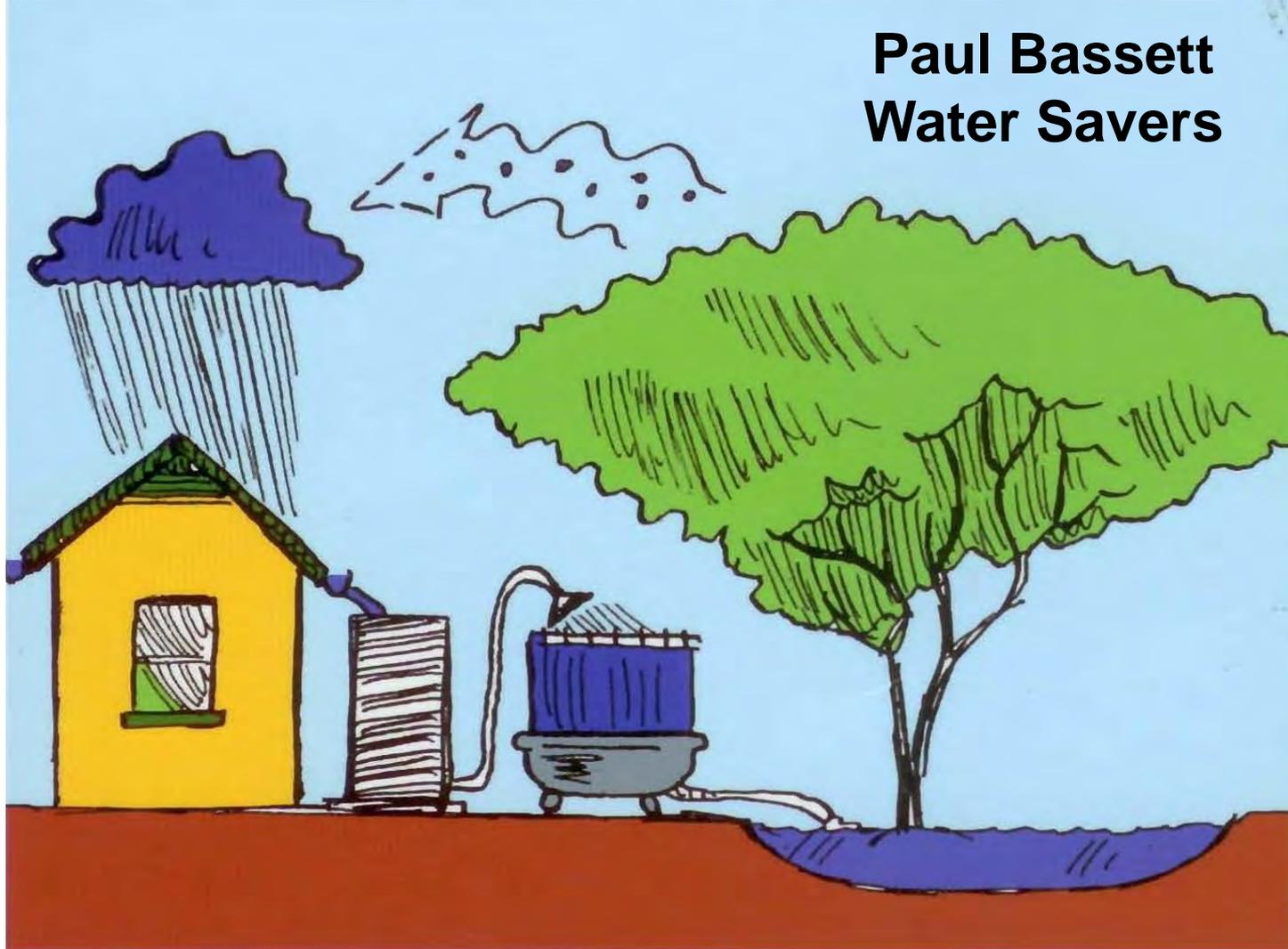




# Innovative Water Technologies



**Paul Bassett  
Water Savers**



*Assistant Secretary of the Army (Installations, Energy & Environment)*



# Agenda

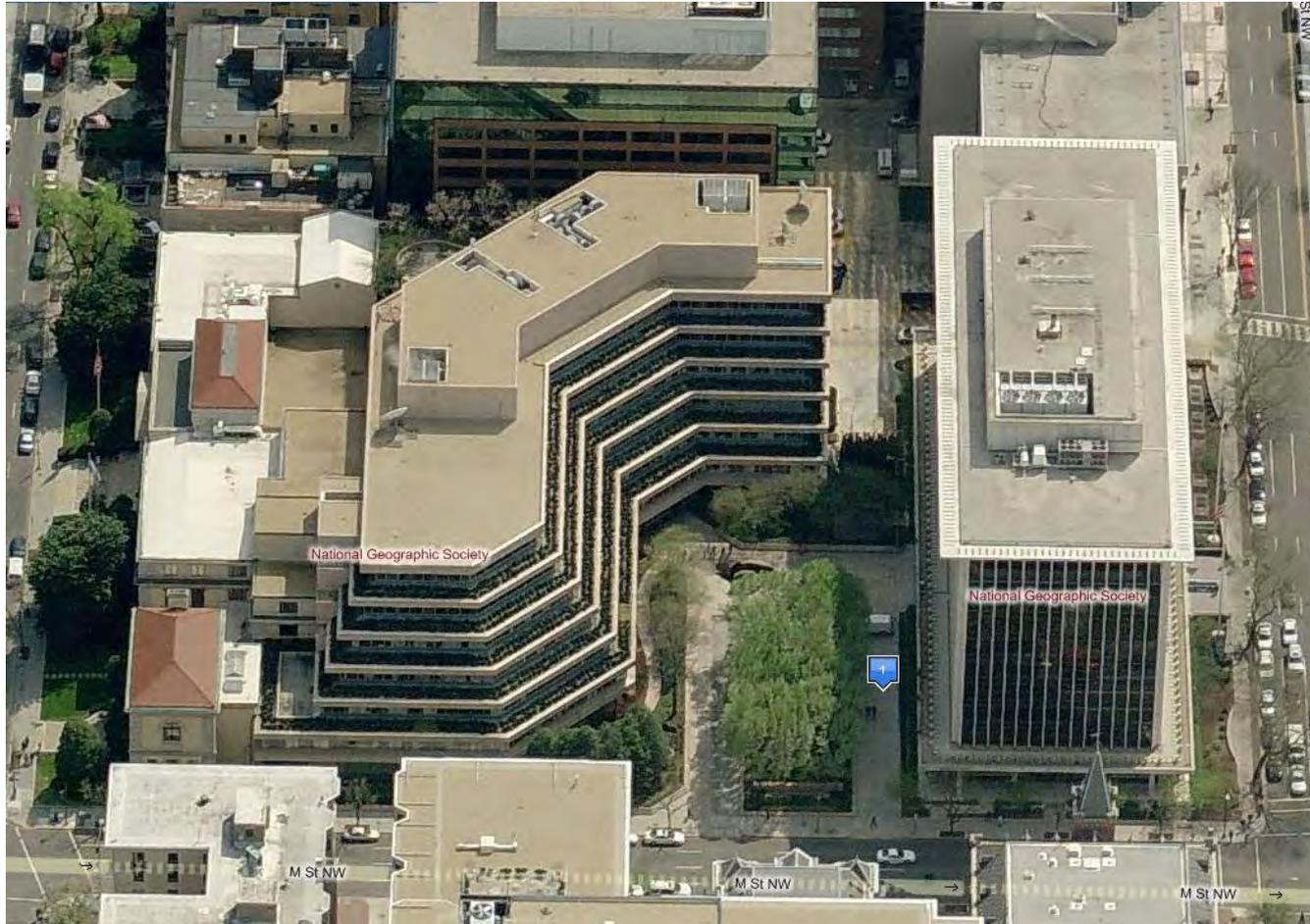


1. Introduction
2. Green Roofs
3. Rainwater Collection
4. Smart Irrigation
5. Advanced Metering
6. Air Handler Condensation Collection
7. Questions & Answers





# 1<sup>st</sup> LEED Pilot Building



*Assistant Secretary of the Army (Installations, Energy & Environment)*



U.S. ARMY

# Chesapeake Bay Watershed



Water Savers, LLC



The Chesapeake Bay watershed (drainage basin) extends about five hundred miles north from Suffolk, VA (near Norfolk and Virginia Beach) to the headwaters of Otsego Lake, near Cooperstown, NY, and east from mountain streams near Blacksburg, VA to Berlin, MD (near Ocean City). It is essentially a giant, sprawling system of rivers that all drain into one shallow tidal basin, the Chesapeake Bay and its tidal tributaries (average depth, only 21 feet).



# Storm Water Runoff



*Assistant Secretary of the Army (Installations, Energy & Environment)*



U.S. ARMY

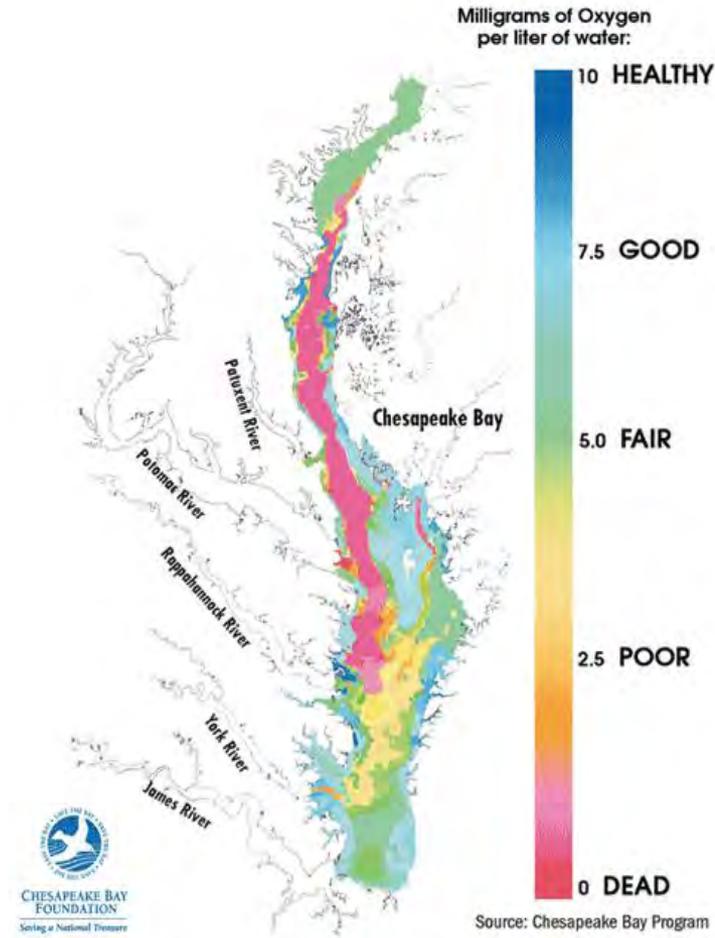
# Bay after heavy spring rains



*Assistant Secretary of the Army (Installations, Energy & Environment)*



# Dead Zones in the Bay





# 1<sup>st</sup> Green Roof at US Capitol



On March 1, 2007, the Speaker of the House Nancy Pelosi and the Majority Leader Steny Hoyer directed the Chief Administrative Officer of the House to develop a “Green the Capitol Initiative” that would demonstrate leadership to the nation by providing an environmentally responsible and healthy working environment for employees.



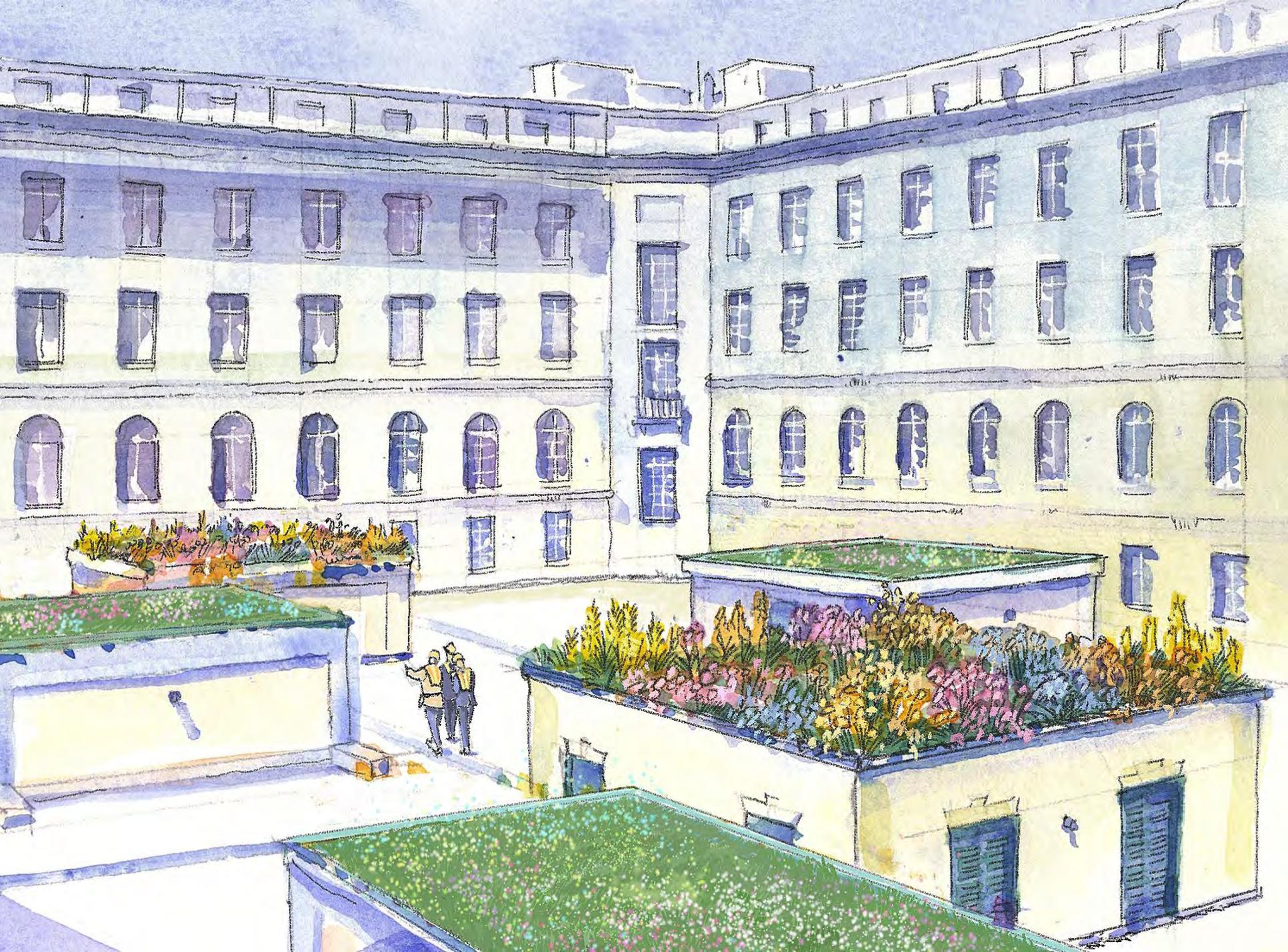


# Cannon House Office Bldg.



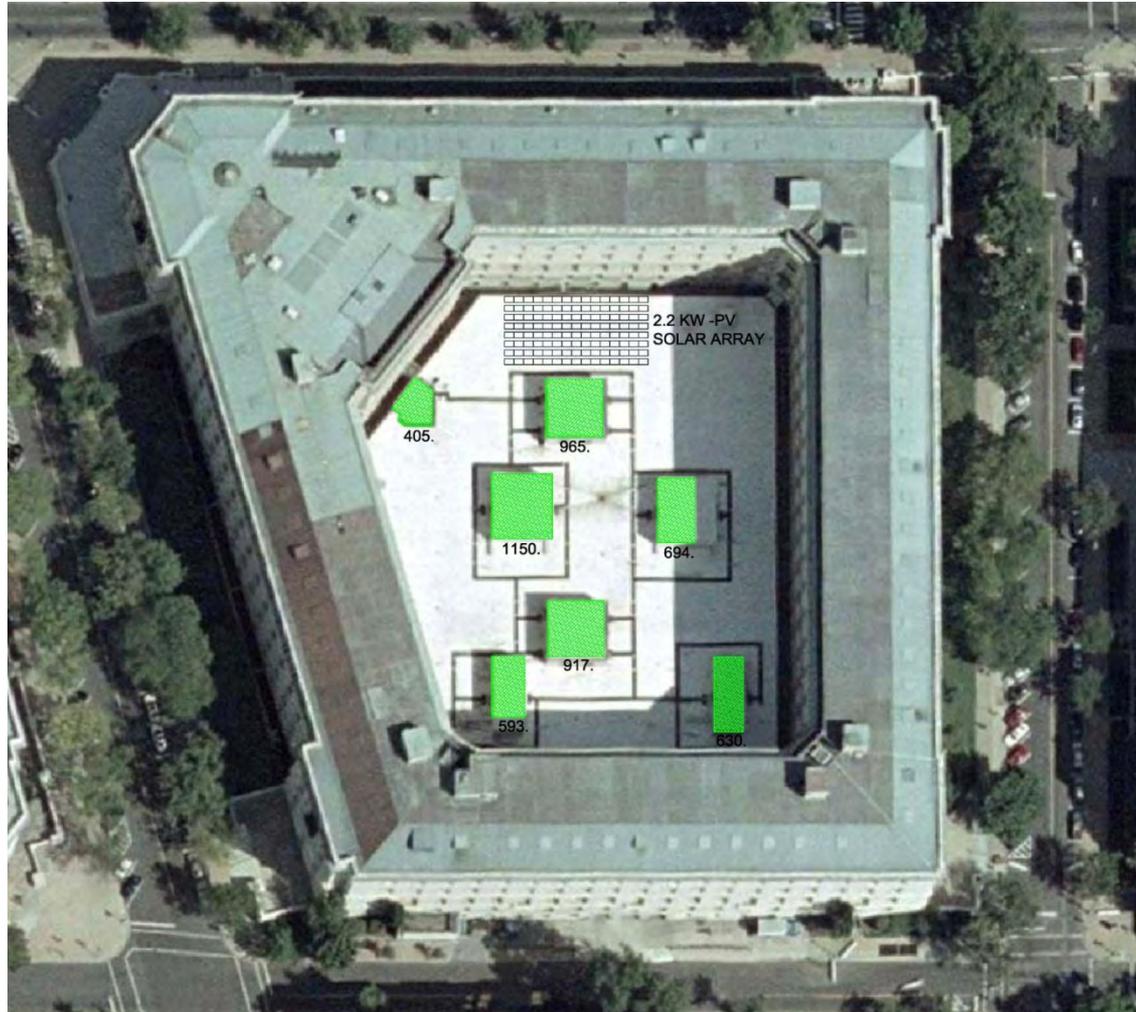
The Cannon House Office Building, completed in 1908, is the oldest congressional office building as well as a significant example of the Beaux Arts style of architecture. It occupies a site south of the Capitol bounded by Independence Avenue, First Street, New Jersey Avenue, and C Street S.E. The building was occupied by the 60th Congress on December 12, 1907. The House, by resolution, directed the Speaker to appoint a select committee of five members to arrange for distribution of rooms.







# Scope of Work





**OPPORTUNITY**



**CONCEPTION**



**CONSTRUCTION**



**COMPLETION**





# Irrigation for Greenroof



## IRRIGATION LEGEND

- BASELINE DRIP MISER SOIL MOISTURE CONTROLLER
- BASELINE 1.5" TWO WIRE SOIL MOISTURE SENSOR (BL-5315)
- BASELINE 1 VALVE BI-DECODER (BL-S201)
- GRUNDFOS RAINWATER PUMP
- 5 MICRON RAINWATER FILTER
- RAIN BIRD QUICK COUPLING VALVE (3RC)
- RAIN BIRD PLASTIC REMOTE CONTROL VALVE (100-PSA)
- RAINWATER HARVESTING CISTERN
- MAINLINE PIPE: 1" HDPE
- LATERAL LINE PIPE: 1" HDPE
- DRIP LINE HEADER AND EXHAUST PIPE: .5" HDPE
- NETAFIM TECHLINE CV 17MM DRIPPERLINE MODEL (TLGV-18) FLOW RATE IS .6 GPM
- NETAFIM TECHLINE ROW SPACING IS 15" AND EMITTER SPACING IS 12"

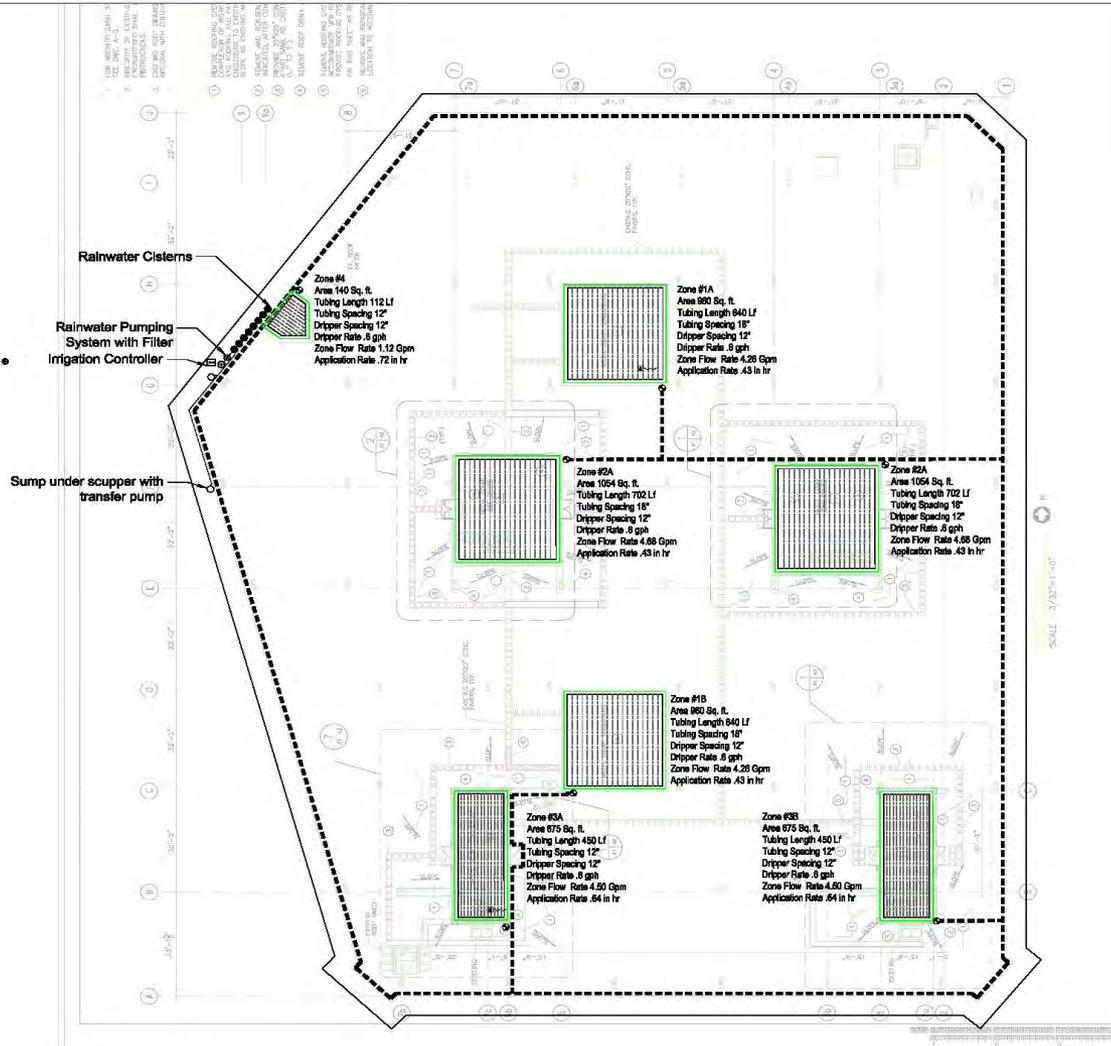
SOIL MOISTURE SENSOR INSTALLED IN GREEN ROOF SOIL MEDIA



SUB SURFACE DRIP TUBING INSTALLED IN GREEN ROOF SOIL MEDIA



GREEN ROOF PLANTINGS ONE YEAR AFTER COMPLETED INSTALLATION



Water Savers, LLC  
 224 Wilson Circle  
 7701 Westchase Rd.  
 Spring, TX 77379  
 409-993-1232  
 www.watersavers.com

PROJECT TITLE  
**CANNON HOUSE OFFICE BUILDING**  
 Green Roof Demonstration Project  
 Washington, DC 20515



IRRIGATION/  
 RAINWATER  
 LAYOUT

DESIGNED: J. BARRETT  
 DRAWING: J. BARRETT  
 CHECKED: J. BARRETT  
 SCALE: 1/8" = 1'-0"

PROJECT NUMBER  
 2010-25

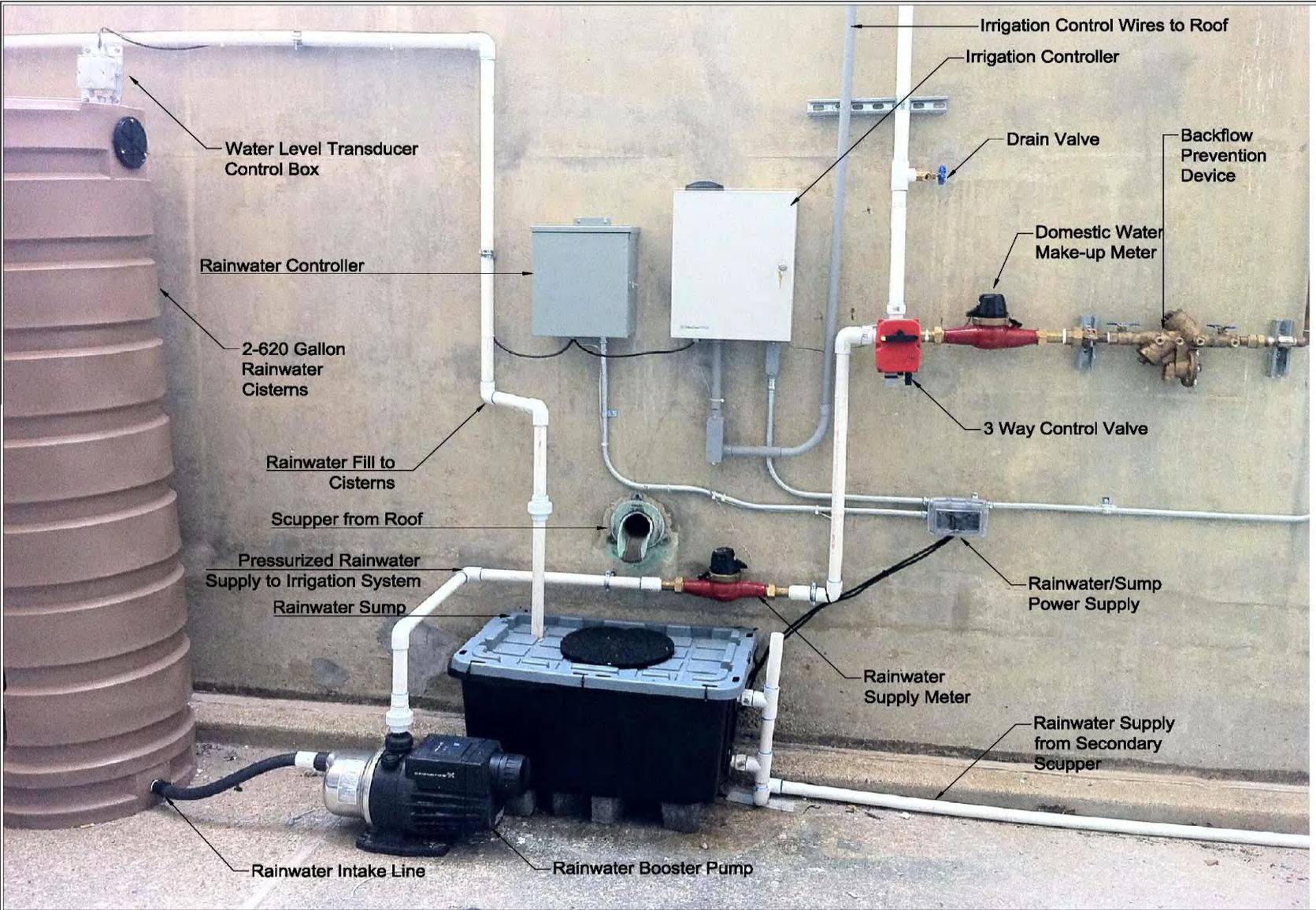
IR.1.1  
 1 OF 1

DESIGN DEVELOPMENT





# Rainwater to Irrigation



Water Savers, LLC

Residential Design & Consulting  
Water Conservation  
798 Maryland Route 2 South  
Cockeysville, MD 21038  
Suite 10  
410.426.1010  
www.watersavers.com

PROJECT TITLE

Architect of the Capitol  
Cannon Building  
Independence Avenue and 1st Street, SE  
Washington, DC 20003



DISSEMINATION STATEMENT



PROJECT IDENTIFICATION

RAINWATER  
Cannon Building  
Greenroof

DRAWN: J. SHERIDAN  
DESIGNED: J. SHERIDAN  
DATE: 06/15/14  
SCALE: N/A

PROJECT NUMBER

2009-14

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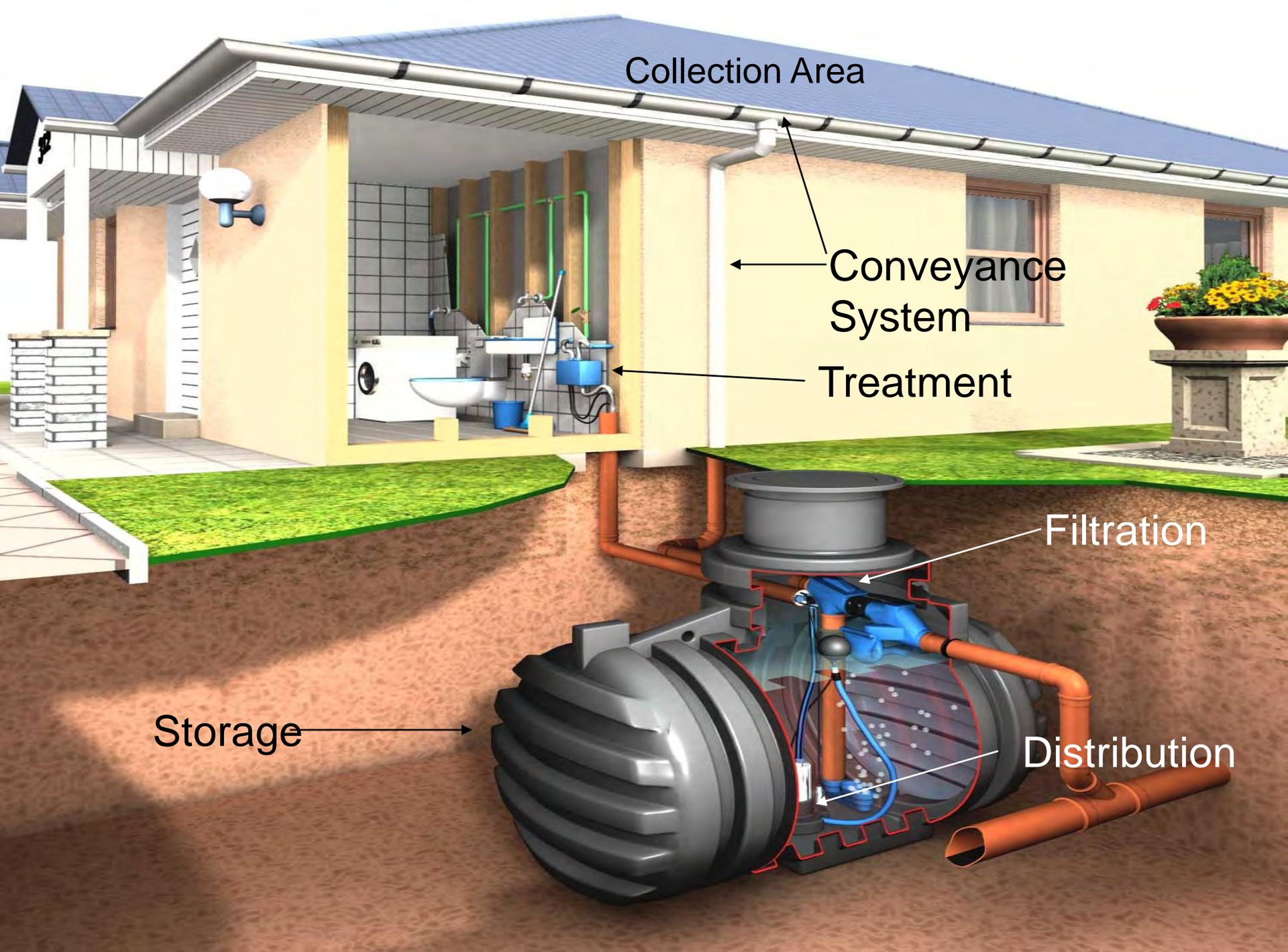
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1 OF 1

Schematic



Collection Area

Conveyance System

Treatment

Filtration

Storage

Distribution

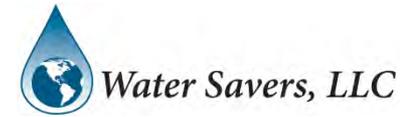


# Smart Irrigation ????





# Sensor Based Control



## Soil Moisture Sensor

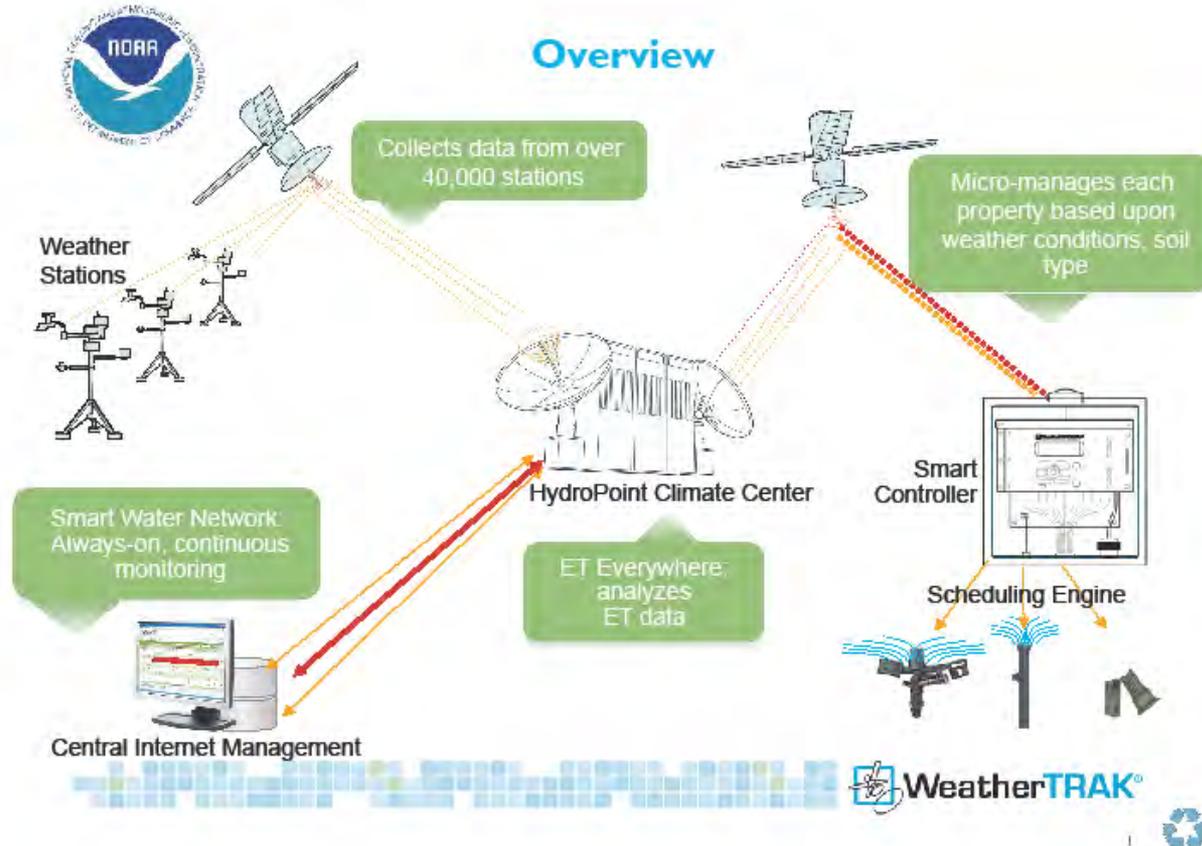
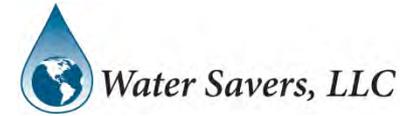


## Weather Based Sensor





# Web-Enabled Control System





# Low Application Sprinklers



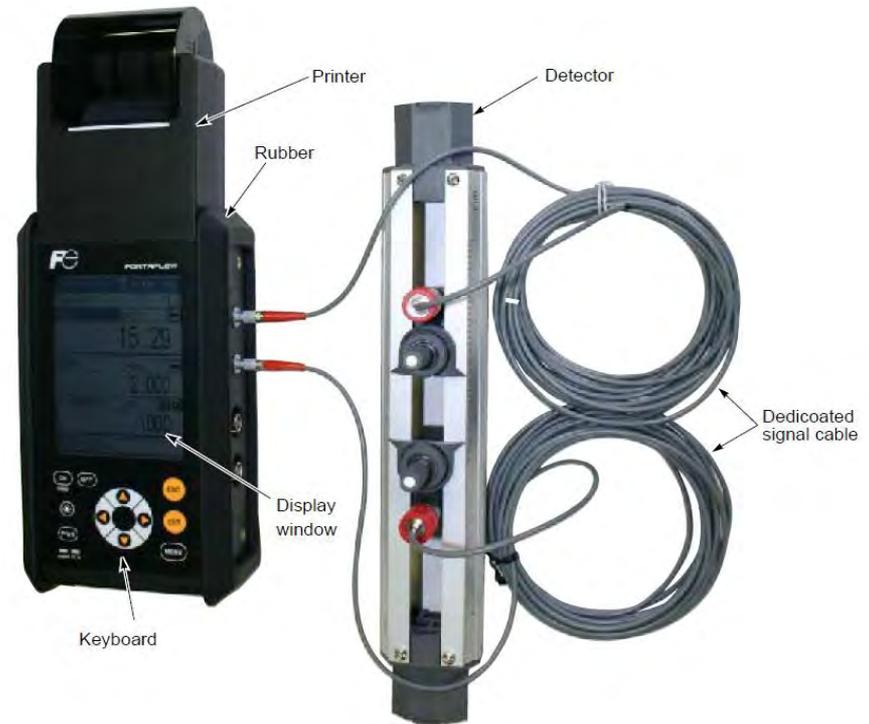


# Subsurface Drip Irrigation



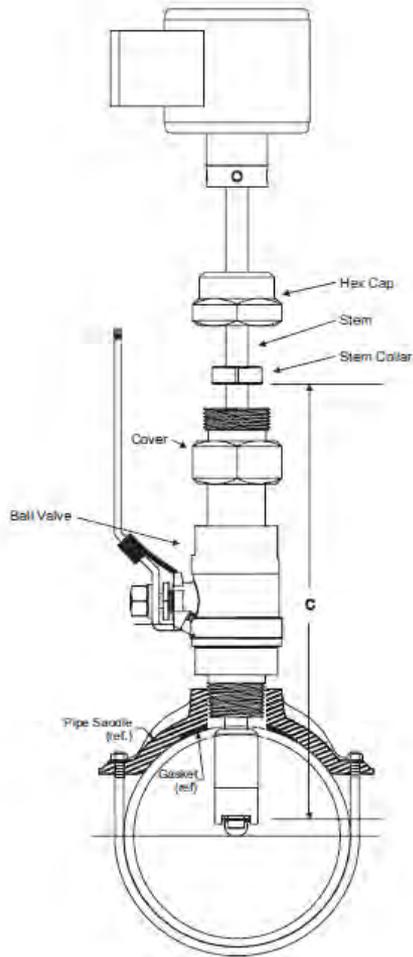
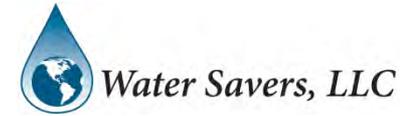


# Ultrasonic Flow Meter





# Insertion Meters w/Loggers





# Hot Tap Machine



## IFT T1-2 TAPPING MACHINE



### Designed by Tappers for Tappers

- Plugs into standard 110 outlet
- Built in drive unit
- Taps all types of pipe quickly and safely
- 3/4" - 2" pressure tap-ins
- 3/4" - 2" compatible for line stopping
- Total weight of machine- 28lbs..

Operating max. pressure 300 psi. @ 100° F

Operating temperature 250° F @ 200 psi.

Higher temperature kit is available

### T1-2 Tapping Machine & Accessories

3/4" – 2" Hot Tapping

\* Rated the best tapping machine in the industry.

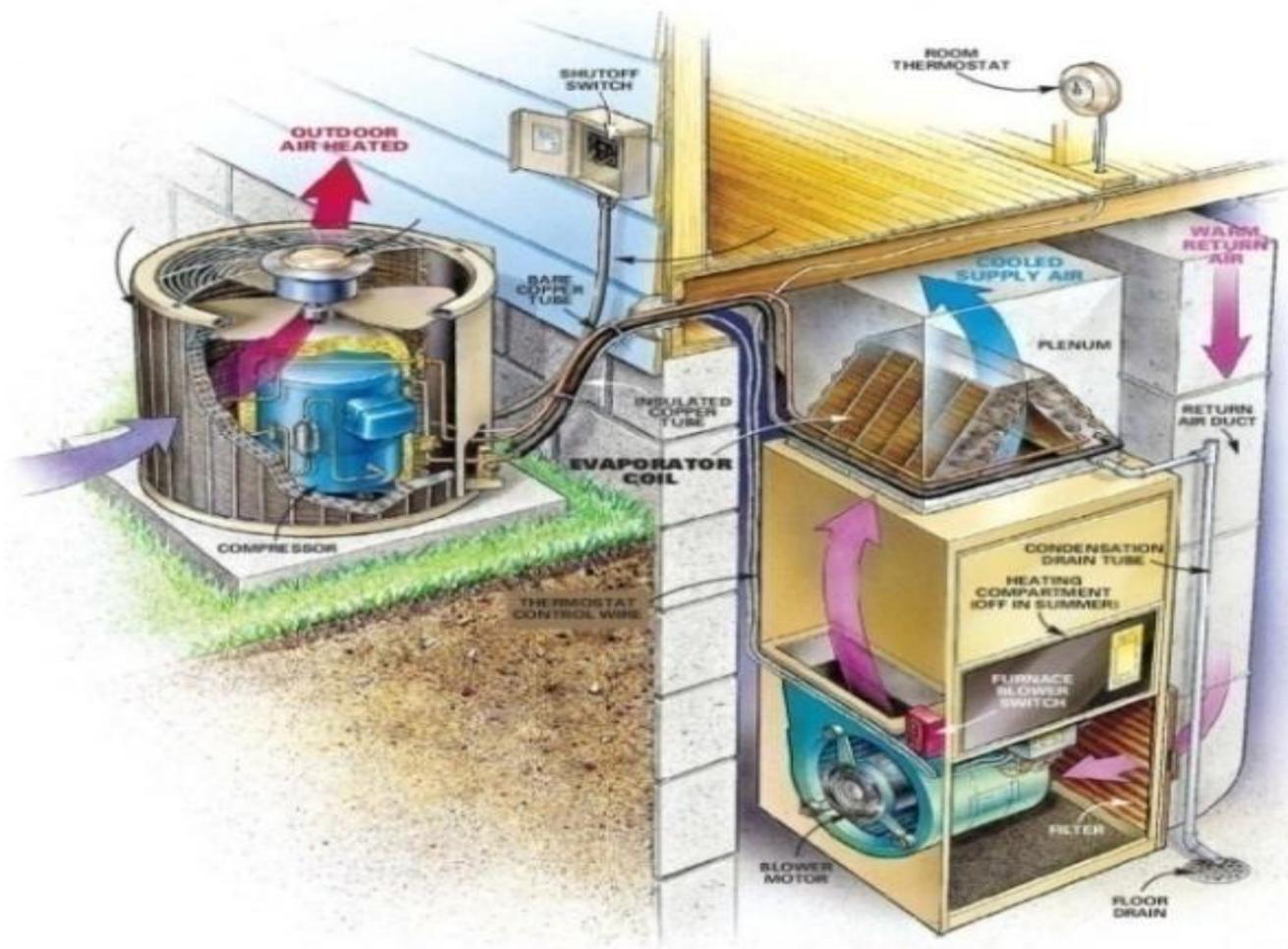
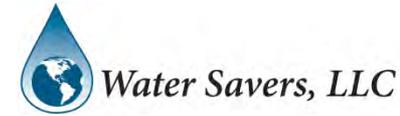


# Insertion Meter Location



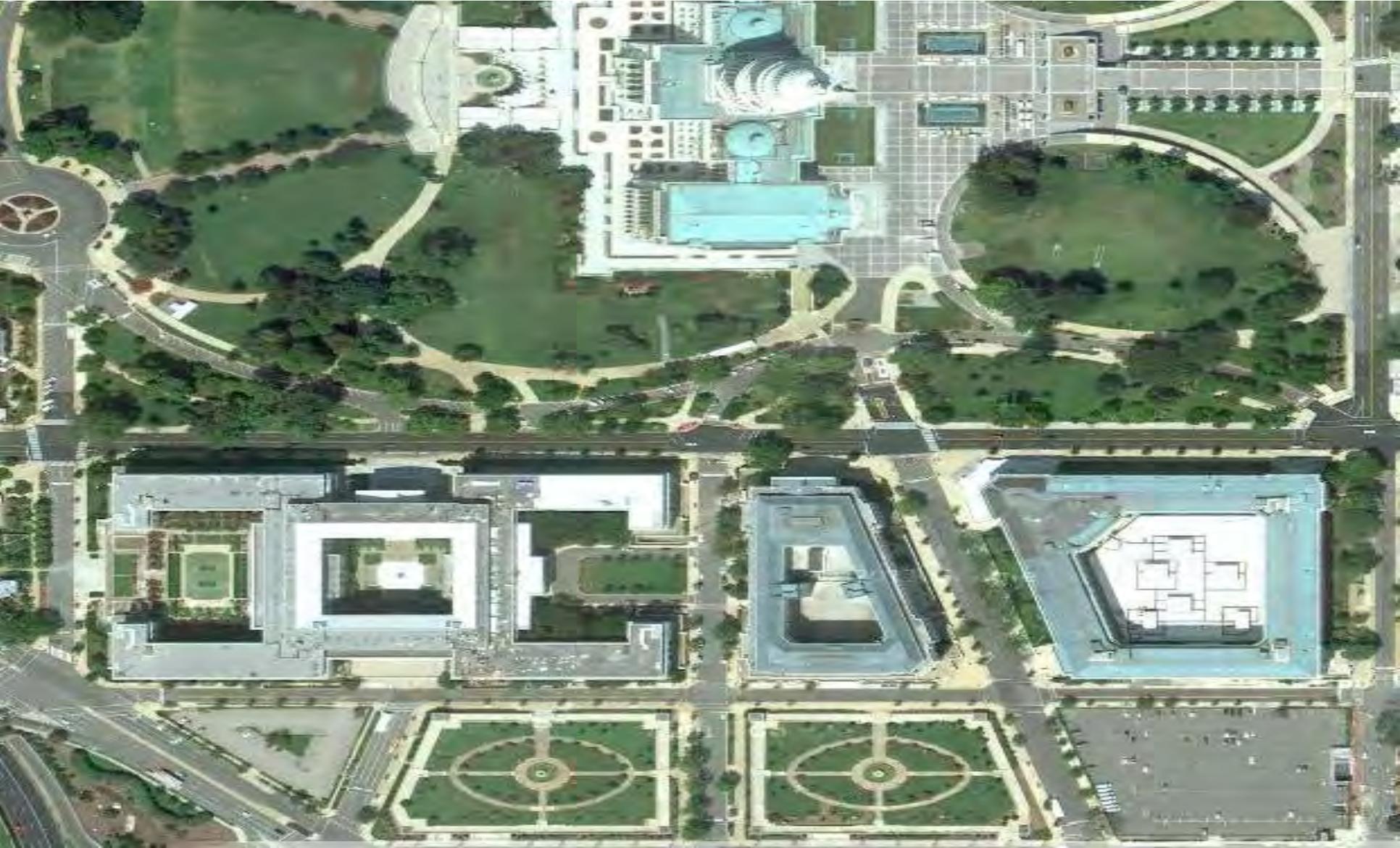
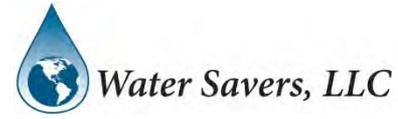


# AHU Condensation Collection



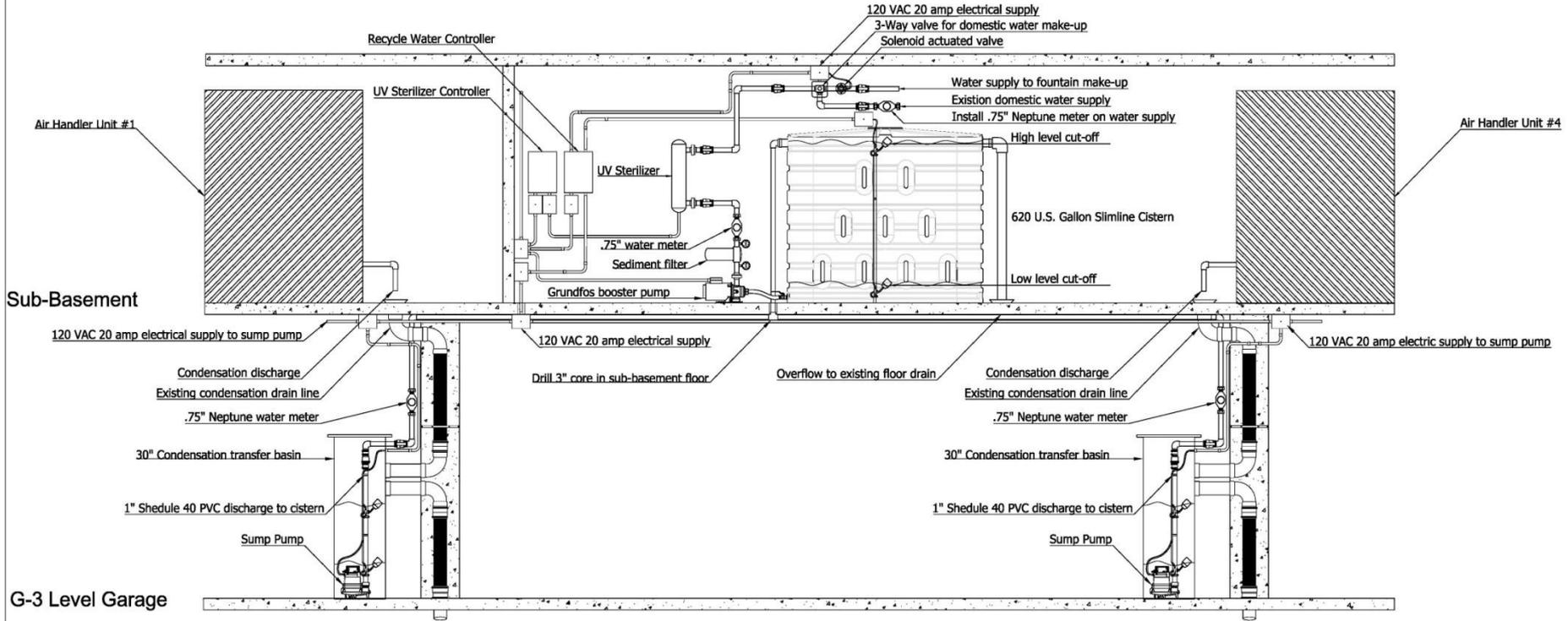


# US House of Representatives









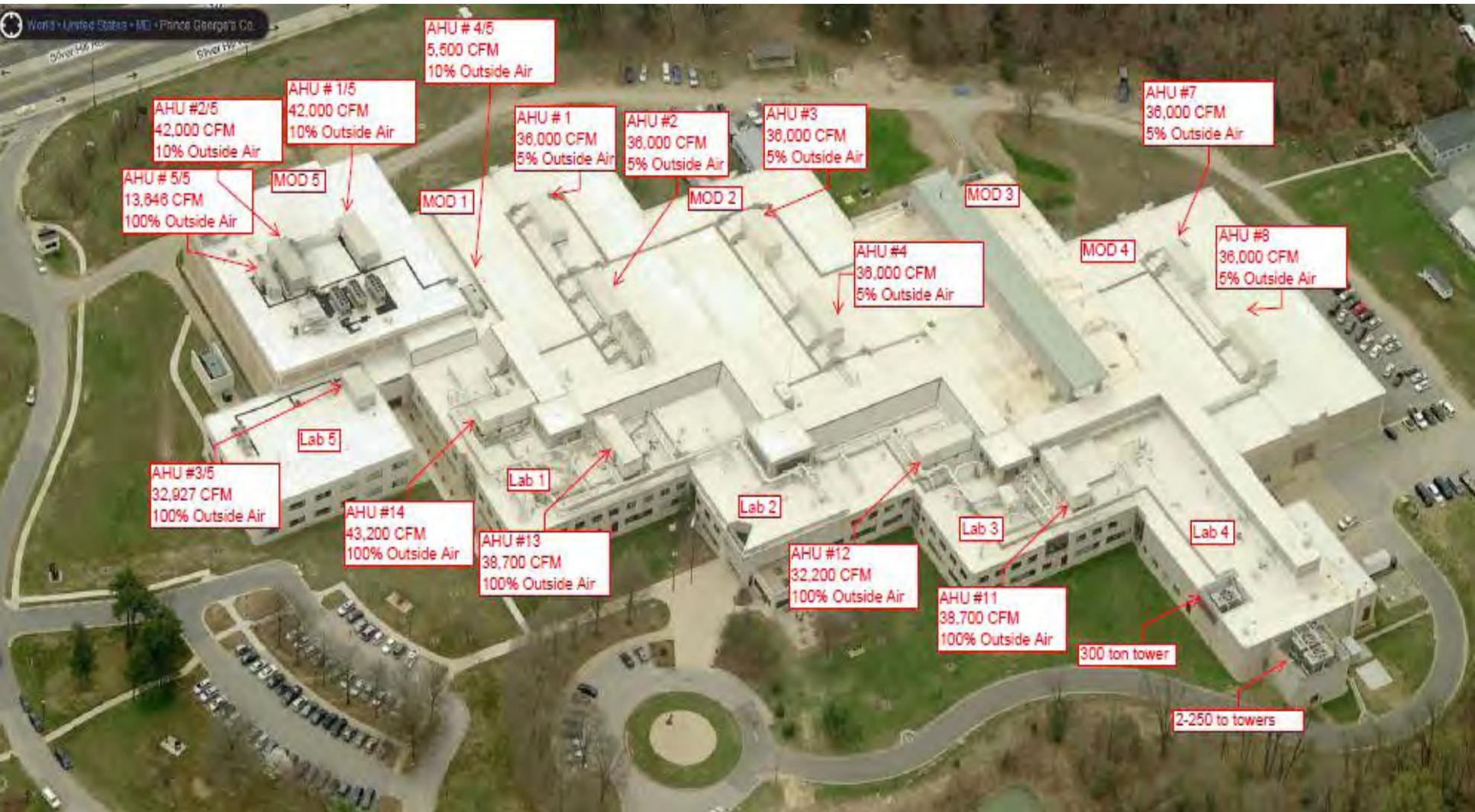
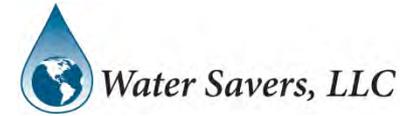


# Smithsonian Museum Support



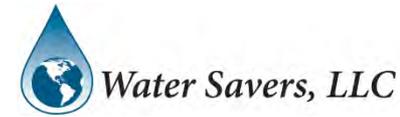


# AHU Locations





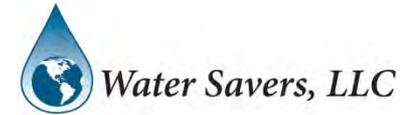
# AHU #14 100% Outside Air



<u>AHU Information</u>			<u>Return Air Conditions</u>			<u>Air Conditioning Set Points</u>				
43,200	CFM Rating		70	Temp.		68	Temp.			
100%	Outside Air Percentage		20%	RH %		20%	RH %			
0%	Return Air Percentage									
<u>Outside Air Conditions</u>			<u>Mixed Air Conditions</u>			<u>AHU Condensate Produced</u>				
Month	Temp.	RH %	Month	Temp.	RH %	Month	GPM	Runtime %	gallons	lbs.
Jan	32	56%	Jan	32	56%	Jan	139	10%	19,993	166,540
Feb	40	51%	Feb	40	51%	Feb	122	10%	17,616	146,741
Mar	46	54%	Mar	46	54%	Mar	131	20%	37,638	313,523
Apr	59	60%	Apr	59	60%	Apr	156	30%	67,185	559,648
May	68	63%	May	68	63%	May	169	50%	121,546	1,012,482
Jun	77	57%	Jun	77	57%	Jun	146	75%	157,324	1,310,509
Jul	82	57%	Jul	82	57%	Jul	144	80%	166,300	1,385,279
Aug	77	63%	Aug	77	63%	Aug	165	90%	214,232	1,784,555
Sep	71	77%	Sep	71	77%	Sep	220	80%	253,809	2,114,226
Oct	57	68%	Oct	57	68%	Oct	187	20%	53,748	447,718
Nov	53	62%	Nov	53	62%	Nov	163	10%	23,403	194,944
Dec	42	57%	Dec	42	57%	Dec	144	10%	20,788	173,160
						TOTAL			1,153,581	9,609,326



# TOTAL AHU Calculations



AHU #	Location of AHU	Velocity-CFM	Condensation Produced (gallons)	Water Rate (\$6.48)	Sewer Rate (\$8.30)	Total Water/Sewer Combined (\$14.78)	Outside Air %
1	Mod 5	42,000	112,154	\$726.8	\$930.9	\$1,657.6	10%
2	Mod 5	42,000	112,154	\$726.8	\$930.9	\$1,657.6	10%
3	Lab 5	32,927	879,258	\$5,697.6	\$7,297.8	\$12,995.4	100%
4	Mod 5	5,500	14,687	\$95.2	\$121.9	\$217.1	10%
5	Mod 5	13,646	364,393	\$2,361.3	\$3,024.5	\$5,385.7	100%
1	Mod 1	36,000	48,066	\$311.5	\$398.9	\$710.4	5%
2	Mod 1	36,000	48,066	\$311.5	\$398.9	\$710.4	5%
3	Mod 2	36,000	48,066	\$311.5	\$398.9	\$710.4	5%
4	Mod 2	36,000	48,066	\$311.5	\$398.9	\$710.4	5%
7	Mod 4	36,000	48,066	\$311.5	\$398.9	\$710.4	5%
8	Mod 4	36,000	48,066	\$311.5	\$398.9	\$710.4	5%
11	Lab 3	38,700	1,033,416	\$6,696.5	\$8,577.4	\$15,273.9	100%
12	Lab 2	32,200	859,845	\$5,571.8	\$7,136.7	\$12,708.5	100%
13	Lab 1	38,700	1,033,416	\$6,696.5	\$8,577.4	\$15,273.9	100%
14	Lab 1	43,200	1,153,581	\$7,475.2	\$9,574.7	\$17,049.9	100%
TOTAL			5,947,432	\$37,916.4	\$48,565.8	\$86,482.2	

<b>Total of AHU w/100% Outside Air</b>	<b>5,323,909</b>	<b>\$34,498.9</b>	<b>\$44,188.4</b>	<b>\$78,687.4</b>
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WSSC Rates      \$6.48              \$8.30              \$14.78



# Collecting Rainwater



World • United States • MD • Prince George's Co.



25 feet 10 m