How Well Has IPUD Maintained the Inverness Water System's Infrastructure?

OVERVIEW (IPUD capital improvements since 1980)

Here is an overview of how much of the Inverness Water System's current infrastructure has been built or updated by the Inverness Public Utility District since 1980 when the IPUD bought the approximately 100-year-old Inverness Water Co. from Citizens Utilities of California.

COLLECTION SYSTEM

COLLECTION POINTS BUILT BY IPUD: 100%

TREATMENT SYSTEM

TREATMENT CAPACITY BUILT BY IPUD: 100%

STORAGE SYSTEM

STORAGE CAPACITY IN TANKS BUILT OR REFURBISHED BY IPUD: 98%

Built by IPUD: **75%**

Refurbished by IPUD: **23%**

DISTRIBUTION SYSTEM

WATER MAINS WELL WITHIN MINIMUM LIFE EXPECTANCY: 98.9%

Mains built by IPUD (since 1981): **68.3%** (exclusively PVC or equivalent)

Mains built by Citizens Utilities (during 1970s): **30.6%** (exclusively transite)

Mains that predate 1970s: **1.1%** (exclusively galvanized iron)

At no time during the 41 years the IPUD has owned the Water System has the District not been actively involved in capital projects for improving and upgrading the system's infrastructure. The most intensive period of this work was the early 1980s, when the decrepit system acquired by IPUD was largely rebuilt. The District spent some $2.5 million on capital improvements during the 1980s. Of this, $290,000 was borrowed money (from the 1979 bond issue, which was paid off in 2011); all of the remainder (more than $2.2 million) was from grants and from Federal and State disaster recovery and mitigation funds (from flooding events in 1982, 1983, and 1986).

All subsequent District capital projects have been paid for entirely out of customer revenue (for the Water System) and property tax proceeds (for the Fire Department). The $800,000 loan for the upcoming Tenney Tanks Replacement Project will be the first time the District has borrowed money (for any purpose) since the voter-approved 1979 bond issue that financed the purchase and rehabilitation of the Water System.

DETAILS

COLLECTION SYSTEM (100% built by IPUD)

The Water System's entire collection system in the watershed on the easterly slope of the Inverness Ridge was obliterated by landslides, mudflows, and flooding in the early morning hours of January 4, 1982. The current network of eight collection points within the watershed was built subsequently, each consisting of a small concrete catchment basin anchored in bedrock. This is where most of our water comes from today (we have historic prescriptive rights to this water). Two similar catchment points further downslope above First and Second Valleys were developed to provide additional water

when needed (summer and fall); we have State permits for limited withdrawals of water from these facilities. Finally, an intensive program undertaken in the mid-1980s to locate ground water (deep wells) was largely unsuccessful; however, three very small wells were developed, and they can be called upon to provide enough water for about 10 households during particularly dry periods.

One collection point in the watershed was rebuilt in 2020 after it was damaged by a landslide the previous year.

Maintenance of the collection system and of our watershed lands is ongoing every year; otherwise, **the District does not project any collection system capital project needs for the foreseeable future**.

TREATMENT SYSTEM (100% built by IPUD)

When the District bought the Water System in 1980, there was barely any treatment system at all. The water was chlorinated and strained, but only some it was even minimally filtered. The District built three up-to-date treatment plants in 1981, using a sand filter technology recommended by the State's Department of Health Services. The main one of these plants (west of the end of Laurel Way in First Valley) was destroyed in the 1982 flood and was subsequently rebuilt at its current location on high ground on Perth Way at the west end of the Mesa.[1]

In the early 1990s, the sand filters technology had to be entirely replaced because of new standards promulgated by U.S. EPA. The District installed state-of-the-art microfilament membrane units. By the mid-2010s, these microfilament units were approaching their life expectancy, and the U.S. EPA regulations for treatment standards were once more becoming more stringent. Again, the District had to completely replace its treatment system, this time installing up-to-date Ultra and Nano filtration.

Thus, the District has had to replace its entire treatment system three times between 1981 and 2016 at great expense. The District managed both the latter two changeouts with reserved funds from customer revenue instead of having to borrow money.

The only known treatment system capital project needs at this time are for upgrades to the emergency power supply systems at the District's two treatment plants and continued development of the SCADA (supervisory control and data acquisition) system.

STORAGE SYSTEM (98% built or refurbished by IPUD)

The District has 10 potable water storage tanks distributed across five sites. Four of the 10 are steel tanks that contain 74% of the District's total storage capacity of 440,000 gallons. Three of the four steel tanks were built since the IPUD acquired the Water System (Seahaven 70,000-gal tank, built in 1990; Conner 100,000-gal tank, built in 2008; and Stockstill 55,000-gal tank, built in 2016). The fourth steel tank is the Colby 100,000-gal tank built in 1969; this tank was refurbished by IPUD in 1983. **Current projections include major projects to refurbish the Seahaven 70,000-gallon tank and the large 100,000-gallon Colby tank** (for the second time).

Six older wooden tanks have a combined total capacity of 115,000 gallons, which is 26% of the District's total storage capacity. The most important of these are the two tanks (70,000 gallons total) at the Tenney site (one at 60,000 gallons built by IPUD in 1983; one at 10,000 gallons built in 1969); these are the tanks currently out to bid for replacement with two steel tanks that will hold 96,400 gallons.

Three 10,000-gallon wood tanks at the Colby site (built in 1980 by IPUD) are next in line for replacement. Finally, a 15,000-gallon wood tank built by IPUD in 1982 at the Seahaven site needs to be replaced. All new tanks will be steel (or possibly concrete); not wood.

[1] After this plant was built, it became redundant to also operate the plant that had been built on Madrone Ave. in Second Valley, so the Madrone plant was repurposed as a pump station.

DISTRIBUTION SYSTEM (98.9% built by IPUD and Citizens Utilities since 1970s)

The distribution system today consists of 10.1 miles of water mains, the largest of which are 6-inch lines (and which support 76 fire hydrants). At the time Citizen's Utilities bought the Inverness Water Co. (and its sister Seahaven Water Co.) in 1960, virtually all the water mains were galvanized iron (GI). During the 1970s, Citizens replaced about one-third of these mains (the oldest ones) with a type of cement-and-fiber transite pipes. Most of the remaining runs of GI line were replaced by IPUD during the major rebuild after the District bought the System in 1980. Subsequently, additional stretches of GI line have been replaced, so that today only a total of 600 feet of GI pipes remains, consisting of one 150-foot run that is not in use and is valved off, and a 450-foot spur line in Seahaven that serves only three customers (because the latter is a low-usage dead-end line, the District flushes it approximately every two weeks so that there is no buildup of stale water).

As noted, 98.9% of the mains are transite or PVC pipes. Transite pipe has a rated life expectancy of 70-100 years, and PVC has a rating of 100-300 years (ratings by American Water Works Association). Thus, our transite lines (installed in the 1970s) have another 15-25 years to go before they reach even their minimum life expectancy, while for the PVC lines (installed beginning in the early 1980s) minimum life expectancy is at least 60 years off.

Transite and PVC pipes are not particularly susceptible to developing leaks (which is a major problem with iron lines). When transite and PVC lines fail, it is typically catastrophic, such as because they are snapped in two by a violent outside force, such as a landslide or earthquake (or tree roots!).

The District does not regard its distribution system as being a source of leaks, because of the type of pipe that is in use, how recently virtually all of it was installed, and its long life expectancy.

There are no major main replacement projects on the District's current list of infrastructure needs.

LEAKS IN THE STORAGE AND DISTRIBUTION SYSTEMS

As noted, the District does not regard its distribution system as "leaky." The storage system, on the other hand, is definitely "leaky." The six wooden tanks are observably leaking, because all six are past their useful life and leaking is a characteristic of aged wooden tanks. Two of these tanks (the two in the worst shape) are scheduled to be replaced over the next 18 months by the tanks replacement project at the Tenney site; the other four wooden tanks (three at Colby, one at Seahaven) will be replaced whenever funds to do so are available.

The District carefully tracks its "unsold water," which is the difference between the volume of water that passes through the production meters at the treatment plants and the lesser amount of "delivered" water that gets billed to the customers on the basis of the bimonthly customer meter readings. This difference consists of such elements as the water that is leaking from the wooden storage tanks, water that is used by the system itself (for a variety of purposes, such as flushing mains), water used by the Fire Department, the "delivered" water that is undercounted because customer water meters "slow down" as they age and undermeasure the flow through them, and water that feeds significant leaks on the customer side of water meters but is not charged for because of the District's liberal policy of reducing the bill when a customer is faced with paying for a large leak.[2]

[2] Water systems typically report their "unaccounted for" water, not their "unsold" water. They do this by estimating how much water is not sold to the customers for the sorts of reasons noted in this footnote's text paragraph, then reporting as "unaccounted for" only what remains. We believe it is more realistic (and informative) to report the entire difference between produced water and "sold" water without attempting to quantify (and explain away) as much of it as possible as "accounted for" by uses other than having been billed to the customers.