WATER MANAGEMENT PLAN, REVISION 2

Edison Environmental Center, Edison, New Jersey

OARM Sustainable and Transportation Solutions Branch (STSB) **October 2016**

Overview

This report summarizes the findings and recommendations associated with a water use and conservation assessment conducted at the U.S. Environmental Protection Agency's (EPA's) Region 2 Edison Environmental Center (EEC) in Edison, New Jersey. Under this Water Management Plan update, EEC will consider implementing the potential water conservation opportunities identified during the water assessment, which are summarized in Table 1. This Water Management Plan describes the facility's water reduction goals, water use trends, end uses of water, drought management plans, and stormwater management efforts.

Background

Executive Order (EO) 13693, Planning for Federal Sustainability in the Next Decade, signed in March 2015, requires agencies to reduce potable water consumption intensity, measured in gallons per gross square foot (gsf), by 36 percent by fiscal year (FY) 2025. Reductions are measured relative to the Agency's baseline water consumption in FY 2007, through reductions of 2 percent annually. In addition to the potable water use reduction requirements in EO 13693, the order requires that agencies reduce industrial, landscaping, and agricultural (ILA) water consumption by 2 percent annually, or 30 percent by the end of FY 2025, relative to an FY 2010 baseline (including nonpotable sources). Agencies also should install water meters and utilize building and facility water balance data to improve water conservation and management.

The implementing instructions of EO 13693 require that, where applicable, agencies should purchase WaterSense® labeled products and choose irrigation contractors who are certified by a WaterSense labeled program.[1]

The Energy Independence and Security Act (EISA) of 2007 directs agencies to complete comprehensive energy and water evaluations for 25 percent of covered facilities (i.e., those accounting for 75 percent of total agency energy use) each year, resulting in each covered facility being assessed once every four years. It also directs agencies to implement cost-effective measures identified through life-cycle analyses and to measure and verify water savings.

Figure 1: View of Building 205 of the EEC in Edison, New Jersey.

[1] WaterSense is a partnership program established by the EPA to promote water efficiency. Products and services that have earned the WaterSense label have been certified to be at least 20 percent more efficient and perform as well or better than standard models. Products that are eligible for the label include toilets, flushing urinals, showerheads, private lavatory faucets, pre-rinse spray valves, and irrigation controllers.

To achieve greater Agencywide water efficiency and to meet EISA requirements, a water assessment was conducted by the OARM's Office of Administration, Safety and Sustainability Division (SSD) at EEC May 4-5, 2016. Since 2002, the SSD's Sustainable and Transportation Solutions Branch (STSB) and its contractor, Eastern Research Group, Inc. (ERG), have conducted water assessments at EPA-owned and operated laboratories to improve water efficiency and comply with EO 13693 and EISA 2007. The assessment team (Angela F. Nunez Matos, STSB; Rafael Hernandez, STSB; Robert Pickering, ERG; and Roy Sieber, ERG) conducted the water assessment at EEC to review existing conditions and update the previous 2013 Water Management Plan.

Table 1. Potential Water Conservation Opportunities at EEC

Suggested Priority	Project Description	Project Cost	Potential Annual Water Savings (Gallons)	Potential Annual Energy Savings (Million Btu)	Potential Annual Utility Cost Savings[2]	Potential Payback (Years)	Notes
1	Install 0.5 gallon per minute (gpm) aerators on faucets throughout EEC with flow rates currently exceeding 0.5 gpm. For faucets within Building 205, install 1.0 gpm faucet aerators to allow activation of the instant hot water systems.	$380	73,000	41	$1,840	0.2	None
2	Replace 12 existing showerheads in Building 238 with WaterSense labeled models flowing at 1.75 gpm or less.	$360	21,000	10	$350	1.0	None
3	Replace urinals in Buildings 205, 209, and 238 with 0.125 gallons per flush (gpf) WaterSense labeled models.	$10,000	53,000	0	$660	15.2	None
4	Regularly read and track all meters and submeters listed in Table 2.	N/A	0	0	Not quantified	Not quantified	Monitoring meters and submeters will help the facility track system specific water use, as well as the monthly amount of rainwater and air handler condensate collected and used.

[2] Utility cost savings are calculated using the most current water, sewer, electricity, and natural gas costs available. As of 2015, the EEC's water rate is approximately $4.17 per hundred cubic feet (ccf) and the sewer rate is $6.92 per 1,000 gallons. Combined, this rate is equal to $12.50 per 1,000 gallons. Natural gas costs $9.26 per thousand cubic feet (Mcf) and electricity costs $0.153 per kilowatt hour (kWh), as determined by averaging the costs from recent utility bills.

Table 1. Potential Water Conservation Opportunities at EEC (continued)

Suggested Priority	Project Description	Project Cost	Potential Annual Water Savings (Gallons)	Potential Annual Energy Savings (Million Btu)	Potential Annual Utility Cost Savings[2]	Potential Payback (Years)	Notes
5	Install and read advanced water meters on individual buildings on the EEC campus.	TBD	0	0	Not quantified	Not quantified	This project is currently being worked on with EPA Headquarters and will help provide more precise and real time water use information to EEC.

Facility Information

EEC occupies 205 acres on the former Raritan Arsenal property in Edison, New Jersey, a suburban location approximately 30 miles southwest of New York City. The facility comprises multiple buildings and numerous temporary trailers. Most of the buildings are brick construction, originally built by the Army at various times between the World War I era and the 1950s and have undergone or are undergoing reconstruction and renovation. Numerous temporary trailers, some more than 20 years old, house laboratory facilities. Long-range plans call for activities to be relocated from these trailers to permanent structures. All totaled, the buildings contain 275,805 square feet of conditioned space. Figure 2 shows a map of EEC, with the buildings with potable water use shown in blue.

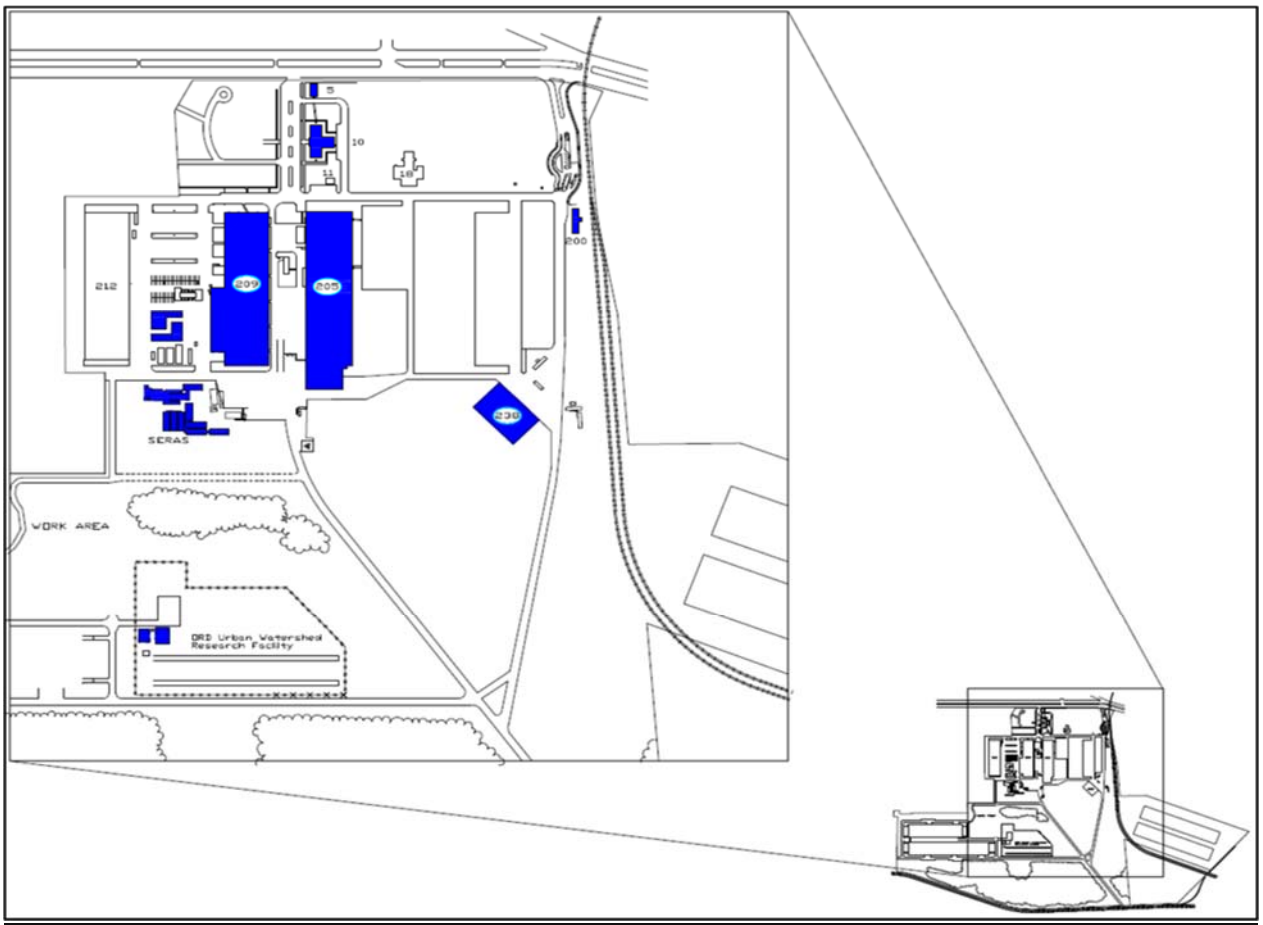

Figure 2: Map of EEC. Buildings with potable water usage are displayed in blue.

Approximately 187 EPA employees and 135 contractors and other non-EPA personnel work at EEC. The facility operates on a flex-time schedule and is typically occupied Monday through Friday between the hours of 6:00 a.m. and 6:00 p.m. EPA does not currently have any plans to vacate the facility.

Water Management Goals

EEC achieves its resource conservation and management goals by implementing an Environmental Management Program (EMP). The Water Management Program of the EMP sets objectives and targets related to water use to reduce the impact on natural resources. It does so by reducing the consumption of water from facility and laboratory operations and by properly managing stormwater runoff. Targets established under this objective include:

- Reduce facility potable water use and water intensity by the amount established by the Agency ConservW targets (set annually by the EPA's STSB). Agencywide, reduce potable water intensity by 26 percent by FY2020, based on an FY 2007 baseline. [Note: This Agencywide reduction target has since been updated to 36 percent by the end of 2025, consistent with EO 13693. EEC will update this objective during the next EMP review and revision.]
- Employ best practices to reduce stormwater runoff and discharges of polluted stormwater.
- For all applicable projects, achieve objectives established by the *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under EISA Section 438.*
- Utilize and maintain best work practices for eliminating construction silt and debris from entering storm drains.
- Maintain work practice controls, xeriscaping, and employee training to limit excessive use of pesticides, herbicides, and fertilizers used in grounds keeping.

Water Supply, Measurement, and Historical Use

EEC uses water for: cooling tower make-up water; sanitary needs; miscellaneous laboratory and research purposes; Urban Watershed Research Branch (UWRB) research; hot water heating loop make-up; and fire hydrant and sprinkler testing. The following sections provide additional details on the facility's water use.

Water Supply

EEC's potable water service is provided by the Middlesex Water Company at a rate of $4.17 per CCF ($5.58 per Kgal). Sewer service is provided by Edison Township at a rate of approximately $6.92 per Kgal. Edison Township bills EEC for sewer service annually based on the previous calendar year's water consumption.

EEC also collects rainwater from Building 209/210's roof and air handler condensate as an alternative water source. This water is collected in three 1,500-gallon cisterns that, when water is available, supplies make-up water for Building 209's cooling tower, boiler blowdown tempering water and for occasional vehicle and equipment washing. UWRB also diverts some stormwater from EEC's culverts into holding ponds. This water is used for research and testing purposes.

Meters and Submeters

Incoming water supplied by Middlesex Water Company is split and flows through two parallel metered pipes in a metering shed. Each meter provides a high-flow and a low-flow component reading. The sum of the two readings (high- and low-flow) from each of the two meters is the measured total. The locked metering shed is located in a separate fenced area outside of the northeast corner of the EPA property.

Laboratory water supplied to the UWRB facility is metered and logged by UWRB staff.

The cooling towers at Buildings 205 and 209 are each equipped with a flow totalizing meter; however only the Building 209 blowdown line is metered. In addition, systems that divert collected air handler condensate to the cooling towers to use as make-up water are metered. The cooling tower installed for cooling of Building 205 is equipped with a flow totalizing meter. EEC also captures rainwater to use as cooling tower make-up water, boiler blowdown tempering water, or for vehicle washing. The total quantity of water used from this rainwater system is also metered.

These meters, with the exception of the UWRB meter, are not currently monitored on a regular basis. As a result of this Water Management Plan, the facility management staff will begin recording and tracking readings from each meter on a monthly basis. The facility manager will use these data to monitor trends in system water consumption, and unexpected changes in consumption will be investigated and resolved.

Table 2 provides a summary of the meters installed at EEC, the area each meter serves, and the meter reading collected at the time of the assessment.

Table 2. EEC Meters and Submeters, May 2016

Meter Location	Area/System Served by Meter	Meter Number	Utility Account Number	Water Source	Meter Reading From Assessment
Northeastern corner of EPA property	EEC main water line	#70243240	#8925300000	City potable water	High flow: 43,100 cubic feet Low flow: 30,821 cubic feet
Northeastern corner of EPA property	EEC main water line	#70243235	#8925300000	City potable water	High flow: 43,800 cubic feet Low flow: 36,350 cubic feet
Bldg 209/210 mechanical room	Bldg 209 cooling tower make-up (city water)	#2298590	N/A	City water	3,205,400 gallons
Bldg 209/210 mechanical room	Bldg 209 cooling tower blowdown	N/A	N/A	N/A	797,230 gallons
Bldg 209/210 roof	Bldg 209 cooling tower make-up (alternative water)	#006275	N/A	Air handler condensate	510,000 gallons
Bldg 209/210 mechanical room	Hot water boiler make-up line	N/A	N/A	City water	15,700 gallons
Bldg 209 warehouse space, adjacent to cisterns	Rainwater collection system	#006163	N/A	Rainwater	760,500 gallons
Bldg 205 mechanical room	Bldg 205 cooling tower make-up (city water)	#2271018	N/A	City water	3,706,600 gallons
Bldg 205 Bay A	Bay A air handler condensate for Bldg 205 cooling tower	#006078	N/A	Air handler condensate	25,200 gallons

Table 2. EEC Meters and Submeters, May 2016 (continued)

Meter Location	Area/System Served by Meter	Meter Number	Utility Account Number	Water Source	Meter Reading From Assessment
Bldg 205 Bay B	Bay B air handler condensate for Bldg 205 cooling tower	#001591	N/A	Air handler condensate	20,600 gallons
UWRB	UWRB Reverse Osmosis (RO) System	N/A	N/A	City water	385,880 gallons

Historical Water Use

In response to EO 13693 and the executive orders that preceded it, EEC established an FY 2007 water use intensity baseline of 16.45 gallons per gross square foot (gsf). In FY 2015, water use intensity was reduced to 12.32 gallons per gsf—a decrease of 25 percent compared to the FY 2007 baseline. However, in FY 2014 and early FY 2015, water use temporarily rose due to dust suppression activities related to the demolition of Buildings 245 and 246. In calendar year (CY) 2015, water use was 2,413,796 gallons, or 10.66 gallons per gsf—a 35 percent reduction over the facility's water use intensity baseline. Figure 3 provides a graph of EEC's water use from FY 2007 through FY 2015.

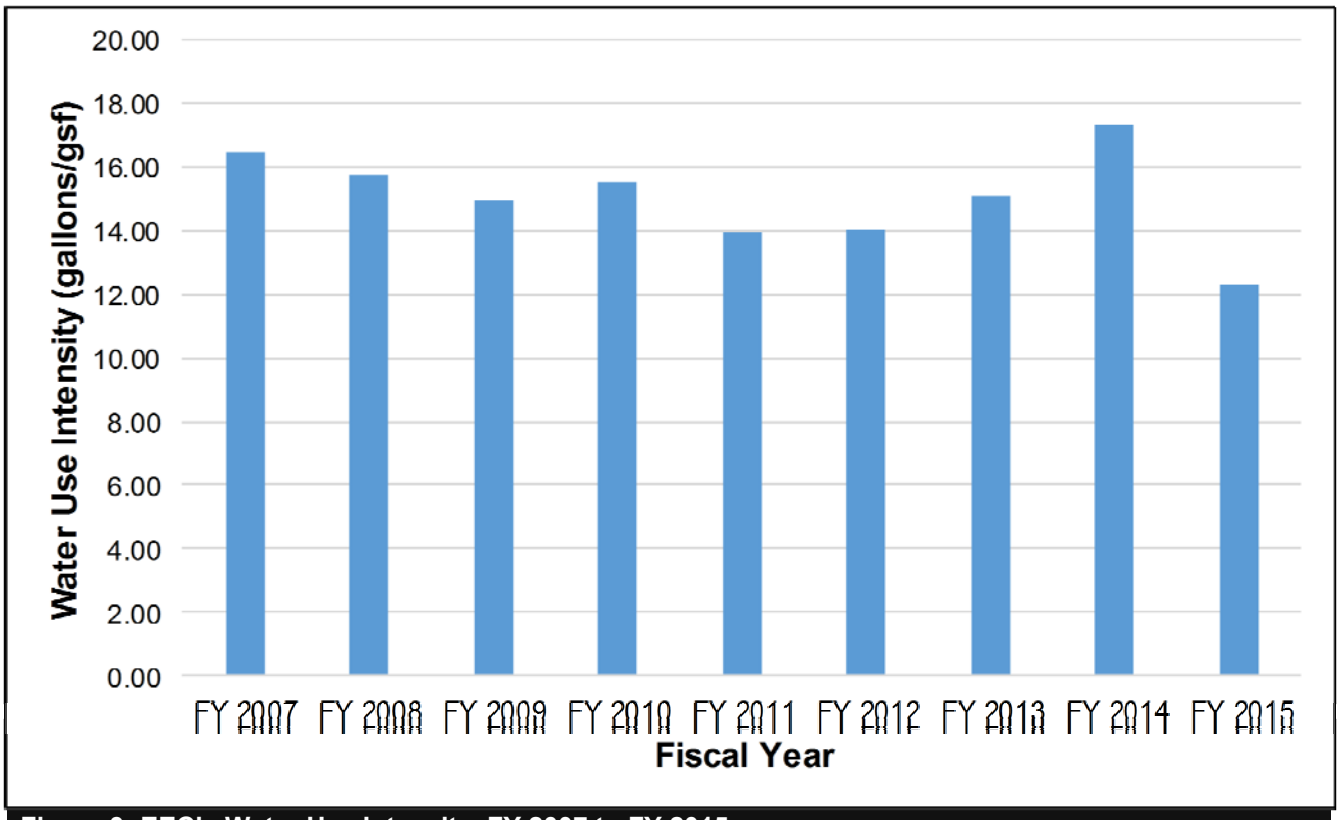

Figure 3: EEC's Water Use Intensity, FY 2007 to FY 2015.

End Uses of Water

Table 3 and Figure 5 identifies the end uses of water at EEC based on the facility's water use in CY 2015. The uses are described in more detail below.

Table 3. Major Potable Water Uses at EEC, Calendar Year 2015

Major Process	FY 2015 Annual Water Use (gallons)	Total Water Use (%)	Basis of Estimate
Potable City Water			
Cooling tower make-up	925,000	38.3	Engineering estimate based on increased usage in summer months
Miscellaneous laboratory and process water use	825,419	34.2	Calculated by subtracting all other estimated and known water uses from the EEC metered total
Sanitary	628,000	26.0	Engineering estimate based on sanitary fixtures installed, occupancy, and daily usage factors
RO system at UWRB	33,377	1.4	Meter readings
Hot water heating loop make-up	2,000	0.1	Engineering estimate based on meter reading
Alternative Water			
Rainwater collected for cooling tower make-up and other uses	150,000	—	Estimated based on flow totalizing meter reading for rainwater collection system during time of assessment. System has been in place for approximately five years
Air handler condensate collected for cooling tower make-up	100,000	—	Estimate based on flow totalizing meter readings on each of the air handler condensate collection systems. Systems have all been installed for approximately five years
Total Potable Water Use	**2,413,796**	**100.0**	**CY 2015 total water use from metered sources**
Total Alternative Water Use	**250,000**	—	**Estimate**

Cooling Towers

EEC is equipped with three cooling towers, which account for its largest water end use. A 300-ton cooling tower is installed on the roof of Building 209. Two 90-ton cooling towers serve Building 205; however, EEC only operates one tower at Building 205 at a time. Both cooling tower systems are equipped with submeters on the make-up water lines. The Building 209 tower also has a water meter installed on the blowdown line. Blow down on each tower is controlled with a conductivity controller, which initiates blowdown when the conductivity reaches 1,800 microsiemens (µS). Each of the cooling tower systems is equipped with a chemical feed system, which is used to inject chemicals to control against scale and corrosion. System operations are monitored by a cooling tower water treatment vendor who comes once every two months.

Figure 4: A 300-ton cooling tower provides building cooling to Building 209.

EEC collects air handler condensate at Buildings 205 and 209 to supply make-up water to the cooling towers. Air handler condensate is fed directly into the cooling tower basin to offset the potable water requirements of the cooling tower systems. Rainwater is also captured from five roof drains on the Building 209 roof into three 1,500 gallon cisterns.

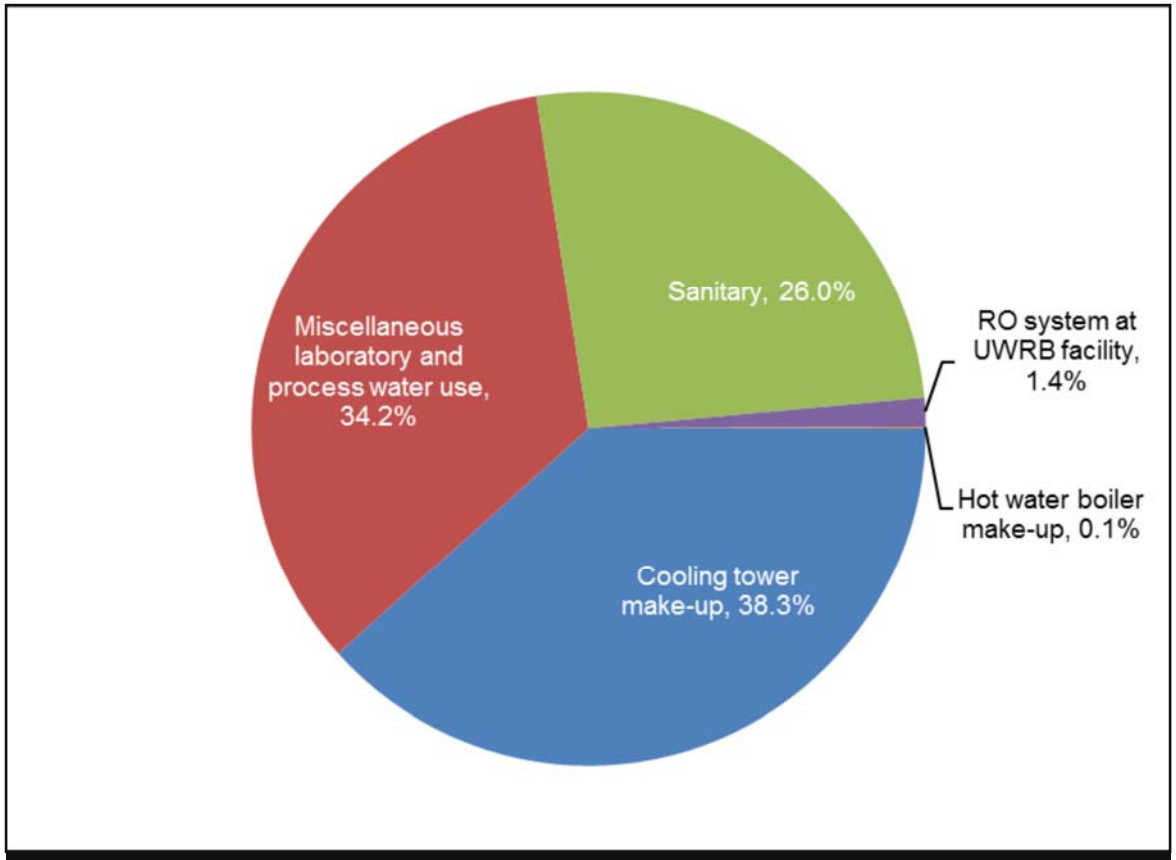

Figure 5: EEC's Water End Uses for CY 2015.

When rainwater is available, this water is also used as make-up water to the Building 209 cooling tower. The control mechanism is designed so that rainwater is used until the cisterns are empty, at which point the system automatically switches to using city water as cooling tower make-up. More information on this system is provided in the Alternate Water Sources section below.

Laboratory Water Uses

EEC conducts a variety of laboratory activities, including chemical, biological, microbiological, and other laboratory support activities. The facility also conducts urban watershed research to evaluate systems and methods to manage risk to human health and the environment from wet weather flows and petroleum and chemical storage systems.

The facility is equipped with two steam sterilizers located in Building 209, Bay C. Both steam sterilizers have tempering water control systems so that tempering water is only applied when hot condensate is discharging from the sterilizers to the drain.

Figure 6: EEC operates two steam sterilizers, which both have tempering water control systems to eliminate continuous flow of tempering water.

EEC does not have a centralized reverse osmosis (RO) system, as is common in many of EPA's laboratories. Instead, small RO units are installed in different laboratory spaces where purified water is required for experiments. Decentralized RO systems are an efficient and effective strategy.

EEC has two Manitowoc ice machines that supply ice for field sampling and other research activities. Both ice machines are air cooled.

EEC also uses water for glassware washing, laboratory faucets, janitorial uses, galley sinks, hose bibs, and other minor uses.

Figure 7: EEC has multiple small RO systems that provide purified water in individual laboratories.

Restroom and Other Sanitary Fixtures

The majority of EEC's toilets and urinals are compliant with 1992 Energy Policy Act (EPAct 1992) water efficiency requirements (1.6 gpf for toilets; 1.0 gpf for urinals). There are four toilets that flush at 3.5 gpf; however these toilets are located in the health facility and the contractor's trailers and are used infrequently. Toilets in Building 209 Bay A and Building 205 Bay A flush at 1.28 gpf, which is considered best practice. Four urinals at the facility are WaterSense labeled models. To achieve water savings, the facility will consider installing 0.125 gpf WaterSense labeled urinals throughout Buildings 205, 209, and 238. Urinal replacement in Building 10 is not suggested and will not be pursued by EEC, due to the age of the building and potential impacts on the plumbing system.

Lavatory faucets installed throughout EEC have various flow rates ranging from 0.5 gpm to 2.5 gpm. The American Society of Mechanical Engineers (ASME) has established 0.5 gpm as the standard maximum flow rate for public use (e.g., all non-residential applications) lavatory faucets. This flow rate is sufficient for hand washing and is considered a best practice for lavatory sinks in public settings. At the time of the assessment, EEC was in the process of installing 0.5 gpm aerators on all lavatory faucets. The facility staff noted that hot water in the restrooms located within Building 205 is generated through instant hot water heaters. In order for the systems to activate, a flow rate of 0.8 gpm must be achieved. Therefore, in place of 0.5 gpm aerators, the facility will instead install 1.0 gpm aerators on the 12 faucets in Building 205 to ensure user comfort during hand washing. Hot water in EEC's other buildings is generated through either electric or natural gas-fired hot water boilers.

EEC also has 17 showerheads installed throughout the facility. These showerheads have EPAct 1992-compliant flow rates of 2.5 gpm; however, this flow rate exceeds the maximum flow rate labeling criteria in the WaterSense specification and adopted by EPA as best practice. Twelve of the showerheads are within Building 238, which houses EEC's fitness equipment. There are three showers in each of the men's and women's locker rooms, each of which is equipped with a stationary showerhead and a handheld showerhead. These showerheads should be prioritized for replacement with 1.75 gpm WaterSense labeled models. The largest opportunity for water-efficient improvements at EEC are within the restrooms.

Table 4 provides an inventory of sanitary fixtures.

Table 4. EEC Sanitary Fixtures Inventory

Fixture Type	Existing Flush Volume/ Flow Rate	Total Number	Recommended Flush Volume/Flow Rate[3]
Toilets	3.5 gpf	4	1.28 gpf
	1.6 gpf	52	
	1.28 gpf	13[4]	
Urinals	1.0 gpf	15	0.125 gpf
	0.5 gpf	2	
	0.125 gpf	2[4]	
Lavatory faucets	2.0 - 2.5 gpm	15	0.5 gpm
	1.5 gpm	18	
	0.5 gpm	17[4]	
Showerheads	2.5 gpm	17	1.75 gpm or less

Urban Watershed Research Branch Facility

UWRB's facility on the EEC campus conducts research and evaluates performance of common and innovative stormwater management practices. This facility is not individually metered; however, the facility has a RO system that is equipped with a submeter that monitors research water use. The submeter reading is monitored weekly on a log sheet. Annual water use from the RO system was recorded to be approximately 33,000 gallons.

UWRB also collects stormwater from the storm drain system and stores the water in two large collection basins to the northeast of the facility. Collected stormwater is used for research purposes. The quantity of collected stormwater is not monitored.

Figure 8: Two storage basins at UWRB's facility collect and store stormwater for research.

Hot Water Heating Loop

Heating at EEC is provided through a closed loop hot water system. Hot water is heated in a gas boiler, which was replaced approximately 8 years ago, and is circulated throughout the facility. Periodically, in order to conduct maintenance and repairs, the hot water loop must be drained. The make-up supply for the hot water loop is metered, allowing facility staff to easily identify if there is a leak in the system.

Fire Hydrant and Sprinkler Testing

EEC conducts an annual preventative maintenance flushing of fire hydrants throughout the center to exercise the hydrant shut off valves. In addition, EEC flushes each building's fire sprinkler system on a quarterly basis to ensure sediment does not build up in the system. This amount of water is anticipated to be negligible and is included under miscellaneous laboratory and process water in Table 3.

[3] EPA's recommended flush volume or flow rate is only applicable to fixtures in certain locations throughout EEC. See Restroom and Other Sanitary Fixtures discussion for details.

[4] Seven 1.28 gpf toilets, two 0.125 gpf urinals, and eight 0.5 gpm faucets are currently installed within Building 209, Bay A. This bay was not occupied at the time of the water assessment. Therefore, usage of these fixtures is minimal.

Irrigation and Landscape

EEC is equipped with an in-ground irrigation system; however, the facility does not irrigate its landscape and the system is not operational, as the facility sustains its landscape off natural precipitation. The facility is considering implementing a project to plant wildflowers in some areas throughout the facility. If this project is pursued, some temporary irrigation would be necessary to establish the wildflowers. Once these plantings are established, irrigation would again be discontinued.

Alternate Water Sources

EEC has been actively engaged in developing alternate sources of water to supply non-potable uses. Currently, both rainwater and air handler condensate are captured and used as cooling tower make-up water. Rainwater is captured from five downspouts on the west side Building 209/210 servicing 0.34 acre of roof area. The rainwater is transferred to three 1,500 gallon tanks located in Building 209 and used as cooling tower make-up water. Chlorine tablets are used to control biological growth in the cisterns until water is needed at the cooling tower. Before being pumped to the cooling tower, collected rainwater is also treated through a 100-micron filter to remove any sediment and other materials. This filter is changed approximately twice per year.

Condensate from air handlers in Building 205 and Building 209 is also captured and used directly as cooling tower make-up water. Approximately 250,000 gallons per year of alternate source water is captured by these methods.

EEC plans to expand the rainwater collection system to include additional downspouts on the Building 209/210 roof. In addition, EEC is considering the feasibility of repurposing an unused storage tank at the UWRB to collect rainwater to use for vehicle and equipment washing.

Figure 9: Rainwater and some air handling condensate is collected from roof drains into three 1,500-gallon cisterns, which provide make-up water to the Building 209 cooling tower.

Completed Water Efficiency Projects

EEC's water use has decreased since the last water use assessment in 2013, with the exception of FY 2014 due to temporary dust suppression activities, as the facility has implemented many effective changes. As described in Table 5, EEC completed five water efficiency projects since FY 2007.

Table 5. Completed Water Efficiency Projects at EEC Since FY 2007

Project	Estimated Annual Water Savings (Gallons)	Completion Year	Additional Notes
Flow meters	N/A	FY 2011	Make-up and blowdown meters were installed on the cooling towers. Flow meters are also installed on the air handler condensate recovery system and rainwater collection system.
Faucet aerators	133,00	FY 2010	Faucet aerators were installed on lavatory faucets throughout the facility. As of the FY 2016 assessment, many of these aerators had been removed, but were in the process of being replaced.
Rainwater collection	150,000	FY 2010	Three 1,500-gallon cisterns are used to collect rainwater and some air handler condensate to use for cooling tower make-up water.
Steam sterilizer	450,000	FY 2010	A tempering water control valve was installed on one steam sterilizer to eliminate continuous water flow. Steam sterilizers have since been upgraded to include integrated control valves.
Air handler condensate recovery	100,000	FY 2009	Condensate is collected from air handlers at Buildings 205 and 209 and used as make-up water for the buildings' respective cooling towers.

Drought Contingency Plan

Drought Risk

EEC is located in an area that rarely experiences drought. The facility's management staff is not able to recall a time when watering restrictions were implemented by the New Jersey Department of Environmental Protection (DEP), which is the authority on statewide and regional drought. EEC's water is supplied by the Middlesex Water Company, which obtains water from deep underground wells located within the service territory. Resource availability from these deep wells is not currently a concern.

Recent Contributions to Drought Contingency

EEC has reduced its water use intensity baseline of 16.45 gallons per gsf, set in FY 2007, to 10.66 gallons per gsf in CY 2015—a 35 percent reduction. EEC plans to pursue projects to continue to reduce facility water use. EEC staff will monitor water meters and submeters so that leaks or other malfunctions resulting in increased water use can be identified and resolved.

Potential Capital Improvement Projects to Reduce Water Use

Potential capital improvement projects are identified in Table 1. These projects represent EEC's plan to further reduce facility water use, particularly if the facility is faced with water supply limitations. If necessary, all of the projects could be implemented relatively quickly, although some do not have short-term payback periods. If fully implemented, these projects are estimated to reduce facility water use by up to six percent.

Opportunities for Short-Term Response to Local Drought

In the event of a drought or other water supply shortage, EEC will follow the water use recommendations and restrictions of the New Jersey DEP, which communicates voluntary and mandatory water conservation restrictions in six drought management regions (EEC is part of the Central drought region). Regional drought conditions and general information on water supply management can be found at the New Jersey drought information web page, www.njdrought.org.

Considerations for New Construction

EEC's current facility includes many aspects that are considered water efficiency best practices. However, if EPA decides to pursue expansion of EEC through new construction or major renovations, the design choices listed below could be considered to further reduce water use.

1) EEC could install restroom fixtures with maximum flow rate and performance requirements provided in Table 6.

Table 6. Requirements for Restroom Fixtures in New Laboratory Construction

Fixture Type	Maximum Flow Rate	Performance Requirement
Toilets	1.28 gpf	WaterSense labeled
Urinals	0.125 gpf	WaterSense labeled
Lavatory faucets	0.5 gpm	None
Showerheads	1.75 gpm	WaterSense labeled

2) Similar to how EEC currently operates, EEC could evaluate laboratory-wide deionized (DI)/RO water requirements and utilize point-of-use systems in individual laboratories wherever feasible, as these systems offer more efficient operation than centralized systems.

3) EEC could incorporate rainwater collection and air handler condensate recovery into the initial design of cooling tower systems.

Stormwater Management

Stormwater generated at EEC is collected in storm drains and culverts and directed away from the facilities. Stormwater flows down towards the UWRB facility, where a portion is diverted into collection basins for research purposes. The remaining stormwater continues to flow to the Raritan River, which flows into Raritan Bay and eventually the Atlantic Ocean.

EEC currently experiences some puddling of stormwater in the parking lot to the south of Building 209. EEC plans to resurface and regrade this area to alleviate these issues once funding is available.

Onsite Green Infrastructure

EEC has a 300,000-square-foot parking area that integrates green infrastructure, including permeable pavers and rain gardens, to control stormwater. This project was also intended for research purposes, as EPA staff assessed performance and capabilities of different types of permeable pavers, including permeable interlocking concrete pavers, pervious concrete, and porous asphalt. These three types of pavers were installed in separate rows of the parking area. Conventional asphalt was used in the driving lanes; however, stormwater from these lanes is directed towards to the permeable pavers.

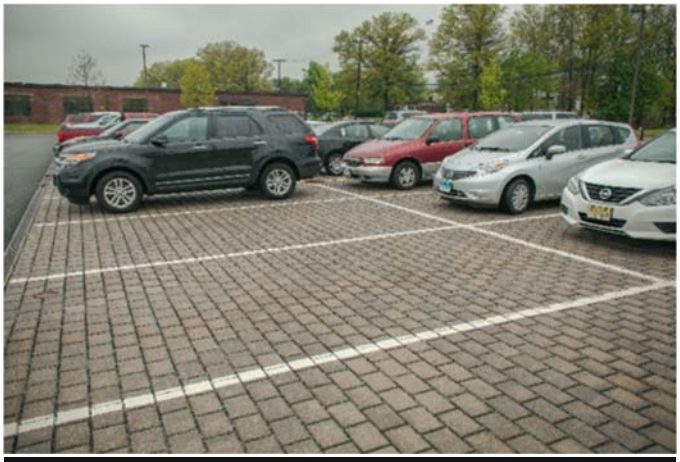

Figure 10: Three types of permeable pavement are in stalled in the main employee parking area at EEC.

Figure 11: A rain garden adjacent to the parking area treats stormwater from Building 205 and other impervious surfaces.

The redesign of this parking area also incorporated the construction of a rain garden. The design of the rain garden also facilitated research, with each of its six rectangular cells equipped with instrumentation for measuring the occurrence and timing of the stormwater as it permeates through the rain garden. The rain garden collects stormwater runoff from certain areas of the parking lot, as well as from Building 205.

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