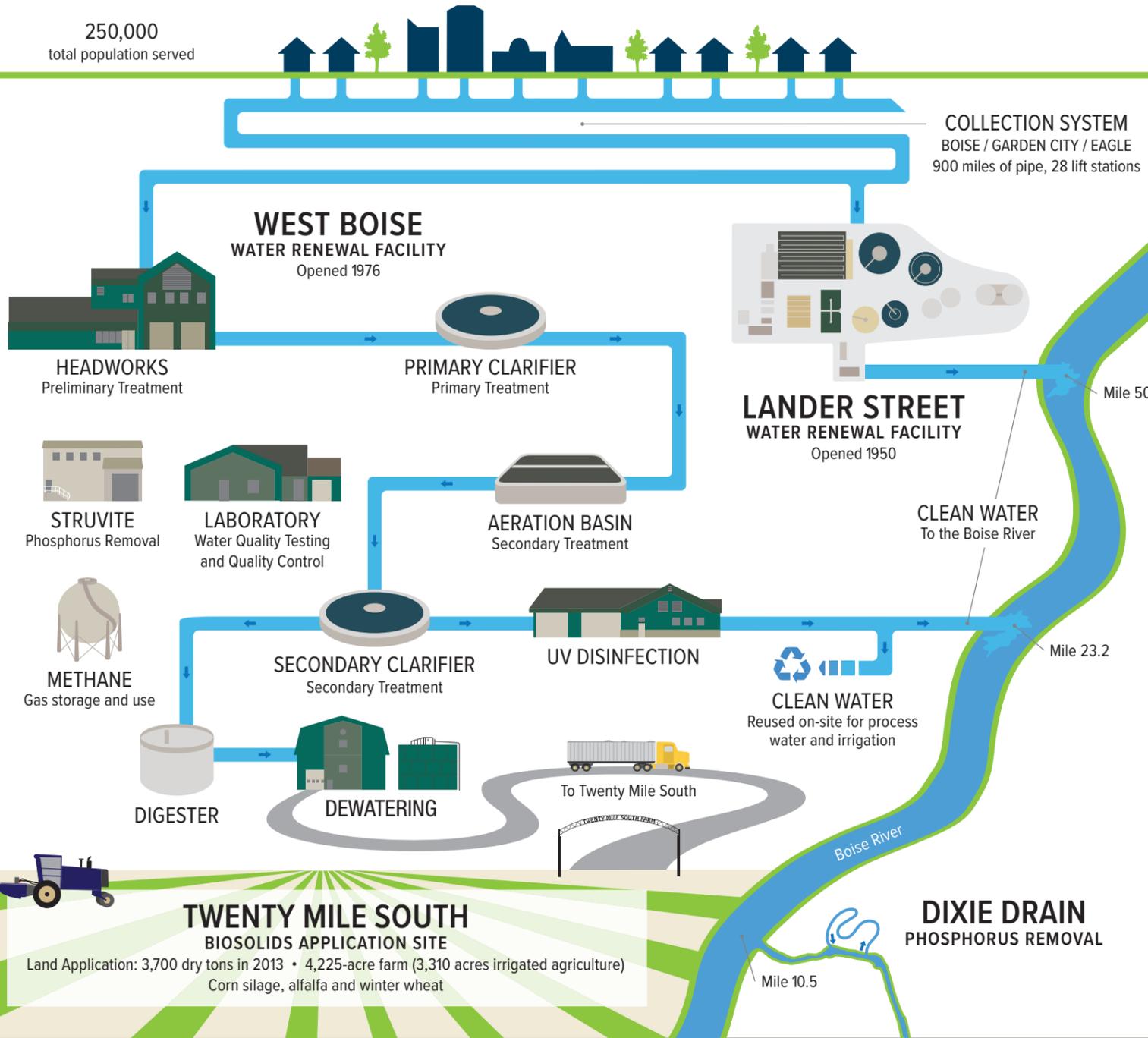


FACILITIES MAP

250,000
total population served



WATER RENEWAL

TREATMENT PROCESS AND SUSTAINABILITY



WEST BOISE WATER RENEWAL FACILITY

cityofboise.org/bee | 11818 West Joplin Road Boise, ID 83714 | 208-608-7300
Home of Boise WaterShed Environmental Education Center



WATER RENEWAL TREATMENT PROCESS

The City of Boise is committed to protecting the environment and ensuring a sustainable use of our resources. At the water renewal facility, used water is processed to remove pollutants before it is discharged to the Boise River. Throughout the treatment process resource recovery is implemented when possible to reuse water, create phosphorus-rich fertilizer, capture and use methane and reuse biosolids. Below is the treatment process and how we practice sustainability.



COLLECTION SYSTEM

On average, each person in the United States contributes approximately 150 gallons of water per day to a community's used water flow. Each house or business has a pipe that is connected to a network of underground pipes and lift stations that pump the used water to a water renewal facility. The City of Boise's collection system has more than 900 miles of pipes!

PRELIMINARY TREATMENT (HEADWORKS)

BAR SCREENING

A bar screen (a large metal rack with bars placed every few inches) is used to remove large trash, plastic materials, toilet paper, etc. The captured material is then collected in a dumpster and hauled to the landfill for disposal.

GRIT REMOVAL

Classifiers use centrifugal force to remove grit – such as gravel, sediment, seeds and coffee grounds. Grit is collected in a dumpster and hauled to the landfill for disposal.

PRIMARY TREATMENT

PRIMARY CLARIFIER

Primary clarifiers are settling tanks that hold the used water for several hours. During that time, most of the heavy solids fall to the bottom of the tank, where they become a thick slurry known as primary sludge. Oil, grease, and material that floats is also skimmed from the surface of the tanks. Both the primary sludge and the skimmed material are pumped to solids processing.

SECONDARY TREATMENT

AERATION BASIN

Used water flowing out of the primary clarifiers still contains some solids and dissolved material, including nutrients like phosphorus and nitrogen. Used water also contains many microorganisms, such as bacteria and protozoa, from human waste. Aeration basins are designed to provide an optimum environment for these microorganisms to feed on the organic material and nutrients. One zone uses air bubbles to provide the mixing and oxygen that is needed by the microorganisms. At West Boise Water Renewal Facility, a secondary food source created by fermenting sludge is also added to trick microorganisms into taking up more phosphorus. Enhanced biological nutrient removal (EBNR) occurs in these tanks. The phosphorus is recovered later on in a different process called struvite production. Struvite can be used as a fertilizer.

SECONDARY CLARIFIER

The microorganisms that grow and feed in the aeration basin will eventually create floc and fall to the bottom of the secondary clarifier, a settling tank, where they are collected. In the activated sludge process most of them are recycled back to the aeration basin where they continue to remove organics and nutrients from the used water. Excess microorganisms that grow in the system are removed from the activated sludge process and are pumped to a solids treatment process.



FINAL TREATMENT TECHNOLOGIES

ULTRAVIOLET DISINFECTION

Ultraviolet light is used for disinfection, rather than chlorine. The water passes through channels containing ultraviolet lamps, and the resulting exposure to high levels of ultraviolet light kills disease-causing bacteria and viruses by making it impossible for them to reproduce.



WATER REUSE

Some effluent (treated) water is reused on-site for process water and irrigation. The water is used for such things as spraying trash off the screens, spraying over the clarifiers, watering the lawns and to help heat and cool buildings. The remaining effluent is discharged to the Boise River.

SOLIDS PROCESSING

SOLIDS THICKENING

It is estimated that only 0.3% of a treatment plant influent is solid matter. The concentrated solids that are removed contain some solids and mostly water. After secondary treatment, the solids may contain 99% water. Mechanical devices are used to further concentrate the solids before they are pumped to a digestion process.

DIGESTER

During anaerobic digestion, large tanks are used to mix and heat the solids to 98°F. Microorganisms present in the solids use the organic material as a food source and convert it to byproducts such as methane gas. The methane is collected and used as an energy source in the plant. Some methane is flared. Digestion results in stabilized biosolids, nutrient-rich sludge that can be used as a soil conditioner.

DEWATERING

Following the digestion process, the biosolids still contain a significant amount of water. Mechanical equipment such as belt presses are used to squeeze water from the biosolids. A polymer is added to thicken up to 14% solids.

BIOSOLIDS APPLICATION SITE (FARM)

The biosolids are trucked to the Twenty Mile South Farm and applied to the land where crops are grown. The biosolids provide valuable nutrients that can improve the condition of soils and yield better crops. Corn, alfalfa and winter wheat are the main crops grown on the City's 4,225-acre farm. The City of Boise must meet stringent regulatory requirements to assure the safe reuse of this material.

PROCESS CONTROL

LABORATORY

The operation of the complex plant processes requires monitoring and testing on a continuous basis. The plant laboratory is used for testing the quality of water as it passes through each plant process and the sludge quality as it passes through the solids process. Laboratory data is also used to assure compliance with stringent regulatory requirements for discharge of the treated water and recycling of biosolids.

DIXIE DRAIN PHOSPHORUS REMOVAL SITE

A phosphorus removal facility was built in 2016 at Dixie Drain, near the confluence of the Boise and Snake rivers, which collects groundwater and surface water from agricultural operations in the lower watershed. Water flows through a sedimentation basin, a chemical is added to bind with the phosphorus, and it creates floc and falls out of the solution. Cleaner water is returned to Dixie Drain and flows to the Boise River. Through the treatment efforts both upstream at the existing treatment plants and at Dixie Drain, 98% reduction in the amount of phosphorus leaving the City of Boise's treatment facilities is obtained.



WHAT IS WATER RENEWAL?

Water renewal is the process used to treat used water from residential, commercial, and industrial sources. Wastewater is 99.94% water and 0.06% waste. Some examples of waste are human waste, food, dirt, soap, personal care products and other chemicals.

WHY IS IT TREATED?

Clean water is essential for all living things. Water renewal facilities are necessary to protect environmental and human health. Waterborne diseases such as cholera and diphtheria are prevented. The treated water is returned to the Boise River to be used again and again downstream.

HOW IS IT REGULATED?

In 1972 the Clean Water Act was enacted to regulate used water treatment to protect human health and the environment since then. The treated used water must support the Boise River's beneficial uses of cold water aquatic life, primary contact recreation (swimming), salmonid spawning, agricultural water supply, industrial water supply, wildlife habitats and aesthetics.