



**HALLSDALE-POWELL  
UTILITY DISTRICT**

# PROGRESS REPORT

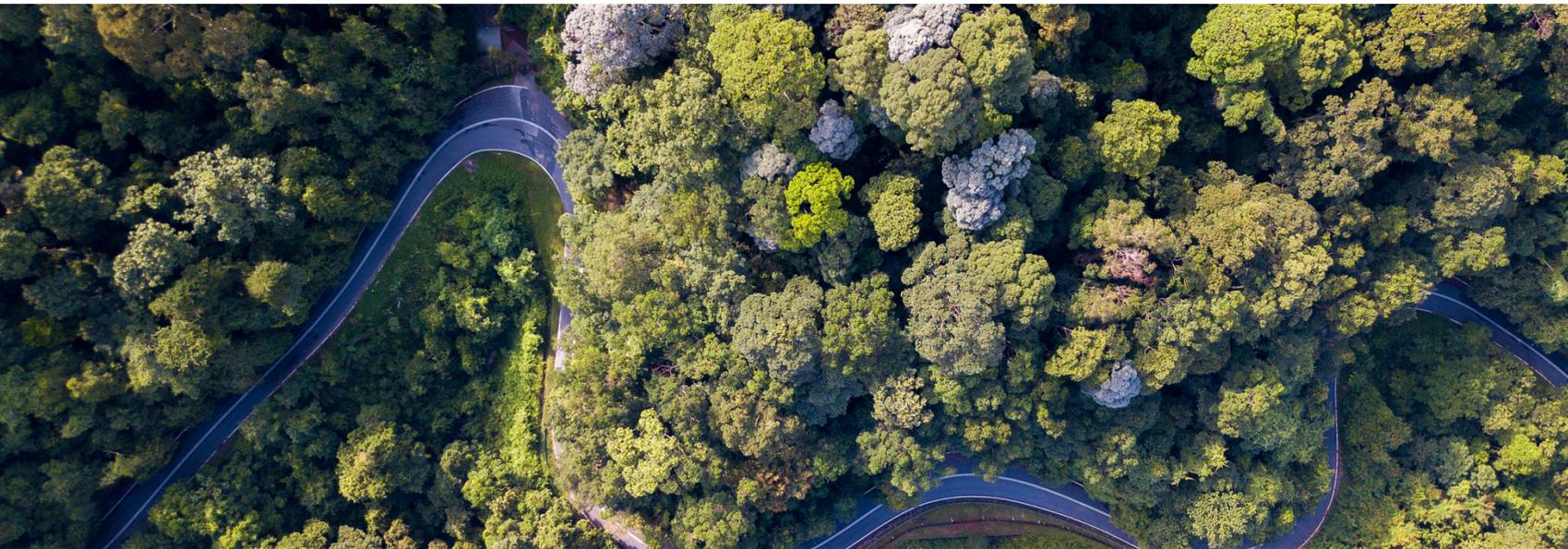
Providing quality, reliable, and progressive water and wastewater service through innovation and fiscal responsibility while maintaining a commitment to excellence in customer service.

COMMITTED TO EXCELLENCE



Hallsdale-Powell Utility District

# REPORT HIGHLIGHTS



HPUD PROGRESS REPORT 2025

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Hallsdale-Powell Utility District

# OUR STORY

Hallsdale-Powell Utility District was established in 1954 to service a small portion of North Knox County. Since then, HPUD has grown to be one of the largest utility districts in the State of Tennessee.

Like most utilities, in the early years, expanding our infrastructure to reach the demand of the growing communities in the area was the driving force of our business. Over the years, HPUD expanded to include North Knox County, Anderson County and Union County. Today, we serve over 80,000 residents.

By the late 1990's, HPUD was faced with a system that was aging and in need of repair and improvements to keep up with the growing demand and the increase in requirements set by Federal and State agencies. In 2004, Hallsdale-Powell Utility District was put under the first of two Consent Orders (CO) issued by the Tennessee Department of Environment and Conservation (TDEC) and the second CO was issued in 2014. The Utility was forced to make substantial capital financial investments in order to meet the Federal and State regulations outlined in the CO and the law during this timeframe.





Hallsdale-Powell Utility District

# WASTEWATER SYSTEM BACKGROUND

Hallsdale-Powell Utility District's wastewater treatment plant is situated on Beaver Creek, a tributary that spans roughly 44 miles from Halls Crossroads to Melton Hill. Beaver Creek is a shallow, low flowing body of water with seven main tributaries. The creek is a significant part of recreational life as it is used for fishing, swimming, and kayaking. However, the creek is prone to flooding and often stays flooded for several day periods depending on the amount of rain, rain intensity, and ground saturation prior to the rain event. In the early 2000's, Beaver Creek and its tributaries were put on the State of Tennessee's 303(D) list of impaired streams and in need of restoration.

HPUD's collection system has one main line or interceptor sewer main that runs along Beaver Creek the entire length of the collection system, approximately 18 miles. The existing 36-inch interceptor was failing and overwhelmed during rain events due to inflow and infiltration along the inceptor and at manholes adjacent to the interceptor. Most of the SSOs primarily occurred in the 5-mile span from HPUD's Beaver Creek Wastewater Treatment Plant through the heart of the Powell community to the I-75 corridor. It was imperative that HPUD develop a plan to fix the undersized, failing infrastructure and stop wet weather SSOs to improve the creek's water quality and help contribute to Beaver Creek's removal from the 303(D) list of impaired streams.



HPUD Sewer Interceptor alignment  
under construction - July 2022

# THE PLAN

HPUD developed a plan to improve wastewater treatment and to address SSOs through a combination of investigative and rehab initiatives as well as improvements to the 5-miles of interceptor sewer main running along Beaver Creek in the Powell community. HPUD was committed to finding cost effective solutions in order to limit the impact on its rate payers.

Over the last few decades, HPUD has made great strides in improving our treatment plants, collection system and distribution system as this report will show.

Take a look with us as we reflect on where we have been and where we are today!



Hallsdale-Powell Utility District

**HPUD PROGRESS REPORT 2025**

# WASTEWATER TREATMENT PLANTS

In **2004**, HPUD was issued a Consent Order (CO) from TDEC focusing on plant improvements to avoid continuous violations of the EPA issued NPDES discharge permit along with infrastructure investments to eliminate sanitary sewer overflows (SSO).

## Plant Improvements

Beaver Creek WWTP, built in the 1960's, had over 135 violations of its NPDES permit in 2003. The plant discharges into Beaver Creek, a small tributary that flows through the Gibbs, Halls, Powell and Karns communities. Construction and renovation of the plant began in 2005 to include a state-of-the-art Membrane BioReactor (MBR), a process that combines a microfiltration or ultrafiltration membrane unit with a suspended growth bioreactor. The plant is permitted for 9.7 MGD average design flow.

The Raccoon Valley WWTP was built in 1974 and renovated in 2013 to upgrade and expand the existing treatment plant to handle more wastewater flow and still meet the compliance requirements set by the EPA. The plant uses aerobic digester treatment and is permitted for 0.3MGD average design flow.

## Results

We are proud to say that both of our facilities are award winning plants today. These plants are now able to handle more wastewater flows and still meet the compliance requirements set by the EPA and TDEC. The investments made in wastewater treatment infrastructure have made these compliance achievements possible!

Since 2007, Beaver Creek WWTP has received 8 Gold, 9 Silver and 1 Platinum **Peak Performance Award** from the National Association of Clean Water Agencies that recognize facilities for excellence in permit compliance. Raccoon Valley WWTP has received 3 Platinum, 11 Gold and 5 Silver awards since 2006.



# COLLECTION SYSTEM BY THE NUMBERS



## Service Area

146 Square Miles



## Treatment Plants

2 Wastewater Treatment Plants  
2 Decentralized Treatment Plants



## Storage Tank

(1) 5 Million Gallon Storage Capacity



## Lift Stations

22



## Manholes

10,163



## Force & Gravity Mains

499 Miles



## Sewer Connections

26,111



# COLLECTION SYSTEM

While considerable progress was made after the first Consent Order (CO), wet weather sanitary sewer overflows (SSOs) continued to create significant issues throughout the District resulting in a second CO issued by TDEC in August of 2014. The primary focus of the second CO was the rehabilitation and replacement of the pipes that collect and carry wastewater from homes and businesses to the treatment plant.



**Pipe Defects**



**Smoke Testing**



**Flow Monitoring Unit**

## System Improvements

In response to the consent orders, Hallsdale-Powell Utility District designed its Capital Improvement Plan (CIP) to focus on replacement and rehabilitation of the collection system in critical areas that needed attention due to SSOs, pipe material, pipe age, and defects that were currently causing issues or could cause issues in the future.

HPUD established a Preventative Maintenance & Inspection (PMI) Program to target problematic areas in the collection system to help prevent SSOs. Activities included in this program are as follows: manhole inspections, smoke testing, closed-circuit television inspection, pre-conditioning, and pipeline cleaning.

HPUD has maintained continuous Flow Monitoring Units throughout the collection system which provide information about the collection system's performance during dry weather and wet weather days.



# SYSTEM EVALUATION & CORRECTION PLAN

In 2015, a Corrective Action Plan & Engineering Report (CAP-ER) was submitted to and approved by TDEC. In response to TDEC's review of HPUD's system evaluation and CAP-ER, HPUD continues to progress to meeting the following objectives.

- Continuing to address infiltration and inflow (I/I) problems
- Continuing to identifying collection system rehabilitation priorities
- Completing Capital Improvement Projects
- Continuing the Preventative Maintenance Inspection Program
- Continuing with lift station improvements (pump stations that boost wastewater flow in low lying areas of the system)
- Continuing calibration and monitoring of flow monitoring stations

HPUD developed a collection system hydraulic model to verify capacity for any new developments prior to approval. As new collection system lines are installed, they are added to the model. For example, with the completion of the sewer interceptor projects, the hydraulic model will be recalibrated to help identify which area(s) in the collection system to focus efforts for the future.

The objectives of the capacity assessment include the following objectives:

- Identifying locations and causes of hydraulic constraints in the collection system
- Assessing the Beaver Creek WWTP's ability to accommodate/treat peak flows
- Assessing how existing sewer system performance will be improved by planned rehabilitation and improvement projects
- Assessing the performance of planned rehabilitation projects to accommodate future population growth





Hallsdale-Powell Utility District

# COLLECTION SYSTEM

## RESULTS

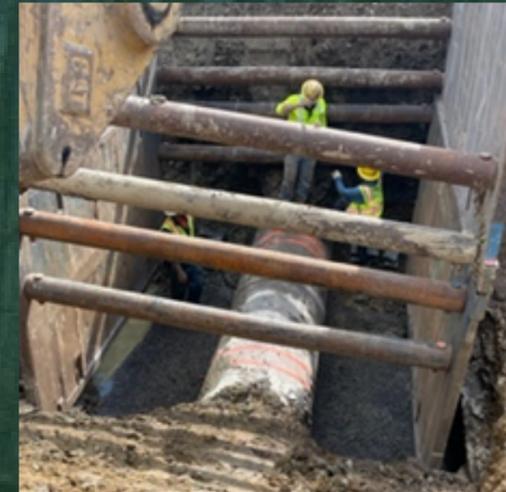
In 2023, Hallsdale-Powell Utility District did not have any chronic sanitary sewer overflows (SSOs) in the collection system. In fact, we saw the lowest number of SSOs on record for HPUD's collection system. This was a result of the work completed in the collection system over the past twenty years. The peak and instantaneous flows were also lower, and the collection system shows a quicker recovery after a rain event which has helped lower the number of wet weather SSOs.

Plant flows have decreased by 3 MGD resulting in significant savings in electric and chemical costs thus helping to reduce operating costs and limiting the impact on our rate payers.

These results will benefit the surrounding communities as it will help to improve the water quality of Beaver Creek, revive and support the native aquatic ecosystems, and enrich the recreational activities that have been enjoyed by residents for many years.

Even with the low number of SSOs in 2023 and the release from the Consent Order in 2025, HPUD is still committed to improving areas in the collection system that are susceptible to wet weather SSOs.

## IMPROVEMENTS COMPLETED DURING THE CONSENT ORDER



157,272 LF OF SEWER PIPE



1,046 MANHOLES



11 LIFT STATIONS



**2024 OUTSTANDING OVERFLOW ABATEMENT PROJECT AWARD**

***The Beaver Creek Sewer Interceptor Improvement Project***

The Outstanding Overflow Abatement Project Award recognizes projects that improved water quality by controlling wet weather overflows through various means such as degree of water quality improvement envisioned or measured, ingenuity in the project, community and stakeholder involvement, and cost effectiveness.



**2024 CLEAN WATER TECHNOLOGY AWARD**

***The Beaver Creek Wastewater Treatment Plant Ultra Violet Disinfection System***

The Clean Water Technology Award recognizes operational innovation or the application of treatment technology to improve effluent quality, resource recovery, and/or sustainability at a municipal or industrial resource recovery facility.





## Hallsdale-Powell Utility District



# WATER SYSTEM BACKGROUND

Hallsdale-Powell Utility District was established in 1954 to about 500 customers in the Powell community due to an inadequate supply of water. HPUD built two (2) small water treatment plants on Fowler Spring and Granny Bright Spring in 1955. In 1960, a third plant was built at Dry Gap Pike bringing the total water production capacity to 1.5 MGD.

In 1965, HPUD built a new water treatment plant located off Melton Hill Lake with a capacity of 2 MGD. The Melton Hill WTP used rapid sand filter technology. A chemical building was added in 1981.



Sand filtration is a water treatment process where raw water flows through a bed of granular media, typically sand supported by layers of gravel. As water passes through the sand, suspended solids, turbidity, and some microorganisms are physically strained out or trapped with the pore spaces between sand grains. Additional removal occurs through absorption and biological activity within the filter media.



# WATER TREATMENT PLANTS



In 2005, the plant was upgraded to a membrane filtration technology system with a daily capacity of 13.4 MG.

A second water plant was constructed in 2007 in Sharp's Chapel on Norris Lake to add an alternate water source and increase capacity to meet present and future demands. The plant uses membrane filtration and has a daily capacity of 4 MG.

The Fowler Spring WTP and the Granny Bright Spring WTP were decommissioned in 2006. The Dry Gap WTP was decommissioned the following year in 2007.

In 2021, a new chemical building was added to aid in chemical delivery, storage, metering, and conveyance issues.



In 2022, Hallsdale-Powell Utility District received the Award of Excellence in Medium Water Treatment from the Clean Water Professional of Kentucky/Tennessee section of the American Water Works Association. The criteria considered for this award includes management, records, appearance, and the overall results of the evaluation by the Honors & Awards Committee.

We also received a perfect score on our last two (2) Sanitary Surveys conducted by TDEC. The survey is a comprehensive review and inspection evaluating the capability of the water system to supply safe drinking water. Required areas of the survey included - review of the raw water source, treatment plant, distribution system, finished water and storage tanks, pump stations, monitoring and reporting, management and operations, and operator compliance.



# DISTRIBUTION SYSTEM BY THE NUMBERS



## Service Area

146 Square Miles



## Water Treatment Plants

2 Plants  
16 Million Gallon Daily Treatment Capacity  
2.8 Billion Gallons Yearly Treated Water



## Water Storage Tanks

14 Tanks  
12 Million Gallon Storage Capacity



## Booster Stations

19



## Water Main

701 Miles



## Hydrants

2,508



## Water Connections

34,044

# DISTRIBUTION SYSTEM

## Challenges

### PIPES AREN'T PERMANENT

Like most of the Nation's water systems, our infrastructure is aging and leaking and in much need of repair or replacement. Our water system is over sixty years old in some areas. There are a variety of causes for water main breaks such as corrosion, extreme temperature changes, soil conditions, construction, and high water pressure.

### THE NEEDS OF EACH WATER UTILITY VARY, AND THE SOLUTIONS ARE NOT A ONE-SIZE-FITS-ALL.

Hallsdale-Powell Utility District's system is located in a semi mountainous area which presents challenges in design and operations due to the numerous ridges and valleys that split the system. There is an 800-foot difference between the high and low elevations in the service area, representing 346 pounds-per-square inch (psi) difference in water pressure. As a result, distribution operators are challenged by maintaining appropriate levels of pressure in thirteen distinctly separated regions throughout the service area.



# DISTRIBUTION SYSTEM IMPROVEMENTS

Hallsdale-Powell Utility District has been maintaining the system, but overtime, the materials that comprise the system reach the end of their life and are no longer reliable. There comes a point when repairs become more costly than replacement. HPUD has been working to review the entire water system and identify and prioritize projects by need. The goal of HPUD's Capital Improvement Plan (CIP) is to address existing issues, while preparing for the level of services needed for the future growth that is expected in the District's service area.

## IMPROVEMENTS COMPLETED DURING THE LAST 20 YEARS

Over the last 20 years, HPUD has replaced, upgraded or installed new water infrastructure to ensure the District has ample reliable, safe drinking water to meet the demand of our growing communities.



**884,558 LF OF WATER PIPE**



**9 BOOSTER STATIONS**



**8 STORAGE TANKS**

## AWARDS & RECOGNITION



### 2022 AWARD OF EXCELLENCE IN MEDIUM WATER DISTRIBUTION

The criteria for this award includes management, records, appearance, and the results overall of the evaluation by the Honors & Awards Committee.





# WATER LOSS CONTROL PROGRAM

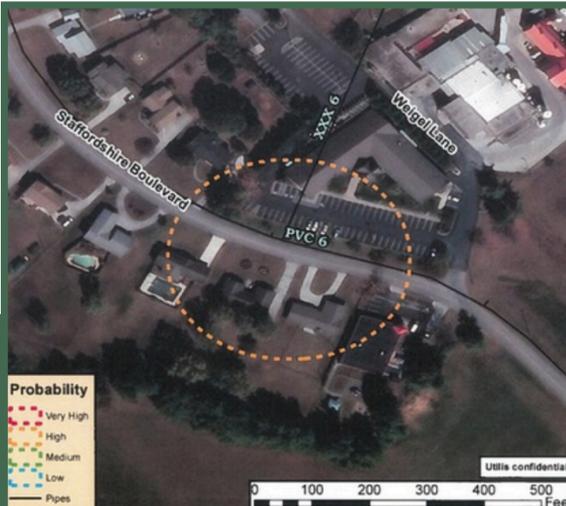
Hallsdale-Powell Utility District implemented a Water Loss Control Program in 2019 to identify points of real or physical water losses and implement solutions to eliminate those points throughout the 689 miles of pipe in our service area of 146 square miles. .

Hallsdale-Powell Utility District used the following methods to find and fix water leaks:

- **District Metered Area (DMA) Implementation** in which we divided the service area into 14 metered zones with 40 main line meters to help monitor system flow and create baseline patterns.
- **Satellite Leak Detection** using algorithms to locate points of interest after which acoustic leak detection is used to further investigate. There were over **500 points** of interest generated and investigated.
- **Third-Party Leak Detection** to perform acoustic leak detection throughout the distribution system, one District Meter Area (DMA) at a time, while HPUD crews worked behind them to repair leaks as they were discovered.
- **Pressure Management** to continuously monitor pressure, and its effect on production. HPUD has worked to keep plant pressure as low as possible while still supporting system needs.
- **Monitoring Flushing Points** by increased sampling on these points in effort to eliminate unnecessary flushing of water. HPUD has reduced flushing by over 40%.
- **In-House Leak Detection** using flow meter data from the DMA zones and acoustic leak detection techniques. HPUD has found over **60 leaks** and considers this program to be the most effective and successful.

## Results

Currently, Hallsdale-Powell Utility District's Water Loss is at **< 30%** which is well in range with the State requirement.



Leak Card Z									
Project:	BrushyValley				Address: Macmont Cir-N- Emory Rd				
Urgency:	Low	Surface Material:	Grass	Leak Type:	Fitting	Pipe Size:	8	Pipe Material:	CI
Leak Detection Method:	Sounding	Visible Water:	No	DB level:	99	Person Submitted To:	Mr. Cody Humphrey		
MPT Estimated GPM	Gallons Per Minute:	1							
	Gallons Per Day:	1440							
	Gallons Per Month:	43800							
	Gallons Per Year:	525600							
Leak Description & Comments:									
WO# 370604 - Distribution leak detected at or near valves. Sounded surrounding connections and best noise is on the south valve. Also found water signatures when probing around valve									



# CONCLUSION

For the last 20 years, HPUD has been committed to the improvement of the water and wastewater systems in the District. As a result of strategic planning and sound management practices, HPUD has significantly reduced SSO's, eliminated plant violations, and our water quality has continuously exceeded state and federal standards.



### Measurable Impact

Our report highlights significant, measurable impact, particularly in clean water projects, affirming the effectiveness of our Capital Improvement Plan.



### Collaborative Success

Strategic collaborations with key partners have expanded our ability to identify and address pressing needs by maximizing resources and improving performance contributing to the overall success of HPUD's Capital Improvement Plan.



### Continued Commitment

While celebrating achievements, we recognize ongoing challenges and reiterate our enduring commitment to providing quality, reliable, and progressive water and wastewater service through innovation and fiscal responsibility while maintaining a commitment to excellence in customer service.