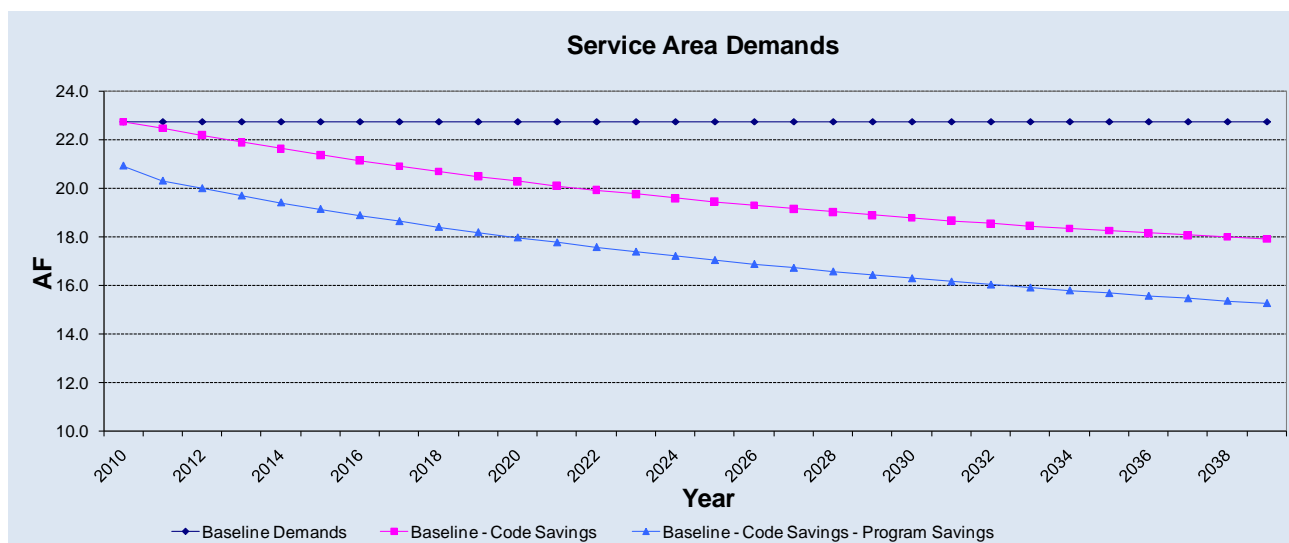


Figure 7-1
Forecast Total Water Demands

7.2 Benefits and Financial Savings

The following benefits and potential financial savings in capital improvements have been identified based on the projected water savings. It will require ongoing conservation efforts to ensure the identified water conservation savings can be made permanent:

Water Supply and Delivery – As LWSD saves on its water demands, the cost savings can be categorized as savings in operation and maintenance (O&M) or capital costs. Marginal savings in water demands will save on O&M of existing equipment and facilities; typically considered the volume charge component. This would include such costs as electrical demands for well pumping or chemical costs for chlorination.

More substantial demand savings over time will save not only on O&M, but could defer the need for some capital improvements. Depending on the increment of conservation savings, LWSD may not need to acquire as much renewable water in the years ahead. The costs of renewable water development will provide the upper-end savings possible with conservation.

LWSD could acquire renewable water supplies to meet a portion of its build-out water demand. If LWSD chooses to participate in a regional system planned by SMWSA, the District could likely benefit from an interruptible supply contract with Denver and Aurora to obtain that water.

The regional infrastructure to deliver that water is planned to include a transmission line along nearby U.S. Highway 85 and is estimated at \$460 M (Baysinger, et al. 2010). SMWSA members expect that system to deliver 40,670 AFY throughout the region at build-out (Strother, 2010). Approximating the cost on a unit basis, the infrastructure will then cost \$11,300 per AFY. Because this capital cost is less than for well construction and allows for incremental purchase, the renewable water cost will be used in this analysis.

In addition, annual costs payable to Denver and Aurora are expected to range from \$4.00 to \$6.00 per 1,000 gal. We will assume an average cost of \$5.00 per 1,000 gal. To this, the operating, maintenance, and replacement cost of the regional system must be added. That annual cost was estimated at \$34.6 M to operate the system for 35,000 AFY (Baysinger, et al. 2010) or approximately \$3.00 per 1,000 gal. The total then would be approximately \$8.00 per 1,000 gal. or \$2,600 per AF.

This is considerably higher than the District’s current costs of operating, but a necessary cost for renewable water. LWSD may have an interest in purchasing renewable water via the SMWSA agreement to offset the escalating costs of continued use of Denver Basin groundwater and provide long-term sustainability, regardless of how much water is saved through conservation.

Projected Savings - The conservation savings to LWSD for capital expenditures is summarized in Table 7-1. The total savings in avoided capital expenditures for water supply and delivery infrastructure based on potential savings in 2020 of 1.4 AFY compared to the baseline projection without conservation is \$26,000. In addition, the District could save \$6,000 in annual O&M costs in 2010 dollars. Ongoing water conservation programs will be needed to ensure that these savings are permanent.

Description	Water Demand Units	Total Water Conservation Program Forecast Demand Reductions	Estimated Unit Cost	Total Savings if Demand Reductions are Permanent
Capital - Water Supply, Delivery, and Treatment	AFY	2.3	\$11,300	\$26,000
Annual O&M, Water System	AFY	2.3	\$2,600	\$6,000

Table 7-1
Projected Capital Expenditure Savings

Section 8: Implementation and Monitoring Plan

8.1 Implementation

LWSD will continue its current water conservation programs. In addition it will implement the new programs previously described in Section 5 and shown in Table 8-1. This table also indicates the proposed dates of implementation.

Water Conservation Measure	Date of Implementation if New Measure
Pricing Structure	
Modifications to increasing block rate structure	Ongoing
Operational Utility Side Measures	
Integrated Resources Planning	Ongoing
Full Metering	Ongoing
Monthly Billing	TBD
Conservation Coordinator	Ongoing
Water Loss Control Program	
Water Loss Control Program	TBD
Education and Public Information	
Conservation public information campaign	TBD

*Table 8-1
Future Water Conservation Measures*

8.2 Ongoing Monitoring

LWSD will track the impacts of the conservation plan annually. Monitoring of total and billed water usage will provide information on water use and progress toward the water conservation goals. With County and State support, LWSD could produce a progress report on the conservation program in 2015 that includes a detailed description of plan implementation as well as the measured impacts on usage.

8.3 Plan Refinement

LWSD will periodically evaluate its program and implementation for conformance with this Plan. The District may adjust the programs identified in this Plan as warranted due to new technology or analysis of the effectiveness of individual programs.

8.4 Compliance with State Planning Requirements

Colorado Statutes Title 37 Water and Irrigation – Colorado Water Conservation Board (CWCB) and Compacts 37-60-126 requires a state approved water conservation plan for covered entities as a condition of seeking financial assistance from the CWCB. Because LWSD is not categorized as a covered entity, those provisions are not applicable to this Plan, although it is largely based on the key planning requirements of that statute.

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