Sustainability Roadmap: Water Efficiency and Conservation

Progress Report and Plan for Meeting
the Governor's Sustainability Goals
for California State Agencies

CA Department of Technology

Edmund G. Brown Jr., Governor

December 2017

California Department of Technology Sustainability Road Map 2018-2019: Water Efficiency and Conservation

Ian Noumov
Alex Gomez
Daniel Gumacal
Glenn Franklin
Sarah Do
Authors

David Nahigian- Facility and Administrative Branch Chief
Mark Standley- Facility and Administrative Assistant Branch Chief
Directing Managers

Amy Tong
Director

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

Acronyms

BMP	Best Management Practices
CALGREEN	California Green Building Code (Title 24, Part 11)
DGS	Department of General Services
EO	Executive Order
DWR	Department of Water Resources
ESPM	Energy Star Portfolio Manager
GHGe	Greenhouse Gas Emissions
GSP	Groundwater Sustainability Plan
LCM	The Landscape Coefficient
LEED	Leadership in Energy and Environmental Design
MM	Management Memo
MAWA	Maximum Applied Water Allowance
MWELO	Model Water Efficient Landscape Ordinance
SAM	State Administrative Manual
SGA	Sustainable Groundwater Agency
SGMA	Sustainable Groundwater Management Act
WMC	Water Management Coordinator
WUCOLS	Water Use Classifications of Landscape Species

Glossary

Backflow - is the undesirable reversal of the flow of water or mixtures of water and other undesirable substances from any source (such as used water, industrial fluids, gasses, or any substance other than the intended potable water) into the distribution pipes of the potable water system.

Back flow prevention device – a device that prevents contaminants from entering the potable water system in the event of back pressure or back siphonage.

Blowdown - is the periodic or continuous removal of water from a boiler to remove accumulated dissolved solids and/or sludge. Proper control of blowdown is critical to boiler operation. Insufficient blowdown may lead to deposits or carryover. Excessive blowdown wastes water, energy, and chemicals.

Compost – Compost is the product resulting from the controlled biological decomposition of organic material from a feedstock into a stable, humus-like product that has many environmental benefits. Composting is a natural process that is managed to optimize the conditions for decomposing microbes to thrive. This generally involves providing air and moisture, and achieving sufficient temperatures to ensure weed seeds, invasive pests, and pathogens are destroyed. A wide range of material (feedstock) may be composted, such as yard trimmings, wood chips, vegetable scraps, paper products, manures and biosolids. Compost may be applied to the top of the soil or incorporated into the soil (tilling).

Critical overdraft - a condition in which significantly more water has been taken out of a groundwater basin than has been put in, either by natural recharge or by recharging basins. Critical overdraft leads to various undesirable conditions such as ground subsidence and saltwater intrusion.

Ecosystem services - are the direct and indirect contributions of ecosystems to human well-being. They support directly or indirectly our survival and quality of life. Ecosystem services can be categorized in four main types:

- Provisioning services are the products obtained from ecosystems such as food, fresh water, wood, fiber, genetic resources and medicines.

- Regulating services are the benefits obtained from the regulation of ecosystem processes such as climate regulation, natural hazard regulation, water purification and waste management, pollination or pest control.

- Habitat services provide living places for all species and maintain the viability of gene-pools.

- Cultural services include non-material benefits such as spiritual enrichment, intellectual development, recreation and aesthetic values.

Grasscycling -refers to an aerobic (requires air) method of handling grass clippings by leaving them on the lawn when mowing. Because grass consists largely of water (80% or more), contains little lignin and has high nitrogen content, grass clippings easily break down during an aerobic process. Grasscycling returns the decomposed clippings to the soil within one to two weeks acting primarily as a fertilizer supplement and, to a much smaller degree, mulch. Grasscycling can provide 15 to 20% or more of a lawn's yearly nitrogen requirements

Hydrozone – is a portion of a landscaped area having plants with similar water needs that are served by one irrigation valve or set of valves with the same schedule.

Landscape Coefficient Method (LCM) describes a method of estimating irrigation needs of landscape plantings in California. It is intended as a guide for landscape professionals.

Landscape water budget - is the calculated irrigation requirement of a landscape based on landscape area, local climate factors, specific plant requirements and the irrigation system performance.

Model Water Efficient Landscape Ordinance (MWELO) - The Water Conservation in Landscaping Act was signed into law on September 29, 1990. The premise was that landscape design, installation, and maintenance can and should be water efficient. Some of the provisions specified in the statute included plant selection and groupings of plants based on water needs and climatic, geological or topographical conditions, efficient irrigation systems, practices that foster long term water conservation and routine repair and maintenance of irrigation systems. DWR adopted the Model Ordinance in June of 1992. One element of the Model Ordinance was a landscape water budget. In the water budget approach, a Maximum Applied Water Allowance (MAWA) was established based on the landscape area and the climate where the landscape is located. The latest update to MWELO was in 2015. MWELO applies to all state agencies' landscaping.

Mulch – Mulch is a layer of material applied on top of soil. Examples of material that can be used as mulch include wood chips, grass clippings, leaves, straw, cardboard, newspaper, rocks, and even shredded tires. Benefits of applying mulch include reducing erosion and weeds and increasing water retention and soil vitality. Whenever possible, look for mulch that has been through a sanitization process to kill weed seeds and pests.

Trickle flow – A device that allows users to reduce flow to a trickle while using soap and shampoo. When the device is switched off, the flow is reinstated with the temperature and pressure resumes to previous settings.

Sprinkler system backflow prevention devices – are devices to prevent contaminants from entering water supplies. These devices connect to the sprinkler system and are an important safety feature. They are required by the California Plumbing Code.

Submeter- a metering device installed to measure water use in a specific area or for a specific purpose. Also known as dedicated meters, landscape submeters are effective for separating landscape water use from interior water use, evaluating the landscape water budget and for leak detection within the irrigation system.

Water Budget - A landscape water budget is the calculated irrigation requirement of a landscape based on landscape area, local climate factors, specific plant requirements and the irrigation system performance.

Water-energy nexus - Water and energy are often managed separately despite the important links between the two. 12 percent of California's energy use is related to water use with nearly 10 percent being used at the end water use. Water is used in the production of nearly every major energy source. Likewise, energy is used in multiple ways and at multiple steps in water delivery and treatment systems as well as wastewater collection and treatment.

Water Shortage Contingency Plans - each urban water purveyor serving more than 3,000 connections or 3,000 acre-feet of water annually must have an Urban Water Shortage Contingency Plan (Water Shortage Plan) which details how a community would react to a reduction in water supply of up to 50% for droughts lasting up to three years.

EXECUTIVE SUMMARY

The California Department of Technology (CDT) Gold Camp Data Center provides information technology services to many state, county, federal and local government entities throughout California. Through the use of a scalable, reliable and secure statewide network, combined with expertise in voice and data technologies, CDT delivers comprehensive, cost-effective computing, networking, electronic messaging, and training solutions to benefit the people of California.

As California faced an unprecedented drought, the CDT has taken several measures to improve water efficiency throughout its Gold Camp Data Center facility. With an estimated 73.8% of the facility's water use attributed to cooling the facility's computer room, emphasis has been placed on identifying ways to more efficiently use water for this purpose. One approach has been to maximize the effectiveness of the open loop cooling systems through precise monitoring of water quality, which in turn increases the number of circulation cycles before blowdown occurs. CDT has also either replaced or retrofitted all toilets, urinals, faucets, and shower heads. These changes have helped to minimize water waste. Additionally, the Department installed a new efficient landscape drip irrigation system in the spring of 2016. Nearly all grass turf was replaced with mulch or decomposed granite. Since the project was completed, an annual savings of over one million gallons has been realized.

CDT will continue to look for ways to reduce its use of water at the Gold Camp Data Center, in order to achieve the sustainability goals established by the Governor.

Amy Tong
Director

SUSTAINABILITY GOALS

The Governor has directed California State Agencies to demonstrate sustainable operations and to lead the way by implementing sustainability policies set by the state. Sustainability includes the following general initiatives:

- Greenhouse Gas Emissions Reductions
- Building Energy Efficiency and Conservation
- Indoor Environmental Quality (IEQ)
- Water Efficiency and Conservation
- Monitoring Based Building Commissioning (MBCx)
- Environmentally Preferable Purchasing (EPP)
- Financing for Sustainability
- Zero Emission Vehicle (ZEV) Fleet Purchases
- Electric Vehicle Charging Infrastructure
- Monitoring and Executive Oversight

The Governor has issued numerous executive orders directing sustainable state operations. The orders relevant to water are:

Executive Order B-18-12

EO B-18-12 and the companion *Green Building Action Plan* require state agencies to reduce the environmental impacts of state operations by reducing greenhouse gas emissions, managing energy and water use, improving indoor air quality, generating onsite renewable energy when feasible, implementing environmentally preferable purchasing, and developing the infrastructure for electric vehicle charging stations at state facilities. The Green Building Action Plan also established two oversight groups; the staffs level Sustainability Working Group and the executive level Sustainability Task Force, to ensure these measures are met.

Executive Order B-18-12 requires State agencies to reduce agency-wide water use 10% by 2015 and 20% by 2020 as measured against a 2010 baseline. The 2015 and 2020 targets reinforce the SB X7-7 requirement that State agencies reduce water use at facilities they operate to support local water suppliers in meeting their targets.

On February 28, 2013, the California Department of Water Resources issued its Water Use Reduction Guidelines and Criteria, pursuant to Executive Order B-18-12. Each applicable agency was required to take actions to reduce water use in facilities and landscapes that are operated by the state, including facilities owned, funded or leased. State operated facilities are defined as facilities where the agency has direct control of the buildings' function, maintenance and repair. For leased facilities, the Green Building Action Plan directed at that time that new and renegotiated leases include provisions for water conservation, reporting water use and installation of sub-meters to the extent possible and economically feasible.

All the following sections in this water plan and the accompanying worksheet only repeat the initial criteria and guidelines issued at that time. Only the MWELO requirements have been updated since that time. Additionally, other Executive Orders have followed, strengthening and elaborating on the issues contained in EO B-18-12.

EO B-18-12 requires that beginning January 2013, agencies shall regularly report current water use into the water tracking database. Since January 2014, annual water use reports have documented progress towards the 2015 and 2020 targets using the ESPM http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager_benchmarking to track energy and water use and to submit annual reports to DGS. (Sustainability Manager, Department of General Services, 707 Third Street, 8th Floor, West Sacramento, CA 95798-9052). Additionally, for facilities with landscape areas over 20,000 sq. ft. the landscape water use must be tracked with a water budget program.

Executive Order B-29-15

EO B-29-15 directs state agencies to take actions in response to the ongoing drought and to the State of Emergency due to severe drought conditions proclaimed on January 17, 2014. The Governor directed numerous state agencies to develop new programs and regulations to mitigate the effects of the drought, and required increased enforcement of water waste state wide. Agencies were instructed to reduce potable urban water use by 25% between 2013 and February 28, 2016.

Executive Order B-30-15

EO B-30-15 declared climate change to be a threat to the well-being, public health, natural resources, economy, and environment of California. It established a new interim statewide greenhouse gas emission reduction target of 40 percent below 1990 levels by 2030, and reaffirms California's intent to reduce greenhouse gas emissions by 80 percent below 1990 levels by 2050. To support these goals, this order requires numerous state agencies to develop plans and programs to reduce emissions.

Other Relevant Executive Orders…

Executive Order B-37-16

EO B37-16 builds on what were formerly temporary statewide emergency water restrictions in order to establish longer-term water conservation measures, including permanent monthly water use reporting, new permanent water use standards in California communities and bans on clearly wasteful practices such as hosing off sidewalks, driveways and other hardscapes. The EO focuses on using water more wisely, and eliminating water waste by taking actions to minimize water system leaks. DWR estimates that leaks in water district distribution systems siphon away more than 700,000 acre-feet of water a year in California - enough to supply 1.4 million homes for a year.

The EO further strengthens local drought resilience and looks to improve agricultural water use efficiency and drought planning. State agencies are to cooperate with urban water management plans which include plans for droughts lasting for at least five years by assuring that the water efficiency and conservation plan has drought contingency actions.

State Administrative Manual & Management Memos

The following sections of the State Administrative Manual (SAM), and associated Management Memos (MM), currently impose sustainability requirements for water on the department under the Governor's executive authority:

SAM Sections

- Landscaping practices 1821.5
- Drought moratorium 1821.4

Relevant Management Memos

- MM 15-06 State Buildings And Grounds Maintenance And Operation
- MM 15-04: Energy Use Reduction for New, Existing, and Leased Buildings
- MM 14-02 Water Efficiency and Conservation
- MM 14-07: Standard Operating Procedures For Energy Management In State Buildings
- MM 14-09: Energy Efficiency in Data Centers and Server Rooms

Relevant Legislation

Sustainable Groundwater Management Act of 2014 - The Sustainable Groundwater Management Act (SGMA) directs the Department of Water Resources (DWR) to identify groundwater basins and subbasins in conditions of critical overdraft. Conditions of critical overdraft result from undesirable impacts, which can include seawater intrusion, land subsidence, groundwater depletion, and/or chronic lowering of groundwater levels. As defined in the SGMA, "A basin is subject to critical overdraft when continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts."

As required in the SGMA, basins designated as high or medium priority *and* critically overdrafted shall be managed under a groundwater sustainability plan or coordinated groundwater sustainability plans by January 31, 2020. All other high and medium priority basins shall be managed under a groundwater sustainability plan by January 31, 2022.

WATER EFFICIENCY AND CONSERVATION REPORT

This Water Efficiency and Conservation Report demonstrates to the Governor and the public the progress the Department has made toward meeting the Governor's goals. This report identifies successful accomplishments, ongoing efforts, and outstanding challenges.

Introduction

California experiences the most extreme variability in yearly precipitation in the nation. In 2015, California had record low statewide mountain snowpack of only 5 percent of average while 2012-14 were the 4 driest consecutive years of statewide precipitation in the historical record. Now, the 2017 water year (October 1, 2016-September 30, 2017) is surpassing the wettest year of record (1982-83) in the Sacramento River and San Joaquin River watersheds and close to becoming the wettest year in the Tulare Basin (set in 1968-69). These potential wide swings in precipitation from one year to the next show why California must be prepared for either flood or drought in any year.

Therefore, using water wisely is critical. The E.O.s and SAM sections listed in the previous section help demonstrate the connection between water and energy use, (the water-energy nexus), water and climate change, and water and landscaping. Further, the impact of water uses by state agencies goes beyond the scope of these E.O.s and SAM sections and DGS management memos as these documents do not address such related issues as water runoff from landscaping and various work processes and the potential for water pollution or the benefits of water infiltration, soil health and nutrient recycling. However, by using holistic water planning, a well-crafted water plan can not only meet all state requirements but add considerable value and benefits to the organization and surrounding communities.

Department Mission and Built Infrastructure

- Under the direction of the California Government Operations Agency, the California Department of Technology (CDT) maintains statutory authority over Information Technology (IT) projects and operates the state's data centers. CDT provides information technology services to many state, county, federal and local government entities throughout California. Through the use of a scalable, reliable and secure statewide network, combined with expertise in voice and data technologies, CDT delivers comprehensive, cost-effective computing, networking, electronic messaging and training solutions to benefit the people of California.
- The Gold Camp facility, which is owned by the Department of Technology, is 154,250 square feet and divided into a computer room space (41,544 sq. ft.) and an office/computer room support space (112,706 sq. ft.). The computer room and office space utilize three 560 ton evaporative cooling towers which remove heat from the chillers used to pump cool water through the closed loop air handling/conditioning system. Additionally, data center chillers are used to cool the building and were

retrofitted with variable frequency drives to optimize efficiency. The data center also utilizes a 460 ton plate and frame water economizer that is able to take advantage of cooler outside air ambient temperatures to precool condenser water to the chiller. During the winter months the plate and frame, in conjunction with the cooling towers is able to provide enough cooling capacity to bypass and shut down the chillers. Based on meter readings of the cooling towers, and flow meters for the computer room versus office chilled water loops, it is estimated that 73.8% of the GC building water use can directly be attributed to the heat rejection needed for data processing equipment.

Table 1: Total Purchased Water

Purchased Water	Quantity (Gallons)	Cost ($/2016 yr)
Potable	13,803,400	$39,441.46
Recycled Water	0	$ 0
	13,803,400 Gallons	$ 39,441.46

Table 2: Properties with Largest Water Use Per Capita

Building Name	Area (ft^2)	Total Gallons	Total Irrigation in Gallons (if known)	Total Data Center Cooling in Gallons	Gallons per Capita in gallons per person per year (2016)
Gold Camp Data Center	154,250	13,803,400	944,042	9,497,196	6,068
Total for Buildings in This Table	154,250 ft^2				---
Total for All Department Buildings	154,250 ft^2				---
% of Totals	100 %	100 %			---

Table 3a: Properties with Largest Landscape Area

Building Name	Area (ft^2)
Gold Camp Data Center	56,000
Total for Buildings in This Table	56,000 ft^2
Total for All Department Buildings	56,000 ft^2
% of Totals	100 %

One of the most difficult challenges the department faces in meeting the Governors water efficiency and conservation goals is that nearly 74% of the building water use is dedicated for the cooling of the computer room. For each Btu generated by data processing equipment, a corresponding amount of heat must be removed by the chillers from the water loop and in turn, from the chillers by the cooling towers. The cooling towers use water in two ways, primarily through evaporative loss. However, as the water travels in cycles through the towers it increasingly gains a higher concentration of silica and other dissolved solids. When this level reaches a high level, the basins must be released into the storm sewer/storm drain system. In order to save water, the department attempts to run as many cycles as possible without risking damage to the chillers.

- To promote the Governor's water efficiency and conservation goals, the department completed a new drip irrigation project in spring 2016.

Table 3A: Department Wide Water Use Trends (w/o Data Center)

Year	Total Occupancy /year	Total Amount Used (Gallons/year)	Per capita Gallons per person per day
Baseline Year 2009**	418	2,805,100	18.385*
Baseline Year 2013	418	2,732,444	17.91
2016	418	2,536,319	16.62*
2020 Goal			

***To accurately reflect the per capita info, the data center cooling water percentage was omitted in our calculations.**

****** **Problems with meter readings from 2008-2011 make establishing a baseline difficult. 2009 appears to come the closest in accuracy when compared to meter reading taken by the onsite engineers.**

Table 3B: Department Wide Water Use Trends (Building Total)

Year	Total Occupancy /year	Total Amount Used (Gallons/year)	Per capita Gallons per person per day
Baseline Year 2009**	418	9,508,052	62.32
Baseline Year 2013	418	13,386,391	87.74
2016	418	12,859,358	84.28
2020 Goal			

- CDT replaced and/or retrofitted all water fixtures within the building. In addition, the department completed the drip irrigation project in spring 2016. CDT is pursuing a project to replace the three cooling towers with more water efficient models.
- The water efficiency projects to replace/retrofit water fixtures and increase the number of cycles for the cooling towers, completed after 2013 track well with the water reductions show in tables 3A and 3B.

Table 5: Summary of Indoor Water Efficiency Projects Completed or In Progress

Year Started	Water Saved (Gallons/yr)	Cost Savings per Year
2012	N/A	
2013	N/A	
2014	191,000	$668.50
2015	N/A	
2016	N/A	

Table 6: Summary of Boilers and Cooling Systems Projects Completed or In Progress

Year Funded	Water Saved (Gallons/yr)	Number of Systems with Water Efficiency Projects	Percent of Department Heating and Cooling systems
2012	N/A	N/A	N/A
2013	N/A	N/A	N/A
2014	203,231	3	100
2015	N/A	N/A	N/A
2016	N/A	N/A	N/A

Table 4: Summary of Landscaping Hardware Water Efficiency Projects Completed or In Progress

Year Funded	Water Saved (Gallons/yr)	Estimated Annual Cost Savings	Total Number of Projects per Year
2012	N/A	N/A	N/A
2013	N/A	N/A	N/A
2014	N/A	N/A	N/A
2015	N/A	N/A	N/A
2016	1,000,000*	$3,500	1

*When estimating water saved, CDT used 2013 irrigation totals at the time the drip irrigation project was proposed. In 2013, total outdoor irrigation was 3 million gallons of water annually. The drip irrigation project was completed in spring 2016. The 2016 outdoor irrigation total was 950,300, a savings of over 1 million gallons of water compared to 2013.

Table 8: Summary of Living Landscaping Water Efficiency Projects Completed or In Progress

Year Funded	Water Saved (Gallons/yr)	Landscape Area MWELO (ft2)	Climate Appropriate Landscape Area (ft2)
2012	N/A	N/A	N/A
2013	N/A	N/A	N/A
2014	N/A	N/A	N/A
2015	N/A	N/A	N/A
2016	N/A	N/A	N/A

Water Shortage Contingency Plans and Critical Groundwater Basins

Urban water suppliers are required to maintain Water Shortage Contingency Plans that are customized to local conditions. These plans include a staged response to water shortages and

droughts lasting up to three years. When implementing the stages of the Water Shortage Contingency Plan, the water supplier will require increasingly stringent reductions in water use.

State agencies are to be aware of their water suppliers' Water Shortage Contingency Plan and the potential impact each stage may have on their water use. State agencies are to have their own contingency plans in place for their building and landscaping water use in order to respond to any stage implemented by the water supplier.

The Sustainable Groundwater Management Act (SGMA) established a new structure for managing California's groundwater resources at a local level by local agencies. SGMA requires, by June 30, 2017, the formation of locally-controlled groundwater sustainability agencies (GSAs) in the State's high- and medium-priority groundwater basins and subbasins (basins). A GSA is responsible for developing and implementing a groundwater sustainability plan (GSP) to meet the sustainability goal of the basin to ensure that it is operated within its sustainable yield, without causing undesirable results. For those facilities located in critical groundwater basins, state agencies are to work with the local GSA plan.

Table 9: Number of Buildings with Urban Water Shortage Contingency Plans and in Critical Groundwater Basins

Number of Buildings with urban water shortage contingency plans.	Number of buildings in critical groundwater basins	Total Amount of water used by buildings in critical groundwater basins (Gallons)
N/A	N/A	N/A

Building Inventories Summary

Table 10: Summary of Building Inventory Needs

Number of toilets to be replaced with 1.25 gallon per flush	Number of urinals to be replaced	Number of faucet aerators to be replaced	Number of showerheads to be replaced @ 2.0 gpm and trickle flow control	Number of clothes washers to be replaced with Energy Star washers	Number of garbage disposals to be replaced.	Number of pre-rinse valves to be purchased and replaced
0*	0*	0	0	N/A	N/A	N/A

*Urinals and toilets had water saving diaphragms installed. 100% of fixtures were either replaced or retrofitted.

Heating and Cooling Systems Inventories Summary

Table 11: Summary of Boilers and Cooling Systems Inventory

Amount of Water Used for make up (Gallons)	Number of flash tanks to purchase and install	Number of meters to purchase and install	Amount currently reused? (Gallons)	Remaining additional water suitable for other purposes such as irrigation (Gallons)
N/A	N/A	N/A	N/A	N/A

Irrigation Hardware Inventories Summary

Landscaping typically uses 50 percent or more of an agency's total water use. While landscaping serves critical functions, the accompanying irrigation hardware, if not properly installed and maintained, can contribute to water waste. By reviewing and inventorying all irrigation hardware, it is possible to achieve significant water savings.

Table 12: Summary of Irrigation Hardware Inventory

Number of separate meters or sub-meters to purchase and install.	Number of irrigation controllers required with weather or soil moisture adjustment and flow sensing capabilities to purchase and install.	Number of backflow prevention devices to purchase and install.	Number of flow sensors to be purchased and installed	Number of automatic rain shut-off devices needed	Number of new pressure regulators to purchase and install.	Number of new hydrozones needed.	Number of new valves to purchase and install.	Number of filter assemblies to purchase and install.	Amount of drip irrigation to purchase and install (area covered)	Number of booster pumps to purchase and install	Number of rotary nozzles or other high efficiency nozzles to purchase and install
0	0	0	0	0	0	0	0	0	0	0	0

Living Landscape Inventory

Far from being just an aesthetic or ornamental feature, landscaping plays a critical role around public buildings and facilities. From providing safety and security, to reducing local heat islands, suppressing dust, reducing water runoff, maintaining soil health, aiding in water filtration and nutrient recycling, landscaping around public buildings is essential. Further, landscaping in public places frequently surrounds historic places and public memorials as well as provides pleasant public gathering spaces. The health and proper maintenance of these

landscapes is vital to the physical wellbeing of California's people as well as to its social, cultural, political and historical life.

Additionally, the many vital ecosystem functions carried out by living public landscaping are critical in helping California meet its goals for greenhouse gas reduction, climate adaptation, and water and energy efficiency and water conservation.

Urban forests are vital to improve site conditions for occupants and visitors to buildings and the surrounding community.

Table 13: Summary of Living Landscape Inventory

Landscape >500Sq. ft.)	Turf (Sq. ft.)	Number of historical sites Or memorials	MWELO landscape area (Sq.ft.)	Climate appropriate landscape area (Sq.ft.)
Yes	12,914	0	> 5,000 sq. ft.	N/A

Large landscape water use

Large landscape water use often represents a significant percentage of a facility's water use and significant water savings can often be achieved through better irrigation scheduling or inexpensive improvements in irrigation hardware. As part of the Water Use Guidelines and Criteria, the water use for landscape areas over 20,000 sq. ft. shall be tracked through a water budget program.

Table 14. Summary of Large Landscape Inventory and Water Budget

Number of Facility Sites/Locations with > 20,000 sq.ft. of Landscaping	Total Landscape Area per facility	Total Water Budget per facility	Total EPA WaterSense or Irrigation Association Certified Staff
1	N/A*	N/A*	N/A*

*CDT's DGS Groundskeeper supervisor recommends we hire a Certified Landscape Irrigation Auditor to prepare a water budget for our site. DGS does not offer this service and irrigates

according to county ordinance and plant needs. CDT will contract with a third party vendor to develop a total water budget for the Gold Camp facility.

BMPs

Building Best Management Practices (BMPs) are ongoing actions that establish and maintain building water use efficiency. State agencies are required by DGS Management Memo 14-02 to implement the building BMPs outlined below.

Building Water Management BMPS

General Water Management

- The Department's Gold Camp facility has building, cooling tower and irrigation water meters. In addition, on-site building engineers verify water readings 3 times a day.
- DGS actively monitors water leak detection equipment.

Leak Detection and Repair

- DGS custodial staff and on-site building engineers visually inspect all water fixtures daily.
- Faucets and showerheads were replaced with WaterSense aerators and showerheads to fulfill LEED Gold certification in 2014.

Kitchens

- CDT Gold Camp does not have kitchen facilities.

Laundry Facilities

- CDT Gold Camp does not have laundry facilities.

Building Heating and Cooling Systems BMPs

- CDT Gold Camp does not utilize steam traps and or steam lines.
- All piping systems are checked for leaks once per shift (3x per day).
- CDT Gold Camp does not utilize boilers.
- Chilled water supply and return piping is insulated.
- Water samples are taken and tested once per shift and random samples are sent to a water treatment specialist for third party evaluation. The cooling towers at CDT Gold Camp utilize a chemical free Dolphin system for water treatment. The system is checked and calibrated on an annual basis by factory certified technicians.
- Condensate pumps are maintained on a monthly, quarterly, semi-annual, and annual basis.
- CDT GC does not utilize boilers, however the water side of the chillers are inspected on an annual basis. The chiller tubes are chemically cleaned, when needed, to ensure optimal heat transfer efficiency.

- Blowdown is dynamically adjusted by networked cooling tower controllers. Blowdown cycles for the towers are determined by incoming water service quality. The lower the level of incoming TDS, the higher the number of cycles can be run without risk of damaging the chillers. Controller readings of TDS levels are verified by on-shift engineer water testing.

- Evaporative cooling towers are the only systems that consume water for the building. Air cooled chillers have been evaluated, however the entire cooling system for the building would need to be re-engineered to meet the capacity needs for the computer room and office.

Landscaping Hardware Maintenance BMPS

- About 95% of landscape area has Netafim and 5% has pop-up sprinklers. The Netafim is checked and repaired weekly due to frequent squirrel damage. Gold Camp does not hand-water and therefore has zero faucet timers. All hoses have quick-couplers.

Living Landscape BMPs

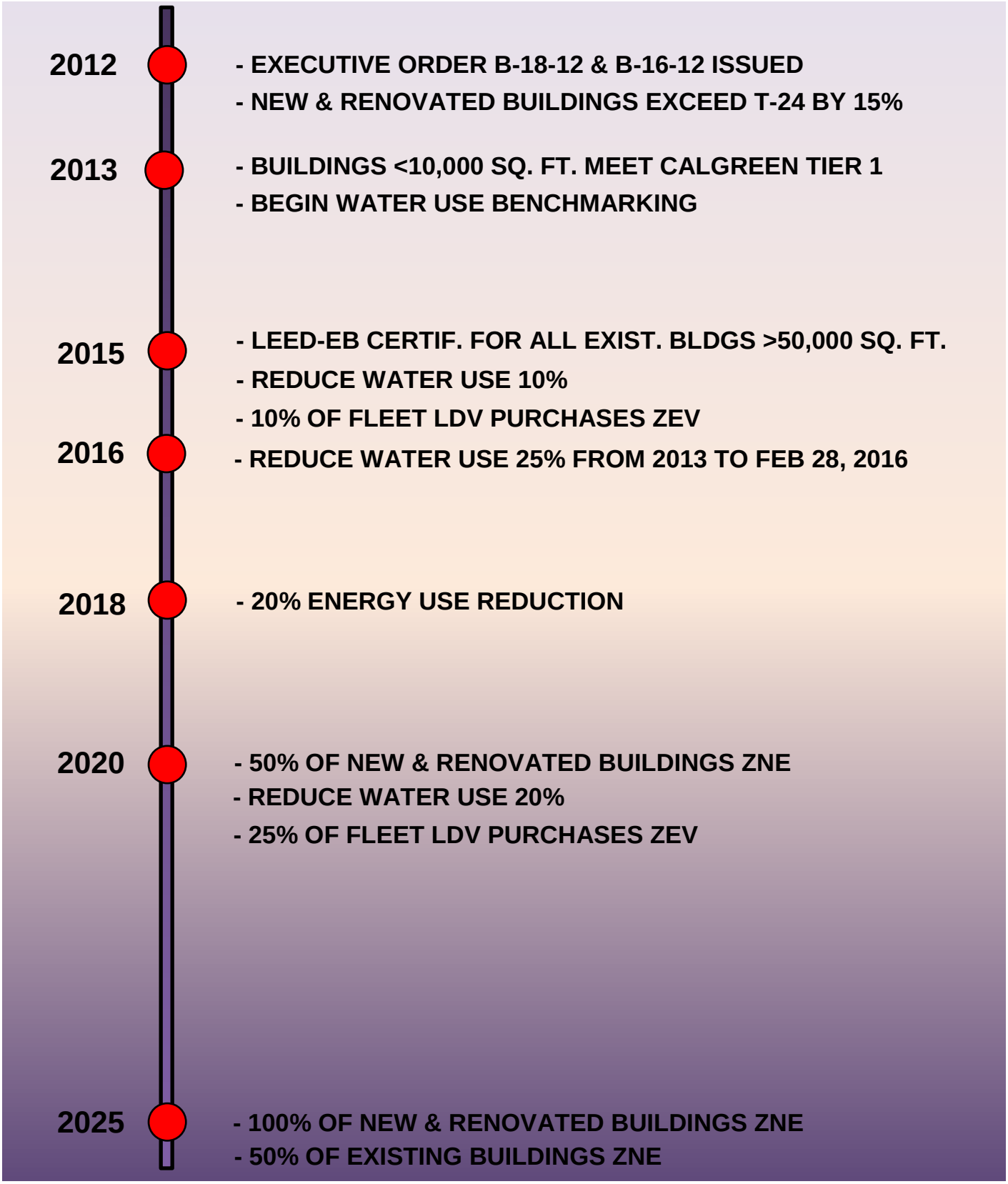
The priorities of plants within Gold Camp's campus is as follows: 1. Trees 2. Shrubs 3. Groundcover 4. Turf. During a drought or other water shortage, trees and large shrubs are at the highest priority for survival. The watering frequency is 3 days a week. Mulch is replaces every three years. All bare soil is covered by a minimum of 3 inches of mulch.

The irrigation schedule is adjusted for seasonal changes twice yearly. The system is tested monthly to check for leaks and misalignment, and other malfunctions. Repairs are done immediately when needed. Watering is done early in the morning or in the evening when wind and evaporation are lowest. Watering is never done between 10am and 6pm. CDT sprinklers direct water only to landscape areas, avoiding hardscapes such as parking lots, sidewalks, or other paved areas. No irrigation water leaves the site. Most plants are native to the climate zone and are watered using WUCOLS plant water use requirements. Gold Camp does not have a bio-swale or other form of rain water capture onsite, but would consider it if practical. Currently, there are minimal plantings for pollinators.

Monitoring, Reporting and Compliance

The Department of Technology adheres to all guidelines for monitoring water use and reporting baseline and annual water use for compliance with the water use reduction targets.

SUSTAINABILITY MILESTONES & TIMELINE



RESPONSIBLE DEPARTMENT, PROGRAMS AND EMPLOYEES

Indoor Water Efficiency Projects In Progress First initiative	
Facility and Administrative Services Branch	Mark Standley, Facility and Administrative Service Branch Manager Ian Noumov, Senior Information Systems Analyst Freddie Sells, Facility Services & Physical Security Analyst Sarah Do, Sustainability Coordinator

Boilers and Cooling Systems Projects In Progress	
Facility and Administrative Services Branch	Mark Standley, Facility and Administrative Service Branch Manager Ian Noumov, Senior Information Systems Analyst Sarah Do, Sustainability Coordinator

Landscaping Hardware Water Efficiency Projects In Progress	
Facility and Administrative Services Branch	Mark Standley, Facility and Administrative Service Branch Manager Ian Noumov, Senior Information Systems Analyst Freddie Sells, Facility Services & Physical Security Analyst Sarah Do, Sustainability Coordinator

Living Landscaping Water Efficiency Projects In Progress	
Facility and Administrative Services Branch	Mark Standley, Facility and Administrative Service Branch Manager Ian Noumov, Senior Information Systems Analyst Freddie Sells, Facility Services & Physical Security Analyst Sarah Do, Sustainability Coordinator

Buildings with Urban Water Shortage Contingency Plans In Progress	
Facility and Administrative Services Branch	Mark Standley, Facility and Administrative Service Branch Manager Ian Noumov, Senior Information Systems Analyst Freddie Sells, Facility Services & Physical Security Analyst Sarah Do, Sustainability Coordinator