

Water Management Plan

Revision 1

United States Environmental Protection Agency
Region 1
New England Regional Laboratory
Office of Environmental Measurement and Evaluation
11 Technology Drive
North Chelmsford, Massachusetts 01863




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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
NEW ENGLAND REGIONAL LABORATORY
OFFICE OF ENVIRONMENTAL MEASUREMENT AND EVALUATION
NORTH CHELMSFORD, MASSACHUSETTS
WATER MANAGEMENT PLAN

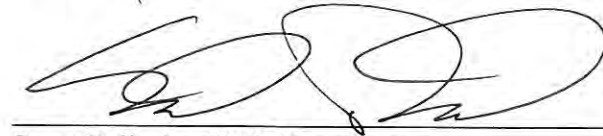
Approved by:



Rob Maxfield, Deputy Director

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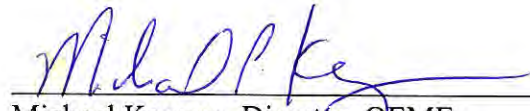
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1.0 EPA'S STATEMENT OF PRINCIPLES ON EFFICIENT WATER USE

To meet the needs of existing and future populations and ensure that habitats and ecosystems are protected, the nation's water resources must be sustainable and renewable. Sound water resource management, which emphasizes wise, efficient use of water, is essential to achieve these objectives.

Efficient water use can have major environmental, public health, and economic benefits by helping to improve water quality, maintain aquatic ecosystems, and protect drinking water resources. As the country faces increasing risks to ecosystems and their biological integrity, the inextricable link between water quality and water quantity becomes more important. Water efficiency is one way of addressing water quality and quantity goals. The efficient use of water can prevent pollution by reducing wastewater flows, recycling process water, reclaiming wastewater, and using less energy. As municipalities and regions deal with chronic drinking water shortages due to drought and changes in climate patterns, water conservation becomes even more important to EPA's mission.

EPA recognizes that regional, state, and local differences exist regarding water quality, quantity, and use. Differences in climate, geography, and local requirements influence the water efficiency programs applicable to specific facilities. Therefore, EPA is establishing facility-specific Water Management Plans to promote the efficient use of water and meet the water conservation requirements under Executive Order (EO) 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, and EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*.

This Water Management Plan has been established to document and promote the efficient use of water at EPA's Region 1 New England Regional Laboratory (NERL) facility located in North Chelmsford, Massachusetts. The plan is organized according to the Federal Energy Management Program (FEMP) Facility Water Management Planning Guidelines.

2.0 FACILITY DESCRIPTION

NERL was constructed to provide a safe, efficient, and economical state-of-the-art laboratory facility for EPA. The facility opened on September 17, 2001. Situated on 11.97 acres at 11 Technology Drive, North Chelmsford, Massachusetts, the 69,349 square-foot laboratory is a showcase for environmental and energy-efficient technologies. The laboratory includes state-of-the-art systems for lighting, heating, cooling, plumbing, and waste handling. NERL received Leadership in Energy and Environmental Design (LEED) Version 1.0 Gold certification in 2003, making it the first EPA building in the nation to become LEED certified. The facility was also presented with a 2002 White House Closing the Circle Award for its proactive recycling program and integrated sustainable design. NERL has welcomed over 2,500 visitors on "green tours" since opening.

The laboratory building is divided into two halves: an office wing and a laboratory wing. The laboratory wing includes four laboratory sections, divided by interstitial utility chases and hallways. All systems have been designed to expand as the use of the building expands and to be recycled if the building is ever decommissioned. The building is leased by the U.S. General Services Administration (GSA) from IStar and is assigned to EPA by GSA. The building lease runs through 2021. EPA is responsible for all water, sewer, and other utility bills.

The laboratory building houses the 60 staff of the Office of Environmental Measurement and Evaluation (OEME) and 25 contractors supporting all aspects of the office's work. OEME provides chemical and laboratory analysis of environmental samples, environmental monitoring, quality assurance management, and response to environmental incidents within Region 1.

NERL's mission involves monitoring and analyzing the health of the New England environment and its impacts on residents. To ensure quality of environmental data, EPA scientists and engineers use state of the art instruments and techniques and apply rigorous quality assurance methods. NERL's capabilities include:

- Chemistry laboratory: analyzes and tests air, water, sediment and toxic waste samples for various chemicals.
- Biology laboratory: conducts testing of water samples for bacteria and toxicity, and analyzes biological samples, such as fish tissue contamination.
- Ecology field monitoring: performs field studies to support EPA, state, and tribal environmental programs for air quality, water, and biological monitoring.
- Air monitoring: works with states and tribes to implement air monitoring programs with over 300 air monitoring stations throughout New England, and carries out special projects and research on priority issues such as mercury.
- Investigations: conducts field studies and inspections of industrial and municipal facilities to ensure compliance with EPA regulations.
- Quality assurance: ensures that environmental data is precise, accurate, and valid so it can be used to support decision-making.

3.0 FACILITY WATER MANAGEMENT GOALS

The water management goals of NERL are achieved through the implementation of the NERL Environmental Management System (EMS). The EMS has been established and is implemented consistent with the NERL Environmental Policy. Revision 4.0 of the NERL Environmental Policy (28 July 2009) and October 2008 natural resource conservation goals are provided in the following sections.

Environmental Policy

It is the NERL policy to integrate environmental stewardship into all of our operations within our defined fence line. We will manage our organizations and our programs in a manner that protects the environment, the safety of our employees, and public health.

In support of this policy, the managers and staff of NERL commit to:

- Comply fully with the letter and spirit of all applicable Federal, State, and local environmental laws, Federal Executive Orders, and applicable policies.

- Work to continually improve the effectiveness of our EMS, and ensure that this Environmental Policy is documented, implemented and maintained within the scope of our EMS.
- Provide a framework for our EMS using cross-functional team and engaging senior management for establishing and reviewing environmental objectives and targets.
- Continue to prevent pollution before it is produced, reduce the amount of waste at our facility, and re-use and recycle whenever possible.
- Provide appropriate environmental training and educate employees to be environmentally responsible on the job.
- Work to continually improve our environmental performance by establishing and periodically reviewing our environmental performance goals, and monitor our environmental performance regularly through rigorous evaluations.
- Evaluate environmental factors and the full acquisition, use and disposal when making planning, purchasing, and operating decisions.
- Use our natural resources (e.g., energy, fuel, and water) efficiently throughout our operations.
- Share information on our Environmental Policy and performance with the public and work cooperatively with the local community and other stakeholders to further common environmental objectives.
- Communicate and reinforce this policy throughout our organization.
- Revisit this Policy and the EMS during the Management Review to make any necessary revisions due to operational changes, organizational priorities or environmental improvements.

Environmental Management System Aspects, Objectives, Targets, and Tasks

In view of this environmental policy, NERL has reviewed its consumption of natural resources (including energy, water, and fuel). In September 2008, NERL identified consumption of natural resources as a significant environmental aspect, including consumption of water. In October 2008, NERL established the following objectives related to these aspects:

- Ensure compliance with the Energy Policy Act of 2005 (EPAAct 2005), Executive Orders, and EPA guidance concerning energy, fuel and water consumption.
- Reduce dependence on non-renewable energy.
- Comply with Agency-directed metering requirements.

To meet these objectives, NERL identified the following tasks related to water to allow it to meet the established objectives:

- Maintain conformance with current Water Management Plan.
- Determine baseline value for FY 2007 and track water use annually. The baseline has been established as 1,166,400 gallons or 16.82 gallons per gross square foot (gallons/gsf).
- Investigate the feasibility of any additional opportunities to further reduce water consumption that may be implemented toward achieving the Agency wide water use reduction goal on an annual basis. Incorporate feasible opportunities into the Water Management Plan and implement those that are identified.
- Prepare and submit building and facilities (B&F) funding requests for revised design and construction/modification projects identified in the Water Management Plan as appropriate.

Objectives, targets, and tasks are reviewed annually as part of the EMS goal of continual improvement.

EO 13514 Goals and ConservW Targets

NERL strives to achieve the water use intensity reduction goal set forth in EO 13514. Therefore, NERL has set a goal of reducing its water use intensity (in gal/gsf) by 2 percent per year from an FY 2007 baseline through FY 2020, for a total reduction in water use intensity of 26 percent. This goal will be incorporated into the facility EMS when it is next revised. NERL's FY 2007 baseline is 16.82 gal/gsf.

To continue progress toward meeting EO requirements, NERL will strive to meet annual facility-specific goals set by EPA's Sustainable Facilities Practices Branch under its ConservW program. These ConservW goals are calculated for each EPA facility based on the facility's previous water use reduction and its potential identified projects.

4.0 UTILITY INFORMATION

Contact Information

Potable water is provided by:

North Chelmsford Water District
P.O. Box 655
North Chelmsford, MA 01863-0635

978-251-3931

Sewer service is provided by:

Town of Chelmsford
Department of Public Works
Sewer Division
P.O. Box 100
Chelmsford, MA 01824

978-250-5233

Rate Schedule

Monthly water billing is based on a tiered rate structure, provided in Table 1.

Table 1. Water Use Fee Structure (effective 1 July 2009)

Monthly Fee Structure per Gallon	Cost
First 7,000 gallons water use	\$33.60
7,000-25,000 gallons, per 1,000 gallons (kgal) water use	\$4.80/kgal
25,001-50,000 gallons, per 1,000 gallons water use	\$5.75/kgal
Over 50,000 gallons, per 1,000 gallons water use	\$7.25/kgal

The utility also charges a bond debt fee of \$175 per quarter for the installed water meter.

Effective during FY 2009, the sewer use fee is \$3.29 per 1000 gallons for commercial customers. The utility also charges a Capital Construction Fee of \$1.05 per 1000 gallons.

The fire sprinkler connection fee is \$350 per quarter.

Payment Office

NERL's facilities staff approve utility invoices and send them to EPA's Research Triangle Park facility for payment.

Research Triangle Park Finance Center (RTP-FC)
Gloria Owens, 919-541-0052

(Pouch and Regular Mail)
Environmental Protection Agency
Mail Code - D143-02
Research Triangle Park, NC 27711

(UPS)
 Environmental Protection Agency
 Mail Code - D143-02
 4930 Page Road
 Research Triangle Park, NC 27711

The fax number for RTP-FC is: 919-541-4975

Onsite Water Supply

Water for specialized laboratory investigations and spot watering of distressed landscape plantings is supplied by an onsite well. The well provides less than 1 percent of the facility water supply (4,520 gallons in FY 2008).

5.0 FACILITY INFORMATION

NERL practices an aggressive degree of water conservation, achieved through innovative facility and process design and through application of sound management systems, work practices, and operation and maintenance (O&M) procedures. High-efficiency sanitary plumbing fixtures with automatic flush valves and shutoffs are used throughout the facility. Native landscaping is used on all of the facility grounds, eliminating the need for irrigation water. Laboratory processes have evolved to be primarily dry and do not consume significant quantities of water.

Major Water Using Processes

Average water use in FY 2008 by major process is shown in Table 2.

Table 2. Major Water-Using Processes, NERL

Process	FY 2008 Annual Consumption (gallons)	Percent of City Water Use	Comments
Sanitary	200,250	14.3	Engineering estimate
Cooling tower make-up	938,000	67.1	Metered
Reverse osmosis system	75,120	5.4	Metered
Miscellaneous laboratory and other uses	184,890	13.2	Calculated as remaining difference from metered total
Total water use	1,398,260	100.0	Metered

Additional details on assumptions and calculations supporting these water use estimates are provided in Appendix A. Because the majority of total water use is for cooling tower consumption, water use varies seasonally. A chart showing this water use trend in FY 2008 is provided in Appendix A.

Measurement Devices

Incoming city water supply is metered through a combination low flow/high flow metering device. The total flow is a combination of both meter readings, which are recorded at least monthly. Onsite well water supply is metered, and total flow is recorded at least monthly. The cooling tower make-up supply line, cooling tower blowdown line, reverse osmosis (RO) unit production line, and RO reject water line are equipped with totalizing flow meters. Total flow on these meters is recorded at least monthly. The discharge line for the pH neutralization system (laboratory acid sewer) is equipped with a flow meter, and meter readings are recorded daily in the treatment system log book.

Flow data from all meters is recorded at least monthly and water use trends are monitored on an ongoing basis. Unexpected changes in water use are investigated and resolved.

Shut-off Valves

The main city water shut-off valve (Tag DCW 97) is located in the mechanical room, Room 148.

Three valves that control well water shut-off (Tags WW 1, WW 2 and WW 3) are located in the shipping and receiving room, Room 214.

Occupancy and Operating Schedules

Approximately 89 employees work at NERL. NERL operates on a flex time schedule, and is typically occupied between 6 a.m. and 6 p.m., Monday through Friday.

6.0 BEST MANAGEMENT PRACTICE SUMMARY AND STATUS

EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, signed in January 2007, calls for federal agencies to reduce water use intensity by 2 percent per year between FY 2007 and FY 2015, for a total reduction of 16 percent. This goal was extended by EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, signed in October 2009. EO 13514 calls for reducing potable water consumption intensity by 2 percent annually through the end of FY 2020, for a total reduction of 26 percent. Facilities should implement best management practices (BMPs) related to water use, considering life-cycle cost effectiveness, to achieve this water reduction goal. FEMP has identified BMPs in 14 areas to help facilities identify and target water use reductions. NERL has adopted BMPs in 11 of the areas, designated by checkmarks in the list below. Two other areas are deemed inapplicable for NERL, designated by "NA" in the list below. The status of each BMP at NERL is as follows:

- Water Management Planning
- Information and Education Programs
- Distribution System Audits, Leak Detection and Repair
- Water-Efficient Landscaping
- Water-Efficient Irrigation
- Toilets and Urinals
- Faucets and Showerheads
- NA Boiler/Steam Systems
- Single-Pass Cooling Equipment

- Cooling Tower Management
- NA Commercial Kitchen Equipment
- Laboratory/Medical Equipment
- Other Water Use
- Alternate Water Sources

Information and Education Programs

Water conservation is a stated goal in NERL's EMS. The onsite building management staff have been trained in water conservation practices. EPA staff awareness of water conservation is maintained through monthly staff meetings, and a "Green Committee" of employees is actively involved in day-to-day conservation issues. Public awareness is maintained by regularly opening the facility to public tours and producing bulletins and posters highlighting water and energy conservation achievements. A podium with information about NERL's native landscape is located at street level and another just outside of the facility to raise public awareness. Conservation techniques and practices of the laboratory have been featured in EPA newsletters and the public media and recognized in several awards the facility has received. BMP status has been achieved in this area.

Distribution System Audits, Leak Detection and Repair

All facility water consumption is accounted for. Water supply piping to laboratory space is on overhead racks in service corridors. Facility staff are trained to report leaks and malfunctioning water-using equipment to the facilities manager or EMS coordinator via email, phone, or a Corrective Action Request. Requests are evaluated and corrected by the onsite building management contractor.

Faucet aerators are installed on laboratory faucets to restrict the flow rate to 0.5 gallons per minute (gpm). For some laboratory activities, NERL staff remove the aerator and run the faucet at a higher flow rate.

The facilities staff review water consumption data to identify outlying water use spikes and determine the cause or issue. BMP status has been achieved in this area.

Water-Efficient Landscaping

Native landscaping is used throughout the facility grounds. The native landscaping design relies on native plant species, including islands of trees and shrubs, surrounded by open areas planted with grasses and wildflowers. A special native landscape contractor replaces and prunes dead plant species and removes weeds. BMP status has been achieved in this area.

Water-Efficient Irrigation

A minimal amount of well water produced onsite is used to water new plantings by hose during drought conditions while they get established. An in-ground irrigation system was installed during facility construction, but is not used. BMP status has been achieved in this area.

Toilets and Urinals

Energy Policy Act of 1992 (EPA 1992)-compliant sanitary fixtures (1.6 gallons per flush (gpf) toilets and 1.0 gpf urinals) with automatic flush valves have been installed throughout the facility. Half of the urinals are a non-water design, installed around 2006. The non-water urinals are maintained by the janitorial staff using an aggressive cleaning, snaking, and cartridge changing procedure. A complete inventory of sanitary fixtures is provided in Table 3.

Table 3. Inventory of Sanitary Fixtures, NERL

Fixture Type	Flow Rate	Total Number
Toilets	1.6 gpf	13
Urinals	1.0 gpf	2
	Non-water	2
Lavatory faucets	2.2 gpm	14
Showerheads	2.5 gpm	8

NERL could consider replacing the two 1.0 gpf urinals with high-efficiency (0.25 gpf or less) or non-water models.

Janitorial staff and employees are trained to report leaks or other maintenance problems, which are immediately corrected by the building management contractor.

BMP status has been achieved in this area.

Faucets and Showerheads

Faucets are compliant with EPA 1992 water efficiency requirements (2.2 gpm for faucets). However, the American Society of Mechanical Engineers (ASME) has established a standard for lavatory faucets in public use (essentially all applications but domestic residences) with a maximum flow rate of 0.5 gpm (ASME Standard A112.18.1). This flow rate is sufficient for hand washing and is considered a best practice for lavatory sinks in public settings.

In order for NERL's faucets to flow at 0.5 gpm, each individual faucet fixture would have to be replaced with a new faucet fixture at that flow rate. NERL's faucet fixtures do not have removable faucet aerators that can be replaced with lower flowing aerators. NERL could save 25,000 gallons of water and 11 million British Thermal Units (BTUs) of energy, resulting in approximately \$400 per year in saved utility cost, by replacing its faucet fixtures. However, since each fixture is approximately \$600 including installation cost, this project is not cost effective at this time.

EPA 1992-compliant showerheads (2.5 gpm) are installed in all eight shower stalls. System pressure is maintained between 20 to 80 pounds per square inch.

A complete inventory of faucets and showerheads can be found in Table 3.

Janitorial staff and employees are trained to report leaks or other maintenance problems, which are immediately corrected by the building management contractor.

Since replacing faucet fixtures is not cost effective at this time, BMP status has been achieved in this area.

Boiler/Steam Systems

Boilers produce recirculating hot water, rather than steam. No steam condensate is generated. BMP status is not applicable in this area.

Single-Pass Cooling Equipment

No single-pass cooling is used. All cooling needs are supplied by a central recirculating chilled water loop or individual chillers for specific laboratory applications. BMP status has been achieved in this area.

Cooling Tower Management

NERL is equipped with one cooling tower, which provides condenser water cooling for the building chillers. Cooling tower make-up water is the largest use of water at the laboratory, estimated to account for over 65 percent of the water consumption in FY 2008. The make-up water is needed to replenish water lost to evaporation and to replace water blown down from the cooling loop to control dissolved solids and associated scale buildup.

The water treatment on the cooling tower is a traditional chemical treatment. In FY 2004, cooling tower system quality and performance was evaluated because the cooling tower was operating at less than 1.5 cycles of concentration. After sampling the incoming city water, a cooling tower chemistry consultant determined that chloride levels are too high to operate at more than 3 cycles of concentration, maximum, due to risk of corrosion. NERL has contacted the city of Chelmsford to report the issue with high chlorides, but no action has been identified to resolve the issue. NERL must optimize their cooling tower system to operate at the maximum cycles of concentration without allowing chlorides to build up in the cooling tower.

Blow down water chemistry is evaluated monthly by a service contractor. Full quality and performance evaluations are performed periodically on blow down water and incoming city water. A conductivity meter is used to automatically control cooling tower blowdown at approximately 2,400 to 2,600 microsiemens per centimeter ($\mu\text{S}/\text{cm}$). Incoming city water is at approximately 800 to 1000 $\mu\text{S}/\text{cm}$. This conductivity control range provides for approximately 2.5 to 3.0 cycles of concentration.

NERL strives to maximize the efficiency of the cooling tower with water efficiency in mind. In addition to the evaluation and analysis performed, NERL may also consider alternate sources of cooling tower make-up water. NERL could consider the cost effectiveness of using air handler condensate as a source of cooling tower make-up water.

BMP status has been achieved in this area.

Commercial Kitchen Equipment

NERL does not operate commercial kitchen equipment. BMP status is not applicable in this area.

Laboratory/Medical Equipment

Purified water for laboratory use is generated by RO. The RO reject water is discharged to the drain. The RO system is equipped with a flow meter that is recorded at least monthly. The ratio of RO make-up water to RO produced is 2.2 to 1.

The facility is equipped with two tabletop, hand-filled steam sterilizers that are not connected directly to potable water supply. Water is used as necessary in individual laboratories for bench scale experimentation and glassware preparation. Occasionally, laboratory scientists test safety showers and eyewashes to assure proper functionality.

BMP status has been achieved in this area.

Other Water Use

NERL does not have any other significant water uses other than those described above. The facility is equipped with a small water softening system that is used for specific project needs. BMP status has been achieved in this area.

Alternative Water Sources

Air handler condensate could be collected from air handling units in the NERL mechanical room and used as cooling tower make-up water. This source of alternative water will be evaluated for feasibility and cost effectiveness under this plan.

BMP status can be achieved in this area by evaluating the use of air handler condensate as cooling tower make-up water and implementing this project if it is cost effective.

7.0 DROUGHT CONTINGENCY PLAN

NERL will follow the water use recommendations of the Massachusetts Department of Environmental Management Office of Water Resources, which coordinates the drought response within Massachusetts.

In the event that voluntary or mandatory water consumption reductions are instituted by Massachusetts Department of Environmental Management or the North Chelmsford Water District, these requirements will be communicated by the Water District to the building owner. In turn, the owner's representative will communicate the requirements to the NERL facilities staff. NERL will then form a task force of facility and operating personnel to identify and implement modifications to facility operations to achieve additional specified reductions in water consumption.

The City of North Chelmsford does not have a water management plan specifically for droughts. However, as conditions warrant, NERL is prepared to follow the water use recommendations and restrictions outlined under the Working Draft Massachusetts Drought Management Plan, dated

21 December 2001. Massachusetts has defined five levels of drought response: normal phase, advisory phase, watch phase, warning phase, and emergency phase.

Details of the 20 December 2001 Working Draft Massachusetts Drought Management Plan are available at:

<http://www.mass.gov/Eoeea/docs/eea/wrc/droughtplan.pdf>

General drought information for the state of Massachusetts, including monthly state and country drought status and drought maps, is available at:

<http://www.mass.gov/dcr/watersupply/rainfall/drought.htm>

8.0 COMPREHENSIVE PLANNING

The EPA facilities staff will ensure the water supply, wastewater generation, and water efficiency BMPs are taken into account during the initial stages of planning and design for any facility renovations or new construction. These factors will also be considered prior to the purchase and installation of any equipment that would measurably change facility water consumption. Where available, WaterSense-labeled products (www.epa.gov/watersense) will be purchased or specified.

The following protocol and methodology will be followed to manage water efficiency:

- 1) The building owner will include specifications or requirements to supply high efficiency equipment or systems during the planning and design phase for renovations, repairs, or new construction.
- 2) When planning facility modifications, the building owner will allow the EPA facilities staff to review and comment on equipment being installed prior to acceptance of a final bid. (Prior review by the facilities manager is not a requirement of emergency repairs. However, equipment acquired for emergency repairs should be evaluated for water efficiency by the building owner and the most efficient equipment available should be used).
- 3) Any modification that impacts the native landscape design of the facility grounds will be accomplished without significant impact on water use or reduction in conservation. The building owner will allow the EPA facilities staff to review proposals, make recommendations, and concur on modifications that would impact water conservation goals.
- 4) Equipment purchased by EPA will be reviewed for water efficiency by the EPA facilities staff prior to purchasing.

9.0 STATUS UNDER GUIDING PRINCIPLES FOR HIGH PERFORMANCE AND SUSTAINABLE BUILDINGS

The Interagency Sustainability Working Group (ISWG), formed as a subcommittee of the EO 13423 Steering Committee, has established guiding principles to assist agencies in meeting the high performance and sustainable buildings goals of EO 13423, section 2(f). In the 1 December

2008 *Guiding Principles for Sustainable Existing Buildings*, ISWG established six supporting principles for protecting and conserving water. The status of NERL with respect to the supporting principles for protecting and conserving water at existing buildings is documented in Table 4.

Table 4. Status of Guiding Principle to Protect and Conserve Water

Topic	Status
Indoor Water	<p><u>Option 1: Comparison to 2006 Plumbing Codes</u> NERL achieves a 23 percent water use reduction from the calculated water use baseline. Because the facility was constructed after 1994, the baseline is established as 120 percent of Uniform Plumbing Code 2006 under the Guiding Principles, Indoor Water Option 1. The facility is equipped with EPA-compliant toilets, urinals, faucets, and showerheads. Half of the urinals are a waterless design.</p> <p><u>Option 2: Comparison to FY 2003 or year thereafter:</u> Draft water use intensity data (measured in gallons per gross square foot (gallons/gsf)) show a decrease of 53 percent between FY 2003 and FY 2008. Water use intensity was 42.99 gallons/gsf in FY 2003 and 19.84 gallons/gsf in FY 2008.</p>
Outdoor Water	The facility is proactive in its approach to outdoor water. The facility practices native landscaping to eliminate the need for supplemental irrigation and does not use any potable irrigation water. As an outreach tool to the public and facility visitors, signs are installed at highly visible locations by the building entrance and the entrance to the site that describe the native landscaping practices used and the associated benefits.
Water Metering	A domestic water meter measures all onsite city water use. Flow totalizing meters are also installed on many of the major subsystem flows.
Stormwater Management	When the facility was constructed, an onsite seasonal wetland, or “vernal pool,” was identified and preserved. A portion of roof rainwater runoff is directed to the pool where it is stored and eventually evaporates, is evapotranspired by surrounding vegetation, or infiltrates into the ground. The remaining roof runoff, as well as the majority of surface runoff from the site, is collected in a storm drain system onsite and filtered through a vortex separator before it is discharged into the municipal stormwater collection system and released to a nearby surface water body.
Process Water	Potable water is not used to improve the facility’s energy efficiency at the expense of water efficiency.
Water-Efficient Products	The Procurement environmental management program within the EMS requires the use of water-efficient products and services where available. The facility is proactive in the purchase of water-efficient products. It is equipped with EPA 1992-compliant toilets, urinals, faucets, and showerheads. Half of the urinals are a waterless design. Laboratory faucets flow at 0.5 gpm.

10.0 OPPORTUNITIES FOR FURTHER WATER CONSERVATION

NERL is pursuing the following projects to achieve additional reductions in water use:

1) Capture and reuse air handler condensate. NERL will evaluate capturing air handler condensate and routing it to the cooling tower. Initial engineering evaluation indicates that it may be possible to capture up to 170,000 gallons per year. This water will significantly offset the consumption of potable water for cooling tower make-up, and result in savings of approximately \$1,800 per year.

3) Replace urinals with high-efficiency or non-water models. NERL will consider replacing two 1.0 gpf urinals with WaterSense labeled urinals with a maximum flush volume of 0.25 gpf or non-water models. Total annual savings are projected to range from 13,000 to 17,000 gallons and \$130 to \$180. At an installed cost of \$1,000 per fixture, simple payback on each fixture upgraded is approximately 10 to 15 years at current water and sewer rates.

Appendix A

**WATER BALANCE SUPPORTING CALCULATIONS AND FY 2008 WATER USE
CHART**

Table A-1. Water Balance Supporting Calculations – FY 2008, New England Regional Laboratory, North Chelmsford, Massachusetts

Major Process	FY 2008 Annual Consumption (gallons)	Supporting Calculations and Source Documentation
Sanitary	200,250	Engineering estimate, calculated using the assumptions: 89 people × 9 gallons/person/day × 250 days/year = 200,250 gallons/year; 9 gallons/day assumed because all sanitary fixtures in Chelmsford are EPA 1992 compliant
Cooling tower make-up	938,000	FY 2008 monthly meter readings
Reverse osmosis system	75,120	FY 2008 monthly meter readings
Miscellaneous laboratory and other uses	184,890	Engineering estimated, calculated by difference from water use total: total water use – sanitary – cooling tower make up – reverse osmosis system = 1,398,260 gallons – 200,250 gallons – 938,000 gallons – 75,120 gallons = 184,890 gallons
Total water use	1,398,260	FY 2008 metered total

