

**APPENDIX C**  
**KENT COUNTY WATER AUTHORITY**  
**WATER SUPPLY SYSTEM MANAGEMENT PLAN**  
**EXECUTIVE SUMMARY**



PARE PROJECT NO. 06233.00

**WATER SUPPLY SYSTEM MANAGEMENT PLAN  
5-YEAR UPDATE  
FOR THE  
KENT COUNTY WATER AUTHORITY**

**VOLUME 1**

**NOT A PUBLIC DOCUMENT  
FOR REVIEW ONLY BY RIWRB, RIDOH,  
RISWP, RIDEM AND RIPUC**

**PREPARED FOR:**

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## Executive Summary

### Background

This Water Supply System Management Plan (WSSMP) has been prepared as required under the Rhode Island General Laws (RIGL) 46-15.3, as amended and titled, "The Water Supply System Management Planning Act" (Act). The legislative authority to effectuate the goals and policies of this Act has been conferred to the Rhode Island Water Resources Board (RIWRB). To this end, the RIWRB has promulgated the Rules and Regulations for Water Supply System Management Planning, October 2002, as amended to implement the provisions of this Act.

Under this regulation, the Kent County Water Authority (KCWA), as a water purveyor supplying over 50 million gallons of water per year, is responsible for the preparation and adoption of a WSSMP. It also requires that the KCWA update this WSSMP periodically, as significant changes warrant but at a minimum of every five years, or as otherwise stipulated in the Regulations.

WSSMP's are prepared in order to provide the proper framework that will facilitate the effective and efficient conservation, development, utilization and protection of the natural water resources of the State as utilized by the water purveyor. Further, the overall goals incorporate the applicable policies and recommendations of the State Guide Plan Element 721, 722, 723, and 724. The purpose of this WSSMP is to outline the objectives of the Water Supply System Management Planning process for the KCWA water supply system, and to serve as a guide to employ the proper decision-making processes toward meeting that goal.

This WSSMP contains a detailed description of the water system and includes the policies and procedures related to the general function, operation, and management of the water system. The water quality protection component of the plan is contained, separately, under Volume II. The Emergency Management section, Volume III, relates to the vulnerability assessment of the water system for use in emergency planning. It shall be incumbent upon the KCWA to implement the recommendations and procedures outlined in this WSSMP in order to comply with the overall requirements of the Act.



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**Water System Description**

The KCWA was established by legislation of the General Assembly of the State of Rhode Island and Providence Plantations in 1946. Formation of the KCWA entailed the consolidation of three water companies: the Warwick and Coventry Water Company, the Pawtuxet Valley Water Company, and the East Greenwich Water Supply Company. The 1956 General Laws empowered the KCWA to own, operate, and maintain a water supply system (including all water supply sources, pumping stations, transmission facilities and distribution piping) in Kent County, and to serve the communities that comprise Kent County (i.e. Coventry, East Greenwich, West Greenwich, Warwick, and West Warwick). Moreover, since 1956, the KCWA has supplied water to localized outlying regions of Cranston, North Kingstown and Scituate. The service population is comprised mainly of residential, commercial, and government customers of which there are over 26,888 metered accounts. The total service population has been estimated at 62,631 persons.

The primary source of water supply for the KCWA water system is wholesale water purchased from the PWSB and City of Warwick and accounts for approximately 87% of system demand for the year 2006. The KCWA also owns three independent wellfields (Mishnock, Spring Lake, and East Greenwich) that collectively supplied approximately 13% of the total system demand in the year 2006. Currently, the East Greenwich Well is the only operating and active well source.

The KCWA does not own or operate any water treatment facilities. However, groundwater is disinfected at each of the production wells via injection of a diluted 15% hypochlorite solution. In addition to disinfection, lime is added for pH adjustment and corrosion control.

The transmission and distribution system consists of approximately 394 miles of water main, with sizes ranging from 2-inch diameter in older areas that serve domestic supply only, to 24-inch diameter transmission mains, which transport water from the supply sources and storage tanks to the distribution system. Transmission mains, which are defined as water mains 12 inches or greater in diameter, total approximately 38.4 miles, or 9.7 percent of the total system piping.

The service area is operated as seven (7) distinct service areas (pressure gradients), each operating at varying hydraulic grades. Three of the pressure gradients serve the majority of KCWA's customers. There are ten water storage facilities that are operated by the KCWA and maintain the pressure gradients. The KCWA owns and operates five (5) booster pumping stations (Knotty Oak Road, Setian Lane, J.P. Murphy Boulevard, Johnson Boulevard, and Hope Road



Pump Stations) and two (2) transmission pumping stations (Clinton Avenue and Quaker Lane Pump Stations), in addition to the four (4) well pump stations (with only the East Greenwich Well active).

The KCWA maintains four interconnections to neighboring water purveyors – two each with Providence Water and the City of Warwick. Three of the four interconnections supply the KCWA with finished water on a daily basis, while one of the interconnections to the City of Warwick (Potowomut) conveys finished water to the City of Warwick. The KCWA also has three emergency interconnections, one with the Quonset Development Corporation the second with the Town of North Kingstown and the third is offline in the City of Warwick.

Kent County service area comprises five communities in central Rhode Island (Coventry, East Greenwich, West Greenwich, Warwick, and West Warwick). The general laws of Rhode Island permit the KCWA to own, operate and maintain a water supply coterminous the county's political boundaries. In addition to serving all or parts of those communities, KCWA service has been extended outside of its legislative boundaries to contiguous bordering areas in need of public water supply. Currently, its service area also incorporates parts of Oaklawn in Cranston, Western Cranston, southeastern Scituate, and the extreme northeast corner of North Kingstown.

The following table indicates the breakdown of KCWA customer account distribution for the year 2006.

Type of Account	Number of Accounts
Residential	25,118
Commercial / Industrial	1,461
Governmental	309
Other (Dry – Non Metered Fire Lines)	151
Total	27,039

The KCWA does not have the ability to accurately record actual population served for each water use classification (i.e. residential, commercial, industrial, government). Census information represents an average population for residential occupancy. A reasonable estimate of total residential population served within the service district can be derived using statewide planning

standards and utilizing various sources of data including the number of residential services, population figures, number of households (actual and projected), and persons per household.

#### 2006 Service Population

Community	2006 Services	2000 Estimated Persons per Household (2000 US Census)	Population Served	Percent of Total
Coventry	7,884	2.63	20,735	33.1
Cranston	885	2.41	2,133	3.4
East Greenwich	3,646	2.58	9,407	15.0
North Kingstown	8	2.57	21	0.0
Scituate	417	2.72	1,134	1.8
Warwick	4,142	2.39	9,899	15.8
West Greenwich	332	2.90	963	1.5
West Warwick	7,804	2.35	18,339	29.3
Total	25,118		62,631	100.0

The water supply and distribution system is 100% metered. Master meters located at each individual well station and interconnection to neighboring purveyors, meter 100% of the water produced and purchased via wholesale interconnections. Every service connection within the water distribution system is metered at the point of sale, with the exception of a small amount of dry-nonmetered fire services, yielding 99.4% metering. In December 1994, the KCWA completed a project whereby all residential water meters were replaced with ARB (automatic reading and billing) style meters. Commercial meters or large meters over 2 inches were not replaced. A large meter testing program has been implemented as required by the Public Utilities Commission's (PUC) Regulations. KCWA is experiencing difficulty with voluntary customer compliance with the PUC's regulations requiring the testing of large meters on an annual basis. Replacement of large meters must be with the appropriate Neptune R900 E-Coder style register meter, to be compatible with the billing software/hardware.

A review of production data totals for the past eleven (11) years (1996 – 2006) reveals an average production rate of 3,634 million gallons per year (mgy), with a high of 3,874 mgy occurring in 2005, and a low of 3,253 mgy occurring in 2006. Based on the total production, the current Average Day Demand for calendar year 2006 computes to 8.91 million gallons per day (mgd) for the entire system. The current Average Day Demand for calendar year 2006 based on total





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system production is 8.91 mgd. The current Average Day Demand for calendar year 2006 based on the total volume of water metered at the point of sale (water purchased ie. residential, commercial, etc.) computes to 7.96 mgd for the entire system. The volume of water sold to residential customers in 2006 totaled 2,051.07 million gallons, which averages to a daily residential consumption of 5.62 mgd. Based on the estimated residential service population of 62,631 persons, the current per capita system demand for residential users is approximately 89.7 gpcd.

The KCWA supplied water to forty-nine (49) major users in 2006. Kent County's major water user class varies greatly ranging from hospitals, to a yacht club, to laundromats and private multi residential properties. The majority of the major users, however, are either residential entities (i.e. mobile home parks, condominium associations, etc.) or large industrial enterprises. In 2006, major user water consumption totaled approximately 692.5 million gallons.

The KCWA has maintained an average of 7.78% non-account water since 1996, and 4.8% for the year 2006. This rate is below the goal of 15% set forth in *Water Supply Policies for Rhode Island*, State Guide Plan Element No. 721. The success KCWA has achieved is largely due to the large meter testing program, residential retrofit program, the meter replacement program, and the aggressive leak detection and repair program that it maintains.

No specific legal obligations or contract agreements exist between any city or town regarding the KCWA's provision to supply water to undeveloped territory. Agreements do exist for wholesale supply from the PWSB and the City of Warwick to obtain supply. KCWA also has an interconnection agreement with the North Kingstown Water Department, the Quonset Development Corporation, and the City of Warwick to provide water under emergency circumstances.

Water conservation initiatives are defined as the "methods, procedures and devices designed to promote efficient use of water and to eliminate waste of water." The KCWA uses seasonal press releases to encourage efficient outdoor watering techniques, provide tips on how to check your home for leaks, encourages the installation of low-flow retrofit devices, and recently developed a Water Conservation Action Plan.



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**Recent System Improvements**

The KCWA maintains an ongoing, aggressive Capital Improvement Program (CIP) in order to provide its customers with a safe and reliable supply of potable water. What follows is a list of major system improvements that are planned for the future or have taken place in recent years.

• Quaker Lane pump station rehabilitation study	Feb 2007
• Mishnock Wells Water Treatment Facility	Feb 2007
• Water Conservation Action Plan	Jan 2007
• Evaluation of the Clinton Avenue Pump Station	2006
• Distribution Storage Tank Hydraulic Evaluation (ongoing)	Dec 2006
• Computer Model Upgrade	Feb 2006
• Major Users Technical Assistance Program	Jan 2006
• Distribution system computerized model update	2005
• Infrastructure Rehabilitation pipeline database update	2004
• Emergency Response Plan	2004
• Infrastructure Rehabilitation Plan	June 2003
• Five-Year Capital Improvements Program Report (2007 update in progress)	2002
• East Greenwich Well sequestering study	2004

**Water Quality Protection**

Volume II of the WSSMP fulfills the requirements of the water quality protection component of the plan. An update of the 2003 Kent County and North Kingstown Source Water Assessment Plan (SWAP) for the KCWA was developed in accordance with the Guide to Updating Source Water Assessments and Protection Plans, final draft October 2006. The final risk ratings for the East Greenwich, Spring Lake, and Mishnock Wellhead Protection Areas were determined to be consistent with the 2003 ratings.

**Current and Future Demands**

Kent County has grown moderately over the past eleven years and over this same span, however, the average day demand has remained fairly constant, indicating the effective employment of water conservation measures. Anticipated future demands for the 5- and 20-year planning periods were developed utilizing population projections for each service community as well as



information from hydraulic modeling reports. The following table shows the estimated ADD and MDD for 5- and 20-year planning periods.

	ADD (MGD)	MDD (MGD)
5-year	11.6	22.4
20-year	13.4	25.6

Theoretical Water Supply values were developed for the current year and 5- and 20-year planning periods.

**Theoretical Water Supply (MGD)**

	Present*	5-Year (2010)*	20-Year (2020)*
Clinton Avenue	25.00	25.00	25.00
Oaklawn Avenue	0.19	0.19	0.19
Quaker Lane	4.60	10.10	10.10
East Greenwich Well	2.00	2.00	1.60**
Mishnock Wellfield	0.00	2.4	1.92**
Spring Lake Well	0.00	0.26	0.21**
Total	31.79 mgd	39.95 mgd	39.02 mgd

\*Pump station values are based on the maximum capacity (both high and low service gradient pumps operating) of the facility and may not be achieved over extended periods due to operational system constraints. Over time, all wells will see a reduction in capacity due to aging of the well through general use. Values are used for planning purposes only and should not be construed as actual available water supply.

\*\*20% reduction in well capacity due to aging of well.

Comparison of the anticipated future demands versus the theoretical water supplies revealed that the KCWA will be able to meet demands for both the 5- and 20-year planning periods.

**Conservation and Education**

The Hunt River Wellhead Protection Area Planning Committee was comprised of members from the KCWA, Rhode Island Economic Development Corporation, and the Towns of East Greenwich, North Kingstown, and the City of Warwick. It was intended that this Committee's first task be the update of the Hunt Aquifer WHPP. This did not occur and the sunset imposed by the Town of East Greenwich regarding this committee action plan ran out. KCWA has recently



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met with the other two water suppliers, North Kingstown and QDC, who use this aquifer as their source of supply to develop a coordinated management plan for this source. This plan was presented to the RIWRB in April 2007. The plan was accepted by the RIWRB and is now being actively implemented.

#### **Demand and System Management**

The KCWA had periodically distributed educational flyers to service area businesses and residents. Funding for periodic newsletters was denied by Public Utilities Commission effectively cutting off one method of communicating these types of concerns to the customers. The KCWA has implemented an "E" News letter on its website as an alternative communication mechanism to offset the debilitating effect cancellation of the printed version has on customer communications. The KCWA recently published a Conservation brochure and Water Audit mailer focused on education and assisting its customers with the elements of conserving water. One flyer, entitled "Lake Mishnock," is a foldout pamphlet that educates readers on water quality issues, protective measures, volunteer efforts, and regional hydrology.

The KCWA implemented a residential retrofit program in 1999 and remains active. The KCWA also developed a Water Conservation Action Plan in January 2007. KCWA started its Major Users Technical Assistance Program (MUTAP) in July 2004 and identified sixty-four (64) customers, at the time, as major users. Major Users are defined as customers that use approximately 3 million gallons of water or more each year (KCWA expanded this at the time to include customers under but close to the 3 million gallons per year threshold).

Outdoor water use contributes to double the average daily demand on most, if not all, water systems throughout the State. Legislative or State agency regulations are necessary to provide an equitable solution to control this increasing demand aspect. Cohesive statewide conservation regulations from the RIWRB are necessary and would demonstrate a firm commitment to conservation that can be equitably implemented across all local, state and municipal boundaries. It is envisioned that this type of initiative would realize significant demand reduction in outside water use across the state.

The KCWA employs a Meter Installation, Maintenance and Replacement (MIMR) Plan as well as an aggressive Leak Detection and Repair program. As previously mentioned, with the exception of some fire services, the KCWA meters 100 percent of the water supplied to its customers.



Other exceptions of water used include municipal, fire fighting, and water system maintenance. The KCWA maintains an aggressive Leak Detection and Repair (LDR) program. For over fifteen years, the KCWA has been performing in-house leak detection and repair services on a routine basis by trained personnel using electronic leak detection equipment.

The KCWA performs preventive maintenance on its water system, the extent of which is limited by the workforce currently available to accomplish this work. Preventive maintenance practices are largely limited to aboveground activities such as exercising emergency power at the pump stations, changing oil, checking gauges, and semi-annual flushing of water mains. The KCWA is looking to expand and formalize its preventive maintenance program.

The KCWA is not contemplating any planned extensions of the water system infrastructure in or outside of the water service district. Any desired expansion of the water system must be applied for, approved by the KCWA, and financed independently.

The KCWA has demonstrated full compliance with all of the water quality provisions of the Safe Drinking Water Act and its subsequent amendments and RIDOH regulations.

#### **Emergency and Drought Management**

The Emergency Management section, Volume III, of the Plan establishes the responsibilities and authority within the KCWA for responding to most probable emergencies and outlines specific tasks for carrying out functional and constructive solutions based on a review of the potential emergencies and risks. The procedures outlined are generally consistent with the goals of the Rhode Island Water Emergency Response Plan. It is also intended that this document provide guidance to ensure that the primary aspects of recovery from an emergency are addressed in an organized manner to aid in an efficient response and in maintaining drinking water quality and quantity.

The KCWA developed a Demand/Drought Management Policy that was approved in April 16, 2003 and revised February 15, 2006. This policy provides the KCWA the ability to proactively prepare and manage potential drought occurrences. The use and development of this policy demonstrates KCWA's commitment to drought management.

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**Implementation, Financial Management, and Coordination**

The KCWA has developed a 20 year Implementation Schedule for system improvements. A detailed schedule outlining the individuals or entity responsible, timing, and costs associated with recommendations of this plan has been developed and is presented within the WSSMP. Where work can be accomplished by the KCWA, the responsibility has been designated "In-House." It is intended that where outside consultants and/or contractors are required, the KCWA shall take the necessary steps to advertise for and contract with such resources. The costs developed for each recommendation include an estimate of the capital, operating and maintenance costs associated with each implementation.

It is evident from review of these documents that KCWA's continued revenue stream and control of expenses has provided a solid foundation for the Authority to continue to provide the quality service to its customers, as well as provide repayment of the debt issuance. PUC authorized rates have failed to realize the full funding needs of all programs and operational cost. KCWA will continue to file for increases as necessary to compensate for budget shortfalls associated with reduction in sales due to variation in consumer water use patterns.

KCWA water rate charges consist of a combination of a *Consumption Charge* (Rate varies according to meter size), a *Service Charge* (Flat Rate), and a State imposed *Water Quality Protection Charge*. The Consumption Charge is of a uniform block rate structure, whereby customers are charged a constant rate per 100 cubic feet of water metered. Service charges are based on size and use.

The WSSMP is intended to be reasonably consistent with the goals and policies of the Comprehensive Community plans for the communities serviced by the KCWA. Naturally, these communities must also take into consideration the ability of the KCWA to extend water service in an area zoned for development without adversely impacting existing customer service or rates for the constituents of the communities served.

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**TITLE 46**  
**Waters and Navigation**  
**CHAPTER 46-15.3**  
**Public Drinking Water Supply System Protection**  
**SECTION 46-15.3-7.5**

**§ 46-15.3-7.5 Completion and filing of water supply system management plans.** – (a) Each party required by this chapter to prepare and maintain a water supply system management plan shall complete and adopt an initial plan adhering to the schedule as previously approved by the water resources board.

(b) Municipalities and water suppliers subject to the requirements of § 46-15.3-5.1 of this chapter shall file a copy of all plans and amendments thereto with the water resources board. The plans shall be treated as confidential documents.

(c) The water resources board shall establish procedures that permit parties that review the plans under rules adopted by the water resources board to obtain sensitive information essential to performance of their reviews, including minimum measures necessary to transmit, use, store, and maintain such sensitive information under conditions that insure its security to the maximum possible. These procedures may include designation of those persons within each reviewing agency authorized to use or inspect sensitive information, and exclusion of all others. An executive summary containing an:

- (1) Introduction;
- (2) Background;
- (3) A general system description containing:
  - (i) Water supply sources;
  - (ii) Water treatment facilities;
  - (iii) Storage facilities;
  - (iv) Pumping stations;
  - (v) Raw water and finished water transmission facilities;
  - (vi) Distribution facilities including low to high service;
  - (vii) Planned extensions;
  - (viii) Interconnections;
  - (ix) Populations served and projections;



- (x) Major users;
- (xi) Metering;
- (xii) Legal agreements;
- (xiii) Leakage;
- (xiv) Demand management;
- (xv) Supply management;
- (xvi) Available water;
- (xvii) Safe yield;
- (xviii) Anticipated future demands;
- (xix) Capital improvement;
- (xx) Rate structure;
- (xxi) Financial management;
- (xxii) Emergency management;
- (xxiii) Water supply source protection; and
- (xxiv) General policies shall be developed.

(4) This summary shall be distributed as the public document. The water resources board shall be authorized to recover and secure water supply management plans and water supply system management plans previously distributed to other than water resources board and designated review agencies and replaced by executive summaries as provided herein.

(d) Municipalities and water suppliers subject to § 46-15.3-5.1 shall review their plans at least once every five (5) years, and shall amend or replace their plan as may be necessary to remain current.

(e) A municipality or water supplier subject to § 46-15.3-5.1 of this chapter may request, in writing, that the water resources board extend the time in which to complete and submit filings required by this chapter, not to exceed one year. A request shall be approved only upon demonstration that an extension is justified by extraordinary circumstances beyond the control of the municipality or water supplier. An extension, if approved, shall not waive any of the requirements of § 46-15.3-7.6. This provision does not apply to the section on emergency management. Should a municipality or water supplier fail to submit a filing as provided herein, a determination of non-compliance shall be made by the water resources board.

#### History of Section.

(P.L. 1997, ch. 360, § 3; P.L. 2002, ch. 232, § 1; P.L. 2007, ch. 340, § 51; P.L. 2009, ch. 288, § 8; P.L. 2009, ch. 341, § 8.)