The Alaska Water and Sewer Challenge

Phase 3: Prototype Development and Testing

Bill Griffith, Facility Programs Manager
Alaska Department of Environmental Conservation
December 8, 2015

Progress in Alaska Village Sanitation

- For half a century, we've focused on getting rid of the honey bucket.
- Much progress has been made:
  - 30 years ago, fewer than 25% of rural Alaska households had running water and flush toilets.
  - In 1996, 55% of rural homes had piped or covered haul service.
  - Today, approximately 85% of rural homes have indoor plumbing (over 90% if regional hubs are included in the calculation).

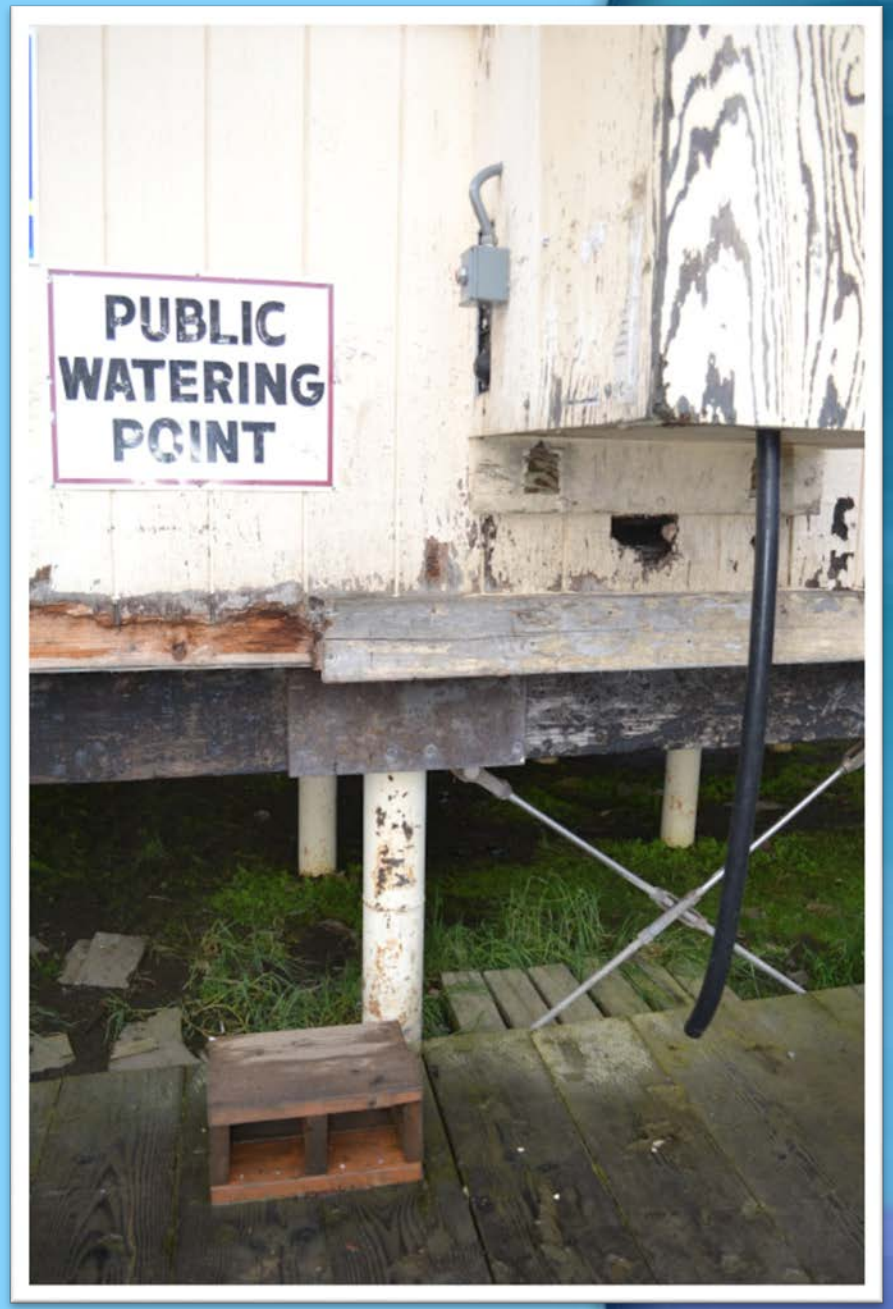
However…

Lack of in-home water and sewer service in rural Alaska causes severe skin infections and respiratory illnesses.

- Conventional, community-wide piped systems and truck haul systems are expensive to construct, maintain and replace.
- Many communities cannot afford the high operation and maintenance costs associated with piped or haul systems.
- Available funding is not adequate to serve remaining homes (approximately 3,300) and make needed improvements.
- Innovative approaches were needed in order to address health problems associated with water and sewer system deficiencies.

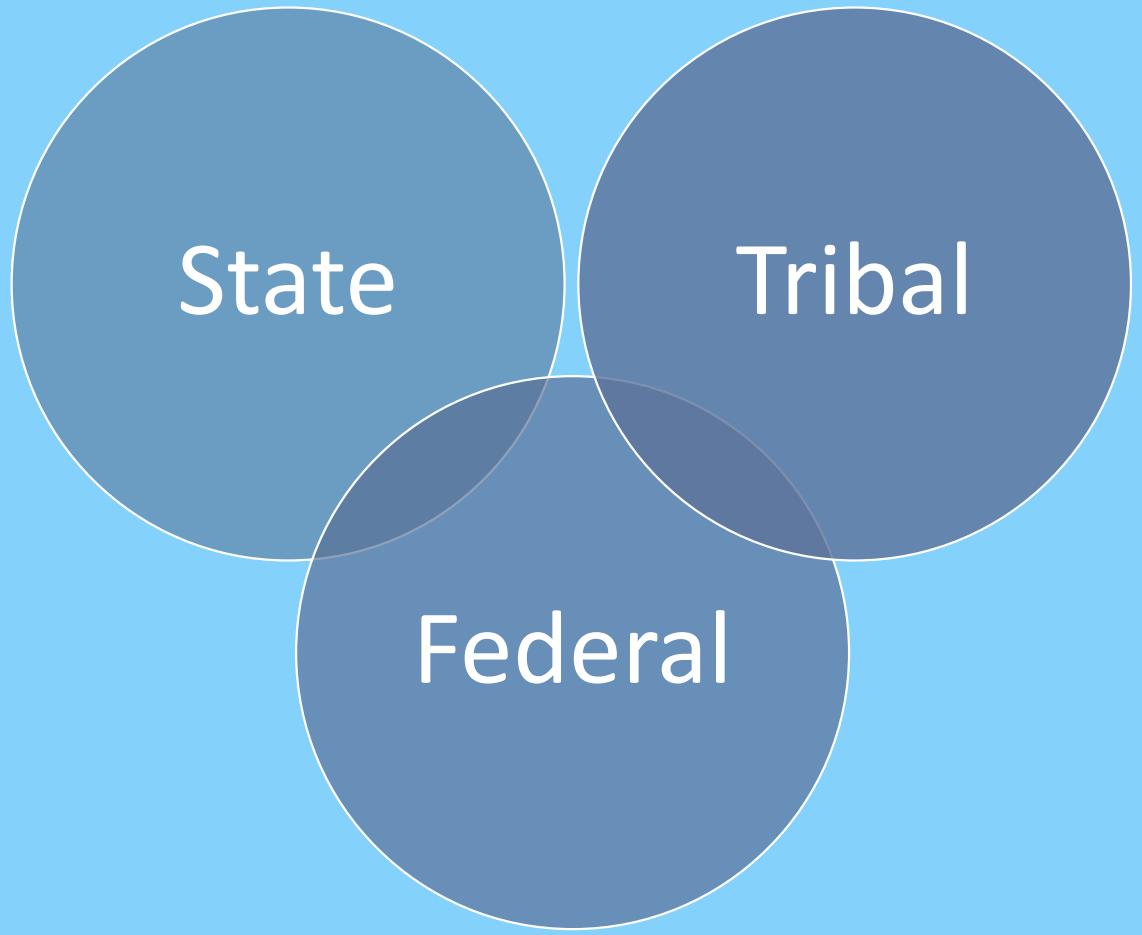
Alaska Water and Sewer Challenge

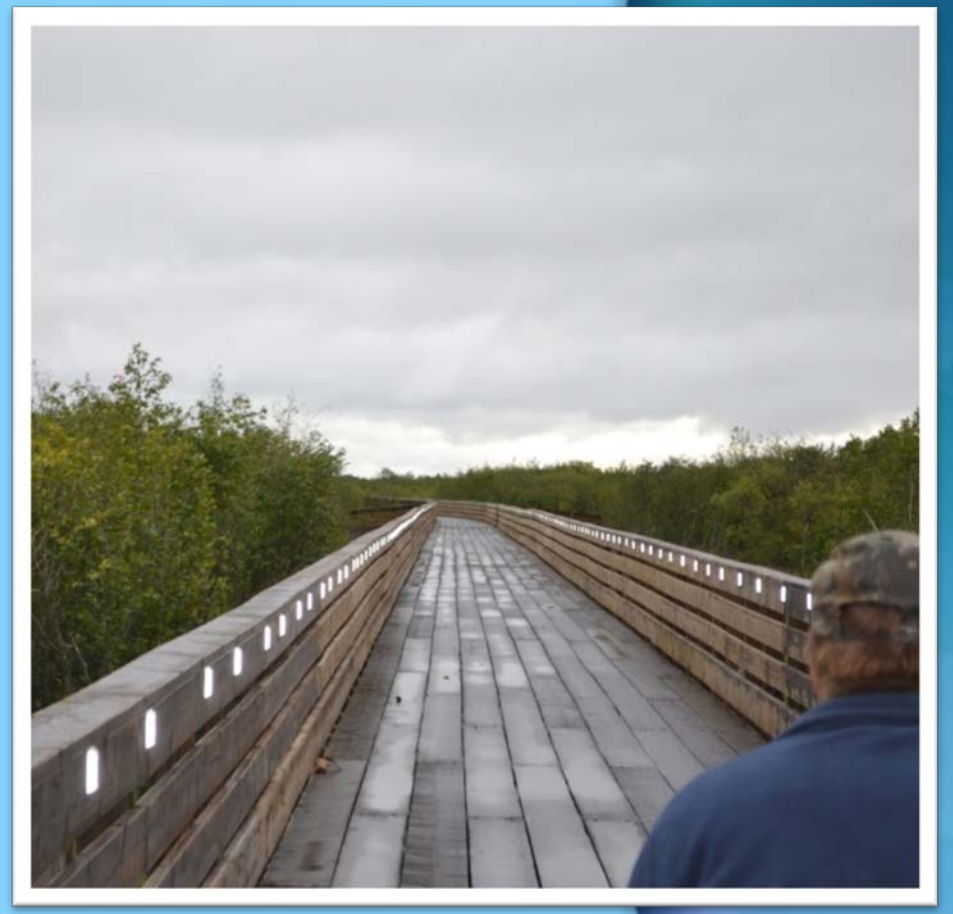
- State-funded research and development project projected to last 5 – 7 years
- Focus is on “decentralized” approaches – household based systems that utilize water re-use technologies
- Private sector driven – with ownership of intellectual property retained by project teams
- Goal is to significantly reduce the capital and operating costs of in-home running water and sewer in rural Alaska homes
- Funding to date is $4 million in state and federal funding. Additional funding will be required to complete the project



Performance Targets

Multi-Agency Steering Committee



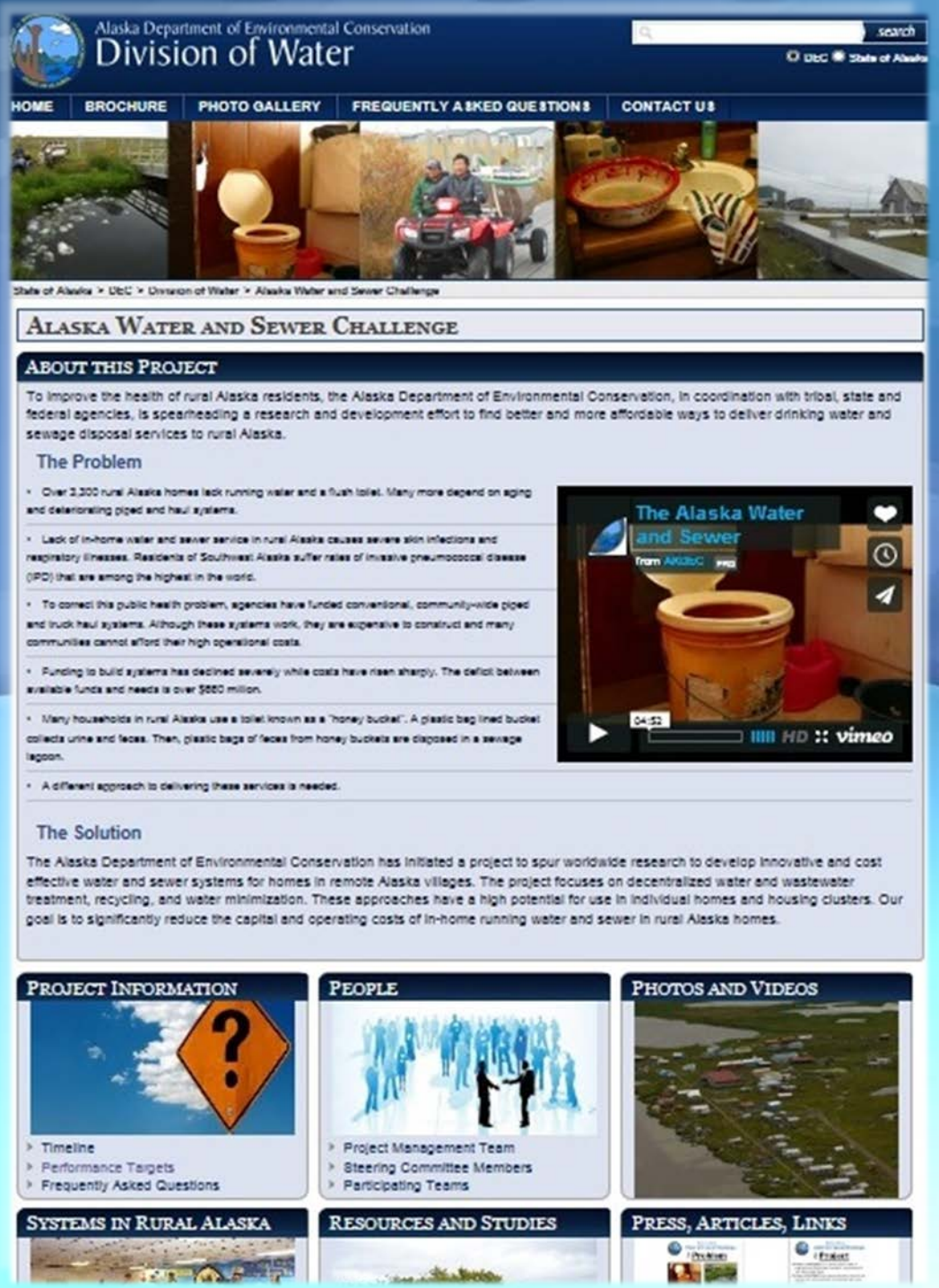


Village Input

- End users provide the most valuable feedback for appropriate technology design
- ADEC partnership with rural communities to better inform the development of future home-based systems
- Teams are required to work with communities from different regions

Project Timeline

Phase	Approximate Timeframe	Duration (months)
Team Formation	Fall 2013 – Spring 2014	9
Proposal Development + Presentation	Fall 2014 – Summer 2015	8
Prototype Development + Pilot Testing	December 2015 – Summer 2017	21
Field System Development + Testing	Fall 2017 – Summer 2019	21
Technology Refinement + Improvement	2020 and beyond	?



THANK YOU!

More questions:

Fatima.Ochante@alaska.gov

Bill.Griffith@alaska.gov

Project Website:

WaterSewerChallenge.alaska.gov

Team: DOWL Alaska

ALASKA WATER & SEWER CHALLENGE: PHASE 3

DOWL Team

Janelle Rogers

- Significant experience leading international experts on watsan projects in Ghana, Indonesia, Tanzania, Crimea, Mozambique, Central Asia, and Armenia
- USAID, MCC, & World Bank consultancies
- PhD in engineering mgt. & social science undergrad
- 4 years as construction engineer leading watsan project in Alaska villages

Chris Schulz

- 30+ years experience as water treatment specialist with CDM Smith and World Bank
- Developed “high tech” whole house water treatment system with no chemicals required
- Developed “low tech” ceramic disk filter system for household water treatment for Mayan Indian communities in Guatemala
- Co-author of book covering treatment processes for communities in developing countries

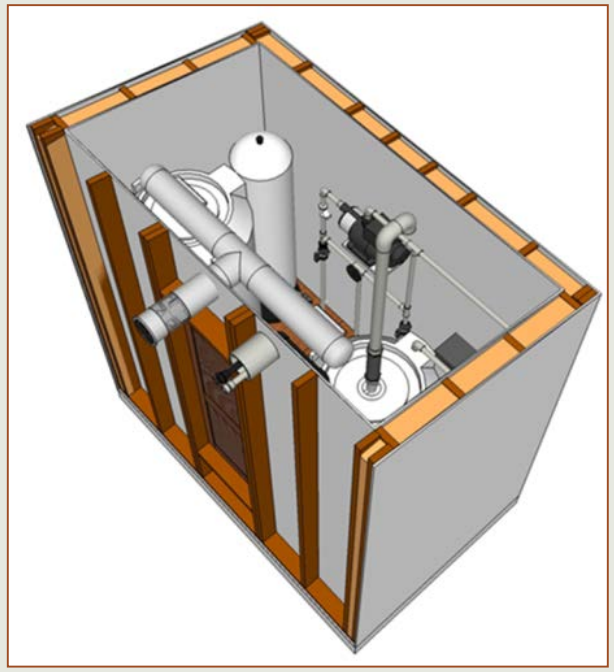
Laurie Krieger

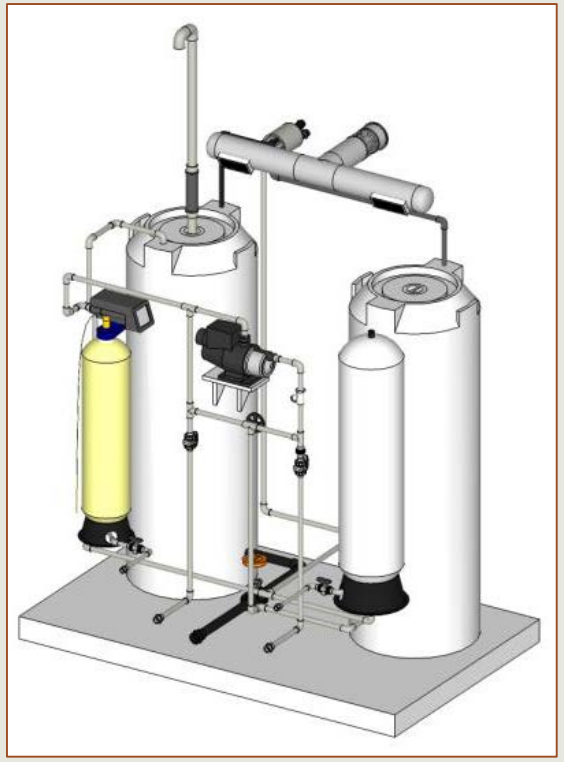
- PhD Public Health anthropologist
- Worked in public acceptance of technology for the past 28 years
- Worked in Water and Sanitation for Health (WASH) for 15 years
- Led WASH studies of public acceptance and use in 3 countries
- Co-author of "game changing" World Bank report on sustainable sanitation in rural Bangladesh

Chase Nelson

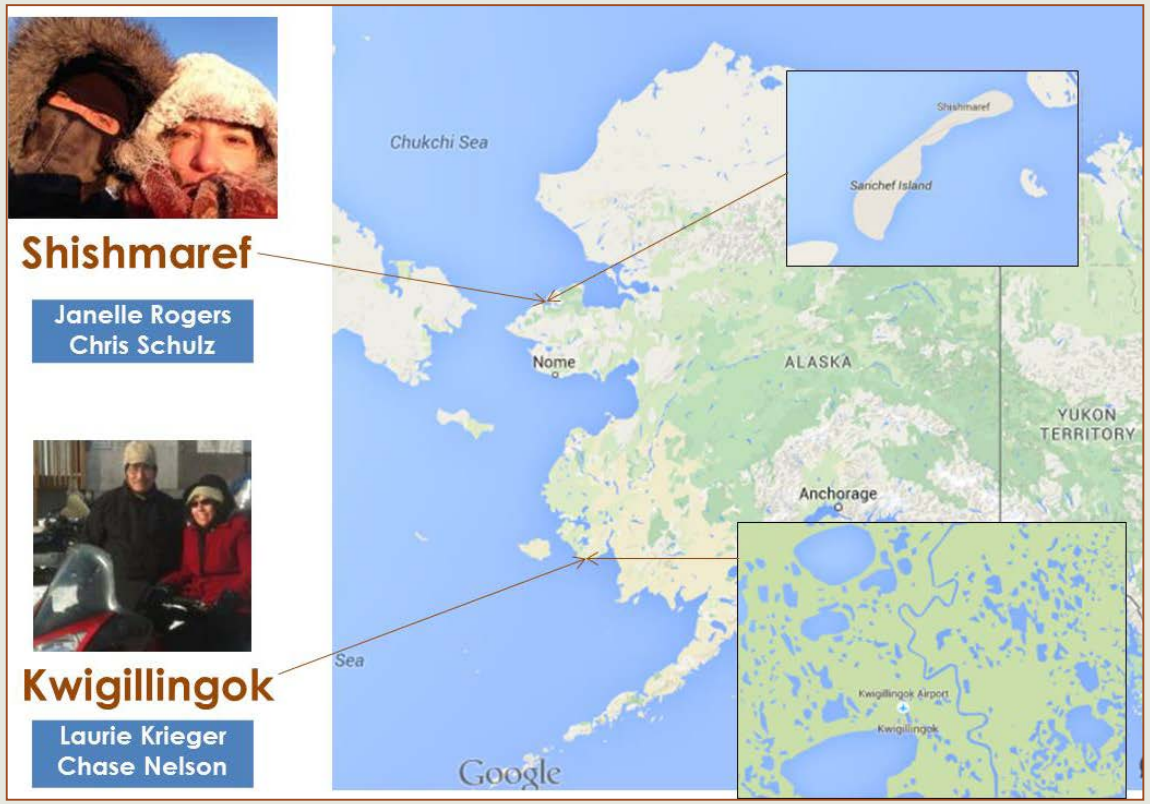
- Multiple years of Arctic Engineering experience
- Capital improvement projects in 55 Alaska villages
- Implemented over $30 Million of Projects in Alaska
- Multiple regions: YK Delta, NW Arctic, Interior Alaska, North Slope, and Southeast Alaska

DOWL Proposed System





End-User Input



Engaged end-users. Using input from these communities, we arrived at the vestibule design.

CCHRC/Fairbanks

Next Steps:

Construct Prototype at CCHRC/Fairbanks and continue interaction with communities during development

Team: Summit Consulting

ALASKA WATER & SEWER CHALLENGE: PHASE 3

ALASKA WATER + SEWER CHALLENGE

Summit Consulting Services

Tuesday, December 8, 2015

http://watersewerchallenge.alaska.gov/

SUMMIT CONSULTING SERVICES Inc.
REMOTE PROJECT CONSTRUCTION MANAGEMENT & DESIGN SERVICES

AGNEW ::BECK

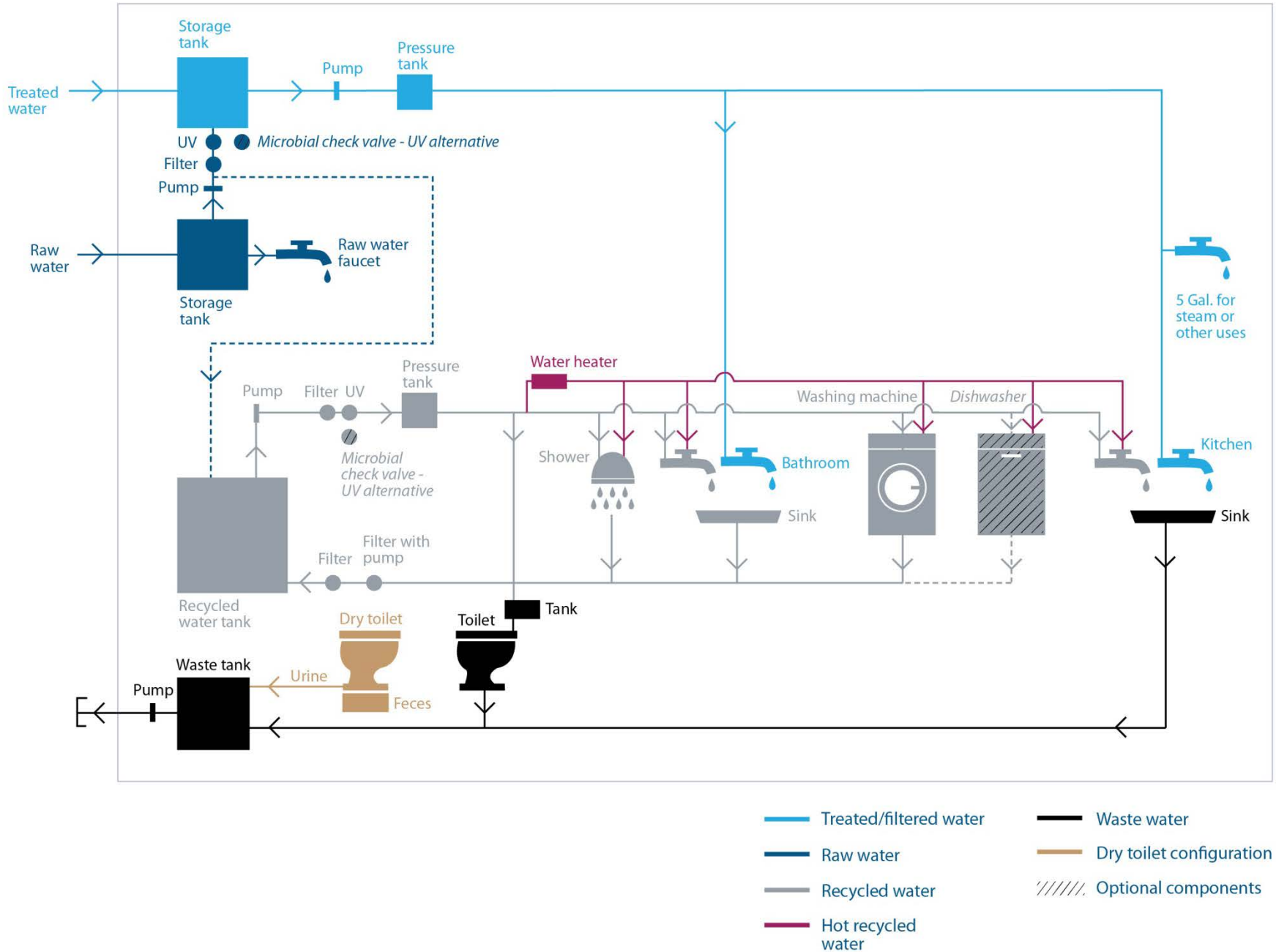
RELOCATE

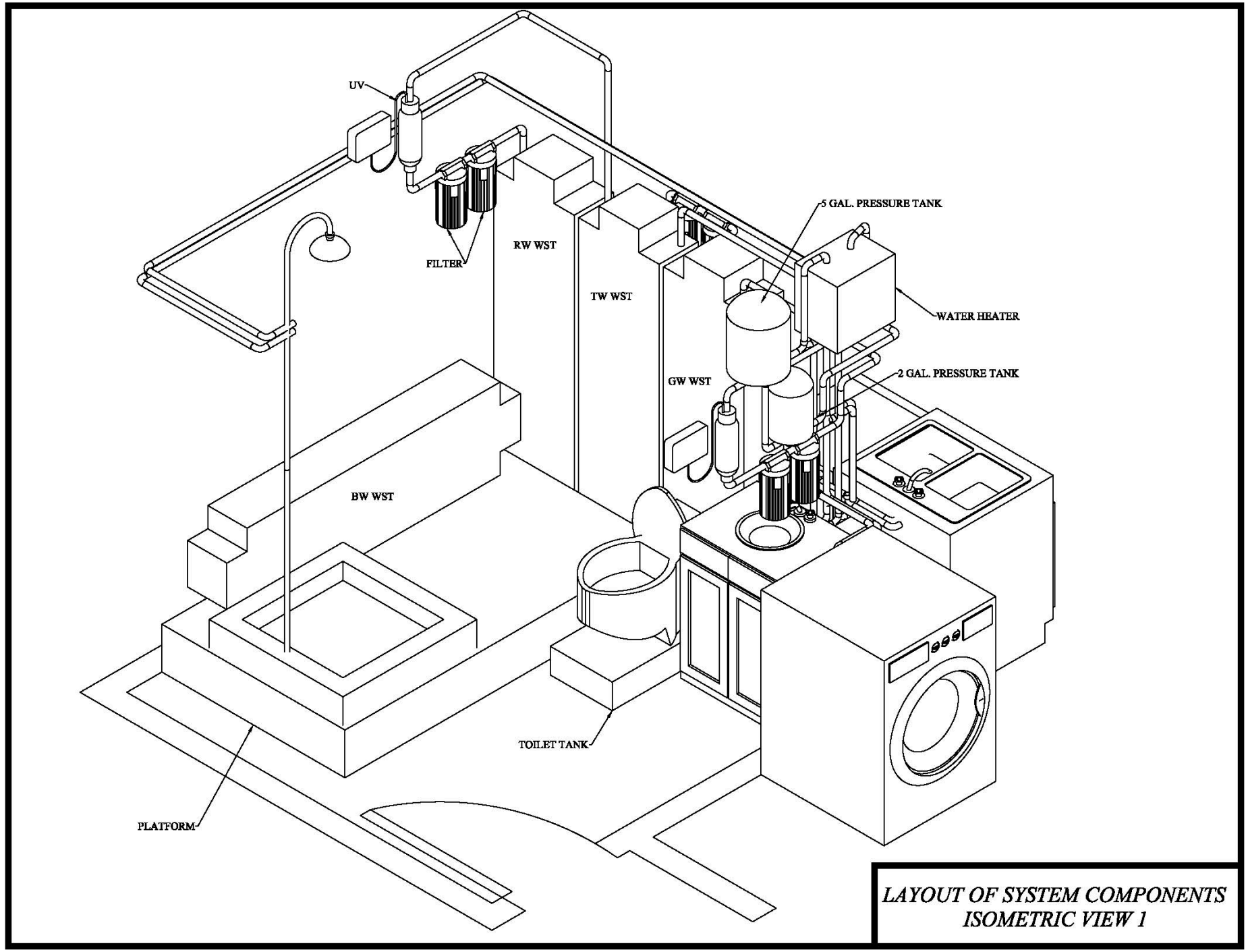
CLIMATE FOUNDATION

BOKU Universität für Bodenkultur Wien

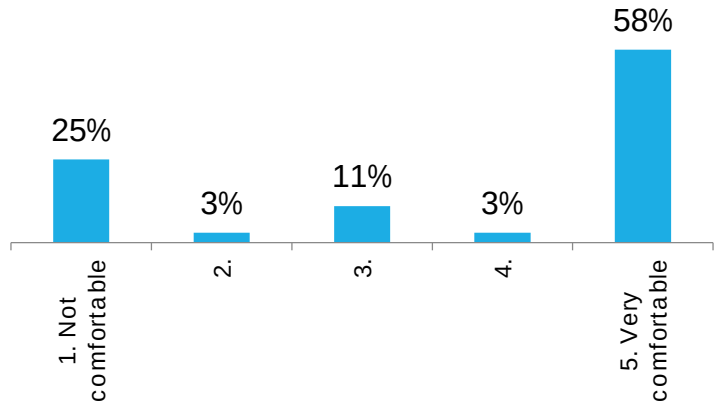
General questions about Summit's proposal? Contact 222.5424 or meghan@agnewbeck.com

Qualifications


Storage tank
Pump
Pressure tank
Treated water
UV
Microbial check valve - UV alternative
Filter
Pump
Raw water
Raw water faucet
Storage tank
5 Gal. for steam or other uses
Water heater
Pump
Filter
UV
Pressure tank
Washing machine
Dishwasher
Microbial check valve - UV alternative
Shower
Bathroom
Kitchen
Sink
Sink
Filter with pump
Filter
Recycled water tank
Tank
Dry toilet
Toilet
Waste tank
Urine
Pump
Feces
Treated/filtered water
Raw water
Recycled water
Hot recycled water
Waste water
Dry toilet configuration
Optional components


UV
FILTER
RW WST
TW WST
5 GAL. PRESSURE TANK
WATER HEATER
GW WST
2 GAL. PRESSURE TANK
BW WST
TOILET TANK
PLATFORM
LAYOUT OF SYSTEM COMPONENTS
ISOMETRIC VIEW 1

End User Input



Comfort with recycled water use for handwashing

Team: University of Alaska Anchorage

ALASKA WATER & SEWER CHALLENGE: PHASE 3

Our Team

UAA
UNIVERSITY of ALASKA ANCHORAGE

College of Engineering & Applied Science
UNIVERSITY OF COLORADO BOULDER

UNC
GILLINGS SCHOOL OF
GLOBAL PUBLIC HEALTH

USC Viterbi
School of Engineering

UBC
THE
UNIVERSITY OF
BRITISH
COLUMBIA

DALHOUSIE
UNIVERSITY

POLYTECHNIQUE
MONTRÉAL

First Nations Health Authority
Health through wellness

ALASKA NATIVE
TRIBAL HEALTH
CONSORTIUM

Cold Climate Housing Research Center
CCHRC

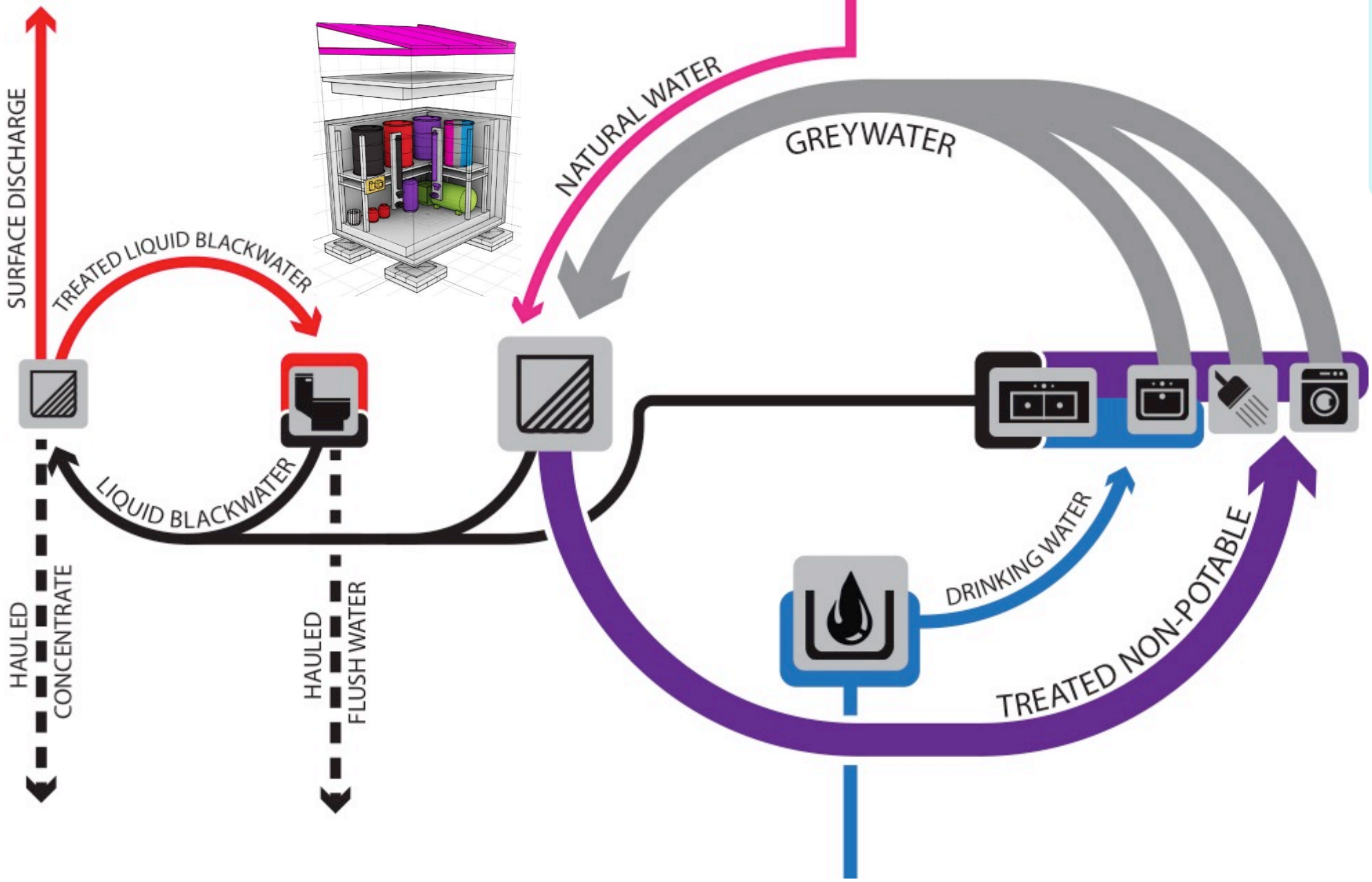
streamlineAM

GV Jones & Associates, Inc.
WATER AND WASTEWATER PROCESS ENGINEERS

MWH

SOUTHERN NEVADA WATER AUTHORITY®

On-site Water Reuse



Our Collaborating Communities

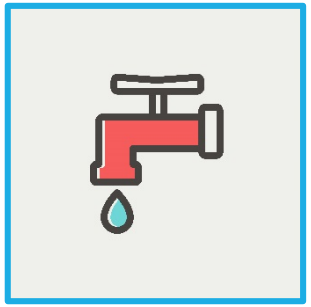
Kipnuk & Koyukuk

Collaborative Engineering

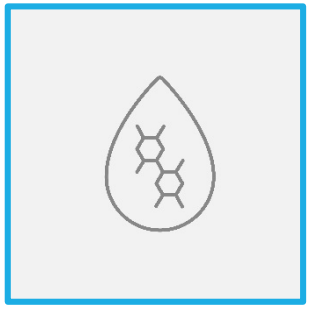
Water reuse

Fixtures to fit

Connecting Household Health to Public Health

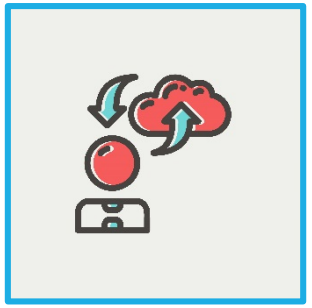


Water quality, quantity and availability



Sanitary waste management

Community-Driven



Open-source built

Maintained for/by the community

Alaska Water & Sewer Challenge
Phase 3 – Prototype Development and Pilot Testing
Press Conference: 10:00AM - December 8th, 2015 – Voth Hall

Primary Team Contact

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University of Alaska Anchorage

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addotson@uaa.alaska.edu

Team Website

ReuseWaterAK.com

State of Alaska Website

WaterSewerChallenge.alaska.gov

Questions & Answers

ALASKA WATER & SEWER CHALLENGE: PHASE 3

www.WaterSewerChallenge.alaska.gov