

# This presentation premiered at WaterSmart Innovations

[watersmartinnovations.com](http://watersmartinnovations.com)



# Water Harvesting

For Commercial & Institutional Buildings

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wahaso

WATER HARVESTING SOLUTIONS

# Learning Objectives

- Understand water harvesting terms & trends
- Learn the approaches and benefits of harvesting.
  - How does LEED certification apply?
- Understand viable sources and uses of rainwater, greywater and groundwater
- Understand the major components of a commercial harvesting system
- Understand how the principles are applied
- Address FAQ's

# What is "Water Harvesting"?

*Water harvesting is the collection, cleaning, storage and recycling of rainwater, stormwater, greywater and other sources to replace or reduce the consumption of municipal potable water.*

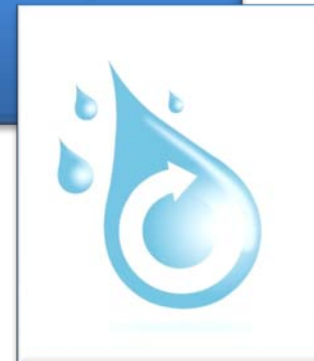
# Trends Support Water Harvesting

Growing Scarcity of Fresh, Potable Water

Growing Interest in Sustainable Building Practices

Growing Concerns Regarding Stormwater Management and the Environment

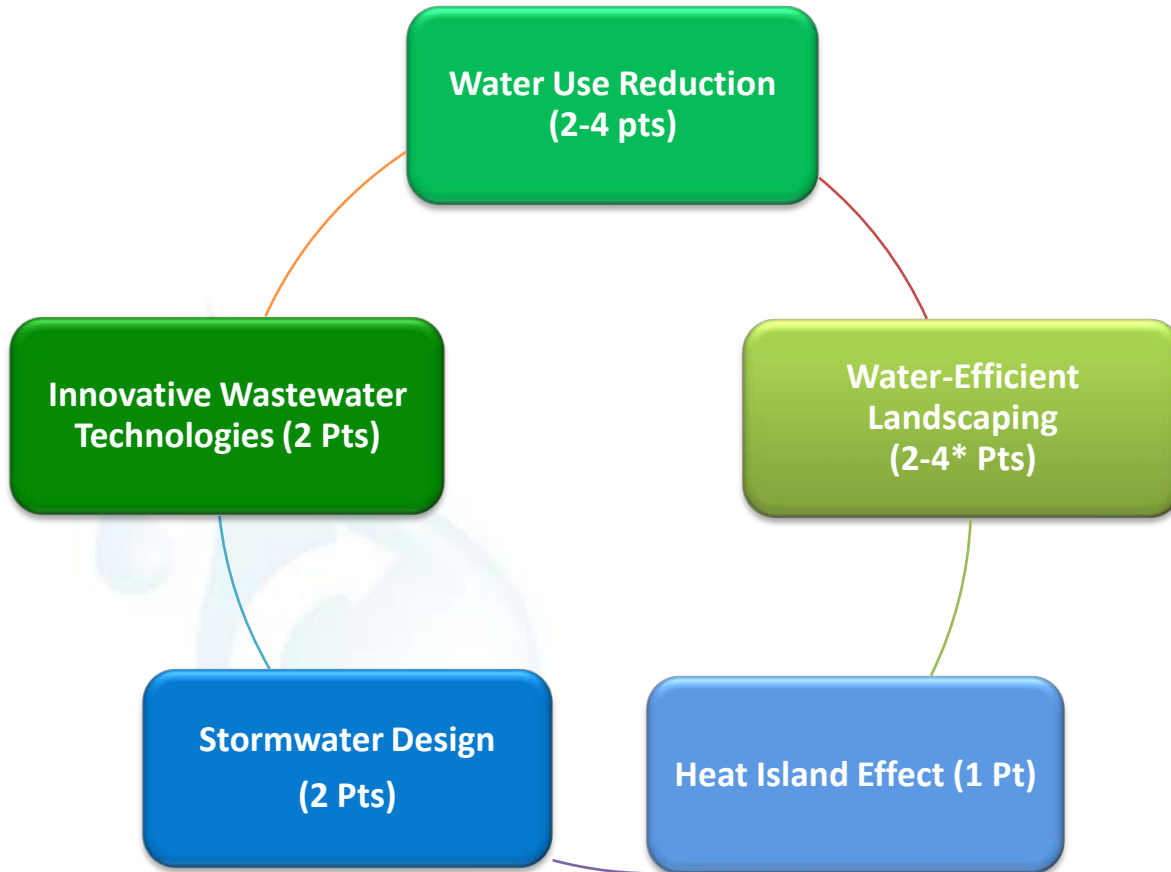
Regulatory Compliance and Incentives



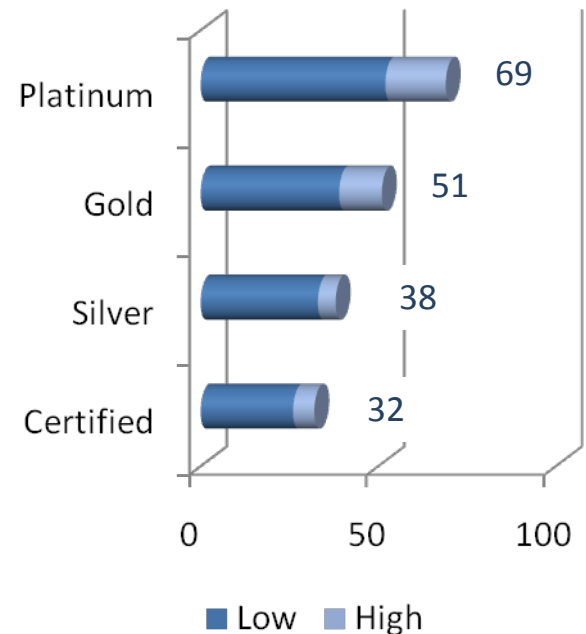
# Why Harvest Water?

- Retain and utilize stormwater
  - Save money on municipal water and sewer charges
  - Protect the environment
- 
- “Green” building certification
  - Regulatory requirements, incentives
  - Higher resale
  - Good public relations

# LEED Certification is a Driver 10 or More LEED Points Available

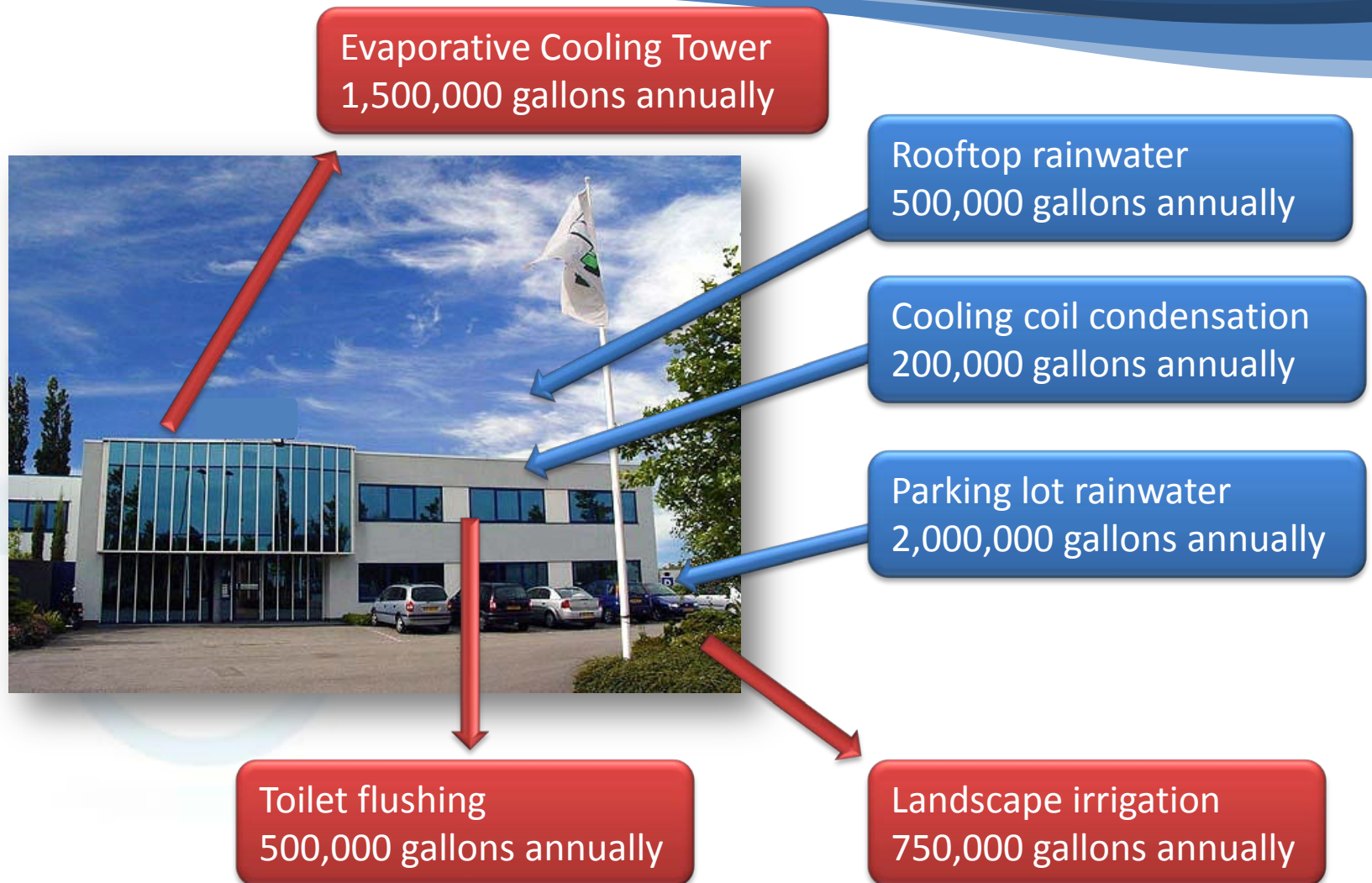


LEED Certification Levels



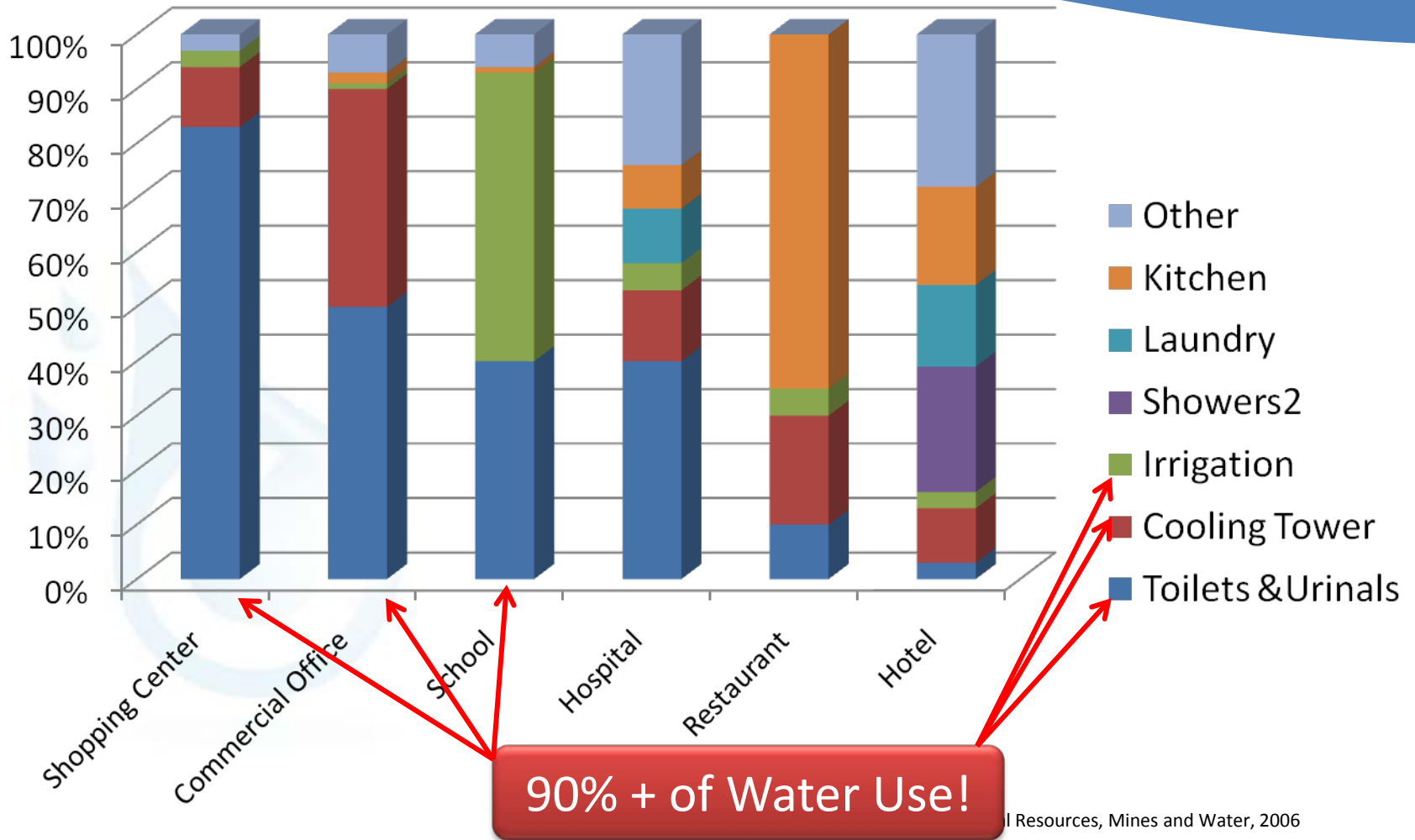
\* 2009 Proposed Changes

# Buildings Present Harvesting Opportunity





# Most Water Use in Commercial Buildings can be Replaced with Harvested Rainwater and Stormwater



# The Greywater Conundrum

- A building's long useful life
- Greywater payout
- Predictable supply
- *One chance to make it happen!*

**2010**

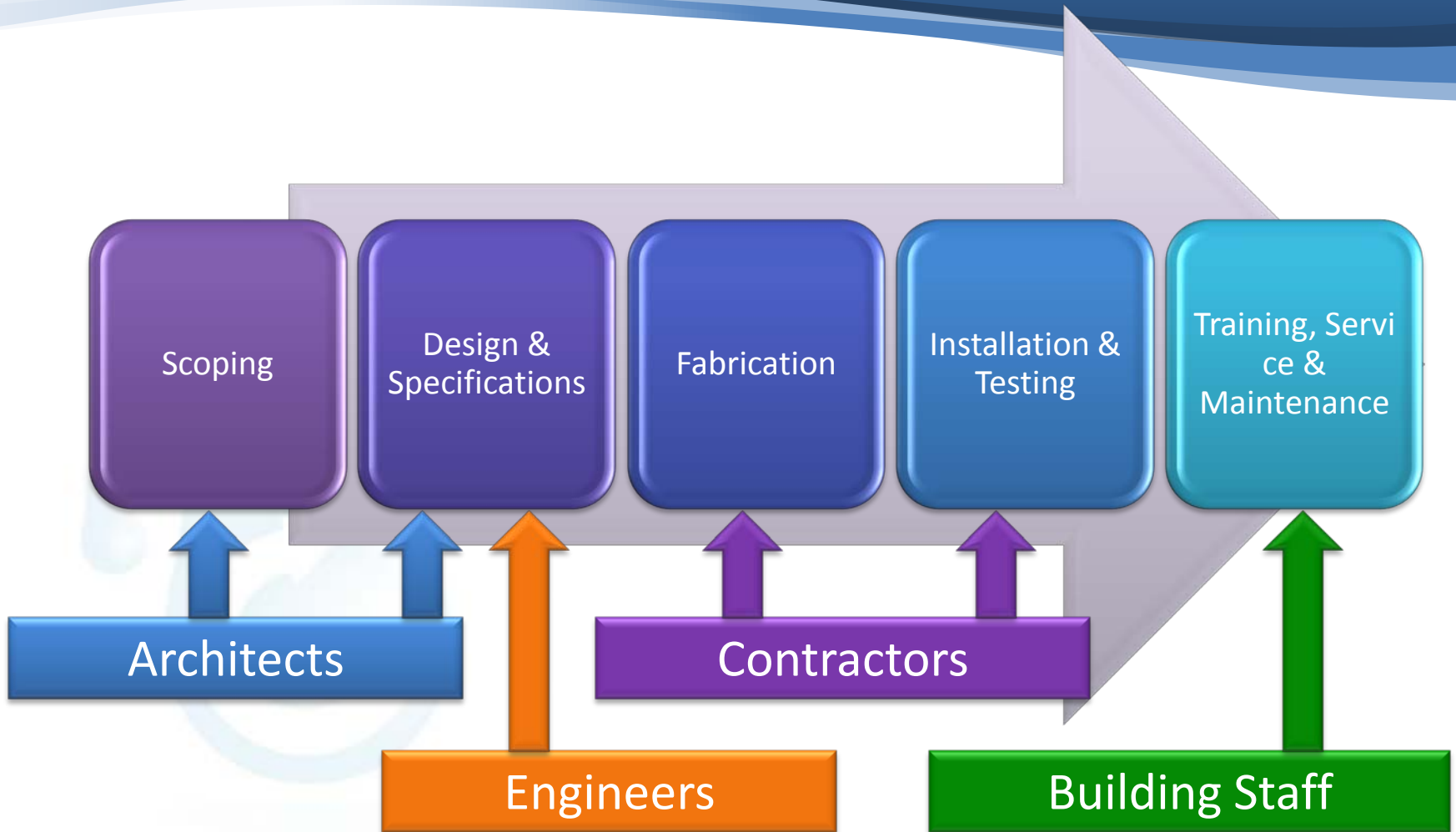


**2012**

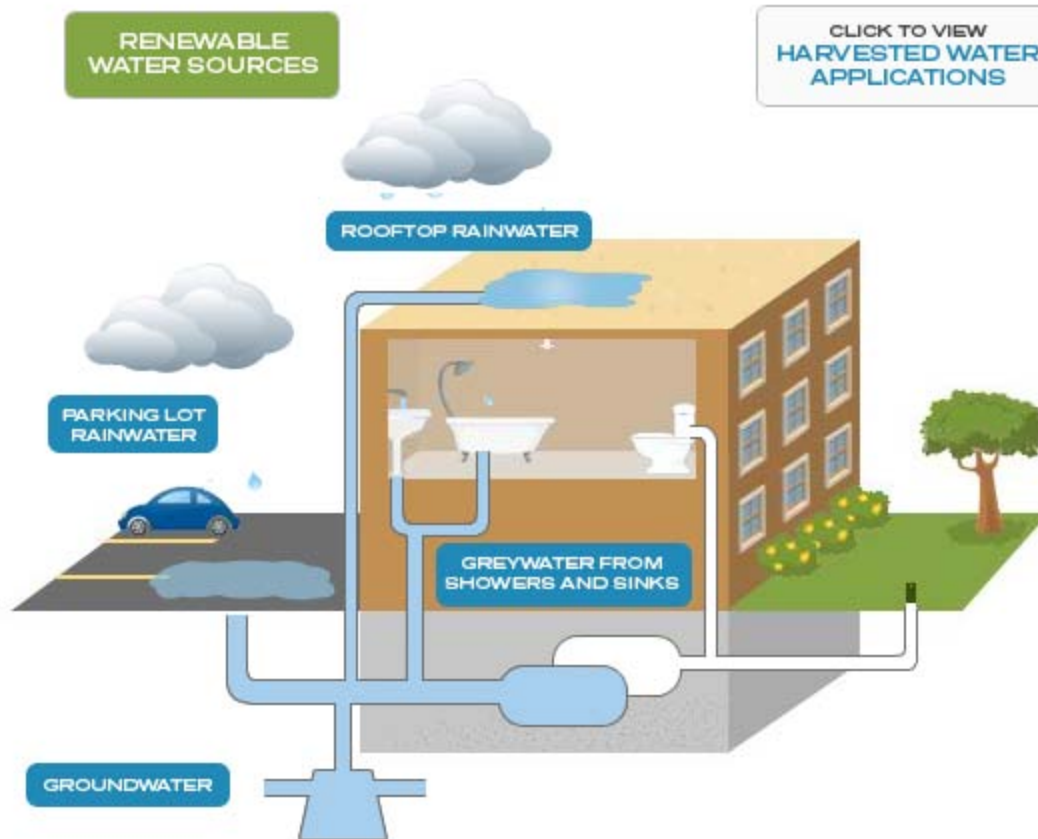


**2050?**

# Development Process Touches Multiple Customers

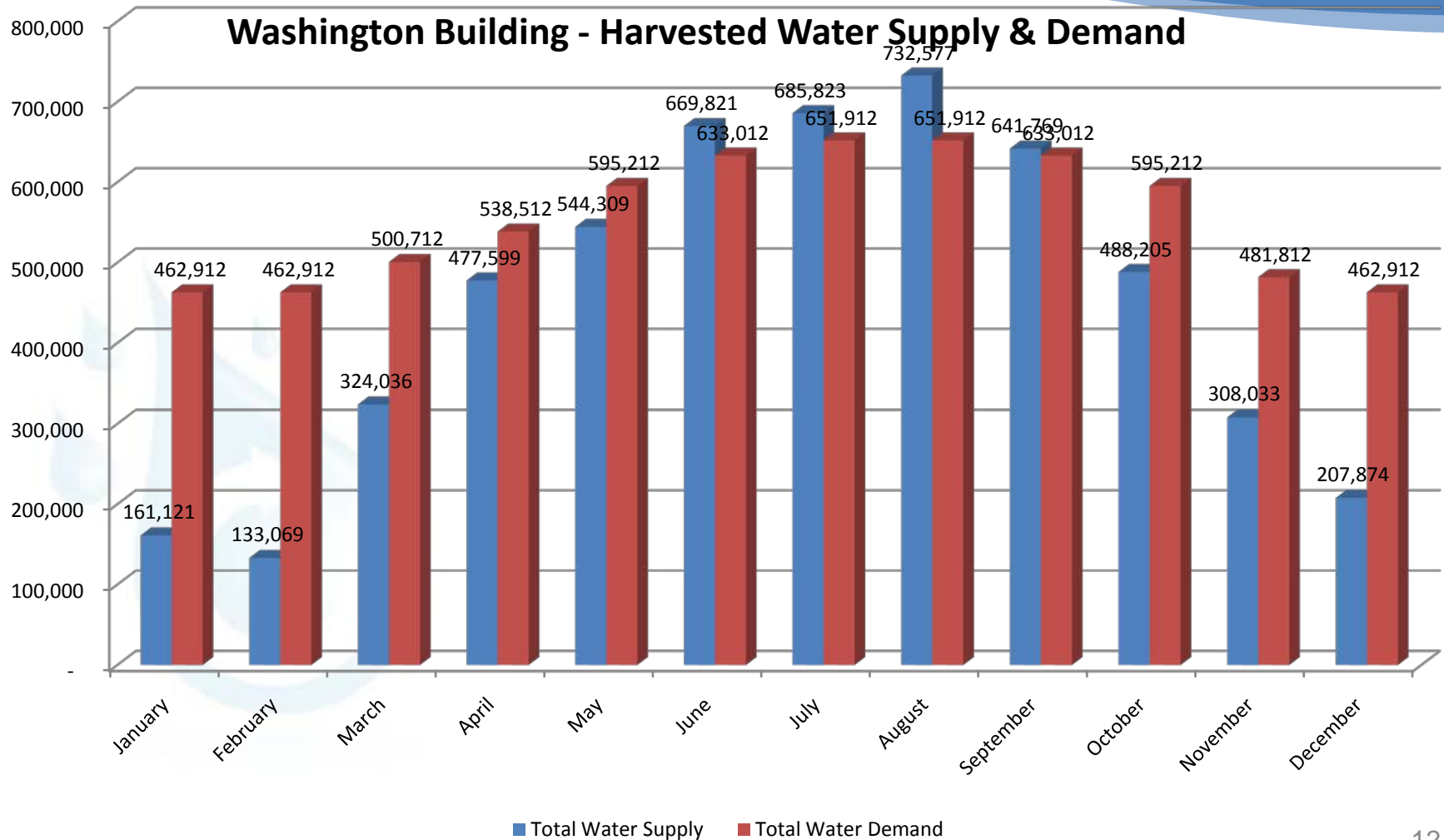


# Scoping: Evaluating Water Sources & Applications

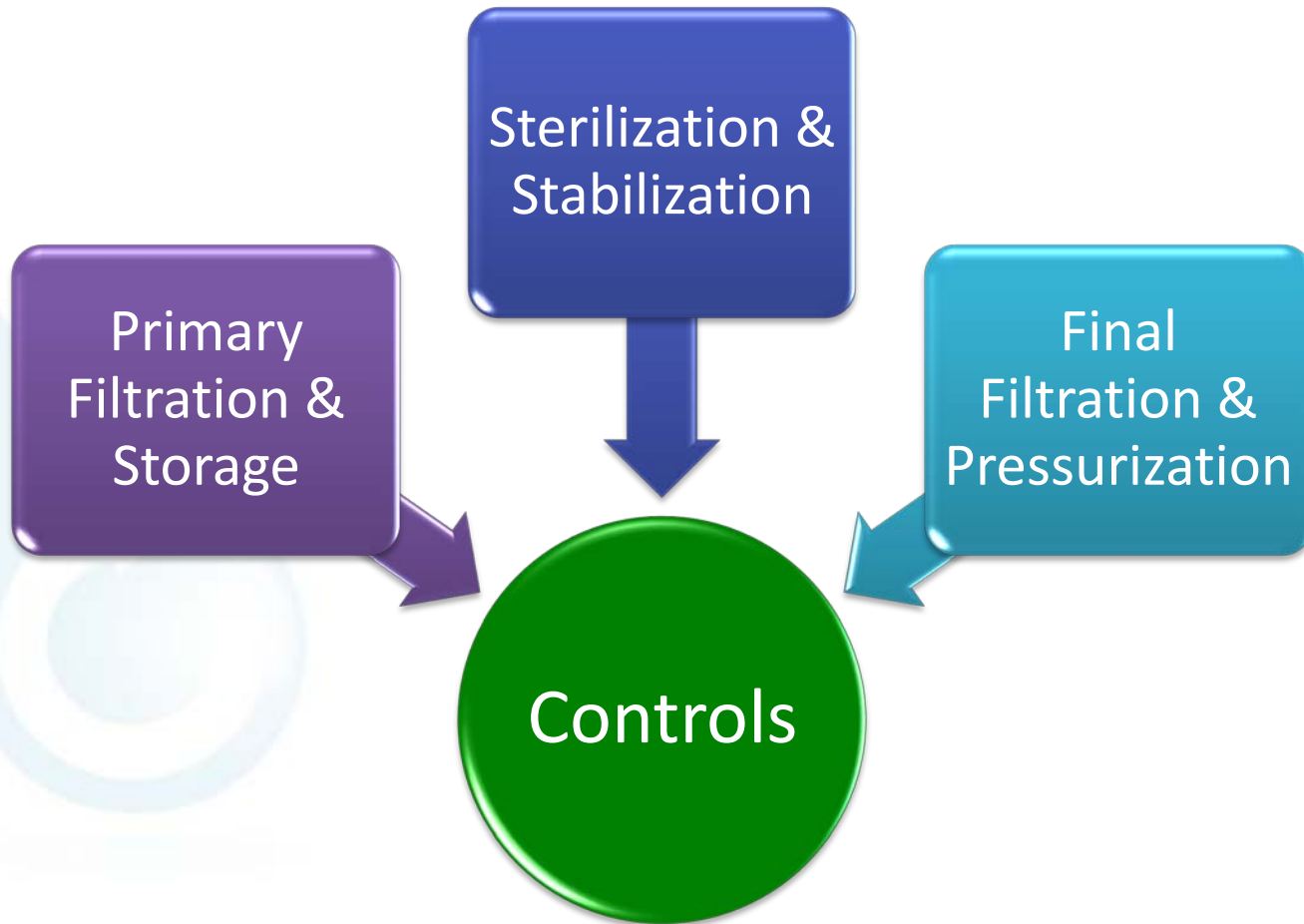


- Each project has a unique combination of requirements and resources.
- The most efficient systems integrate sources & uses

# Custom Rainwater Evaluation



# System Components are Customized to Each Project



# Primary Filtration & Storage

- Considerations

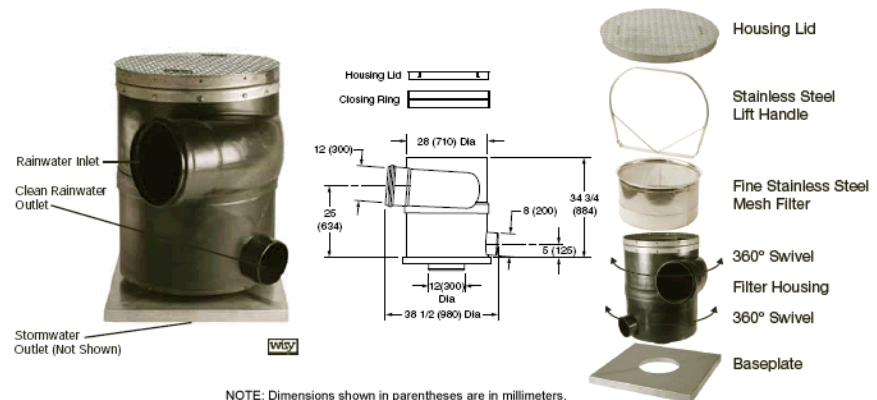
- Initial filtration depends on sources
  - Mechanical & biological options



Natural Filtration Through Vegetated Swale



Mechanical Separators



# Storage Method is a Key Variable



Internal  
Polyethylene  
Tanks



Concrete Vaults



Underground  
Fiberglass Tanks

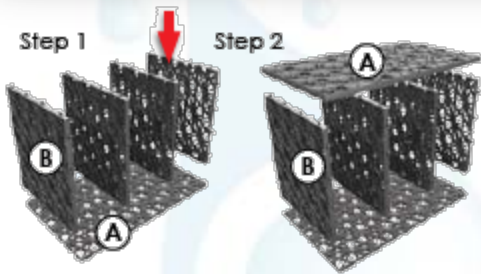


# Architectural Integration of Storage



Steel Tanks Can Be  
Decorative - and  
Signal Harvesting  
Efforts

# Atlantis' Patented D-RainTank Technology

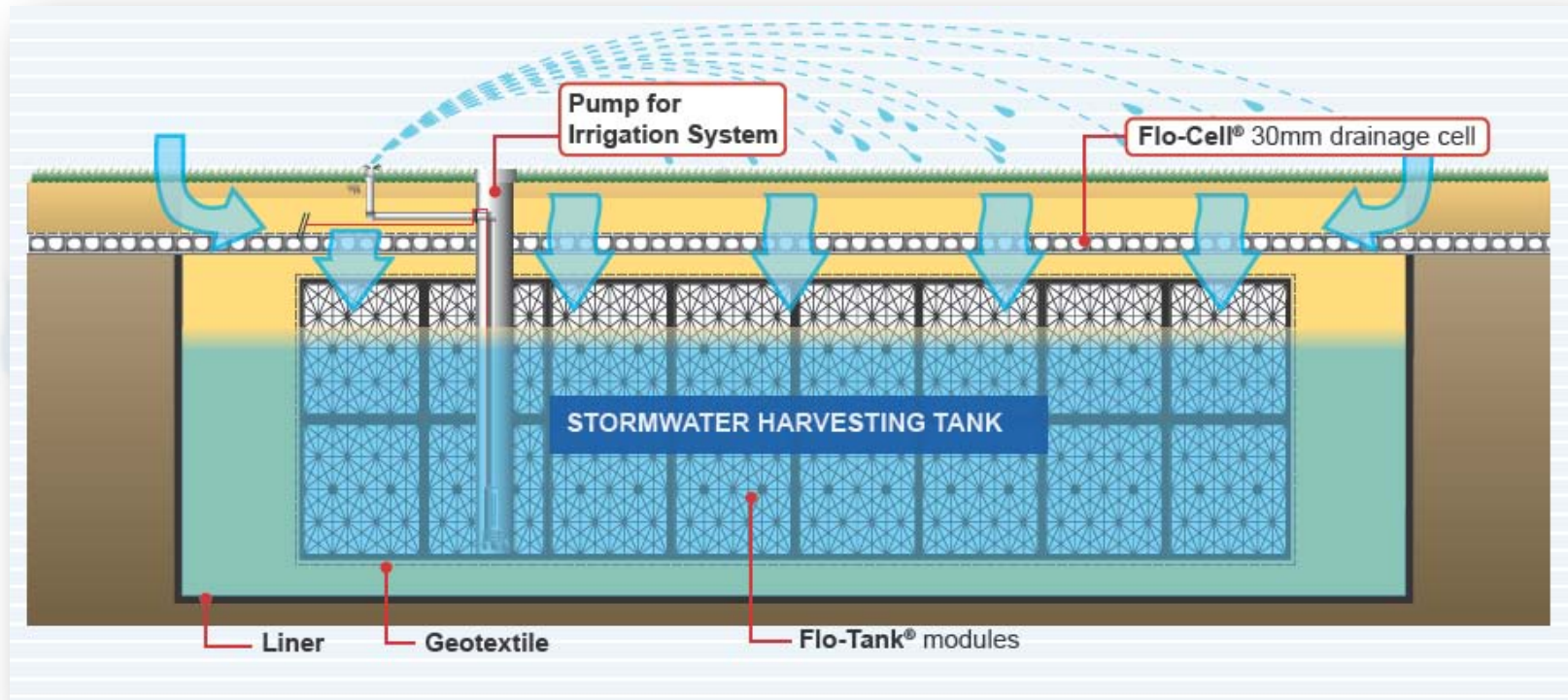


Unlimited Cistern  
Size and  
Configuration



# Atlantis System is Ideal for Stormwater Retention & Reuse

Water is kept cool, clean and ready for reuse

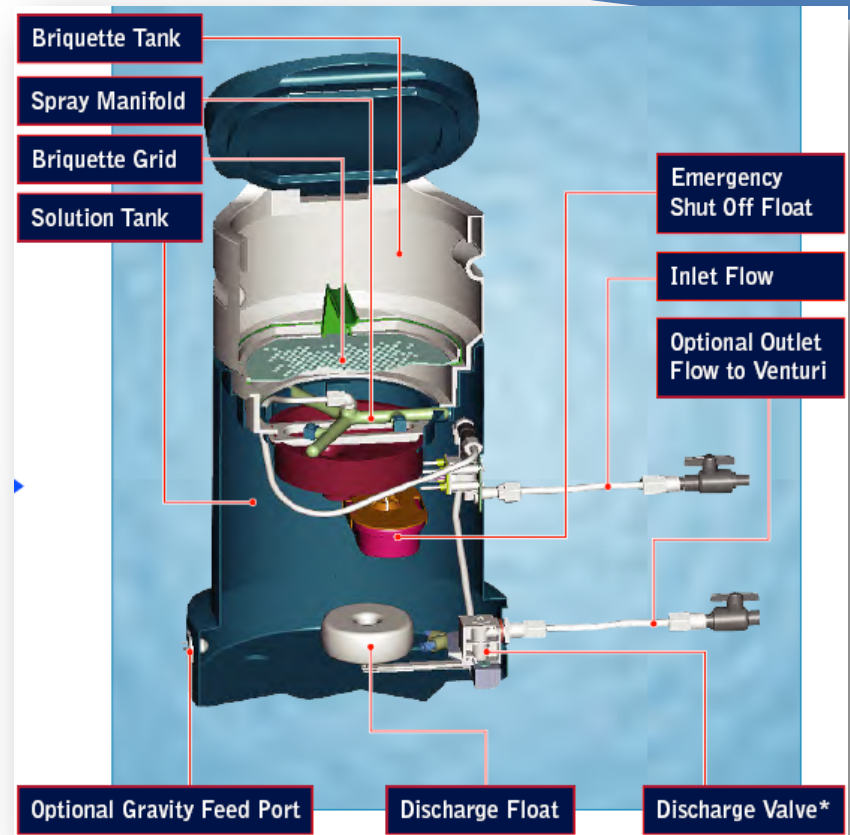


# Water Sterilization and Stabilization

- Considerations

- How will water be used?
- Turnovers per day
- Methodology:  
UV, Chlorine, Chlorine Dioxide, Ozone

Ultra-Violet Sterilization

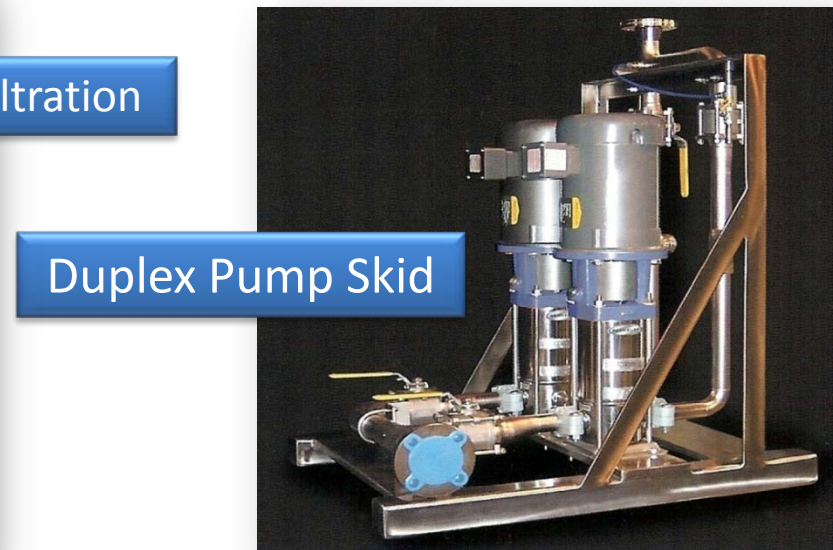


Chlorine Dosing System

# Final Filtration and Pressurization

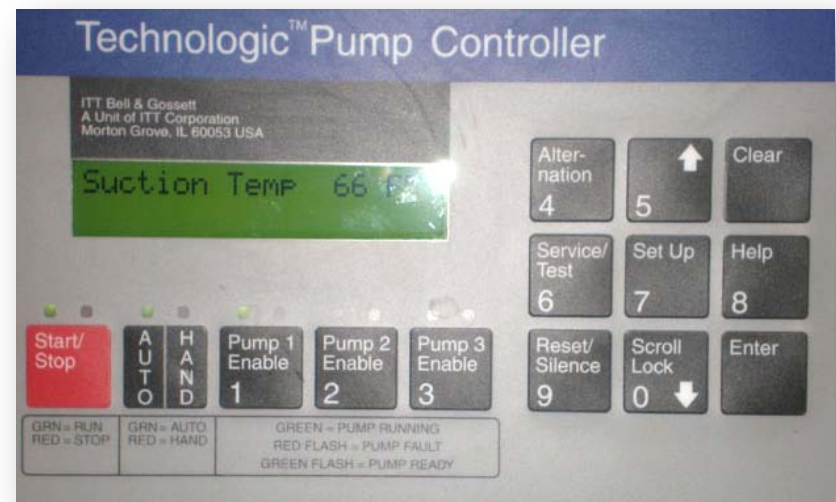
- Considerations

- Output of harvesting system
- Water source; how and where will water be used?
- Final filtration options: bag, sand, ultra, carbon, R/O



# System Controls

- Custom controls programmed for each project
  - Monitor all systems 24/7; touch screen & web interface
  - Manage pressures, pumping, levels, filtration, cycling
  - Programmed to client specs and building automation





# **Case Studies**

## **Integrated Harvesting Systems**

# Harold Washington Social Security Building - Chicago

- 1970's Construction
- History of green initiatives
- Looking for more savings in water & energy





# Harold Washington Social Security Building

## Sources

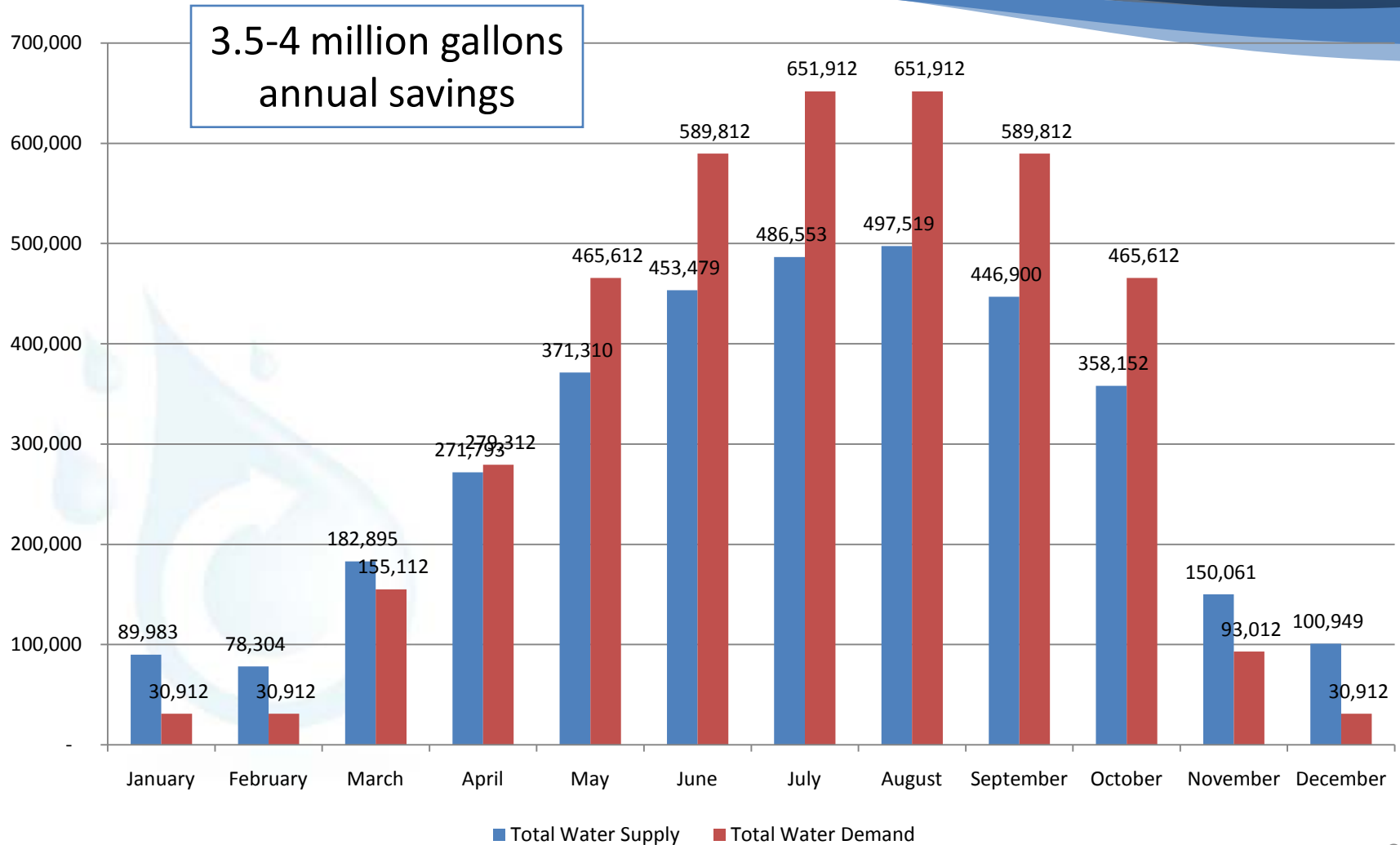
- Rooftop rainwater
  - 100K+ gallons per month
- Condensate from cooling system
  - 12 gallons per minute
- Groundwater ejector pits
  - 2,000 gallons per day

Innovative Approaches to  
Maximizing Sources & Uses of  
Harvested Water

## Uses

- Cooling tower “make-up” in warm season
  - 21K gallons per day
- Landscape irrigation
  - 300 gallons per day
- Toilet flushing in remodeled area
  - 350 gallons per day
- Boiler “make-up” in winter
  - 800 gallons per day

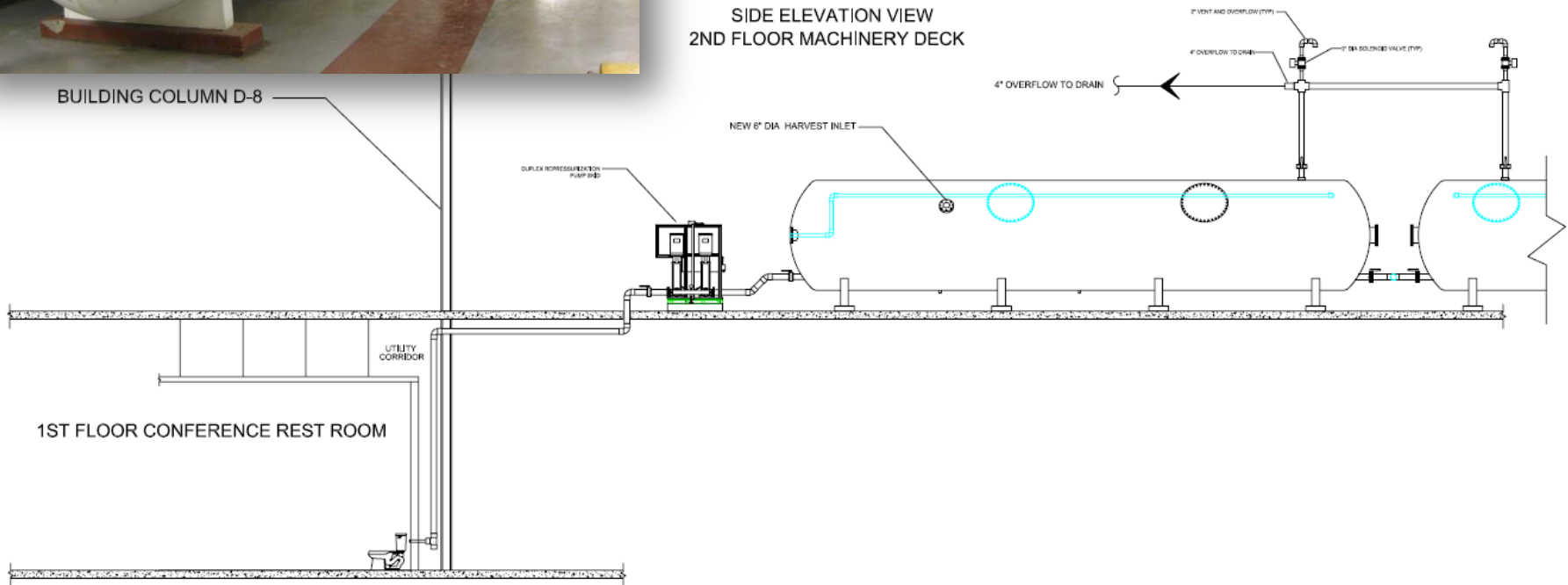
# Innovative Efforts Approach Balance in Supply and Demand



# Use Four 8,000 Gallon Decommissioned Tanks



SIDE ELEVATION VIEW  
2ND FLOOR MACHINERY DECK



# System Up & Running Sept '09



Control system will track and display water harvested and applied

Annual Water & Sewer Savings at Current Rates: \$9,700



# New York City Sanitation Building

“Tower ‘O Garbage”

## NYC WATER BOARDED WITH 14.5% RATE HIKE

By DAVID SEIFMAN

May 17, 2008

No matter how sunny it is this summer, you're going to get soaked if you're a homeowner, because the Water Board yesterday approved a 14.5 percent hike in water rates that takes effect July 1.

That will bump up the bill for the average one-family home from \$699 to \$801 a year.

### Getting Soaked



Water rate hikes
2008: 14.5%
2007: 11.5%
2006: 9.4%
2005: 3.0%
2004: 5.5%
2003: 5.5%
2002: 6.5%

Projected change in annual bills (starting July 1)
Single-family home (100,000 gallons used) <b>\$699 to \$801</b>
Apartments (85,000 gallons used) <b>\$545 to \$681</b>

Source: NYC Water Board

[Click image to enlarge](#)

Sponsored Links



# New York Sanitation Building

- New metropolitan building to house & service sanitation trucks
  - Seeking LEED certification
  - High municipal water costs
  - 108 workers during peak days
  - 81,000 square foot roof
    - Green roof and impervious roof
  - Steam heat provided by City
  - Toilets, showers and truck washing
  - Greeley and Hansen engineers

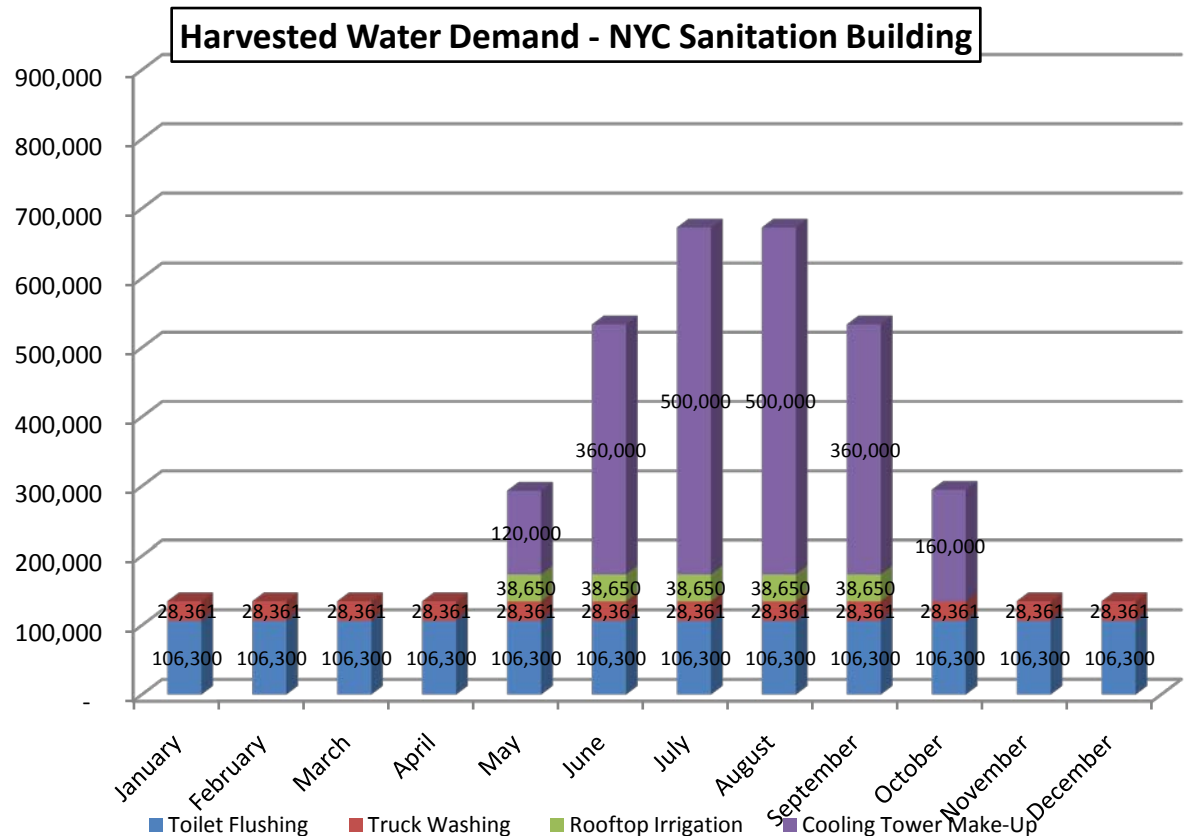


**GREELEY AND HANSEN**

# Four Non-Potable Water Uses

- 3.8 million gallons of non-potable demand were identified

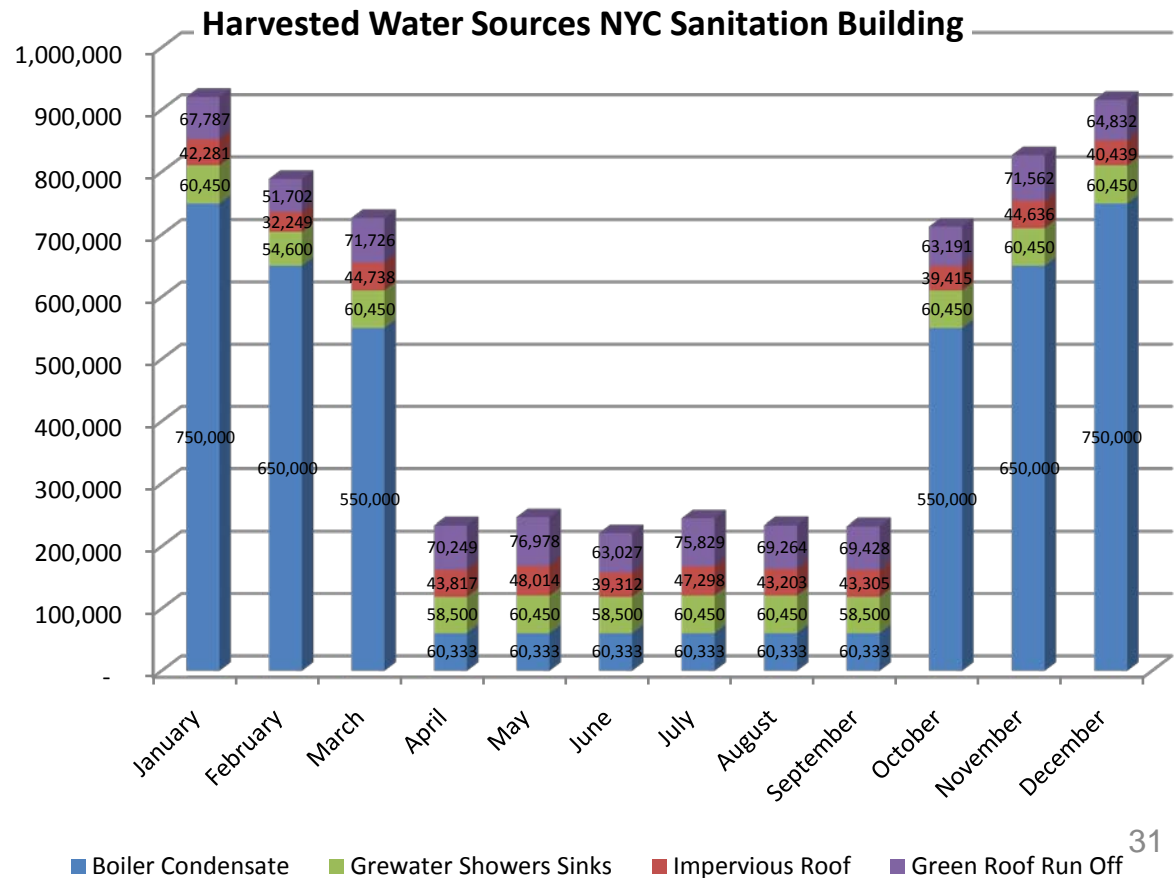
- 2 million gallons cooling tower make-up
- 1.3 million gallons toilet flushing
- 340K gallons truck washing
- 200K gallons roof top watering



# Three Water Sources Harvested

- 6.3 million gallons of harvestable water supplies were identified

- 4.3 million gallons steam condensate
- .7 million cooling condensate
- 1.3 million gallons from green roof and impervious roof





# Water Harvesting's Impact

- Typical savings 2-5 million gallons of potable water each year & thousands of dollars
- Reduce the impact of a building on stormwater runoff
- “Guilt free” greenery around a building
- Stop flushing toilets with drinking water
- Integrate water conservation into a broader sustainability effort

# Common Questions

- System costs?
- What is not included in a system?
- Are there regulatory issues? (Local codes?)
- Timeline from design to install?
  - What are milestones relative to an overall building project?
- System payout? (Return on investment)
- Ongoing maintenance requirements & costs?

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