Webinar: Whole-house Greywater Systems: GreyFlow, IrriGRAY, and Nexus eWater

March 16th, 2016

Moderator:

Laura Allen
Greywater Action

Presenters:

Sam Milani
AWWS GreyFlow

Paul James
Water ReNu-IrriGRAY

Bob Hitchner
Nexus eWater

Grey Water Reuse in Domestic & Commercial Applications

By Sam Milani
Managing Director

AWWS
Advanced Waste Water System

Presentation Outline

- What we have learned about greywater diversion in the past 12 years
- Greyflow Range of Domestic Grey Water systems
- The Greywater irrigation system
- Domestic & Commercial Applications
- AWWS the world leader in Greywater diversion

AWWS
Advanced Waste Water System

What we have learned about Grey water diversion systems in the past 12 years

1. Your soil is your tank
   - Avoid large tank, more Hygienic, reduces footprint, more economical systems, easier to transport and install, will fit in 99% of the homes
2. Good Pre-filtration and no Post-filtration
3. People do not like to maintain or clean dirty filters manually.
   - Install a low maintenance system with Self-cleaning filter mechanism
4. Drip is the best way to spread the water over a large area. But Greywater drip irrigation is very different than normal drip irrigation
5. New homes require 2 stage installs
6. Water restriction, government incentives & cost of water are the biggest driver of grey water reuse.
7. Commercial Greywater systems are sized based on the garden sizes and require disinfection to avoid risk of infection

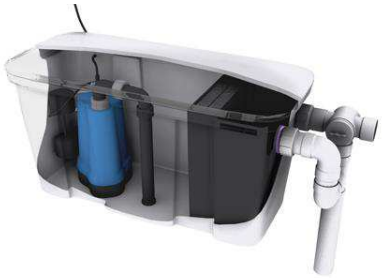
WaterMark
ATS 5200.460
CERT WMKT 21323

Greyflow Range of Greywater Plug & Play diversion systems

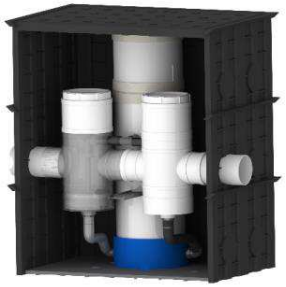
waterwise APPROVED

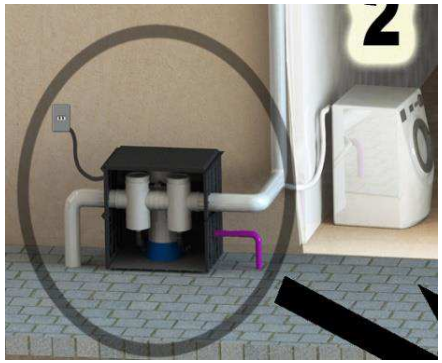
Smart Approved WaterMark

1. G-Flow Plug & Play (8 Gal tank)
   - **Above Ground & Partially Buried**
   - **2” inlet/outlet**
   - **RRP $ 600 + Tax**



2. Grey Flow PS Self clean Plug & Play (5 Gal tank)
   - **Above & Partially Buried**
   - **4” inlet/outlet**
   - **RRP from $1700 + Tax**





3. Grey Flow Pro Self clean Plug & Play (32 Gal tank)
   - **Below Ground & Partially Buried**
   - **4” inlet/outlet**
   - **RRP from $2300 + Tax**

Greyflow Range of Greywater 2 stage install diversion system for new homes on slab

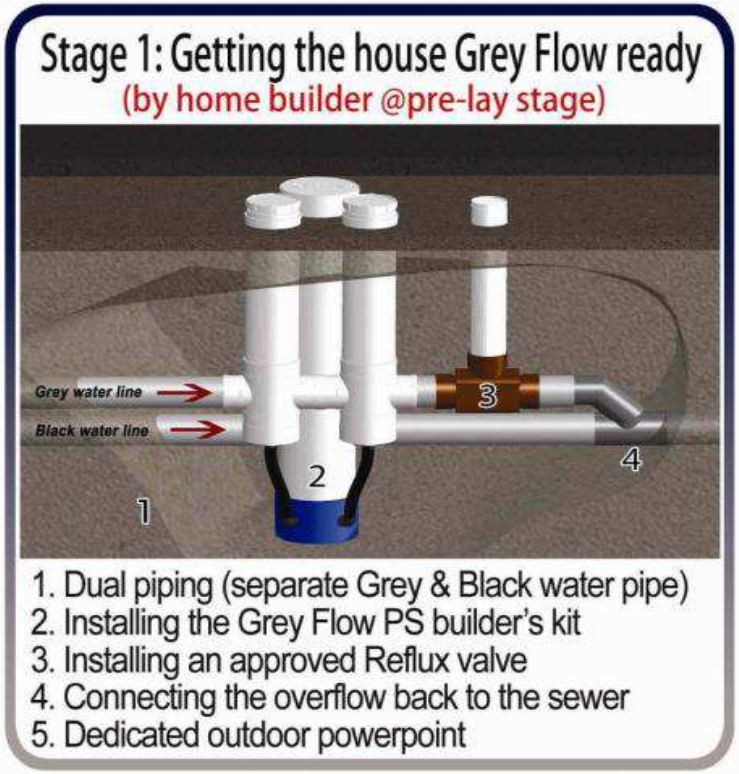
1. Grey Flow PS 2 stage install
   - **Below Ground**
   - **4” inlet/outlet**
   - **RRP from 1800 +Tax**

Builder’s Kit (GFPS-A)

2. Grey Flow Pro 2 stage install
   - **Below Ground**
   - **4” inlet/outlet**
   - **RRP from 2500 + Tax**

Self-Cleaning Mechanism(GFSC)

Finishing Kit (GFPS-B)



Greywater irrigation system

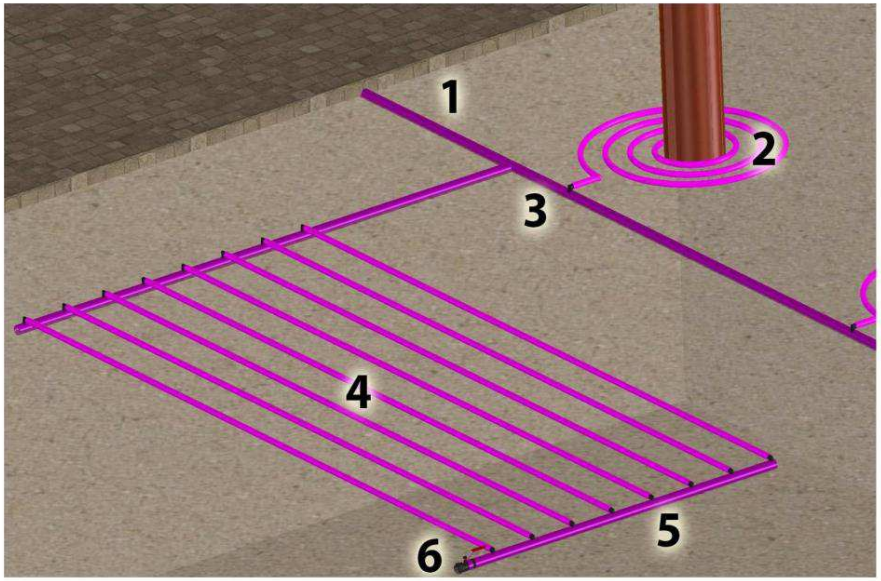
Greyflow Dripline 2.6 GPH with large passages

Lilac color with emitters every 12” (comes in 330 feet coil)

2 to 6 stations GF Rotor volumetric indexing Valve

Rotates once 13 or 26 gallons have passed thru

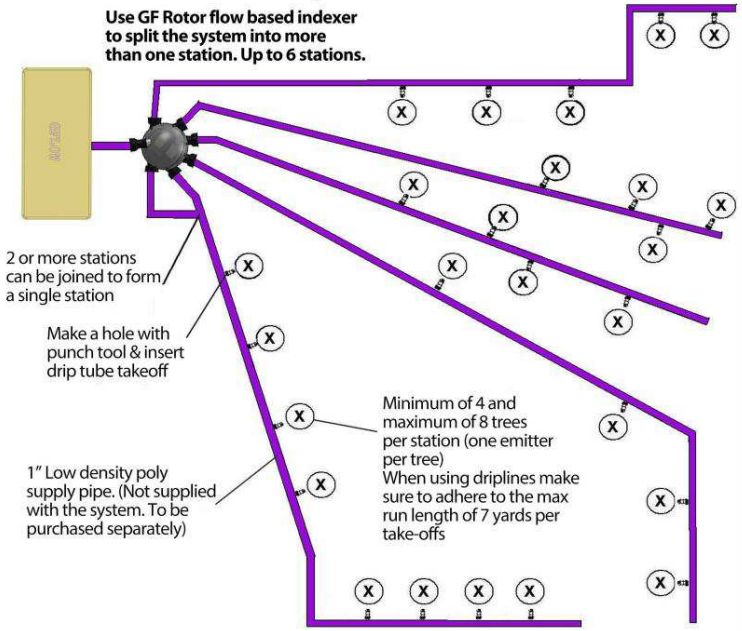
Installing the GF Drip-Tube irrigation lines



1. 1″ or larger feeder pipe
2. Coil of GF Drip-Tube around trees
3. Elbow take-off adaptor
4. 0.6″ GF Drip-Tube (no more than 7 yd length
5. 1″ flush manifold
6. Manual flush valve

Grey Water Warning Sign to be visible at all times →

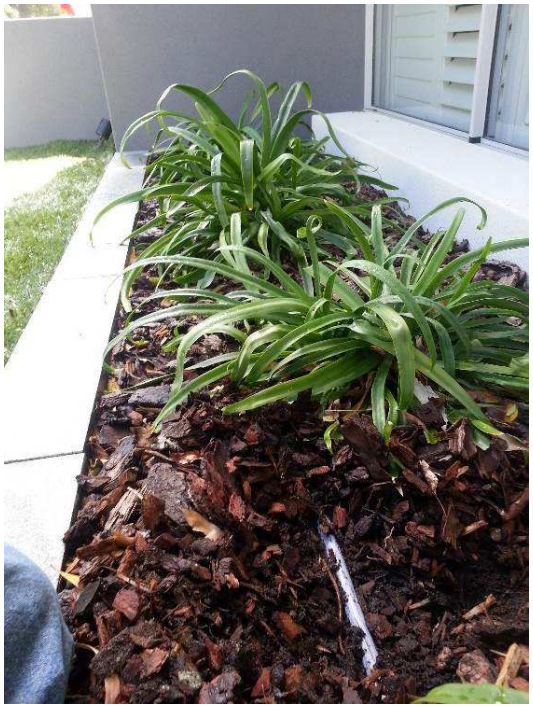
Multi station distribution using GF Rotor

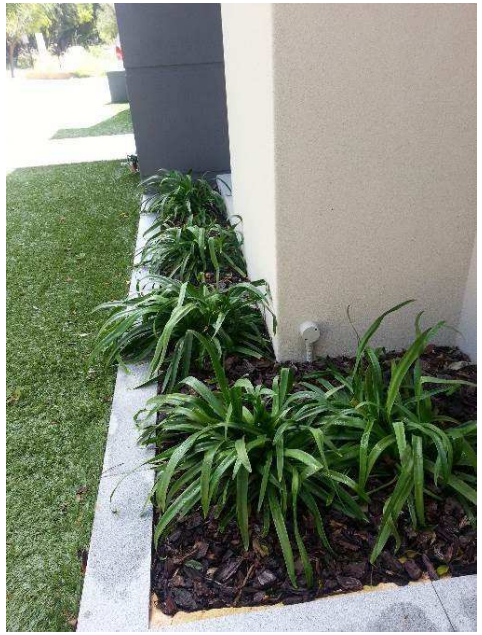


Domestic & Commercial Applications

✓ *Homes with the G-Flow & Town water backup*

✓ New Homes with the G-Flow & scheme water backup





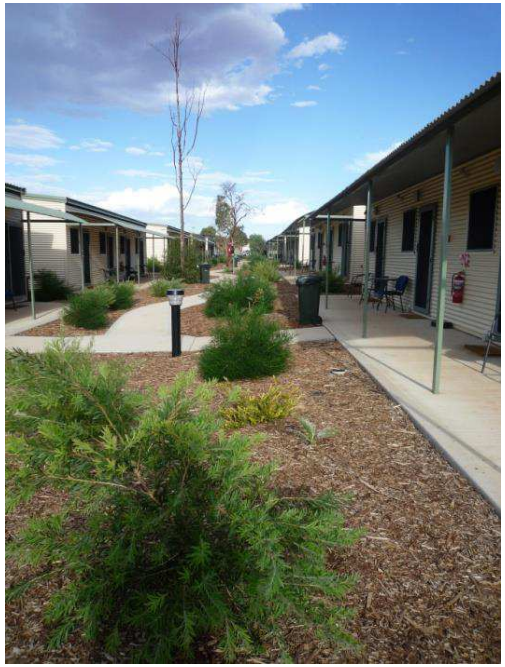
✓New Homes with the Grey Flow PS

✓ ***NLV Retirement Village Erskine WA (2006) With 350 x Greyflow PS Manual (1/house) for a saving of 5 Millions Gallons/year***

✓ ***St Barbara Mining Camp Leonora WA (2008) with 75 x Greyflow PS self clean (1/donga) for a saving of 3 Millions Gallons/year***

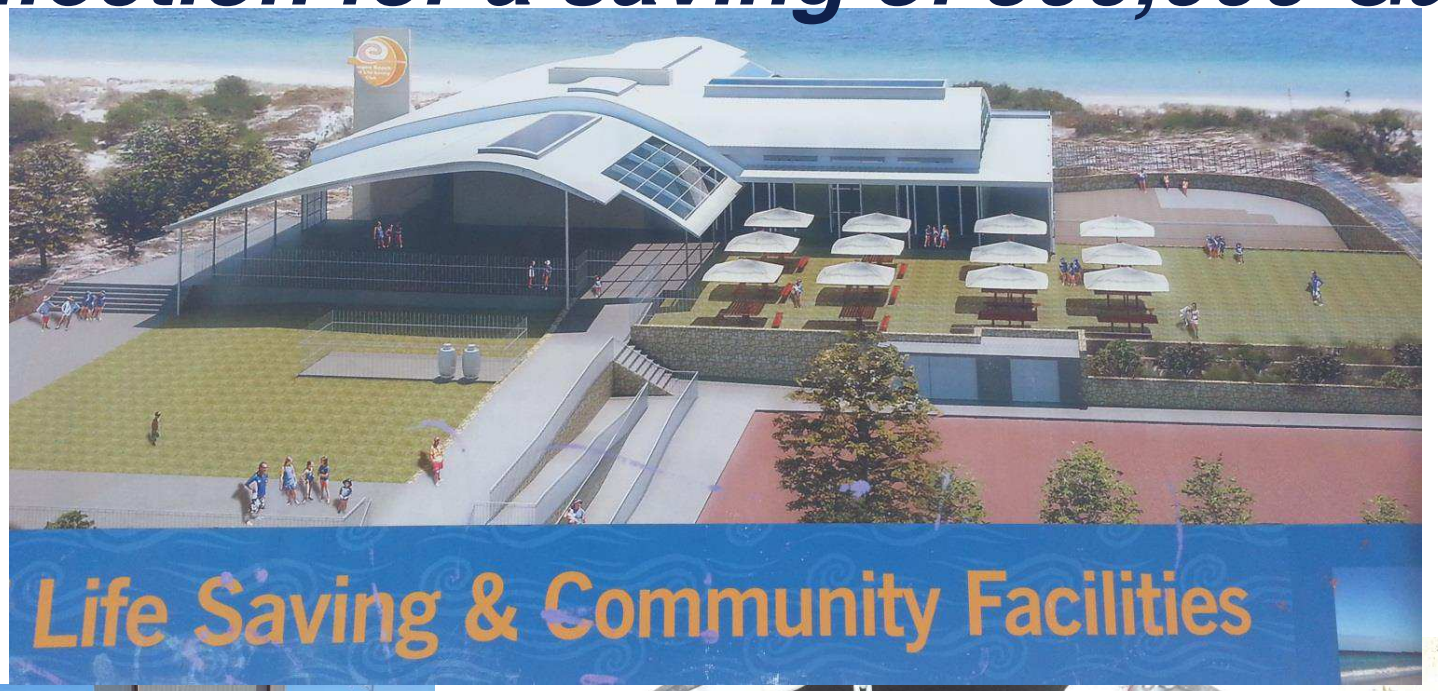
St Barbara Mining camp construction phase May 2008

St Barbara Mining camp
Planting phase Feb 2009



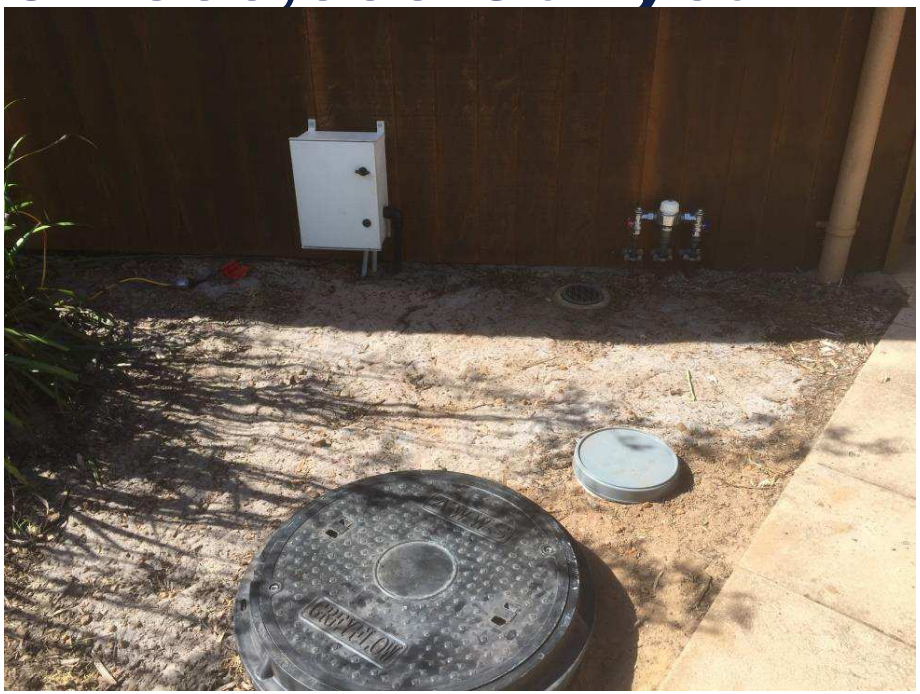
St Barbara Mining camp
After 2 years Feb 2011
Get $ 8000/year rebate on their sewer fees

✓ ***Coogee surflife saving Club (2012)***
With 1 x Greyflow Pro 5000 with ozone disinfection for a saving of 300,000 Gal/year

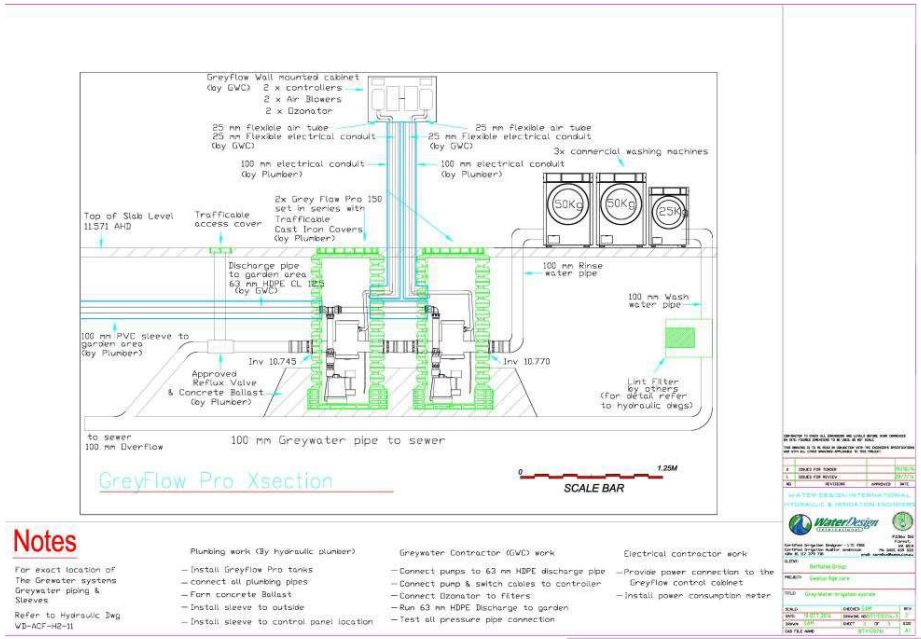


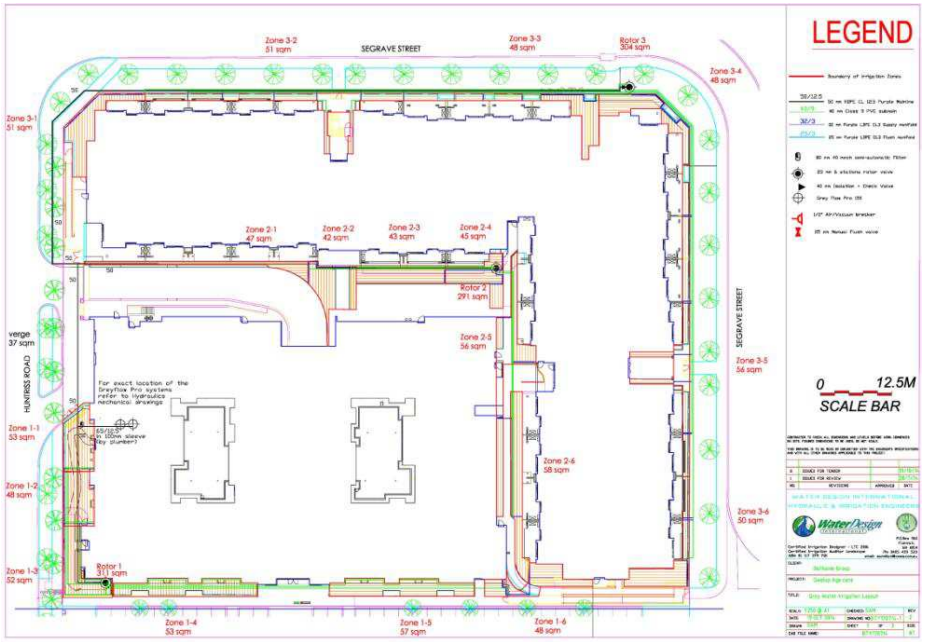
✓ *Leederville Office Building (2015) With 1 x Greyflow Pro 600 with ozone disinfection for a saving of 50,000 Gal/year*

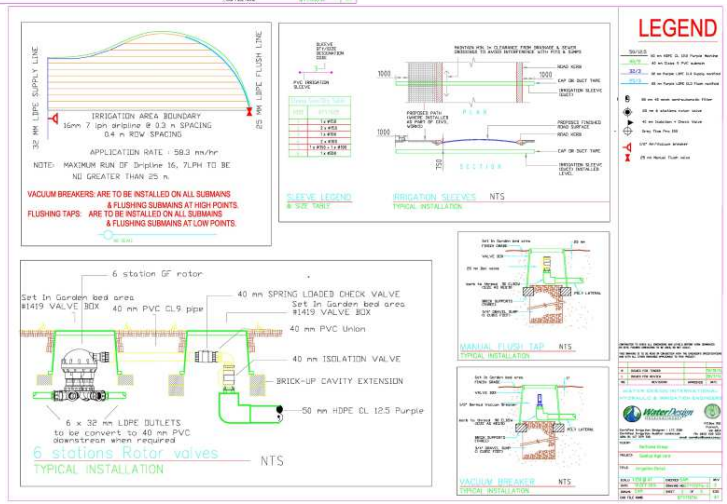
✓ ***Warnliffe Mill Caravan Park WA (2015) with 1 x Greyflow Pro 150 with chlorine disinfection for a saving of 300,000 Gal/year***



✓ *Bethanie Gwelup WA age care laundry (2016) with 2 x Greyflow Pro 150 with ozone disinfection for a saving of 700,000 Gal/year*





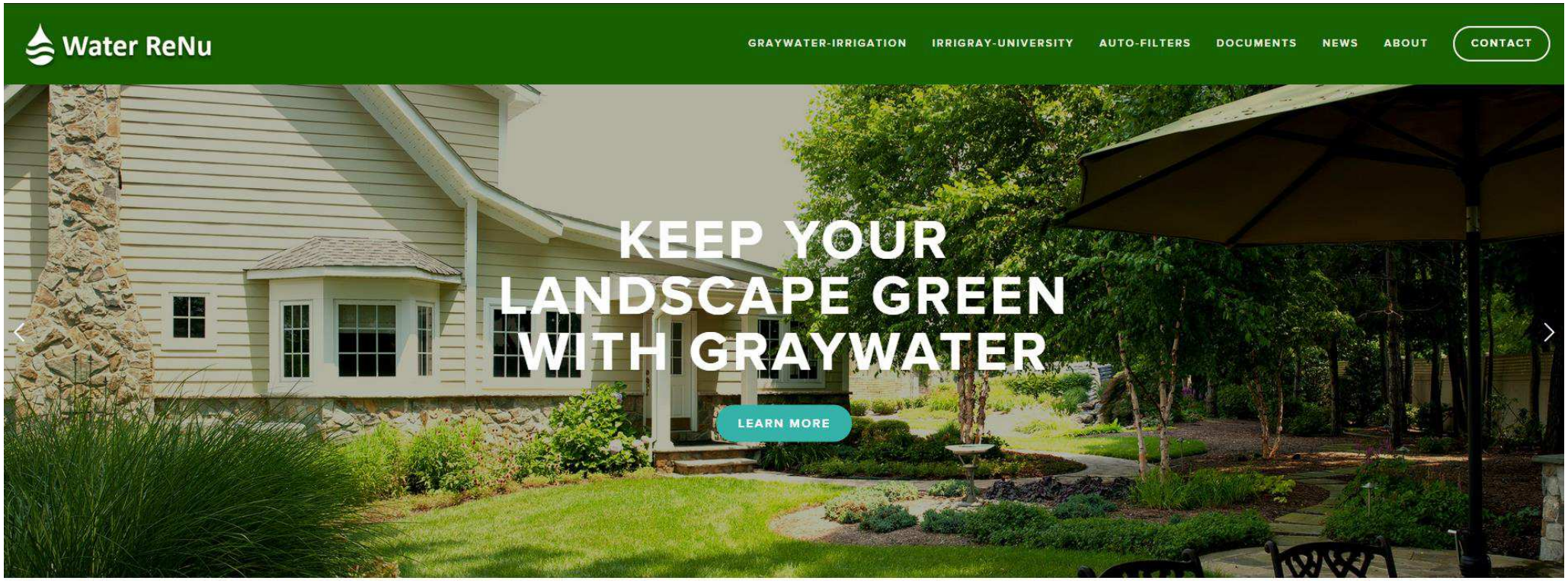


AWWS the World leader in Greywater diversion

- With over **12 years experience** in greywater diversion for gardens
- **Competent & Qualified** design staff
- More than **7,000 systems installed worldwide** (Australia, New Zealand, South Africa, Israel, Morocco, England, Chile & USA)
- A wide range of **Award winning systems** to suit **domestic & commercial** applications
- A unique **Patented** self cleaning system

AWWS is the uncontested world leader in Greywater diversion for gardens

AWWS
Advanced Waste Water System



We manufacture **Smart** Graywater, Rainwater, Condensate & Potable Water Irrigation systems for residential, commercial and industrial clients.

Patents Pending

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VP Research & Product Development
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Water ReNu

- Signature product = IrriGRAY
  - Product Development since 2000 / 2001
  - IrriGRAY platform released 2015
  - Small / large residential, multi-family & commercial
- Automated Filter Systems
  - Well Water
  - Industrial Process
  - Other
- Monitoring
  - Wells
  - Water Storage
  - Filter Performance
  - Commercial Controllers

Water ReNu

Texas Advisory Board

- Tim Jackson
  2016 President, Texas Association of Builders (TAB)
- Michael Biggerstaff, TAB Developer of the year 2015
- Chad Decker, 2016 President, San Angelo HBA
- + More across Texas

Key Client Drivers – **95%** of Residents

- **Landscape Insurance** (avoid drought / water restrictions)
- **Save Money Each Year** (lower water bills)
  - $512 per year with IrriGRAY
  - $1,394 with Potable Water Smart Controller & Sprinklers
  - $1,107 with Potable Water Smart Controller & Sprinklers (max usage = 1" per week)
  - **NET saving (after including incremental installation cost, amortized in mortgage, and running costs) between $350 & $650+ per year**
  - Future water pricing increases not included in cost savings
- **Social Conscience / Save Water**

- **Base Price = $4,150 + Irrigation Dripperline / Irrigation Components**
- **Incremental installed cost ~ 2,500 – 5,000 more than traditional spray system**

IrriGRAY

844-GRAYH$_2$O
844-472-9426
waterrenu.com

The Breakthrough Graywater Irrigation System

Minimize Water Restrictions
Keep Your Landscape Green All Summer
Save Water and Money
Protect your Landscape Investment
Re-use Water you've already paid for
Effective. Efficient. Economical

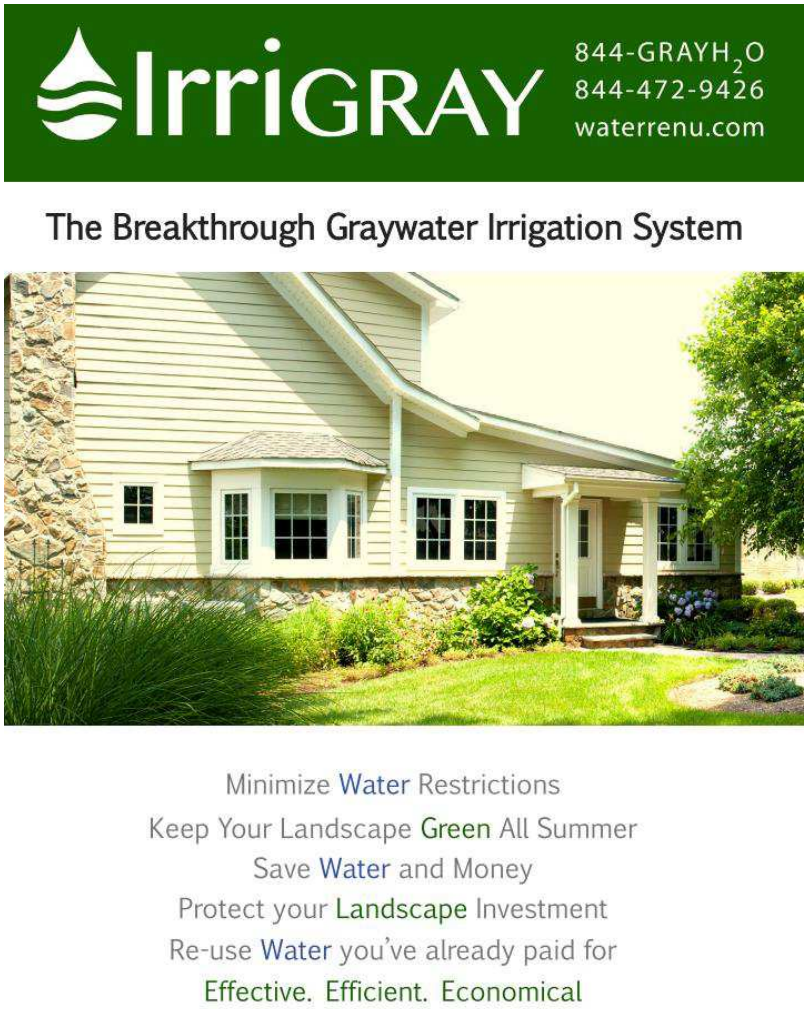
Key Client Drivers - Installation

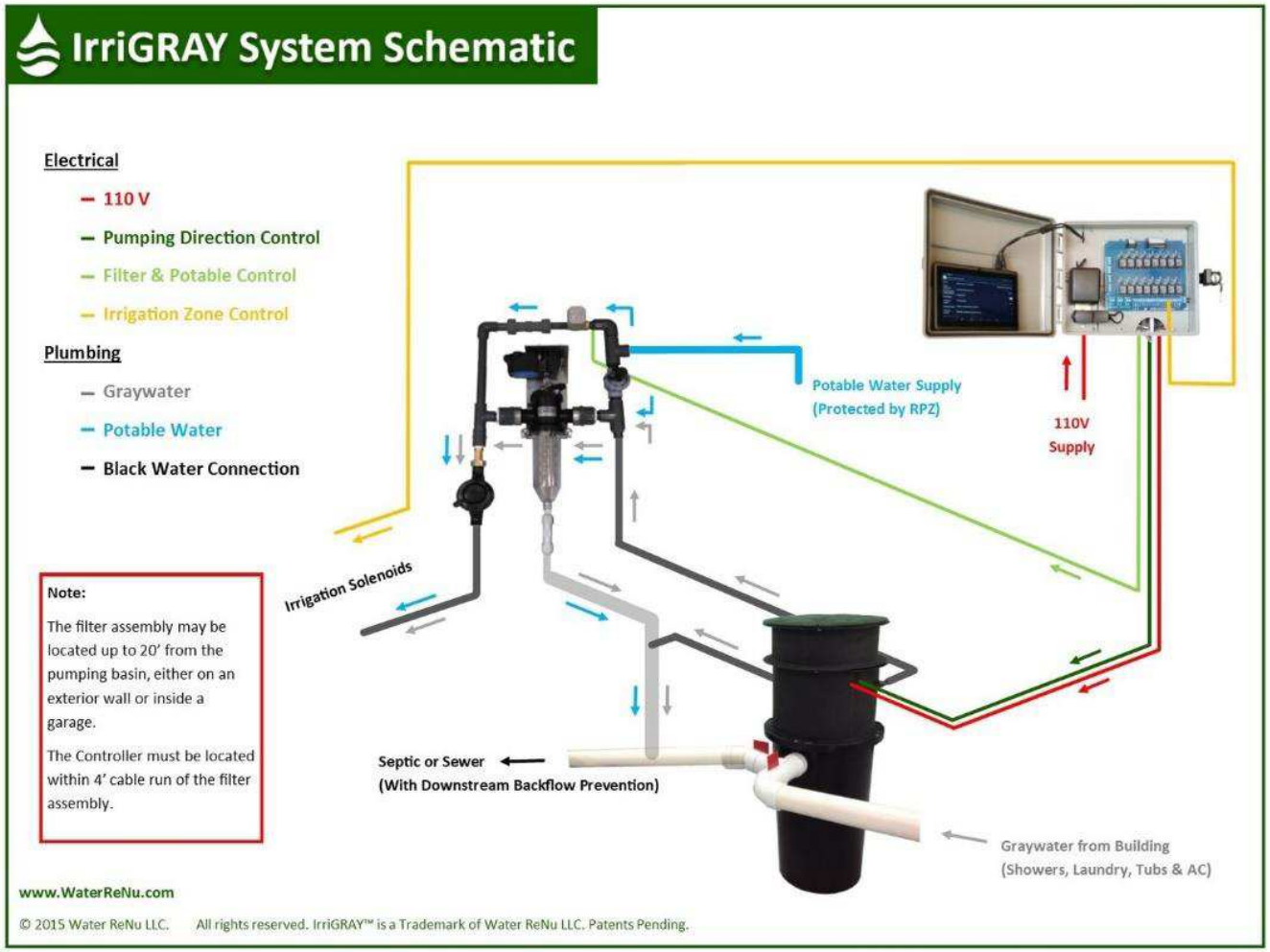
- **Builders;**
  need solutions for reducing outdoor water consumption
  - Standardized installation process for plumbers, electricians and landscapers
  - Site Context Flexibility (multiple sources of water)
  - Monitoring for landscape guarantees

- **Building Contractors;**
  need plug and play solutions
  - drop in plumbing,
  - pre wired electrical and control cabling

- **Landscape Installer;**
  simplify installation
  - simplified rules & techniques, reduce labor & time by 50%
  - One controller for all irrigation and water management methods
  - Internet Based programming
  - Remote Control ability for on site testing and commissioning
  - Automated monitoring until resident move in and initial landscape warranty

- **Landscape Maintenance;**
  minimize site visits while providing superior service
  - Automated monitoring
  - Internet accessible controller programming
  - Water Management and Budgeting Data / Skills (new residential offering)





IrriGRAY has 5 main components

- Compact Pumping Basin
- Self Cleaning Filtration and Water Management Module
- On-Site Water Management and Process Controller (Wifi Capable), remote software version management and updating
- Irrigation Zones (sub surface landscape bed / turf dripperlines)
- Internet Based Reporting / Configuration / Monitoring Service

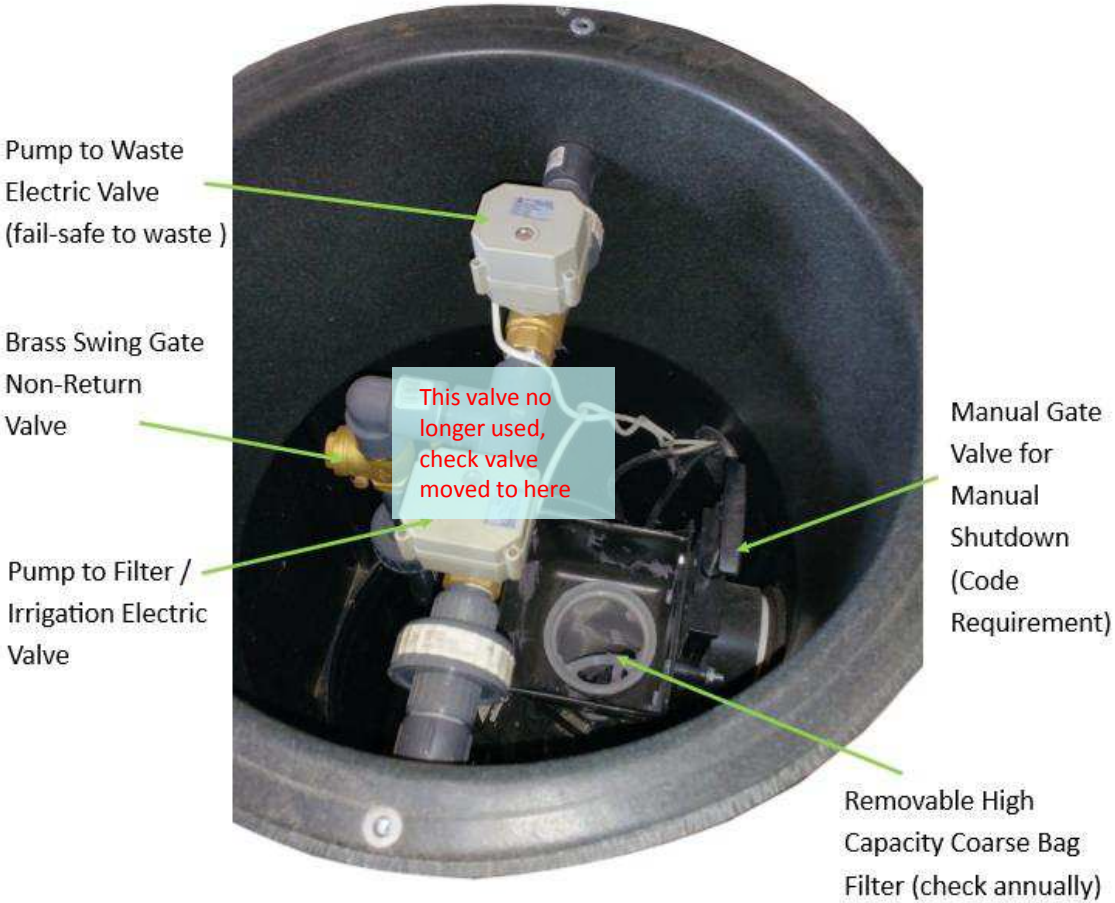
Other Managed Components / Supplies

- Rainwater storage & level control
- Condensate
- RO waste (diluted)
- Potable dripperline zones (vegetable gardens)
- Potable sprinkler zones
- Pool / fountain top ups

IrriGRAY Graywater Collection

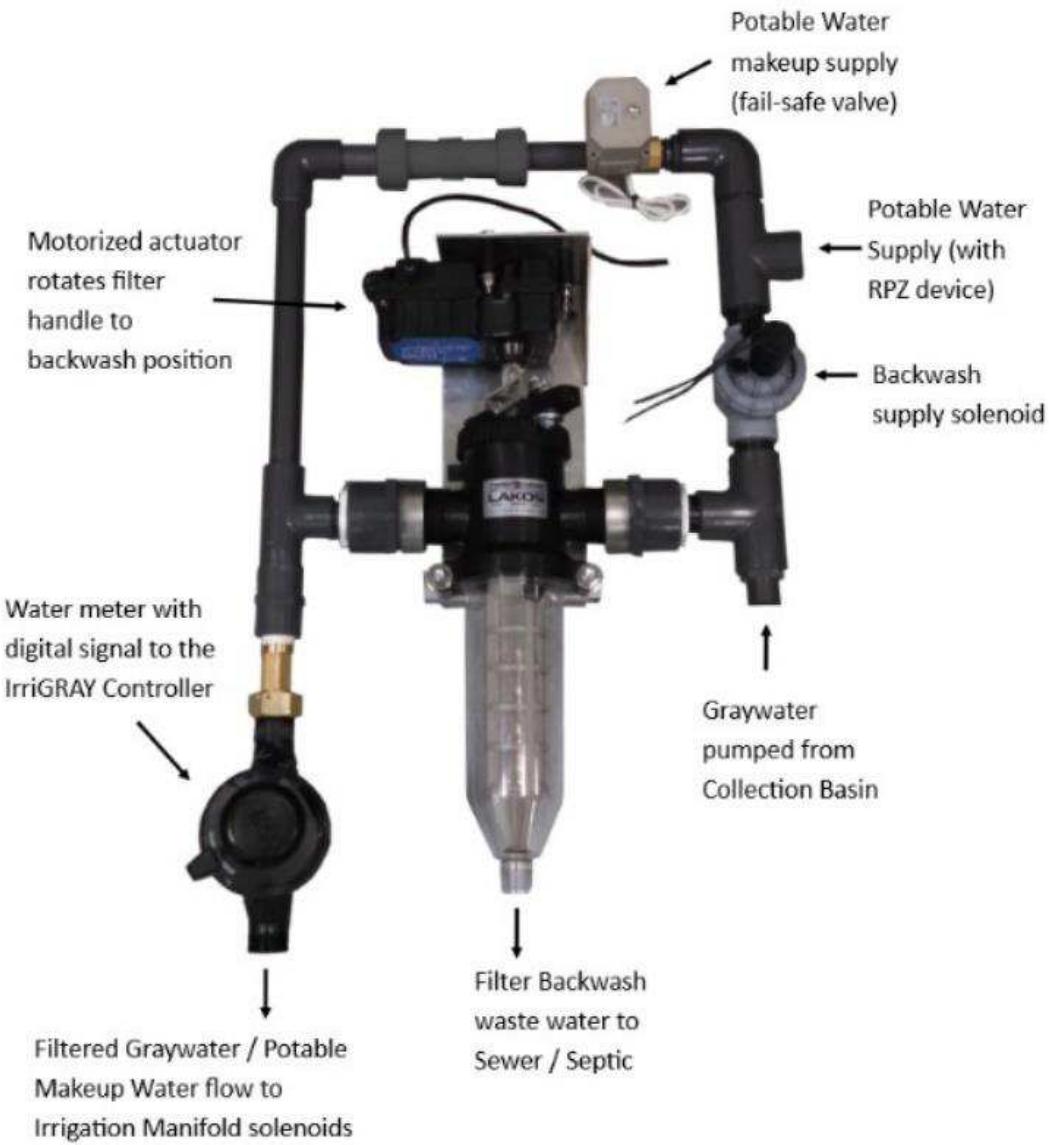
- Compact 18” Diameter x 30” Deep Sump Basin
- Pumps out as quickly as graywater is produced, storage not required
- **Segregated Waste Plumbing:**
  - Sewer / Septic waste (commodes, kitchen, basins);
  - Graywater (everything else)
- Larger Basin for Commercial applications e.g. Hotels

IrriGRAY Basin, Inside View with Basin Extension



- Energy
  - ~ 0.3 kWh / day (family)
  - < $0.05 day, $16 per year @ $0.15 per kWh

IrriGRAY Filter & Makeup Water Supply Assembly



- Self Sensing
- Auto Backwash to Septic / Sewer
- Compact size
- Freeze protected
- Does not remove soap (this helps irrigation)

Disc Filters

IrriGRAY System Plumbing

Water ReNu Disc Filter, Rainwater Storage & Potable Water Connections

www.WaterReNu.com

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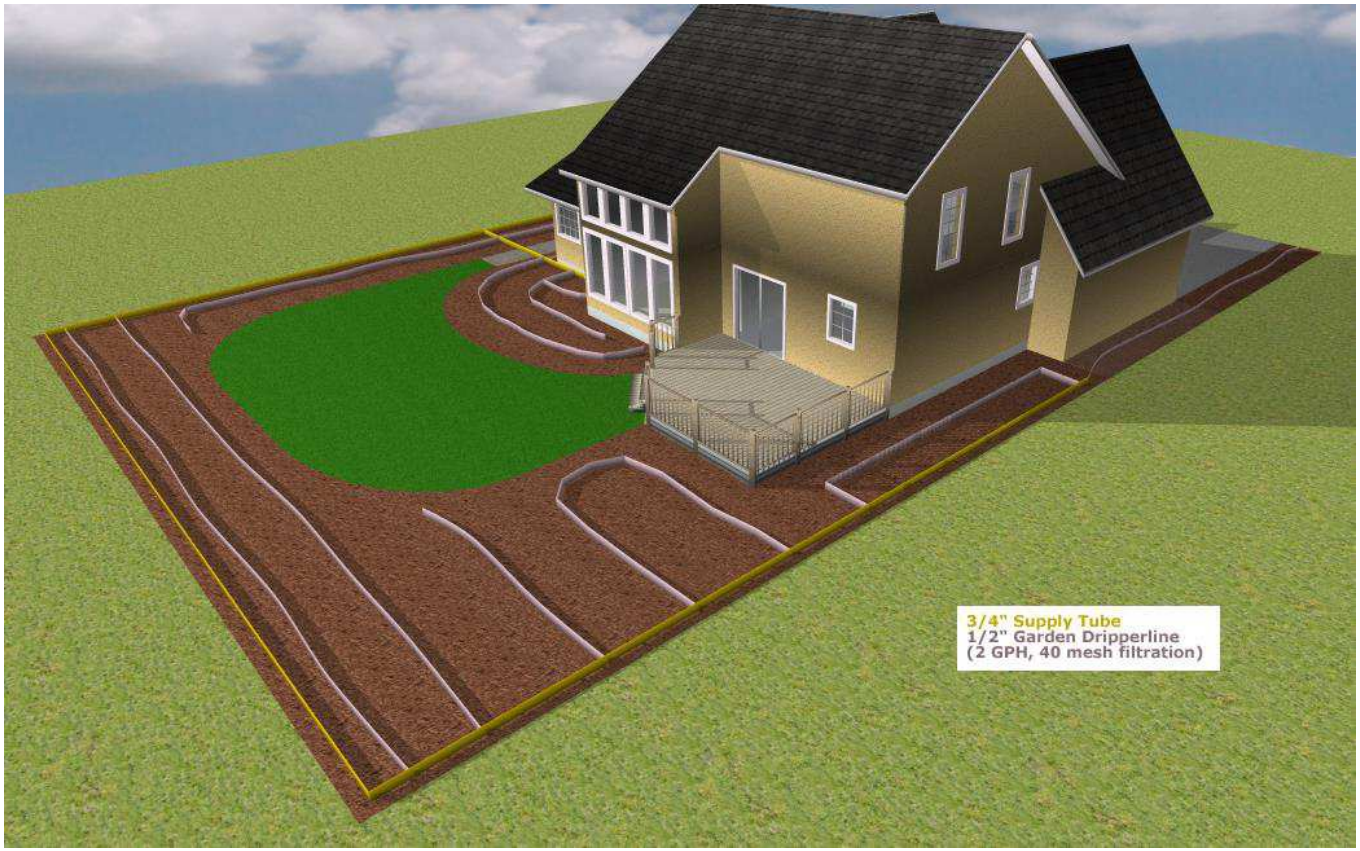
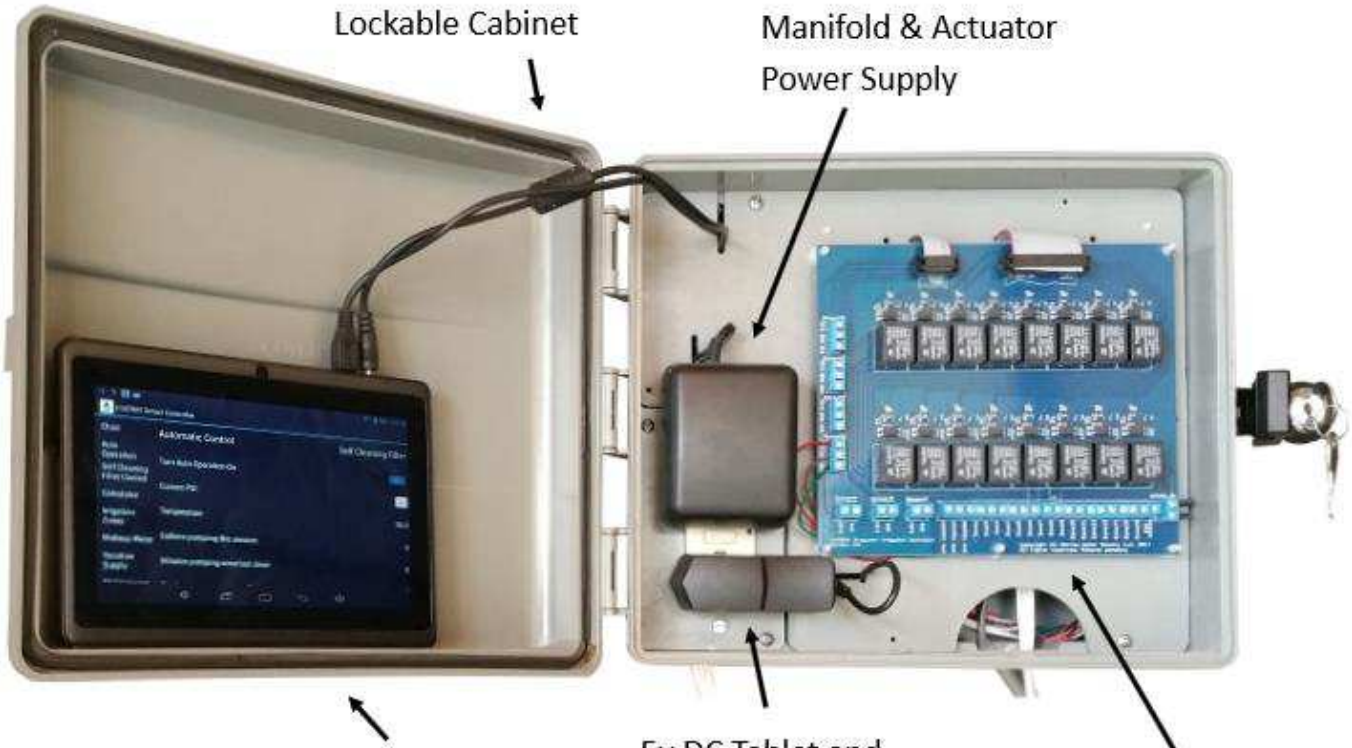
Irrigation



Up to 16 Graywater dripperline, potable water sprinkler & dripperline, & master valve zones

- Landscape Beds
  - Dripperline on top of soil, under mulch, every 3 - 6 feet, subject to soil type
  - **Capillary Irrigation: Water the Soil, not the plant**
- Turf, 1-3 inches + below sod, every 12 inches
  - Prevent striping, small lawns can irrigate via capillary transfer from landscape beds
  - **Dripperlines MUST be pressure flushed every month (5 on / off cycles)**
- NO Restrictions*
  - Graywater or Potable Water;
  - * A limited number of regions apply potable water restrictions to dripperline systems
- Uses ½ or less water, grows faster
  - Daily irrigation c/w irrigation
  - Roots in topsoil, 95% efficiency

IrriGRAY Controller



Water Management & Preventative Maintenance Examples:

How to Manage Graywater throughout the year?

- Summer
  All graywater for primary landscape, + makeup water if required

- Fall / Spring
  Excess graywater to secondary landscape, e.g. native grasses

- Winter / Freeze
  All graywater to secondary, subsurface drainage field
  Keeps load off septic, reducing maintenance

Preventative Maintenance

- Dripperlines require pressure flushing every month to ensure optimum performance for many years – avoid issues with soap and other TDS.
- Too many to describe today

IrriGRAY™ Controller: In the 'Cloud'

IrriGRAY Smart Controller

Paul | Logout

- Go Back
- View Charts
- Climate & Water
- Zones
- Vacation Supply
- New Lawn
- Rainwater Storage
- Self Cleaning Filter Control

Configuration Name: Reconfigured for extra zones corrected

Save As New

Climate & Water

Select Location:

USA | TX | Dallas/Ft. Worth

ET Values:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2.0	2.46	3.96	5.14	6.21	7.06	7.4	7.25	5.49	4.19	2.59	2.1

Use Excess Graywater?

Choose which months excess (extra) graywater can be used in the landscape. Otherwise extra graywater is sent to waste.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
☐	☐	☑	☑	☑	☑	☑	☑	☑	☑	☐	☐

Freeze Controls:

Activate Freeze Mode When Temperature Falls Below: 40

Disable Freeze Mode When Temperature Reaches Above: 50

Freeze to Waste ☑

Help Desk

Climate & water

This page contains global settings used for all irrigation zones.

Location

Select your location using the drop down fields for Country, State and City.

Based on your location, IrriGRAY loads historical EvapoTranspiration values for each month of the year. ET values are used to determine exactly how much water needs to be irrigated each day. Historical values are better for landscape management, because daily irrigation (as managed by IrriGRAY) establishes constant soil moisture, which is not as variable as fluctuating weather conditions.

If your location is not in the list, you must enter a value for each month. ET values can be found on government websites, as well as inquiring at your local garden nursery.

Potable Water Dripperline Use

This section defines which days over a two week period that potable water

IrriGRAY

IrriGRAY Smart Controller

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- Go Back
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Potable Water Sprinkler Use—Select days that Potable Water should be used for sprinkler irrigation.

We recommend having every day ON (better irrigation efficiency) , however turn OFF any days which are not permitted for potable water sprinkler use if required by local water restrictions.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 1	✓	✓	✓	✓	✓	✓	✓
Week 2	✓	✓	✓	✓	✓	✓	✓
Week 3	✓	✓	✓	✓	✓	✓	✓
Week 4	✓	✓	✓	✓	✓	✓	✓

Maximum Allowed Inches of Sprinkler Irrigation Per Month: 0

Potable Water Dripperline Use—Select days that Potable Water should be used for makeup water and vegetable gardens:

We recommend having every day on (better irrigation efficiency) , however turn OFF any days which are not permitted for potable water dripperline use if required by local water restrictions

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 1	✓	✓	✓	✓	✓	✓	✓
Week 2	✓	✓	✓	✓	✓	✓	✓

Apply Extra Water On Permitted Days?

(•) Yes

authorities have applied special potable water dripperline use restrictions - and this is rare across the US because dripperlines are normally exempted from restriction - you can turn off days as required.

Apply Extra Water on Permitted Days?

If potable water restrictions apply to dripperline irrigation systems in your area, AND you have turned off days as per your restrictions for Potable Water Dripperline Use, you can elect to have the 'missing' water - from days where potable water is disabled - added to the next allowed potable water irrigation day. The default setting is "Yes".

Makeup Water Supply Starts at.....

Specify what time of the day graywater production normally ceases. For most households this is 10pm, allowing for night time showers and laundry activities.

If Rainfall Detected.....

Most rain sensors are adjustable - and are often set to trigger with 1/4, 1/2 or more inches. Subject to your rain sensor, you can set the delay period before potabale water should be used to 'makeup' for a shortfall of graywater.

Use Excess Graywater?

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- Go Back
- View Charts
- Climate & Water
- **Zones**
- Vacation Supply
- New Lawn
- Rainwater Storage
- Self Cleaning Filter Control

Configuration Name: Reconfigured for extra zones corrected

Save As New

Zone 2

Back | Zone 2 Graywater Turf South | Save zone (saves zone settings to session only - this does not save a new config version)

GRAYWATER DRIPPERLINE | GRAYWATER DISPOSAL | POTABLE WATER SPRINKLER | POTABLE WATER DRIPPERLINE

Surface Area: 200

Plant Type: 0.4 (Medium / Low Water Use e.g. Native plants

Planting Density: 100%

Increase / Decrease: 100%

Apply Water Every Day? (a few plants such as grapevines, avocado and cacti prefer only 1-2 days per week)

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
✓	✓	✓	✓	✓	✓	✓

Line Length	Flow Rate	Emitter Spacing	Line Spacing	Estimated Water
300	2.0	12	12	1.02

☐ Freeze Capable

Help Desk

Zones - Graywater Dripperline

Graywater dripperline is the most common type of zone in IrriGRAY. It is designed for managing the amount of graywater (and potable or rainwater as makeup water) irrigated via sub surface dripperlines for turf and landscape beds.

Surface Area

Specify the size of the planting area in square feet for this zone. **Note: in special cases such as Trees in small planter boxes surrounded by concrete (where most of the roots extend a long way from the planter box), use the foliage area of the tree instead of the planter box area.*

Planting Density

Slide the adjustment to suit the planting density for the zone. Turf would almost always have a planting density of 100%. Typical landscape beds vary in density, from 10% up to 80%.

Plant Type

The plant type determines how much water the average plant in this zone requires, relative to alfalfa grass as a reference crop.

IrriGRAY

IrriGRAY Smart Controller

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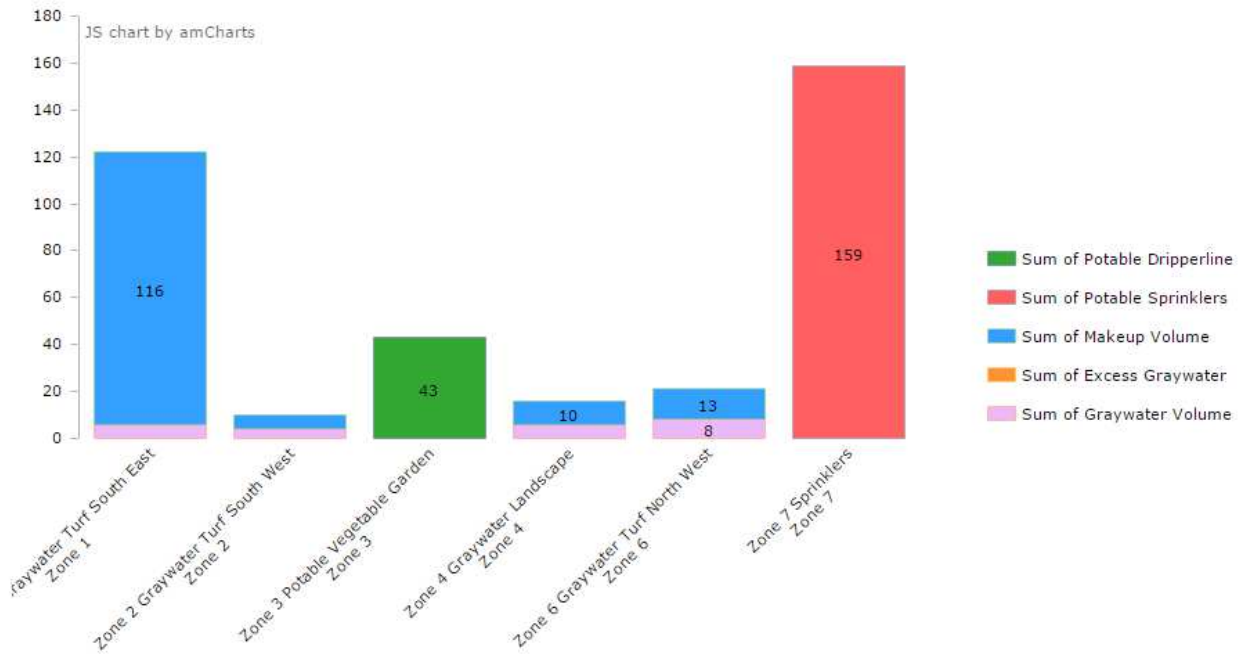
- Go Back
- Water Usage by Zone Chart
- Water Usage by Water Type Chart
- Day By Day Chart
- Live View Chart
- Event List

Water Usage by Zone Chart

Water Usage by Zone Chart

Start Date February 29,2016 End Date March 01,2016 Submit Reset



Help Desk

Water Usage by Zone Chart

This chart shows how many gallons of water have been used in each zone from the start date to the end date.
Water usage is split into 5 possible water / irrigation types:

- Potable Dripperline Irrigation
- Potable Sprinkler Irrigation
- Makeup Water Irrigation (related t graywater irrigation zones)
- Excess Graywater Irrigation (if excess graywater has been pump to a zone)
- Graywater Irrigation

You can change the start and end dates to review water use at different times.
The Y axis shows the number of gallons, and the X axis shows each zone.

IrriGRAY

IrriGRAY Smart Controller

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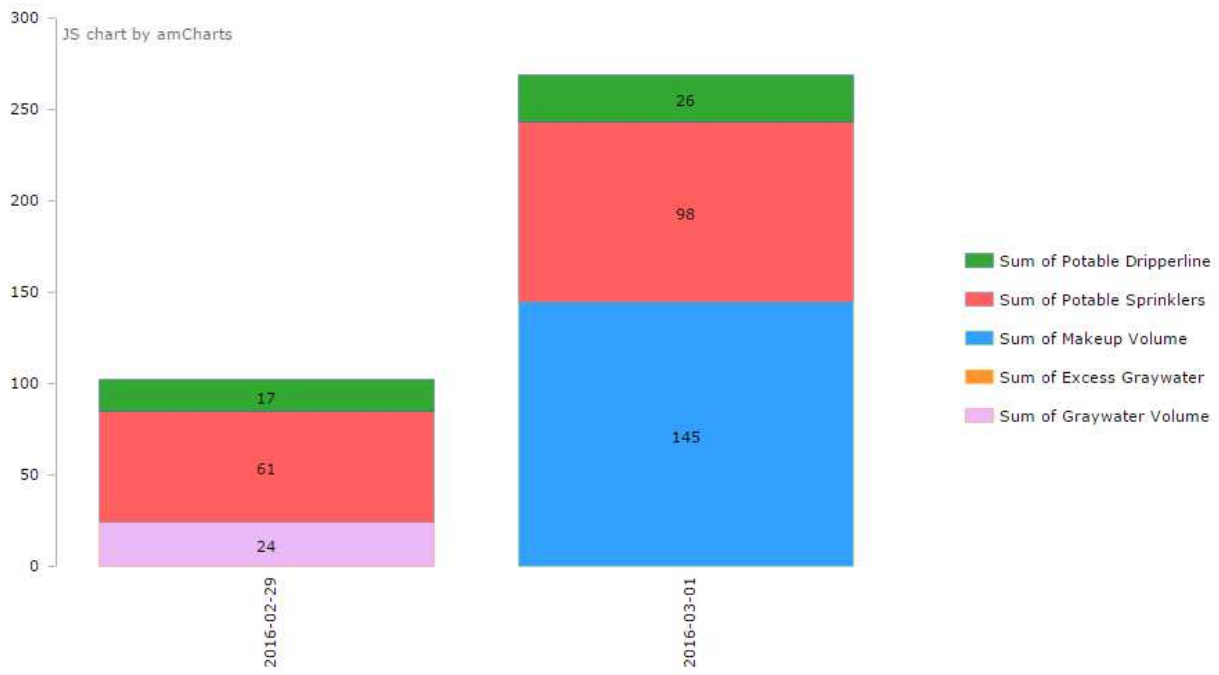
Day By day Usage Chart

Day By Day Usage Chart

Start Date February 29,2016 End Date March 01,2016 Submit Reset



Help Desk

Day By Day

This chart shows how many gallons of water have been used each day from the start date to the end date. Water usage is split into 5 possible water / irrigation types:

- Potable Dripperline Irrigation
- Potable Sprinkler Irrigation
- Makeup Water Irrigation (relatec graywater irrigation zones)
- Excess Graywater Irrigation (if excess graywater has been pun to a zone)
- Graywater Irrigation

You can change the start and end dates to review water use at different times.
The Y axis shows the number of gallons, and the X axis shows columns for each day.

IrriGRAY

IrriGRAY Smart Controller

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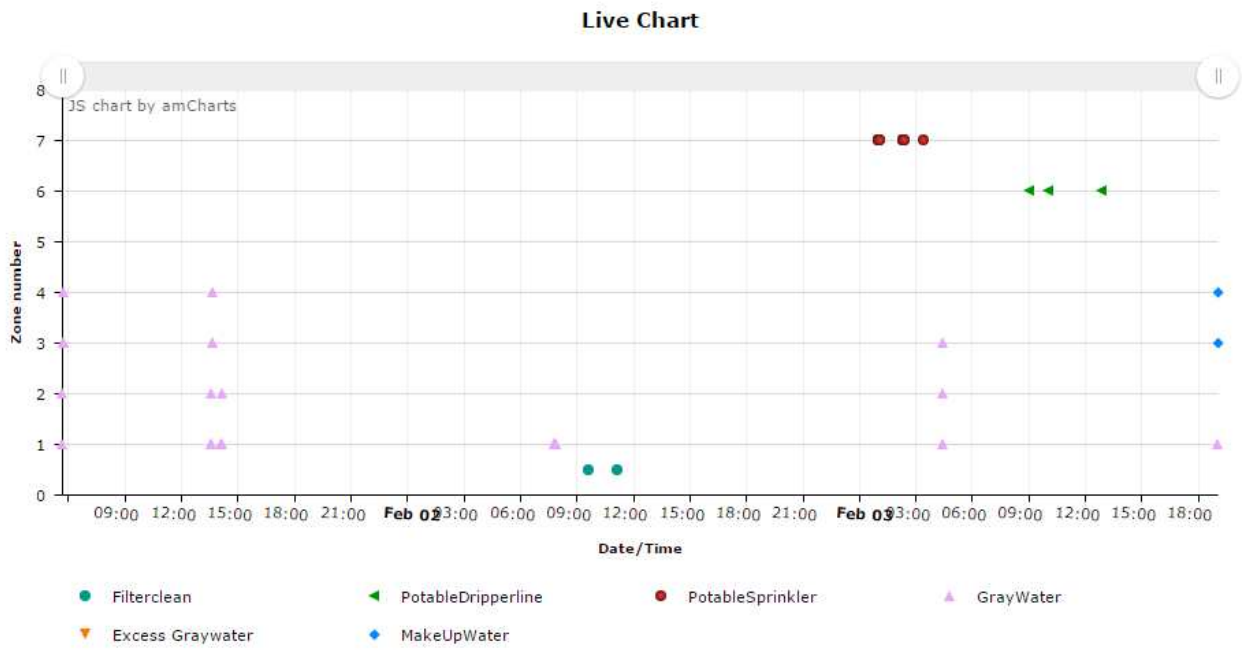
- Go Back
- Water Usage by Zone Chart
- Water Usage by Water Type Chart
- Day By Day Chart
- Live View Chart
- Event List

Live View Chart

Live View Chart

Start Date February 01,2016 End Date February 03,2016 Submit Reset



Help Desk

Live View Chart

This chart shows when irrigation events occur furing the day. The IrriGRAY tablet sends data to the IrriGRAY server every minute an activity is occuring.

The Y axis represent the zone number, with the exception of filter clean events, which are drawn at Y = 0.5.

The X axis represents the date & time range, between the Start Date and End Date.

Graywater Events

Graywater is being irrigated throughout the day, and to which zones. Graywater is indicated by t yellow triangles.

Makeup Water is irrigated (genera at the end of the day), and to whic zones. Makeup Water is indicated yellow diamonds.

When the filter has self cleaned. T is indicated by an orange circle. Filter cleaning is not related to irrigaton zones, so these circles a placed below zone 1.

Potable Water Zone Events

Potable water dripperline zones c use potable water for irrigation. Th

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Remote Control

On

Sensor Readings

Pressure before Filter :	2 psi	Makeup Water Flow Rate :	1 gpm
Pressure after Filter :	1 psi	Potable Sprinkler / Drip Flow Rate :	2 gpm
Basin Water Level :	inches	Temperature Sensor :	2 F

Irrigation Zones

☑ Zone 1 Graywater Turf South East	☐ Zone 2 Graywater Turf South West	☐ Zone 3 Potable Vegetable Garden	☐ Zone 4 Graywater Landscape
☐ Zone 5 Excess Graywater (freeze ok)	☐ Zone 6 Graywater Turf North West	☐ Zone 7 Sprinklers	☐ Zone 8 Graywater Turf North East
☐ Zone 9	☐ Zone 10	☐ Zone 11	☐ Zone 12
☐ Zone 13	☐ Zone 14	☐ Zone 15	☐ Zone 16 Potable Water Master Valve

Pump On?	Off
Filter Backwash	Off
Alternate Water	On
Water Diversion?	Off
Filter Position	Normal

Help Desk

Remote Control

Remote Control allows anyone with account access to place the IrriGRAY Controller into a remote controllable manual state.

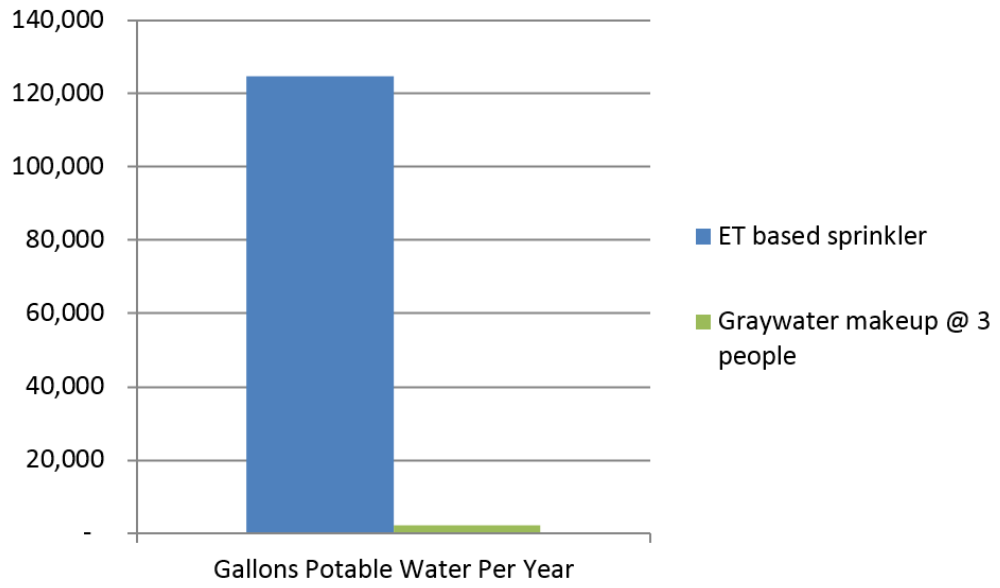
This enables any of the individual controls such as pump power / water valves & irrigation solenoids to be turned on or off immediately.

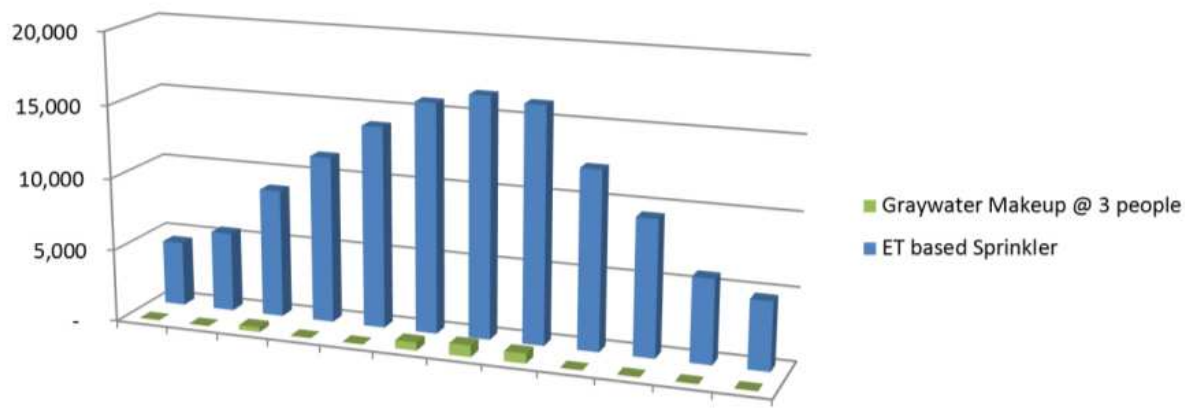
Live sensor data (pressure sensors & temperature sensor) are shown every 0.1 second. Please note these numbers do jump around in vaue, as the values have not been smoothed / averaged by the software.

Gallons per minute flow indicators take some time to show a value, because at least 2 meter 'clicks' are required to determine the flow speed through the meter. If flow stops, the value is not changed to 0. The software continues to measure time and meter 'clicks' to determine if a very slow flow is still occuring.

Before closing the session, and after all water operations have been completed, open one of the irrigation solenoids to remove any residual presure in the system. If this is not done, IrriGRAY will detect the residual pressure and assume the graywater pump is attempting to irrigate, and the software will create

- What Graywater Irrigation Can Achieve:
  - For a DFW property with 2,000 sq ft turf & 1,000 sq ft beds (3 residents)
- **124,000** Gallons Potable Water with Sprinklers and a 'smart' controller
- **96,000** Gallons Potable Water with Sprinklers limited to a max of 1" per week
- **5,000** Gallons of Potable Water in conjunction with an Efficient Graywater System

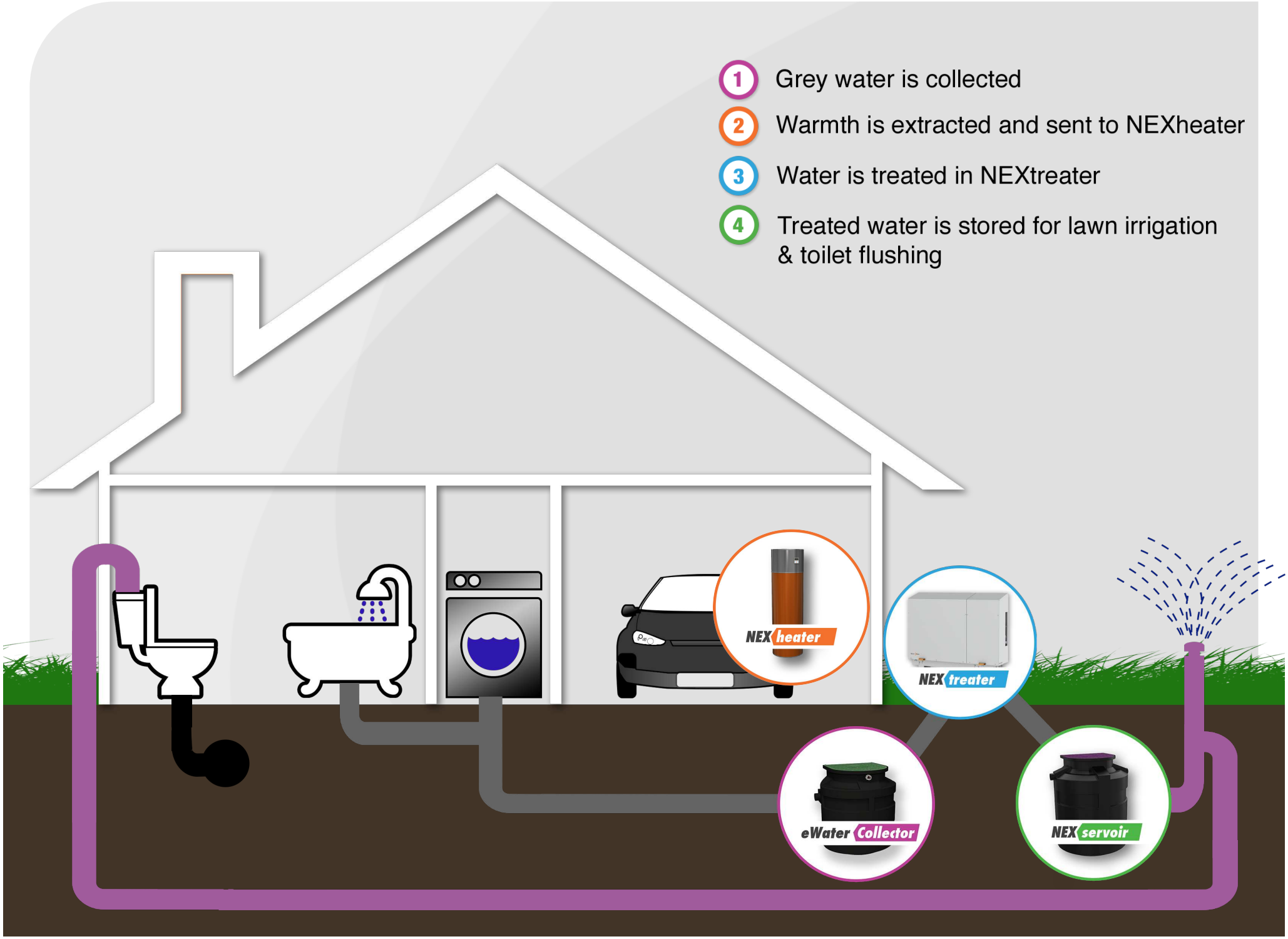




Nexus e Water

Water Recycling for the Home

Bob Hitchner, bob@nexusewater.com


1 Grey water is collected
2 Warmth is extracted and sent to NEXheater
3 Water is treated in NEXtreater
4 Treated water is stored for lawn irrigation & toilet flushing
NEX heater
NEX treater
eWater Collector
NEX servoir

What we will cover

1. The Nexus Solution is a “certified” greywater treatment solution – So What?
2. The Nexus solution is an automatic greywater solution – So What?
3. How the Nexus System Treats Water
4. Installation: “Recycle Ready” + NEXtreater
5. Installation pix

NEX treater

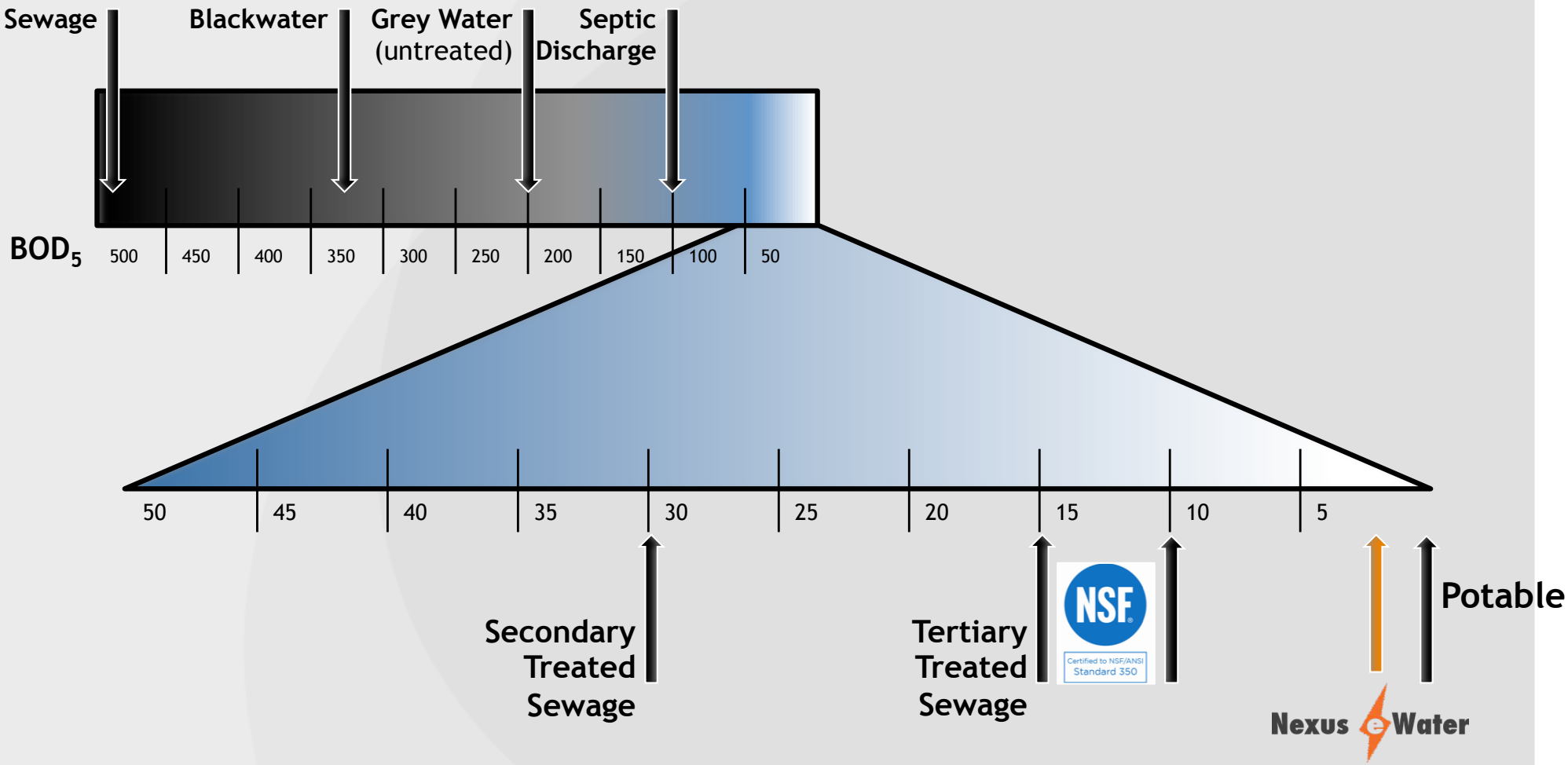
why certified treatment?

- Certified to NSF/ANSI 350
- Very high water quality
- Connects to any irrigation system
- Above-ground irrigation OK
- Veggies watering OK
- Flushing toilets OK

Before After

How clean? Very clean!

Water Quality Spectrum: BOD

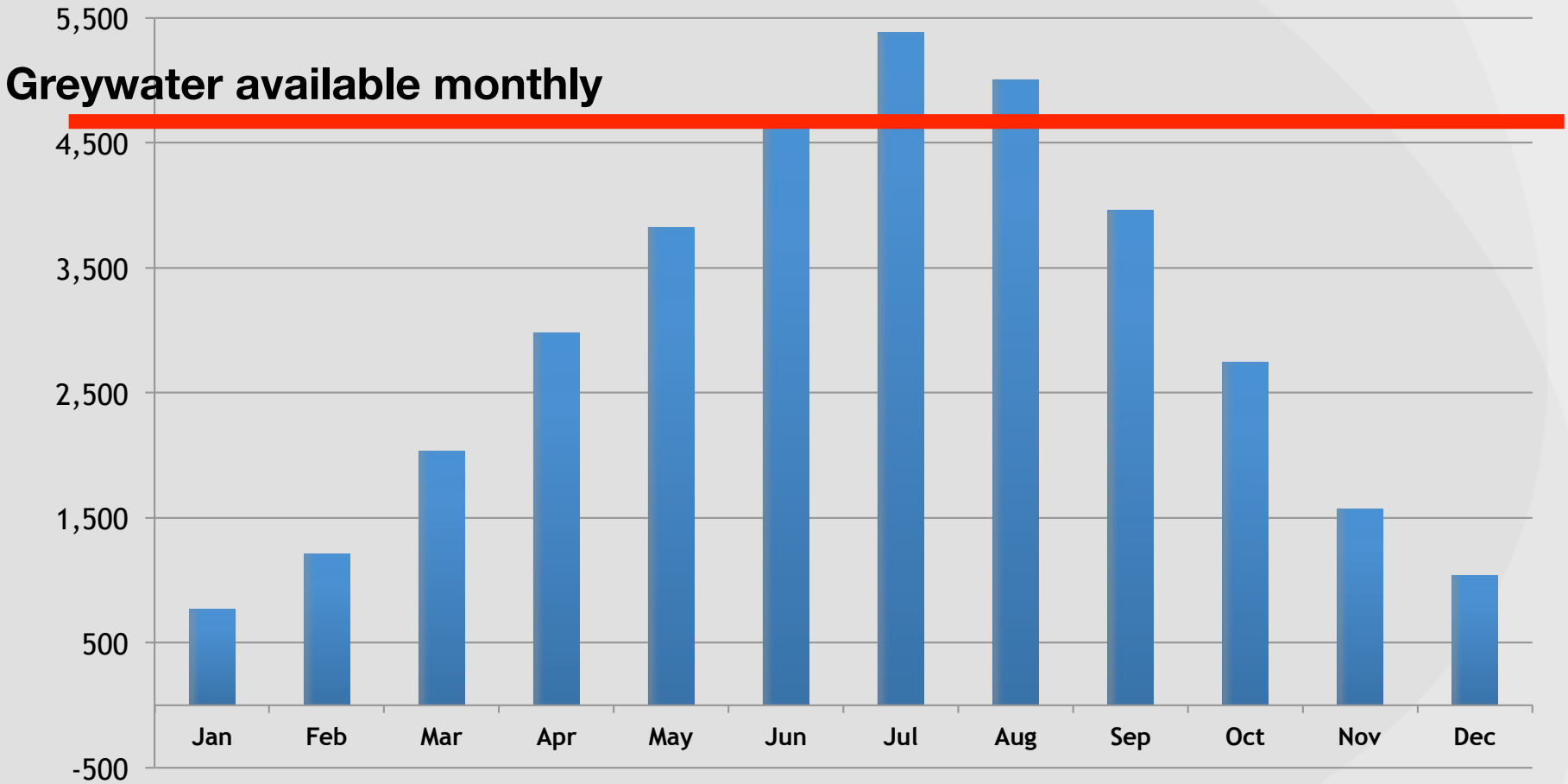


An Automatic System – So?

1. Treats and stores water until use
2. Connects to automated irrigation controllers
3. Works in background – no active operation by you, the Homeowner
4. Operates continuously – no diverters to operate
5. Alerts you when a filter needs to be changed
6. Works when you are on vacation

Socal City – Recycling Impact

2000 sq ft landscape, 4 persons



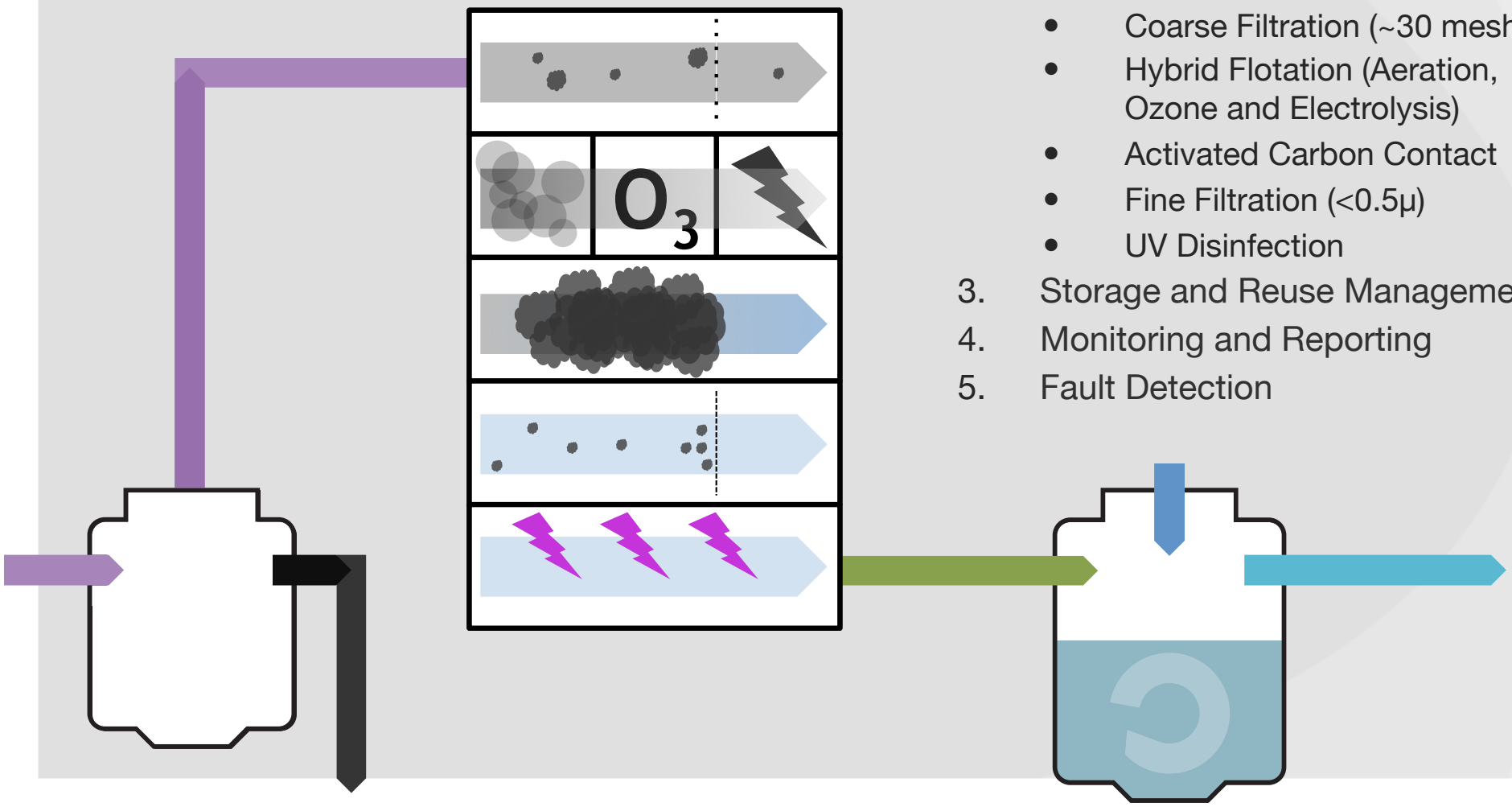
Data is available on mobile app

Nexus Water

NEX treater

HOW IT WORKS

Treatment Process



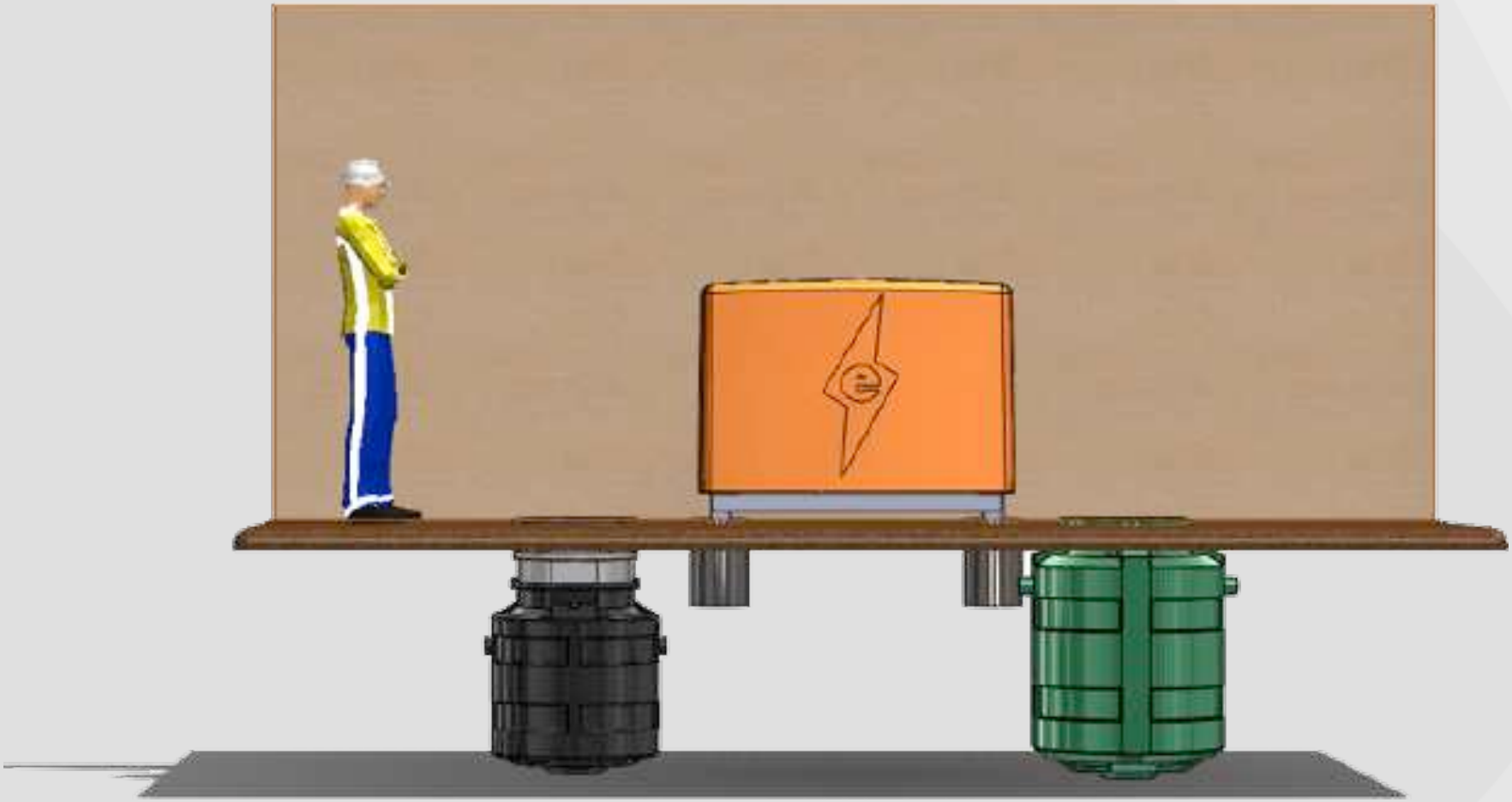
1. Grey Water Collection
2. Batch Treatment Process
   - Coarse Filtration (~30 mesh)
   - Hybrid Flotation (Aeration, Ozone and Electrolysis)
   - Activated Carbon Contact
   - Fine Filtration (<0.5μ)
   - UV Disinfection
3. Storage and Reuse Management
4. Monitoring and Reporting
5. Fault Detection

Installation Requirements

See: The Nexus Guide to the Recycle-Ready Home

1. Dual Plumb
2. Greywater and Black water must exit home in same location
3. Two tanks in ground
4. Pre-configured “greywater access port”
5. NEXtreater treatment appliance (above-ground)
6. 10 Amp electrical circuit
7. Nearby hose bib for top-up water
8. Connect treated water tank to any irrigation system

Side View with Tanks



75 gallons Greywater

200 gallons fresh water

NEXtreater

The heart of a certified, treated, automatic solution

Select Tank & Treater Locations

Dig Appropriately Deep Holes

Level, Square, & Align

Connect Underground

Connect Vent

Install Bench

Connect Plumbing to Bench

Voila! Your Greywater Access Port

Bench Level & 5”+ off House

Recycle-Ready

Tanks Backfilled

NEXtreater Installed

Your Next Steps

- If building a new home: Ask your builder to make it "Recycle Ready"
- Download our Guide to the Recycle Ready Home (see home page or …):

  http://www.nexusewater.com/recycle-ready-home-design

- Send me questions: bob@nexusewater.com

Thank you!

AWWS
Advanced Waste Water Systems
Greywater Diverter Systems

Water ReNu

Nexus eWater