





Comprehensive Water Conservation and Implementation Plan

County of Rockland
March 3, 2020

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Chair – Rockland Water Task Force

EDWIN J. DAY
Rockland County Executive

ROCKLAND COUNTY
Comprehensive Water Conservation and Implementation Plan
Rockland County, New York

Prepared with the assistance of:
Rockland County Task Force on Water Resources Management, Conservation Committee

and

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Adopted March 3, 2020

The Legislature of Rockland County

HARRIET D. CORNELL
Chairwoman – Rockland Water Task Force

February 19, 2020

The history of Rockland's water will one day be a case study of how the smallest county in the State of New York-- with 90% of its water supply owned by a private company, in contrast to the 90% of the population of the United States which gets its piped water from publicly-owned utilities—took control of its water future by fostering collaboration among government, citizen activists and Hudson River environmental organizations.

As Chairwoman of the Legislature from 2005 -2013, I was deeply involved with the citizens and organizations protesting the private company's proposed construction of a desalination treatment plant using Hudson River water, traveling with them to meetings, and submitting both written and oral testimony on behalf of Rockland County and its citizens. In 2013 the New York State Public Service Commission (PSC) decided to hold two public hearings in Rockland as to whether a desalination plant was needed to ensure adequate future water supply.

Its first hearing was held on October 1, 2013. I testified that Rockland was capable of developing its own plan of conservation and described a potential Water Task Force with representatives from a variety of backgrounds and a broad mission. The Task Force was subsequently created by the Rockland County Legislature and signed by the County Executive on June 19, 2014. When the Task Force started its work, the PSC Chairwoman, Audrey Zibelman, followed its activities closely. On December 17, 2015, the PSC directed the private company, Suez Water NY, to abandon plans for a desalination plant.

With the help of Rockland's State legislative representatives, the Task Force was written into the NYS Budget with an allocation of $250,000 for hiring a consultant firm to aid in development of a long-term Water Conservation Plan and to fund the start of its implementation.

This is where we are now, with a fine plan tailored to Rockland County with the excellent assistance of Jacobs Civil Consultants, and honed by the dedicated members of the Task Force Conservation Committee and the help of Rockland citizens at public workshops. It includes a menu of options for municipal and private sector actions which will not only save our precious water, but also will save money. While it is always easier to involve people when they are fighting against something, Rockland is a special place with engaged citizens who care deeply about issues of water supply and quality - and they have already demonstrated their willingness to fight ***for*** something worthwhile. With appreciation to all who brought us to today. Onward!

Harriet Cornell

Acknowledgments

HARRIET D. CORNELL
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EDWIN J. DAY
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Many thanks to all the ***Public Stakeholders*****,** whether municipal decision-makers and elected officials, business owners, residential water-users**,** or students who attended planning workshops, provided their comments and insights, or data and other information vital to the preparation of the Plan. The successful implementation of the Plan depends on each and every member of our diverse Rockland communities.

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List of Exhibits

Glossary of Terms and Abbreviations

AWE	Alliance for Water Efficiency
AWWA	American Water Works Association
Commercial customer	includes retail business, public buildings, and schools
CSC	Climate Smart Communities
Demand	total measure of water as used by customers in Rockland County
DOH	Department of Health
gpcd	gallons per capita per day
gpd	gallons per day
High-efficiency	Used to designate fixtures with low water use; typically, through the use of designated products under the EPA EnergyStar and WaterSense programs
Industrial customer	heavy or light manufacturing
Local	Defines jurisdictions below the county level including towns and villages
mgd	million gallons per day
Multi-family customer	where a single water meter is dedicated to multiple homes such as apartments
NYC DEP	New York City Department of Environmental Protection
NYMTC	New York Metropolitan Transportation Council
NYS	New York State
O&M	operation and maintenance
Passive conservation	water conservation realized through technology improvements
PSC	Public Service Commission
ROI	return on investment
SDWIS	United States Environmental Protection Agency Safe Drinking Water Information System
SED	socioeconomic and demographic
Single-family customer	where a single water meter is dedicated to a single home
System loss	loss of water through distribution or water treatment infrastructure system or inaccurate metering of consumer consumption
US EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
Water production	the volume of raw water that is withdrawn, treated and thereafter enters the distribution system; includes system loss
Water supply	a source for raw drinking water; in Rockland County a combination of surface and groundwater sources
WRF	Water Research Foundation

Executive Summary

This Comprehensive Water Conservation and Implementation Plan (Plan) presents an integrated approach to water conservation that is implementable and cost-effective for the County of Rockland (County) and its implementation partners. Though it's difficult to quantify with certainty what the total sustainable supply is for the County, periods of non-sustainable groundwater supply withdrawal, when groundwater levels drop, have been observed during previous peak demand seasons when drought and high temperatures occurred. As population continues to increase, it's anticipated that periods when production exceeds current peak-production levels will increase, resulting in greater risk of non-sustainable withdrawal. This Plan provides a framework of strategies by which overall and peak demands can be reduced, through conservation, so that current supplies and infrastructure can meet forecast water demand.

The County, as coordinator and leading voice for water conservation, is demonstrating leadership by engaging and working alongside implementation partners, stakeholders, the public, businesses, and government agencies at multiple levels to implement this Plan. It's understood by the County that this Plan provides a framework for specific actions based on best-available data, and that it will be adjusted as better information and new conditions arise.

The 20 water conservation measures in this Plan are designed as a menu of alternatives that can be adapted, adopted, and implemented by one or more implementation partners. A detailed summary is provided for each conservation measure. Measure descriptions provide guidance and recommendations for planning, customizing, and implementing, including specific sections on intent, points of integration, implementation partners, additional stakeholders/partners, conservation measure description, implementation guidance, potential costs, potential water savings, and considerations for enhanced implementation and resources.

1. Introduction

The Rockland County Comprehensive Water Conservation and Implementation Plan (Plan) presents an integrated approach to water conservation that is implementable and cost-effective for the County of Rockland (County), and its implementation partners throughout the County. It is intended to complement other resource conservation efforts within the County and support the region's economic, environmental, and social well-being. The Plan was developed through a stakeholder approach envisioned by the County, including a combination of public meetings and stakeholder workshops, then was further refined and finalized through input provided by the Rockland County Planning Department and Task Force on Water Resources Management (Task Force).

1.1 Rockland County Overview

Located on the west bank of the Hudson River, Rockland County is one of the northern counties that forms the New York metropolitan area. At 176 square miles, the County is made up of five townships, further subdivided into nineteen villages; Exhibit 1 provides a list of local jurisdictions. The Rockland County municipal landscape is important in the context of this Plan because the New York State constitution grants local municipalities the ability to govern themselves provided they follow state and federal law; an arrangement known as home rule. Due to this legal arrangement, the County has limited ability to pass laws and ordinances related to water conservation; successful implementation relies, in part, on solutions that may be embraced and adopted by local jurisdictions within the County. Therefore, the County engaged stakeholders throughout the planning process, including selection and development of conservation measures and the implementation framework.

Exhibit 1. Local Jurisdictions of the County of Rockland

Townships		
Clarkstown	Orangetown	Stony Point
Haverstraw	Ramapo	
Villages		
Airmont	New Hempstead	South Nyack
Chestnut Ridge	New Square	Spring Valley
Grand View-on-Hudson	Nyack	Suffern
Haverstraw	Piermont	Upper Nyack
Hillburn	Pomona	Wesley Hills
Kaser	Sloatsburg	West Haverstraw
Montebello		

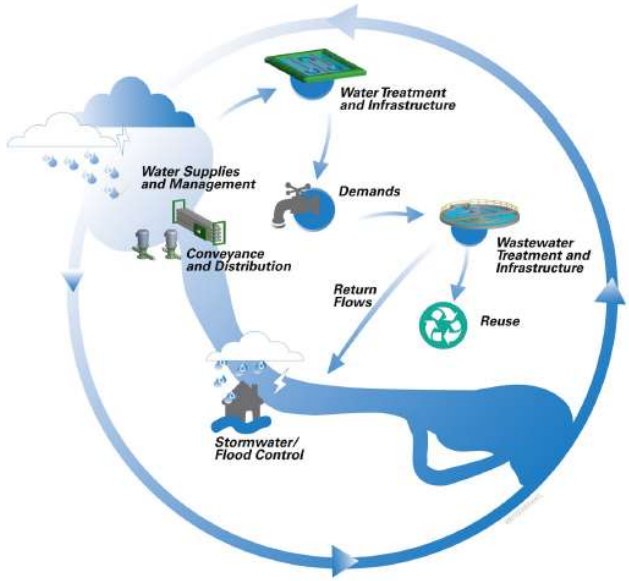
1.2 Integrated Water Conservation Planning

The County recognizes that water conservation planning is most effective when interrelationships among water resources, infrastructure, energy use, land use, public and private water supplies, community values, and local governance are addressed. Specifically, the Plan addresses current and future water needs while considering implications for water supply, treatment, reuse, watershed health, water quality, instream flows, community well-being and fiscal considerations.

Exhibit 2 illustrates the complexity and scope of water resource management. Through an integrated approach, the County seeks to develop a plan that recognizes and addresses inter-relationships among water resources-related goals, strategies, and outcomes. In doing so, the County seeks to attain the following water conservation benefits using an integrated water resource planning philosophy:

- Identify a clear path to achieve multiple benefits,
- Recognize water resource interrelationships, including cross-jurisdictional connections,
- Create opportunities to optimize expenditures and drive cost-effective implementation,
- Anticipate potential unintended consequences, and
- Avoid redundancies

Exhibit 2. Water Resource Management Integration



Integral to this approach is acknowledging ongoing water and energy resource conservation efforts of the two largest utilities in the County: water utility SUEZ Water New York Inc. (SUEZ NY) and energy utility Orange and Rockland. Measures in the Plan are intended to complement ongoing efforts rather than duplicate them. The Plan also considers the interrelationships among its strategies and their impacts and supports collaborative implementation that broadens traditional organizational roles at both the local jurisdiction and County level. With an integrated Plan, the County can also comprehensively implement shared strategies for public education, technical assistance for local jurisdictions and county-wide evaluation of Plan progress.

1.3 Plan Focus

As the first Comprehensive Water Conservation and Implementation Plan for the County of Rockland the primary focus of this Plan is to:

- Gain a holistic understanding of current water demand in the entire county (Section 2),
- Predict future water demand conditions in the county, then identify short- and long-term water savings goals based on potential savings documented in literature (Section 3),
- Develop an implementation plan that the County can use to guide implementation partners in selecting, customizing, and implementing water conservation measures in their jurisdictions (Section 4), and
- Present a menu of 20 water conservation measures that address the unique challenges facing Rockland County, while also respecting the authority of local jurisdictions (Section 5).

1.4 Planning Process

The planning process was designed to incorporate technical analysis, best practices, and stakeholder engagement including a combination of public meetings, stakeholder workshops, and detailed review by the Rockland County Planning Department and Task Force. During the public kick-off meeting in October 2018, input from attendees helped to identify the plan drivers, focus, and critical success factors. These insights were useful early in the planning process while developing the current water use profile for the County. The active engagement of stakeholders – including anticipated implementation partners – supported the water demand forecasting and development of both near-term and long-term water-savings targets throughout the 2050 planning horizon.

Following the review of current and projected water use demands, a half-day workshop on March 7, 2019 was attended by more than 100 participants, with representatives from the County's local jurisdictions along with other stakeholders such as the County Department of Health, local school districts and colleges, large water users, utilities and municipalities, and the green industry. The workshop objective was to engage participants and gather input from stakeholders regarding perceived challenges for conserving water, potential water-saving measures, and policies. Participants provided critical input to the planning process, sharing information and insights regarding programs they may implement; a full list of ideas generated at the stakeholder workshop are presented in Appendix A. Following the stakeholder workshop, the broad array of proposed water conservation measures was further refined and finalized through input provided by the Rockland County Planning Department and Task Force.

The resulting draft Plan was presented at an additional open public meeting. The draft Plan was posted on the County website July 18, 2019 for stakeholders and the public to review and comment in advance of the July 30, 2019 public meeting where a formal presentation of the draft Plan was made, and feedback solicited; a full list of ideas generated at the presentation are included in Appendix B. At the close of the draft Plan commenting period revisions were made based on feedback received before the Plan was finalized and presented to the County legislature for final acceptance.

2. Existing Facilities and Conditions

Understanding current conditions provides a foundation for creating the Plan. This section provides an overview of current conditions in the County, its water resources, and its water resource management infrastructure. Documenting the interconnected nature of water resources management, including regional population information, basin return flow conditions (the amount of treated wastewater effluent), watershed development and in-stream conditions, lays the groundwork for developing an integrated approach to water conservation planning.

2.1 Population

As one of the counties that make up the New York metropolitan area, Rockland County has experienced continued population growth over the last decade. As reported in the United States Census Bureau 2013-2017 American Community Survey 5-year Estimates, the current population is estimated at approximately 325,000 persons, a 4 percent increase from the 2010 population. Because the County is located only 33 miles north of New York City, growth is anticipated to continue through the 2050 planning horizon for this Plan, to approximately 409,000 people by 2050 (NYMTC 2015).

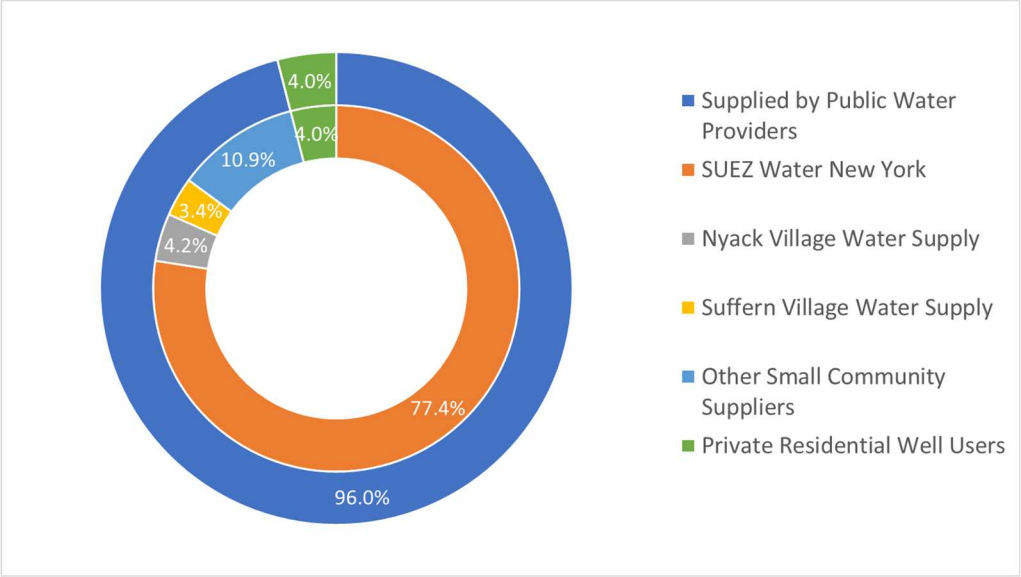
2.2 Water Supply and Treatment

The County's water supply comes from a combination of surface and groundwater sources (Heisig 2010), specifically:

- Groundwater from the Newark basin aquifer,
- Groundwater from alluvial aquifers along the Ramapo and Mahwah Rivers, and
- Surface water from Lake Deforest Reservoir

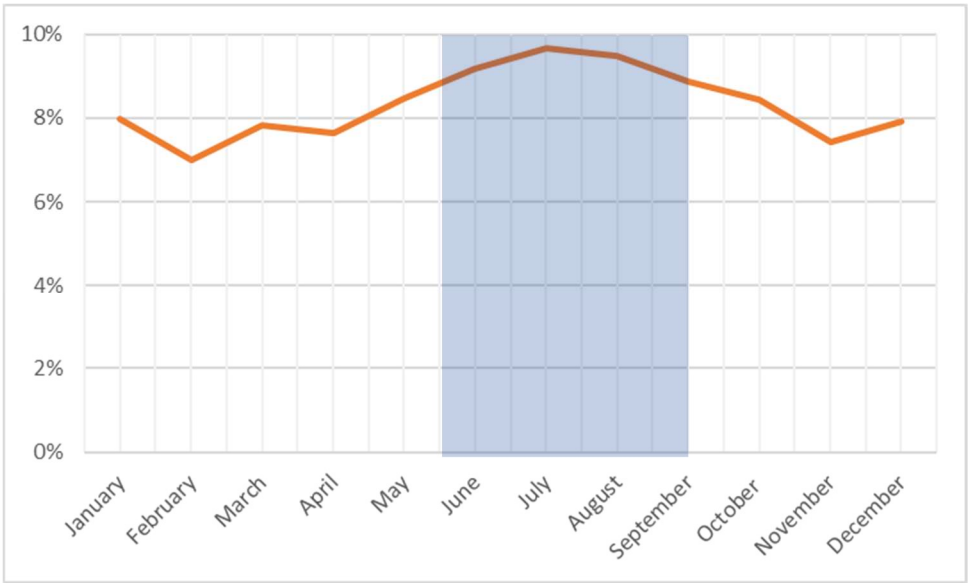
Public water providers and private residential well users draw from these sources, with private wells serving a far smaller portion of the population; Rockland County Department of Health estimates there are approximately 6,000 private wells (Thapa 2016). According to the United States Environmental Protection Agency Safe Drinking Water Information System (SDWIS) federal data warehouse, most of the County's population is provided water by one of the 66 regulated public water systems in the County (SDWIS 2018). Exhibit 3 provides an estimated percentage of the population served by each of these systems, along with a breakdown of the major public water providers in the County.

Exhibit 3. Existing Water Supply Providers in Rockland County by Percentage of Population Served



For this Plan, water treatment practices by the largest water utility, SUEZ NY, are considered representative of treatment processes used by public providers. According to SUEZ NY's 2018 Annual Water Quality report: all surface water sources receive coagulation, flocculation, filtration, disinfection, and corrosion control treatment, while groundwater sources receive disinfection (sodium hypochlorite or ultraviolet), corrosion control, and in some cases granular activated carbon filtration treatment depending on whether the source is an alluvial aquifer (SUEZ 2018). Based on SUEZ NY's 2017 production data, measured as output from the treatment plant, the season for peak water production in the County typically begins July 1st and lasts until mid-September (Exhibit 4) (Graziano 2018).

Exhibit 4. Percentage of Total Annual Production by Month with Peak Period Highlighted



2.3 Physical Setting

Land development affects physical, chemical, and biological conditions of the County's watersheds, waterways, and water resources. Population growth and redevelopment in the County has resulted in land use and land cover changes over the past few decades. Generally, land use has shifted from forest and agricultural lands to residential, commercial, industrial, and other urbanized land uses. More detailed information on land use in the region, and its impact on water resource management in the County, can be found in the 2010 USGS Water Resources of Rockland County report, which focused on the Newark Basin Bedrock Aquifer (Heisig 2010). The County also has plans in place to develop a similar water resources management plan for the Ramapo Watershed, another critical source of groundwater in the County. Conclusions of that study could influence conservation targets and planning in future updates of this Plan.

2.4 Water Quality

Protection of source water is vitally important to the County as degradation of source water can potentially pose human health threats and increase water treatment costs for local communities. Though water quality was not the focus of this Plan, the integrated water resource planning approach used to select the conservation measures in this Plan supports sustainable resource management. As a result, several of the conservation measures contained in Section 5 provide water quality co-benefits.

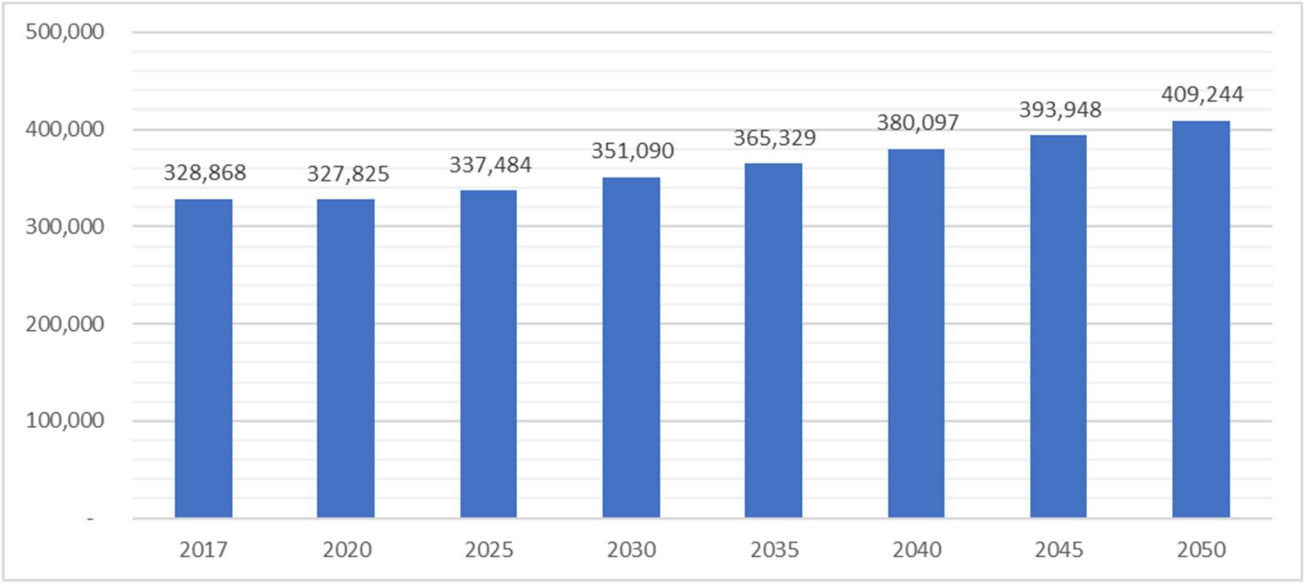
3. Future Conditions

Understanding current and projected future water demand under the “business as usual” scenario, or baseline scenario, provides a foundation for evaluating conservation strategies This section describes water demand and wastewater flow forecasts for the County based on population projections for the region. This section also examines three potential future demand scenarios to identify a range of near-term and long-term water savings targets.

3.1 Population Projections

Population projections from the 2050 Socioeconomic and Demographic (SED) Forecast for Rockland County, prepared by the New York Metropolitan Transportation Council (NYMTC) were used in developing water demand forecasting for Rockland County (NYMTC 2015). The NYMTC forecast, though developed for regional transportation planning purposes, provides detailed population forecast data for the New York metropolitan area. According to the SED forecast, the Rockland County population is projected to reach 409,000, an increase of 24 percent, by 2050 (Exhibit 5). This Plan assumes that growth will be distributed evenly across the customer classes (single-family, multi-family, commercial, and industrial); therefore, measures were developed that address demand for each customer class.

Exhibit 5. Population Forecast for Rockland County (NYMTC 2015)



3.2 Watershed Land Uses Changes

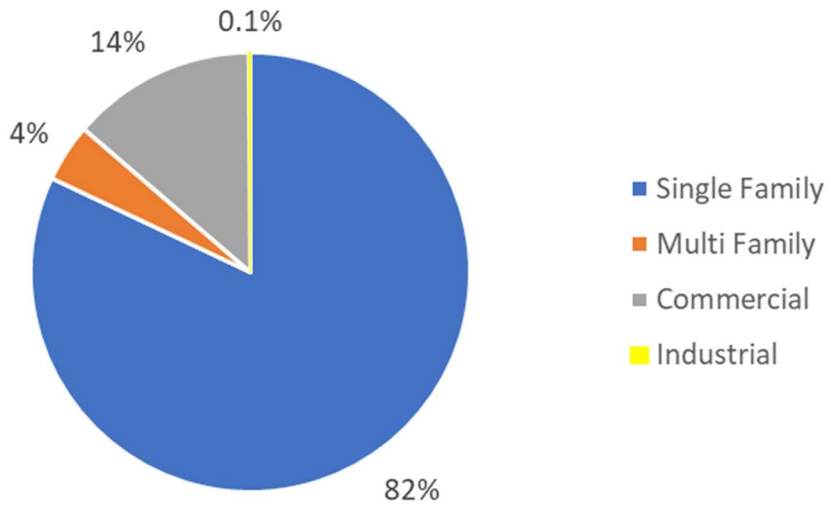
As the New York metropolitan area population and employment continue to grow, land development is also predicted to increase (“ROCKLAND TOMORROW: Rockland County Comprehensive Plan”). Given the County’s proximity to New York City, this trend of development was assumed to continue through 2050. Ensuring that future zoning and planning efforts consider water conservation was a major driver behind the inclusion of several regulatory measures that are described in Section 5.3.

3.3 Water Demand Forecasts

As noted in Section 2, SUEZ NY supplies water to most of the population in the County, but a significant portion of the population (approximately 23 percent) is served by a combination of Nyack Village Water Supply, Suffern Village Water Supply, other small community suppliers (SDWIS 2018), and private residential wells (Thapa 2016). Weighting the percentage of total population served by each provider against the percentage of total customers by class for each provider, results in an estimate of the total percentage of accounts by customer class in Rockland County; shown in Exhibit 6. Each customer class is defined as follows:

- Commercial Customer: includes retail business, public buildings, schools, and other institutions
- Industrial Customer: heavy or light manufacturing
- Multi-family Customer: where a single water meter is dedicated to multiple homes
- Single-family Customer: where a single water meter is dedicated to a single home

Exhibit 6. Percentage of Accounts by Customer Class for Rockland County



Applying this percentage of accounts by customer class against the population forecast developed by the New York Metropolitan Transportation Council (NYMTC 2015) makes it possible to forecast the number of accounts by customer class in Rockland County through 2050. Multiplying the forecast number of accounts by the daily demand per account data from SUEZ NY (SUEZ 2016), which was assumed to be representative of all accounts in the county, a county-wide baseline water demand scenario was developed. A pie chart detailing total percentage of demand by customer class in Rockland county is provided in Exhibit 7. Adding system losses, assumed at 18 percent of total demand (NYS PSC maximum allowable water loss), produces the baseline annual average water production forecast for the County through 2050, provided in Exhibit 8. It should be noted that passive conservation savings, realized through technology improvements, are not included in the baseline annual average water production forecast and production could be lower if actual system losses are less than 18 percent.

Exhibit 7. Percentage of Baseline Water Demand by Customer Class for Rockland County

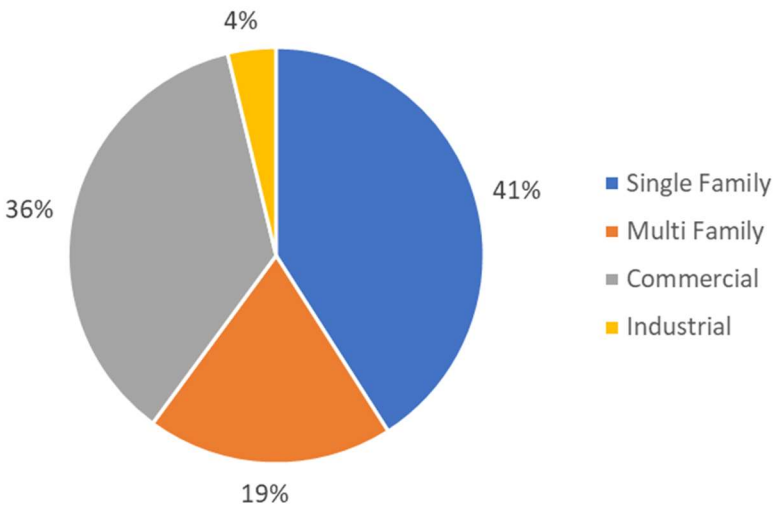
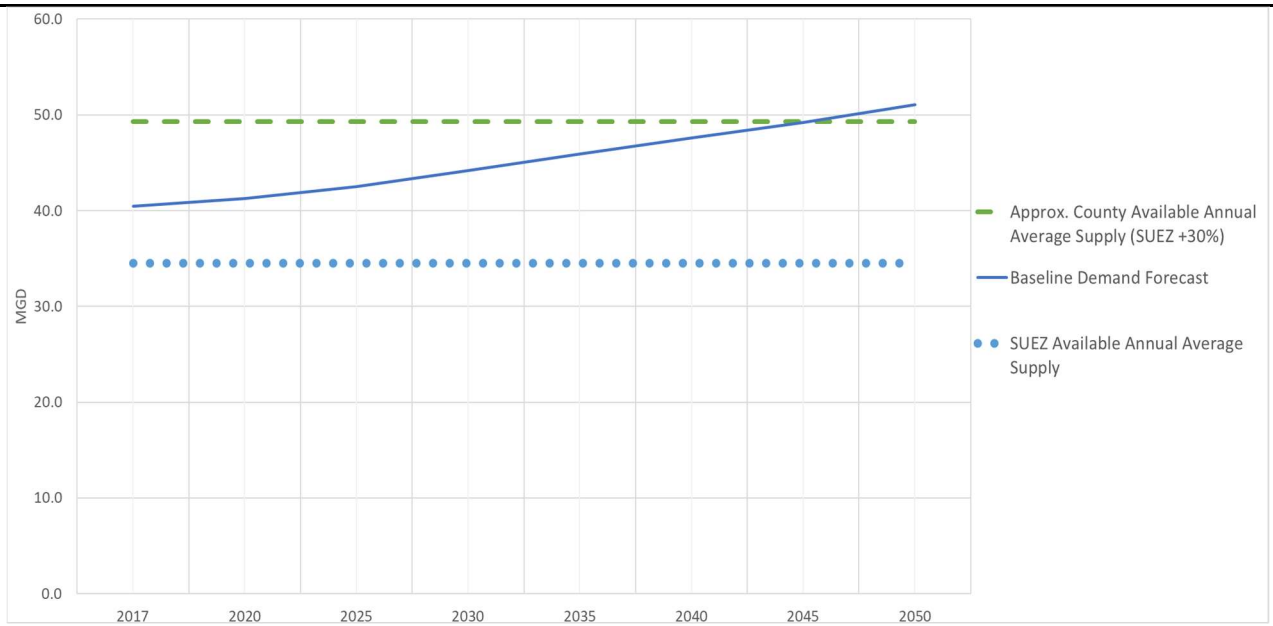


Exhibit 8. Baseline Annual Average Water Production (Demand + System Loss) for Rockland County



Note:
1. Baseline scenario includes system losses equal to 18 percent of total demand, which equals NYS PSC maximum allowable water loss.
2. Passive conservation savings, realized through technology improvements, are not included in the forecast.

Using the County's 2017 estimated demand and SUEZ NY's actual production numbers (Graziano 2018), it's estimated that SUEZ NY produces 70 percent of the County's daily supply production. So, given SUEZ NY's available annual average supply rate of 34.5 million gallons per day (mgd) (Graziano 2018), the available annual average production rate for the entire County is estimated to be approximately 49 mgd. Both the SUEZ NY and County available annual average production rates are compared with the baseline demand forecast in Exhibit 8. It should be noted, that while the County appears to have enough supply to meet the baseline production forecast until 2044, not all this supply may be readily accessible to augment public supply as various small community and private residential well accounts contribute to the total. It should also be noted that this does not

consider the spatial distribution and accessibility of the supply, which may further limit the portion of estimated supply available to water providers.

3.4 Future Water Supply

Ensuring adequate future supply to meet projected 2050 demands within the County will require implementing one or both of the following actions:

1) Reduce overall and peak demands, through conservation, so that current supplies and infrastructure can meet forecast water demand.

2) Develop new water supply sources and upgrade wastewater treatment facilities to keep pace with development.

While achieving water conservation requires financial investment, there are avoided costs that result from water use efficiency. Over the years, various proposals to increase water supply to meet forecast demands have been explored (Haverstraw 2010, SUEZ 2016, Rockland County Sewer District 2002). Although there is no accepted plan to increase supply within the County, there was an updated water reuse study done for Rockland County Sewer District No. 1 (2016). The focus of this Plan is to provide the County with guidance on the first strategy, coordinating water conservation efforts to reduce overall and peak water demands county-wide.

3.5 Water Conservation Scenarios

The demand forecast shown in Exhibit 8 (Scenario 1) assumes that water consumption by account will stay the same as County population increases through 2050. Some passive conservation savings, realized through technology improvements, will occur over the forecasted period, though these passive savings are unlikely to contribute significantly to meeting forecasted water demand. To determine what water savings were possible, and whether those savings would contribute significantly to meeting forecasted water demand, three water demand scenarios were developed to identify a range of near-term and long-term water saving targets:

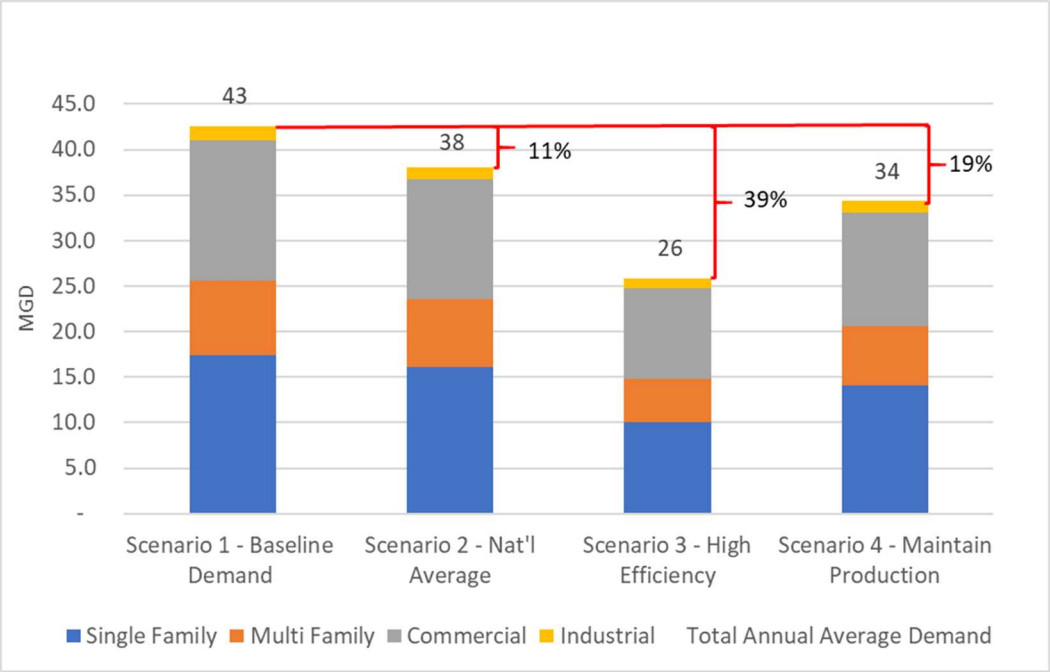
- Scenario 2: Reduce demand to national average gradually by 2050
  - 8 percent reduction in residential water use by account to match 2016 average residential demand calculated from the national Water Research Foundation (WRF) 2016 study: Residential End Uses of Water Study Update – Version 2 (DeOreo et al. 2016)
  - 15 percent reduction in commercial and industrial account demand (Kiefer et al. 2015)
- Scenario 3: Reduce demand gradually to high-efficiency by 2050
  - 42 percent maximum potential reduction in residential water use per account calculated from the national Water Research Foundation (WRF) 2016 study: Residential End Uses of Water Study Update – Version 2 (DeOreo et al. 2016)
  - 35 percent maximum potential reduction in commercial and industrial account demand (Kiefer et al. 2015)
- Scenario 4: Maintain current production through 2050
  - 19 percent reduction in water demand across all accounts, effectively counteracting the impact of forecasted population increases.

The proposed reduction in demand per account and resulting water savings for each scenario are presented in Exhibit 9, and the overall 2050 annual average demand reduction for each scenario is represented as a stacked bar graph in Exhibit 10. While each of these water conservation scenarios on the surface appears to have the potential to enable the County to meet 2050 forecasted water demands, demand and therefore production is not flat throughout the year.

Exhibit 9. Summary of Customer Account Demand Scenarios

			Scenario 2: Reduce Demand to National Average gradually by 2050	
Customer Class	**Baseline Demand (Scenario 1) (gal/day/account) (A)**	**Scenario 2 2050 Demand (gal/day/account) (B)**	**Scenario 2 2050 Required Water Savings (gal/day/account) (A-B)**	**Scenario 2 Change in Demand (%) (B-A)/A**
Single-family	200	185	15	-8%
Multi-family	1,792	1,655	137	-8%
Commercial	1,066	906	160	-15%
Industrial	13,642	11,595	2,046	-15%
			Scenario 3: Reduce Demand to High Efficiency gradually by 2050	
Customer Class	**Baseline Demand (Scenario 1) (gal/day/account)**	**Scenario 3 2050 Demand (gal/day/account)**	**Scenario 3 2050 Required Water Savings (gal/day/account)**	**Scenario 3 Change in Demand (%)**
Single-family	200	116	84	-42%
Multi-family	1,792	1,036	755	-42%
Commercial	1,066	693	373	-35%
Industrial	13,642	8,867	4,775	-35%
			Scenario 4: Maintain Current Production through 2050	
Customer Class	**Baseline Demand (Scenario 1) (gal/day/account)**	**Scenario 4 2050 Demand (gal/day/account)**	**Scenario 4 2050 Required Water Savings (gal/day/account)**	**Scenario 4 Change in Demand (%)**
Single-family	200	161	39	-19%
Multi-family	1,792	1,444	347	-19%
Commercial	1,066	859	206	-19%
Industrial	13,642	10,998	2,643	-19%

Exhibit 10. 2050 Annual Average Demand for Each Water Demand Scenario (mgd)



The yellow curve on the far left of Exhibit 11 depicts the calculated 2017 annual production (demand plus water losses) for all of Rockland County, applied to SUEZ NY's 2017 annual production curve (Graziano 2018). The 2017 peak production period is highlighted on the graph and a line connecting where the peak demand period intersects the production line has been drawn across the graph. Periods of non-sustainable groundwater supply withdrawal, when groundwater levels drop, have been observed during previous peak demand seasons where drought and high temperatures occurred (Heisig 2010). Peak production is also important because it drives the sizing of water and wastewater treatment facilities. In the baseline Scenario 1, represented as the blue line in Exhibit 11, should demand per account remain the same as the County's population continues to increase, current peak production and seasonal peaking periods are expected to increase significantly (shown as the area above the line in the graph). Of the three water conservation scenarios only Scenario 2, represented as the orange line in Exhibit 11, also exhibits an increase in peak production and seasonal peaking periods.

Factoring in that the County has already had periods of non-sustainable groundwater withdrawal during peak production periods (Heisig 2010), scenarios where production is often greater than current peak production levels have a greater risk of resulting in non-sustainable withdrawals. As stated previously, the County's water supply is a complex mix of surface and groundwater supplies, and while it may not be feasible to directly quantify the total available supply, trends like those observed in the annual production can provide insights that are useful in planning. Specifically, this exercise illustrated the need to provide water conservation measures in Section 5 that address water uses that drive up seasonal peak demand.

Exhibit 11. Forecasted Water Production Scenarios for all of Rockland County through 2050

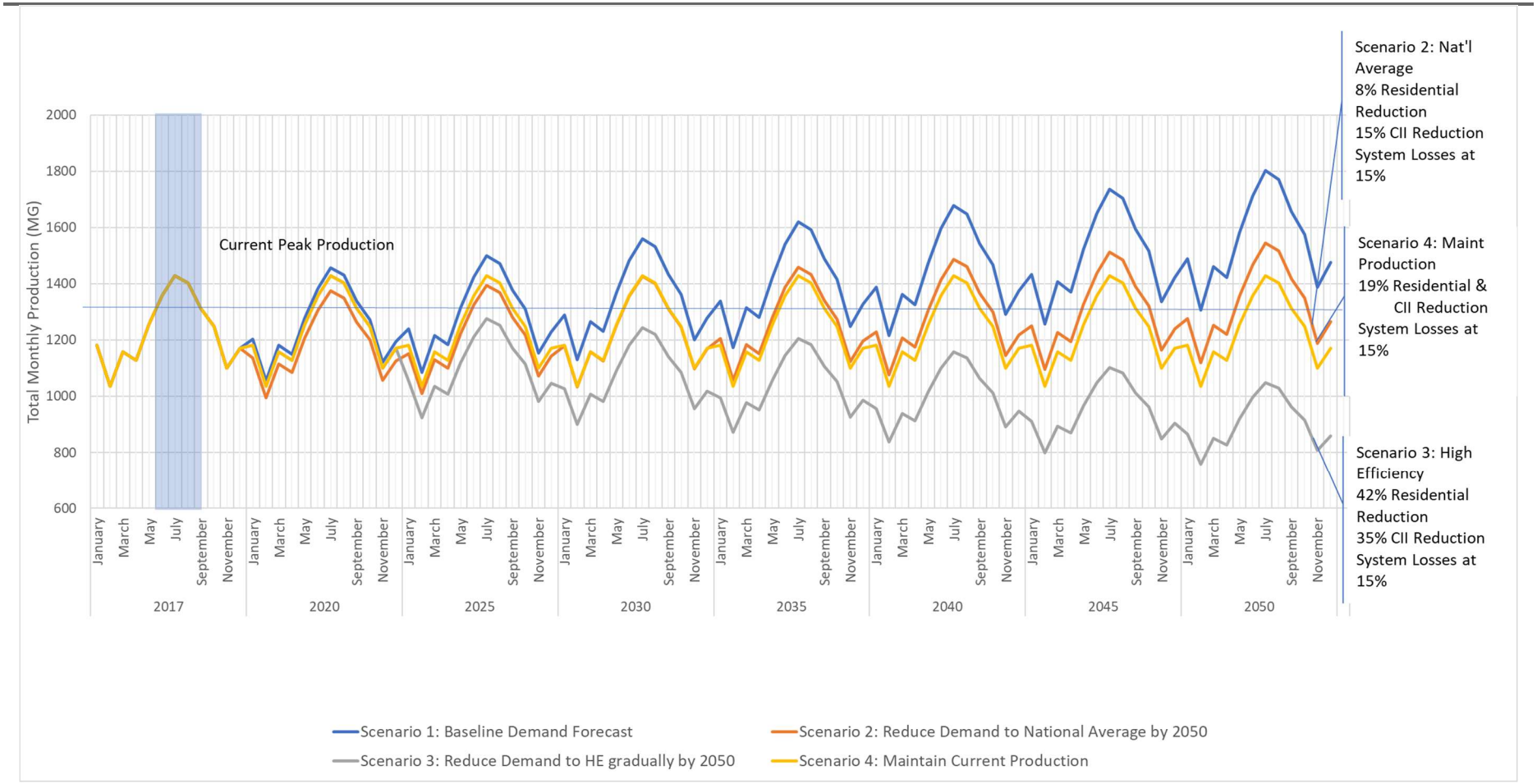


Exhibit 12 summarizes near-term and long-term cumulative water savings targets for all accounts for each scenario for 2030 and 2050, respectively. These values are for the entire County, meaning that any water savings from SUEZ NY or other small community providers would count toward the total target. It should also be noted that the values in Exhibit 12 do not reflect potential "passive conservation" savings (effect of more-efficient fixture and appliance standards). The County may expect 0.72 mgd in savings by 2030 and 1.14 mgd in savings in passive conservation by 2050 attributable to future standards (Jacobs 2019).

Exhibit 12. Water Savings Targets: Short and Long Term

Scenario	Near-term Target (mgd by 2030)	Long-term Target (mgd by 2050)
Scenario 1: Baseline demand, no reduction	0.0	0.0
Scenario 2: Reduce demand to national average by 2050	9.1	32.7
Scenario 3: Reduce demand gradually to high-efficiency by 2050	19.3	85.1
Scenario 4: Maintain current production	9.6	45.5

3.6 Managing to Water Savings Targets

The New York State constitution grants local municipalities the ability to govern themselves provided they follow state and federal law. This legal arrangement means that the successful implementation of water conservation practices in Rockland County relies, in part, on solutions that may be embraced and adopted by local jurisdictions within the County. As the County's role in implementation of this Plan is to support and coordinate water conservation efforts led by implementation partners, tracking and documenting county-wide progress may also be considered under the purview of the County. As the County works with implementation partners to select, adopt, implement, and track water conservation programs it's recommended that county-wide progress be captured and plotted annually against the water conservation scenarios presented in Section 3.5 (adjusted for actual population numbers).

4. Plan Implementation and Future Plan Evaluation

The 20 water conservation measures detailed in Section 5 constitute a menu of alternatives that can be adapted, adopted, and implemented by one or more implementation partners. This Plan calls for the County to lead and coordinate water conservation efforts engaging implementation partners such as local jurisdictions, schools and other institutions, and water users, as well as key stakeholders and the general public. For regulations, the County can convene a county-wide working group consisting of local jurisdictions' planning department representatives and key stakeholders to develop codes, but local jurisdictions (implementation partners) would be the ones to adopt the ordinances. Similarly, the County can lead development of a commercial kitchen retrofit program, but local school districts, universities, other institutions, and the hospitality industry become implementation partners to install water-efficient fixtures and adopt best practices.

Following the County legislature's acceptance of the final Plan, the implementation process can begin. Implementation roles, and schedules presented in this section, are intended to serve as a roadmap for a County-coordinated implementation of the Plan. As New York is a home rule state, measures will be implemented primarily by implementation partners with support from the County, therefore the implementation schedule provided in Exhibits 14 through 16 should be viewed as a framework for action. Activities can move forward or back in time based on available resources, public and stakeholder input, and changing circumstances.

4.1 Implementation Stakeholders and Roles

Implementation of this Plan involves participation and action by a broad set of stakeholders implementation partners including individual residents, businesses, community and trade organizations, and government agencies at multiple levels. Partnerships will be required to implement most of the identified conservation measures with the County serving to lead and coordinate. The broad roles for implementation of this Plan are summarized in this section.

Rockland County

- Responsible for promoting interjurisdictional collaboration for water conservation
- Serves as a forum and clearinghouse for County water conservation issues and information
- Provides technical resources and guidance in implementing this Plan
- Coordinates county-wide policy working group
- Monitors progress of Plan implementation
- Works with municipalities to adopt an information and outreach program

Implementation Partners

- Responsible for engaging with the County on developing measures and leading local implementation
- May own and operate local water and wastewater treatment systems that manage water supply, treatment, and distribution

Implementation of this Plan involves participation and action by a broad set of stakeholders and implementation partners including individual residents, businesses, community and trade organizations, and government agencies at multiple levels.

- Adopt and enforce local land use policies, codes, and ordinances
- Engage in water-saving activities such as retrofit of fixtures, appliances, landscapes, and irrigation systems

Stakeholders

- Include individuals or organizations not responsible for leading implementation but whose input is important
- Provide expertise on key topics such as landscaping practices or irrigation standards
- Identify challenges and opportunities for program implementation
- Engage in policy and program development and implementation
- Support and/or participate in implementation (e.g., Cornell Cooperative Extension, Irrigation Association, green industry)

General Public

- Become part of the conservation team

County-wide Working Groups for Policy Development

- Convened by the County, informal working groups, or working groups formalized through inter-jurisdictional memoranda of agreement, are recommended as a mechanism to collaboratively refine goals, develop policy language, and model ordinances that local municipalities could consider if in keeping with their local policies and plans.

4.2 Implementation Schedule and Plan

The proposed schedule, presented in the following section and Exhibits 14 through 16, was developed to provide a strong foundation of education, information and program planning in the near-term, that will build stakeholder and public support for the successful launch of more complex incentive and regulation measures in the mid- to long-term:

Near-term: Years 1 to 3

- **Year 1** – Build a strong foundation of support by focusing on public education and incentives for residential water users.
- **Year 2** – Continue public education and incentives for residential water users, while expanding the program to include commercial, industrial, and institutional water users. This year is also critical for completing planning for mid-term (3 to 5 years) and long-term (5 to 10 years) activities.

Mid-term: Years 3 to 5

- **Year 3 –** Each implementation partner should continue to build upon measures launched in previous years while planning the launch of education and incentive measures identified for the mid-term (3 to 5 years).
- **Year 4 -** Education and incentive measures identified for the mid-tern (3 to 5 years) should be fully launched, while planning continues for expansion beyond voluntary education and incentive measures to include water conservation regulations that may be required to meet water savings goals.

  Note - Management and administrative efforts are anticipated to increase through initial setup and expansion of each stakeholder's conservation program. Limitations of both staffing and funding resources

should be identified early in the scheduling and implementation process as it may result in new elements ramping-up more slowly. Examples of potential administrative needs over the 5-year implementation phase for the Plan may include: additional customer service representative training, additional project management support to effectively communicate and manage the conservation incentive programs, and administrative support of contracts for purchasing or installing conservation fixtures.

Long-term: Years 5 and Beyond

- **Years 5 and Beyond** - It is important to recognize that realizing sustainable conservation savings from information and incentive programs will require the implementation of those programs through the current planning period and beyond. During this phase it's critical that the long-term schedule be revised using information gathered through annual implementation assessments, future evaluations, and Plan revisions.

4.3 Future Plan Implementation Evaluation

Evaluation is a key strategy in effective implementation of any plan. It supports understanding the successes and challenges of plan execution and determination of when and how to modify a plan. It's recommended that the County review and update this Plan on a 5-year cycle, or as needed. Reviews and updates are important components of an adaptive management approach and should include any lessons learned through implementation of this Plan and incorporate recommendations from any new water resource management reports.

Adaptive management recognizes the limitations of current knowledge regarding future conditions and the inevitability of change. This Plan provides a big-picture context for specific actions based on best-available data and will need to be adjusted as better information and new conditions arise. By design, short-term management measures are outlined in greater detail than long-term management measures. Recommendations for the next 5 years are reasonably firm, whereas those beyond 5 years are expected to be refined, possibly multiple times, before being implemented.

4.3.1 Annual Reviews

It's recommended that the County, with support from implementation partners, develop an annual progress report that can be made publicly available on the County website. The annual report should, firstly, focus on documenting program updates, accomplishments, and next steps from both the County and each implementation partner, and secondly, document progress against short- and long-term water savings targets laid out in Section 3.

4.3.2 Plan Updates

Plan updates are recommended every 5 years. During regular plan updates the County should take a holistic look at changed conditions since the last Plan update, including evaluation of the following:

- Population forecasts and trends
- Emerging water resources management issues

The County, with support from implementation partners, can develop an annual progress report to be made publicly available on the County website.

- Water conservation program performance and assessment of the need for enhancements
- Water supply sources and treatment capacity and facilities needed to address demands
- Wastewater treatment capacity and facilities needed to address demands
- Water quality trends
- Available funding sources

As with existing planning efforts, future planning should be open and inclusive, involving representatives from the County's local jurisdictions, implementation partners, and stakeholders. Informal adjustments to the Plan between regular Plan updates can be made to provide for adaptive management.

Exhibit 14. Rockland County Comprehensive Water Conservation and Implementation Plan List of Recommended Water Conservation Measures

		Measures	Implementation Partner		Recommended Implementation			Potential Water Savings	Customer Sector				Water Use Classification	
			Local	State	Near-term (1 to 2 years)	Mid- term (3 to 5 years)	Long-term (5+ years)		Single-family	Multi-family	Commercial	Industrial	Indoor	Outdoor
Information	1	Water Conservation White Paper	X		X	X	X	10 to 80 gallons per day per residential account (See section 5.1.1)	X	X	X	X	X	X
	2	Water Use Audit Guidance for Residential Users	X		X	X	X		X	X			X	X
	3	Sustainable Landscaping Education Program	X		X	X	X		X	X	X	X		X
	4	Water Awareness Events	X		X	X	X		X	X			X	X
	5	Water Conservation Education Program	X		X	X	X		X	X	X	X	X	X
	6	Private Well Use	X			X			X	X	X	X	X	X
Incentives	7	Commercial Kitchen Program	X		X	X		5 to 20% reduction in monthly water demand per participant			X	X	X	
	8	Business Community Partnership	X		X	X	X	Varies			X	X	X	X
	9	Plumbing Contractor Education Program	X	X		X		Varies	X	X	X	X	X	
	10	Landscaper, Irrigators and Plant Nursery Partnership	X		X	X	X	Varies	X	X	X	X		X
	11	Governmental and Institutional Building Retrofits	X	X	X	X	X	Dependent on building and projects selected			X	X	X	X
	12	Water Conservation for Variances for New Development	X		X			Dependent on building and projects selected	X	X	X		X	X
	13	Recognition for Implementing Water Conservation Measures	X		X	X	X	Varies	X	X	X	X	X	X
	14	Targeted Incentive Programs	X			X		Varies	X	X	X	X	X	X
	15	Water Loss Assistance Program	X		X	X	X	Dependent on current water loss.	X	X	X	X		X
Regulations	16	Time of Sale Plumbing Standards	X	X			X	35 gallons per day per housing unit	X	X			X	
	17	State-wide Irrigation Trades Licensing Program		X		X	X	Varies	X	X	X	X		X
	18	Require Water Conservation Practices in New Developments	X		X	X		Dependent on ordinance	X	X	X	X	X	X
	19	Lawn and Landscape Irrigation Schedule	X			X		Dependent on ordinance	X	X	X	X		X
	20	Green Building Codes and Ordinances Related to Water Conservation	X			X	X	Dependent on ordinance	X	X	X	X	X	X

Exhibit 15. Rockland County Comprehensive Water Conservation and Implementation Plan, Recommended Implementation Timeline for Water Conservation Measures

Measures			Near Term		Mid Term			Long Term				
			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Information	1	Water Conservation White Paper										
	2	Water Use Audit Guidance for Residential Users										
	3	Sustainable Landscaping Education Program										
	4	Water Awareness Events										
	5	Water Conservation Education Program										
	6	Private Well Use										
Incentives	7	Commercial Kitchen Program										
	8	Business Community Partnership										
	9	Plumbing Contractor Education Program										
	10	Landscaper, irrigators, and plant nursery partnership										
	11	Governmental and Institutional Building Retrofits										
	12	Water Conservation for Variances for New Development										
	13	Recognition for Implementing Water Conservation Measures										
	14	Targeted Incentive Programs										
	15	Water Loss Assistance Program										
Regulations	16	Time of Sale Plumbing Standards										
	17	State-wide Irrigation Trades Licensing Program										
	18	Require Water Conservation Practices in New Developments										
	19	Lawn and Landscape Irrigation Schedule										
	20	Green Building Codes and Ordinances Related to Water Conservation										

Planning Phase

Implementation Phase (dashed lines represent optional extended implementation phases)

Links Recommended Prerequisite Measures

Exhibit 16. Rockland County Comprehensive Water Conservation and Implementation Plan, Implementation Timeline for Water Conservation Measures

Measure*		Strategic Area	Recommended Prerequisite Measures	Near-term Implementation Actions		Mid-term Implementation Actions			Long-term Actions
				Year 1	Year 2	Year 3	Year 4	Year 5	Years 6 through 10
1	Water Conservation White Paper	Information	NA	• Develop white paper, focused on needs and next steps, and distribute to elected officials either through direct-mailing or in-person meetings	• Use white paper for "Water Conservation 101" briefings for newly-elected officials	• Update if needed and use white paper for "Water Conservation 101" briefings for newly-elected officials	• Update if needed and use white paper for "Water Conservation 101" briefings for newly-elected officials	• Update if needed and use white paper for "Water Conservation 101" briefings for newly-elected officials	• Update if needed and use white paper for "Water Conservation 101" briefings for newly-elected officials
4	Water Awareness Events	Information	1	• Add events to County calendar and website • Encourage local jurisdictions, through white papers and other communications, to also acknowledge and plan events • Involve stakeholders in planning and conducing events	• Continue programs and work to increase participation	• Continue programs and work to increase participation	• Continue programs and work to increase participation	• Continue programs and work to increase participation	• Continue programs and work to increase participation • Consider expanding focus of events to include broader sustainability issues
5	Water Conservation Education Program	Information	1	• Develop outreach messages and program materials • Create website hub for water conservation information, resources, and activities • Identify and engage partners to share information	• Launch public education program, using elected officials, utilities, and implementation partners as conservation advocates • Begin planning messages and materials to support future implementation of other measures	• Continue program • Focus on honing the message or speaking to a specific goal or theme • Boost messaging to special populations and water-using sectors • Add new materials and distribution partners to boost participation in other measures	• Continue program • Focus on honing the message or speaking to a specific goal or theme	• Continue program • Focus on honing the message or speaking to a specific goal or theme	• Evaluate success of program and consider making revisions based on feedback from implementation partners and other stakeholders
11	Governmental and institutional building retrofit	Incentives	1	• Engage local jurisdictions as implementation partners • Begin public building audits • Research and apply for funding to implement conservation programs like fixture replacement and more innovative projects, such as water reuse	• Establish goal for number of retrofits each year • Begin retrofit of water efficiency fixtures/ landscapes in public buildings • Publicize milestones and successes	• Continue program • Publicize milestones and successes • Focus on getting 100% participation of local jurisdictions	• Continue program • Publicize milestones and successes	• Continue program • Publicize milestones and successes	• Continue program • Sign-on any remaining local jurisdictions

*Note: Measures are listed in order of their projected implementation from the Plan timeline (Exhibit 15).

Exhibit 16. Rockland County Comprehensive Water Conservation and Implementation Plan, Implementation Timeline for Water Conservation Measures

Measure*		Strategic Area	Recommended Prerequisite Measures	Near-term Implementation Actions		Mid-term Implementation Actions			Long-term Actions
				Year 1	Year 2	Year 3	Year 4	Year 5	Years 6 through 10
12	Water Conservation for Variances for New Development	Incentives	1	• Convene a County-wide working group for policy development	• Continue efforts with the County-wide working group to define needs and recommendations • Develop sample materials and implementation advice	• Set up a pilot/ demonstration program within one jurisdiction • Roll out recommendations to all local jurisdictions • Hold coordination workshops designed to provide implementation assistance and a venue to share lessons learned	• Continue program through development of green building codes and ordinance measure		
2	Water Use Audit Guidance for Residential Users	Information	5		• Building upon Water Conservation Education Program, develop materials specifically for water use audits • Reach out and begin coordinating with additional stakeholders and partners	• Publicly launch measure • Align public education program to launch of measure • Engage additional stakeholders and partners in implementation • Reference resources within the County including those engaged through the Business Community Partnership or Landscaper, Irrigators and Plant Nursery Partnership measures	• Continue program • Focus audit materials around a certain theme or water use • Explore providing in-person audits for large water users	• Continue program • Focus audit materials around a certain theme or water use • Look at providing in-person audits for certain accounts	• Continue program • Review successes and revise program as necessary to ensure high participation rate
3	Sustainable Landscaping Education Program	Information	5		• Building upon Water Conservation Education Program, and input from additional stakeholders or partners with expertise, begin developing education materials for water-saving landscapes	• Publicly launch measure and post on website • Align public education program to launch of measure • Research and apply for funding to implement a pilot sustainable landscaping or alternatively, leverage Business Community Partnership or Landscaper, Irrigators and Plant Nursery Partnership measures	• Continue updating materials and focus on actively delivering the message • Reference resources within the County including those engaged through Landscaper, Irrigators and Plant Nursery Partnership measure	• Continue program • Ensure materials stay aligned with Water Conservation Education Program messaging • Ensure recognition is given for implementing sustainable landscaping practices	• Continue program • Ensure materials align with County-wide Lawn and Landscape Irrigation Schedule measure • Research and apply for funding to implement sustainable landscaping projects on public property

*Note: Measures are listed in order of their projected implementation from the Plan timeline (Exhibit 15).

Exhibit 16. Rockland County Comprehensive Water Conservation and Implementation Plan, Implementation Timeline for Water Conservation Measures

Measure*		Strategic Area	Recommended Prerequisite Measures	Near-term Implementation Actions		Mid-term Implementation Actions			Long-term Actions
				Year 1	Year 2	Year 3	Year 4	Year 5	Years 6 through 10
7	Commercial Kitchen Program	Incentives	5		• Develop materials and program plan for measure • Begin recruiting participants and gathering water use data • Identify speakers and any additional stakeholders or partners	• Launch program • Recognize participants and publicize successes	• Continue program • Expand to additional participants, or focus on different type of commercial water user (hospitals, hotels, etc.)	• Continue program • Expand to additional participants, or focus on different type of commercial water user (hospitals, hotels, etc.)	
8	Business Community Partnership	Incentives	5		• Explore opportunities for implementation partnerships by meeting with local businesses (perhaps first year focuses on businesses with commercial kitchens and is expanded each year) • Develop a program plan, and implementation materials for a pledge program	• Publicly launch measure • Use partners in the local business community to support implementation of other measures • Recognize partners for their contributions	• Continue program • Leverage relationships with local businesses to support launch of Targeted Incentive Programs measure	• Continue program	• Continue program • Evaluate success of program and consider making revisions based on feedback from partners
13	Recognition for Implementing Water Conservation Measures	Incentives	5		• Develop approach to media campaign • Strategize how the measure could be used to support other measures	• Launch media campaign to highlight residents, businesses, and communities advancing conservation • Develop case studies and testimonials to feature in future White Papers, Annual Progress Report, and Public Education Program materials	• Continue program	• Continue program	• Continue program • Evaluate success of program and consider making revisions based on feedback
15	Water Loss Assistance Program	Incentives	11		• Develop a program plan, including a list of training courses. • Research and select leak detection equipment for purchase.	• Announce and implement the first year of training courses; collecting feedback from participants. • Pilot leak detection equipment sharing program.	• Continue program	• Continue program	• Continue program • Evaluate success of program and consider making revisions based on feedback

*Note: Measures are listed in order of their projected implementation from the Plan timeline (Exhibit 15).

Exhibit 16. Rockland County Comprehensive Water Conservation and Implementation Plan, Implementation Timeline for Water Conservation Measures

Measure*		Strategic Area	Recommended Prerequisite Measures	Near-term Implementation Actions		Mid-term Implementation Actions			Long-term Actions
				Year 1	Year 2	Year 3	Year 4	Year 5	Years 6 through 10
18	Require Water Conservation Practices in New Developments	Incentives	12		• Convene a County-wide working group for policy development	• Continue efforts with the County-wide working group to define needs and recommendations • Develop sample materials and implementation advice	• Set up pilot/ demonstration program within one jurisdiction • Roll out recommendations to all local jurisdictions • Hold coordination workshops designed to provide implementation assistance and a venue to share lessons learned	• Continue program through development of green building codes and ordinance measure	
10	Landscaper, Irrigators and Plant Nursery Partnership	Incentives	3		• Develop a program plan, and implementation materials either at the same time as, or slightly lagging, the Sustainable Landscaping Education Program • Explore opportunities for implementation partnerships by meeting with local businesses	• Publicly launch measure • Use partners to support implementation of other measures • Recognize partners for their contributions	• Continue program • Leverage relationships with local businesses to support launch of State-wide Irrigation Trades Licensing Program measure	• Continue program • Leverage relationships with local businesses to support launch of Lawn and Landscape Irrigation Schedule measure	• Continue program • Evaluate success of program and consider making revisions based on feedback from partners
9	Plumbing Contractor Education Program	Incentives	2, 5			• Begin coordinating with County licensing board	• Publicly launch measure		
14	Targeted Incentive Programs	Incentives	2, 5			• Conduct research to identify the most cost-effective and impactful incentives • Develop a program plan for implementing the targeted incentive program • Build program support structure, including staff and outreach materials • Research and apply for funding to implement conventional water efficiency projects, like fixture replacement, and more innovative projects, like onsite water reuse	• Publicly launch incentive program • Track participation, cost, and water savings • Document lessons learned and feedback to be incorporated into future incentive programs • Recognized partners for their contributions • Publicize milestones and successes	• Optional – incentive programs may last several years, depending on the implementation approach • Alternatively, incentive programs can be launched as needed, targeting different participants, and designed to align and support implementation or public acceptance of other measures	

*Note: Measures are listed in order of their projected implementation from the Plan Timeline (Exhibit 15).

Exhibit 16. Rockland County Comprehensive Water Conservation and Implementation Plan, Implementation Timeline for Water Conservation Measures

Measure*		Strategic Area	Recommended Prerequisite Measures	Near-term Implementation Actions		Mid-term Implementation Actions			Long-term Actions
				Year 1	Year 2	Year 3	Year 4	Year 5	Years 6 through 10
19	Lawn and Landscape Irrigation Schedule	Regulations	1, 3, 5, 10			• Develop model irrigation ordinance (perhaps a County-wide policy working group effort) • Convene public meetings to gauge acceptance	• Coordinate with local jurisdictions adopt irrigation schedule • Update landscaping education materials with schedule		
20	Green Building Codes and Ordinances Related to Water Conservation	Regulations	1, 12, 18			• Convene a County-wide working group for policy development (perhaps the same group working on conservation ordinances); this may shift out depending on water ordinance progress; potentially simultaneous development	• Continue efforts with the County-wide working group to define needs and recommendations • Develop sample materials and implementation advice	• Set up a pilot/ demonstration program within one jurisdiction • Roll out recommendations to all local jurisdictions • Hold coordination workshops designed to provide implementation assistance and a venue to share lessons learned	• Focus on getting 100% participation of local jurisdictions
6	Private Well Use	Information	1				• Leveraging support from the white paper, begin procurement of a consultant to conduct the study • Reach out and begin coordinating with additional stakeholders and partners through scope development and advertisement	• On-board consultant and kick-off study • Summarize results and compile recommendations • Incorporate recommendations into Annual Water Conservation Plan Progress Report and future Plan updates	• TBD – dependent on findings of study
17	State-wide Irrigation Trades Licensing Program	Regulations	1, 3, 5, 10				• Enlist partners from other measures in a County-wide working group to develop a needs case and recommendations • Build state-wide coalition	• Coordinate planning for regulation with messaging in white papers to elected officials • Draft bill	• Introduce bill in state legislature

*Note: Measures are listed in order of their projected implementation from the Plan timeline (Exhibit 15).

Exhibit 16. Rockland County Comprehensive Water Conservation and Implementation Plan, Implementation Timeline for Water Conservation Measures

	Measure*	Strategic Area	Recommended Prerequisite Measures	Near-term Implementation Actions		Mid-term Implementation Actions			Long-term Actions
				Year 1	Year 2	Year 3	Year 4	Year 5	Years 6 through 10
16	Time of Sale Plumbing Standards	Regulations	1					• Convene a County-wide working group for policy development • Determine if State legislation is required • Include stakeholders (including realtors) and partners from other measures	• Continue efforts with the County-wide working group to define needs and recommendations • Develop sample materials and implementation advice • Roll out recommendations to all local jurisdictions • Hold coordination workshops designed to provide implementation assistance and a venue to share lessons learned

*Note: Measures are listed in order of their projected implementation from the Plan timeline (Exhibit 15).

5. Water Conservation Measures

This section contains brief summaries for 20 water conservation measures (measures) selected from more than 60 proposed at a County-wide stakeholder workshop held during March 2019. A full list of ideas generated at the workshop is presented in Appendix A. The potential 60 conservation ideas were screened and more fully refined during several reviews and discussions with the County, Task Force, potential implementation partners, and other stakeholders within the County. All play important roles in implementing the water conservation measures described in this section. The measures included in this section address unique challenges facing the County while also respecting authorities of local jurisdictions. The County and Task Force support a vision for the Plan that is inclusive of all residents, makes sense within Rockland County, advances meeting conservation targets, and is cost-effective. The selected measures consider:

- Near-term and long-term actions to save water,
- Monetary and non-monetary measures and incentives,
- Co-benefits such as energy savings and stormwater management objectives,
- Quantifiable long-term water savings,
- Implementability by municipality, Rockland County, or state, and
- Indoor and outdoor water uses (by all sectors as well as existing and future residents and businesses).

To assist with implementation planning, discussed further in Section 5, each of the 20 water conservation measures, summarized in Exhibit 17, has been grouped into one of the following strategic areas:

- Information (education and public awareness)
  - An essential part of garnering public acceptance is clearly communicating the need and methods for conserving water. The importance of conservation education has been documented in several studies including the 2010 national study by the Water Research Foundation. While direct water-use savings are difficult to correlate with specific programs and specific messages, reduction in water use by customers receiving conservation information as compared to others not receiving conservation is well documented (Silva et al., 2010).
- Incentives (monetary and non-monetary)
  - The most cost-effective, funded incentives for water conservation are ones where: the proposed conservation measure is not widely used; target users view the program favorably; customers who can benefit most are identified; multiple marketing strategies are used for the program; barriers (availability of measure, program staffing, costs to customer, etc.) are mitigated; and there is an educational/behavioral change component.
- Regulation (legislation, ordinances, and requirements)
  - Conservation standards implemented at a state (e.g., laws and funding tied to conservation) or local level (e.g., ordinances and building codes) can result in substantial long-term private sector water savings if successfully enforced.

Exhibit 17. List of Recommended Water Conservation Measures

Information	1	Water Conservation White Paper
	2	Water Use Audit Guidance for Residential Users
	3	Sustainable Landscaping Education Program
	4	Water Awareness Events
	5	Water Conservation Education Program
	6	Private Well Use
Incentives	7	Commercial Kitchen Program
	8	Business Community Partnership
	9	Plumbing Contractor Education Program
	10	Landscaper, Irrigators and Plant Nursery Partnership
	11	Governmental and Institutional Building Retrofits
	12	Water Conservation for Variances for New Development
	13	Recognition for Implementing Water Conservation Measures
	14	Targeted Incentive Programs
	15	Water Loss Assistance Program
Regulations	16	Time of Sale Plumbing Standards
	17	State-wide Irrigation Trades Licensing Program
	18	Require Water Conservation Practices in New Developments
	19	Lawn and Landscape Irrigation Schedule
	20	Green Building Codes and Ordinances Related to Water Conservation

Each subsection, corresponding with one of the three water conservation strategies, begins with a pair of summary exhibits (Exhibits 18, 19, 21, 22, 23, and 24) that originate from the larger Exhibit 14 provided in Section 4. These exhibits are intended to assist the County, implementation partners, and other stakeholders with selecting the measures appropriate for their jurisdiction.

A brief discussion of County-level potential costs and savings for each strategy follows the exhibit. To the extent possible, given available data, applicable information on costs and water savings for each measure have been provided. For many measures, saving and costs will vary among the implementation partners, so savings and costs were not quantified in this Pan. With most measures being enacted at the local not County level, due to New York being a home rule state, it's important to recognize potential costs and savings will likely vary depending on the implementation partner. The County, in its role as implementation coordinator, will need to provide technical guidance to implementation partners on collecting the data necessary to quantify costs and savings.

The measure follows each subsection introduction. The 2- to 3-page summary for each measure contains the following elements:

- **Intent:** Describes the purpose of the measure.
- **Points of Integration:** Describes the relationship of the measure with other policies or resource management goals.
- **Implementation Partners**: Those who engage with the County on developing measures and are responsible for leading implementation. Examples include: local jurisdictions, businesses, institutions, utilities, etc.
- **Additional Stakeholders/Partners**: Others not responsible for leading implementation but whose input is important. Examples include: commercial sector, apartment associations, affordable housing groups, irrigation association, landscape industry, plumbing contractors, etc.
- **Conservation Measure Description**: Discusses the rationale for the measure and provides a specific action to be taken or broad overview of the measure.
- **Implementation Guidance**: Provides specific guidance on how the measure can be implemented by implementation partners.
- **Potential Costs:** Identifies, and quantifies when possible, estimated costs to implementation partners, and water users.
- **Potential Water Savings:** Identifies, and quantifies when possible, estimated water savings from implementing the measure.
- **Considerations for Enhanced Implementation**: Contains additional, optional actions that may be taken to increase implementation effectiveness.
- **Resources**: Lists resources and documents providing additional information to support implementation.

5.1 Information (Education and Public Awareness)

Exhibit 18. Implementation Considerations for Information Strategy Conservation Measures

	Measure	Implementation Partner		Recommended Implementation			Potential Water Savings
		Local	State	Near-term (1 to 3 years)	Mid-term (3 to 5 years)	Long-term (5+ years)	
1	Water Conservation White Paper	X		X	X	X	See section 5.1.1
2	Water Use Audit Guidance for Residential Users	X		X	X	X	
3	Sustainable Landscaping Education Program	X		X	X	X	
4	Water Awareness Events	X		X	X	X	
5	Water Conservation Education Program	X		X	X	X	
6	Private Well Use	X			X		

Exhibit 19. Applicable Customer Sector and Use Classification for Information Strategy Conservation Measures

	Measure	Customer Sector				Water Use Classification	
		Single-family	Multi-family	Commercial	Industrial	Indoor	Outdoor
1	Water Conservation White Paper	X	X	X	X	X	X
2	Water Use Audit Guidance for Residential Users	X	X			X	X
3	Sustainable Landscaping Education Program	X	X	X	X		X
4	Water Awareness Events	X	X	X	X	X	X
5	Water Conservation Education Program	X	X	X	X	X	X
6	Private Well Use	X	X	X	X	X	X

5.1.1 Estimating Costs and Water Savings from Information Measures

Water savings from information-disseminating measures, while essential to a successful water conservation program, are difficult to quantify. As a result, the effectiveness of these measures is often gauged primarily through performance measures other than water saved. These may include user satisfaction, changes in user water use behaviors as measured via consumer surveys, before-and-after analysis of water use, numbers of attendees at workshops, per capita costs, and similar benchmarks.

Exhibit 20. Potential Combined Water Savings from all Information Activities

Customer Class	Current Water Usage Gallons per Day per Account (2017)	Potential Reduction in Usage per Account from Information-disseminating Measures (4.6% reduction)	
		Gallons per Day per Account	Gallons per Year per Account
Single-family	200	9.2	3,355
Multi-family	1,792	82.4	30,081

There is very little published literature that documents measurable water savings resulting from information dissemination strategies. One of the most referenced reports is from a 2013 pilot study done by the East Bay Municipal Utility District California (Mitchell et al. 2013). In this study, households were periodically sent social-norms-based water usage reports over a period of 12 months. Included in the reports was household water use alongside average use and high-efficiency home water usage and a list of actionable information on how to become more efficient. The study concluded that the better-informed customers, those receiving the reports, reduced their water use by 4.6 to 6.6 percent.

Assuming the sum of all the information strategies presented below results in a similar impact on single- and multi-family water users in the County, water savings may be expected on the order of what's presented in Exhibit 20. It should be noted that water savings gained from informative measures like education and surveys can erode over time; therefore, long-term investment in information strategies is imperative to ensure that gained water savings are sustained.

To the extent possible, additional costs, water savings, avoided costs, and benefits are captured for each measure in the summary. During implementation of this Plan the County, in its role as coordinator, should work closely with implementation partners on documenting actual costs and water savings.

WATER CONSERVATION MEASURE 1

Water Conservation White Paper

Intent

Increase awareness of community leaders regarding the importance of, and business case for, water conservation to maintain a sustainable water supply for the County.

Points of Integration

This measure should lay the groundwork for interjurisdictional collaboration.

Implementation Partners

Local jurisdictions

Additional Stakeholders/Partners

Elected officials

County Board of Health

Task Force

Local water provider

Local wastewater treatment provider

Community leaders

Conservation Measure Description: Develop and distribute a white paper to various leaders throughout the County that is focused on concisely stating the need for protection of water resources, the role of water conservation, and how they can support that effort.

Successful implementation of the county-wide water conservation strategy proposed in this Plan will require support at multiple levels of government. A unified message, developed through interjurisdictional collaboration, is important to a strong foundation for action and implementation of the Plan. This measure equips community leaders at County and local level with the facts and talking points they would need to communicate why water conservation is important in Rockland County, and how it's being implemented.

Implementation Guidance: First implemented in the form of a County-wide white paper to be distributed among the County leadership and the Legislature. The Task Force will likely be the driving force behind the first white paper, if not the author, with support from implementation partners and other stakeholders. The focus of the initial County-wide white paper would be to prepare a business case for investing in conservation.

Subsequent white papers can be developed by the County or implementation partners based on:

- Water conservation plans or activities of implementation partners, and
- Annual progress reports (driven by performance metrics).

As the regional voice for water conservation, the County would drive the development and distribution of these white papers. Should subsequent white papers be developed and issued on the topic of water conservation in the County it will be critical to maintain a system of communication between the County and the various implementation partners so that County leaders and residents continue to receive a unified message.

Potential Costs: If the white paper is developed in-house by the County with input from the implementation partner, then the primary costs of this measure will be in administrative and dedicated technical staff time; additional costs for contracting and management would be incurred if an outside party is brought in to develop the document. Once the white paper is developed distribution costs should be minimal, though there's a benefit to having a staff member designated as point of contact to respond to any questions.

Potential Water Savings: There are no quantifiable water savings from this measure; success of this measure could be based on the number of white papers distributed to, or relevant meetings held with, elected and other community leaders.

Considerations for Enhanced Implementation:

- The Task Force or other volunteer stakeholders could set up in-person meetings with elected leaders in the County to present the key messages within white paper (in addition to mailing or emailing).
- Though intended for direct distribution to elected officials, it might also be beneficial to distribute white papers to potential stakeholder groups like the County's facility manager, Rockland Municipal Planning Federation (local jurisdictions, planning, and zoning board members) or Leadership Rockland (leaders in government, business and non-profit) as these groups may support implementation of other measures.
- Beyond coordinating with implementation partners, the County may consider reaching out to the various water providers in the County when developing white papers to ensure the full scope of water conservation efforts within the County are being captured.

Resources:

> *The Preliminary Assessment of the Ramapo and Hackensack Watersheds in Rockland and Orange Counties* (Van Abs 2017) and *Water Resources of Rockland County, New York, 2005–07, with Emphasis on the Newark Basin Bedrock Aquifer* (Heisig 2010) reports are good resources for understanding water resources in the County.

> Key findings summarized in the executive summary of this Plan*, County of Rockland Comprehensive Water Conservation and Implementation Plan*, can form the basis of an initial white paper and inform future annual updates.

> US EPA WaterSense® Program annual WaterSense Accomplishment Reports are good examples of a contemporary take on white papers that are more graphical: https://www.epa.gov/watersense/watersense-accomplishment-reports/.

WATER CONSERVATION MEASURE 2

Water Use Audit Guidance for Residential Users

Intent

Provide residents a way to understand how much water they use in and around their home and identify ways to save water.

Points of Integration

This measure improves residential consumer awareness and, with implementation, user efficiency.

Implementation Partners

Local jurisdictions

Additional Stakeholders

Local energy provider

Local water provider

Local wastewater treatment provider

Conservation Measure Description: A water audit, also known as water survey, is primarily an education tool that fosters awareness of water-using fixtures and habits in homes. This measure will provide residential water users with information on how to perform a do-it-yourself water audit using online calculators, materials distributed via direct mailings, or with the assistance of door-to-door auditors.

An audit gathers information about water-using fixtures inside the home such as toilets, showers, dishwashers, and washing machines, and outside water use for irrigation, swimming pools, hot tubs, and other water-using features. The do-it-yourself water audit will also provide advice on detecting leaks, identifying inefficient irrigation systems, and other water-saving strategies. The number of household residents and their water-use habits can also be factored into the water use estimate. Information gathered from a do-it-yourself water audit can help residents target water-saving technologies or behaviors to reduce water usage.

Implementation Guidance: Audit materials can be provided through online or printed instructions, with the assistance of door-to-door auditors. Audit guidance can be more general, to appeal to all residential users, or focused on subsets of residential users, like the top 10 percent of residential water users or those with the largest outdoor water use. The audit could also be developed with a focus on a use classification like indoor or outdoor water use; for instance, a local jurisdiction could send an irrigation audit checklist with helpful efficiency recommendations to residents at the beginning of irrigation season.

Development of the actual audit materials will depend on the audience and whether there is a specific water use or behavior being targeted. For instance, a landscape audit wouldn't apply to a high-rise resident without landscaping. There are many examples of residential water audit materials available on the internet via municipal websites and non-profit organizations while the US EPA WaterSense® Program, and Alliance for Water Efficiency websites are useful for guidance on best practices. Regardless of format, water audits typically include the following basic information:

- **General Building Information**: Whether single- or multi-family, what the part-time/full-time occupancy is, property square footage, building square footage, and year constructed.
- **Water Use Information**: Provided by water bill.
- **Interior Water Use**: Each type of water use, volumes per use, and number of each type.
- **Exterior Water Use**: Each type of water use, volumes per use, and number of each type.

- **Comprehensive List of Potential Water-saving Measures**: Providing preliminary water savings, costs, and optional return on investment (ROI) calculations when possible.

Potential Costs: Costs include the development of the do-it-yourself water audit tool such as an online calculator or paper survey, distribution of the tool (production, mailing, distribution during community events, and similar methods), and occasional updates.

Potential Water Savings: A water use audit is primarily an educational tool that fosters awareness of water-using fixtures and habits in homes. Field or onsite audits can lead to direct savings and can be designed to include direct installation of replacement fixtures during the audit. Methods for evaluating implementation success of this measure include:

- Number of households participating with the assistance of door-to-door auditors.
- Actual savings using before-and-after tracking, either estimated by fixture or water meter readings.

According to the Alliance for Water Efficiency, indoor residential home audits done by trained professionals, who both assess current water use practices and make recommendations on efficiency improvements, can save 33.9 gpd per single-family unit and 11 gpd per multi-family unit.

Considerations for Enhanced Implementation:

- Providing field contractors to conduct the audits will increase the costs but additional stakeholders or partners may be engaged to assist with implementation at little or no added cost. Examples include: partnering with electrical providers to provide comprehensive energy and water audits, training community members to conduct audits, or engaging groups such as the Master Gardeners to conduct irrigation audits.
- Combine with an implementation measure by engaging licensed plumbers or contracts to audit residents, distribute educational materials, and replace fixtures or repair minor leaks during a home water audit Philadelphia, PA has such a program that focuses on low-income and elderly residential users.
- For reference when developing residential audit tools, according to the 2016 Water Research Foundation Residential End Uses of Water report, among single-family residential water users, clothes washing, toilet flushing, showering, faucets, and leaks are the largest indoor use of water per person on average.

Resources:

> The US EPA WaterSense® Calculator is an example of a simplified water audit tool: https://www.epa.gov/watersense/watersense-calculator
> EmPower New York that provides residential energy audits to low-income families, free of charge, https://www.nyserda.ny.gov/All-Programs/Programs/EmPower-New-York
> Silva, T., Pape, D., Szoc, R., Mayer, P. 2010. *Water Conservation: Customer Behavior and Effective Communications.* Published by Water Research Foundation and U.S. Environmental Protection Agency. Web Report No. 4012.
> Alliance for Water Efficiency, https://www.allianceforwaterefficiency.org/
> Kent County Water Authority, "Household Water Audit Homeowner Guide To Assessing Water Use," https://kentcountywater.org/config/reduce/HouseholdWaterAuditHomeownerGuide.pdf

WATER CONSERVATION MEASURE 3

Sustainable Landscaping Education Program

Intent

Promote education for residents and homeowners to change attitudes towards green lawn culture and encourage water-saving landscaping practices.

Points of Integration

This measure reduces water use, promotes and sustains watershed health and potential source water protection. It also lays groundwork for future landscape watering regulations.

Implementation Partners

Local jurisdictions

Soil/Water Conservation District

Local Cooperative Extension Office

Rockland County Community College

Additional Stakeholders/Partners

Local water provider

Local landscaping companies

Local plant nurseries

Conservation Measure Description: Sustainable landscaping designs attractive, functional spaces in balance with the local climate and environment so that minimal additional resources are required to sustain the landscape. With an emphasis on using the right plant in the right place, appropriate use of turf, water-wise plantings, soil amendment, use of mulch, and irrigating efficiently sustainable landscapes assist with preserving vital resources like water, and reduce air, water, and soil pollution. Additional co-benefits are many, including: reduced use of pesticides and herbicides, habitat regeneration and creation, and enhanced stormwater capture. Through a targeted education effort, this measure is meant to address the current “green lawn” culture in the County.

Implementation Guidance: Initial implementation of this measure includes development of education materials. While the format of these materials may vary, it’s recommended that the content, potentially distributed over several documents, focus on:

- What is sustainable landscaping, why it is important, and what homeowners stand to gain (cost savings, environmental health, wildlife interest).
- Which plants are best adapted to the County; with a focus on those that may be readily purchased.
- Best practices for irrigation efficiency, including using rain sensors, timers, and similar equipment.
- On-site water reuse practices in the County; including collection and allowed uses for rainwater and grey water.

In developing these materials it’s recommended that County work closely with the local Cornell Cooperative Extension office, along with the County Soil and Water Conservation District.

Potential Costs: Costs include the development of outreach materials (by in-house staff or contractor referencing existing materials from partners whenever possible), distribution of the material (mail, community events, etc.), and occasional updates.

Potential Water Savings: There are no direct quantifiable water savings from this measure; however, material distributed, attendance at workshops or events, number of demonstration gardens installed, and similar measures could be tracked. As new landscapes are installed, local utilities or volunteer participants could track and report on before-and-after water use.

Considerations for Enhanced Implementation:

- Secure funding to construct demonstration gardens with educational signs on public property or other large landscapes with public access, the maintenance for which can be provided by sponsors or volunteer organization (school, garden club, etc.).
- Leverage measure 10, Landscaper, Irrigators and Plant Nursery Partnership, to distribute educational materials, host program events, and ensure equipment and plants featured in outreach materials are available for purchase within the County.
- Incentivize early adopters through measure 11, Public Building Facilities Retrofit, and measure 13, Recognition for Implementing Water Conservation Measures.
- Adoption of sustainable landscaping practices can be incorporated into future regulations, like those summarized in measure 17, Require New Developments to Develop a Water Conservation Plan, and measure 19, Green Building Codes and Ordinances Related to Water Conservation, or incentivized as a variance to lawn and landscape watering regulations as described in measure 18, Require Water Conservation Practices in New Developments.

Resources:

> The Native Plant Center at Westchester Community College, https://www.sunywcc.edu/about/npc/

> US. EPA WaterSense® Water-Smart Landscape Design Manual, https://www.epa.gov/watersense/water-smart-landscape-design

> Information on plants native to the Northeastern United States, Native Plant Trust, https://www.nativeplanttrust.org/

> Sustainable home landscape information and sample teacher curriculum supported by the United States Botanical Garden, Landscape for Life, https://landscapeforlife.org/

> Plumbing Code 2015 of New York State, Chapter 13 Nonpotable Water Systems, https://up.codes/viewer/new_york/ipc-2015/chapter/13/nonpotable-water-systems#1302

> Cornell Cooperative Extension of Rockland County, http://rocklandcce.org/

> San Diego County Water Authority Sustainable Landscape Guidelines, https://www.watersmartsd.org/news/sustainable-landscape-guidelines

> Commonwealth of Massachusetts, “More Than Just a Yard Ecological Landscaping Tools for Massachusetts Homeowners,” https://www.mass.gov/files/documents/2017/11/07/morethanjustyard.pdf

> San Antonio Water System, https://www.saws.org/conservation/garden-style/

WATER CONSERVATION MEASURE 4

Water Awareness Events

Intent

Leverage materials and brand of national and global water awareness events to increase public knowledge and awareness of water issues in preparation for a more comprehensive County-specific public education program.

Points of Integration

These program emphasis importance of water resources and sustainable management of those resources.

Implementation Partners

Local jurisdictions

Additional Stakeholders/Partners

Elected officials

Local educational institutions

Rockland Business Association

Conservation Measure Description: For this measure implementation partners are expected to add branded water awareness events to their business calendar and promote those events through a combination of: distribution of educational materials, local events, social media postings, and advertising. These events present an opportunity to partner with schools, community groups, and other institutions in distributing public education materials to residents throughout the County.

Implementation Guidance: This measure can be implemented at all levels of County government and within local jurisdictions. Some prominent events that should be recognized under this measure include:

- US EPA WaterSense® Fix-A-Leak Week Campaign

This nationally recognized water conservation campaign held each year for a week in mid-March, focuses on educating water users regarding the impact of leaks, and instructions on how to find leaks. There is a mascot and national media campaign included with this event, along with resources for both educators (fact sheets and guides) and the public.

- United Nations World Water Day

Held every year on March 22, World Water Day is an international event that advocates for sustainable management of freshwater resources around the world. Each year the event has a different theme that is carried over in a variety of multilingual resources including posters, videos, educational resources, and other branded materials.

- EarthEcho Water Challenge (formerly World Water Monitoring Day)

Established in 2003 by America's Clean Water Foundation, this now-international event runs from World Water Day in March, through December. This program is aimed at school-age children with an extensive library of guides, lesson plans, and other resources. Water testing kits are also available through this event.

Potential Costs: Funding and staffing needs for implementation of this measure will vary from jurisdiction to jurisdiction. If available, using resources in a public outreach office may be the most cost-effective means of planning and advertising events.

Potential Water Savings: There are no quantifiable water savings from this measure, though the quantitative success of this measure could be based on the number of events sponsored by communities, schools, and other institutions and participation at those events.

Considerations for Enhanced Implementation:

- Conduct public education activities in partnerships with other public and private entities such as local water and wastewater treatment service providers.
- Become a partner of organizations listed for added benefits like posting event details on their site.
- The County could consider implementing their own annual event as part of measure 5 Regional and Local Public Education Program.

Resources:

> US EPA WaterSense® Fix a Leak Week, https://www.epa.gov/watersense/fix-leak-week

> United Nations World Water Day, https://www.worldwaterday.org/

> EarthEcho Water Challenge, http://www.worldwatermonitoringday.org/

> US Water Alliance, Imagine a Day without Water, http://uswateralliance.org/resources/blog/imagine-day-without-water-0/

> American Water Works Association, Drinking Water Week, https://www.awwa.org/Events-Education/Drinking-Water-Week/

WATER CONSERVATION MEASURE 5

Water Conservation Education Program

Intent

Develop a public outreach campaign that informs Rockland County residents of the cost of not conserving water and how each water user, household and business can save water.

Points of Integration

Water conservation education can be integrated with education regarding watershed management, and wastewater to emphasize the interconnected nature of water resources and their management.

Implementation Partners

Local jurisdictions

Additional Stakeholders/Partners

County Board of Health

Elected officials

Local educational institutions

Local wastewater treatment provider

Local water provider

Planning and zoning

Conservation Measure Description: Local public education programs build local support for Plan implementation and support local jurisdictions and utilities in attaining local water resource management goals. Involving the public in local water resource management efforts is crucial because it promotes broad public support, helps create an ethic of stewardship and community service, and enables the public to make informed choices related to water resources. Changes in basic behavior and practices are necessary to achieve long-term improvements in protecting the region's water resources.

Implementation Guidance:

Though water savings from public education programs are not readily quantifiable they are critical to developing the support of residents. Strategy and message development are critical, and it's been documented by the Water Research Foundation (Silva et al. 2010) that effective water conservation campaigns are centered around four principles (4Ps):

- *Product* – This moves the user to action, by defining actions you'd like your audience to adopt and sustain, along with a message addressing water supply and demand and the consequences of not conserving water,
- *Price* – Addresses water users' perceived cost of the measure (price, time, effort, etc.), while also educating them about the benefits (saving money, etc.),
- *Place* – This principal considers how and where measures will be implemented – ideally at the point of decision making so that it's most convenient for the water user – the driving principle being the more access users have, the more likely they are to implement.
- *Promotion* – How you communicate your product, price, and place message to water users is critical. Using multiple communication channels to disseminate information about water conservation is recommended; the more people receive the message the more likely it is to influence behaviors. Outreach can be grouped as follows:
    - *Passive Information Delivery:* These activities are designed to distribute education materials and messages and perform outreach to inform residents and target audiences. Direct mailings, social

media, websites, and partnerships with other public and private entities are ways in which to disseminate this information.

- *Active Information Delivery:* Engagement activities, such as community workshops and volunteer events (sustainable landscaping, door-to-door water audits, etc.), that provide opportunities for residents and stakeholders to participate in programs and active implementation of recommended measures in the Plan.

For example, if the County was to develop an irrigation controller education program applying the 4Ps would look something like:

- *Product* – The focused message or action would be that the County wants homeowners to consider installing a WaterSense® certified irrigation controller
- *Price* – Provide a sample return on investment
- *Place* – Provide tips on where to purchase the controller and how to get it installed
- *Promotion* – Partner with irrigation contractors so materials are distributed directly to those residents to whom the information applies

Facilitating regional coordination, cooperation, and information sharing among local public education programs will be critical for the success of this measure. As with measure 1, Water Conservation White Paper, it's recommended that the County maintain communication with the various implementation partners so that county residents receive a unified message. Also, implementation of this measure may align closely with the implementation strategy for other measures in this Plan.

Potential Costs: If available, using resources in a public outreach office may be the most cost-effective means of planning and advertising events. Otherwise costs can vary widely based on the material developed and how it is distributed.

Potential Water Savings: The effectiveness of public education programs is typically gauged primarily through benchmarks such as consumer awareness gathered through surveys, user changes in water use behaviors, and number of attendees at events.

Considerations for Enhanced Implementation:

- Develop a comprehensive outreach plan as part of the overall program that would be coordinated by the County with input from participating local jurisdictions. The intent of the outreach plan would be to identify a series of water conservation themes, adopted for a set time period, which would then serve as guidance in development of individual outreach campaigns. For instance, an outreach campaign associated with a "What's your water IQ?" theme could include a weekly water tip centered around the 4Ps, to be distributed through social media.
- Work with stakeholders in the County that know how to successfully engage residents and special populations: including multi-lingual communities and those with special circumstances. Gather lessons learned and revise materials and the outreach strategy accordingly, including production of multilanguage versions of all outreach materials.

- Coordinate closely with public outreach departments throughout the County, capitalizing on opportunities to align with other sustainability initiatives.

Resources:

> Silva, T., Pape, D., Szoc, R., Mayer, P. 2010. *Water Conservation: Customer Behavior and Effective Communications.* Published by Water Research Foundation and U.S. Environmental Protection Agency. Web Report No. 4012.

> The New York City Department of Environmental Protection Water Saving Tips website has several examples of locally focused educational materials, https://www1.nyc.gov/site/dep/water/water-saving-tips.page/

> Massachusetts Water Resources Authority, Garden and Landscaping Water Conservation Tips and Rain Barrel Information, http://www.mwra.com/comsupport/conservation/gardeningtips.htm/ and Water Conservation and Efficiency website, http://www.mwra.com/comsupport/waterconservationmain.htm/.

> Texas Water Development Board, Conservation Literature, http://www.twdb.texas.gov/conservation/literature/index.asp/

> Sonoma-Marin Water Saving Partnership, http://www.savingwaterpartnership.org//

WATER CONSERVATION MEASURE 6

Private Well Use

Intent

Understand the extent of water being withdrawn from private water wells within the County for future conservation planning.

Points of Integration

Private well users draw from the same groundwater sources and currently, from a watershed management perspective, their impact is not well understood.

Implementation Partners

State

County Board of Health

Additional Stakeholders/Partners

State DEC

Local jurisdictions

Planning and zoning

Local educational institutions

Local wastewater treatment provider

Local water provider

Conservation Measure Description: Though private wells serve only 4 percent of the population, according to County DOH, little is known about how much water is being withdrawn by these users. This measure seeks to understand the water demand from private water wells within the County and their impact during peak periods when water conservation is most critical. This measure would gather data and produce a report summarizing study findings that could then be used to develop future conservation strategies.

Implementation Guidance: The intent of this measure is to focus on private residential wells within the County, active small community and industrial wells are captured under the Safe Drinking Water Information System (SDWIS) federal data warehouse. For the scope of the report it's recommended that the study incorporate at a minimum the two following tasks:

- *Review and summary of available data* – Including but not limited to: County DOH permitting of well construction and maintenance program data, Rockland County private well testing law data, and New York State Department of Environmental Conservation (NYS DEC) water well program.
- *Well use survey* – Develop a voluntary questionnaire for private well users, including educational materials that align with Water Conservation Education Program and County well testing program.
- *Recommendations for conservation and further study* – It will be important to identify ahead of developing use assumptions any data gaps upon which future regulatory strategies can be developed.

Potential Costs: Costs will depend on the party engaged to do the study and the final scope. Ideally a researcher from a local educational institution could be found to lead the effort at a reduced cost over hiring and contracting a consultant. Much of the data is publicly available for review, so little cost other than labor is anticipated. The survey will have both labor and production costs associated with development and implementation.

Potential Water Savings: Though the intent of this measure is to gain a better understanding of private residential well use, the survey portion of the study presents the opportunity to interact directly with users of materials developed under measure 5, Public Education Program.

Considerations for Enhanced Implementation:

- Fund the study through a grant from NYS DEC.
- Train community members or other volunteers to conduct surveys.
- Upon completion of the study, any recommended information, incentive, or regulatory strategies should be incorporated into an updated version of this Plan.

Resources:

> Possible funding sources for this type of study include the New York State Regional Economic Development Councils 2019 Consolidated Funding Application, https://regionalcouncils.ny.gov/sites/default/files/2019-04/2019ResourcesAvailableGuide_0.pdf

> New York State Department of Environmental Conservation Well Database, https://www.dec.ny.gov/energy/1603.html

> Rockland County Public Water Supply Protection, http://rocklandgov.com/departments/health/environmental-health/water-supply/

> WellOwner.org web page, Conservation Matters, Groundwater https://wellowner.org/groundwater/conservation-matters/

5.2 Incentives

Exhibit 21. Implementation Considerations for Incentive Strategy Conservation Measures

	Measure	Implementation Partner		Recommended Implementation			Potential Water Savings
		Local	State	Near-term (1 to 3 years)	Mid-term (3 to 5 years)	Long-term (5+ years)	
7	Commercial Kitchen Program	X		X	X		5 to 20% reduction in monthly water demand per participating account
8	Business Community Partnership	X		X	X	X	Varies
9	Plumbing Contractor Education Program	X	X		X		Varies
10	Landscaper, Irrigators and Plant Nursery Partnership	X		X	X	X	Varies
11	Governmental and Institutional Building Retrofits	X	X	X	X	X	Dependent on building and projects selected
12	Water Conservation for Variances for New Development	X		X			Dependent on building and projects selected
13	Recognition for Implementing Water Conservation Measures	X		X	X	X	Varies
14	Targeted Incentive Programs	X			X		Varies
15	Water Loss Assistance Program	X		X	X	X	Dependent on current water loss.

Exhibit 22. Applicable Customer Sector and Use Classification for Incentive Strategy Conservation Measures

Measure		Customer Sector				Water Use Classification	
		Single-family	Multi-family	Commercial	Industrial	Indoor	Outdoor
7	Commercial Kitchen Program			X	X	X	
8	Business Community Partnership			X	X	X	X
9	Plumbing Contractor Education Program	X	X	X	X	X	
10	Landscaper, Irrigators and Plant Nursery Partnership	X	X	X	X		X
11	Governmental and Institutional Building Retrofits			X	X	X	X
12	Water Conservation for Variances for New Development	X	X	X		X	X
13	Recognition for Implementing Water Conservation Measures	X	X	X	X	X	X
14	Targeted Incentive Programs	X	X	X	X	X	X
15	Water Loss Assistance Program	X	X	X	X		X

5.2.1 Estimating Costs and Water Savings from Incentive Measures

As stated in the Section 5 introduction, the most cost-effective incentives for water conservation are ones where: the proposed conservation measure is not widely used; target users view the program favorably; customers who can benefit most are identified; multiple marketing strategies are used for the program; barriers (availability of measure, program staffing, costs to customer, etc.) are mitigated; and there is an educational/behavioral change component. In many cases the costs and water savings potential of each measure is tied to a metric central to the incentive, for instance the potential costs and water savings of a Commercial Kitchen Program (Measure 7) will be dependent on the number of participants and the size of their establishment. To the extent possible, additional costs, water savings, avoided costs, and benefits are captured for each measure in the summary. During implementation of this Plan the County, in its role as coordinator, should work closely with implementation partners on documenting actual costs and water savings.

WATER CONSERVATION MEASURE 7

Commercial Kitchen Program

Intent

Reduce water use in facilities within commercial and institutional kitchens.

Points of Integration

This measure should result in decreased water demand, as well as decreased wastewater flows and energy usage.

Implementation Partners

Local jurisdictions

Local wastewater treatment provider

Local water provider

Additional Stakeholders/Partners

County Board of Health

Elected officials

Local energy provider

New York State restaurant association

Rockland County Business Association

Conservation Measure Description: This measure would provide water use efficiency guidance through a public-private partnership with commercial and institutional kitchens in restaurants, schools, and hospitals. The role of the implementation partner for this measure includes: recruiting program participants, developing and managing a series of workshops, tracking water usage throughout the program, and recognizing participants that achieve their goals.

Implementation Guidance: The program plan for this measure follows the seven-step water management framework that the US EPA endorses in its WaterSense at Work guidebook:

Step 1: Making a commitment
Step 2: Assessing facility water use
Step 3: Setting and communicating goals
Step 4: Creating a water conservation plan
Step 5: Implementing the water conservation plan
Step 6: Evaluating progress
Step 7: Recognizing achievement

During the program the implementation partner will assist participants through each step including four main deliverables:

- *A water audit checklist* – to include basic facility information, and an inventory of water- and energy-consuming equipment that helps participants prepare a cost-benefit analysis for various types of equipment and identify behavioral best practices.
- *Workshops with conservation experts* – Four workshops throughout the year:
  - Workshop 1 – Making a Commitment and Assessing Facility Water Usage
  - Workshop 2 – Setting and Communicating Goals and Creating a Water Conservation Plan
  - Workshop 3 – Implementing the Water Conservation Plan
  - Workshop 4 – Evaluating Progress and Recognizing Achievement

  To maximize participation, each workshop could be offered multiple times throughout the day, as many participants may only be able to attend outside their business hours. Potentially, the New York Restaurant Association could be incorporate a workshop/presentation into their usual meeting schedule.
- *Monthly reports on water usage* – It's recommended that each participant have their water usage data from the preceding year at the beginning of the program for comparison of current and past water use.
- *Public recognition* – This can take the form of press releases, both at the beginning and end of the program, and the presentation of physical awards to participants that meet program goals.

Potential Costs: A part-time project manager will be required to run the program for up to 10 participants. Workshop speakers may be paid or unpaid; potential resources could include US EPA regional office for a WaterSense® speaker, local water provider or local university. Other non-labor costs include: a venue to host workshops, and awards for participants that meet goals.

Potential Water Savings: The NYC DEP has run a similar program they call the "Water Challenge Program" where each year participants from a different commercial sector are invited to participate in the challenge with the goal of reducing their water usage by 5 percent. Participants in the 2015 New York City Water Challenge to Restaurants reduced their water use from 5 to 20 percent over the one-year program through a combination of fixture and equipment replacement/retrofits along with activities intended to promote staff behavioral changes. Reductions equated to savings of 5,000 to 22,000 gallons per month for each establishment. According to the New York State Department of Health Restaurant Check database there are 1,058 food services establishments in the County, if each of them reduced their water savings by 5,000 gallons per month that would equate to over 63 million gallons per year of savings.

Considerations for Enhanced Implementation:

- Invite the local energy provider to present on their available conservation rebates during Workshop 2.
- At the end of the NYC DEP Water Challenge, lessons learned are compiled into a manager's guide that is then distributed to those that were unable to participate. These guides can be found on their website: https://www1.nyc.gov/site/dep/water/water-saving-tips.page

Resources:

> US EPA WaterSense® at Work – Best Management Practices for Commercial and Institutional Facilities, https://www.epa.gov/sites/production/files/2017-02/documents/watersense-at-work_final_508c3.pdf

> Kenniff, V., Flowers, C., Pho, K 2016. Growing a Public-Private Water Conservation Partnership Program with Restaurants in New York City. Journal – American Water Works Association. February 2016.

> Alliance for Water Efficiency - Commercial Kitchens Water Use Efficiency and Best Practices Guide, http://www.allianceforwaterefficiency.org/Commercial-Kitchens-Guide-Library.aspx

> The New York City Department of Environmental Protection Water Saving Tips website has several examples of restaurant focused educational materials, https://www1.nyc.gov/site/dep/water/water-saving-tips.page

> PG&E, "Top 9 Ways Restaurant Owners Can Conserve Water, https://www.pge.com/en/mybusiness/save/smbblog/article/water-conservation-top-9-ways-for-restaurant-owners-to-conserve-water.page/

> Sustainable Food Service.com, https://www.sustainablefoodservice.com/cat/water-efficiency.htm/

> Texas Water Development Board, "Best Management Practices for Commercial and Institutional Water Users," http://www.twdb.texas.gov/conservation/BMPs/CI/doc/Commercial%20&%20Institutional%20BMP%20Guidebook.pdf?d=2920.2599999844097

WATER CONSERVATION MEASURE 8

Business Community Partnership

Intent

Educate and incentivize the County business community to support implementation of the measures in this Plan.

Points of Integration

This measure increases knowledge and awareness of water issues among businesses in the County.

Implementation Partners

Local jurisdictions

Additional Stakeholders/Partners

Local Chambers of Commerce

Rockland County Business Association

Manufacturers association

Local water provider

Conservation Measure Description: This measure is intended to educate and incentivize the County business community to support implementation of measures in this Plan. Commercial users account for 36 percent of the County water demand, second only to single-family users, so their involvement and support is critical.

Retailers of water-using equipment and products are especially critical to reach, as many products out there claim to be water-efficient but are not currently recognized by the WaterSense® program, which can lead to confusion. An added complication is that the New York State plumbing standards are related to new construction, so retailers are not restricted in what they can stock.

Implementation Guidance: Viable approaches to implementation of this measure include the following.

- Meet with local businesses to discuss the Plan and measures being implemented in their community. If receptive, request their help in distributing education materials in exchange for local recognition through press releases or a participation sticker campaign showing support for County water conservation efforts.
- Coordinate with local home improvement businesses to offer residents bulk discounts on water-saving fixtures (spray valves, toilets), rain barrels, or other products that align with recommendations being made in the local public education program. The implementation partner would market, coordinate orders, identify a local business to fulfill the order, then organize an event around distribution of items.
- Develop a water conservation business pledge program for businesses that sign onto the program and commit to taking specific steps to achieve a specified level of conservation; typically denoted as bronze, silver, gold, or platinum status.

Potential Costs: Staffing needs for implementation of this measure will vary from jurisdiction to jurisdiction as will funding costs to support outreach materials, awards, and other associated expenditures.

Potential Water Savings: Savings from a bulk order of water-efficient fixtures can be calculated using the manufacturer's specifications, an assumption of current water use of the fixture to replace, and number of fixtures distributed. In the case of a pledge program a percent reduction goal could be set and quantified through recent water bills. Other qualitative approaches to measuring success include: business participation, and satisfaction with program.

Considerations for Enhanced Implementation:

- Develop materials under the Local Public Education Program (measure 5) specifically for businesses participating in the partnership program
- Publicly recognize successful partners through the County's program to recognize residents and businesses that implement water conservation measures (measure 13).

Resources:

> Metropolitan North Georgia Water Planning District Pledge to Conserve website, https://mydropcounts.org/pledge-to-conserve/

> Texas Water Development Board, "Best Management Practices for Commercial and Institutional Water Users," http://www.twdb.texas.gov/conservation/BMPs/CI/doc/Commercial%20&%20Institutional%20BMP%20Guidebook.pdf?d=2920.2599999844097

> US EPA, Region 1 – New England, "Water Conservation Tips for Businesses," https://www3.epa.gov/region1/eco/drinkwater/water_conservation_biz.html

WATER CONSERVATION MEASURE 9

Plumbing Contractor Education Program

Intent

Develop an education program for plumbers and recognize plumbing businesses whose employees have completed the program.

Points of Integration

This measure increases knowledge and awareness of water issues among Licensed Plumbers in the County and lays the groundwork for implementation of future green construction regulations.

Implementation Partners

County licensing board

Additional Stakeholders/Partners

Local jurisdictions

Elected officials

Local Chamber of Commerce

Legal counsel

Conservation Measure Description: According to Chapter 319 section 5.k of the Laws of Rockland County, which governs licensing of plumbing, heating, air-conditioning, refrigeration, and sheet metal contractors in the County of Rockland, "The board may from time to time adopt and revise rules and regulations prescribing and enforcing present and future continuing education for licensees, applicants for licenses, and users of licenses, or combinations thereof, required or permitted by this chapter." The intent of this measure is for the County to work with the licensing board to explore how water conservation training may be incorporated into the County's continuing education requirement.

Implementation Guidance: The ability to implement this measure lies primarily with the County licensing board and County government, with input from legal counsel. It has yet to be determined whether Chapter 319 of the County Rules and Regulations can be amended to require water conservation be a component of continuing education for plumbers.

The County could explore endorsing the Green Plumbers program. This is an example of a national program, supported by City of Palo Alto, Portland Water and others, that offers an accreditation (free) and licensing program (small fee) that rewards plumbers who participate in the program with marketing opportunities. Aside from the marketing opportunities, many communities further incentivize the Green Plumber program by making it a condition for participation in rebate or direct-install programs.

Potential Costs: It's assumed that one less-than part-time staff member will be required to manage this measure, primarily to coordinate with the licensing board and other stakeholders. For the Green Plumbers program any fees are paid by the licensee.

Potential Water Savings: Effectiveness of this measure can be gauged primarily through qualitative benchmarks such as: participation, and satisfaction with program.

Considerations for Enhanced Implementation:

- Develop materials under the Local Public Education Program (measure 5) specifically for businesses participating in the partnership program to distribute to customers.

Resources:

- Chapter 319 of the Laws of Rockland County, http://rocklandgov.com/files/6715/5369/7955/P_locallaw_2008_pomona.pdf
- Green Plumbers website, http://greenplumbersusa.com/
- Marin Municipal Water District, https://www.marinwater.org/162/Professional-Training

WATER CONSERVATION MEASURE 10

Landscaper, Irrigators and Plant Nursery Partnership

Intent

Recognize businesses that promote WaterSense or water efficient products and low-water using landscapes.

Points of Integration

This measure supports several informational measures, including audit guidance for residential users, sustainable landscaping and local public education efforts, and regulation measures, including County-wide lawn and landscape irrigation schedule and green building codes and ordinances related to water conservation.

Implementation Partners

Local jurisdictions

Additional Stakeholders/Partners

Local water provider

Local landscaping/irrigation companies

Local plant nurseries

Local Cooperative Extension Office

Soil/Water Conservation District

Conservation Measure Description: Landscape irrigation drives summer peak water usage in the County. Outdoor water efficiency on large landscapes can optimize existing irrigation systems and promote sustainable landscaping practices. Reducing water use on landscapes can also provide benefit for watershed management by reducing irrigation runoff and pollution that enters waterways.

Like the Business Community Partnership measure, measure 8, this measure seeks to encourage landscapers, irrigation contractors, and plant nursery businesses in the County to support water conservation measures in the County through non-monetary incentives.

Implementation Guidance:

- Meet with local businesses to discuss the intent of the Plan and measures being implemented in their community. If receptive, request their help in distributing education materials in exchange for local recognition through press releases or a sticker marketing campaign.
- Develop a County-certified landscape audit program where trained nursery staff, irrigation contractors, landscaping professionals or trained volunteers would assess the efficiency of existing irrigation systems, make recommendations to reduce outdoor water use, and distribute local education program materials. The WaterSense® landscaping water budget tool, link below, can be using in lieu of developing a new tool and would present a standardized approach.
- Work with plant nurseries to support sustainable landscaping workshops for both landscapers and the public, along with setting up displays and stocking recommended plants from the County's Sustainable Landscaping Education Program.
- Promote WaterSense® labeled programs for irrigation professionals, benefits include earning a professional certification, inclusion on WaterSense's online professional directory, use of WaterSense® logo for business marketing, and access to helpful tools and materials. The implementation partner could further incentivize these certifications by making them a condition for contracting services.

Potential Costs: Staffing needs for implementation of this measure will vary from jurisdiction to jurisdiction as will funding costs to support outreach materials, and other associated expenditures.

Potential Water Savings: Actual savings are difficult to predict, if the measure is implemented, success could be measured by the following:

- Partnerships – number of businesses that sign-on and their satisfaction.
- Sustainable Landscaping Workshop – number of attendees, resulting sales of recommended equipment or landscape plants and materials.
- Landscape Audits – number of audits performed, suggested measures implemented, number of auditors trained, square feet of irrigated landscapes audited, before-and-after water use tracking.

Considerations for Enhanced Implementation:

- Incentivize the landscape audit program by contracting irrigation professionals to perform audits of the top peak season water users in the community, and further support these efforts with an ordinance requiring routine water audits for irrigated landscapes over a certain square footage.
- Recruit partners from the landscaping and plant nursery industries, as well as volunteers such as master gardeners, to assist in development of other measures that address outdoor water use, including: sustainable landscaping demonstration gardens, landscaping ordinances, irrigation system standards, or minimal soil standards to be implement County-wide.
- Adopt a green industry contractor registration program, like what's being implemented by The Village of Tarrytown, NY. Under Tarrytown's registration program all arborist, landscaper, gardener, horticulturalist, or landscape services need annually register with the Village Clerk before being deemed eligible to work in the Village. Green industry contractors agree to abide by all the Village's landscape codes and receive registration stickers to place on their vehicles. Unregistered individuals or businesses are subject to fines.
- At the County's discretion, it may be possible to partner with New York State Department of Environmental Protection on the implementation of this measure.

Resources:

> WaterSense® Water Budget Tool, https://19january2017snapshot.epa.gov/www3/watersense/water_budget/index.html

> WaterSense® Professional Certification website, https://www.epa.gov/watersense/professional-certification-0

> The California Department of Water Resources has a Model Water Efficient Landscape Ordinance that addresses Irrigation Audits, Irrigation Surveys, and Irrigation Water Use Analysis, https://water.ca.gov/Programs/Water-Use-And-Efficiency/Urban-Water-Use-Efficiency/Model-Water-Efficient-Landscape-Ordinance

> Village of Tarrytown, NY code related to registration requirement for green industry contractors, https://ecode360.com/10674249

WATER CONSERVATION MEASURE 11

Governmental and Institutional Building Retrofits

Intent

Improve the efficiency of all government buildings to conserve water and demonstrate leadership in conservation.

Points of Integration

This measure should result in decreased water demand, as well as decreased wastewater flows and energy use.

Implementation Partners

State

Local jurisdictions

Additional Stakeholders/Partners

Elected officials

Maintenance staff

Local wastewater treatment provider

Local energy provider

Conservation Measure Description: Public buildings within the County vary with respect to type and volume of water use. When public buildings, such as schools, administrative offices, libraries, etc., install water-saving fixtures and equipment, water savings and cost savings are shared by County residents. This program would include survey of public buildings to identify potential retrofit demonstration projects. The program would also include collaborative funding for estimating water savings, planning and implementing improvements, and auditing results.

Implementation Guidance: For this measure the County and each local jurisdiction provider shall whenever possible follow the Water Management Planning guidance provided in the US EPA WaterSense® at Work guide:

1) Make a commitment – County to identify implementation partners among local jurisdictions.

2) Assessing facility water use – through utilization of current facilities maintenance staff or contracted resources, each implementer will gather their water use data from the previous year bills, if available, and conduct a water audit of each of their facilities. A simple checklist or spreadsheet can be used to collect information about water usage in the facility and the US EPA WaterSense® at Work guide can be referenced to develop a list of potential water conservation measures.

3) Creating an action plan –selecting water conservation projects for each facility requires: calculating costs, potential savings, and payback; identifying financing sources; and then using that information to prioritize projects. With fixture or equipment replacement projects the payback period justifies the upfront cost, while in others with longer payback periods it may be more feasible to wait until existing equipment reaches its end of life before upgrading. Funding will be challenging, and each implementer should look to partner with their local water or energy provider and take advantage of New York State Regional Economic Development Council grants.

4) Implementing the action plan – to keep implementation costs down it's recommended that each implementer consider using current facility maintenance staff before contracting services.

5) Evaluating progress – continuously reevaluating where the program is regarding the action plan is important to ensuring goals are being met. It's also critical that as actions are completed, new ones are brought up for consideration.

6) Recognizing achievement – garnering support and fulfilling the goal of demonstrating leadership in water conservation requires recognizing when goals are met and promoting success both internally and externally. The approach to celebrating achievements can be as simple as a press release or more visible through banners and signs that celebrate achievements.

Potential Costs: Costs will vary widely depending on implementation approach. It is estimated that one part-time staff will be required to guide facility maintenance staff through the water audit and conservation planning step.

Potential Water Savings: While each implementer will be able to calculate success in terms of cost and water saved – at a County level success of this measure can be determined in terms of: how many local jurisdictions commit to survey their facilities, develop an action plan, and implement the action plan. Those local jurisdictions could report their savings to the County during the Annual Comprehensive Water Conservation Plan Review.

Considerations for Enhanced Implementation:

- The County could take the lead in identify, applying for and manage grant monies that could be used to fund all or a portion of a local-jurisdiction's action plan.
- As the program progresses, it may be helpful to the County to create a water usage benchmark for government building throughout the County, based on a metric like gallons per day per square foot, for comparison.

Resources:

> US EPA WaterSense® at Work – Best Management Practices for Commercial and Institutional Facilities, https://www.epa.gov/sites/production/files/2017-02/documents/watersense-at-work_final_508c3.pdf

> New York State Regional Economic Development Councils 2019 Consolidated Funding Application, https://regionalcouncils.ny.gov/sites/default/files/2019-04/2019ResourcesAvailableGuide_0.pdf

> US EPA Clean Water State Revolving Fund (CWSRF), https://www.epa.gov/cwsrf

> NYS Environmental Protection Fund, https://www.dec.ny.gov/about/92815.html

> NYS Environmental Protection Fund Grant Applications, https://www.dec.ny.gov/pubs/grants.html

> Regional Greenhouse Gas Initiative (RGGI), https://www.dec.ny.gov/energy/rggi.html

> New York State Energy Research and Development Authority (NYSERDA) Funding Opportunities, https://www.nyserda.ny.gov/Funding-Opportunities/Current-Funding-Opportunities

> US Department of Housing and Urban Development (HUD) Community Development Block Grant (CDBG) program, https://www.hud.gov/program_offices/comm_planning/communitydevelopment/programs

> US Department of Energy Water Efficiency in Federal Buildings and Campuses, https://www.energy.gov/eere/femp/water-efficiency-federal-buildings-and-campuses

WATER CONSERVATION MEASURE 12

Water Conservation for Variances for New Development

Intent

Tie land use or subdivision code variances to measures documented in a water conservation plan prepared by the developer.

Points of Integration

This measure should result in decreased water demand, as well as decreased wastewater flows. It may also result in better stormwater management, which benefits water quality as well as energy savings.

Implementation Partners

Local jurisdictions

Additional Stakeholders/Partners

Inspection/code enforcement staff

Legal counsel

Local wastewater treatment provider

Local water provider

Planning and zoning

Developers

Contractors

Conservation Measure Description: County population is forecast to increase by 24 percent by 2050, and it's assumed that new housing developments will continue to be constructed throughout the County to meet housing demand. The 2011 ROCKLAND TOMORROW: Rockland County Comprehensive Plan addresses the need for housing options, and the preservation of open space, by promoting clustered subdivision design around existing County centers. According to feedback collected during the March 2019 stakeholder workshop for the development of this Plan, many attendees supported making new developments as water-efficient as possible. The intent of this measure, and why it's labeled as an incentive activity, is to tie subdivision variances to water-saving measures included in subdivision master plans and building practices. Without these plans it's difficult for local planners to fully integrate water efficiency into their land use planning efforts.

Implementation Guidance: It's not uncommon for a local Zoning Board of Appeals to allow variances to density limits, parking requirements, pavement width, accessory buildings and similar requirements, or fee reductions, to achieve municipal policy goals for affordable housing, stormwater management and the like.

Without going as far as to develop a new ordinance, which will be discussed in more detail under regulation measures, in most locations the local Zoning Board of Appeals may attach conditions to the granting of variances. Examples include approving a density limit variance on the condition that ultra-high efficiency fixtures are installed along with sustainable landscapes to offset the potential increase in demand. Initially, one or more pilot projects could be authorized to demonstrate effectiveness and the results could be documented and shared with other Zoning Board of Appeals throughout the County.

Potential Costs: The ability to implement this measure lies primarily with local jurisdictions, Planning and Zoning Commissions, and Board and legal counsel. Labor costs associated with initial policy development are anticipated , but thereafter costs would be minimal.

Potential Water Savings: Savings will vary depending on the locally adopted policy.

Considerations for Enhanced Implementation:

- The Water Research Foundation 2018 Integrating Land Use and Water Resources: Planning to Support Water Supply Diversification Report, linked below, found that there's an improved water and community sustainability benefit to institutionalizing coordination between water and land use planning. Because New York is a home rule state many of the County's stakeholders are concerned about inadequate training and communication on the importance of water resource management within local planning and zoning departments. Water resource management could become the driver for closer coordination between local planning and zoning departments in the County while the American Planning Association, Alliance for Water Efficiency and other organizations have references, resources and could provide speakers for training workshops, webinars or other training opportunities.

Resources:

> Water Research Foundation 2018 Integrating Land Use and Water Resources: Planning to Support Water Supply Diversification Report, http://www.waterrf.org/PublicReportLibrary/4623A.pdf

> Alliance for Water Efficiency Green Building information, https://www.allianceforwaterefficiency.org/resources/green-building/

> Institute for Local Government "Water Conservation Leadership Guide: Issues for Local Officials to Consider." https://www.ca-ilg.org/sites/main/files/file-attachments/resources__FINAL_-_web_version_0.pdf

WATER CONSERVATION MEASURE 13

Recognition for Implementing Water Conservation Measures

Intent

Feature residents or businesses that are implementing water conservation measures in newspapers, websites, City or County meetings or community events, and other communications.

Points of Integration

This measure should recognize those that implemented projects resulting in decreased water demand, as well as decreased wastewater flows.

Implementation Partners

Local jurisdictions

Additional Stakeholders/Partners

Elected officials

Local wastewater treatment provider

Local water provider

Planning and zoning

Local energy provider

Conservation Measure Description: The intent of this measure is to non-monetarily incentivize residential, commercial, and industrial users in the County to undertake water conservation projects.

Implementation Guidance: This measure can be implemented by the County or local jurisdictions, and it's recommended that the project plan for this measure address the following:

1) Who will be the project team? Staff assisting with the Water Conservation Education Program (measure 5) could be a good fit to run this program.
2) Who will recognition be given on behalf of, in other words who's sponsoring (is it a local elected official, Task Force, etc.)?
3) What's being recognized? Is there a water conservation goal or theme that would be appropriate, perhaps tied to the Local Public Education Program messaging? For instance, recognition of outside water use projects could be a theme during the summer when use is at its highest. Potentially include "winners" from various sectors such as residential, institutional, industrial, business, government.
4) Where are recognized residents or businesses being featured? Is the recognition high-profile enough to incentivize people to complete project so they get featured? Is the recognition presented in a way to educate and motivate others to take on similar projects (social-norms)?
5) How often is recognition being given? A good program will be consistent in how regularly it recognizes residents and businesses.

Potential Costs: It's anticipated that one less-than part-time staff could run the recognition program. Non-labor costs will depend on how residents or businesses are recognized, but could include articles, advertisements, media spots, physical awards, etc.

Potential Water Savings: Savings will vary considerably depending on the project that's being recognized. Implementers could consider making documentable water savings a condition for receiving recognition, in which case it would be possible to quantify the savings from this measure. Other methods of measuring success include: number of participants, general feedback, and size of projects being recognized.

Considerations for Enhanced Implementation:

- Consider expanding the program to recognized local jurisdictions, water or wastewater providers like Metropolitan North Georgia Water Planning District did with their STREAM Awards, https://northgeorgiawater.org/what-is-the-metro-water-district/stream-awards-projects-programs-excellence/
- Should the program build to significant proportions there's potential to submit for WaterSense Partners of the Year, for WaterSense program participants that promote WaterSense and water efficiency, https://www.epa.gov/watersense/watersense-awards
- Work with Rockland Business Association on selecting of Green Council Award recipient for Water Conservation.

Resources:

> Lake Havasu City Water Conservation Certificate of Recognition Program. More information available at: http://www.havasuwatersavers.org/certificate.php

> The San Antonio Water System recognizes water-saving landscapes that meet specified criteria. More information is available at: https://www.gardenstylesanantonio.com/garden-tips-blog/2014/11/18/2014/11/watersaver-landscape-recognition/

> King County, Washington recognizes schools for water conservation and pollution prevention. More information available at: https://www.kingcounty.gov/depts/dnrp/solid-waste/programs/greenschools/water-conservation.aspx

> Austin Water's Pretreatment Excellence Awards could be modified to recognize accomplishments of residents, neighborhoods and businesses, http://www.austintexas.gov/department/pretreatment-excellence-awards

WATER CONSERVATION MEASURE 14

Targeted Incentive Programs

Intent

Provide guidance on setting up and running a publicly-funded incentive program.

Points of Integration

This measure would result in decreased water demand, as well as decreased wastewater flows.

Implementation Partners

Local jurisdictions

Local wastewater treatment provider

Local water provider

Additional Stakeholders/Partners

Elected officials

Inspection/code enforcement staff

Local GIS department

Local energy provider

Conservation Measure Description: The most cost-effective, funded incentives for water conservation are ones where: the proposed conservation measure has not been previously adopted; target customers view the program favorably; customers who can benefit most are identified; multiple marketing strategies for the program are used; barriers (availability of measure, program staffing, costs to customer, etc.) are mitigated; and there is an educational/behavioral change component (Silva et al. 2010).

Additionally, incentive programs can take several forms:

- *Distribution Programs*, where an entity purchases fixtures in bulk at a reduced cost and distributes them directly to users (at-cost or free);
- *Installation Programs,* where an entity purchases fixtures and directly installs them in a user's building;
- *Voucher Programs*, where an entity provides users with a document to redeem for a free or discounted fixture; and
- *Rebate Programs*, where users purchase and install a water conservation fixture that complies with program requirements and are reimbursed by the entity after providing required installation documentation. Grant programs fall within this program type.

Direct distribution and installation programs have several advantages over voucher and rebate programs. First, by purchasing program fixtures in bulk, an entity may be able to negotiate a lower unit cost. Second, an entity has more control over fixture specifications and quality, and since the savings are typically passed onto users, economic barriers for low-income user participation are reduced or avoided. Conversely, voucher and rebate programs typically rely heavily on users or contracted vendors to purchase, store, and install fixtures, placing more burden on users.

Implementation Guidance: A robust program plan is essential to successful planning, funding, and implementation of any incentive program. Contents of the plan should include the following sections:

- *Program Introduction* – Why an incentive program, and what's the larger vision (including specific goals).
- *Program Structure* – Where does the incentive program fit into the larger organization or plan, who are water users or what water-use types are the focus of the program, will it be a distribution, installation, voucher, or rebate type program and how will the program be structured (a flow chart is helpful to illustration program steps from start to end).

- *Program Guidelines* – What's the program budget, what are the eligibility requirements and required documents to support an eligibility claim, what's the value of the incentive and how long is it good for, how are the incentive program funds disbursed, and how are incentives tracked and monitored.
- *Program Outreach* – Includes specifics on types of outreach activities and when they will occur, indicates the types of outreach materials to be developed to assist with outreach (program guide, FAQ, etc.), how outreach activities will coordinate with existing outreach resources (public relations department, call center, etc.), and will a customer relationship management tool be used to ensure program communications and action items are correctly tracked.
- *Program Delivery Team* – Who is on the project team, what are their responsibilities and time commitment to the program. At the least most programs need a project director, project manager, and customer service representative. Change management should also be addressed in this section.
- *Schedule* – What will be the timespan for the program, how will it align with the funding calendar, is there a schedule-driven goal that needs to be tracked.
- *Communication Protocol* – How will stakeholders be managed by the project team, are there routine reports that need to be submitted to document progress or costs.
- *Quality Program* –Who are the individuals that are accountable for ensuring quality service and products are provided through the program, how will continuous quality control procedures be applied to the program.
- *Records Management* – What records must be retained, where will they be stored (include a filing structure).

Potential Costs: Incentive program costs can vary widely depending on the type of incentive program and number of users eligible for the program. Labor cost will depend on the size of the program team, their time commitment, and whether it's possible to leverage existing public relations or outreach resources; refer to program plan. Non-labor costs will include production and distribution of outreach materials and the cost of the incentive program itself.

Setting the value of an incentive can be done through a cost-benefit analysis, or through a literature search when the information to quantify costs or benefits is not available. American Water Works Association (AWWA) Water Conservation Programs Manual (M52) provides guidance on how to conduct a cost-benefit analysis based upon the principle that a cost-effective conservation project is one where "the present value of the benefits exceeds the present value of the costs." In other words, when the benefit-to-cost ratio is greater than one, a project is considered cost-effective. Calculating project costs includes project implementation costs, specifically labor and materials, and predicted revenue impacts. Benefits, also thought of as cost savings or avoided costs, are further classified by M52 as reduced water purchases, lower operation and maintenance costs, and capital investments. It should be noted that benefits beyond water conservation can be incorporated into the analysis; for instance, shareholders (including other city agencies and communities in the watershed), customers, general population, etc. may also experience quantifiable benefits from improving water efficiency.

Ultimately, the goal is to quantify the benefit of water conservation in terms of dollars per gallon of water saved as a means of valuing the incentive.

Potential Water Savings: Savings from incentive programs can vary considerably and could be difficult to quantify without access to metered usage data. Qualitatively, the success of an incentive program can be tracked by: number of incentives issues, number of users participating, estimated water and sewer costs reduced by customer, estimated O&M/capital costs avoided per incentive issues, user satisfaction.

Considerations for Enhanced Implementation:

- Support incentive programs through grants like those provided by the New York State Regional Economic Development Council.
- Partner with the local energy provider in developing an incentive program for water conservation that compliments energy conservation programs in the County.

Resources:

> Alliance for Water Efficiency Resource Library, Water Conservation Programs, http://www.allianceforwaterefficiency.org/Water_Conservation_Programs_Library_Content_Listing.aspx

> American Water Works Association (AWWA). *Water Conservation Programs – A Planning Manual* – M52. American Water Works Association, 2017.

> New York State Regional Economic Development Councils 2019 Consolidated Funding Application, https://regionalcouncils.ny.gov/sites/default/files/2019-04/2019ResourcesAvailableGuide_0.pdf

> San Francisco Public Utilities Commission Conservation website, rebates and incentives, https://www.sfwater.org/index.aspx?page=129

> San Antonio Water System Conservation website, https://www.saws.org/conservation/

WATER CONSERVATION MEASURE 15

Water Loss Assistance Program

Intent

Encourage cooperation and knowledge-sharing about maintaining control over water loss among the various jurisdictions in the County.

Points of Integration

This measure will result in decreased water demand and better protection against the risk of contamination in finished water.

Implementation Partners

Local jurisdictions
Local wastewater treatment provider
Local water provider

Additional Stakeholders/Partners

Elected officials
Local GIS department

Conservation Measure Description: According to the Water Research Foundation "A first-order conservation measure for all piped water systems is to ensure the integrity of the distribution system by minimizing water losses and maximizing energy efficiency." A water loss program at its most basic performs two functions: firstly, it accounts for water in a system and secondly, it addresses the repair of known leaks. While tools and equipment to implement such a system are readily available, small resource-constrained local jurisdictions and water utilities sometimes lack the training or personnel to implement such a program or can only do so irregularly. This measure proposes to develop a county-wide water loss prevention program where local jurisdictions and water providers pool resources county-wide and share lessons learned.

Implementation Guidance: This measure is roughly modeled on The Rockland County Fire Training Center, which is governed by the Rockland County Office of Fire and Emergency Services and offers a variety for training programs for the County's 26 all-volunteer departments. A County Water Loss Training Center could provide training and leak detection equipment to local jurisdictions in the County that could benefit:

- *Water Loss Training* – The industry standard tool for water audits is the AWWA Free Water Audit Software. While the tool is intended to enable municipalities to perform a self-assessment via an easy to use Excel-based platform, the tool comes into its own when data is validated and benchmarked against other communities. A County Water Loss Training Center could encourage and assist local jurisdictions with adopting and annually updating the tool; the finding of which would be valuable to incorporate into annual Comprehensive Water Conversation Plan update reports.
- *Leak Detection Equipment* – This program would focus on developing a leak detection training and certification course through the County Water Loss Training Center where, upon their staff successfully completing the required courses, local jurisdictions would be eligible to use a communally purchased set of equipment.

Potential Costs: Program staffing and equipment costs could vary widely depending on several factors including: demand, courses offered, facility needs, and leak detection equipment selected. It is assumed that any costs related to repairing leaks found using the shared leak detection equipment would be incurred by the owner of the infrastructure.

Potential Water Savings: Upon completion of the AWWA Free Water Audit Software by local jurisdictions in the County, it will be possible to quantify the potential water savings achievable through a proactive water loss assistance program. A realistic goal would be to reduce levels of water loss down to that which is endorsed by the New York State Public Service Commission (18 percent maximum allowable water loss) or New York State Department of Environmental Conservation (15 percent maximum allowable water loss).

Considerations for Enhanced Implementation:

- Seek grant funding to support the purchase of shared leak detection equipment.
- Use shared leak detection equipment and trained staff to perform leak detection on publicly owned campuses that have extensive yard piping.
- Offer Water Loss Training Center courses to out-of-County participants for a fee.
- Pattern with regional professional societies, like the New York Section of AWWA, on training courses and materials.

Resources:

> American Water Works Association Free Water Audit Software, https://www.awwa.org/Resources-Tools/Resource-Topics/Water-Loss-Control

> US Department of Energy “Best Management Practice #3: Distribution System Audits, Leak Detection, and Repair” https://www.energy.gov/eere/femp/best-management-practice-3-distribution-system-audits-leak-detection-and-repair

> WaterWorld “Successful Water Leak Detection and Audit Methods,” https://www.waterworld.com/home/article/14070706/successful-water-leak-detection-and-audit-methods

5.3 Regulation

Exhibit 23. Implementation Considerations for Regulatory Strategy Conservation Measures

Measure		Implementation Partner		Recommended Implementation			Potential Water Savings
		Local	State	Near-term (1 to 3 years)	Mid- term (3 to 5 years)	Long-term (5+ years)	
16	Time of Sale Plumbing Standards	X	X			X	35 gpd per housing unit
17	State-wide Irrigation Trades Licensing Program		X		X	X	Varies
18	Require Water Conservation Practices in New Developments	X		X	X		Dependent on ordinance
19	Lawn and Landscape Irrigation Schedule	X			X		Dependent on ordinance
20	Green Building Codes and Ordinances Related to Water Conservation	X			X	X	Dependent on ordinance

Exhibit 24. Applicable Customer Sector and Use Classification for Regulatory Strategy Conservation Measures

Measure		Customer Sector				Water Use Classification	
		Single-family	Multi-family	Commercial	Industrial	Indoor	Outdoor
16	Time of Sale Plumbing Standards	X	X			X	
17	State-wide Irrigation Trades Licensing Program	X	X	X	X		X
18	Require Water Conservation Practices in New Developments	X	X	X	X	X	X
19	Lawn and Landscape Irrigation Schedule	X	X	X	X		X
20	Green Building Codes and Ordinances Related to Water Conservation	X	X	X	X	X	X

5.3.1 Estimating Costs and Water Savings from Regulation Measures

In addition to customer incentives and public education and information, policies or regulations are elements of a comprehensive water conservation program. Policies presented here are options for the County to consider and could be incorporated into local water provider service rules or adopted into local codes through ordinances. Costs for implementation and enforcement would likely be low, provided much of the work is carried out by the current County and implementation partner staff. During implementation of this Plan the County, in its role as coordinator, should work closely with implementation partners on documenting actual costs and water savings.

WATER CONSERVATION MEASURE 16

Time of Sale Plumbing Standards

Intent

Adopt a retrofit-on-resale ordinance that requires either the buyer or seller of a property to replace inefficient plumbing fixtures upon sale.

Points of Integration

This measure would result in decreased indoor water demand, as well as decreased wastewater flows.

Implementation Partners

State

Local jurisdictions

Additional Stakeholders/Partners

Realtor associations

Affordable housing advocates

Elected officials

Legal counsel

Planning and zoning commissions/ boards

Inspection/code enforcement staff

Conservation Measure Description: While New York State plumbing standards require water-efficient fixtures, these regulations apply primarily to new construction or installation and, therefore, do not address inefficient fixtures in existing buildings. According to the 2017 U.S. Census Bureau American Community Survey 5-year Estimates, savings from developing a measure for existing buildings could be significant since over 90 percent of housing stock in the County was constructed pre-1999[1] and, therefore, may still use less-efficient fixtures. This measure proposes to develop regulations requiring water-efficient fixtures be installed when a property is sold, also known as a time of sale plumbing standard.

Implementation Guidance: While time of sale plumbing programs exist in Texas, Georgia, California, and Colorado, Santa Cruz County in California provides a good reference case study for the County, as California is also a home rule state. The program in California is implemented at both the state and local level:

- *State Level* - California Civil Code (link provided below in references) requires installation of water conservation fixtures in homes built before 1994, any non-compliant plumbing fixtures on the property must be disclosed to the buyer. State law also allows more restrictive requirements to be included in local building codes provided they comply with state law at a minimum. There is little enforcement at the state level.
- *Local Level* – The Santa Cruz County ordinance, which applies to all unincorporated areas of the County, is an example of local implementation and enforcement. The Santa Cruz ordinance (link provided below in references) focuses on time of sale retrofits and makes it the responsibility of the seller to comply. The seller must arrange to have an authorized inspector (city employee, or state-licensed plumbing contractor) confirm the interior plumbing fixtures on the premises comply with ordinance before a water conservation certificate, which is required before time of sale, can be issued. There are several penalties for violation detailed in the ordinance that result in infractions, along with a civil remedy that stipulates that if the seller does not install the correct fixtures within 90 days the seller is “liable to the buyer in the amount of 250 dollars for each fixture that does not comply with this chapter at the time of sale, or the actual costs of the buyer to comply with this chapter, whichever amounts are greater.”

[1] The census data lumps new housing by decade, the 1990-1999 new housing estimates were included since the Energy Policy Act, requiring low-flow toilets and faucets, etc., was enacted in 1992.

Potential Costs: Provided the County can provide legal counsel, costs for implementation of this measure would be low.

Potential Water Savings: Based upon the SUEZ NY survey, done as part of the 2016 Water Conservation Plan, there are likely more than 190,000 residential fixtures distributed through single- and multi-family households throughout the County. While many of these fixtures may have been upgraded to more-efficient models through renovations, replacing remaining inefficient fixtures could result in significant savings. The US EPA claims that an average family can save 13,000 gallons per year (35 gallons per day) if toilets are replaced with WaterSense® models; if similar savings can be expected in the County, then replacing approximately 28,500 fixtures (roughly 15 percent of the total estimated number of fixtures in the County) could result in 1 mgd of savings.

Considerations for Enhanced Implementation:

- This measure assumes that, like in California, it will be necessary for the County to advocate for acceptance of time of sale plumbing standards at the state level before having the legal jurisdiction to adopt standards at the County level. Further coordination with the County's legal counsel during implementation may provide further clarification and result in refinement to the implementation approach provided above.
- Consider a step-wise approach where the make/model or water use of fixtures and appliances are disclosed at time of sale before advocating for a complete retrofit.
- The County might consider combining rollout of the regulation with an incentive program to promote greater public acceptance.
- Future phases of this measure could be expanded beyond inspection of home appliances to include irrigation systems.

Resources:

> California State, Civil Code, Water Conservation Fixture Regulations Reference Sections 1011.5, 1104.1 and 1101.4 http://leginfo.legislature.ca.gov/faces/codesTOCSelected.xhtml?tocCode=CIV&tocTitle=+Civil+Code+-+CIV

> Santa Cruz County, Plumbing Fixture Retrofit Regulations, https://www.codepublishing.com/CA/SantaCruz/html/SantaCruz16/SantaCruz1603.html#16.03

> City of Watsonville Water Conservation Certification, https://www.cityofwatsonville.org/DocumentCenter/View/5877/City-of-Watsonville-Water-Conservation-Certificate-for-Property-Transfers-

WATER CONSERVATION MEASURE 17

State-wide Irrigation Trades Licensing Program

Intent

Partner with local irrigation organization(s) to advocate for a state-wide irrigation licensing program.

Points of Integration

This measure would result in decreased outdoor water demand.

Implementation Partners

State

Additional Stakeholders/Partners

Elected officials
Local jurisdictions
Legal counsel
Planning and zoning
Inspection/code enforcement staff

Conservation Measure Description: Incorrectly installed or existing inefficient irrigation systems can exacerbate summer peak water usage in the County. Building upon the Landscaper, Irrigators and Plant Nursery Partnership (measure 10), and with the support of local irrigation organizations, this measure promotes a state licensing initiative for irrigation professionals.

Implementation Guidance: Neighboring states, New Jersey and Connecticut, have licensing programs for irrigation professionals that could serve as reference case studies for the County.

- *Connecticut* –The State Department of Consumer Protection manages a three-tiered process that consists of: (1) apprentice licenses, (2) journeyman licenses, and (3) contractor licenses. Licensees move up the licensing tiers as they complete required courses and gain on-the-job experience. License holders are permitted to install, repair, replace, alter and maintain lawn sprinkler systems.
- *New Jersey* – The New Jersey Department of Community Affairs advisory board manages the state's landscape irrigation contractor certification program. Applicants must be able to demonstrate 3 years of experience under a licensed contractor before taking the licensing exam. After successfully passing the exam, licensees must participate in a continuing education credit program to subsequently renew their license. A license is required in New Jersey to construct, repair, maintain, alter, or rewire any portion of the system. Master plumbers are exempt.

It's recommended that the County also support implementing a licensing program at the state level. In New York State the Department of Education, Office of the Professions, manages licenses in accordance with state education law. Local irrigation organizations will be valuable resources when developing license program components including competency or education standards, conservation best practices, and continuing education requirements.

Potential Costs: Provided the County can provide legal counsel, and there is support from the local irrigation organization, costs for implementation of this measure would be low.

Potential Water Savings: Savings from this measure are difficult to quantify. Success of the program could be established on number of participants and user satisfaction.

Considerations for Enhanced Implementation:

- Public information materials and websites could include a list of certified irrigation professionals.
- Once the program is in place, local regulations could require that irrigation systems be installed by certified irrigators.

Resources:

> New Jersey Administrative Code, Landscape Irrigation Contractors (NJAC 5:62-1.1), https://www.nj.gov/dca/divisions/codes/codreg/pdf_regs/njac_5_62.pdf

WATER CONSERVATION MEASURE 18

Require Water Conservation Practices in New Developments

Intent

Establish requirements for new construction to include water efficiency standards for indoor and outdoor water use.

Points of Integration

This measure would result in decreased water demand, as well as decreased wastewater flows.

Implementation Partners

Local jurisdictions

Additional Stakeholders/Partners

Elected officials

Inspection/code enforcement staff

Local wastewater treatment provider

Local water provider

Planning and zoning

Site plan review

Conservation Measure Description: Generally, implementing water-conserving elements in new buildings and construction is more cost-effective than retrofitting existing structures and landscapes. This ordinance would establish requirements for new construction to include specified water-efficiency standards for indoor and outdoor water use. Requirements would be developed with input and involvement of the building and real estate community, irrigators, landscape professionals, building inspectors, city planners, and other stakeholders.

Implementation Guidance: Conservation goals of each local jurisdiction can be tailored to address the unique water use challenges of each community, allowing maximum flexibility in planning and implementation. An ordinance could include the following elements:

- Establishing or amending landscape and/or irrigation requirements in development codes to require rain/freeze sensors, potentially limited irrigated areas, and other features.
- Establishing standards for landscaped median width, and width between sidewalks and curbs to prevent irrigation overspray, or prohibiting pop-up or rotary spray heads for irrigating narrow areas.
- Requiring irrigation plans review and approval.
- Requiring submeters or separate metering for multi-family housing units.
- Requiring pint or half-gallon urinals, high-efficiency water heaters, cooling towers with minimum cycles of concentration requirements. or other water-efficient fixtures and appliances in new commercial and industrial developments.
- Requiring reduction of impervious surfaces.

Case Study:

The City of El Paso requires a conservation plan for new connections to the utility system (https://www.epwater.org/business_center/new_installations). The El Paso Water Conservation Plan is a 2-page form that collects information on: basic information about the building, internal water use, external water use, and maintenance practices. Once the form is submitted, along with the application for new water or sanitary sewer service, it must be approved by the El Paso Water Conservation Department. Irrigation meters, referred to as yard meters in El Paso, are captured in a separate 2-page form. This yard meter plan form contains the details for capacity, coverage, and operation of the proposed irrigation system while also containing space to

document any water-efficiency efforts. As with the basic Water Conservation Plan, the Yard Meter Plan must be approved by the Water Conservation Department.

Potential Costs: Developing and passing water conservation ordinances for new developments would be low, though a rigorous stakeholder approach is recommended during development. Once passed, additional labor costs could be incurred from training and increased deployment of inspectors.

Potential Water Savings: Savings from this measure will vary based on the parameters of the ordinance.

Considerations for Enhanced Implementation:

- Consider convening a working group of planning officials, irrigators, plumbers, developers, and builders to develop a model ordinance to be used by local jurisdictions.
- Coordinate closely throughout the County on ordinances for new developments, capitalizing on opportunities to align with other sustainability initiatives.

Resources:

> California Department of Water Resources, Model Water Efficient Landscape Ordinance, https://water.ca.gov/Programs/Water-Use-And-Efficiency/Urban-Water-Use-Efficiency/Model-Water-Efficient-Landscape-Ordinance

> Metropolitan North Georgia Water Planning District, Model sub-metering policy or ordinance language, https://northgeorgiawater.org/wp-content/uploads/2015/07/MODEL_SUB-METERING_POLICY.pdf

> City of Santa Fe Comprehensive Water Conservation Requirements Ordinance (SFCC 1987 § 25-2.2), file:///C:/Users/sbutler/Downloads/Appendix_C%20(1).pdf

> California Water Conservation Board “Best Practices for Implementing Water Conservation and Demand Management Through Land Use Planning Efforts Addendum to 2012 Guidance Document,” https://dnrweblink.state.co.us/cwcbsearch/ElectronicFile.aspx?docid=208193&dbid=0

WATER CONSERVATION MEASURE 19

Lawn and Landscape Irrigation Schedule

Intent

Reduce water used for irrigation via an outdoor watering schedule.

Points of Integration

This measure would result in decreased outdoor water demand during peak demand period and help improve water quality by limiting urban runoff.

Implementation Partners

Local jurisdictions

Local water provider

Additional Stakeholders/Partners

Irrigation organizations

Landscaping industry

Elected officials

Inspection/code enforcement staff

Planning and zoning

Conservation Measure Description: This measure supports the development of an ordinance that would establish an irrigation ordinance to reduce to reduce water usage year-round, with particular emphasis during the peak demand season.

Implementation Guidance:

Ordinance Development

Irrigation ordinances can include the following elements:

- Irrigation systems may be operated for no longer than a prescribed duration for a set number of days per week.
- Allowable irrigation day may be set by address on a no more than once per week or twice per week schedule. For instance, residential odd number addresses may water on Saturdays, residential even number addresses may water on Sundays, nonresidential odd number addresses may water on Tuesdays, and nonresidential even number addresses may water on Thursdays. (Alternative schedule: watering is allowed on the same day as trash collection.)
- No outdoor irrigation is allowed when it is raining.
- Handheld hoses used for lawn and landscape irrigation, vehicle washing, and other tasks must be equipped with an automatic shutoff nozzle.
- Temporary exemptions granted by application and permit may be allowed for newly planted grass, sod, and other plant materials, not to exceed 30 days.

Prevention of water waste could also be incorporated into an irrigation ordinance by including the following elements:

- Prohibiting runoff from properties during irrigation
- Prohibiting hose washing of driveways, sidewalks, and patios

Ordinance Enforcement:

To ensure compliance, an enforcement protocol must be established and followed. Exacting a fee on a customer's water utility bill for violating water use restrictions is the preferred method of enforcement, as it is significantly less burdensome than a costly court or hearing process. Depending on state statutes, city charters, and bylaws, additional approaches for enforcement of irrigation schedules can take many forms ranging from: education, fines (e.g., code violations), and misdemeanors (e.g., police department enforcement and tickets).

Case Studies:

- Frisco, Texas – City-adopted irrigation standards provide irrigation system check-ups and establish both year-round and seasonal outdoor water use requirements. Enforcement includes that first-time violations will receive a door-hanger with a $50.00 administrative fee included on the next available water bill. A $100.00 fee is applied for the second violation, and a $200.00 fee for the third violation. Further violations will include the issuance of a citation.
- Tampa, Florida - Tampa has adopted a year-round no more than twice per week watering schedule. Tampa's Water Enforcement Office issues citations that may result in penalties ranging from $100 to $450 and a mandatory court appearance.
- Waukesha, Wisconsin – Waukesha adopted a no more than twice per week sprinkling ordinance from May 1 through October 1. The water utility enforcement approach includes a warning for the first offense followed by fines for subsequent offenses. If more than three violation notices are issued the matter is referred to the Police Department who may then choose to issue a citation where each subsequent day in violation is considered a separate offense.

Potential Costs: Developing and passing water conservation ordinances for new developments would be low, though a rigorous stakeholder approach is recommended during development. Once passed, additional labor costs could be incurred from enforcement.

Potential Water Savings: It's been documented in literature that government mandates, consistently enforced through fine or other means, result in reduced water use (Silva et al. 2010). Some studies suggest up to 11 percent of municipal water use can be saved with outdoor watering restrictions that limit outdoor watering to no more than twice per week (Texas Living Waters Project 2018).

Considerations for Enhanced Implementation:

- Get input and support from landscaping professionals and other landscape-related business during development of the ordinance.
- Reach out to Nassau County officials for lessons learned from implementing and enforcing their lawn irrigation regulations.
- Coordinate closely throughout the County on irrigation ordinances, capitalizing on opportunities to improve based on lessons learned from other jurisdictions.
- Consider developing the ordinance after a focused information campaign on water-saving landscape practices.

Resources:

- Frisco, Texas has adopted irrigation standards and a sprinkling ordinance. Information is available at: https://friscotexas.gov/1468/Irrigation and https://www.friscotexas.gov/445/Water-Efficiency-Plan
- Texas Living Waters Project provides information regarding outdoor water use and opportunities to reduce water for irrigation. More information available at: https://texaslivingwaters.org/issue-papers-and-publications/outdoor-watering-2018/
- Tampa Bay Water information available at: https://www.tampagov.net/water/info/water-use-restrictions
- Waukesha Wisconsin sprinkling ordinance information is available at http://www.waukesha-water.com/so.html/

WATER CONSERVATION MEASURE 20

Green Building Codes and Ordinances Related to Water Conservation

Intent

Implement green building codes related to water conservation, efficiency and management.

Points of Integration

This measure would result in decreased indoor and water demand, and decreased wastewater flows. There would also be co-benefits related like energy savings and improved water quality by reducing stormwater runoff.

Implementation Partners

Local jurisdictions

Additional Stakeholders/Partners

Elected officials

Inspection/code enforcement staff

Legal counsel

Local wastewater treatment provider

Local water provider

Planning and zoning

Site plan review

Local energy provider

Developers

Builders

Conservation Measure Description: Participants at the March 2019 stakeholder workshop indicated opportunities for coordination between local planning and zoning departments and the County regarding not only water conservation ordinances, but more-expansive green building codes. Each local municipal government has the authority to enact building and subdivision codes, water use ordinances, and incentives for water conservation. This measure focuses on developing model green building codes that could be adopted by local jurisdictions within the County to enhance resource management and conservation and sustainable practices on a County-wide basis.

Implementation Guidance:

General Recommendations on Approach

The County inviting local jurisdictions to draft policies, model ordinances, and make general recommendations for consideration and possible adoption by individual governing bodies is an effective approach. For example, the Metropolitan North Georgia Planning District engaged local jurisdictions to develop model policies and ordinances.

Available Tools

- US EPAs Sustainable Design and Green Building Toolkit for Local Governments

The guide is useful because it outlines a holistic approach to assisting local jurisdictions to identify and remove barriers to green building within their permit process. The tool kit is a detailed guide that takes users through a step-by-step assessment complete with checklists, then provides guidance on developing and implementing a guidance plan. The water efficiency, conservation, and management checklists address: water reduction and innovative plumbing systems, innovative wastewater treatment, water-efficient landscaping, and landscaping irrigation. Included in the guide are links to model ordinances for each of the six topic areas, under water efficiency, conservation, and management the following ordinances are provided:

- Rainwater Collection and Distribution Requirements
- Commercial Rainwater Harvesting
- Residential Greywater Ordinance

- US EPA WaterSense® New Home Specification

  This brief guide provides all the EPA WaterSense® program criteria for water-efficient homes. Currently, the specifications only apply to certain types of single-family or multi-family residences with independent heating, cooling, and hot water systems. The program aims to encourage the construction of homes that use 20 percent less water than an average home. Though the guide does not directly translate to codes or ordinances many of the recommendations are specific enough to be easily adapted. The advantage of using this guide in conjunction with the Sustainable Design and Green Building Toolkit is that it has specific recommendations that can be used to fill in gaps identified through the toolkit checklists.

- National Institute of Building Sciences Whole Building Design Guide

  This website, which is a collaboration between federal, private, non-profit, and educational institutions, provides a wealth of resources, recommendations and case studies related to a wide-range of sustainable building guidance. Their Green Building Standards and Certification Systems summary provides a comprehensive overview of building standards, green codes, green product certifications, and green building rating and certification systems that would be a valuable reference for the County.

Potential Costs: Developing and passing green building codes for new developments and redevelopment would be low, though a rigorous stakeholder approach is recommended during development. Once passed, additional labor costs could be incurred from training and increased deployment of inspectors.

Potential Water Savings: Savings from this measure will vary based on the code revisions implemented. According to the NYMTC forecast, there will be over 25,000 new single- and multi-family households in the County by 2050. If resulting construction to accommodate these new households complied with WaterSense® New Home Specifications, the total daily water savings could be over 3 million gallons per day (assuming water saving of 37 gpd for single-family dwellings and 316 gpd for multi-family dwellings).

Considerations for Enhanced Implementation:

- An effort should be made to align with the NYC DEC Climate Smart Communities (CSC) Certification program, as participation in the CSC program results in better scores on grant applications for some state funding programs.
- Engage a progressive developer/builder to implement a subdivision or neighborhood that follows green building code standards. Gather data on construction costs as well as energy and water usage and costs to develop a business case for application of green building standards. Use the data to inform the model code.

Resources:

> New York State Climate Smart Communities Program, https://climatesmart.ny.gov/

> US EPA WaterSense® New Home Specification, https://www.epa.gov/watersense/homes-specification

> US EPA Sustainable Design and Green Building Toolkit for Local Governments, https://www.epa.gov/smartgrowth/sustainable-design-and-green-building-toolkit-local-governments

> National Institute of Building Sciences Whole Building Design Guide, https://www.wbdg.org/

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Appendix A. Water Conservation Stakeholder Workshop Responses

Water Conservation Implementation Challenges and Opportunities

Summary of feedback received from Rockland County Stakeholders during Task 3 workshop held on March 7, 2019.

Implementation Challenges	Opportunities Discussed at Workshop	Additional Opportunities
Education/ Information Related		
The public in Rockland County is not well informed as to the importance of water resource management, and best practices for water conservation.	The County could launch a unified outreach campaign to consistently message the importance of water resource management throughout the County.	Form a county-wide partnership through interlocal agreements to focus on conservation, water resource management with shared website and communication materials.
Inadequate training and communication on the importance of water resource management within local planning and zoning departments.	Water resource management could be used as a driver for closer coordination between local planning and zoning departments in the County.	The American Planning Association, Alliance for Water Efficiency and other organizations have references, resources and could provide speakers for training workshops, webinars, or other training opportunities.
Lack of information on commercial and industrial use in the County.	Approach commercial and industrial customers and industry associations with opportunities to boost or market their “green” practices.	Provide industry-specific water savings tips and best practices
Inadequate training and communication with local plumbers and contractors on the importance of water resource management and/or a resistance to change practices.	Ensure outreach campaign addresses both users and professionals in the construction and landscaping industry; potentially highlighting those businesses that stock or endorse water-wise products.	
Overcoming language and information barriers that exist in the County.	Work with other municipal departments or non-governmental organizations that are currently working within the County’s various ethnic, cultural, and linguistic groups.	
There is a perception that water conservation is inconvenient, ineffective or expensive.	Establish a quantitative goal and feasible metrics that are tied to the Plan to demonstrate County-wide and individual benefits.	Prepare worksheets for residents and businesses to calculate savings on water, sewer, energy, and gas bills to show economic benefits of more-efficient water use.
"Green lawn" culture.	Work with landscapers and nurseries on supplying water smart options and informing customers of the benefits.	Establish demonstration gardens showing good landscape design and irrigation practices. Provide educational materials on good landscaping practices.

Implementation Challenges	Opportunities Discussed at Workshop	Additional Opportunities
Communication between County and towns/villages on groundwater and reservoir levels.	Identify water conservation/water supply contacts for each community within the County to facilitate water supply communications and information sharing on water conservation measures.	
Incentives Related		
The cost of water is relatively affordable, as compared to other utility costs, so there's a perception that conservation doesn't result in significant cost savings (return on investment).	Water conservation has many co-benefits that can be used to motivate individuals and communities beyond cost savings.	Conduct survey to seem what would motivate Rockland County residents to save water – price, civic pride, environmental concerns, etc. and build survey results into public information campaign. Leverage materials developed by others – such as Alliance for Water Efficiency and American Water Works Association "Value of Water" series
Incentive programs that provide an insufficient monetary benefit to motivate water users or take too long to reimburse participants.	Build upon lessons learned from incentive programs offered by other utilities in the County.	Encourage plumbers and plumbing supply and home/DIY stores to offer discounts on high-efficiency fixtures and installation in a coordinated fashion. Through interlocal agreements, purchase high-efficiency fixtures in bulk and make them available at-cost or as giveaways.
Funding at town and village level to implement water conservation programs.	Water conservation planning counts towards the NYC DEC Climate Smart Communities (CSC) Certification program, and participation in the CSC program results in better scores on grant applications for some state funding programs.	Grants may be available from private foundations.
Policies/ Regulation Related		
Municipal Home Rule Law – adopting county-wide policies may be difficult	Conservation measures can be selected and tailored to address the unique water use challenges of each community, allowing maximum flexibility in planning and implementation.	A county-wide coalition of willing local governments could convene to draft policies (e.g., plumbing, building, subdivision, or land use codes) for consideration and possible adoption by individual governing bodies.

Implementation Challenges	Opportunities Discussed at Workshop	Additional Opportunities
Adopting new legislation is difficult, time-consuming and has the perception that it adds costs to tax payers.	Developing a balanced approach of implementing policies at the local, county, and state level may quell negative public perception.	Work with others - private sector, institutions, economic development corporations, professional associations – within the County and across the state to develop and advocate for consensus-based policies.
Incorrect installation or use of existing inefficient irrigation systems provided by unlicensed irrigation system installers and/or not installed with water-efficient design.	Partner with others with accreditation or licensing programs (neighboring states, irrigation association, others) on educational materials, including best management practices, and other outdoor water efficiency measures.	Adopt codes for new development that establishes landscape and irrigation standards including installation by licensed irrigators.
Applying conservation practices to current housing stock in the County.	Require plumbing retrofits (high-efficiency toilets, showerheads, and aerators) at time of sale.	
Court-enforceable restrictions on water use, and enforcement of existing town and village building codes.	Work with inspectors and code-enforcement officers on identifying enforcement mechanisms.	Some cities adopt ordinances that prohibit the waste of water under various statutory authorizations – code violation, misdemeanor under penal codes or as a violation of water service rules. Options to enhance enforcement opportunities could be identified and shared within the county.
Water efficiency is not given the same attention as energy efficiency despite the nexus between energy and water efficiency; New York Public Service Commission support and engagement are needed on the topic of water conservation and efficiency.	Form a coalition with other counties in the state that are experiencing water supply issues to lobby for more support from New York Public Service Commission.	
Undocumented water loss in private piping systems.	Endorse universal customer metering and submetering on properties with significant amounts of yard piping.	Adopt water waste ordinances or utility service regulations that require customers to repairs leaks. For customers with meters, send notification if bill volume is higher than usual.

Water Conservation Measures and Lead Authority

Summary of feedback received from Rockland County Stakeholders during Task 3 workshop held on March 7, 2019.

Specific Programs and Activities				Lead Authority			
Water Use Focus	**Information**	**Incentives**	**Requirements**	**Water Provider**	**Municipality**	**County**	**State**
Best Management Practices - Commercial and Industrial	Provide guidance and/or links to do it yourself water audits	Incentivize replacement of once through cooling equipment and other water conservation retrofits	Require replacement of all once through cooling equipment or regulate use	X	X		
Best Management Practices - Indoor Water Use	Media campaign; website, social media, etc. which features best management practice for indoor water use including do it yourself water audits, and savings/cost-avoidance	Offer rebates for select fixture replacements	Require fixture change-outs as part of inspection at time of sale	X	X		
Best Management Practices - Outdoor Water Use for Irrigation	Establish guidelines for efficient irrigation system to mitigate peak demands Educate residential and commercial users about irrigation apps and other free resources	Offer rebates for residential and commercial users to install smart controllers for new and old irrigation systems Provide incentive to upgrade older inefficient irrigation systems	Implement a sprinkling/Irrigation ordinance which may also include irrigation standards for new systems Implement irrigation restrictions for turf only (allows for irrigation of crops and ornamental beds) Implement permitting process for all new irrigation systems to ensure efficient and effective installations	X	X		
Best Management Practices - Outdoor Water Use General	Develop an education campaign aimed at non-irrigation types of outdoor water use	Offer rebates for select retrofits for outdoor water use	Restrict residential and commercial mowing heights to 3 to 3.5 inches	X	X		

Specific Programs and Activities				Lead Authority			
Water Use Focus	**Information**	**Incentives**	**Requirements**	**Water Provider**	**Municipality**	**County**	**State**
Energy/Water Nexus	Develop a white paper to education County and municipal leadership on the connection between energy and water conservation	Partner with other utilities offering energy conservation rebates to ensure proposed measures also offer water efficiency.	Work with New York Public Service Commission to prioritize water conservation via the energy/water nexus via state grants	X	X	X	X
Industry - Retailers	Work with local vendors and retailers to support the United States Environmental Protection Agency WaterSense program	Recognize businesses that carry WaterSense or water efficient products.	Work to develop state-wide point of sale plumbing standards.	X	X	X	X
Industry - Contractors and Plumbers	Develop an education program for plumbers and supply companies.	Recognize businesses that have completed contractor/plumber education courses.		X	X	X	
Industry - Irrigation System Installers	Partner with Irrigation Association on outreach to installers; importance or zones, and central irrigation controller for large installations.	Provide variance for homeowners that allow their irrigation system to be audited by a certified irrigation contractor and implement improvements to water any day of the week (reference Connecticut's system)	Partner with local irrigation organization, sponsor a state-wide irrigation licensing program.	X	X	X	X
Industry - Landscapers and Nurseries	Develop a landscaper's education program; change attitudes towards green lawn culture - plants that use less water	Work with industry and supply chain to stock water smart plants Provide residential and commercial incentives for use of drought tolerant plantings	Xeriscape Ordinance	X	X	X	
Land Use Planning	Develop a white paper to education Land Use Planning leadership on need for water conservation and how planning departments can support that effort.		Develop a county-wide land use approach for water conservation, including: permeable surface requirements		X	X	
Leaks	Organize a Fix a Leak Week Event with United States Environmental Protection Agency WaterSense	Develop a County level leak detection program which shares training and equipment among communities		X	X	X	

Specific Programs and Activities				Lead Authority			
Water Use Focus	**Information**	**Incentives**	**Requirements**	**Water Provider**	**Municipality**	**County**	**State**
Municipal Water Conservation Partnership	Develop a water supply notification system for municipalities and planning boards	Support all facility water use surveys of all publicly owned building in the County and develop a water conservation plan for all or the largest users.	Introduce a benefit charge to fund partnership efforts to address measures identified in municipal water conservation plans and other efforts.		X	X	
New Construction - Commercial and Industrial	Develop a white paper to education County and Municipal leadership on the need for water smart commercial and industrial growth in Rockland County.	Encourage low impact commercial industries and incentivize through the County tax rate structure			X	X	
New Construction - General	Identify partner organizations for education programs - irrigation association, Cornell cooperative extension, department of consumer protection, etc.	Support a water innovation laboratory or incubator	Revise building codes which implement recommendations of water innovation lab.	X	X		
New Construction - Residential Developments	Supply building department with educational materials to educate contractors on the need to conserve water.	Tie variances to measures documented in a Water Conservation Plan	Require new developments to develop a Water Conservation Plan/Water Neutral Development.		X		
Source Water Protection	Develop a white paper to education local planning and zoning boards on the need to protection of water resources (salt and fertilizers) and develop best practice recommendations.	Begin an adopt-a-creek program to support quality monitoring and resource stewardship.	Develop a County policy to limit or eliminate salt-use.		X	X	X
State Water Compact			Revise Interstate Water Compact with New Jersey; model on Delaware valley agreement.			X	X

Specific Programs and Activities				Lead Authority			
Water Use Focus	**Information**	**Incentives**	**Requirements**	**Water Provider**	**Municipality**	**County**	**State**
Users - General	Develop an outreach campaign (through social media/print/traveling exhibit) that educates County Residents on the cost of not conserving - capital costs, treatment costs (power, chemicals), transition drought. Offer versions of general outreach materials that are sensitive to the County's various ethnic, cultural and linguistic groups.	Feature residents/businesses that are implementing water conservation measures			X	X	
Users - School Age	Develop a grade school/high school curriculum; include water audit challenge'			X	X	X	
Users - Golf Courses		Incentives for golf course to install central computers with online access for irrigation	Exclude golf courses from water restrictions if turf management program is in place (water restrictions in priority order) Require golf courses to adopt New York State Best Management Practices for water quality and conservation Require golf courses to run from a central irrigation controller	X	X	X	
Water Reuse		Incentivize water recycling systems for golf course wash pad			X	X	

Specific Programs and Activities				Lead Authority			
Water Use Focus	**Information**	**Incentives**	**Requirements**	**Water Provider**	**Municipality**	**County**	**State**
Water Audits	Provide guidance and/or links to do it yourself water audits	Have large users (office parks, commercial buildings and condos) audited for water use by professionally certified company to identify wasteful water practices		X	X	X	
Well Users	Work with Department of Health to better understand well use in the County and their impact on the groundwater supply.	Target conservation programs to private well users after determining their demand.	Support state-wide legislative initiative to meter all groundwater wells.		X	X	X

Appendix B. Draft Comprehensive Water Conservation Plan Workshop Responses

Water Conservation Implementation Enhancements and Potential Partners

Summary of feedback received from Rockland County Draft Comprehensive Water Conservation Plan Workshop held on July 30, 2019.

**Note – Final Plan Measure #15 Water Loss Assistance Program, was added to the Plan after the Draft Plan Workshop; therefore measure numbering may not match that which is provided in the Final Comprehensive Water Conservation Plan.*

Conservation Topic Area	Opportunities to Enhance Implementation	Potential Implementation Partners
Landscaping Water Use • Measure 3 Sustainable Landscaping Education Program • Measure 10 Landscaper, Irrigators and Plant Nursery Partnership • Measure 16 State-wide Irrigation Trades Licensing Program • Measure 18 Lawn and Landscape Irrigation Schedule	o Disincentives o Landscaping meter o Rain gardens WQ + water efficiency o Weather sensitive sprinklers, e.g., rain sensors o Incorporate gardens and educate at all levels o Toilets (residential + commercial), leaks, repair o Permaculture-techniques, training	o Cornell with Suez NY, irrigators, drip irrigation tear o New York State Department of Environmental Conservation o Audubon o N.A. Butterfly Association o Go “native” o Enforcement – police o Bill inserts o Demonstration gardens on public property
Water Conservation Codes • Measure 11 Public Building Retrofit • Measure 12 Water Conservation for Variances for New Development • Measure 17 Require Water Conservation Practices in New Developments • Measure 19 Green Building Codes and Ordinances	o Consider adding swimming pools o Potential County-wide conservation Code	o County Department of Health o Partner with municipalities through inter-municipal agreement s
Non-Residential Water Use • Measure 7 Commercial Kitchen Program • Measure 8 Business Community Partnership • Measure 14 Targeted Incentive Programs	o Encourage monitoring usage to catch on-site leaks o Auditing o Alternative on site water (rainwater, recycled, grey water) o Incentives o Develop a recognition program around good press/ rating systems o Link to codes – e.g., expedited process + other incentives	o Schools o NYSRTA

Conservation Topic Area	Opportunities to Enhance Implementation	Potential Implementation Partners

Water Conservation Education
• Measure 2 Water Use Audit Guidance for Residential Users
• Measure 4 Water Awareness Events
• Measure 5 Regional and Local Public Education Program
• Measure 13 Recognition for Implementing Water Conservation Measures
	o Enhancements to audit measures
	  • Plumbers + contractors – engage them / opinions
	  • Engage cultural non-governmental organizations
	  • Engage community centers and houses of worship
	  • Send messages home with kids
	  • Survey – use it to get info out + collect
	  • Table at farmers markets
	o Enhancement to water awareness events
	  • Work with environmental management council and city executives
	  • Begin and essay contest (10 yr old)
	  • Leverage home shows
	  • Build upon existing programs
		o Suez NY / other utilities
		o Non-governmental organizations
		o Hospitals
		  • Replace infrastructure
		  • Information in waiting rooms
		  • Printing, on TV's/monitors
		o Superintendents, curricula, development
		o PSA – various media and "internal" monitors e.g., universities
		o Social media
		o Pod-cast
		o (Partners) America's Pledge
		  • Modified for water
		  • Tie into existing organization and program
		  • Become a model for state and counties
		  • Simplify information
		o Educate elected officials
		o Use drought exp for other
		o Health department regulations
		o Educate well users
		o Sub-metering on multi-family users

State Level Water Conservation • Measure 1 Water Conservation White Paper • Measure 6 Private Well Use • Measure 9 Plumbing Contractor Education Program • Measure 15 State-wide Time of Sale Plumbing Standards	o Training for construction professionals in energy, water "green building incentives, water sense" o Unified County rules – to the extent possible o Organize a Ramapo watershed study o Establish the need for a water demand study to be part of new development planning o Establish City requirements across the County	o Hudson Valley Regional Council