This presentation premiered at WaterSmart Innovations

watersmartinnovations.com

watersmart
INNOVATIONS

Aquacraft
WATER ENGINEERING & MANAGEMENT

The high efficiency water using home of the future

What will it be, how much water will it take, and can it be realized?

What is it?

- The water efficient home of the future will employ the best available technology for obtaining the maximum benefits from water with the minimum amount of actual water used.
- It will employ the state of the art fixtures and appliance, but will also add new technology for minimizing leakage and use of recycled water for uses such as toilet flushing.
- It will provide the occupants of the home with a way to track their water use in relationship to a well defined water budgets for indoor and outdoor uses
- The goal of this house will be to limit indoor use to no more than 68 gphd (25 gpcd) (25,000 gpy for domestic uses) and landscape use to a **locally determined percent of ET**.
- This home will not save water by creating deprivation, but will satisfy all needs based on allowed limits

What constitutes waste?

- Use of more water for a given purpose than is required based on the current efficiency standard for that use, or allowing water to be passed through the system for no beneficial purpose at all.
- Information from the Residential End Uses of Water Update (WRF Project 4309) has provided new benchmarks for evaluating efficiency.

Wasteful indoor uses

- Leakage > ~5 gpd
- Outmoded toilets that use more than 1.28 gpf
- Outmoded showers that use more than 1.6 gpm
- Clothes washers that use more than an average of 15 gpl
- Dishwashers > 6 gpl
- Poorly designed hot water systems
- Kitchen faucets > 2.2 gpm
- Other faucets > 1.0 gpm

Wasteful outdoor uses

- Applying more than the theoretical irrigation requirement (TIR) or water allowance
- Undetected leaks in irrigation or pool system
- Having a landscape that requires too much water (over the locally determined % of ET)
- Having a poorly designed or maintained irrigation system that misapplies water
- Not having a clear water budget and schedule for the irrigation system

Biggest water wasters in sf households

- Leakage of all kinds
- Over-irrigation
- Use of too much high water use plantings
- Use of outmoded fixtures
- Use of outmoded appliances
- Waiting for hot water
- Homeowners with no idea of how much water they are using or should be using

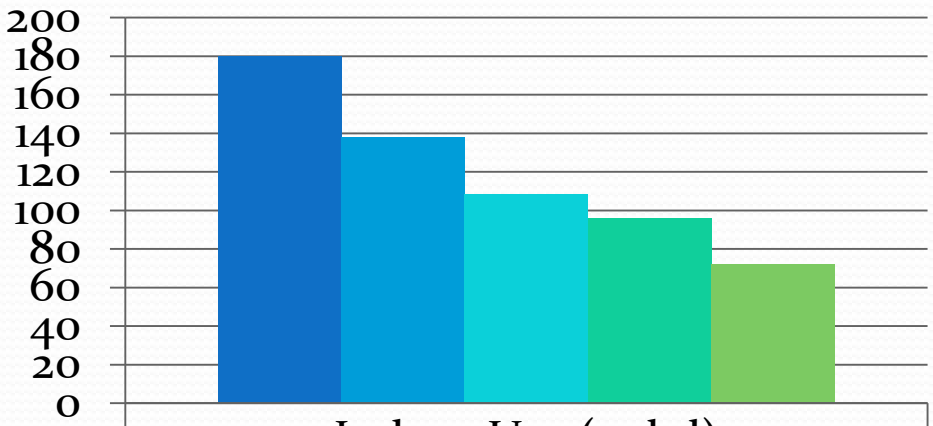
Best ways to save water indoors

- Upgrade to High Efficiency toilets, clothes washer, showers and dishwashers
- Install devices that detect leaks and notify customers or (better) turn off the water
- Use structured hot water systems with circulation systems to cut down on wait
- Having a clear water budget and real time feed-back on water use
- Use of recycled greywater for toilet flushing

Best ways to save water outdoors

- Properly designed landscape that requires acceptable amount of water based on local standards and drought conditions
- Properly designed irrigation system with a good program
- No leaks !
- Water budget with heavy penalties for excess irrigation
- Staying within the budget!
- Have built in drought restriction levels

Levels of Efficiency Indoors



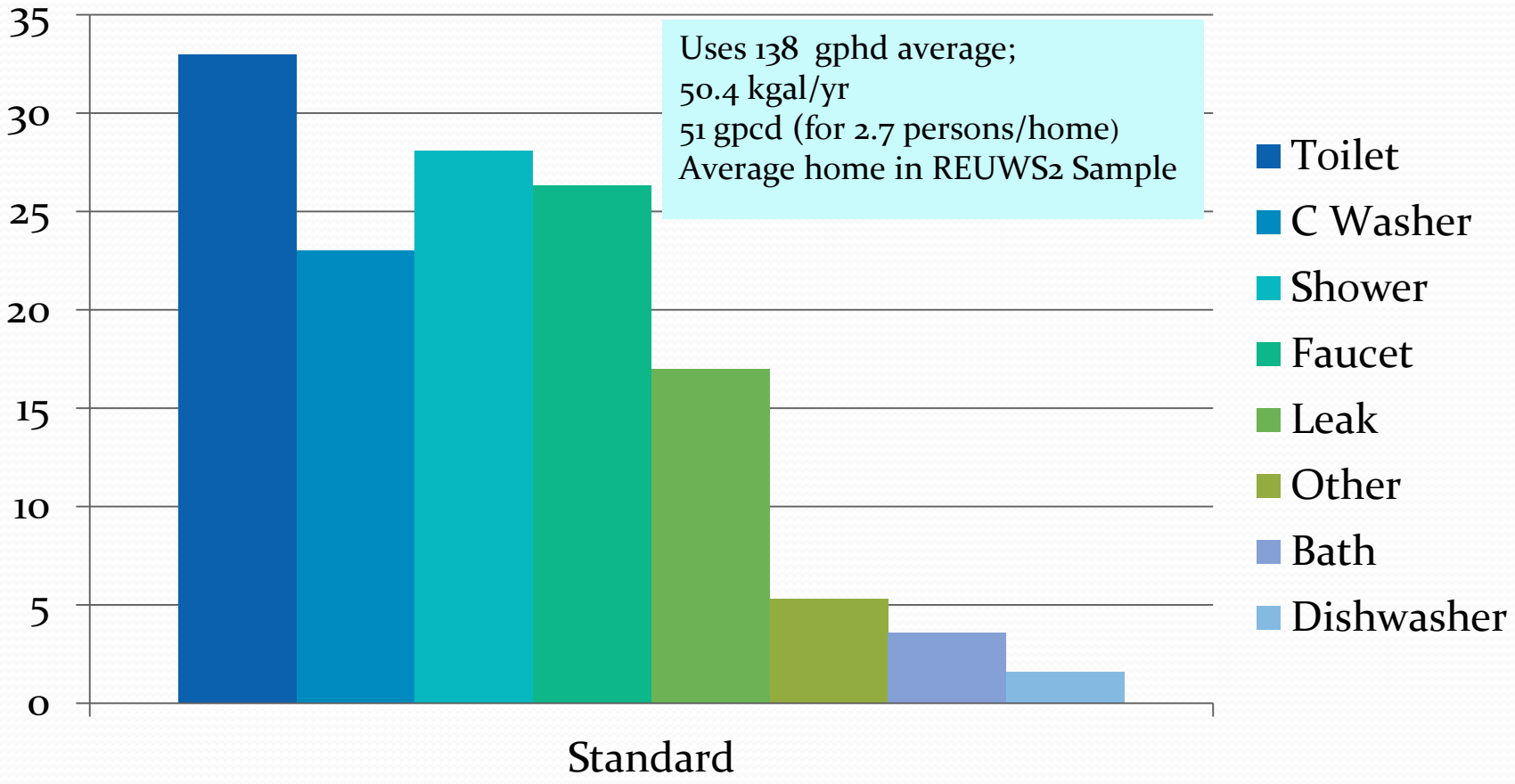
	Indoor Use (gphd)
Pre 1992	180
REUWS2 Standard	138
High Efficiency	108
Ultra	96
Super	72

Summary of efficient standards

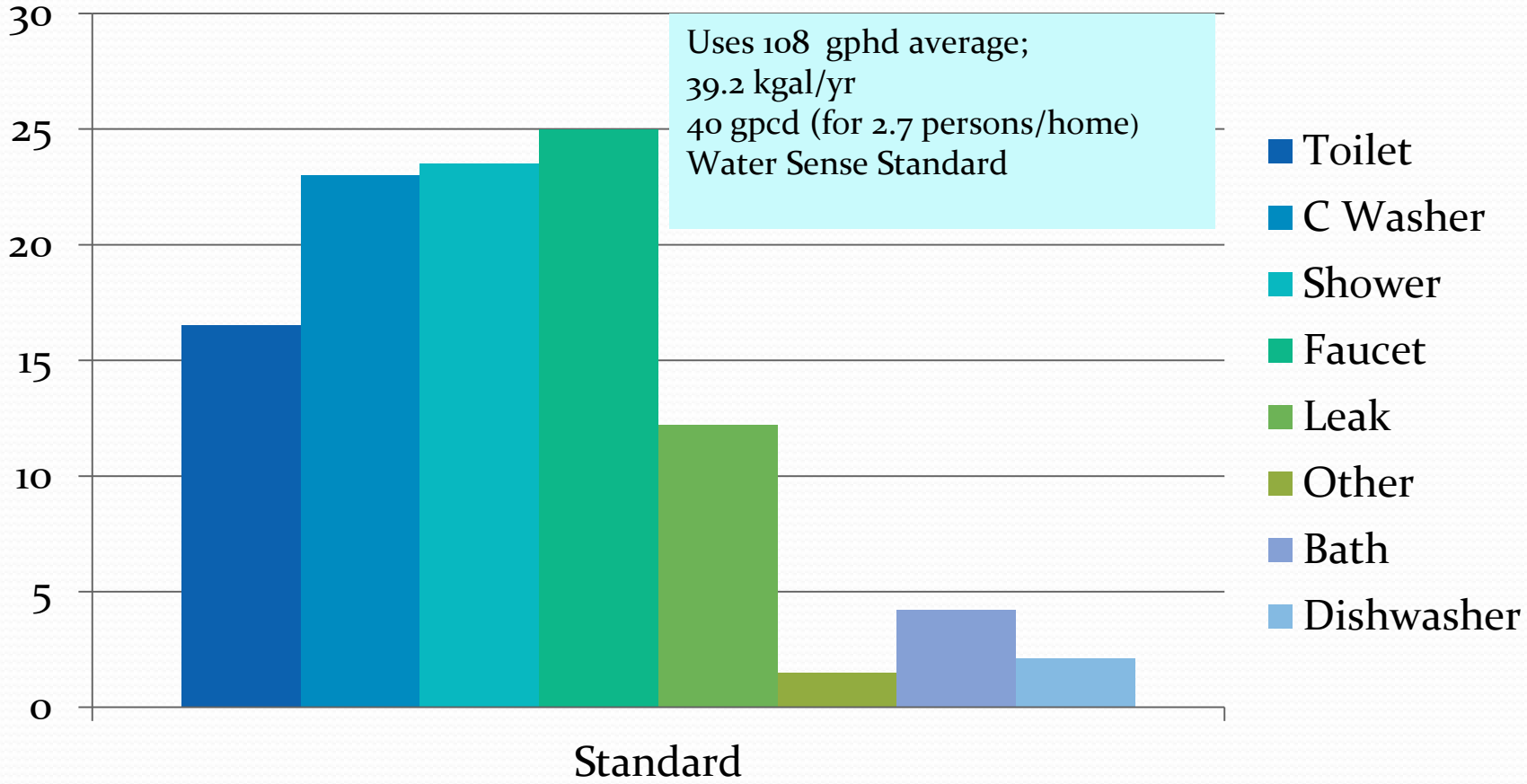
Product	Standard	High Efficient	Ultra-efficient
Toilet	+3.5 gpf	1.6 gpf	<1.28 gpf
Clothes Waster	+ 30 gpl	< 30 gpl	< 15 gpl
Showers	> 2.5 gpm	< 2.5 gpm	< 1.6 gpm
Faucets, kitchen	> 2.5 gpm	<2.5 gpm	< 2.2 gpm
Faucets, bathrooms	> 1.5 gpm	< 1.5 gpm	< 1.0 gpm

Source, Residential End Uses of Water Study 2, WRF (2015), Table 112

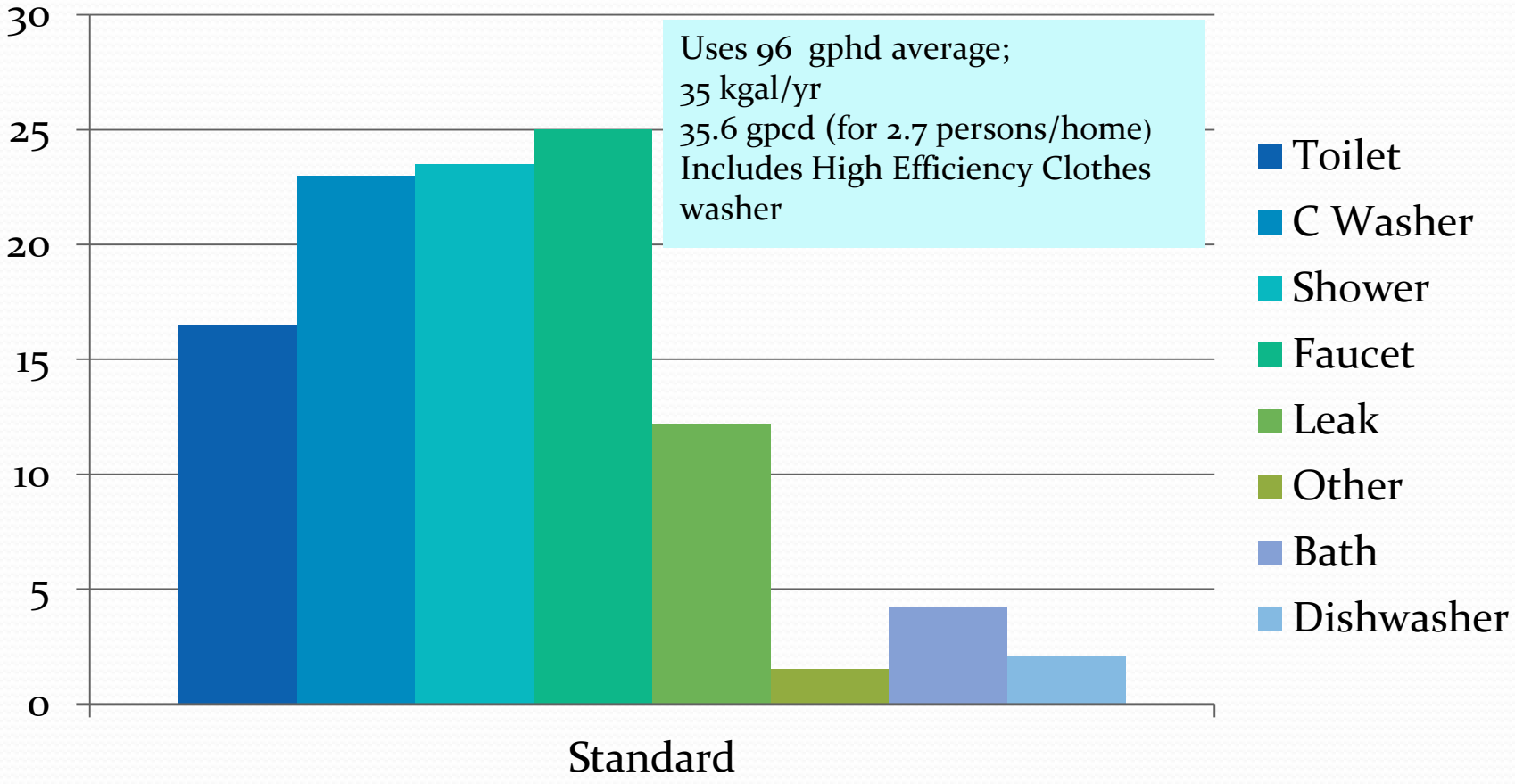
Standard Home (2007)



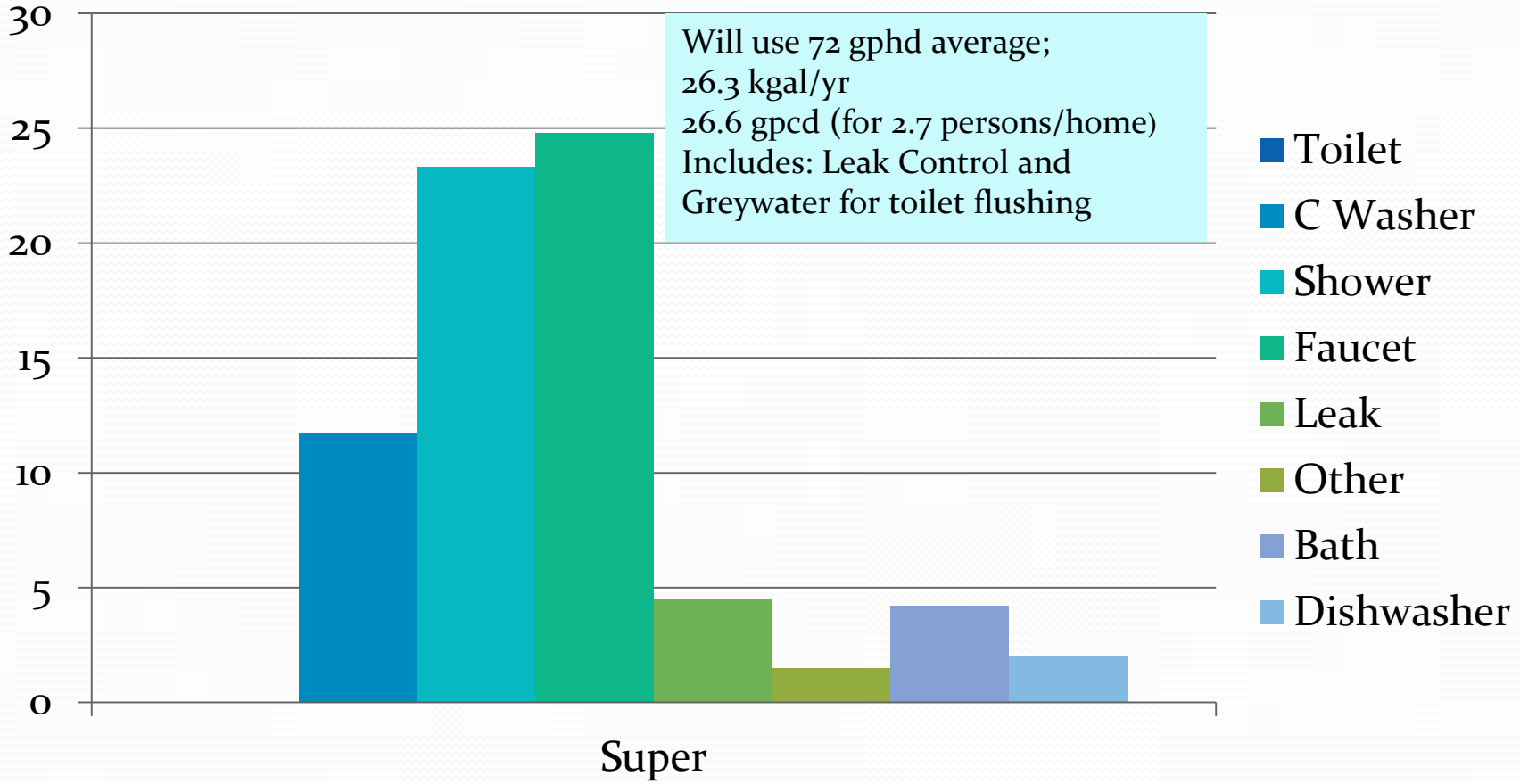
High Efficiency Home (2015)



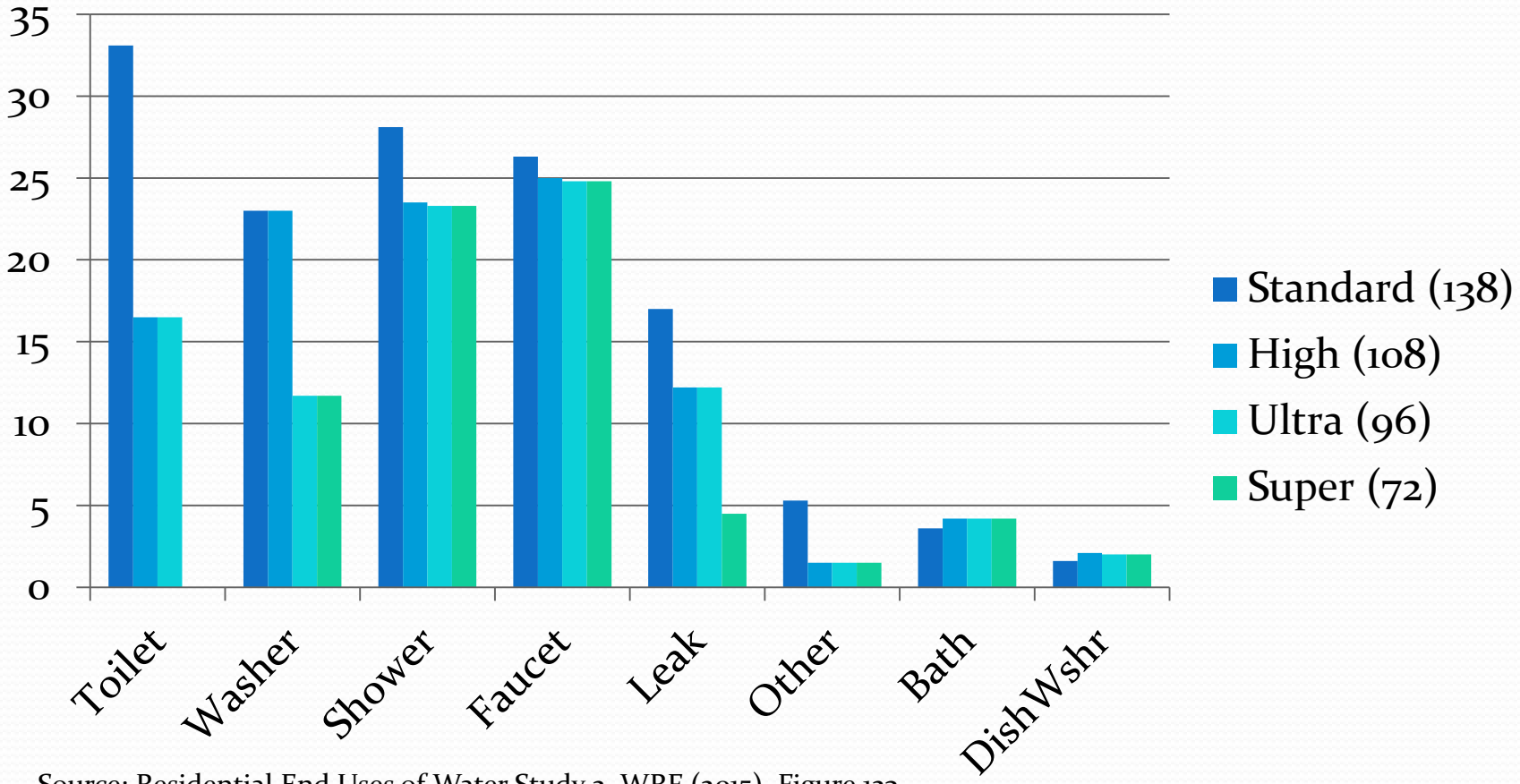
Ultra Efficient Home (2015)



Super Efficient Home (future)



Comparison of Indoor Uses (gphd)



Source: Residential End Uses of Water Study 2, WRF (2015), Figure 123

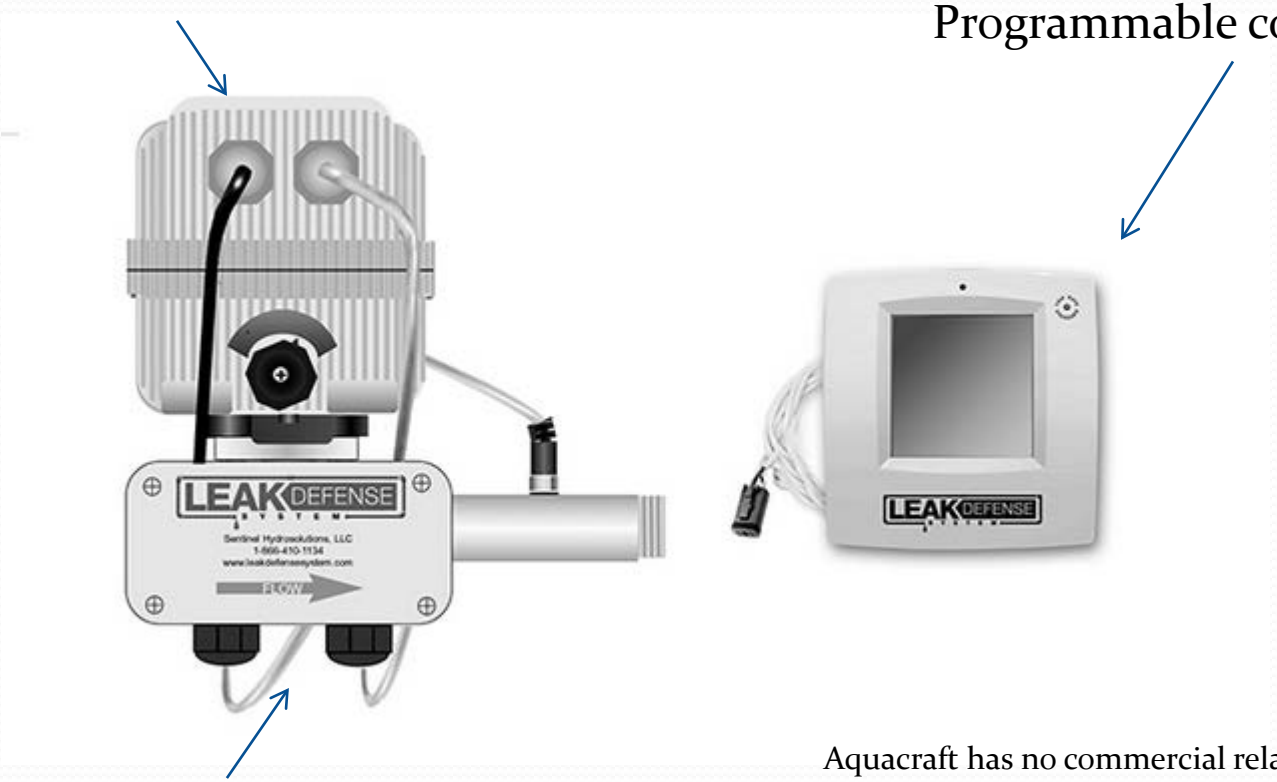
Required Items for Super Conserving Home of the Future

- HET Toilets (<1.28 gpf)
- Energy Star Clothes Washers (<15 gpl)
- Water Sense Showers (<1.6 gpm)
- Water Sense Faucets (<2.2 gpm (kitchen), (<1.0 gpm bath)
- Leak Detection and Control
- Greywater recycling for toilet flushing
- Structured hot water systems
- Real time feedback

Example of Leak Detection and Control: Leak Defense System

Electric Valve shuts off water

Programmable controller



Flow sensor on water line

Aquacraft has no commercial relationship with any manufacturer.

Control for Leak Defense System

Trip point indicator light

Visual flow indicator, with arrow at trip point

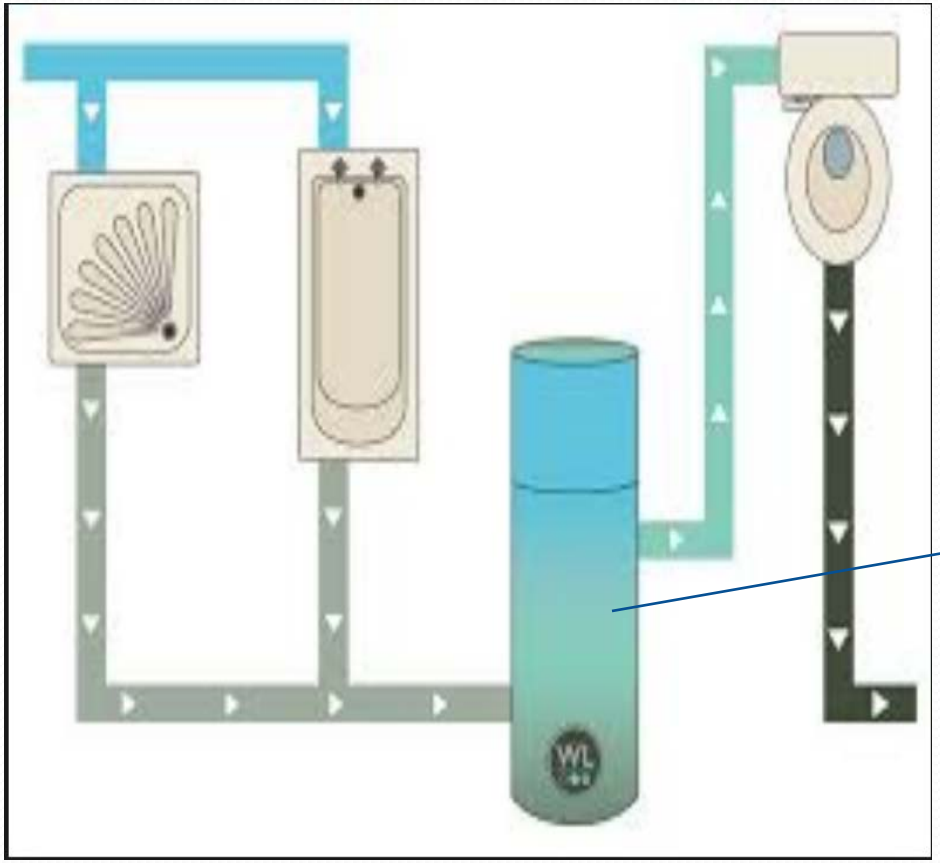
Home or Away modes 1 min/15 min for shut off

Manual on/off switch

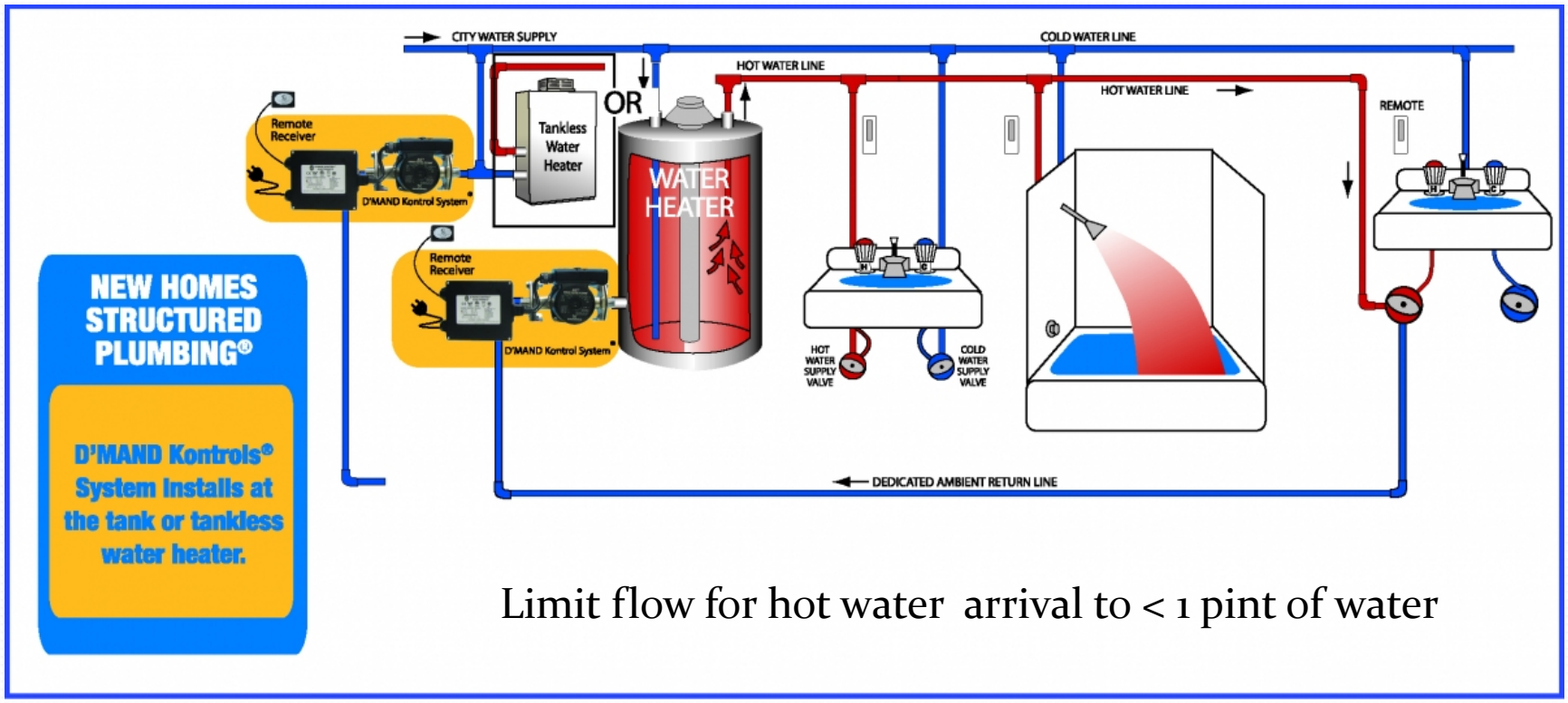
Program trip point

http://leakdefensesystem.com/

Example of Greywater System: Water Legacy System



Structured Plumbing Systems:

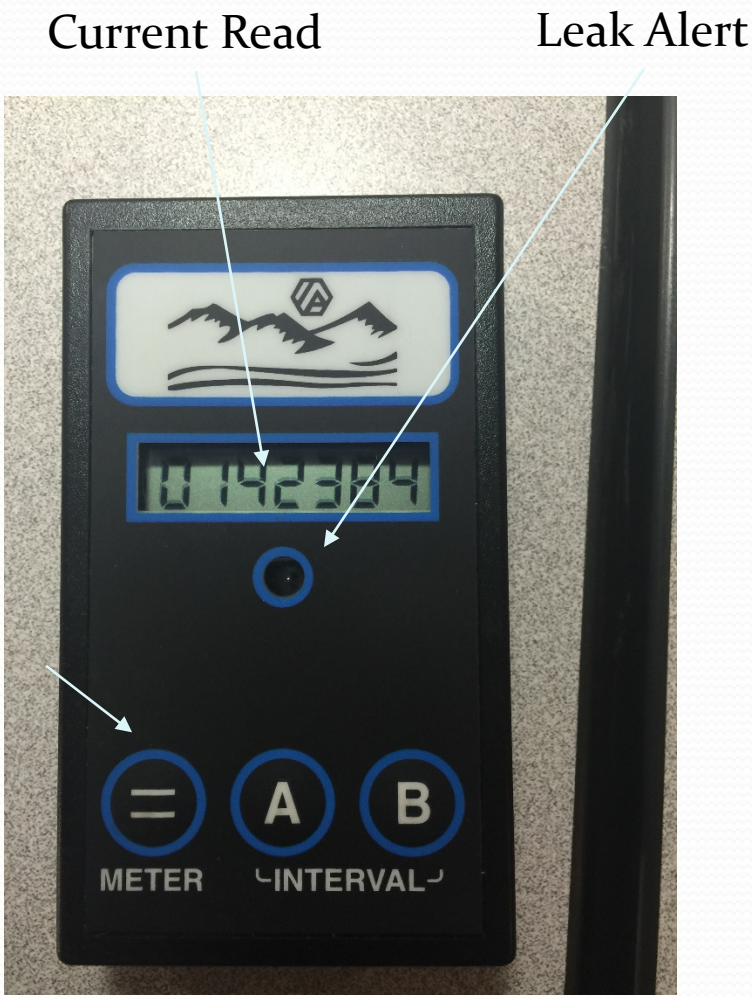


Limit flow for hot water arrival to < 1 pint of water

http://www.gothotwater.com/

Real-time Water Use Monitor

- Reads customer water meter real time from inside the home
- Provide leak alert
- Can be stuck to refrigerator
- Allows both total reading and two intervals (like odometers)
- Very simple



Contact Information:

William DeOreo, Aquacraft, Inc
2709 Pine Street
Boulder, CO 80302
303-786-9691 (O), 303-859-4997 (C)
www.aquacraft.com