



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

www.WaterSewerChallenge.alaska.gov

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...

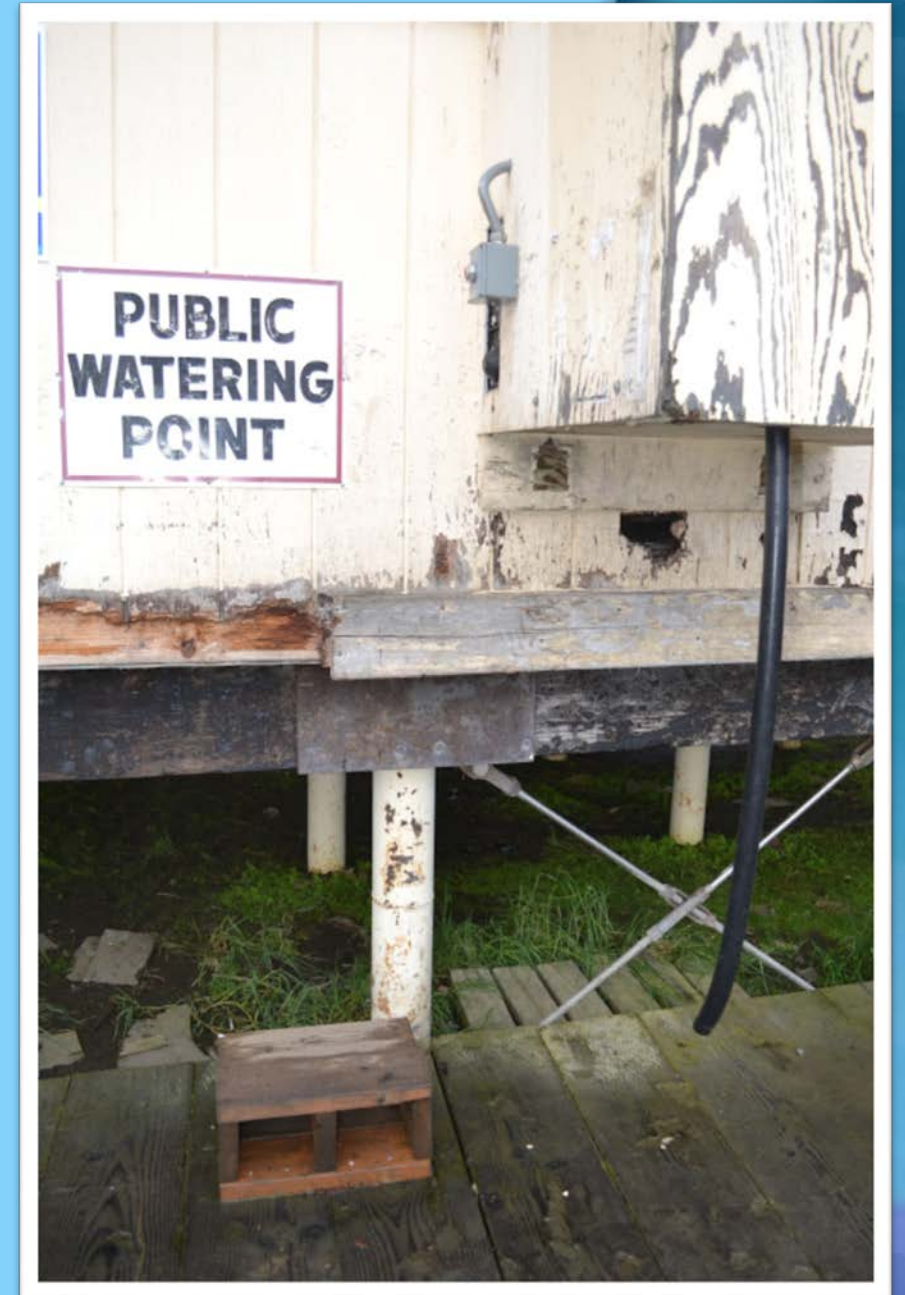
Lack of in-home water and sewer service in rural Alaska causes severe skin infections and respiratory illnesses.



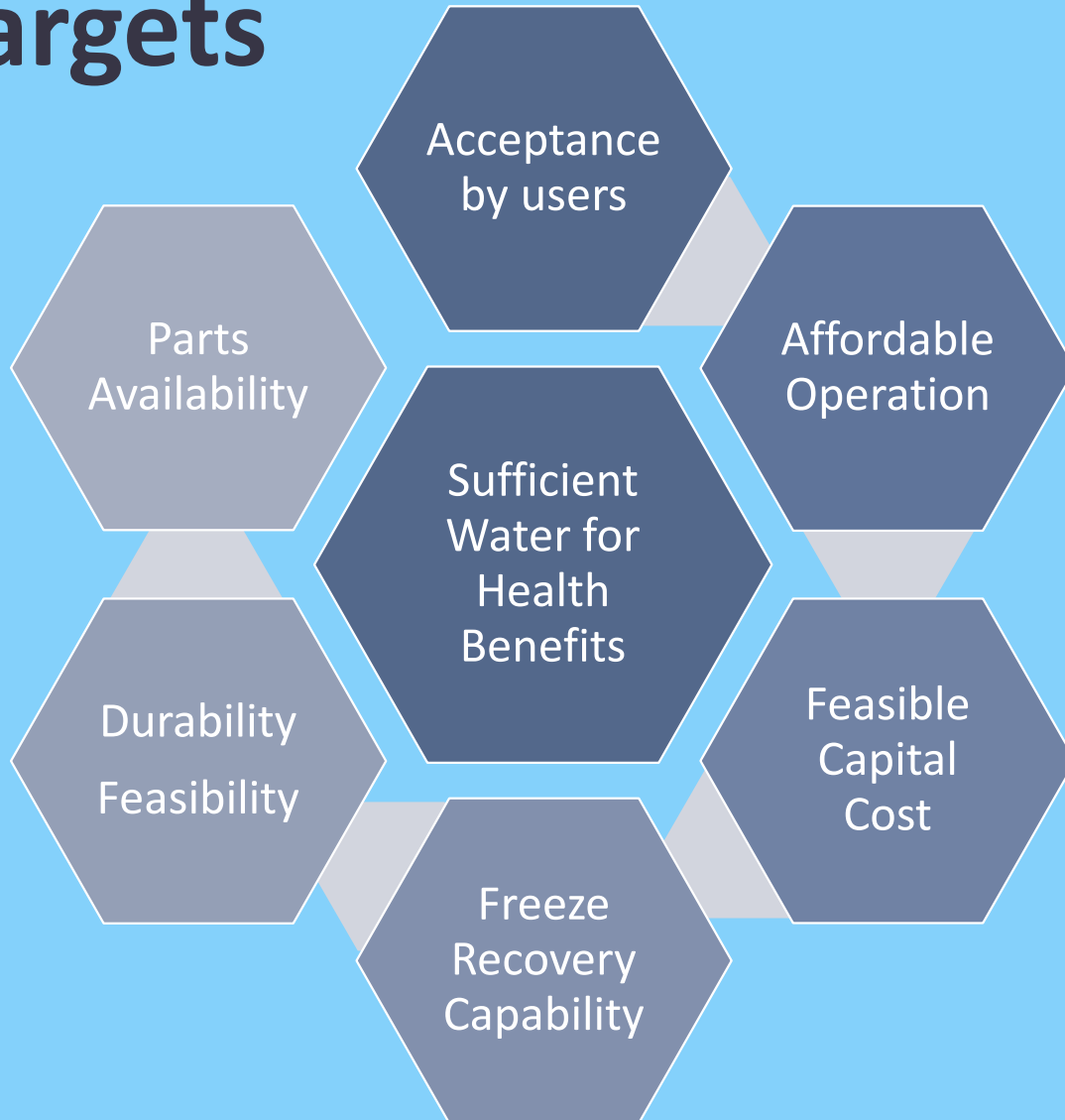
- Conventional, community-wide piped systems and truck haul systems are expensive to construct, maintain and replace.
- Many communities cannot afford the high operation and maintenance costs associated with piped or haul systems.
- Available funding is not adequate to serve remaining homes (approximately 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

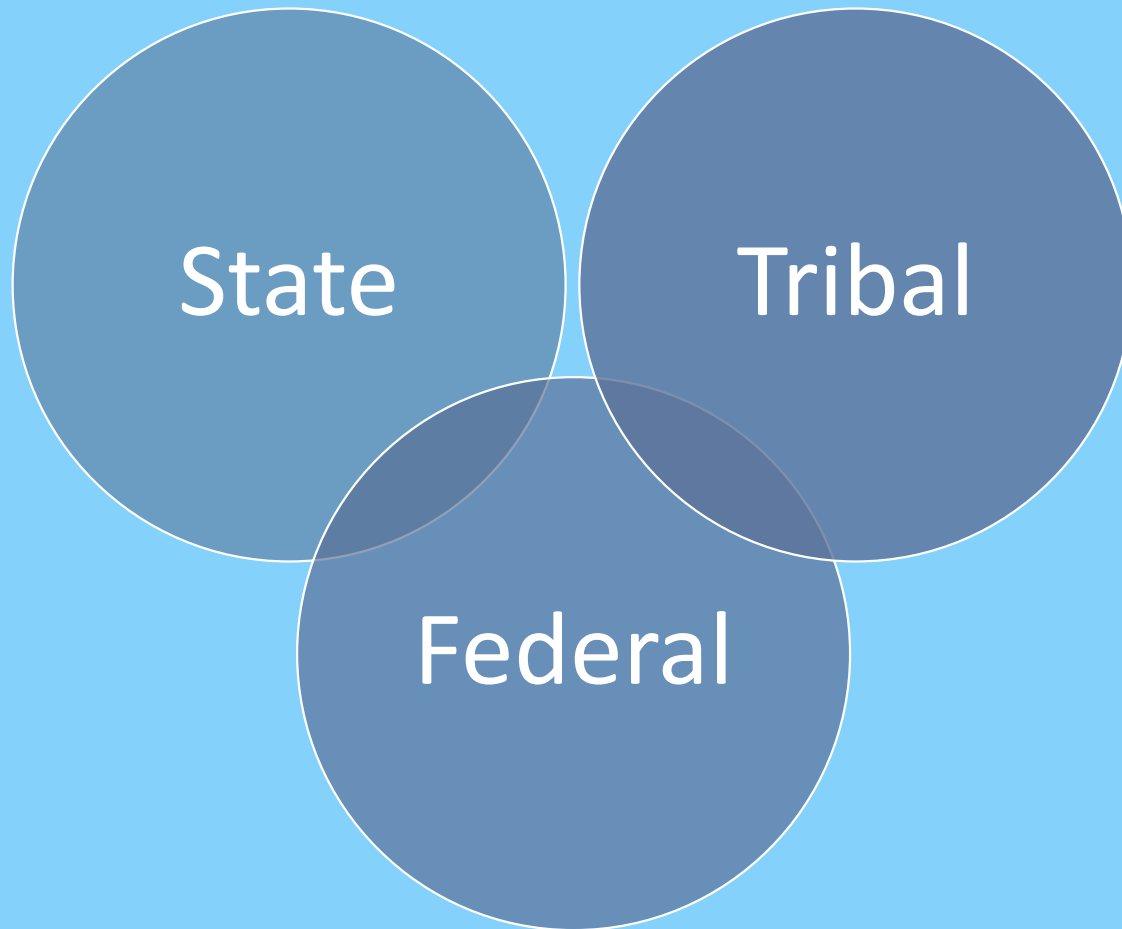
- State-funded research and development project projected to last 5 – 7 years
- Focus is on “decentralized” approaches – household based systems that utilize water re-use technologies
- Private sector driven – with ownership of intellectual property retained by project teams
- Goal is to significantly 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	?

Contact Information for Teams

DOWL Alaska Inc.

Team lead: Janelle Rogers

(425) 256-1255 / RogersJD@cdmsmith.com

Summit Consulting Services Inc.

Team lead: Dave Cramer

(907) 291-2339 / TeresaAtSummit@aol.com

www.facebook.com/summitakwsc/

University of Alaska Anchorage

Team lead: Aaron Dotson

(907) 786-6041 / addotson@uaa.alaska.edu

www.reusewaterak.com

Alaska Department of Environmental Conservation
Division of Water

HOME BROCHURE PHOTO GALLERY FREQUENTLY ASKED QUESTIONS CONTACT US

State of Alaska > DEC > Division of Water > Alaska Water and Sewer Challenge

ALASKA WATER AND SEWER CHALLENGE

ABOUT THIS PROJECT

To improve the health of rural Alaska residents, the Alaska Department of Environmental Conservation, in coordination with tribal, state and federal agencies, is spearheading a research and development effort to find better and more affordable ways to deliver drinking water and sewage disposal services to rural Alaska.

The Problem

- Over 3,000 rural Alaska homes lack running water and a flush toilet. Many more depend on aging and deteriorating piped and haul systems.
- Lack of in-home water and sewer service in rural Alaska causes severe skin infections and respiratory illnesses. Residents of Southwest Alaska suffer rates of invasive pneumococcal disease (IPD) that are among the highest in the world.
- To correct this public health problem, agencies have funded conventional, community-wide piped and truck haul systems. Although these systems work, they are expensive to construct and many communities cannot afford their high operational costs.
- Funding to build systems has declined severely while costs have risen sharply. The deficit between available funds and needs is over \$600 million.
- Many households in rural Alaska use a toilet known as a "honey bucket". A plastic bag lined bucket collects urine and feces. Then, plastic bags of feces from honey buckets are disposed in a sewage lagoon.
- A different approach to delivering these services is needed.

The Solution

The Alaska Department of Environmental Conservation has initiated a project to spur worldwide research to develop innovative and cost effective water and sewer systems for homes in remote Alaska villages. The project focuses on decentralized water and wastewater treatment, recycling, and water minimization. These approaches have a high potential for use in individual homes and housing clusters. Our goal is to significantly reduce the capital and operating costs of in-home running water and sewer in rural Alaska homes.

PROJECT INFORMATION

- Timeline
- Performance Targets
- Frequently Asked Questions

PEOPLE

- Project Management Team
- Steering Committee Members
- Participating Teams

PHOTOS AND VIDEOS

SYSTEMS IN RURAL ALASKA

RESOURCES AND STUDIES

PRESS, ARTICLES, LINKS

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
- RogersJD@cdmsmith.com / (425) 256-1255 / <http://www.dowl.com/Contact-Us>



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

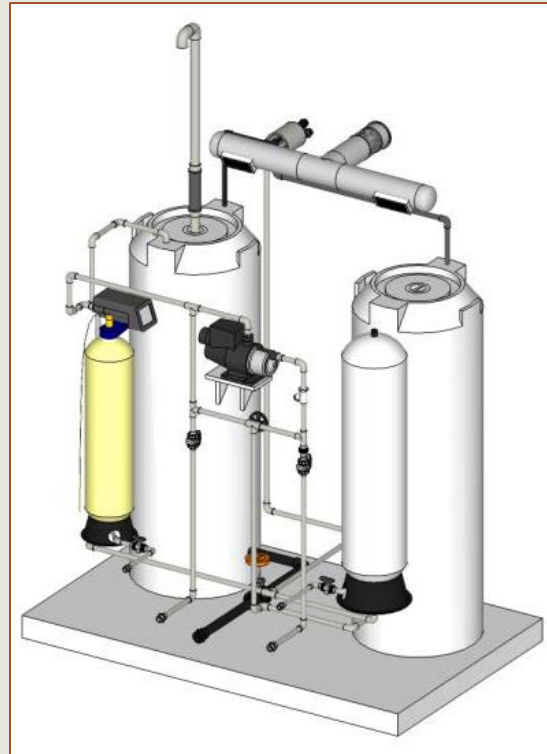
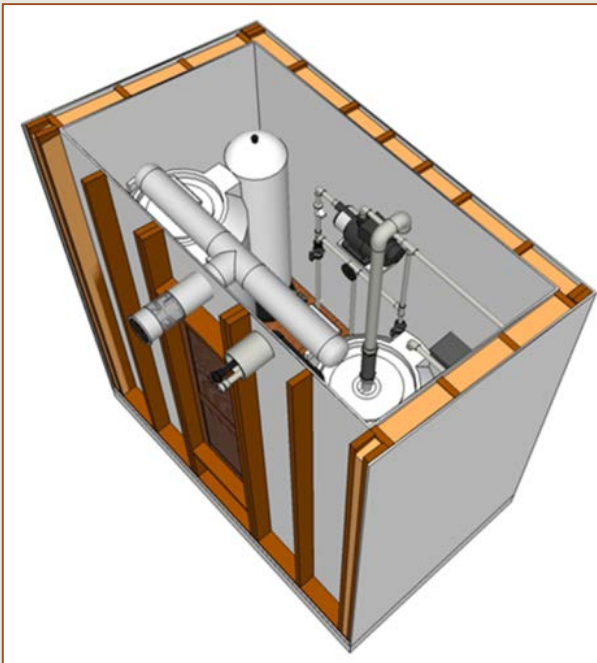


Chase Nelson

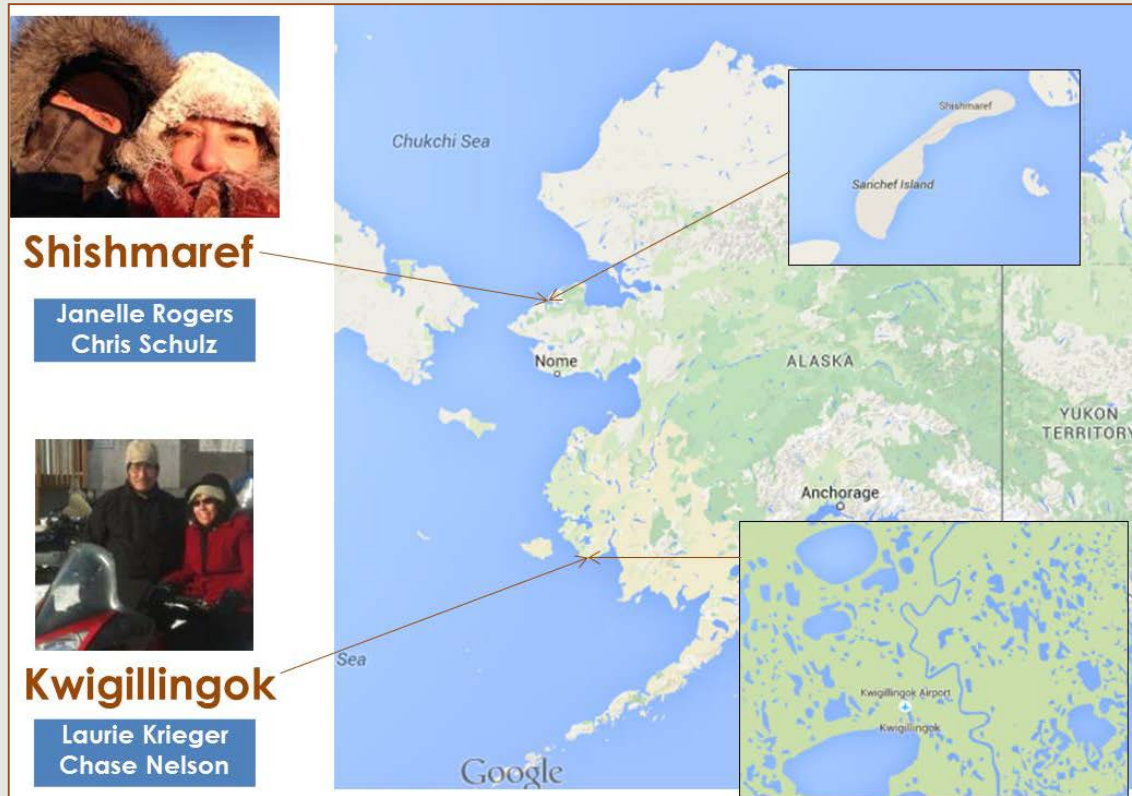
- Multiple years of **Arctic Engineering** experience
- Capital improvement projects in 55 Alaska villages
- Implemented over \$30 Million of Projects in Alaska
- Multiple regions: YK Delta, NW Arctic, Interior Alaska, North Slope, and Southeast Alaska



DOWL Proposed System



End-User Input



Next Steps:

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



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



CCHRC/Fairbanks



Team: Summit Consulting

ALASKA WATER & SEWER CHALLENGE: PHASE 3

ALASKA WATER + SEWER CHALLENGE

Summit Consulting Services

Tuesday, December 8, 2015

<http://watersewerchallenge.alaska.gov/>



AGNEW
:: BECK

RELOCATE

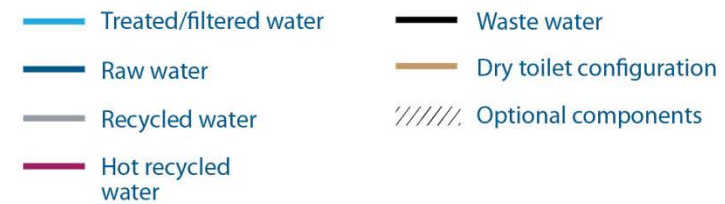
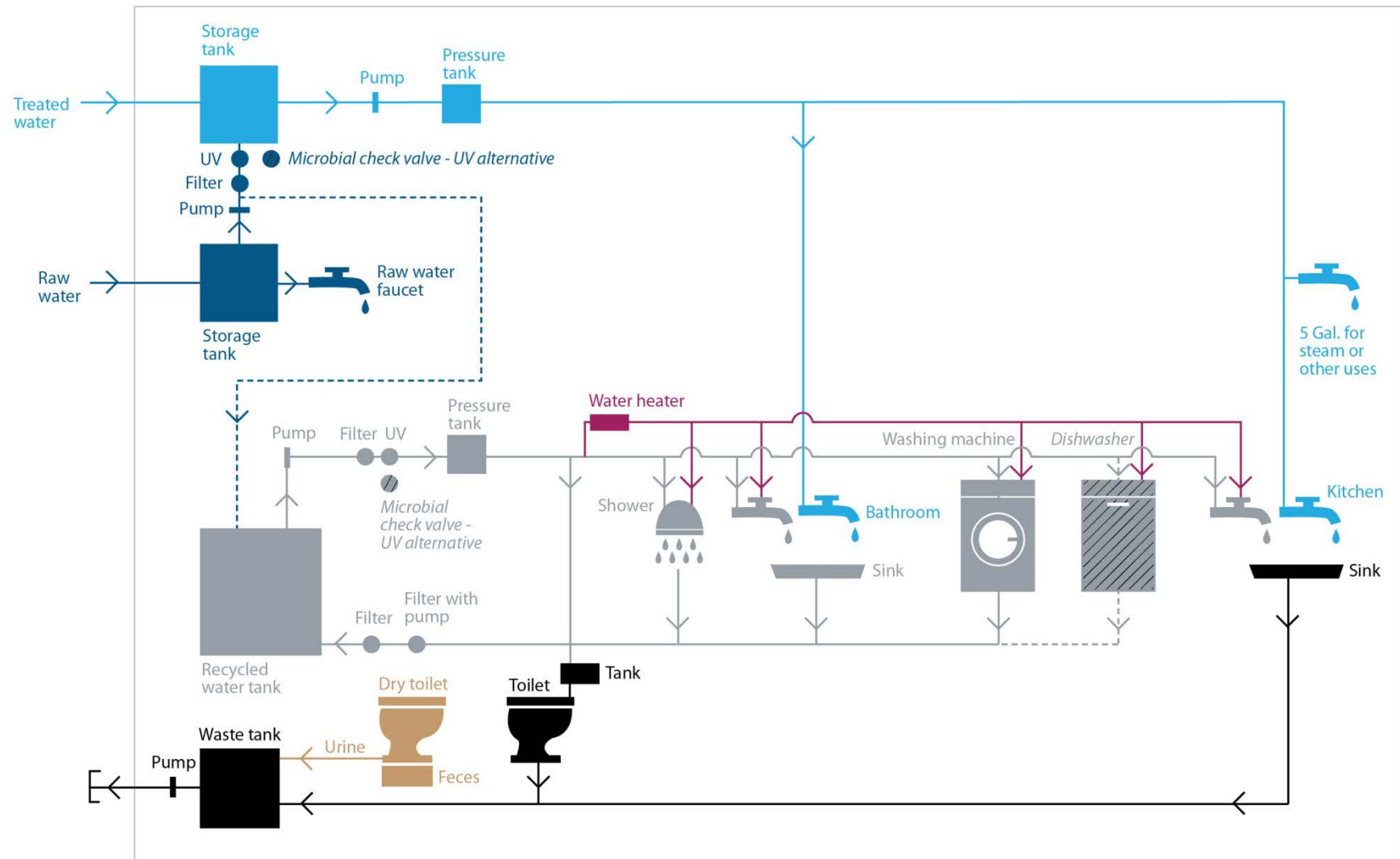


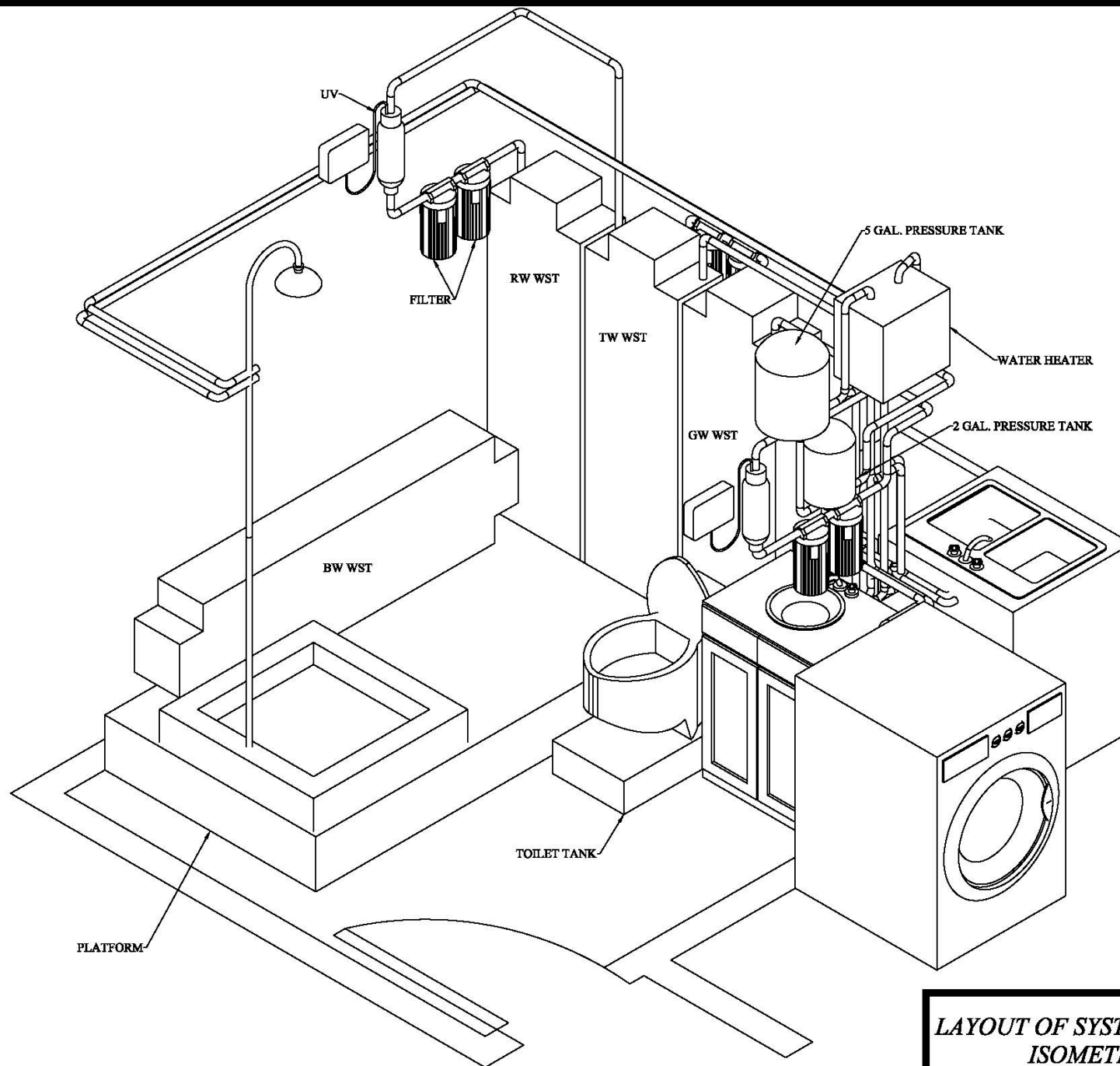
Universität für Bodenkultur Wien

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

Qualifications

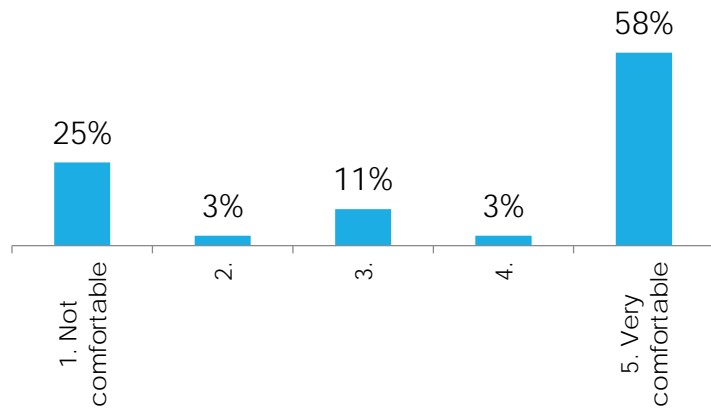






LAYOUT OF SYSTEM COMPONENTS
ISOMETRIC VIEW 1

End User Input



Comfort with recycled water use for handwashing



Team: University of Alaska Anchorage

ALASKA WATER & SEWER CHALLENGE: PHASE 3

Our Team



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



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

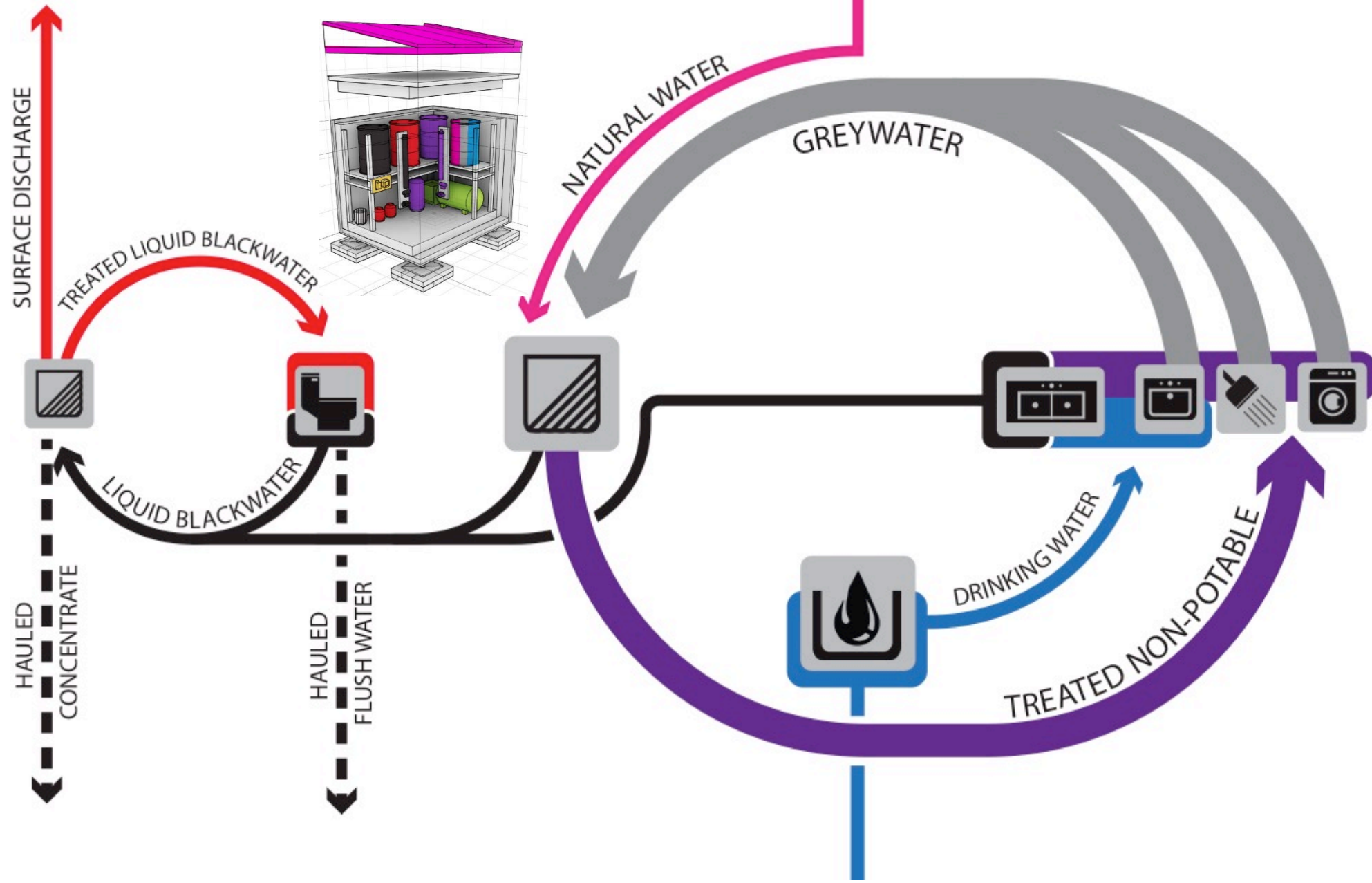


MWH®



SOUTHERN NEVADA WATER AUTHORITY®

On-site Water Reuse



Our Collaborating Communities

Kipnuk & Koyukuk

Collaborative Engineering



Water reuse

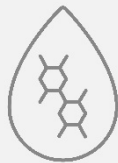


Fixtures to fit

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

Aaron D. Dotson, Ph.D., P.E.



UAA College of Engineering
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