Town of Pilot Mountain
Town Hall 124 West Main Street Pilot Mountain, NC 27041
Thursday, February 18, 2021, 6:00 PM
This meeting will be held via Zoom and will be available via Facebook Live

BOARD OF COMMISSIONERS SPECIAL MEETING AGENDA

Call to Order

Adoption of Agenda

Public Comment: Those wishing to make a comment should email that comment to publiccomment@pilotmountainnc.org.

Board and Committee Reports

New Business

1. Water and Sewer AIA Presentation
2. Police Vehicle Funding
3. Minimum Housing Code Ordinance Amendment
4. Animal Ordinance Amendment
5. DWR Grant Application Resolution

Administrative Reports

6. Town Manager and Staff Reports

Mayor and Commissioners Comments

Other Business

Adjournment

AIA Presentation	
Background Information:	
Ken Orie with Withers Ravenel will be with us to present the findings of the AIA study.	
Staff Recommendation:	Presentation only.
Possible Board of Commissioner Actions	
• Take No action	
Attachments	
• Board Presentation	

Town of Pilot Mountain AIA/AMP Presentation

February 18, 2021

6:00 pm

Presented by

Kenneth Orie, PE
Director of Engineering, Utilities
Casey Dolan
Staff Professional

PRESENTATION
TOPICS

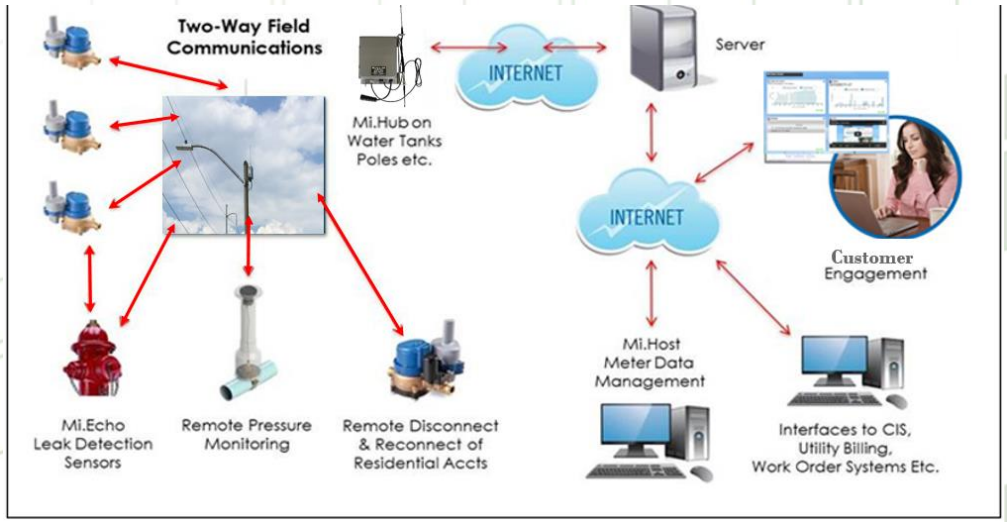
- What is AIA/AMP?
- What did we do?
- Risk Matrix
- Results
- Next Steps

AIA – Asset Inventory Assessment

- **Overview**
  - The Asset Inventory and Assessment grants were created in Session Law 2015-241 in the changes made to NCGS 159G, to broaden the use of grant funds to encourage water and wastewater utilities to become more viable and more proactive in the management and financing of their systems.
  - The grants are limited to $150,000 from the Wastewater Reserve or the Drinking Water Reserve

AMP – Asset Management Plan

- **Answers the questions**
  1. What is the current state of my assets?
  2. What is my required "sustainable" level of service?
  3. Which assets are critical to sustained performance?
  4. What are my minimum life-cycle costs?
  5. What is my best long-term funding strategy?



Work Completed

Sewer Scope

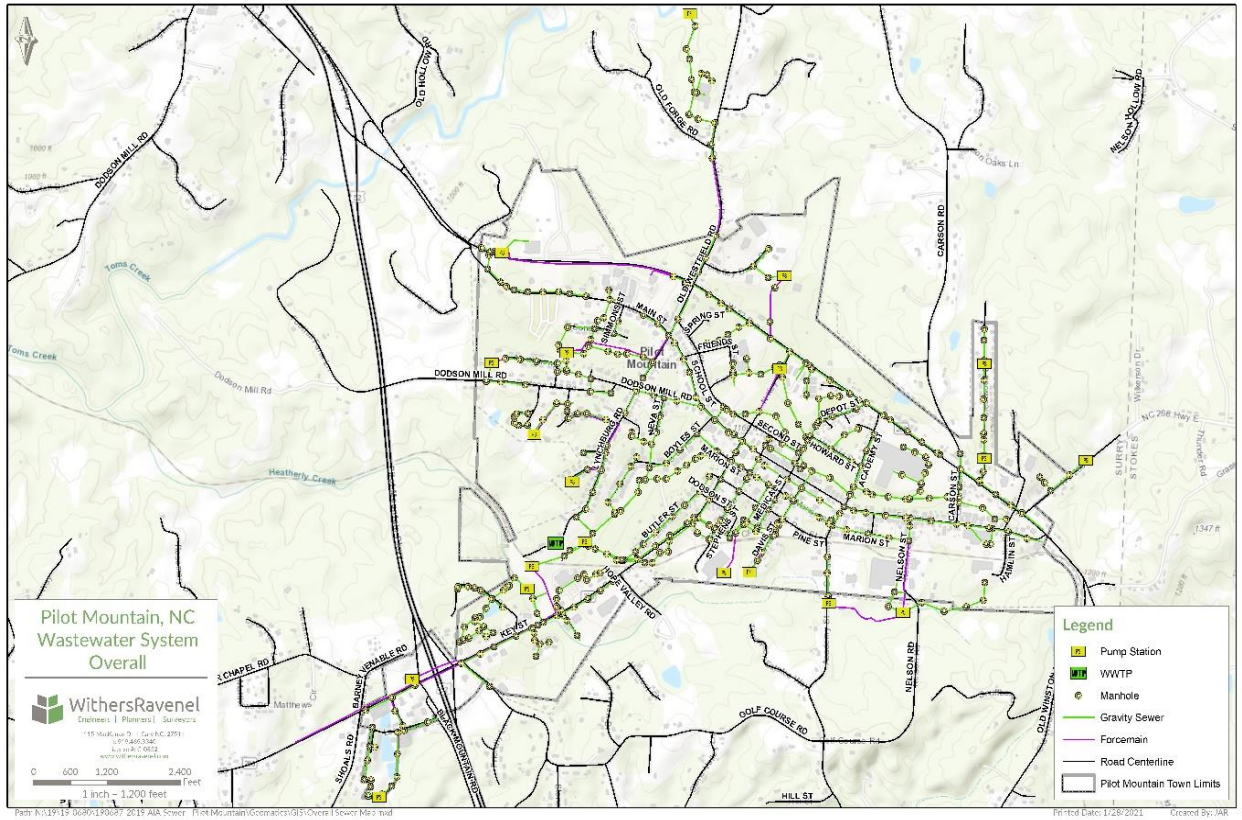
- Mapping
- Assessment
  - Lift Stations
  - Age
  - Material
  - Smoke Testing

19 Miles of 4”-18” Sanitary Sewer

4.5 Miles of 1.5”-8” Force Mains

20 Sanitary Sewer Lift Stations (including WWTP influent and effluent stations)

424 Sanitary Sewer Manholes



Work Completed

Water Scope

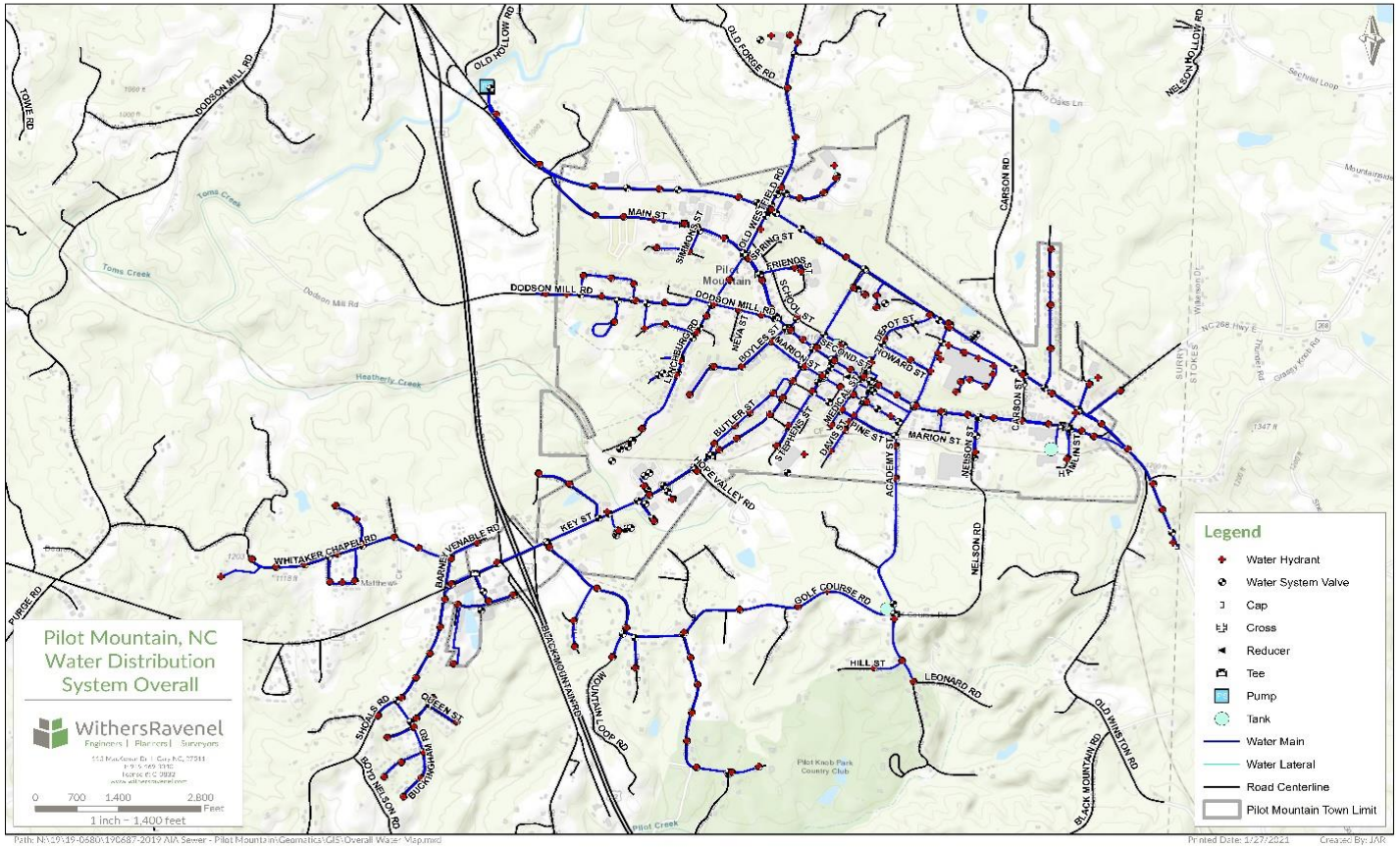
- Mapping
- Assessment
  - Age
  - Material
- Hydraulic Modeling
  - Fire Flows
  - Pressure
  - Storage

26 Miles of 2”-12” Water Mains

2 Water Storage Tanks

201 Fire Hydrants

380 Water Valves



Risk Matrix – Sewer

Risk of Failure

- MH Assessment
- Pipe Material
- Pipe Age

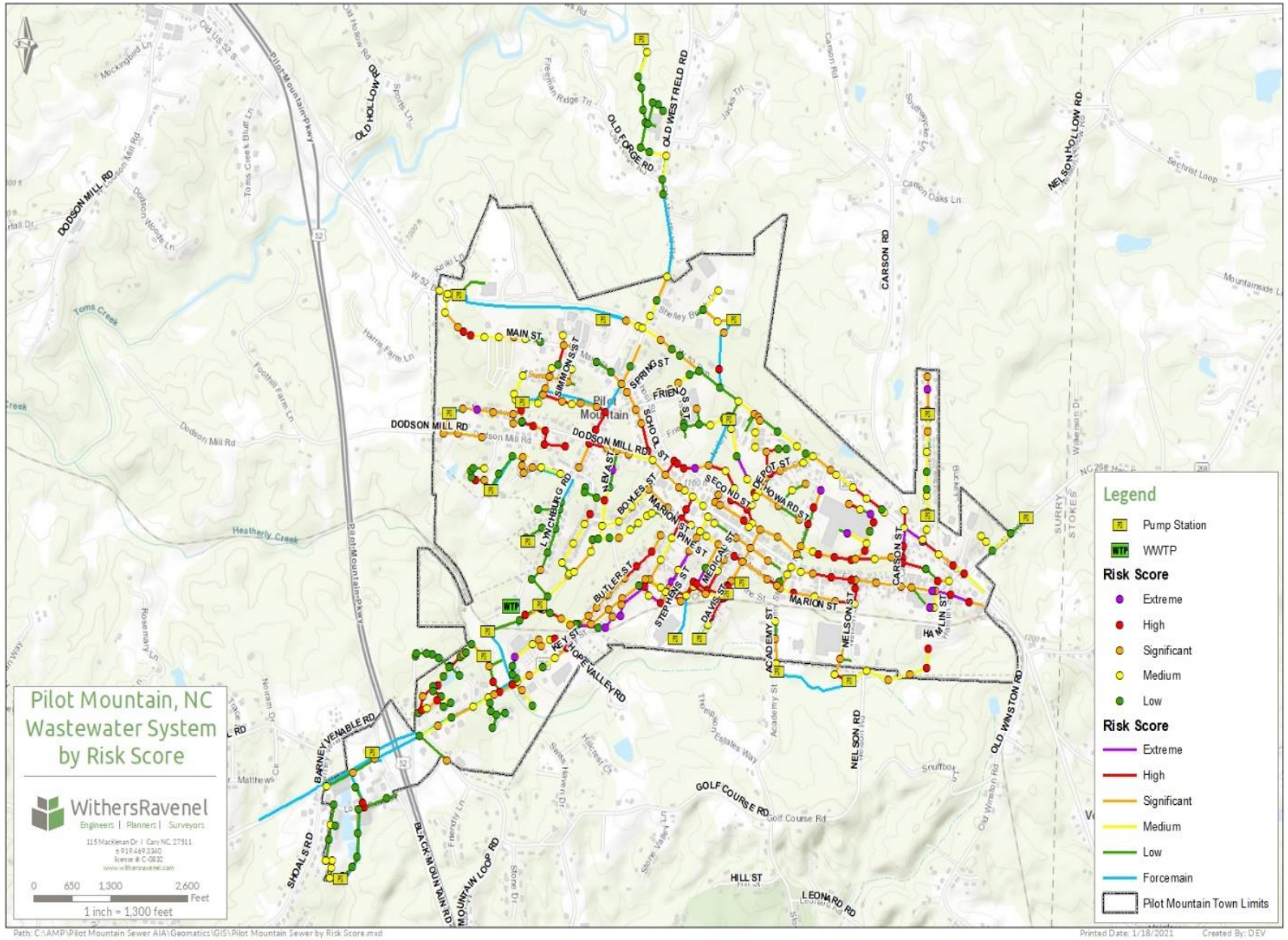
Minor ----- Consequence of Failure ----- Catastrophic										
10	-	-	-	2,644	-	-	-	2,640	-	1,376
9	905	-	-	82	-	-	-	1,918	-	-
8	593	-	-	2,543	-	-	-	5,020	-	269
7	285	-	-	2,569	-	-	148	6,724	-	1,002
6	2,034	-	-	9,647	-	-	1,370	11,243	-	1,442
5	1,026	-	-	1,228	-	-	662	3,635	-	452
4	543	-	-	7,062	-	-	374	8,519	-	456
3	1,385	-	-	8,318	-	-	385	5,194	-	186
2	-	-	-	14	-	-	-	1,315	-	-
1	544	-	-	4,777	-	-	-	5,377	-	8
	1	2	3	4	5	6	7	8	9	10

Rare ---------- Likelihood of Failure ---------- Almost Certain

Risk Scale Legend

Low	Medium	Significant	High	Extreme
2071+	2046 - 2071	2031 - 2046	2026 - 2031	2021 - 2026

Figure 13. Risk matrix for the gravity sewer pipes by linear foot



Risk Matrix – Water

Risk of Failure

- Pipe Material
- Pipe Age

$$RoF\ Score = Total\ LoF\ Score * Total\ CoF\ Score$$

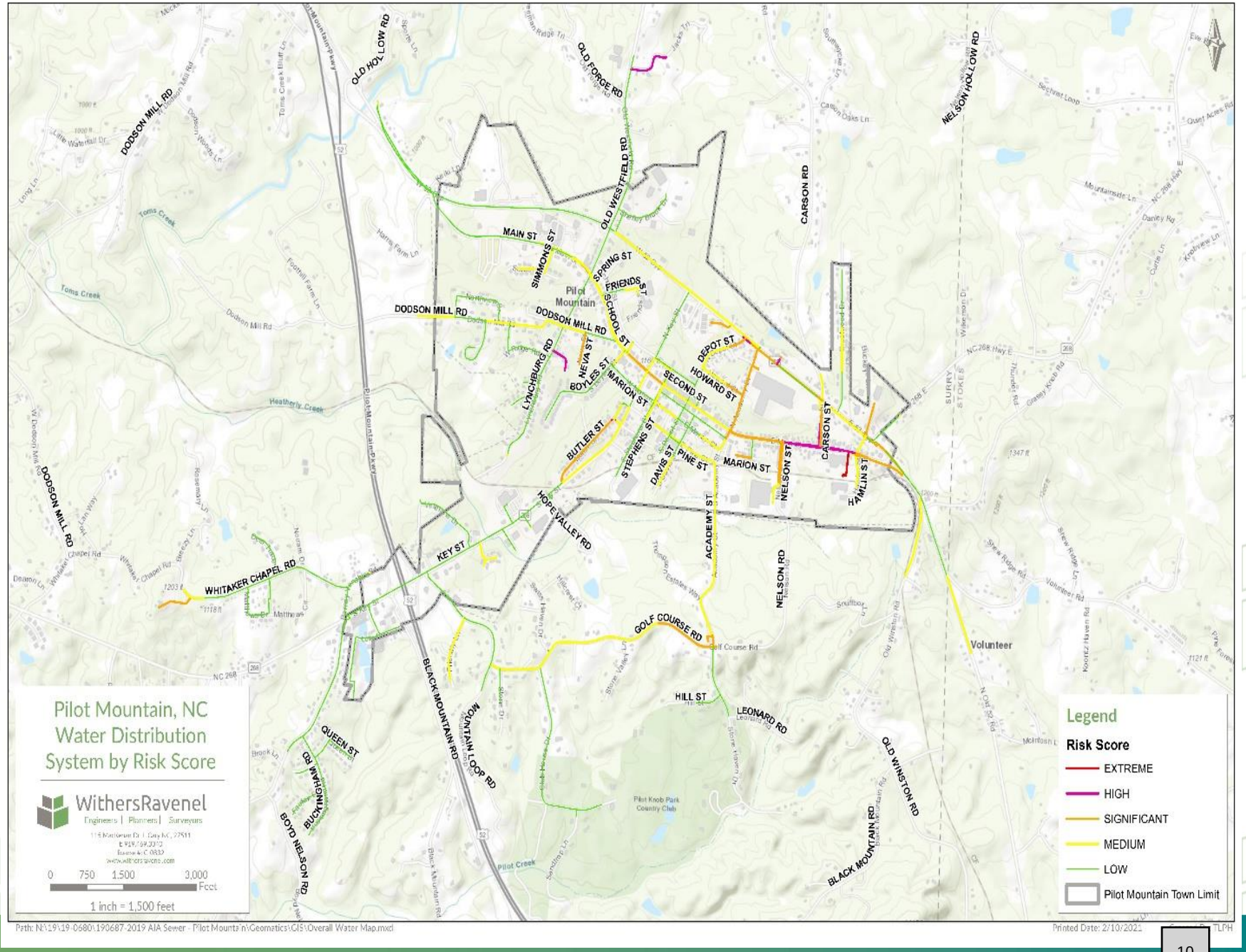
Minor ----- Consequence of Failure ----- Catastrophic										
10	10	20	30	40	50	60	70	80	90	100
9	9	18	27	36	45	54	63	72	81	90
8	8	16	24	32	40	48	56	64	72	80
7	7	14	21	28	35	42	49	56	63	70
6	6	12	18	24	30	36	42	48	54	60
5	5	10	15	20	25	30	35	40	45	50
4	4	8	12	16	20	24	28	32	36	40
3	3	6	9	12	15	18	21	24	27	30
2	2	4	6	8	10	12	14	16	18	20
1	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10

Rare ---------- Likelihood of Failure ---------- Almost Certain

Risk Scale Legend

Low	Medium	Significant	High	Extreme
2071+	2046 - 2071	2031 - 2046	2026 - 2031	2021 - 2026

Figure 44. Typical risk matrix scoring codes



Financial Impact - Sewer

Risk Score	Percent	Linear Foot	$184/LF	$155/LF	$159 Weighted/LF
LOW	24%	25,809	$4,748,895	$4,000,427	$4,103,664
MEDIUM	26%	27,960	$5,144,657	$4,333,814	$4,445,655
SIGNIFICANT	30%	31,303	$5,759,782	$4,851,991	$4,977,203
HIGH	16%	16,557	$3,046,572	$2,566,406	$2,632,636
EXTREME	4.05%	4,285	$788,514	$664,237	$681,379
TOTAL	**100%**	**105,915**	**$19.49 M**	**$16.42 M**	**$16.84 M**

Financial Impact - Water

Risk Score	Percent	Linear Foot	$253/LF	$142/LF	$198 Weighted/LF
LOW	55%	83,815	$21,205,070	$11,901,660	$16,595,273
MEDIUM	27%	41,358	$10,463,588	$5,872,844	$8,188,895
SIGNIFICANT	13%	19,939	$5,044,645	$2,831,382	$3,947,983
HIGH	4%	5,742	$1,452,672	$815,334	$1,136,874
EXTREME	0.33%	501	$126,632	$71,074	$99,104
TOTAL	**100%**	**151,354**	**$38.29 M**	**$21.49 M**	**$29.97 M**

Project Name	2021-2026	2026-2031	2031-2036	2036-2041	2041-2046	2046-2070	2070+
Sewer Collection							
Extreme Risk Gravity Main Rehabilitation	$681,379						
High Risk Gravity Main Rehabilitation		$2,632,636					
Significant Risk Gravity Main Rehabilitation			$1,659,068	$1,659,068	$1,659,068		
Medium Risk Gravity Main Rehabilitation						$4,445,655	
Low Risk Gravity Main Rehabilitation							$4,103,664
Lift Station							
Offsite Pump Station (No. 18) and Aerial Crossing	$552,000						
Heatherly Creek Outfall and Pump Station					$2,970,000		
Upgrade Lola Lane Pump Station			$880,000				
TOTAL	**$1,233,379**	**$2,632,636**	**$2,539,068**	**$1,659,068**	**$4,629,068**	**$4,445,655**	**$4,103,664**

Project Name	2021-2026	2026-2031	2031-2036	2036-2041	2041-2046	2046-2070	2070+
Water Distribution							
Extreme Risk Water Main Rehabilitation	$28,030						
High Risk Water Main Rehabilitation		$922,457					
Significant Risk Main Rehabilitation			$1,305,920	$1,305,920	$1,305,920		
Medium Risk Water Main Rehabilitation						$4,445,655	
Low Risk Water Main Rehabilitation							$4,103,664
Install Additional Water Mains	$888,922						
Hydrants and Valves							
Replace Hydrant Assembly	$142,960	$142,960					
Install Additional Water Main Valves	$40,000						
Water Storage Tanks							
Install Altitude Valve on Pilot Center Tank	$58,000						
stall Tank Mixing Equipment for Golf Course Rd Tar	$34,000						
TOTAL	$888,922	$1,065,417	$1,305,920	$1,305,920	$1,305,920	$4,445,655	$4,103,664

Future/Next Steps

- **Water**
  - Review projects/recommendations with Town
  - Rate study based on above
- **Sewer**
  - Review projects/recommendations with Town
  - Rate study based on above
  - Add CCTV to refine results
- **Water/Sewer**
  - Continue to work on planning and budgeting annually
  - Merge data set with street maintenance to avoid digging up new street

ANY QUESTIONS?

THANK YOU.

PILOT MOUNTAIN WATER AND WASTEWATER ASSET MANAGEMENT PLAN

February 2020

Prepared for:

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Appendix III – Sanitary Sewer Smoke Testing Technical Memo

LIST OF ABBREVIATIONS

ACP	-	Asbestos Concrete Pipe
ADD	-	Average Daily Demand
AMI	-	Advanced Metering Infrastructure
AMP	-	Asset Management Plan
CDBG	-	Community Development Block Grant
CIP	-	Capital Improvement Plan
CI	-	Cast Iron
CoF	-	Consequence of Failure
DMA	-	District Metered Area

DIP	-	Ductile Iron Pipe
EPA	-	Environmental Protection Agency
EPS	-	Extended Period Simulation
EST	-	Elevated Storage Tank
FAM	-	Funding and Asset Management
FY	-	Fiscal Year
GIS	-	Geographic Information System
GPM	-	Gallons per Minute
KPI	-	Key Performance Indicators
HGL	-	Hydraulic Grade Line
HPR	-	Hydrant Pressure Recorder
ISO	-	Insurance Services Office
LF	-	Linear Feet
LIFO	-	Last In, First Out
LoF	-	Likelihood of Failure
MDD	-	Maximum Daily Demand
MG	-	Million Gallon
MH	-	Manhole
MGD	-	Million Gallons per Day
NCAC	-	North Carolina Administrative Code
NCDEQ	-	North Carolina Department of Environmental Quality
NCGS	-	North Carolina Geodetic Survey
NFF	-	Needed Fire Flow
NRW	-	Non-Revenue Water
O&M	-	Operation and Maintenance
PHD	-	Peak Hour Demand
PRV	-	Pressure Reducing Valve
PVC	-	Polyvinyl Chloride
PHD	-	Peak Hour Demand
RoF	-	Risk of Failure
SCADA	-	Supervisory Control and Data Acquisition
SSO	-	Sanitary Sewer Overflow
SS	-	Steady-State

TDH - Total Design Head

VCP - Vitrified Clay Pipe

WTP - Water Treatment Plant

WWTP - Wastewater Treatment Plant

1 Executive Summary

The Town of Pilot Mountain, henceforth referred to as the Town, has a population of 1,504 (SPE, 2019) and is located about twenty (20) miles northwest of Winston-Salem, North Carolina. Pilot Mountain is in Surry County and has a diverse commercial base consisting of local and national companies. The Town is a full-service municipality and currently operates and maintains nineteen (19) miles of streets, twenty-six (26) miles of water distribution system, nineteen (19) miles of sewer collection system, a 1.5 MGD Wastewater Treatment Plant (WWTP), and a 1.6 MGD Water Treatment Plant (WTP). The water and sewer repairs/rehabilitation Capital Improvement Project (CIP) results in the total CIP budget for projects for the next 50 years, as seen below.

Table 1. Capital improvement plan prices

Project Name	2021-2026	2026-2031	2031-2036	2036-2041	2041-2046	2046-2070	2070+
Sewer Collection							
Extreme Risk Gravity Main Rehabilitation	$681,379						
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Hydrants and Valves							
Replace Hydrant Assembly	$142,960	$142,960					
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TOTAL	**$886,922**	**$1,065,417**	**$1,305,920**	**$1,305,920**	**$1,305,920**	**$4,445,655**	**$4,103,664**

As seen in Table 1, the initial years of the CIP focus on essential projects that provide immediate impact in areas where sewer has aged beyond its useful life and are rated as an Extreme or High Risk of Failure or in areas where staff have identified important shortcomings of the system as noted in the map below.

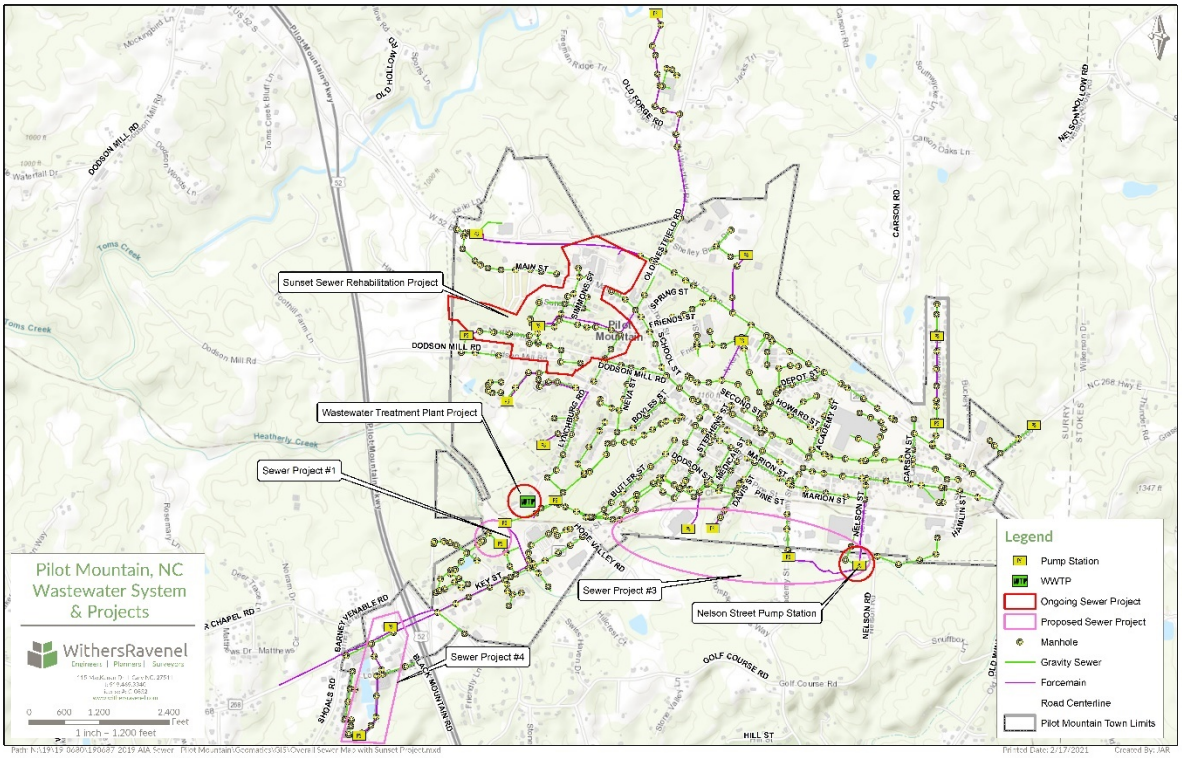


Figure 1. Wastewater system project summary map

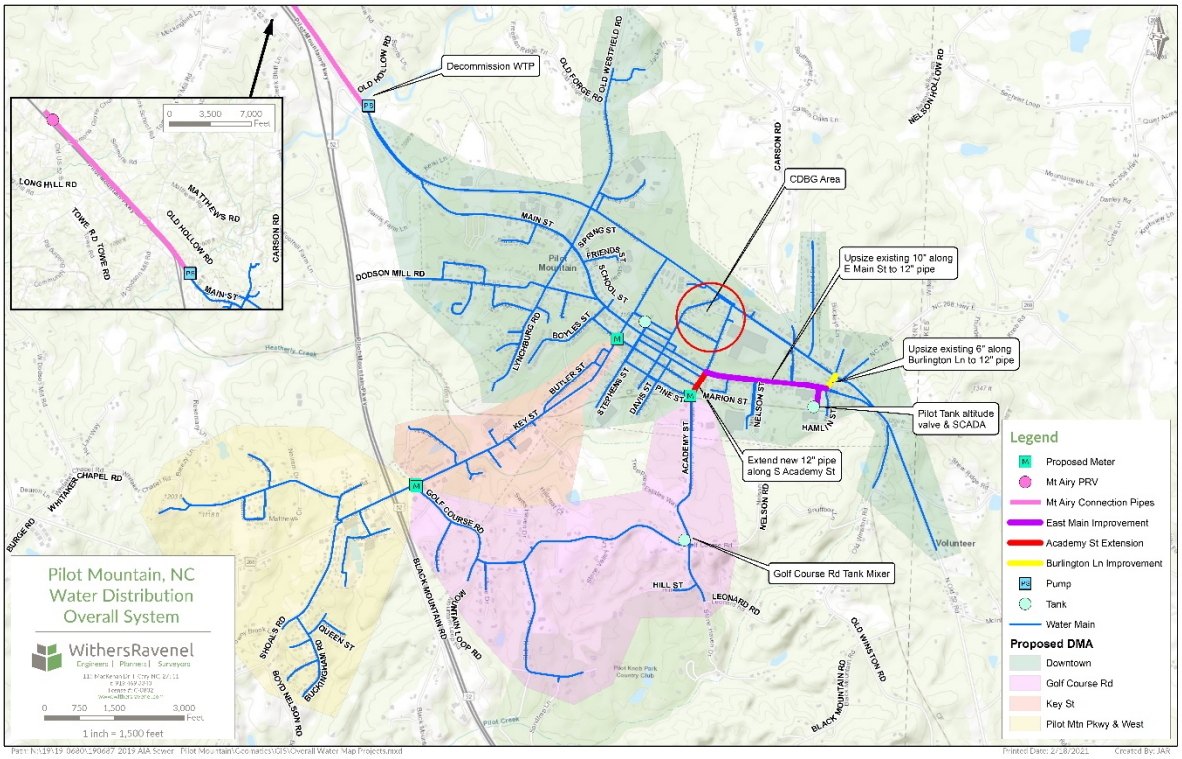


Figure 2. Water system project summary map

2 Introduction and Background

The Pilot Mountain is a town located in northeast North Carolina in Surry County, approximately twenty (20) miles northeast of the City of Winston-Salem. The population of the Town is 1,504 (SPE, 2019) while the population of Surry County is 73,489 (SPE, 2019). The Town owns and maintains a wastewater collection system, including a treatment plant and a water distribution system, including a treatment plant.

This Asset Management Plan (AMP) has been created to document, map, and assess the current condition of the various assets in the wastewater system that serve the people of the Town, as well as prioritize the potential future improvements. The goals of the AMP are to:

- Document the wastewater collection and the water distribution infrastructure.
- Perform a non-intrusive condition assessment of the wastewater and water system assets.
- Apply cost estimates to identified capital improvement needs.
- Create a prioritized Capital Improvement Plan (CIP)
- Document Operation and Maintenance (O&M) Plans for the wastewater and water systems

This Asset Management Plan (AMP) inventories and assesses the wastewater collection and water distribution systems within the Town. Assets within the wastewater collection system including gravity sewers, force mains, and manholes were inventoried in a Geographic Information System (GIS) database to be maintained by the Town. Assets within the water distribution system including water mains, water storage tanks, water valves, and fire hydrants were inventoried in a GIS database to be maintained by the Town.

The sewer database contains Key Performance Indicators (KPIs) such as age, material, diameters, manhole condition, smoke testing results, and pump station tributaries, and the water database contains KPIs such as age, material, hydrant condition, C Factor, and pressure. The KPIs were used to determine the Likelihood of Failure (LoF) and Consequence of Failure (CoF) for the wastewater and water system assets, respectively. The resulting LoF and CoF scores are on a 0 to 10 scale, with a score of 10 corresponding to the most likely to fail or having the most severe consequence(s) of failure. Once these scores were determined, each asset's Risk of Failure (RoF) was established within a 10 x 10 risk matrix with LoF and CoF on opposing axes. An asset's risk is determined by multiplying the LoF and CoF together. Scores can theoretically range from 0 to 100, with 100 having the highest RoF.

The KPIs for both LoF and CoF were determined by WithersRavenel's team in conjunction with the Town's staff. These KPIs were based on their knowledge of the causes and impacts of previous system failures. The RoF scores are utilized to prioritize projects and place them within a funding timeframe.

This AMP serves as a guide to the inventory of wastewater and water system assets in the Town, condition assessment of the assets, CIP with cost estimates, and O&M plans for the sewer and water systems. Approximate costs to replace wastewater system assets, including gravity sewer lines, force mains, and manholes and water system assets, including water mains, water storage

tanks, water valves, and fire hydrants were determi,ned for 5-year to 50-year planning periods from 2021 to 2071. Costs shown are present worth. This document also evaluates the condition of the pump stations that serve the Town.

This document is intended to be a living document and will be combined with the previously adopted water system AMP which will then be reviewed and updated on a regular basis. It is recommended that the data stored within the GIS is continually captured and validated to ensure that the most relevant and accurate representations of the current systems are captured.

3 Sewer System Overview

Pilot Mountain Wastewater Treatment Plant provides day-to-day operations and twenty-four-hour response to collection system emergencies for Pilot Mountain, NC. The wastewater collection system totals nineteen (19) miles of gravity sewer lines ranging in diameter from 4 inches to 18 inches and 4.5 miles of force main ranging in diameter from 1.5 inches to 8 inches and in age from new to over 50 years old. The system also includes twenty (20) sewer lift stations and 424 manholes that transport wastewater to the Town-owned and operated WWTP.

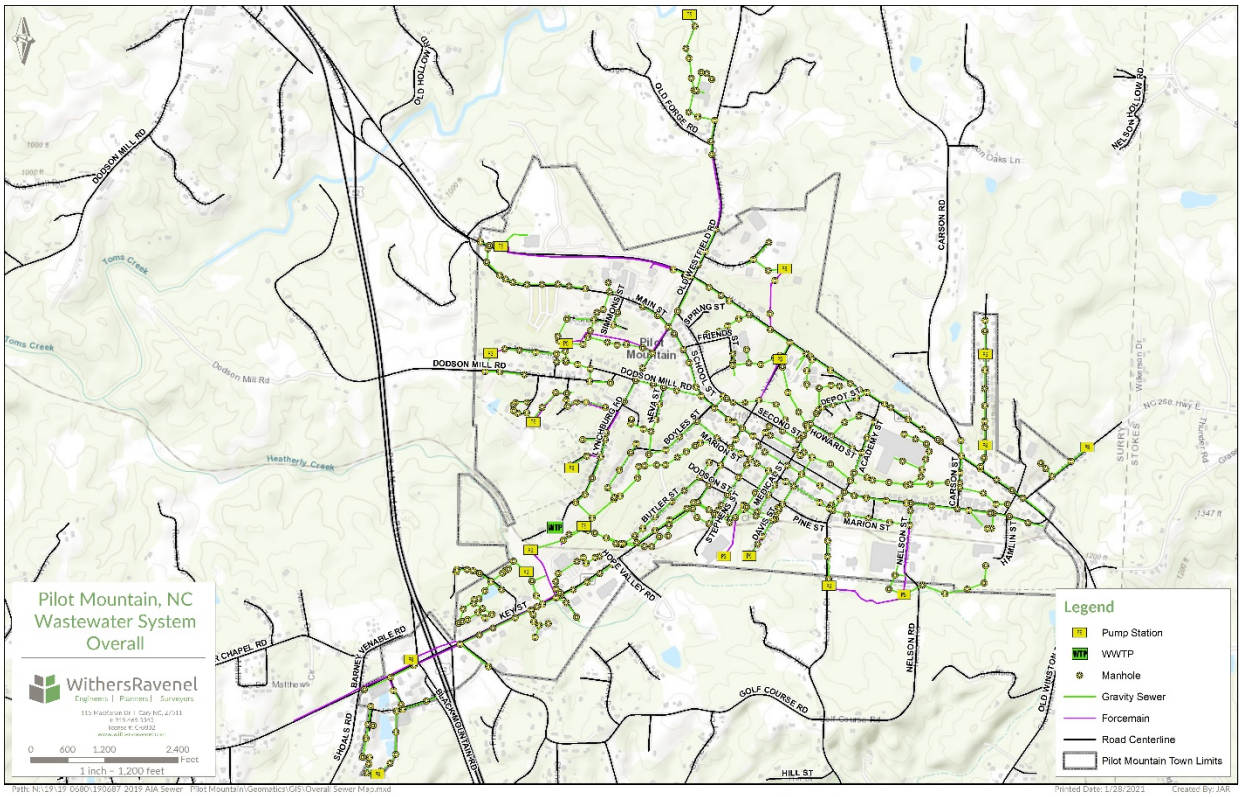


Figure 3. Wastewater system overall map

19 Miles of 4”-18” Sanitary Sewer

4.5 Miles of 1.5”-8” Force Mains

20 Sanitary Sewer Lift Stations (including WWTP influent and effluent stations)

424 Sanitary Sewer Manholes

4 Critical Sewer Assets

4.1 Wastewater Treatment Plant

The Town sends its wastewater to the WWTP, owned, and maintained by the Town. The Town is currently working on a project to provide like-for-like replacements to the WWTP, including influent pump station improvements, adding a standby generator for the influent pump station, replacing the failed clarifier mechanism and related valves and appurtenances at the WWTP. This AMP will not incorporate the improvements to plant at this time as those were out of the scope for this project, but they will be included in future versions.

4.2 Lift Stations

The wastewater collection system contains twenty (20) lift stations, shown in Figure 4. These lift stations are an integral part of the sewer collection infrastructure for the city. Pump Station capacities range from 10 gpm to 700 gpm. Table 2 gives a summary of information collected during the lift station assessment and drawdown testing for the twenty (20) lift stations for the Town. The lift station assessment and drawdown testing omitted Stations 1 and 19 because they are part of the wastewater treatment plant and Station 5 because it is being replaced as part of the Sunset Sewer Subbasin Rehabilitation Project. There are ten (10) lift stations that lack redundancy. The drawdown flow and TDH show the performance of the pump based on where the pump is located on the design curve. Head conditions on the influent and effluent sides of the pump can drive the drawdown flow and TDH values higher or lower than the design flow and TDH.

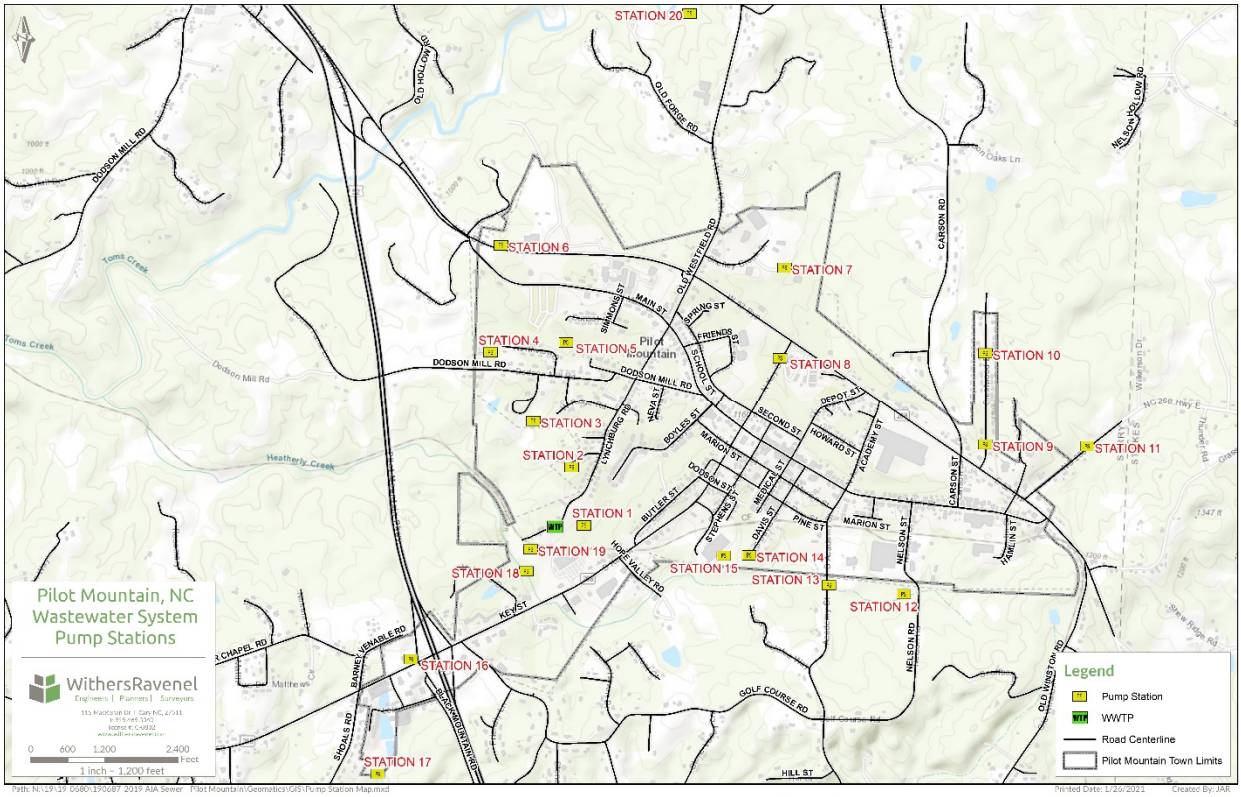


Figure 4. Lift station map

Table 2. Summary of information for the collection system lift stations

Station Number	Station Name	Pump Number	Manufacturer	Operation Status	Design TDH (ft)	Design Flow (gpm)	Drawdown TDH (ft)	Drawdown Flow (gpm)
1	Influent	1	Barnes	--	--	700	--	--
		2	Barnes	--	--	700	--	--
2	Old Barn Circle	1	Sulzer	Yes	--	10	88	19
		2	Sulzer	No	--	10	--	--
3	Mt. View	1	--	Yes	--	110	--	99
		2	--	Yes	--	110	--	63
4	Mayor	1	ABS	Yes	--	10	--	24
		2	ABS	No	--	10	--	--
5	Sunset	1	Fairbanks	--	97	100	--	--
		2	Fairbanks	--	97	100	--	--
6	Recreation	1	Tsurumi	Yes	--	90	105	20
		2	Tsurumi	Yes	--	90	105	19
7	Shellybrook	1	Goulds	Yes	--	100	--	53
		2	Goulds	Yes	--	100	--	53
8	Slick Rock	1	--	Yes	--	230	--	157
		2	--	No	--	230	--	--
9	Upper Crestwood	1	ABS	Yes	--	50	85	24
		2	ABS	Yes	--	50	85	25
10	Lower Crestwood	1	Sulzer	Yes	--	30	62	35
		2	Sulzer	No	--	30	--	--
11	Fitall	1	Barnes	Yes	--	40	--	35
		2	Barnes	No	--	40	--	--
12	Nelson Street	1	Smith & Loveless	Yes	90	720	--	595
		2	Smith & Loveless	No	90	720	--	--
13	J.R. Lynch	1	Barnes	Yes	30	200	32	185
		2	Barnes	Yes	30	200	34	166
14	Davis Street	1	Sulzer	Yes	--	11	89	41
		2	Sulzer	No	--	11	--	--
15	Denny Street	1	Barnes	Yes	--	330	--	427
		2	Barnes	Yes	--	330	--	299
16	Neighbor's	1	Tsurumi	Yes	62	400	68	313
		2	Tsurumi	No	62	400	--	--
17	Lola Lane	1	Myers	Yes	--	88	140	61
		2	Myers	No	--	88	--	--
18	Offsite	1	Tsurumi	Yes	--	75	55	77
		2	Tsurumi	No	--	75	--	--
19	Effluent	1	Fairbanks-Morris	--	--	--	--	--
		2	Fairbanks-Morris	--	--	--	--	--
20	Middle School	1	Myers	Yes	215	200	210	211
		2	Myers	Yes	215	200	205	283

4.3 Gravity Sewer, Force Main, and Manholes

4.3.1 Gravity Sewer and Force Main

The collection system in Pilot Mountain consists of approximately nineteen (19) miles of gravity sewer and 4.5 miles of force main to convey wastewater from the collection system to the wastewater treatment plant. The collection system serves 831 sewer customers which includes residential, commercial, industrial, and institutional. The gravity sewer pipe diameters range from 4 to 18 inches and pipe ages range from new to over 50 years. Figure 5, Figure 7 and Figure 9 provide a summary of the sizes, materials, and ages of the gravity sewer pipes contained in the collection system.

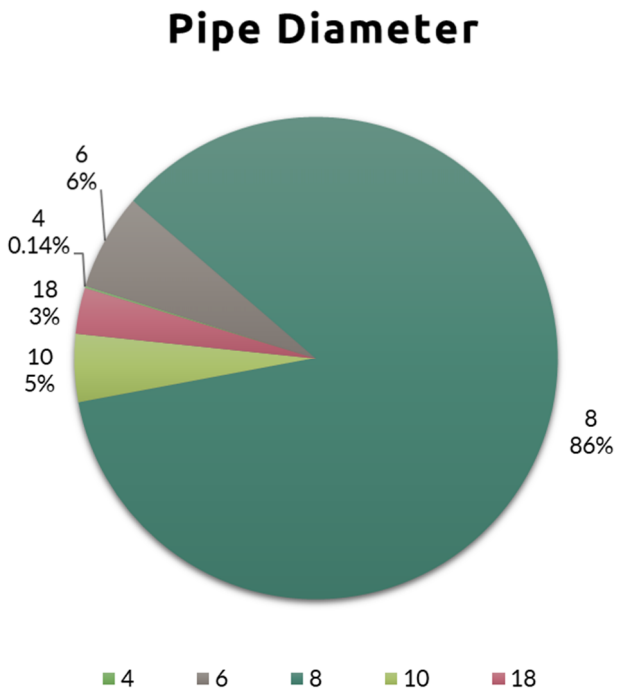


Figure 5. Diameters (inches) of gravity sewers in the collection system

As shown in Figure 5, the majority of the sewer pipelines are 8-inch diameter. This is typical as these sizes are prominent for branch collectors which feed into larger trunk lines, 10 inches and 18 inches, that make up approximately 5% and 3% of the system, respectively. About 6% of the system is comprised of lines smaller than 8-inches, which is no longer allowed in new sewer construction per the Minimum Design Criteria for the Permitting of Gravity Sewers.

For this AMP, it was decided all collection system pipes that are larger than 8" have been considered critical. The label critical is because of the impact that a failure would have on these larger collection lines. They are the central conveyance for the entire system and should be prioritized differently within the collection system. Those lines are shown below:

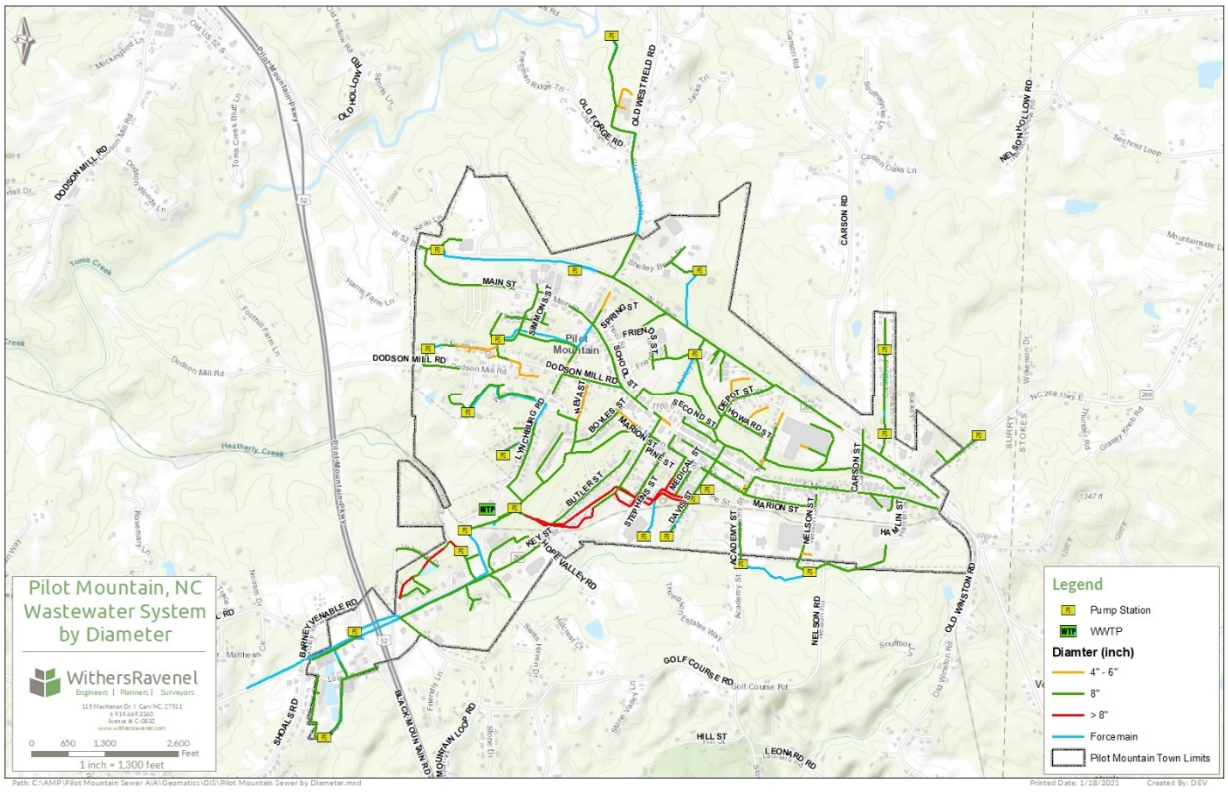


Figure 6. Wastewater system by diameter

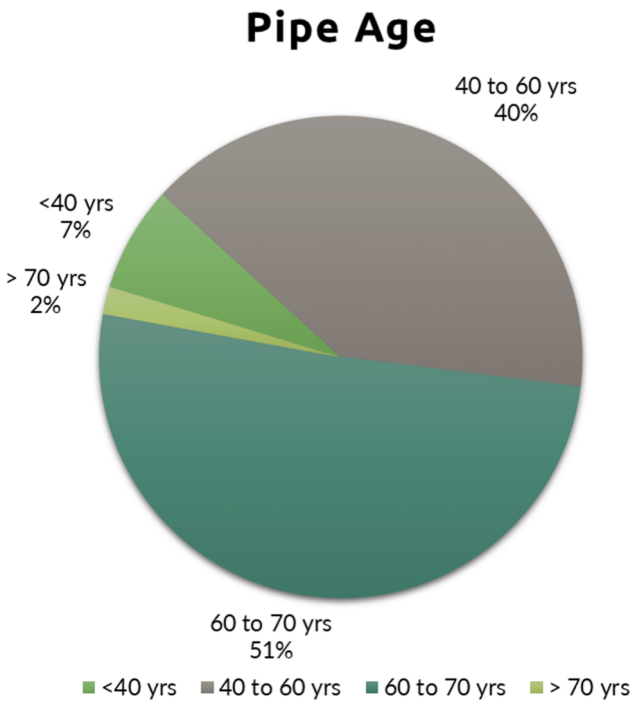


Figure 7. Ages (years) of gravity sewer pipes in the collection system

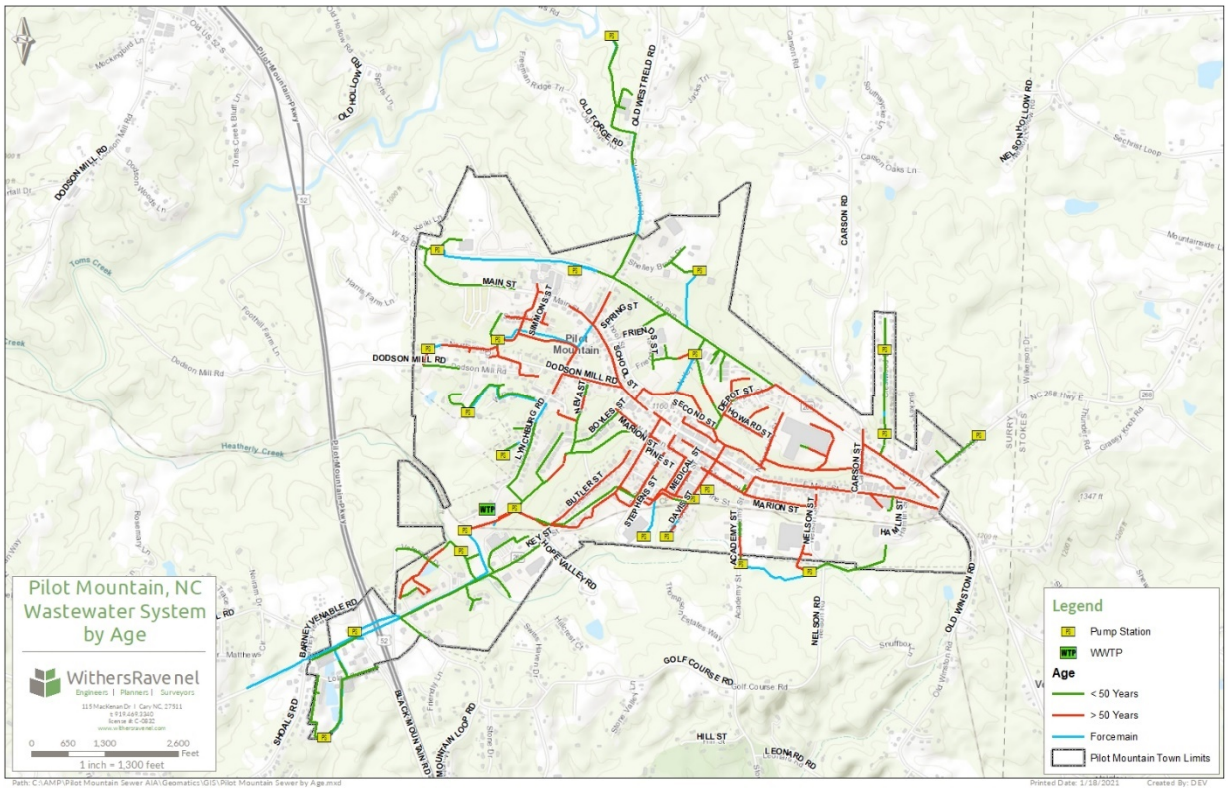


Figure 8. Wastewater system by age

Figure 7 illustrates the general age of the collection system pipes and shows that 2% of the lines have been in place for over 70 years, 51% have been in place for 60 to 70 years, 40% have been in place for 40 to 60 years, and 7% have been in place for less than 40 years.

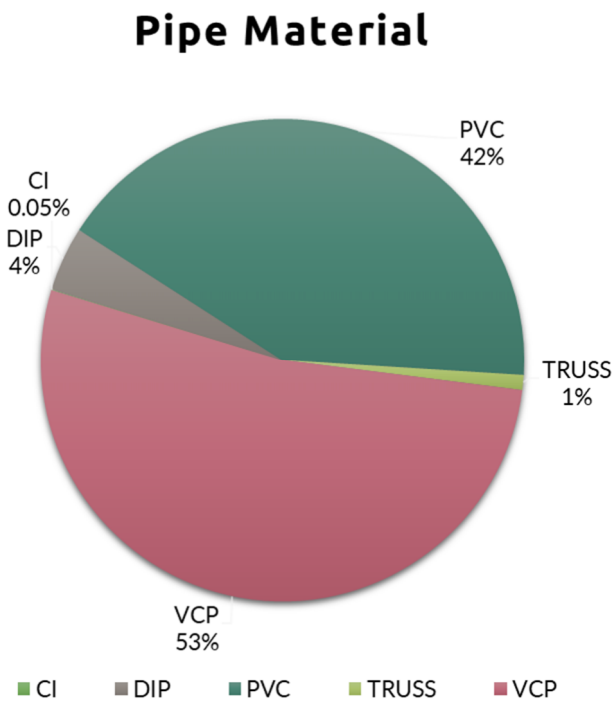


Figure 9. Materials of gravity sewer pipes in the collection system

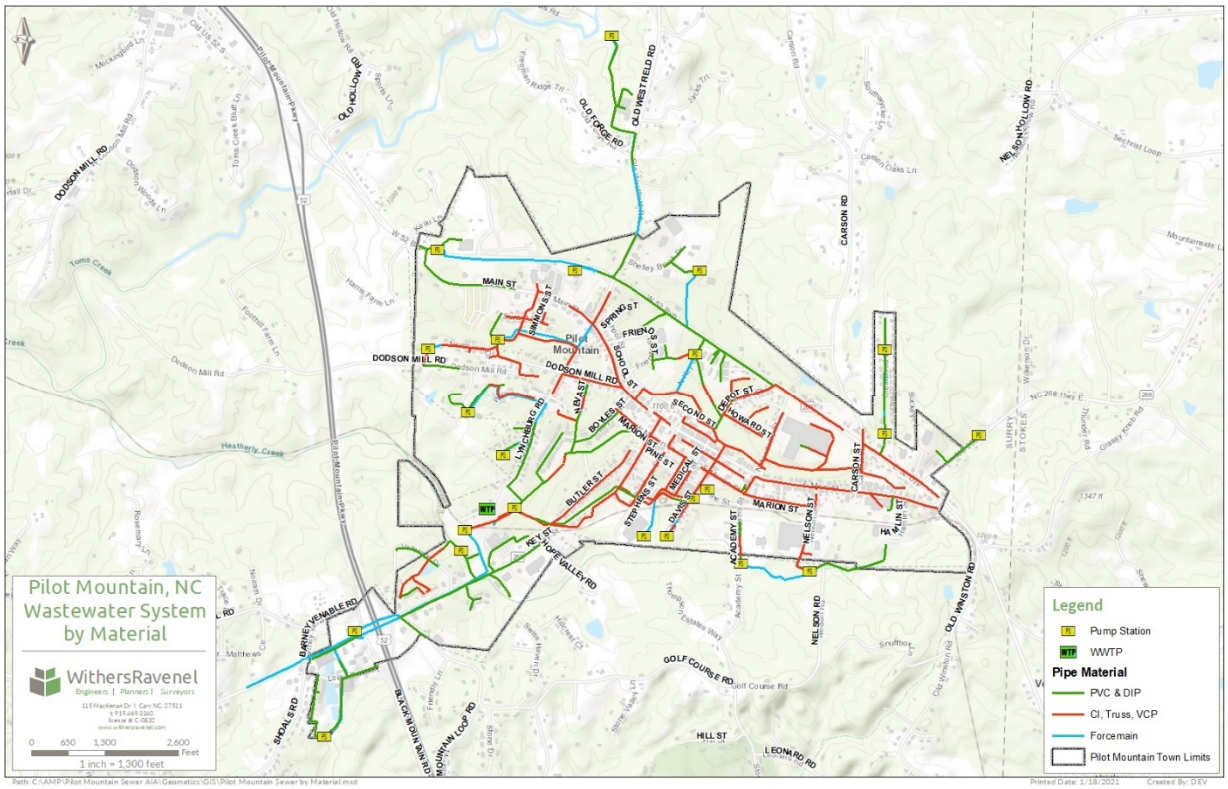


Figure 10. Wastewater system by material

Figure 9 represents the various pipe materials found in the collection system. Ductile Iron Pipe (DIP), Cast Iron Pipe (CI), Polyvinyl Chloride (PVC) represents approximately 46% of the system, and are materials commonly used in new sewer construction projects. Vitrified Clay (VCP) represents 53% of the sewer utility and is typically the oldest and potentially most compromised piping.

4.3.2 Manholes

The sewer collection system consists of 424 manholes. All 424 manholes were mapped as part of this project, see Figure 11 below. In-depth manhole assessments were not performed as a part of this project, but manhole conditions were determined using the sanitary smoke testing analysis. See Appendix III for the detailed manhole defects.

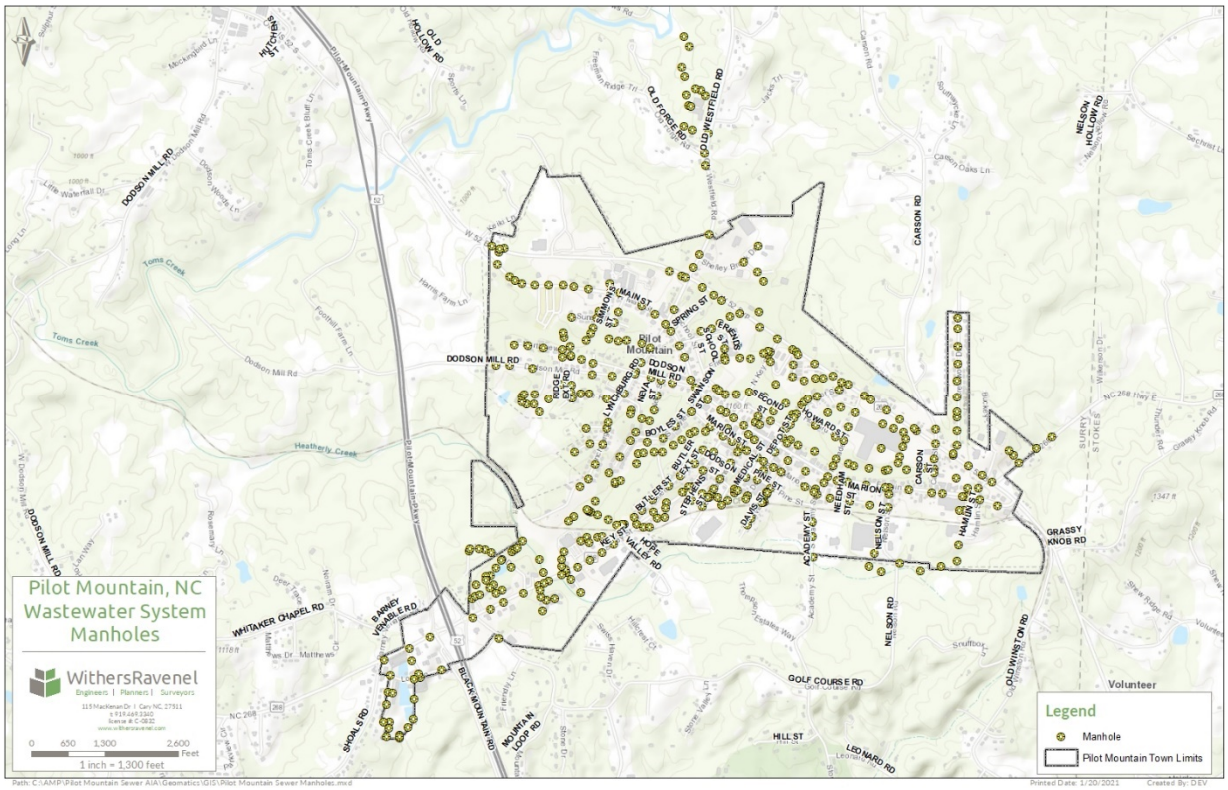


Figure 11. Wastewater system manhole map

Manhole locations are stored in the GIS database along with the other relevant sewer system information. The manhole information stored in the GIS database includes rim elevation, cover size, cover type, cover material, condition (if accessible), wall material (if accessible), depth (if accessible), Currently, the only manhole information stored in the GIS database is the manhole identifier, location, and rim elevation.

As a result, manholes were assigned the LoF and CoF KPIs of the associated sewer pipes. It is recommended that additional data including manhole material, manhole depth and pipe invert elevations be collected and updated into the GIS.

5 Sanitary Sewer Smoke Testing

5.1 Overview

Smoke testing was conducted in the Town from June 15 through July 20, 2020 utilizing a smoke machine supplied by WithersRavenel and a crew of employees from WithersRavenel and the Town. The entire collection system was tested, including nineteen (19) miles of gravity sewer line and 424 manholes. The smoke machine was placed on eighty-five (85) manholes and the crew walked the surrounding area, inspecting for defects. The Sanitary Sewer Smoke Testing Technical Memo, found in Appendix III, contains detailed information on the defects.

5.2 Overall Defect Summary

All visible defects were recorded, and photos were taken to aid in post-field inspection and future relocation of defects. The defects discovered were as follows:

- 107 cleanout defects
- 2 defects in meter boxes
- 9 stormwater cross-connections
- 2 roof drain connections
- 56 manhole defects
- 4 lateral defects
- 26 other unique defects

5.3 Drainage Defect Summary

There were 133 defects in total that were noted as able to drain into the sewer system, and they are categorized as follows:

- 89 defects in cleanouts and meter boxes
- 9 stormwater cross-connections
- 21 manhole defects
- 4 defects over the sewer mains and laterals
- 10 other unique defects

6 Sewer Asset Condition Assessment, Ranking, and Prioritization

Each of the gravity sewer lines and manholes inventoried were prioritized for improvement/ replacement. As discussed in Section 4, the 424 manholes are populated with the same or similar scores as the adjoining sewer and are included as part of the sewer asset for the CIP improvement projects because it is common for sewer rehabilitation projects to include manholes when adjoining sewer lines are repaired.

Based on the asset KPIs stored in GIS, each asset was assigned LoF and CoF scores which were utilized to calculate the Risk Score for each asset. Lower risk scores indicate less risk, while higher scores indicate greater risk. Therefore, the risk score indicates the relative priority for the repair/replacement of the asset. Approximate costs were determined to replace gravity sewer lines and manholes for the next 50 years. The projected costs are not adjusted for future costs and are instead displayed as current dollar amounts for consistency.

6.1 Priority Ranking Methodology

Three KPIs were utilized to determine the LoFs of the gravity sewer lines and manholes in the collection system. These KPIs are weighted based on their impact on LoF as described below and listed in Table 3.

- Age – Age is a typical indicator for LoF, as continued use and degradation over time leads to a higher likelihood of problems in older assets.
- Material – Materials that are known to be more likely to fail, such as vitrified clay pipe which is susceptible to cracking, are given higher scores.
- Critical Diameters – Critical diameters are a diameter of greater than 8 inches. Most of these lines are main trunk outfall lines which carry the wastewater to the treatment plant. These lines are critical in the successful functioning of the wastewater treatment system.

Table 3. Sewer likelihood of failure (LoF) scores

LoF KPI Factors	
Pipe Age (Years)	**LoF Score**
>40	4
Material	**LoF Score**
CI, VCP, TRUSS	3.5
Critical Diameter	**LoF Score**
> 8"	2.5

In addition, the CoF for the gravity sewer lines were calculated from four separate KPIs which are weighted based on the impact of the asset's failure. These KPIs are described below and allocated scores are listed in Table 4.

- Manhole Condition – Smoke testing defects were utilized to determine manhole condition.
- Smoke Testing – Areas that are in proximity to positive smoke testing were given a higher ranking than those that were not in areas that had positive results.
- Pump Station Tributary – Pipes that are tributaries to pump stations were given a medium ranking

Table 4. Sewer consequence of failure (CoF) scores

CoF KPI Factors	
Manhole Condition	**CoF Score**
DOES NOT EXIST	4
POOR, VERY POOR	3
VARIOUS DEFECTS	2
FAIR	1
Smoke Testing	**CoF Score**
Heavy - Moderate	3.5
Low	1
Pump Station Tribuary	**CoF Score**
Yes	2.5

After the LoF and CoF scores were assigned to the gravity sewer lines and manholes, the scores were multiplied together to determine the overall risk score for each asset. The risk scores can range up to 100, with a lower score meaning the asset is a lower risk (and therefore a lower priority for repair/replacement) and a higher score indicating the asset is a higher risk (and therefore a higher priority for repair/replacement). Figure 12 shows how LoF scores and CoF scores determine an asset's overall RoF score, and color codes the RoF scores to show their recommended year of replacement. The following formulas determine an asset's RoF:

$$Total\ LoF\ Score = (LoF\ score, Pipe\ Age) + (LoF\ score, Material) + (LoF\ score, Critical\ Diameter)$$

$$Total\ CoF\ Score = (CoF\ score, Manhole\ Condition) + (CoF\ score, Smoke\ Testing) + (CoF\ score, Pump\ Station\ Tributary)$$

$$RoF\ Score = Total\ LoF\ Score * Total\ CoF\ Score$$

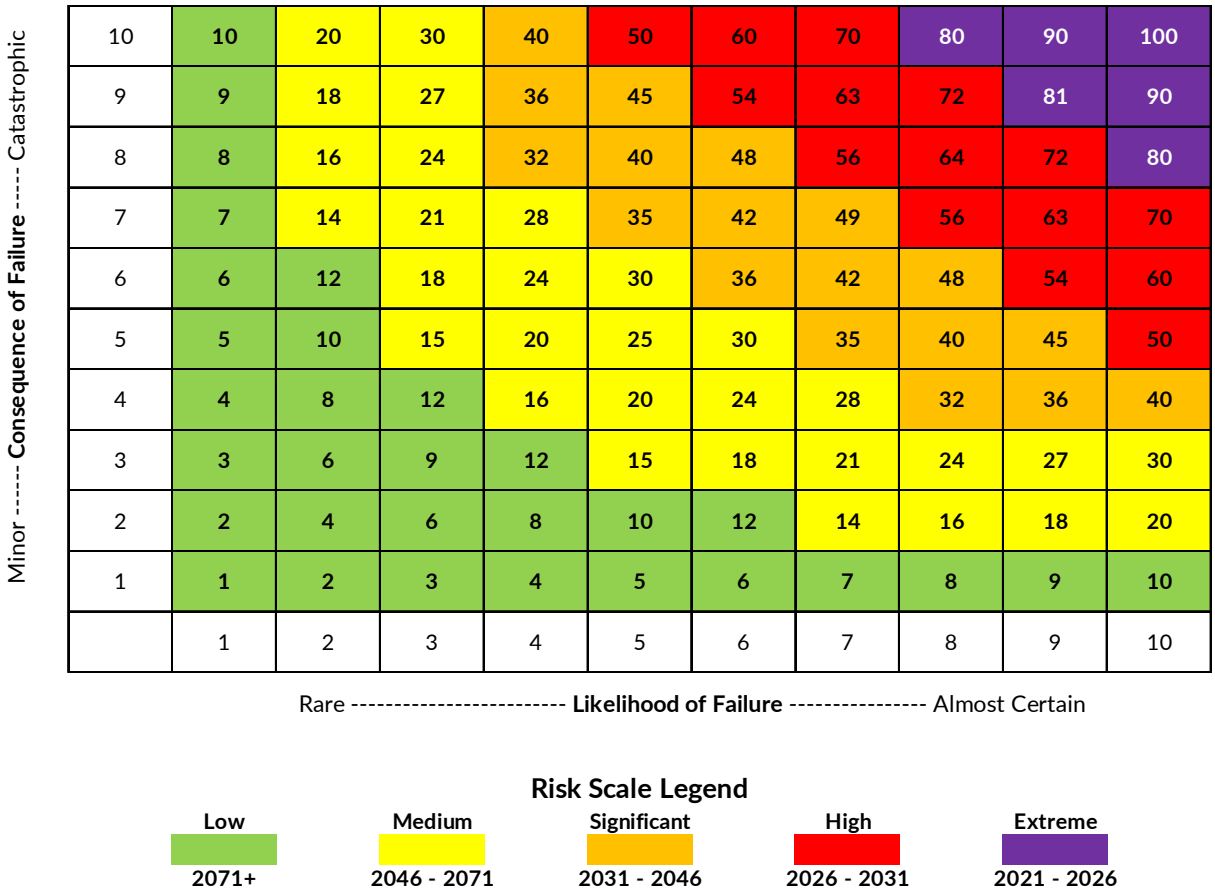


Figure 12. Typical risk matrix scoring codes

Figure 12 shows the typical risk matrix indicating possible risk scores and priority rankings for the sewer assets. Categories from "Low" to "Extreme" are based on an assumed time to failure. For example, the "Extreme" category is defined as anything scoring 80 or above and is assumed to require replacement by Fiscal Year (FY) 2026.

6.2 Asset Prioritization Results

Using the ranking methodology described in Section 6.1, each of the gravity sewer pipes and manholes was assigned a risk score. As seen in Figure 13 below, 4,285 Linear Feet (LF) of gravity sewer were placed in the "Extreme" risk category, 16,558 LF were placed in the "High" risk category and 31,302 LF were placed in the "Significant" risk category. The numbers in the matrix represent linear footage of pipe that received each risk score. The numbers in the legend represent the year range in which repair/replacement should be scheduled.

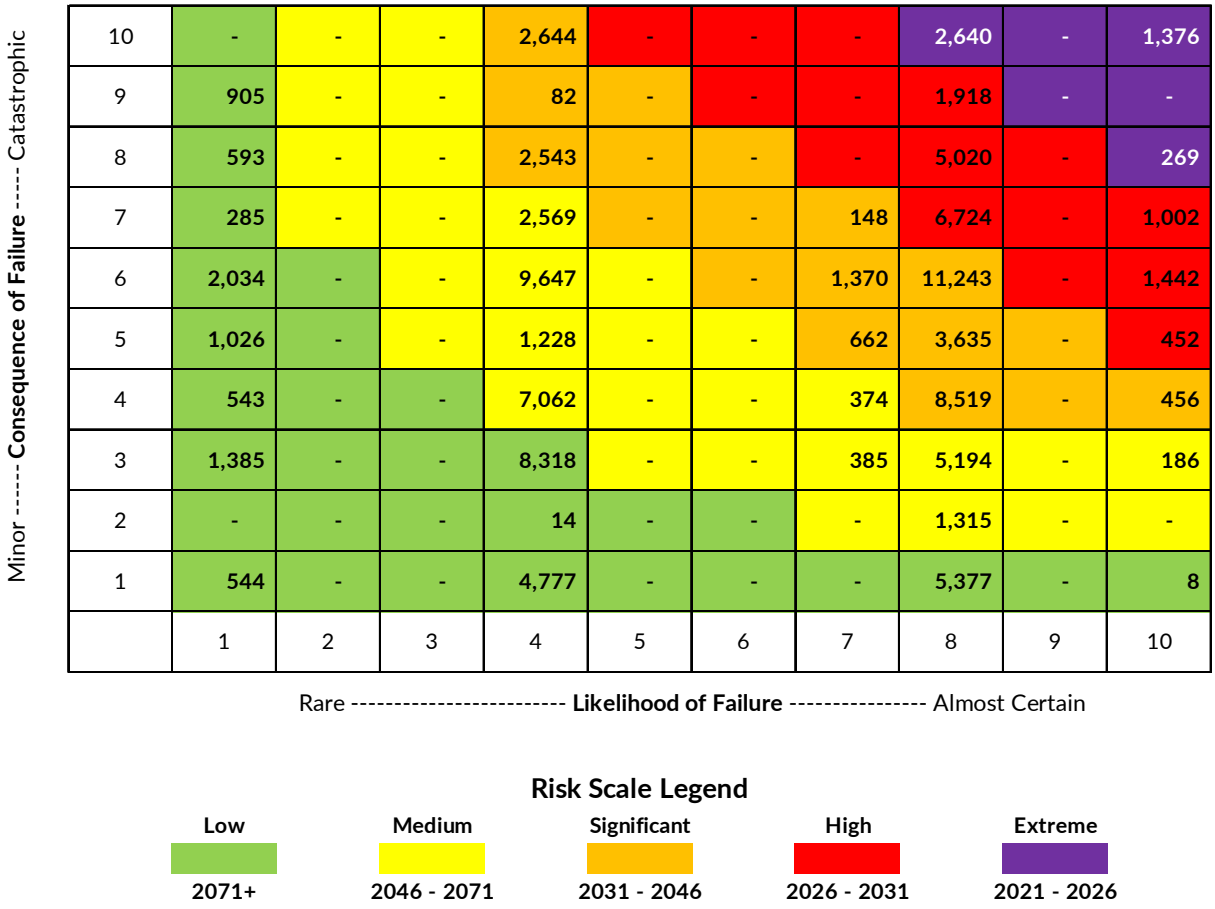


Figure 13. Risk matrix for the gravity sewer pipes by linear foot

As seen in Figure 14 below, 12 manholes were placed in the "Extreme" risk category, 69 were placed in the "High" risk category and 134 were placed in the "Significant" risk category. The numbers in the matrix represent the number of manholes that received each risk score. The numbers in the legend represent the year range in which repair/replacement should be scheduled.

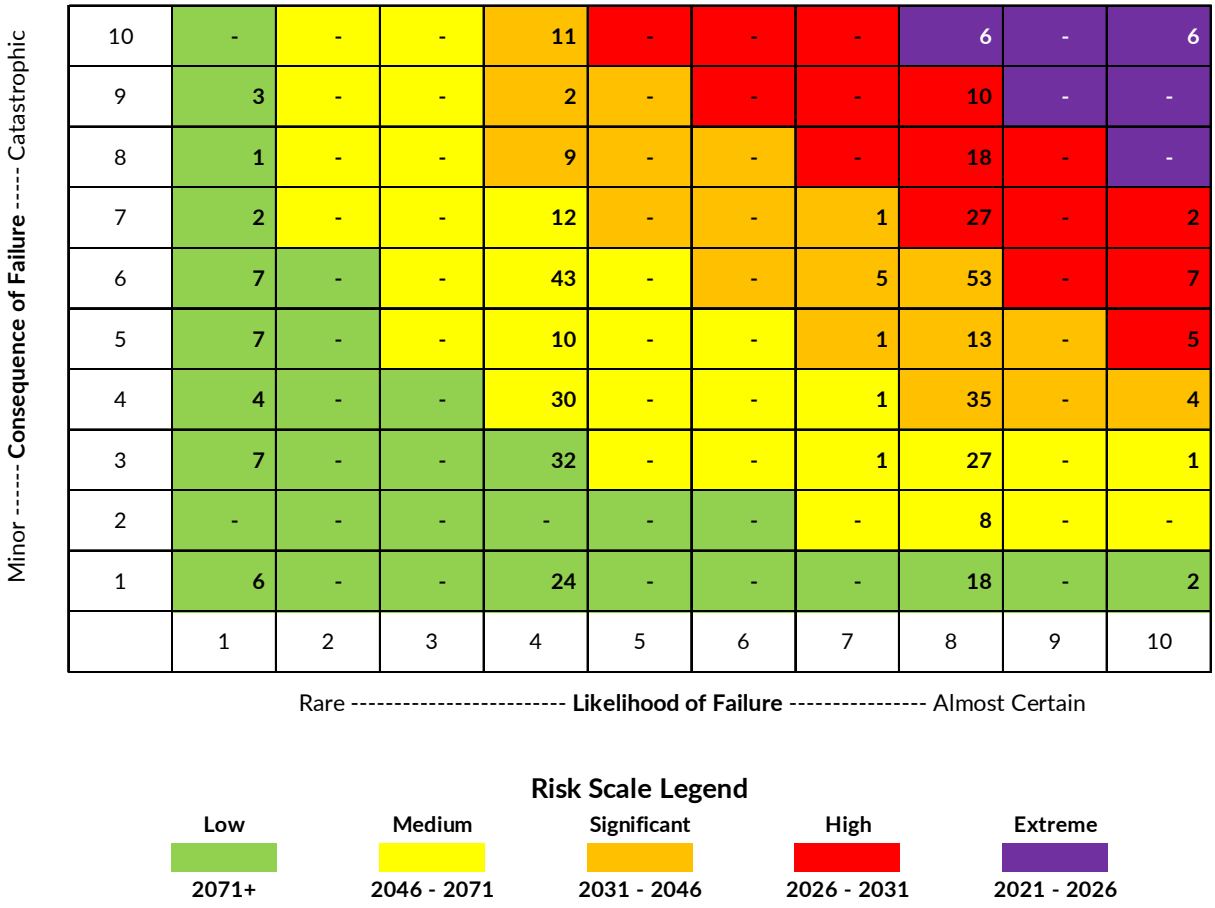


Figure 14. Risk matrix for manholes

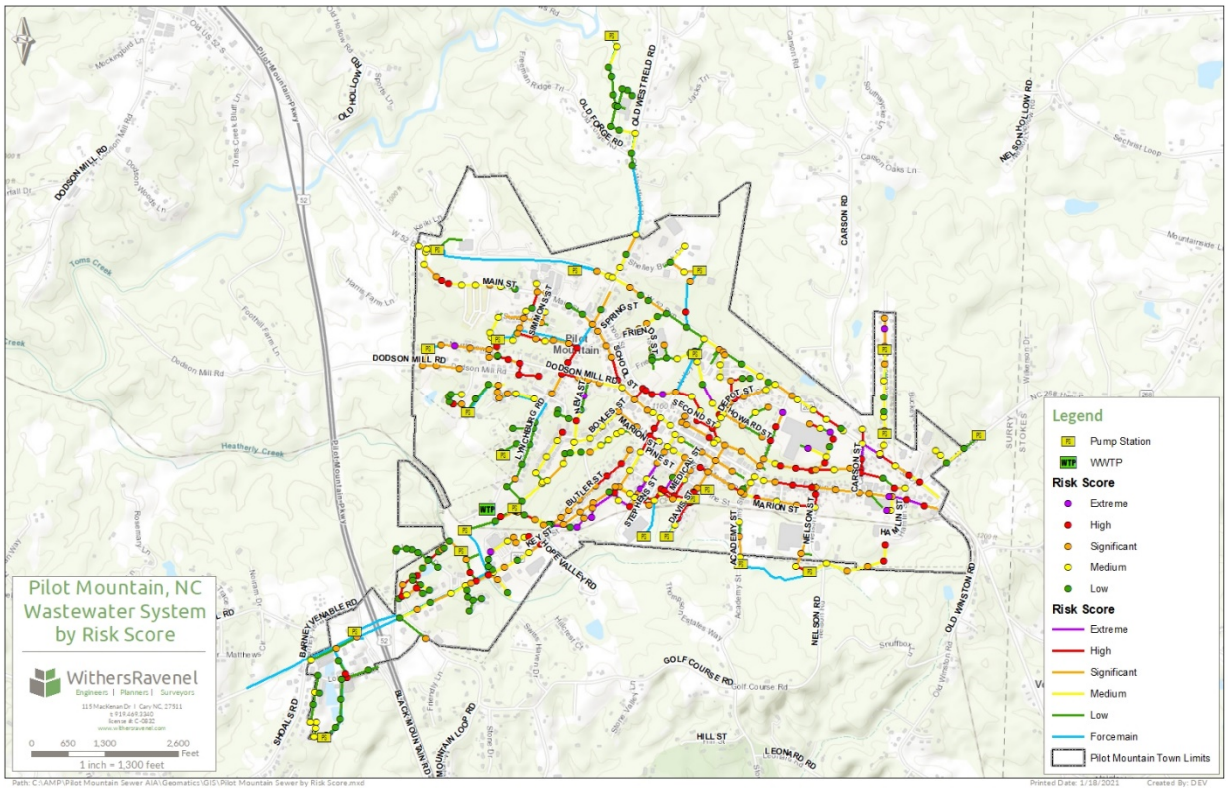


Figure 15. Wastewater system by risk score

7 Sewer System Capital Improvement Plan

7.1 Sewer System Improvements

With adequate data loaded into the GIS along with KPIs and their assigned scores, it is possible to automate a broad, generalized snapshot of prioritized replacement costs based on the results of the risk matrix.

Next, based on an evaluation of many construction bids across North Carolina, the average cost, in respect to pipe diameter, for combined sewer pipe and manhole replacement or trenchless rehabilitation is shown in the table below. These values include soft costs, such as engineering, permitting, and inspection.

Table 5. Gravity sewer replacement and rehabilitation pricing

Diameter (in)	Replacement ($/LF)	Rehabilitation ($/LF)
6	$223	$181
8	$173	$147
10	$184	$155
18	$392	$294
Overall	$184	$155

Using the above values and the percent composition of the gravity sewer pipe diameters, from Figure 5, the overall average cost for combined sewer pipe and manhole replacement is approximately $184/LF and the overall average trenchless rehabilitation cost is approximately $155/LF, including manholes.

Without extensive assessments and evaluation of the sewer, it is not possible to differentiate the assets that are candidates for replacement vs. trenchless rehabilitation. However, it is expected that a high percentage will qualify for less expensive and non-intrusive trenchless rehabilitation. For the purpose of this AMP, it is assumed that 85% of the system will qualify for the less expensive rehabilitation option and 15% of the system will require the more expensive replacement option.

Table 6 below details the total cost of replacement/rehabilitation based on an 85% rehabilitation weighted estimate. Based on the weighted estimates, it would cost approximately $16.8M (today's dollars) to replace/rehabilitate the entire service area.

Table 6. Total gravity sewer replacement or rehabilitation cost by risk category

Risk Score	Percent	Linear Foot	$184/LF	$155/LF	$159 Weighted/LF
LOW	24%	25,809	$4,748,895	$4,000,427	$4,103,664
MEDIUM	26%	27,960	$5,144,657	$4,333,814	$4,445,655
SIGNIFICANT	30%	31,303	$5,759,782	$4,851,991	$4,977,203
HIGH	16%	16,557	$3,046,572	$2,566,406	$2,632,636
EXTREME	4.05%	4,285	$788,514	$664,237	$681,379
TOTAL	**100%**	**105,915**	**$19.49 M**	**$16.42 M**	**$16.84 M**

7.2 Gravity Sewer and Lift Station Improvement Projects

Based on input from the Town staff and the risk matrix scoring, the following projects are recommended for inclusion in the CIP budget for the collection system over the next 20 years. The locations for these projects are shown in **Appendix I**.

1. Offsite Pump Station (No. 18) and Aerial Crossing - $552,000

The pump station components and nearby aerial stream crossing are aged beyond their useful life and are in need of replacement. Due to the vicinity in relation to the adjacent stream and abandoned wastewater lagoon, complete rehabilitation is recommended for the needed repairs on the pump station. Aerial crossings are considered a high priority asset by the North Carolina Department of Environmental Quality (NCDEQ) due to extremely damaging consequences in the event of a failure. Complete replacement of the aerial sewer crossing is recommended immediately.

2. Replace Aged Gravity Mains - $8,300,000

Strategically replace the sewer mains, including manholes, that are in poor condition, starting with the vitrified clay pipes. Pipes have been prioritized based upon the criteria in Table 3 and Table 4, and the results are shown in Figure 13 and Figure 14 for the gravity sewer pipes and manholes respectively.

3. Heatherly Creek Outfall and Pump Station - $2,970,000

The capital project involves the installation of new gravity sewer along Heatherly Creek from the existing Nelson Street Pump Station (No. 12) downstream. A new pump station would need to be constructed at the downstream location of the new gravity sewer. This capital project would replace four (4) existing pump stations with one (1) new station which eliminates three (3) pump stations from the Town's inventory.

4. Upgrade Lola Lane Pump Station - $880,000

This project involves upgrading the Lola Lane Pump Station and installing gravity sewer from the neighbor's Pump Station (No. 16) west along NC Hwy 268 then connect to the existing sewer on Foot Hill Dr. The new gravity sewer will re-direct wastewater previously sent to Neighbors' Pump Station (No. 16) to the Lola Lane Pump Station (No. 17), eliminating the Neighbors' Pump Station (No. 16) altogether.

8 Collection System Operation and Maintenance (O&M) Plan

Operation and Maintenance for the wastewater collection system focuses on upkeep of the lift stations. Maintenance consists of "Emergency Maintenance," which is corrective action needed quickly to keep the system operational, and "Preventative Maintenance," which is routine, scheduled tasks in order to prevent problems before they arise. The items below represent routine maintenance items performed throughout the collection system.

8.1 Lift Station Maintenance

The routine Pump Station Operation and Maintenance Program will include the following items:

- Inspecting, cleaning and removing debris from the pump station structure, outside perimeter, and wet well.
- Inspecting and exercising all valves.
- Inspecting and lubricating pumps and other mechanical equipment.
- Verifying the proper operation of the alarms, telemetry system, and auxiliary equipment.
- Other testing procedures as recommended by the manufacturer.
- Annual flow meter calibration (at a minimum).
- NOTE: Pump stations not connected to telemetry systems must be inspected at least daily. Pump stations with telemetry must be inspected at least once per week.

In addition, a Pump Station Check List Form should be created and utilized for each inspection. The inspection form should cover the following items:

- Check wet well level periodically, more frequently when high flows are expected or have occurred.
- Record hours of running time from elapsed time meters at least once per week and check for equal running times on each pump.
- Inspect control panel switches for proper positioning.
- Test alarms.
- Check valves for proper positioning (valves functioning, normally open valves are open, normally closed valves are closed).
- Confirm valve lever arms and weights are ok.
- Check for unusual pump noise or vibration.
- Check amp readings. Note discrepancies.
- Confirm pumps appear to be seated properly.
- Confirm that no leakage is observed.
- Confirm guide rails and brackets are aligned and fastened.
- Note any rust or loose parts.
- Confirm that piping and valves are not leaking and that bolts and nuts are tight.
- Confirm that any rusty parts have been replaced, cleaned, or painted.
- Record flow rate observed during site visit.
- Check and record pressure gauge readings during observed flow rate. Note any changes from normal readings.
- At least once per week, manually pump down the wet well to check for and remove debris.
- Inspect floats and transducer and cables and remove all debris to insure proper operation.
- Untangle twisted cables that may affect the automatic cycle operation.
- Check control settings.
- If a pump is removed, place the lead pump selector switch on the number of the pump remaining in operation.
- Inspect the pump hand/off/automatic selector switch. Turn to off. Fill up wet well with water until high water is activated. Turn to auto and check if both pumps operate automatically with slight delay between each. Pump until pump shuts off. Fill water until the lead pump starts.

When the lead pump starts, shut off water. Allow pump to lower the wet well until the pump shuts off.
- Check pumps for blockage and any abnormalities in operation.
- Confirm generator is automatically exercising on schedule at start-up. Periodically manually throw main disconnect to check the Automatic Transfer Switch (ATS) and generator operation.
- Cut grass, pick up trash, remove debris, walk around perimeter, inspect fencing, landscaping, look for vandalism or evidence of trespassing or other security concerns.

8.2 Collection System Maintenance

- Clean and video inspect at least 10% of the collection system each year. At the time of cleaning, record the date, location of cleaning, type of cleaning, and other general observations during cleaning (type of debris, quantities, etc).
- Document all Sanitary Sewer Overflow (SSOs) using the State form or other similar form. All spills, reportable or not, must be documented. Spills that are reported to the State should be on the required form.
- Incorporate information from new construction and rehabilitation projects, including line diameter, material, and scoring for other KPIs, into the collection system GIS within one year of construction completion.
- All high priority lines (including aerials, sub-waterway crossings, lines contacting surface waters, lines positioned parallel to stream banks and subject to eroding in such a manner that may threaten the line, and any other segment of the system that is designated as high priority) must be inspected every six months. A log must document the area inspected, the date, method of inspection, and any corrective actions performed or initiated.

9 Water System Overview

Pilot Mountain Water Treatment Plant (WTP) provides day-to-day operations and twenty-four-hour response to distribution system emergencies for Pilot Mountain, North Carolina. The water distribution system totals approximately twenty-six (26) miles of water mains ranging in diameter from 2 inches to 12 inches and in age from new to over 50 years old. The system also includes two (2) high service pumps, one (1) clear well, two (2) active water storage tanks, 201 fire hydrants and over 380 valves. There are no current wholesale customers/interconnections, but a future interconnection to the Town of Mt. Airy is currently under construction.

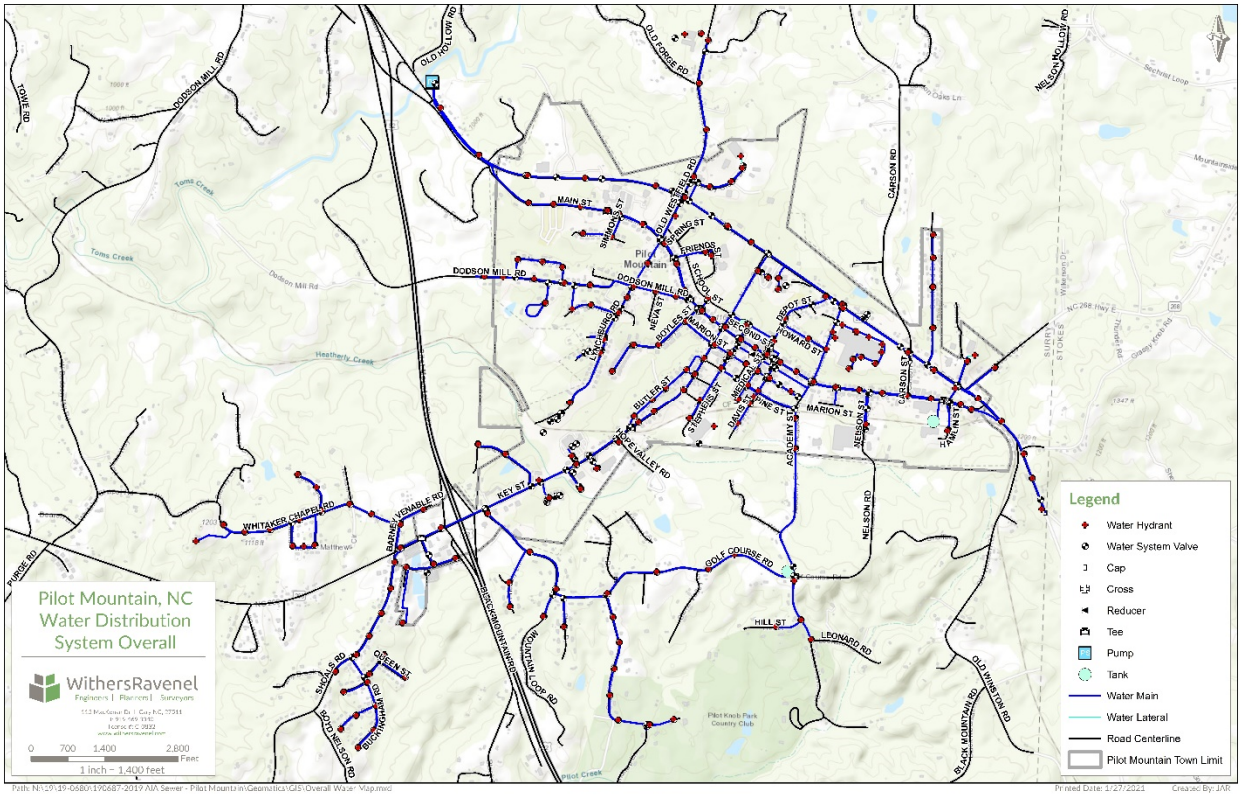


Figure 16. Water system overall map

26 Miles of 2”-12” Water Mains

2 Water Storage Tanks

201 Fire Hydrants

380 Water Valves

9.1 System Evaluation

In the next section, the details of water assets are summarized and evaluated in the context of state and national standards. Table 7 lists the specific North Carolina Administrative Code (NCAC) and Insurance Services Office (ISO) standards against which the Town's system was compared. This is not a comprehensive list of possible evaluation standards, but rather a critical starting list from which the Town can realistically define priorities for their CIP and continuous O&M.

The table also contains the terminology Peak Hour Demand (PHD), Maximum Day Demand (MDD), and Average Day Demand (ADD), which will be discussed in more detail in Section 11.

Table 7. Water system design standards per NCAC and ISO standards

System Parameter	Evaluation Criterion	Value	Design Standard/Guideline
Valves	Number at Crosses	3	NCAC T15A:18C.0907(a)
	Number at Tees	2	
	Number on Hydrant Branch	1	
System Pressure	Minimum, during PHD	30 psi	NCAC T15A:18C.0405(b)
	Minimum, during MDD + Fire Flow	20 psi	
Water Storage	Minimum Combined Elevated and Ground Storage Capacity	1/2 ADD	NCAC T15A:18C.0805
	Fire Flow Volume	Min 75,000 gal	
Minimum Residential Fire Flow, by Distance Between Buildings	> 30 ft	500 gpm	ISO Guide for Needed Fire Flow (2014)
	21 - 30 ft	750 gpm	
	11 - 20 ft	1,000 gpm	
	< 10 ft	1,500 gpm	
Minimum Nominal Diameter	Hydrant Branches	6-inch	NCAC T15A:18C.0901
	Non-Fire Protection Mains[1]	2-inch	

1. Contingent on residence restrictions per NCAC T15A:18C.0002

10 Critical Water Assets

10.1 Water Treatment Plant

The Town receives its water from the WTP, owned and maintained by the Town. The WTP includes a high service pump station which houses 700 GPM and 1,050 GPM high service distribution pumps, and a 5,500 GPM backwash pump, and connects to a 500,000 gallon clearwell. This AMP will not incorporate the improvements required to plant at this time as the Town has plans to decommission this plant.

The Town has a Supervisory Control and Data Acquisition (SCADA) system at the WTP which tracks water level in the clearwell and Golf Course Rd water storage tank as well as other WTP parameters shown in Figure 17.

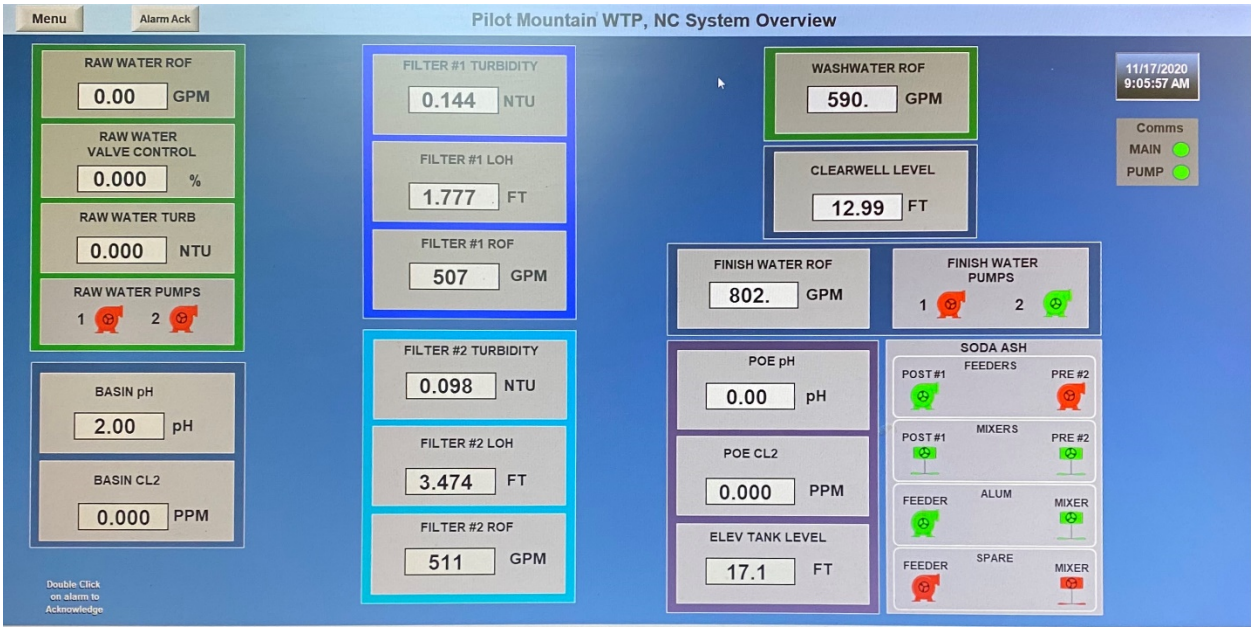


Figure 17. Water treatment plant SCADA screen

10.2 **Distribution Mains**

The Town distribution system consists of approximately twenty-six (26) miles of water mains to convey water from the water treatment plant through the potable water system. Pipe diameters range from 2 to 12 inches and pipe ages range from new to over 50 years. Figure 18, Figure 20, and Figure 21 provide a summary of the sizes, materials, and ages of the water main pipes contained in the distribution system.

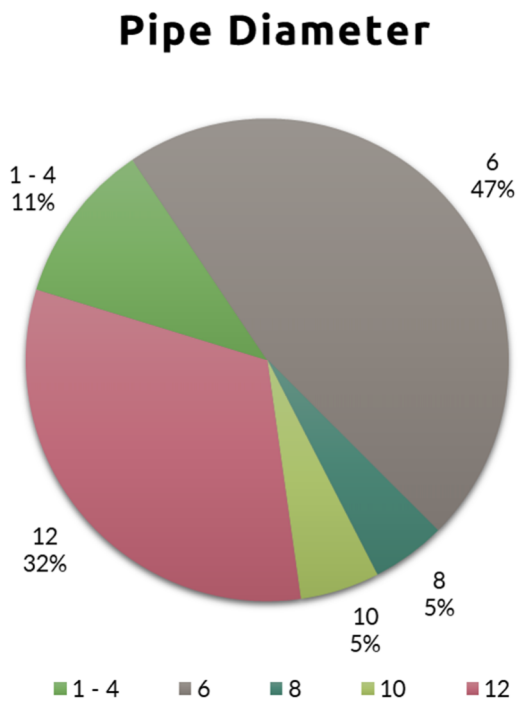


Figure 18. Diameters (in inches) of water mains in the distribution system

As shown in Figure 18, most of the water pipelines are 6-inch diameter. About 11% of the system is comprised of lines smaller than 6-inches or unknown, which is no longer allowed in new water construction designed to carry fire protection flows (see Table 7). Figure 19 shows the water system map by pipe diameter.

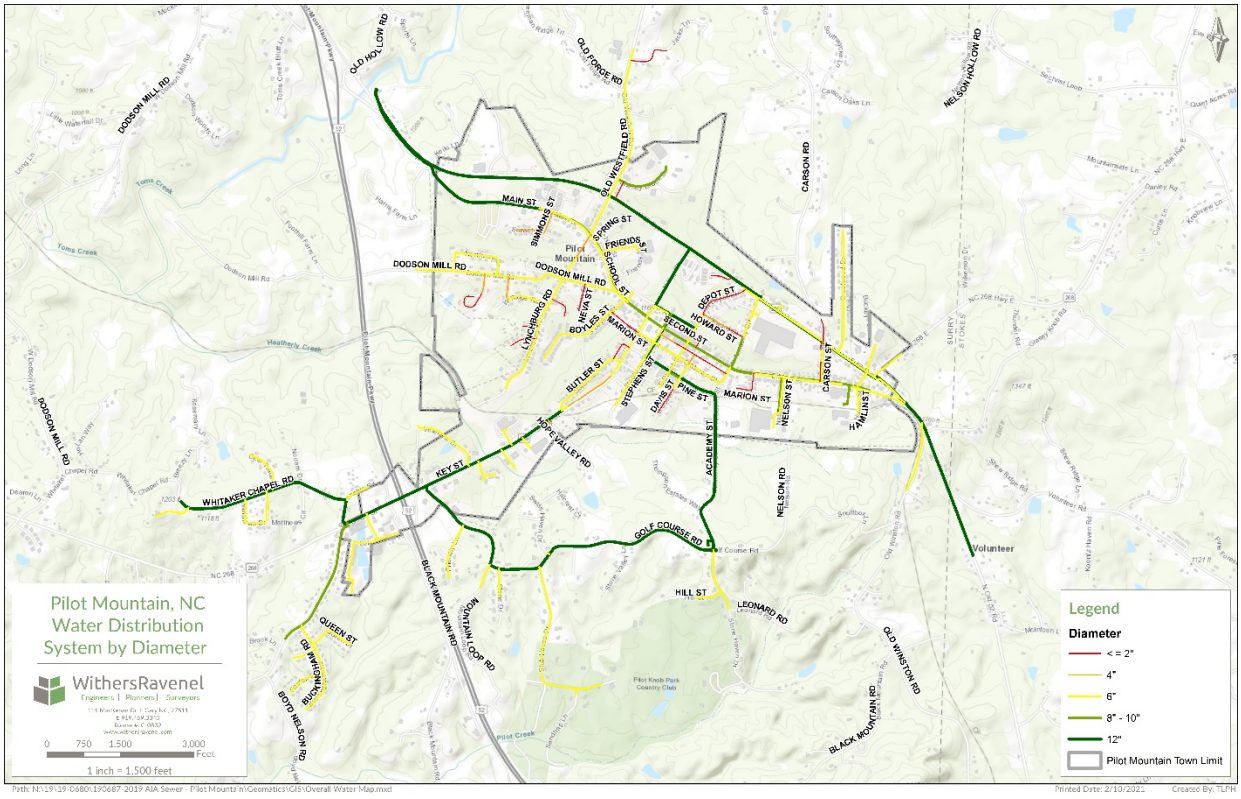


Figure 19. Water system by diameter

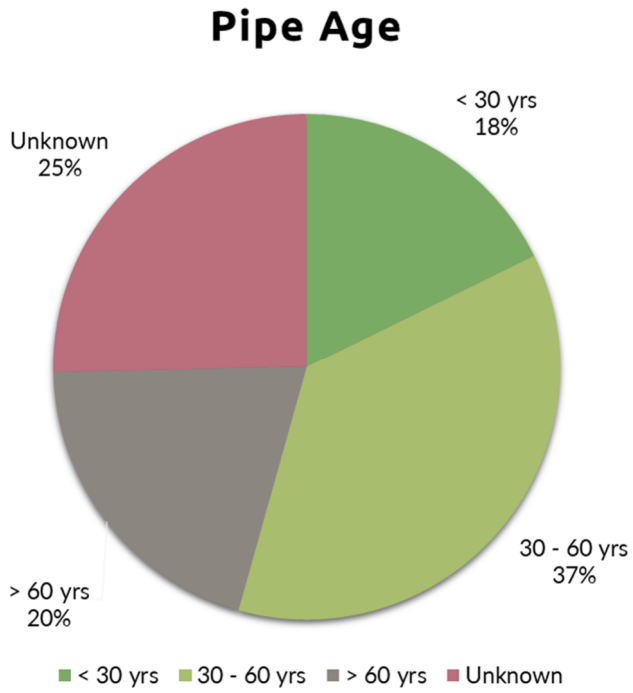


Figure 20. Ages (years) of water main pipes in the distribution system

Figure 20 illustrates the general age of the distribution system pipes and shows that 20% of the lines have been in place for over 60 years, 37% have been in place for 30 to 60 years, and 18% have been in place for less than 30 years. There is an additional 25% of the distribution system pipes for which the general age is unknown and requires future GIS database updates and assessments.

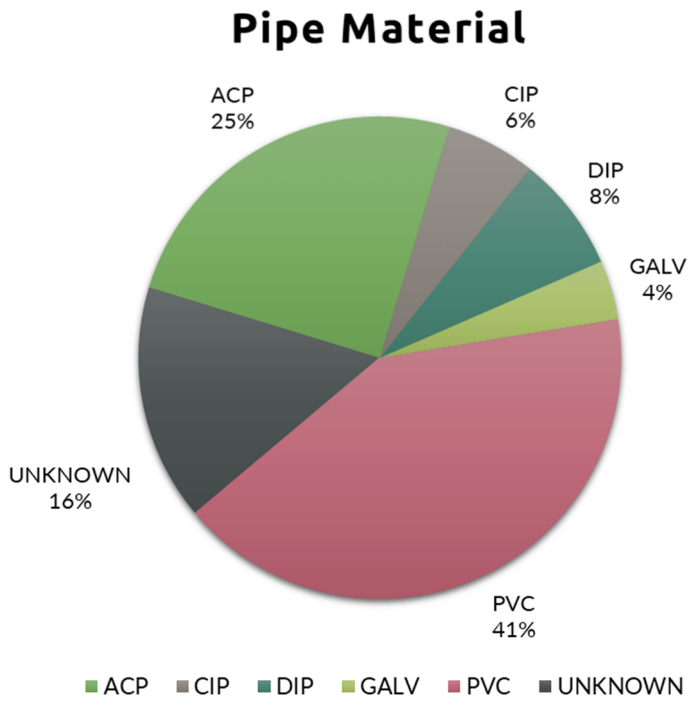


Figure 21. Materials of water main pipes in the distribution system

Figure 21 represents the various pipe materials found in the distribution system. Ductile Iron (DIP) and Polyvinyl Chloride (PVC) represents approximately 49% of the system, and are materials commonly used in new sewer construction projects. Galvanized iron (GALV), Cast Iron (CI), and Asbestos Concrete (ACP) represents 35% of the sewer utility and is typically the oldest and potentially most compromised piping. There is an additional 16% of the system is of unknown material and requires future GIS database updates and assessment.

10.3 **Customer Meters**

The Town serves 1,084 water customers, with residential, commercial, industrial, and institutional usage types. In recent years, the Town overhauled their metering system with installation of an Advanced Metering Infrastructure (AMI). This system is accessible via Mueller's Mi.Net Infrastructure Network and all customer water consumption data since mid-2017 is now available in one-hour increments. In addition to the customer meters, this infrastructure contains eleven (11) permanent repeaters and one small District Metered Area (DMA) for a commercial complex, tracked by an input meter.

Table 8 breaks down the respective meter sizes and annual consumption for these customers. Despite the possible impact of a pandemic on customer behavior usage and patterns, overall annual totals between 2019 and 2020 remained relatively similar. Nearly 91% of the total accounts are served by 5/8" meters while accounting for about 46% of the total demands for 2019 and 2020. In general, customers served through 5/8" or ¾" meters will be residential. Though customers served by 2" meters take up less than 2% of total accounts, this category of user consumes the next highest percentage of total water at about 39%. This is due to the single-largest consumer of water being the Town's WWTP's chemical feed, which is tracked via meter but not billed.

After the WWTP, the next largest individual water users are the recreation center, the Econolodge, New River Tire Recycling, schools, and several restaurants.

Table 8. Number of customer accounts and metered consumption by meter size, 2019 and 2020 yearly totals

Meter Size (in)	Number of Accounts	Percent of Total Accounts	2019 Metered Consumption (MG)	2019 Percent of Consumption	2020 Metered Consumption (MG)	2020 Percent of Consumption
5/8	985	90.9%	31.54	46.3%	31.22	45.8%
3/4	8	0.7%	0.16	0.2%	0.16	0.2%
1	51	4.7%	3.57	5.2%	3.69	5.4%
1 1/2	16	1.5%	5.22	7.7%	4.92	7.2%
2	17	1.6%	26.71	39.2%	26.87	39.5%
3	2	0.2%	0.56	0.8%	0.58	0.9%
4	2	0.2%	0.02	0.0%	0.08	0.1%
6	3	0.3%	0.34	0.5%	0.51	0.8%
Total	**1084**	**100%**	**68.14**	**100%**	**68.10**	**100%**

On a monthly or even seasonal scale for 2019, as shown by Figure 22, customer usage does not have significant variation. Though in late summer/early fall, East Surry High School field irrigation becomes the single-largest water user. This figure additionally shows the monthly WTP production for the year, and the resulting calculated Non-Revenue Water (NRW). On average, 2019 had about 30% NRW, likely lost through a combination of hydrant flushing, transmission leaks, tank overflows, service connection leakage, and non-authorized usage.

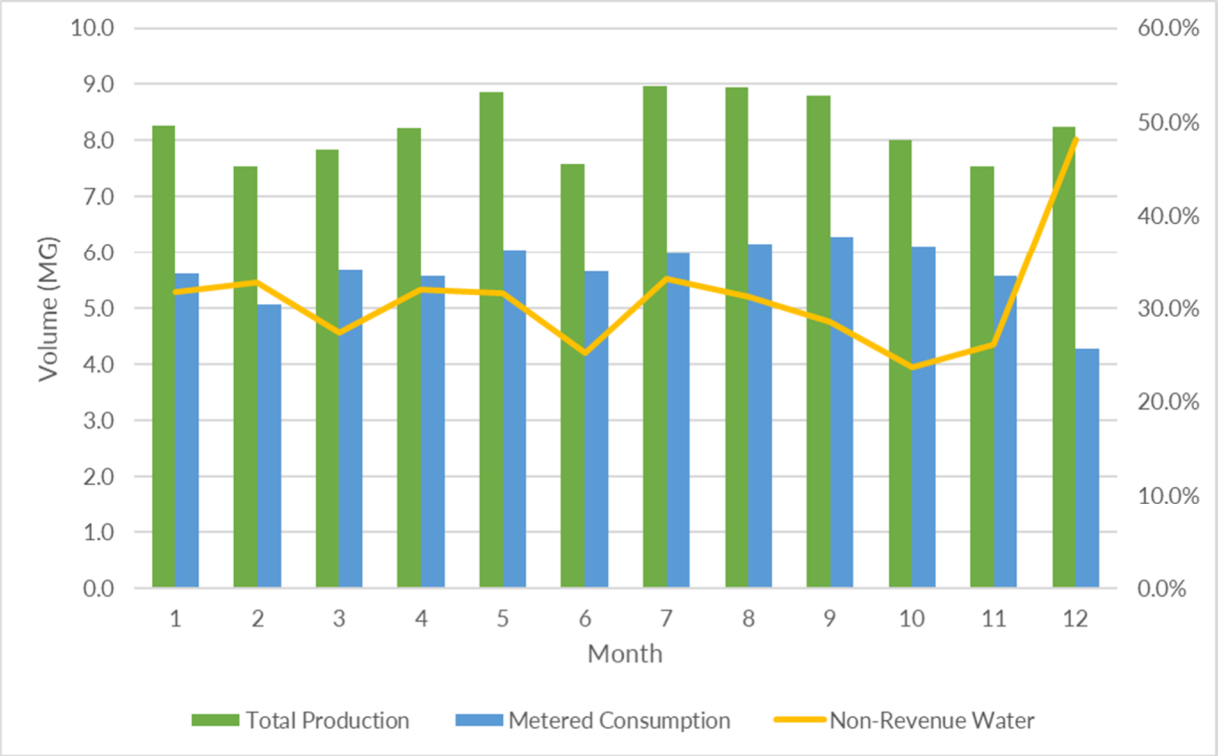


Figure 22. Monthly production, metered consumption, and resulting non-revenue water for 2019

As an additional note, the Mi.Net downloads of monthly or yearly totals is not a strictly accurate representation of aggregate customer consumption. Investigation of the hourly increments of consumption revealed negative values reported at some time steps. These negatives in turn decrease the cumulative consumption registered for the customer. It is not clear if the Town distinguishes between *billed* consumption and *registered* consumption and it is possible the Town is losing revenue when this occurs. Correspondence with Mueller has confirmed these are not meter errors and most likely is backwards flow through the customer meter. The leading suspected cause is low pressures in the system near these customers.

10.4 **Water Storage Tanks**

Finished water storage in the Town consists of two (2) active and one (1) off-line Elevated Storage Tanks (ESTs), in addition to the 0.5 MG clear well at the WTP.

All three (3) ESTs were surveyed by WithersRavenel field crew as a part of this project, to confirm the information collected from previous reports and plans provided by the Town. Information collected during the field survey includes rated capacity, headwater pressure (psi), top of tower tank elevation, bottom of tower tank elevation, foundation elevation, pressure gauge location and elevation, and calculated water elevation.

10.4.1 Field Survey Methods

The field data collection utilized multiple technologies; North Carolina Geodetic Survey (NCGS) Virtual Reference Station, GPS to calculate real time, North Carolina Grid Coordinate Values and

Elevations. To increase accuracy and precision, coordinate, foundation and headwater pressure gauge elevations were determined by using conventional survey instruments to observe common "control points" in a minimum series of 3's and averaging the numbers for a mean value. This method was coupled with "reflectorless" technologies to measure the elevation of the water towers from the ground. The "reflectorless" measurements create a "point" at the top of tower tank and bottom of tower tank to determine the elevations. Once the real coordinate values were applied to the headwater pressure gauge, formulas were used to calculate the water elevation within the tanks.

10.4.2 Field Survey Observations

It was observed that the Second St EST pressure gauge showed a headwater pressure that indicated water stored in the tank. The water elevation calculations showed the water level was in the riser but not in the tank. Upon consultation with the Town and chlorine analysis, it was determined that the tank was not connected to the system and the water housed in the riser was old water that was never completely drained out. The most likely reason for the undrained water may be the manhole used to empty the tank is too shallow and may cause overflows into the apartments nearby.

Table 9. Nominal, measured, and calculated tank geometries

Label	Elevation (Base) (ft)	Elevation (Minimum) (ft)	Elevation (Overflow) (ft)	Elevation (Top of Tower) (ft)	Volume (MG)	Calculated Diameter (ft)
Pilot Center	1,206.10	1,265.98	1,295.10	1,300.10	0.2	34.2
Second St	1,154.89	1,276.63	1,295.11	1,300.11	0.125	33.9
Golf Course Rd	1,196.50	1,257.86	1,297.76	1,302.58	0.5	46.2

Table 9 contains the information gathered from the field survey. The Pilot Center and Second St Tank overflow elevations were assumed as 5ft below top elevation, and the Golf Course Rd overflow elevation was assumed from plans. The Golf Course Rd bowl elevation could not be confirmed from survey due to shape of its riser and therefore was assumed from operational knowledge. The respective elevation of the SCADA level sensor has also not been confirmed.

The Town additionally has observed that filling the Golf Course Rd tank can cause overflows at the Pilot Center Tank, which does not have an altitude valve. The exact conditions and respective HGL at which this occurs remains unknown.

10.5 **Water Valves**

The distribution system in Pilot Mountain consists of nearly 380 water valves to control the conveyance of water throughout the Town. Valve assessments were not performed as a part of this project, therefore existing water valve condition is not formally qualified. Figure 23 shows the location of the water valves. There are twenty-six (26) pipe crosses in the system, and Figure 24 shows the number of valves at each pipe cross. Similarly, there are 279 pipe tees in the system, and Figure 25 shows the number of valves that are found at each pipe tee.

As listed in Table 7, pipe crosses require at least three (3) valves and tees at least two (2) valves at intersections. At least 40% of crosses and 48% of tees are deficient in total number of required

valves. The summary of valves at tees also includes hydrant laterals, and laterals not containing hydrant valves is discussed in the next subsection.

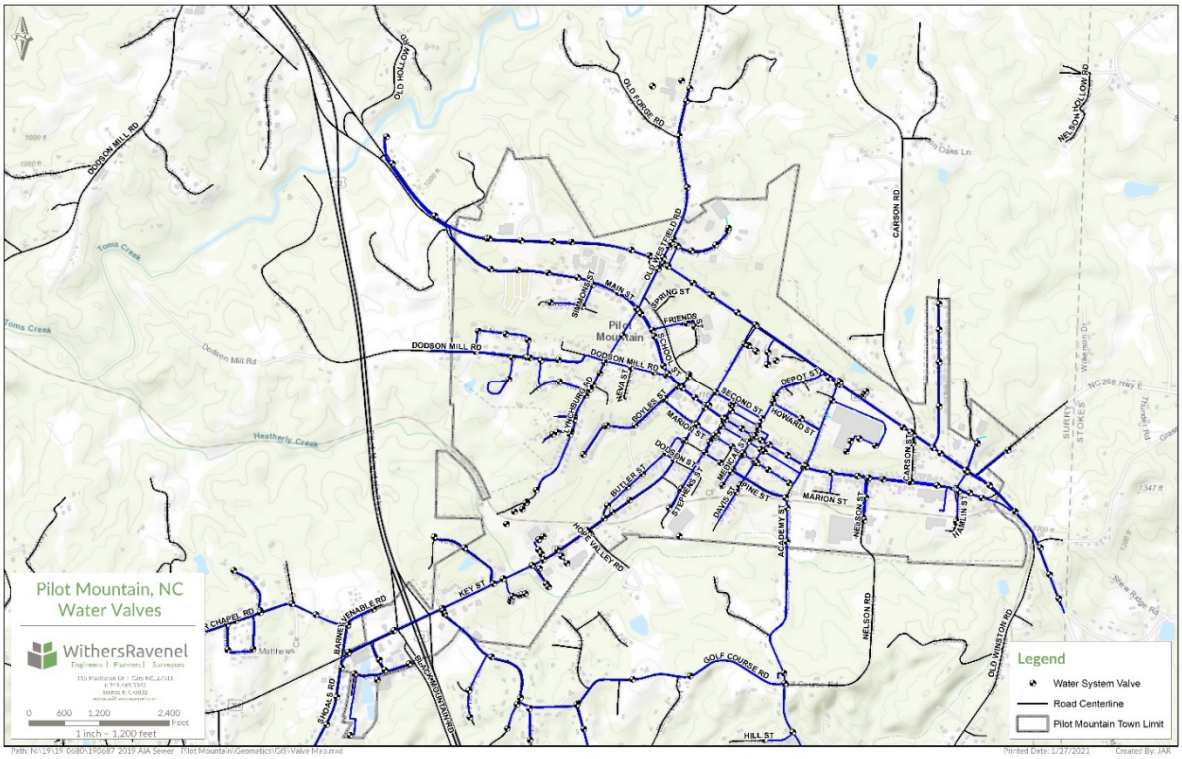


Figure 23. Water valve map

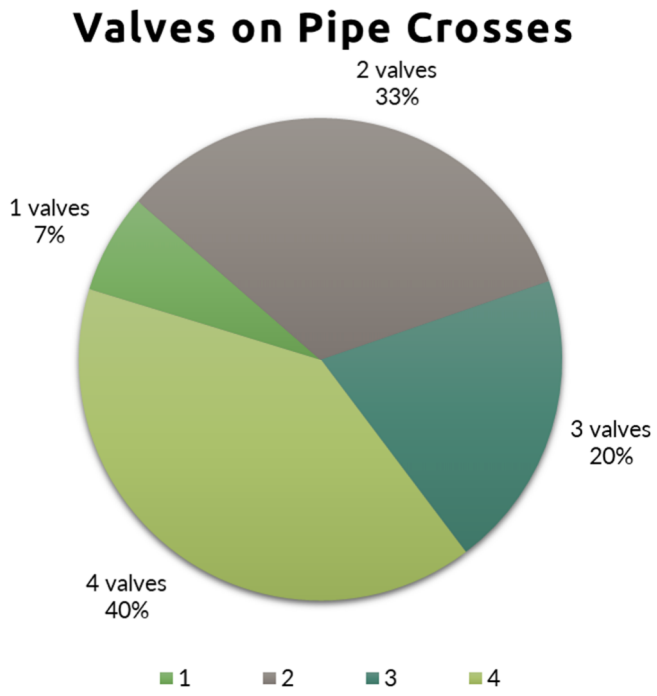


Figure 24. Number of valves on pipe crosses

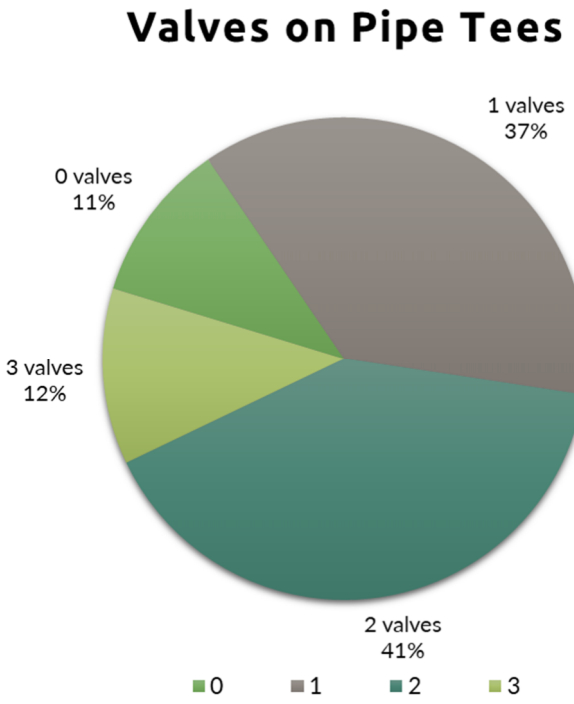


Figure 25. Valves on pipe tees

10.6 **Fire Hydrants and Laterals**

The distribution system in Pilot Mountain consists of 201 fire hydrants to provide fire flow throughout the Town. Verified hydrant brands include American Darling, M&H, and Mueller, with about 30 classified as "Other" or "Unknown". Hydrant conditions were field-assessed, and the results are shown in Figure 26 and Figure 27.

Per NCAC standards (Table 7), hydrant laterals should be a minimum of 6 inches in diameter. Figure 28 displays the locations of laterals in the system which do not meet this design criteria.

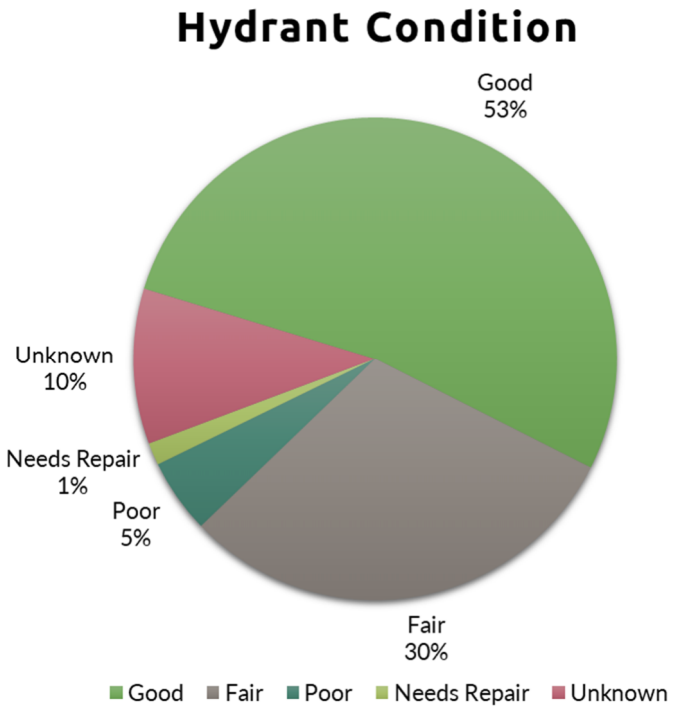


Figure 26. Summary of field-assessed hydrant condition

Figure 26 represents the condition of the fire hydrants in the distribution system and shows 53% of hydrants are in the "Good" category, 30% of hydrants are in the "Fair" category, 5% of hydrants are in the "Poor" category, 1% of hydrants are in the "Need Repair" category, and 10% of hydrants are in the "Unknown" category and require future GIS database updates and assessments.

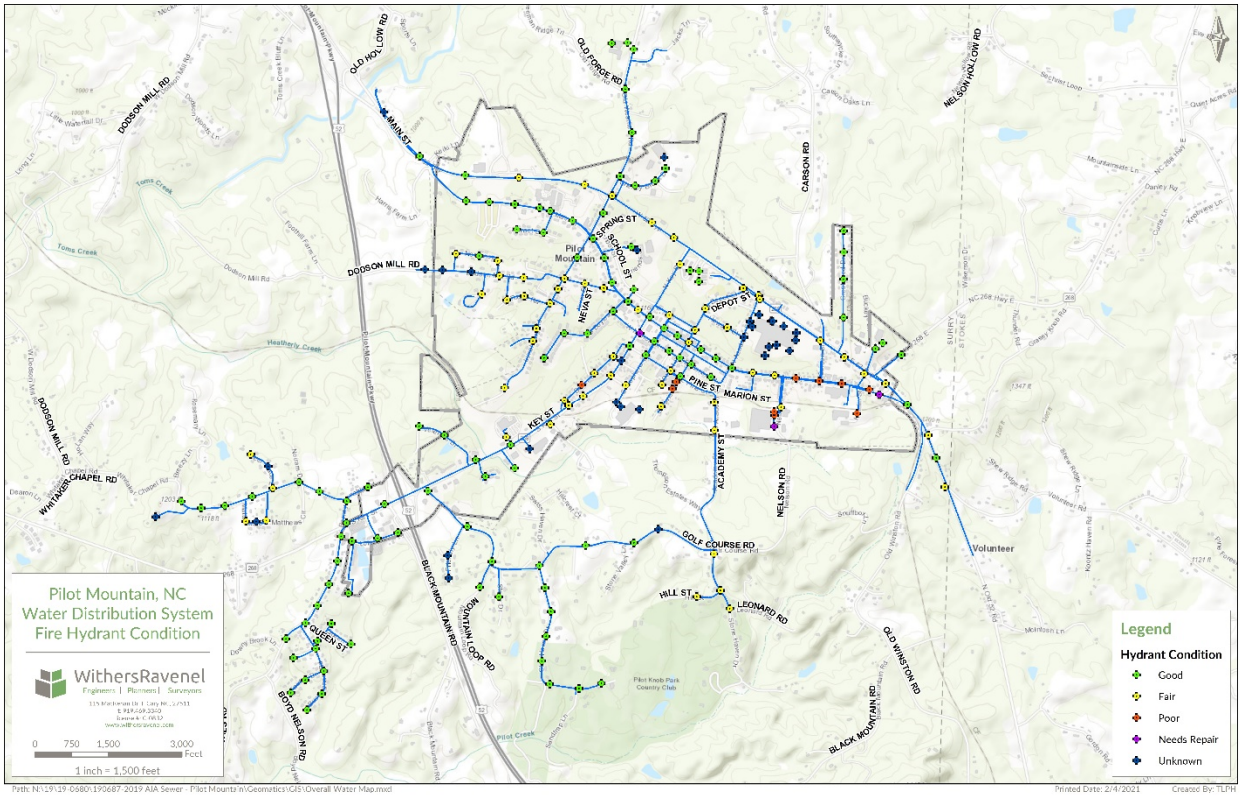


Figure 27. Hydrant condition map

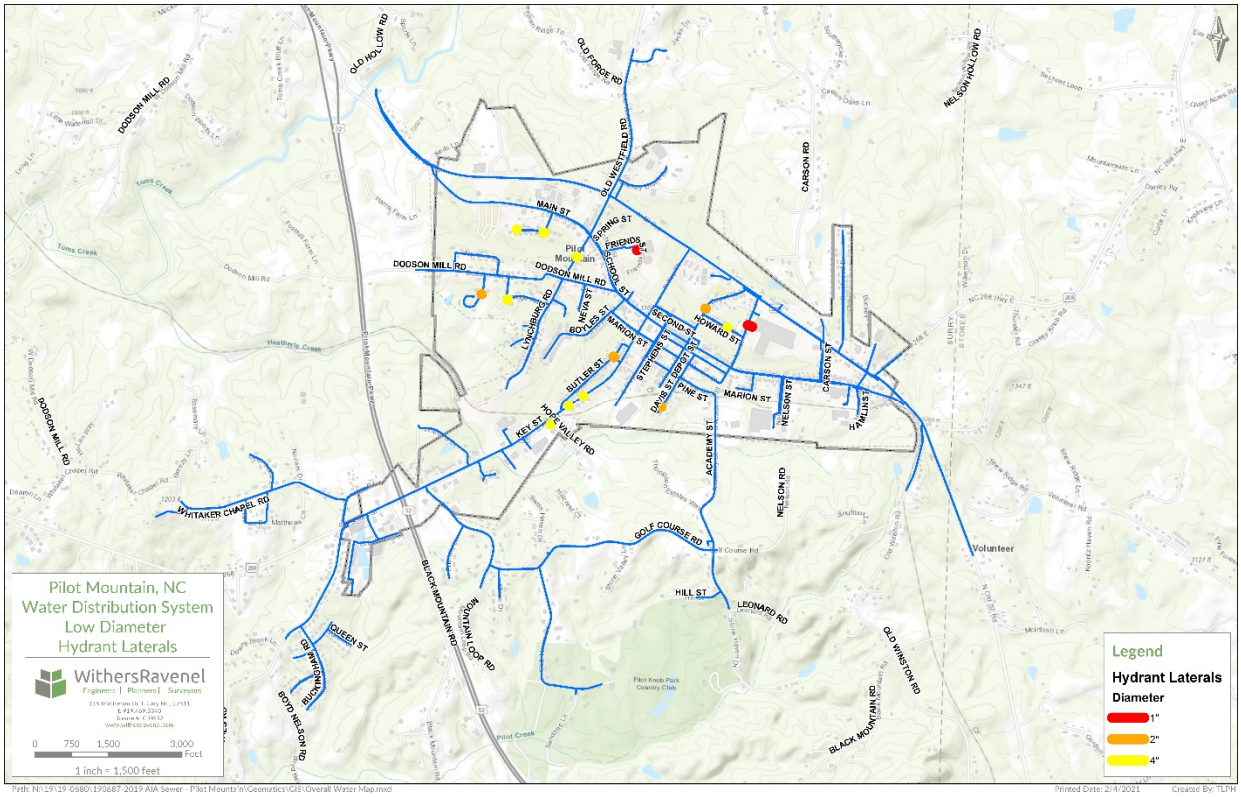


Figure 28. Hydrant laterals less than 6-inches in diameter

11 Hydraulic Water Model

A well-developed and calibrated hydraulic model provides valuable understanding to water utilities. With a model, utilities can understand behavior of their system and its components, and can provide predictive insight into operational changes, impact of improvements, or assess relative efficacy of different operational/design scenarios.

11.1 Model Development

Section 10 detailed a summary of existing infrastructure, system components, and relevant information from which a hydraulic model was built. The first GIS collection effort identified locations and physical characteristics of mains, laterals, hydrants, and valves. Filling in specifics for the high service pumps, WTP pipework, and EST geometries required more Town as-builts, pump manufacturer information, and additional survey for the tanks (see Section 10.4). Mueller provided coordinates for the customer meters.

The physical characteristics of the system loaded into the model are as follows:

- Mains and laterals: diameter, length, connectivity, and age and material when available
    - Age and material guide initial estimates of Hazen-Williams C-factor, a representation of pipe condition.

- WTP: internal piping from clear well to distribution system, pump and clear well locations and elevation, and pump manufacturer curves
- Hydrants: elevation and connectivity
- Valves and fittings: type, elevation, and connectivity
- Tanks: geometries summarized in Table 9
- Customer meters: elevation, assumed connectivity, and user demands (to be explained below)

Bentley's WaterGEMS was selected as the modeling software and system GIS was directly imported to form the hydraulic model. Each system component has a unique Facility ID and therefore the model has 1:1 connectivity with the GIS database. This also enables streamlined future updates to the model as infrastructure is repaired, replaced, constructed, or abandoned. The only difference between the model and the GIS database is the model does not include a small number of private-owned assets that field crews collected information on.

11.1.1 Data Collection

After the physical characteristics of the system have been built in the model, the next phase entails collecting the data which drives the model. Water enters the model via a reservoir (here the clear well), the rate and volume at which it enters determined by pump operations, and system volumetric turnover formed by customer usage and NRW demands. The system pressure/HGL is therefore predicted from how tanks respond to operations and demands, as well as the pipe network connectivity, capacity, condition, and respective elevations.

11.1.1.1 System Operations

Meetings with the Town's staff provided a general guideline to their system's operations. Of the two WTP pumps, the 1050 gpm pump is typically run most of the time and the 700 gpm pump run only for maintenance purposes. The pump is typically run Mondays, Tuesdays, Thursdays, and Fridays, and is off completely Wednesdays and the weekend. Their SCADA monitors the clear well and Golf Course Rd tank elevations relative to the sensors. As discussed in Section 10.4, the exact operating HGL of both the Golf Course Rd and Pilot Center tanks has not been confirmed.

Additionally, staff performs hydrant flushing on a continuous basis.

11.1.1.2 System Pressures

Anecdotal information from the Town indicated generally low pressures in the system unless the pumps were running. Ends of the system have had observed low pressures, especially during hydrant flushing.

Hydrant pressure recorders (HPRs) can be attached to hydrants and collect pressure data on a minute-by-minute time stamp for as long as they are installed. Three HPRs were originally installed throughout the Town, with one at the high school, one on North View Dr, and one at the conference center. However, the conference center HPR was turned off shortly after

installation and therefore was unable to collect any data. Figure 1Figure 29 shows the locations of the remaining two HPRs.

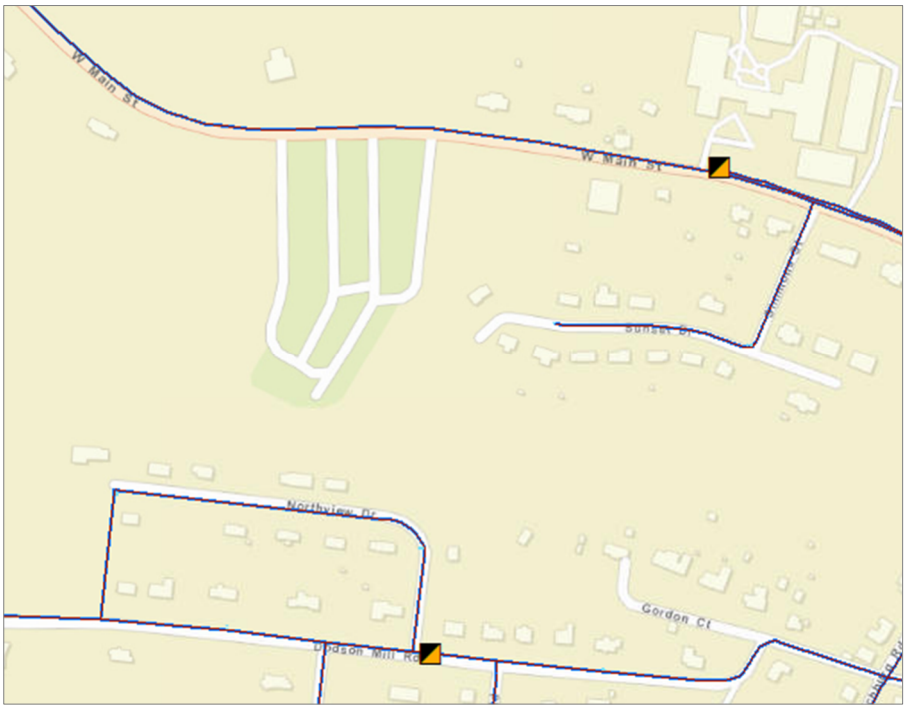


Figure 29. HPR installation locations

The HPRs were set out to collect data from October 7th to 20th in 2020, as shown by Figure 30. These two timeseries roughly follow the same pattern as each other, where pressures increase when the pump is running, and slowly decrease when the pumps are off and the tanks control the HGL. There are several brief, but recognizable drops in pressure. The high school HPR, which is on a direct distribution main, shows the transient impacts of the pump turning on and off. The North View Dr HPR has pressure impacts from pump transition status, and also has some pressure drops when the system is draining slowly. These could possibly be from localized impacts of hydrant flushing, customer usage, or even leaks.

This pressure data also indicated pump activity over the weekend when the pump is typically not run. Correspondence with the Town confirmed the change in typical operational patterns.

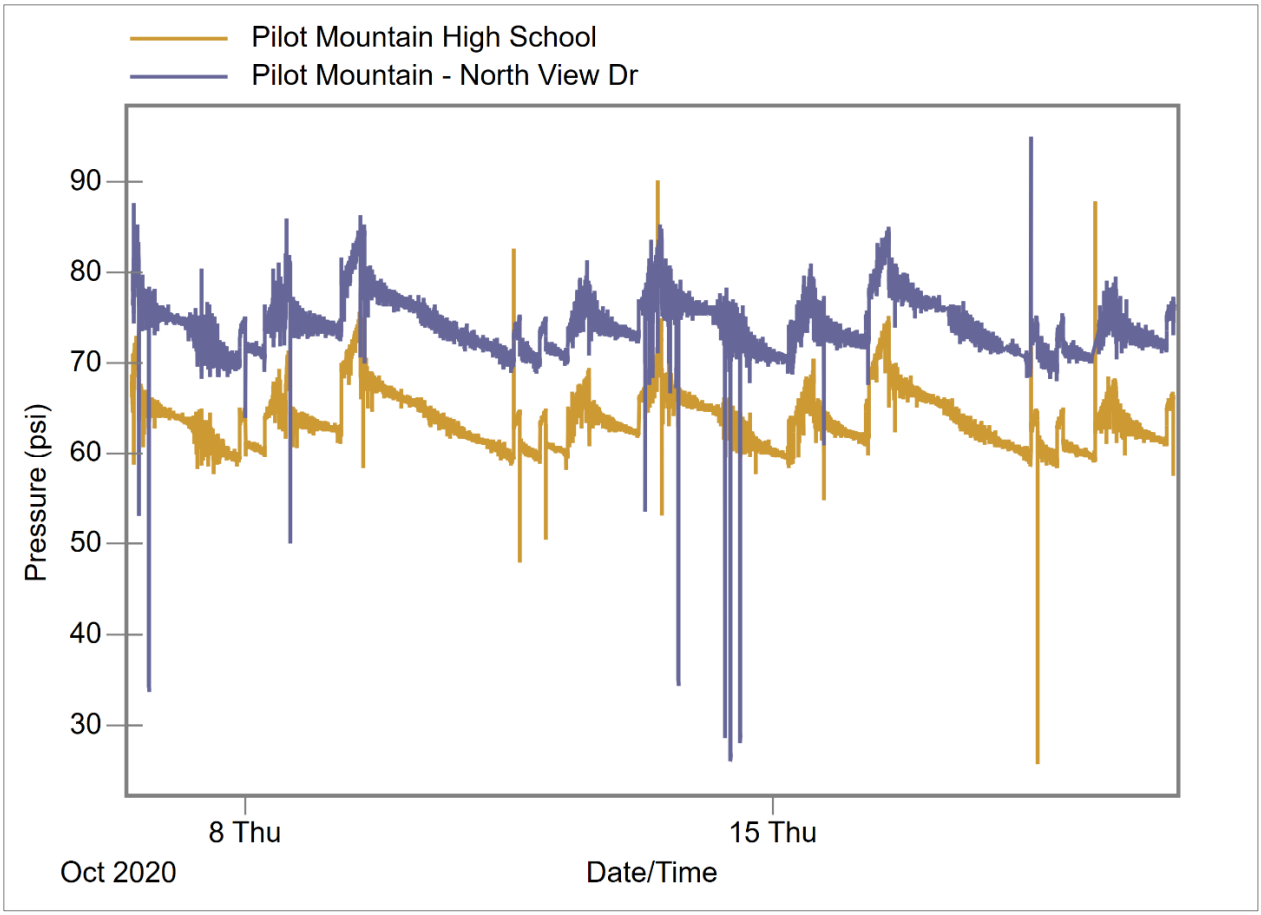


Figure 30. HPR data collected from Oct 7th to 20th.

11.1.1.3 System Water Demands

Section 10.3 outlined customer meter information and monthly/annual consumption totals. For model development and calibration, customer information should be obtained to correspond with the same period of collected field data (in this case HPR data). Through the Mi.Net interface, hourly consumption for all 1084 accounts was downloaded and imported into the model. User demands in the model have two setting options: 1) a "fixed" demand that withdraws water at a consistent rate, or 2) a pattern with multipliers to represent historic usage. Figure 31 shows an example of a residential customer's usage pattern over the model simulation period, which has clear diurnal patterns of higher water usage in mornings and evenings. Each customer's historic usage and pattern for the HPR collection period was assigned to each meter within the model.

Figure 32 shows how the WWTP's water usage appears in the model during this collection period. Typically, the WWTP is operated continuously, but after seeing the gap in flows, the Town confirmed the WWTP was off-line one day for water line work.

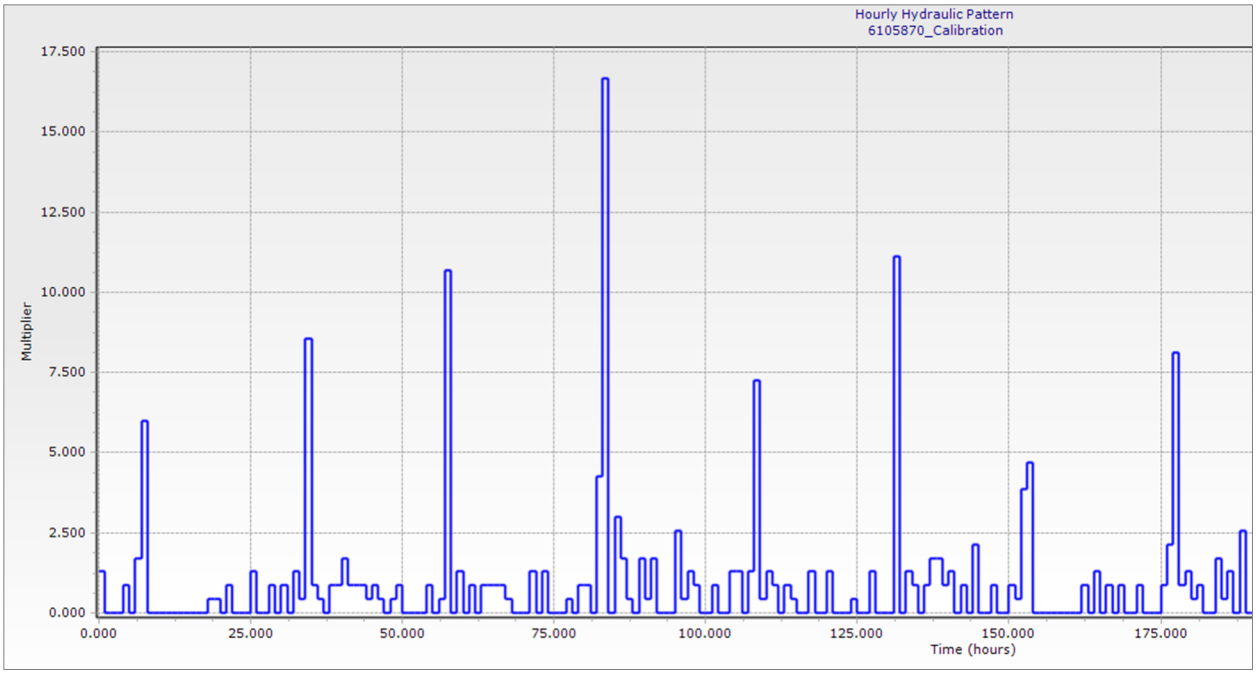


Figure 31. Example residential customer demand multiplier

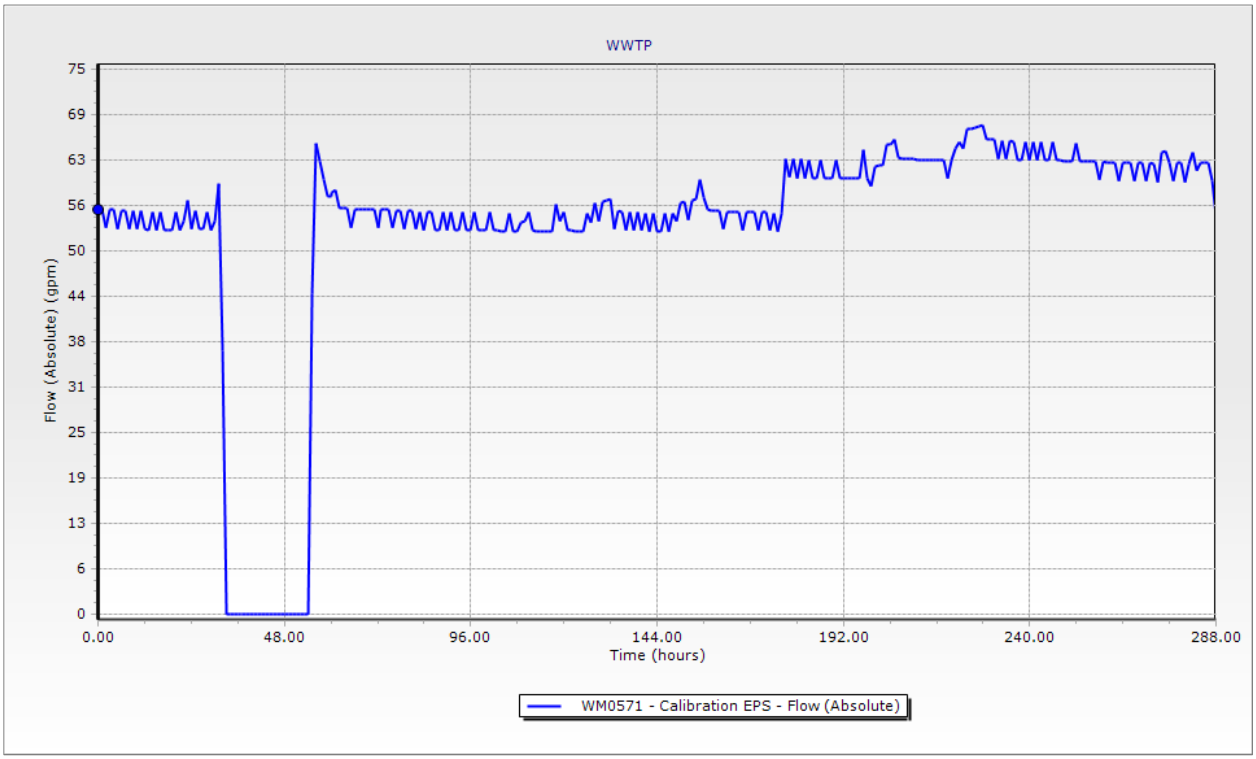


Figure 32. Modeled water usage for the Town WWTP

After customer data is accounted for in the model, remaining system demands consist of NRW as the Town does not have wholesale water customers. The Town provided daily water

production values measured at the WTP meter for this period and when compared to metered consumption, NRW is approximately 58%. This is considerably higher than annual NRW calculated in Section 10.3 and is discussed further in the next section.

11.2 **Model Calibration**

Model calibration is an iterative process where model inputs and parameters are adjusted to find agreement with field measurements. With a reasonably-calibrated hydraulic model, pressures, flows, and tank levels can be predicted for a range of scenarios. The simplest calibration is a steady-state (SS) calibration, which is a simulation for a given moment in time. SS models rely on specific demand definitions such as Average Day Demand (ADD), Maximum Day Demand (MDD), or Peak Hour (PH). The NCAC defines MDD as average of the two highest days of record, but both ADD and MDD values vary depending on availability of historic data. Extended Period Simulation (EPS) is a series of SS simulations connected to estimate system behavior over time, which requires defining rules for pump operations and tank response. With a model simulation over a sufficient period, an EPS model also contains multiple demand conditions.

A model calibration is subject to inherent uncertainties of a distribution system. Without extensive and complete field testing of all system components, such as hydrant flow tests at all hydrants or comprehensive valve tests, condition and/or performance of all components may not be completely accurate on a localized scale. However, with both AMI and HPR data, the sources of uncertainty for model parameters are significantly reduced. Parameters that were adjusted were pipe roughness (C-factor), pipe open/close status (to represent closed valves), and NRW.

Though NRW was calculated from production data, the accuracy of the WTP meter is suspect. Adding NRW as a demand through the system at the full 58% caused the two tanks to drain within days and caused system pressures to plummet to unrealistic values. However, adjusting the NRW to too low of a percent causes the tanks to not drain enough to match the observed decline in HGL monitored by the HPRs. One possible explanation is a broken check valve at the pump station, and flow re-entering the clear well interfering with SCADA readings and causing drops in HGL. Additionally, the NRW was distributed evenly throughout the system assuming leakage through customer connections. If instead NRW was due to significant hydrant flushing during this period in October, detailed logs of flushing volume, duration, and location would have been needed for the calibration period. Lastly, there could exist several key locations of long-term leaks, which to model accurately would require calibrating emitter coefficients and pressure-dependent demands.

Ultimately, a balance of pressure dependent NRW distributed through the system resulted in a final calibration which drops the predicted HGL low enough compared to observed HGL without completely draining the two tanks. These results are shown in Figure 33 and Figure 34.

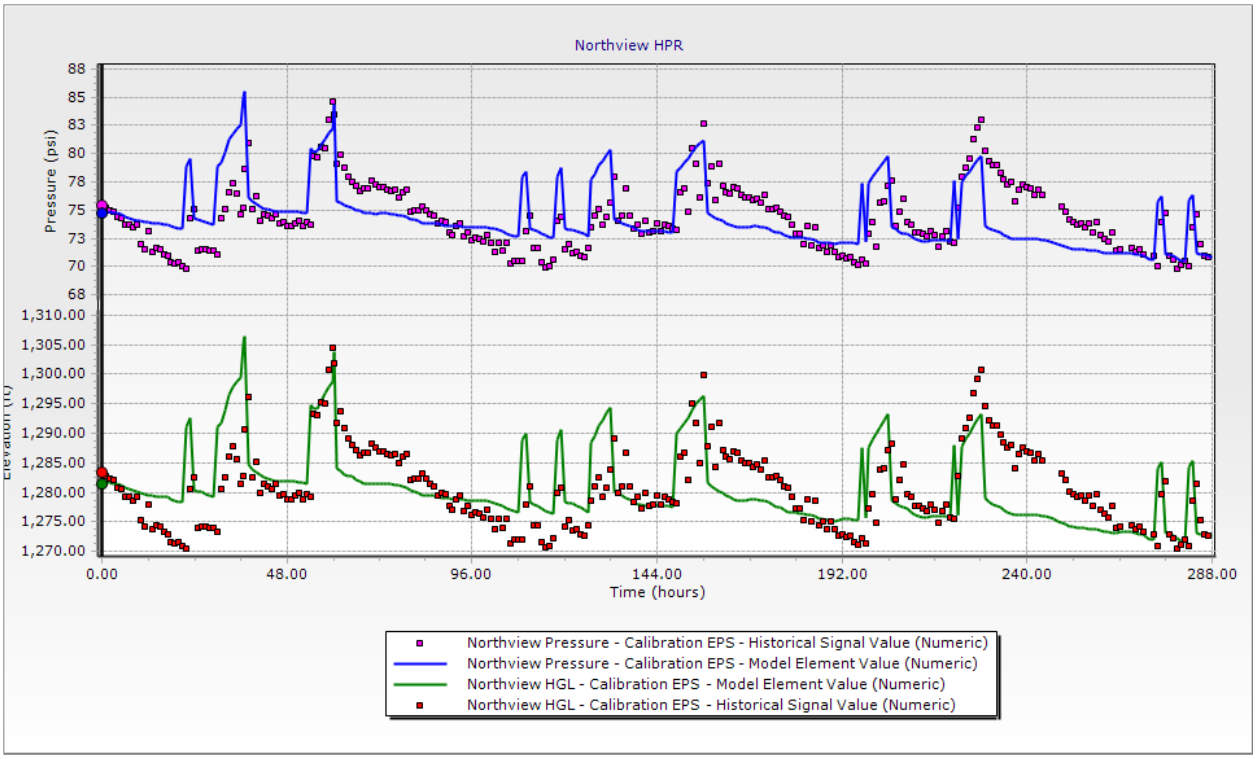


Figure 33. Model-predicted versus observed pressure and HGL at the Northview Dr HPR

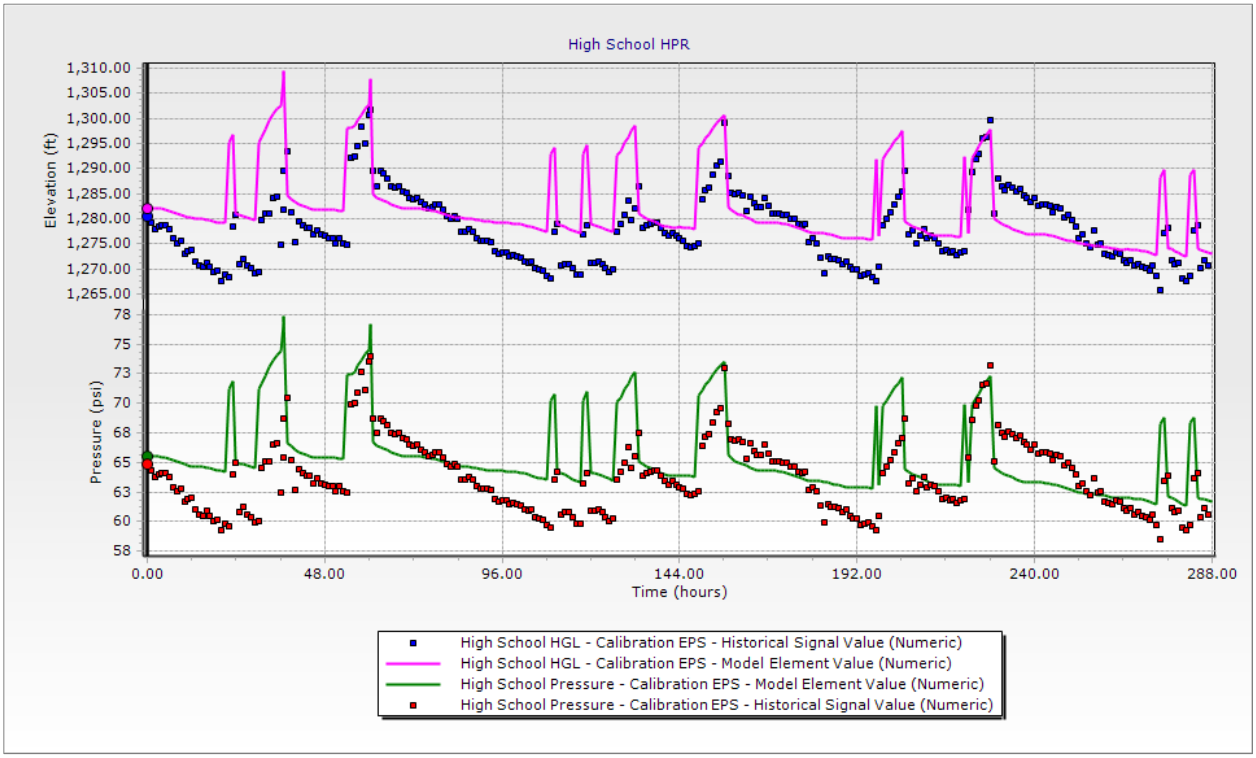


Figure 34. Model-predicted versus observed pressure and HGL at the High School HPR

11.3 Model-Predicted System Performance

System performance was compared against the standards listed in Table 7. Though tank storage is listed as a criterion, it is presented for discussion purposes only as the Town has ample storage (Table 9) in comparison to customer demands (Table 8).

11.3.1 System Minimum Pressure

In an EPS simulation, the model calculates pressure at every junction (valve, fitting, hydrant) for every time step of the simulation. Minimum pressures are a result of conditions leading to low system HGL, which will involve a combination of peak demands, pump settings, and tank levels. For this system, minimum system pressures occur when the pump has been off for some time and the tanks are at their lowest levels.

Figure 35 shows the model-predicted pressures at the minimum HGL. As storage tanks are typically built at the higher elevations of the system, it is not unusual to see lower pressures for these two parts of the system. Conversely, lower parts of the system will have higher predicted pressures unless model settings have been otherwise adjusted based on field data. As seen in Figure 33 and Figure 34, the model does not have the exact conditions of NRW defined such that the model can predict pressures low as observed by the HPRs. Figure 35 can offer insight into possible leak locations where pressures are 100+ psi. The low point along Key St specifically is an area worth further investigation. AMI data showed customer meters with reverse flow in this area, and the Town already has one DMA set up for a commercial complex here with known issues.

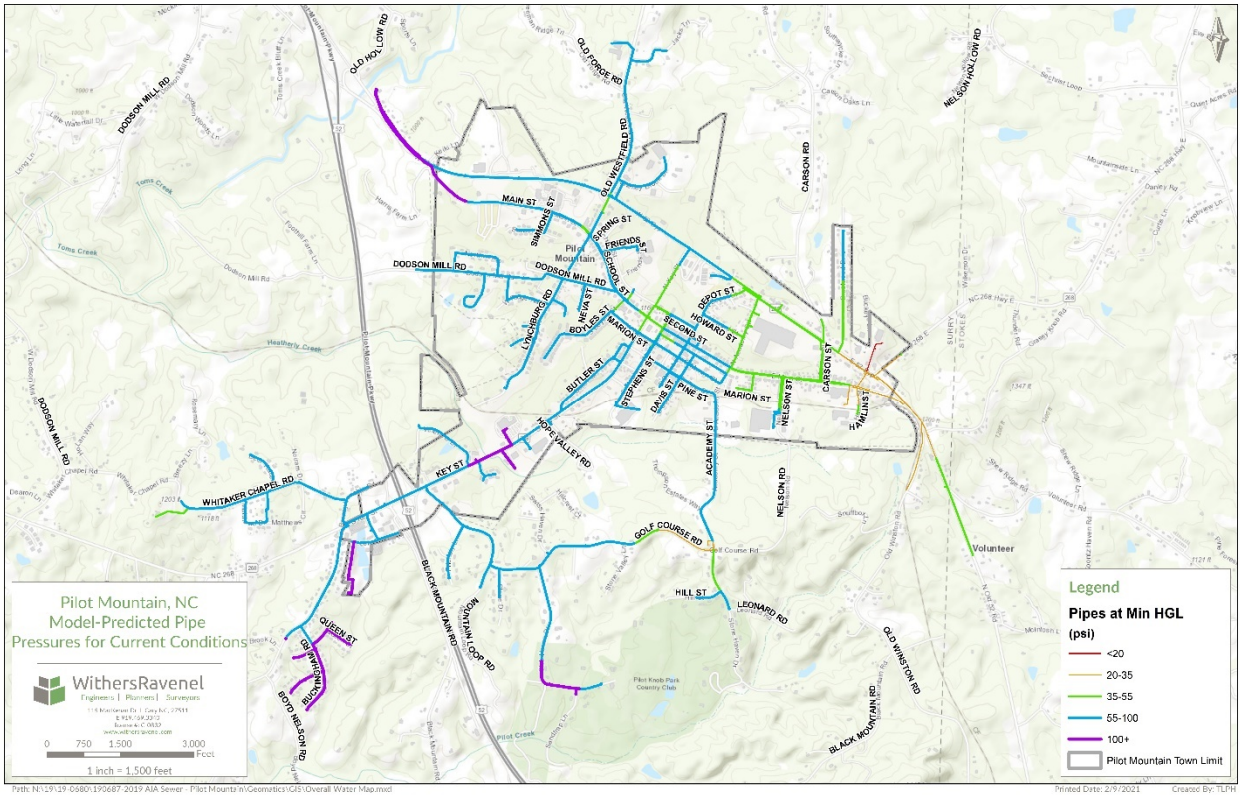


Figure 35. Model-predicted pipe pressures for current system conditions

11.3.2 Fire Flow Analysis

WaterGEMs contains a fire flow analysis tool which predicts available fire flow per hydrant subject to a specified minimum residual system pressure (20 psi per NCAC). The model will iteratively test a required fire flow demand on each individual hydrant and calculate system pressure response until an upper limit is reached or pressure drops below the defined minimum. Required fire flow demand per ISO standards will vary depending on customer type, building characteristics, and on-site fire protection. As most Town customers are residential, Table 7 and the model fire scenario focused on examining theoretically available residential fire flows.

Figure 36 displays the model-predicted available fire flows for the system and Figure 37 breaks down the percentage of hydrants in each flow category. Over half of the system hydrants are predicted as not able to meet at least 1,000 gpm of fire flow. These values are more than a function of available tank storage (which is not restrictive for this system), but also sensitive to transmission pipe diameter, pipe condition, and possible routes of flow. Though the model predicts generally high pressure for many parts of this system, residual pressures quickly plummet once a fire flow demand (>500 gpm) is tested. The south and west part of the system is particularly sensitive as Key St does not have a large diameter connection to downtown (Figure 18) and many parts of the system do not have looping for redundancy.

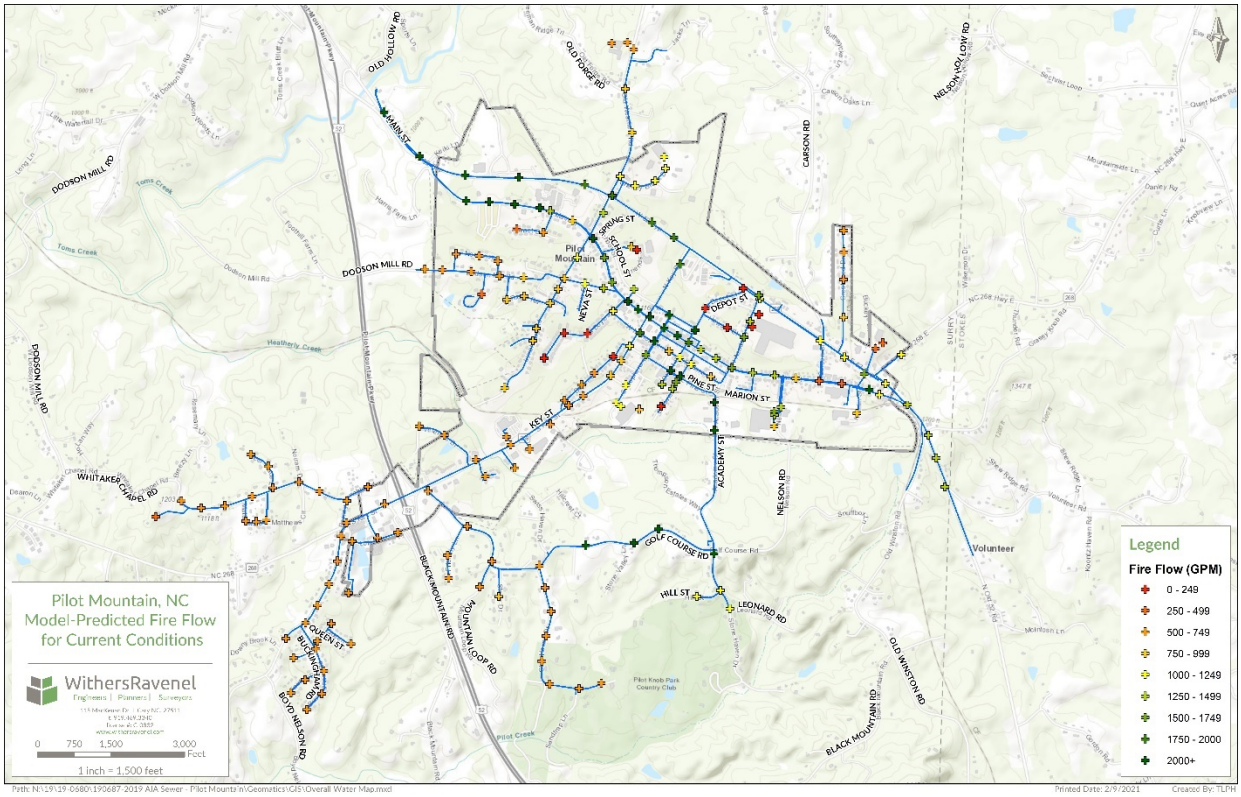


Figure 36. Model-predicted fire flow availability for current system conditions

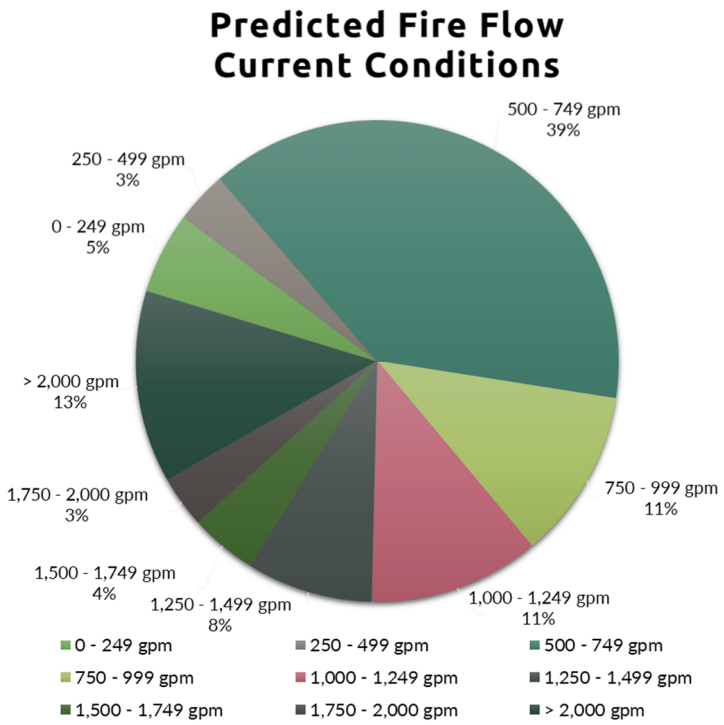


Figure 37. Distribution by category and percent of hydrants for predicted fire flow for current conditions

11.4 **Model-Predicted Performance for Future Conditions**

As stated in Section 10.1, the WTP will be decommissioned and the Town will be connected to the City of Mount Airy distribution system via PRV and about 3.5 miles of new 12-inch transmission main. This planned design is shown in Figure 38 and the calibrated hydraulic model was adapted to model this future scenario.

Figure 38. Planned design for new connection to City of Mt. Airy

11.4.1 Proposed Improvements

11.4.1.1 Tank Improvements

The pressure setting for the future PRV will depend on the state of the Pilot Center tank. Currently the tank does not have an altitude valve to control rate of inflow and historically will overflow. It is recommended to have an altitude valve installed to not only prevent wasting purchased water via overflows, but also to allow more flexible and efficient usage of the PRV.

It is also recommended to recalibrate the SCADA and level sensor for the Golf Course Rd tank. It will be important to set the PRV to open or close based on tank levels to enable cycling for water quality purposes. Additionally, the Golf Course Rd tank as-builts were not detailed enough to confirm characteristics of drain and fill lines, but it is assumed water is Last In, First Out (LIFO). Therefore, it is recommended to install a tank mixer to reduce water stratification and improve water quality.

11.4.1.2 Pipe Improvements

The future conditions model also incorporated pipe improvements, which included:

- All hydrant laterals improved to at least 6-inch diameter.
- System mains have been repaired, cleaned, or replaced to C-factor of 120.
- Strategic upsizing of existing mains

- One section of pipe extension

Figure 39 displays recommended main upsizing and extension projects around the Pilot Center Tank. As what will be discussed in Section 12.2, this area has model-predicted low pressures and old cast iron pipe, which leads to a higher priority for replacement. Considering conclusions from fire flow results about looping and transmission main sizing, this offers an opportunity to connect the two tanks directly with a 12-inch main (currently flow between two tanks must travel through 8-inch or smaller at some point). Then with upsizing an existing 6-inch on Burlington Lane, another major transmission loop will be improved with the connection to the existing 12-inch on East 52 Bypass. With improved looping and distribution pathways, the purchased water through the PRV will be used more efficiently in the system.

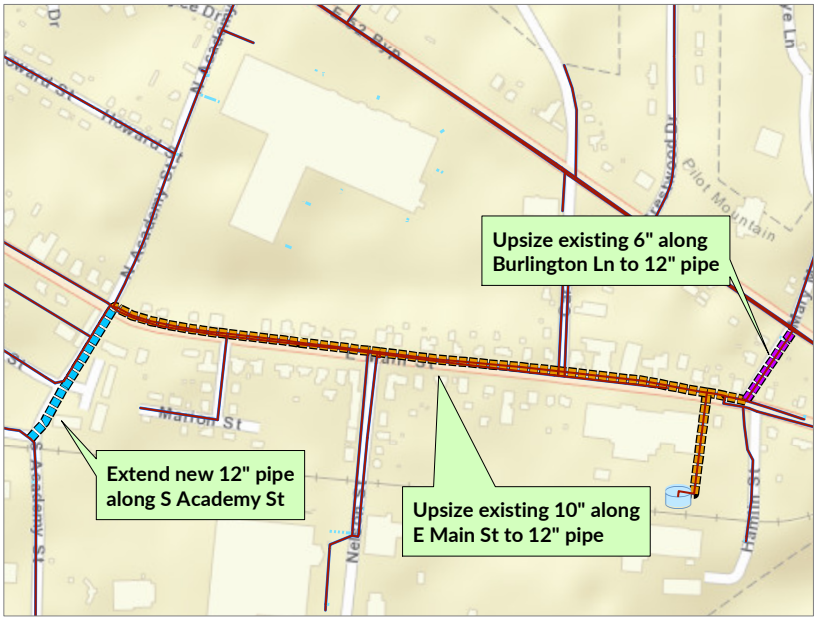


Figure 39. Proposed pipe improvement projects near Pilot Center tank

11.4.1.3 PRV Operational Settings

The exact HGL at which the Pilot Center tank will overflow is not known but is assumed as 1295 ft based on other field-verified elevations (Table 9). Therefore, there are two possibilities for PRV settings:

1) No altitude valve for Pilot Center tank: PRV setting << Tank HGL
2) Install altitude valve: PRV setting >> Tank HGL

Correspondence with the City of Mount Airy established a predicted available pressure of 150 psi at the proposed connection point, therefore with a new altitude valve, there is flexibility for potential PRV settings.

Figure 40 shows an example of flow through the PRV and respective tank levels. This is for a hypothetical PRV setting of 1350 ft HGL (or 93 psi) and the PRV closing shortly after the Pilot

Center tank fills completely. This mimics current WTP operations where pump status follows tank levels.

This is a generalized representative setting; real-world operations should enable full tank turnover every 3-7 days per Environmental Protection Agency (EPA) recommendations (EPA, 2002).

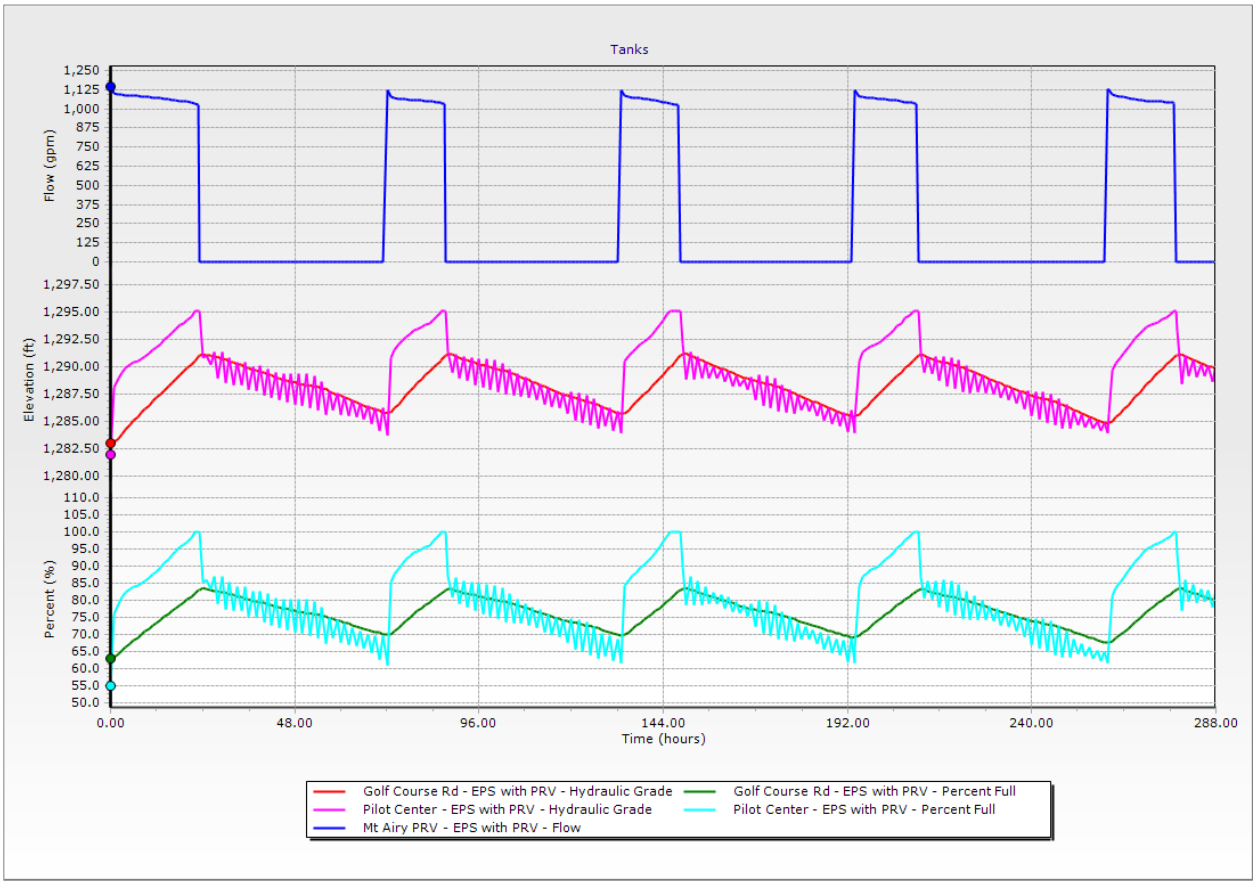


Figure 40. Predicted flow through PRV and tank levels for future system conditions

11.4.2 Future System Minimum Pressure

Figure 41 shows an updated version of Figure 35 with the recommended improvements and future conditions described in the previous subsection. Overall, more sections of the system have either higher or completely optimal (55+ psi) pressures. When a more formal investigation into NRW has been completed, the model can be further refined to predict system behavior more accurately in the low elevation areas.

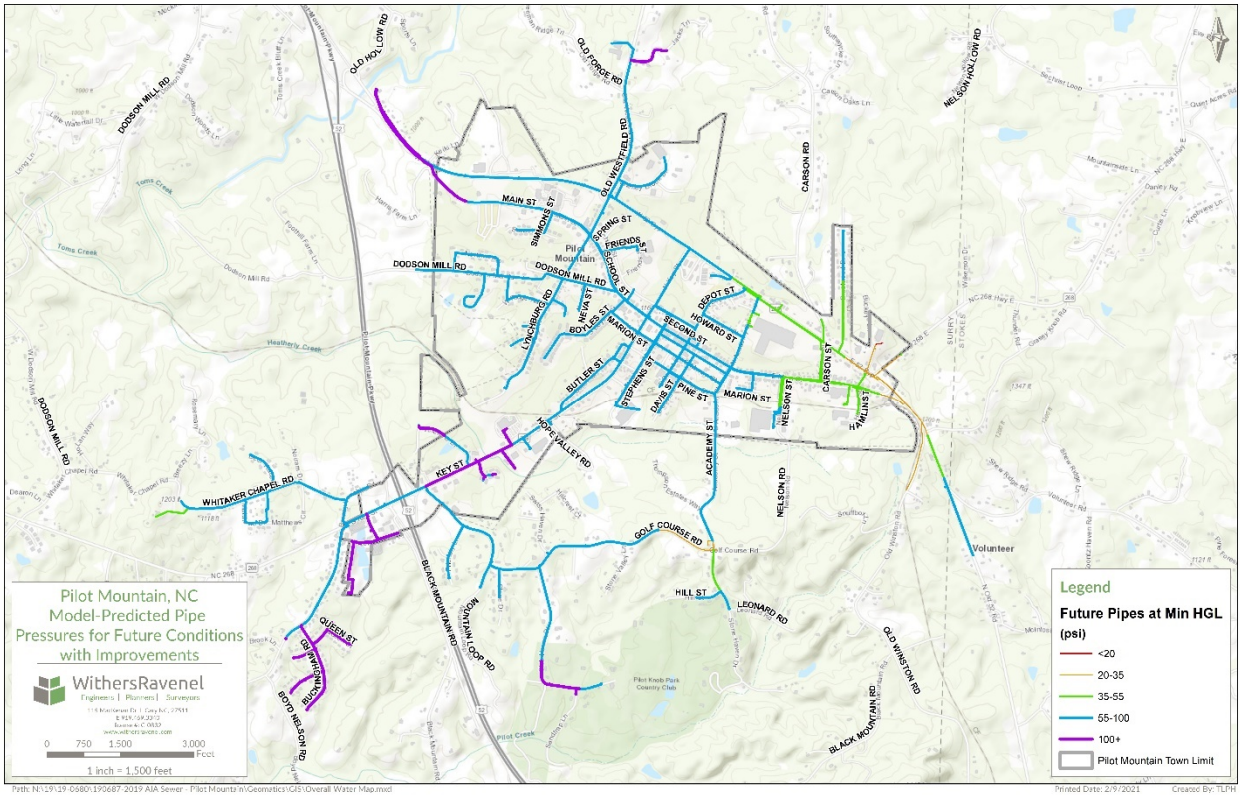


Figure 41. Model-predicted pipe pressures for future system conditions with improvements

11.4.3 Future System Fire Flow

Figure 42 and Figure 43 likewise show updated versions of Figure 36 and Figure 37. The increased transmission main capacity and looping dramatically improves predicted flow availability, especially in the south and western part of the system. Percent of hydrants unable to meet at least 1,000 gpm of fire flow decreases from over 50% to less than 10%.

One small section of note is Howard St near Depot St. It is difficult to tell in the figures, but this small main is not looped and is two dead ends (4-inch on one side, 2-inch the other), hence difficulty with providing and improving fire flow. These streets are potentially Community Development Block Grant (CDBG) eligible, but requires checking with grant requirements to see if pipe alignment or diameter can change with replacement.

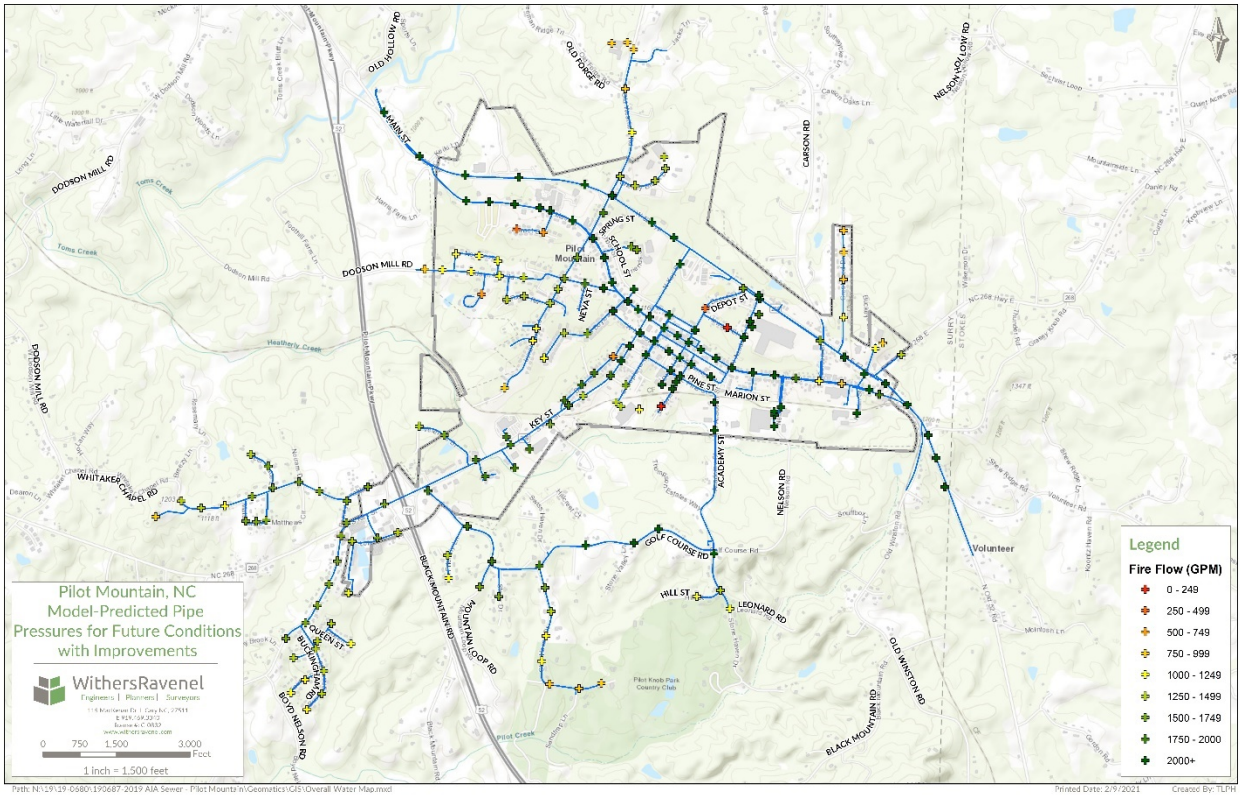


Figure 42. Model-predicted fire flow availability for future system conditions with improvements

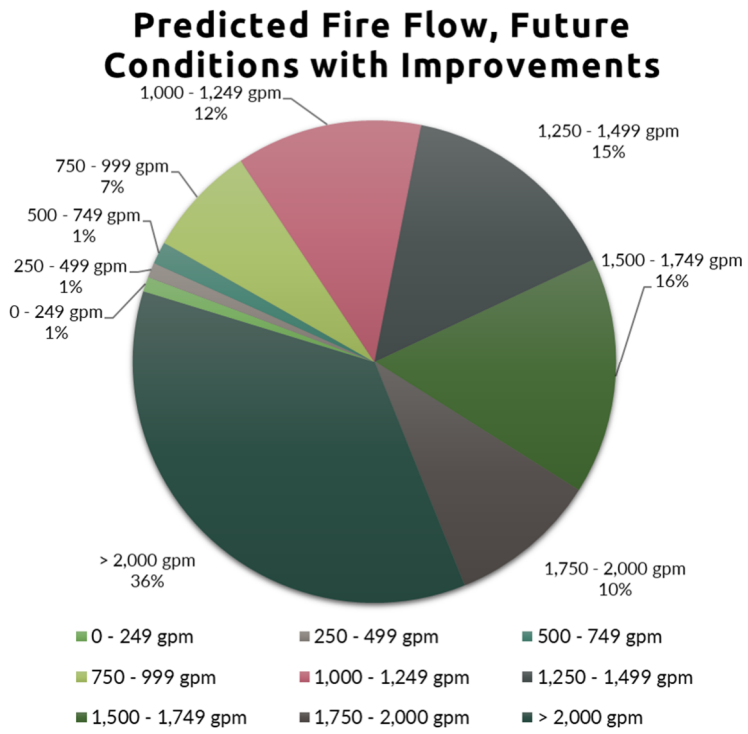


Figure 43. Distribution by category and percent of hydrants for predicted fire flow for future conditions

12 Water Asset Condition Assessment, Ranking, and Prioritization

Each of the water main lines, fire hydrants, and water valves inventoried were prioritized for improvement/ replacement. Based on the asset KPIs stored in GIS, each asset was assigned LoF and CoF scores which were utilized to calculate the Risk Score for each asset. Lower risk scores indicate less risk, while higher scores indicate greater risk. Therefore, the risk score indicates the relative priority for the repair/replacement of the asset. Approximate costs were determined to replace water mains, for the next 50 years. The projected costs are not adjusted for future costs and are instead displayed as current dollar amounts for consistency.

12.1 Priority Ranking Methodology

Two KPIs were utilized to determine the LoFs of the gravity sewer lines and manholes in the collection system. These KPIs are weighted based on their impact on LoF as described below and listed in Table 10.

- Age – Age is a typical indicator for LoF, as continued use and degradation over time leads to a higher likelihood of problems in older assets.
- Material – Materials that are known to be more likely to fail, such as vitrified clay pipe which is susceptible to cracking, are given higher scores.

Table 10. Water likelihood of failure (LoF) scores

LoF KPI Factors	
Pipe Age (Years)	**LoF Score**
> 60	5
30 - 60	3.5
Unknown	2.5
Material	**LoF Score**
CIP	5
ACP	3
GALV	2.5
Unknown	2.5

In addition, the CoF for the gravity sewer lines were calculated from three separate KPIs which are weighted based on the impact of the asset's failure. These KPIs are described below and allocated scores are listed in Table 11.

- Fire Flow Availability – Model-predicted available fire flow
- C-Factor – Generalized pipe condition based on hydraulic model calibration
- Pipe Pressure – Model-predicted pipe pressures during lower HGL conditions (pumps off, tanks near operational low)

Table 11. Water consequence of failure (CoF) scores

CoF KPI Factors	
Fire Flow Availability (gpm)	**CoF Score**
0 - 250	4
250 - 500	3
500 - 750	2
750 - 1000	1
C-Factor	**CoF Score**
< 80	2
80 - 120	1.5
Pressure (psi)	**CoF Score**
< 20	4
20 - 35	3
35 - 55	2

After the LoF and CoF scores were assigned to the gravity sewer lines and manholes, the scores were multiplied together to determine the overall risk score for each asset. The risk scores can range up to 100, with a lower score meaning the asset is a lower risk (and therefore a lower priority for repair/replacement) and a higher score indicating the asset is a higher risk (and therefore a higher priority for repair/replacement). Figure 44 shows how LoF scores and CoF scores determine

an asset's overall RoF score, and color codes the RoF scores to show their recommended year of replacement. The following formulas determine an asset's RoF:

$$Total\ LoF\ Score = (LoF\ Score, Pipe\ Age) + (LoF\ Score, Material)$$

$$Total\ CoF\ Score = (CoF\ score, Fire\ Flow\ Availability) + (CoF\ score, C\ Factor) + (CoF\ score, Pressure)$$

$$RoF\ Score = Total\ LoF\ Score * Total\ CoF\ Score$$

10	10	20	30	40	50	60	70	80	90	100
9	9	18	27	36	45	54	63	72	81	90
8	8	16	24	32	40	48	56	64	72	80
7	7	14	21	28	35	42	49	56	63	70
6	6	12	18	24	30	36	42	48	54	60
5	5	10	15	20	25	30	35	40	45	50
4	4	8	12	16	20	24	28	32	36	40
3	3	6	9	12	15	18	21	24	27	30
2	2	4	6	8	10	12	14	16	18	20
1	1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10

Minor ------ **Consequence of Failure** ---- Catastrophic

Rare ---------- **Likelihood of Failure** ---------- Almost Certain

Risk Scale Legend

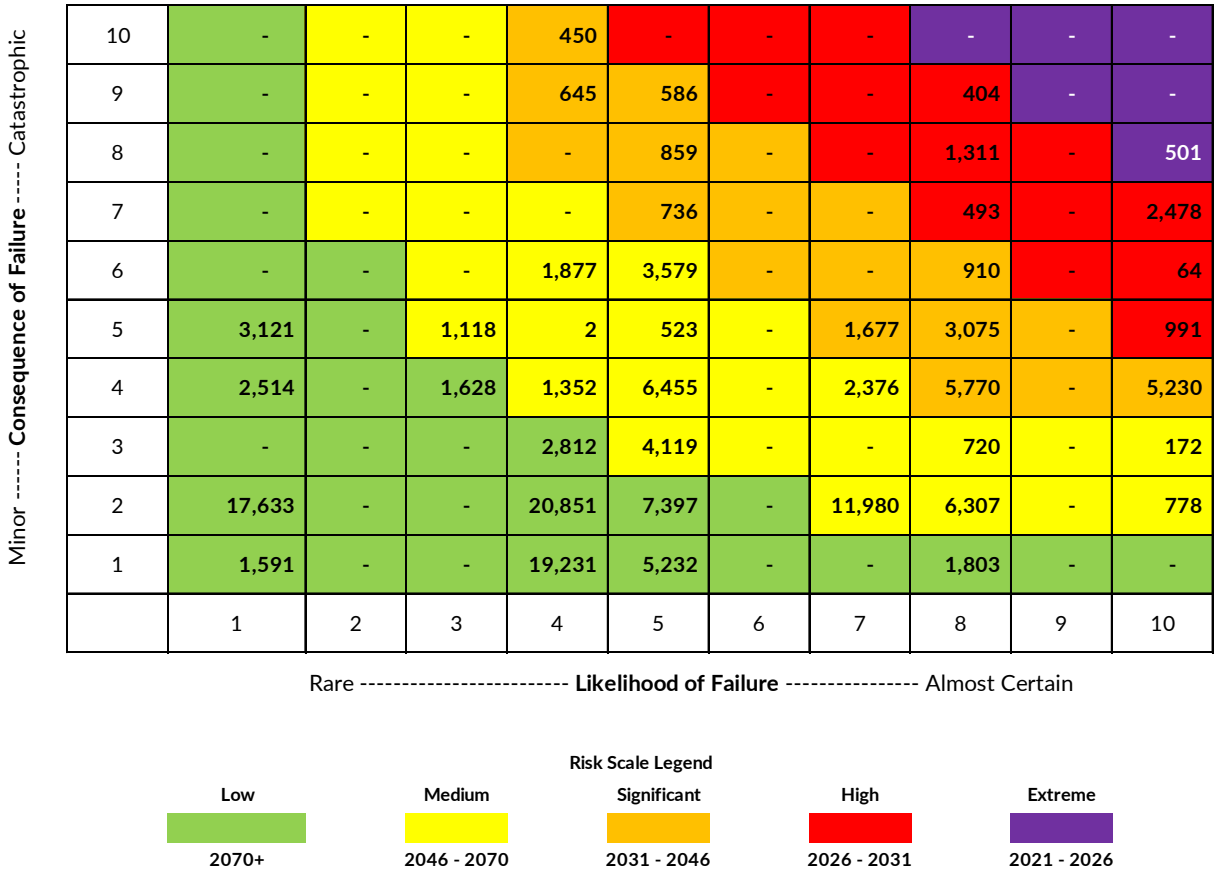
Low	Medium	Significant	High	Extreme
2071+	2046 - 2071	2031 - 2046	2026 - 2031	2021 - 2026

Figure 44. Typical risk matrix scoring codes

Figure 44 shows the typical risk matrix indicating possible risk scores and priority rankings for the water assets. Categories from "Low" to "Extreme" are based on an assumed time to failure. For example, the "Extreme" category is defined as anything scoring 80 or above and is assumed to require replacement by FY 2026.

12.2 **Asset Prioritization Results**

Using the ranking methodology described in Section 12.1, each of the water main pipes and manholes was assigned a risk score. As seen in **Figure 5** below, 501 LF of water main were placed in the "Extreme" category, 5,742 LF were placed in the "High Risk" category, and 19,939 LF were placed in the "Significant Risk" category. The numbers in the matrix represent linear footage of pipe that received each risk score. The numbers in the legend represent the year range in which repair/replacement should be scheduled.



10	-	-	-	450	-	-	-	-	-	-
9	-	-	-	645	586	-	-	404	-	-
8	-	-	-	-	859	-	-	1,311	-	501
7	-	-	-	-	736	-	-	493	-	2,478
6	-	-	-	1,877	3,579	-	-	910	-	64
5	3,121	-	1,118	2	523	-	1,677	3,075	-	991
4	2,514	-	1,628	1,352	6,455	-	2,376	5,770	-	5,230
3	-	-	-	2,812	4,119	-	-	720	-	172
2	17,633	-	-	20,851	7,397	-	11,980	6,307	-	778
1	1,591	-	-	19,231	5,232	-	-	1,803	-	-
	1	2	3	4	5	6	7	8	9	10

Figure 45. Risk matrix for the water main pipes by linear foot

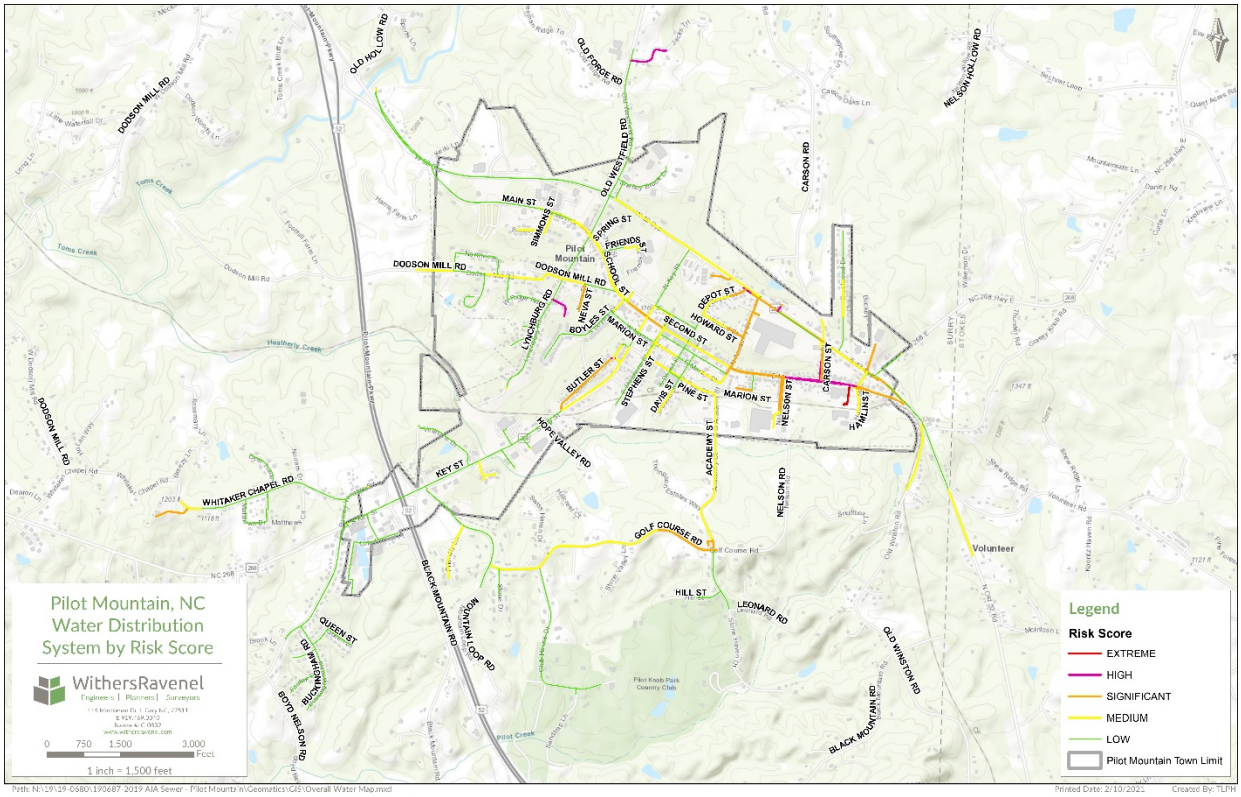


Figure 46. Water system by risk score

13 Water System Capital Improvement Plan

13.1 Water System Improvements

With adequate data loaded into the GIS along with KPIs and their assigned scores, it is possible to automate a broad, generalized snapshot of prioritized replacement costs based on the results of the risk matrix.

Next, based on an evaluation of many construction bids across North Carolina, the average cost, for combined water main, valve, and hydrant replacement or rehabilitation is calculated. These values include soft costs, such as engineering, permitting, and inspection.

The overall average cost for combined water main, valve, and hydrant replacement is $253/LF and the overall average water rehabilitation cost is approximately $142/LF.

Without extensive assessments and evaluation of the water system, it is not possible to differentiate the assets that are candidates for replacement vs. trenchless rehabilitation. However, it is expected that a high percentage will qualify for less expensive and non-intrusive trenchless rehabilitation. For the purpose of this AMP, it is assumed that 85% of the system will qualify for the less expensive rehabilitation option and 15% of the system will require the more expensive replacement option.

Table 6 below details the total cost of replacement/rehabilitation based on an 85% rehabilitation weighted estimate. Based on the weighted estimates, it would cost about $24M (today's dollars) to replace/rehabilitate the entire service area.

Table 12. Total water main replacement or rehabilitation cost by risk category

Risk Score	Percent	Linear Foot	$253/LF	$142/LF	$198 Weighted/LF
LOW	55%	83,815	$21,205,070	$11,901,660	$16,595,273
MEDIUM	27%	41,358	$10,463,588	$5,872,844	$8,188,895
SIGNIFICANT	13%	19,939	$5,044,645	$2,831,382	$3,947,983
HIGH	4%	5,742	$1,452,672	$815,334	$1,136,874
EXTREME	0.33%	501	$126,632	$71,074	$99,104
TOTAL	**100%**	**151,354**	**$38.29 M**	**$21.49 M**	**$29.97 M**

13.2 **Water System Improvement Projects**

Based on input from the Town of Pilot Mountain Staff, and the Risk Matrix scoring, the following projects are recommended for inclusion in the CIP budget for the collection system over the next 5 years. The locations for these projects are shown in **Appendix I**.

1. **Risk Water Main Rehabilitation - $16,840,000**

   Strategically replace the water mains, upsizing when necessary to ensure all lines are at least 6-inch diameter, starting with galvanized iron, asbestos concrete, and cast iron popes. Pipes have been prioritized based upon the criteria above and being replaced based upon the criticality score.

2. **Install Additional Water Mains – $1,150,000**

   Install additional water mains to simplify the path connecting the two elevated water storage tanks.

3. **Replace Hydrant Assembly - $286,000**

   Strategically replace or repair the hydrants that are in poor condition and in need of replacement, add valves to all hydrant laterals that do not currently have a valve, and upgrade all hydrant laterals that are smaller than 6-inch diameter to comply with state standard.

4. **Install Additional Water Main Valves - $28,000**

   Add water valves throughout the system so that more sections can be shut off more easily.

5. **Install Altitude Valve on Pilot Center Tank - $58,000**

   Install an altitude valve and connect Pilot Center Water Storage Tank to SCADA so that water elevation can be monitored.

6. **Install Tank Mixing Equipment - $35,000**

   Install tank mixing equipment in the Golf Course Rd and Pilot Center Water Storage Tanks to decrease water age in the tanks.

14 Distribution System Operation and Maintenance (O&M) Plan

Operation and Maintenance for the water distribution system focuses on upkeep of the lift stations. Maintenance consists of "Emergency Maintenance," which is corrective action needed quickly to keep the system operational, and "Preventative Maintenance," which is routine, scheduled tasks to prevent problems before they arise. The items below represent routine maintenance items performed throughout the collection system.

14.1 Distribution System Maintenance

- Water meters
    - Conduct meter accuracy testing and flow meter maintenance.
        - Check for appropriate meter sizing and meter type for customer usage, along with checking installation, to reduce reporting errors.
    - Track Mi.Net notifications of errors, warnings, and negative flows. Note time and location of occurrences and compare to SCADA readings.
- Tanks
    - Recalibrate the Golf Course Rd tank level sensor such that the tank elevation, and therefore system HGL, can be determined.
    - Test conditions to determine at what system HGL the Pilot Center tank will overflow.
    - Fully drain and valve off the Second St tank.
    - Upgrade SCADA to allow for data storage of operational conditions.
    - Perform ongoing inspections to check and repair:
        - Pipes, jointing, fittings, and appurtenances.
        - Internal and external corrosion
        - Seasonally induced stress
- Hydrants
    - Track frequency, volume, and timing of flushing with portable meters and activity logging.
- Distribution mains
    - Incorporate information from new construction and rehabilitation projects, including line diameter, material, and scoring for other KPIs, into the collection system GIS within one year of construction completion.
    - All high priority lines (including aerials, sub-waterway crossings, lines contacting surface waters, lines positioned parallel to stream banks and subject to eroding in such a manner that may threaten the line, and any other segment of the system that is designated as high priority) must be inspected every six months. A log must document the area inspected, the date, method of inspection, and any corrective actions performed or initiated.

14.2 **Water Audit**

In preparation for the Mount Airy Interconnection, a water audit of the water distribution system will identify sources of water loss. The results in the above sections show the condition and performance of the system. These results are a good starting point to continue and perform a more in-depth water audit.

15 Total CIP Estimates

Table 13. List of proposed projects for the next 50 years

Project Name	2021-2026	2026-2031	2031-2036	2036-2041	2041-2046	2046-2070	2070+
Sewer Collection							
Extreme Risk Gravity Main Rehabilitation	$681,379						
High Risk Gravity Main Rehabilitation		$2,632,636					
Significant Risk Gravity Main Rehabilitation			$1,659,068	$1,659,068	$1,659,068		
Medium Risk Gravity Main Rehabilitation						$4,445,655	
Low Risk Gravity Main Rehabilitation							$4,103,664
Lift Station							
Offsite Pump Station (No. 18) and Aerial Crossing	$552,000						
Heatherly Creek Outfall and Pump Station					$2,970,000		
Upgrade Lola Lane Pump Station			$880,000				
TOTAL	**$1,233,379**	**$2,632,636**	**$2,539,068**	**$1,659,068**	**$4,629,068**	**$4,445,655**	**$4,103,664**

Project Name	2021-2026	2026-2031	2031-2036	2036-2041	2041-2046	2046-2070	2070+
Water Distribution							
Extreme Risk Water Main Rehabilitation	$28,030						
High Risk Water Main Rehabilitation		$922,457					
Significant Risk Main Rehabilitation			$1,305,920	$1,305,920	$1,305,920		
Medium Risk Water Main Rehabilitation						$4,445,655	
Low Risk Water Main Rehabilitation							$4,103,664
Install Additional Water Mains	$583,932						
Hydrants and Valves							
Replace Hydrant Assembly	$142,960	$142,960					
Install Additional Water Main Valves	$40,000						
Water Storage Tanks							
Install Altitude Valve on Pilot Center Tank	$58,000						
stall Tank Mixing Equipment for Golf Course Rd Tar	$34,000						
TOTAL	**$886,922**	**$1,065,417**	**$1,305,920**	**$1,305,920**	**$1,305,920**	**$4,445,655**	**$4,103,664**

As seen in Table 13, the initial years of the CIP focus on essential projects that provide immediate impact in areas where water or sewer has aged beyond its useful life and are rated as a High Risk of Failure or in areas where staff have identified important shortcomings of the system.

16 References

Finished Water Storage Facilities. EPA Office of Water, Office of Ground Water and Drinking Water. August 15, 2002.

Insurance Services Office (2014). Guide for Determination of Needed Fire Flow, 6th Edition.

Standard Population Estimates. Estimates of the Total Population of North Carolina, North Carolina Counties, and Municipalities within Counties for July 1, 2019. Office of State Budget and Management. https://files.nc.gov/ncosbm/demog/muniestbycounty_2019.html#top

APPENDIX I – GIS MAPS

Sunset Sewer Rehabilitation Project

Wastewater Treatment Plant Project

Sewer Project #1

Sewer Project #3

Nelson Street Pump Station

Sewer Project #4

Pilot Mountain, NC Wastewater System & Projects

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0 600 1,200 2,400 Feet

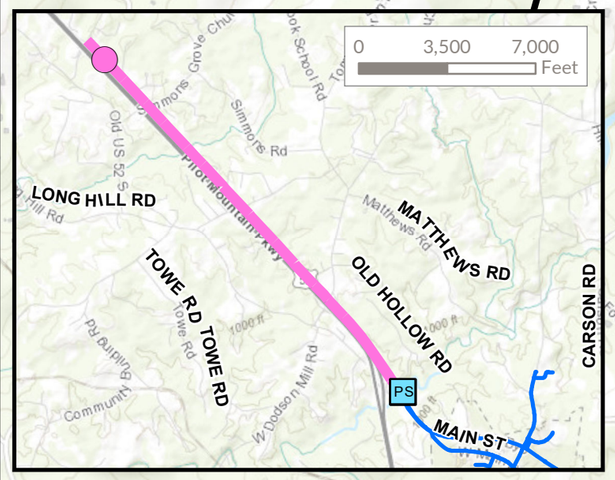
1 inch = 1,200 feet

Legend

- PS — Pump Station
- WTP — WWTP
- Ongoing Sewer Project
- Proposed Sewer Project
- Manhole
- Gravity Sewer
- Forcemain
- Road Centerline
- Pilot Mountain Town L

Path: N:\19\19-0680\190687-2019 AIA Sewer - Pilot Mountain\Geomatics\GIS\Overall Sewer Map with Sunset Project.mxd

Printed Date: 2/17/2021 Created By: JAR



Decommission WTP

CDBG Area

Upsize existing 10" along E Main St to 12" pipe

Upsize existing 6" along Burlington Ln to 12" pipe

Pilot Tank altitude valve & SCADA

Extend new 12" pipe along S Academy St

Golf Course Rd Tank Mixer

Pilot Mountain, NC Water Distribution Overall System

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0 750 1,500 3,000 Feet

1 inch = 1,500 feet

Legend

- M — Proposed Meter
- Mt Airy PRV
- Mt Airy Connection Pipes
- East Main Improvement
- Academy St Extension
- Burlington Ln Improvement
- PS — Pump
- Tank
- Water Main

Proposed DMA

- Downtown
- Golf Course Rd
- Key St
- Pilot Mtn Pkwy & We

Pilot Mountain, NC Wastewater System Overall

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0 600 1,200 2,400 Feet

1 inch = 1,200 feet

Legend

- PS — Pump Station
- WTP — WWTP
- Manhole
- Gravity Sewer
- Forcemain
- Road Centerline
- Pilot Mountain Town Limits

Path: N:\19\19-0680\190687-2019 AIA Sewer - Pilot Mountain\Geomatics\GIS\Overall Sewer Map.mxd

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Pilot Mountain, NC
Wastewater System
Pump Stations

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0 600 1,200 2,400 Feet

1 inch = 1,200 feet

STATION 20
STATION 6
STATION 7
STATION 4
STATION 5
STATION 8
STATION 10
STATION 3
STATION 2
STATION 9
STATION 11
STATION 1
STATION 19
STATION 18
STATION 15
STATION 14
STATION 13
STATION 12
STATION 16
STATION 17

DODSON MILL RD
OLD HOLLOW RD
OLD FORGE RD
OLD WESTFIELD RD
NELSON HOLLOW RD
CARSON RD
MAIN ST
SPRING ST
FRIENDS ST
SCHOOL ST
SIMMONS ST
NEVA ST
LYNCHBURG RD
BOYLES ST
SECOND ST
DEPOT ST
HOWARD ST
ACADEMY ST
MARION ST
DODSON ST
STEPHENS ST
MEDICAL ST
DAVIS ST
PINE ST
BUTLER ST
HOPE VALLEY RD
KEY ST
BARNEY VENABLE RD
SHOALS RD
BLACK MOUNTAIN RD
GOLF COURSE RD
NELSON RD
HAMLIN ST
OLD WINSTON RD
HILL ST
CHAPEL RD

Toms Creek
Heatherly Creek
Pilot Mountain
Dodson Mill Rd
Golf Course Rd
Shew Ridge Rd
NC 268 Hwy E
Wilkerson Dr
Thunder Rd
Carson Oaks Ln
Walks Mill Dr
Matthews Cir

Legend

- PS — Pump Station
- WTP — WWTP
- Road Centerline
- Pilot Mountain Town Limits

Path: N:\19\19-0680\190687-2019 AIA Sewer - Pilot Mountain\Geomatics\GIS\Pump Station Map.mxd

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Pilot Mountain, NC Wastewater System by Diameter

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0 650 1,300 2,600 Feet

1 inch = 1,300 feet

Legend

- PS — Pump Station
- WTP — WWTP

Diamter (inch)

- 4" - 6"
- 8"
- > 8"
- Forcemain
- Pilot Mountain Town L

Path: C:\AMP\Pilot Mountain Sewer AIA\Geomatics\GIS\Pilot Mountain Sewer by Diameter.mxd

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Pilot Mountain, NC Wastewater System by Age

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0 650 1,300 2,600 Feet

1 inch = 1,300 feet

Legend

- PS — Pump Station
- WTP — WWTP

Age

- < 50 Years
- > 50 Years
- Forcemain
- Pilot Mountain Town L

Path: C:\AMP\Pilot Mountain Sewer AIA\Geomatics\GIS\Pilot Mountain Sewer by Age.mxd
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Pilot Mountain, NC Wastewater System by Material

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0 650 1,300 2,600 Feet

1 inch = 1,300 feet

Legend

- PS — Pump Station
- WTP — WWTP

Pipe Material

- PVC & DIP
- CI, Truss, VCP
- Forcemain
- Pilot Mountain Town L

Path: C:\AMP\Pilot Mountain Sewer AIA\Geomatics\GIS\Pilot Mountain Sewer by Material.mxd
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Pilot Mountain, NC Wastewater System by Risk Score

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0 650 1,300 2,600 Feet
1 inch = 1,300 feet

Legend

- PS — Pump Station
- WTP — WWTP

Risk Score

- Extreme
- High
- Significant
- Medium
- Low

Risk Score

- Extreme
- High
- Significant
- Medium
- Low
- Forcemain
- Pilot Mountain Town L

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Water Distribution System Overall

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0 750 1,500 3,000 Feet

1 inch = 1,500 feet

Legend

- Water Hydrant
- PS Pump
- Tank
- Water Main
- Lateral

96

Pilot Mountain, NC
Water Distribution System Overall
Downtown NW

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0 250 500 1,000 Feet

1 inch = 500 feet

OLD HOLLOW RD
Old Hollow Rd
OLD FORGE RD
Old Forge Rd
OLD WESTFIELD RD
Old Westfield Rd
W 52 Byp
MAIN ST
W Main St
SIMMONS ST
SPRING ST
Pilot Mountain
LYNCHBURG RD
SCHOOL ST
FRIENDS ST
KEY ST
DODSON MILL RD
Dodson Mill Rd
RIDGE EXT RD
NEVA ST
Keiki Ln
Harris Farm Ln
Shelley Brook Dr
Gordon Ct
Sunset Dr
1053 ft
1125 ft
1160 ft
1116 ft
1105 ft
1110 ft
1100 ft
1190 ft

Legend

- Water Hydrant
- Water System Valve
- Water Hydrant Valve
- Cap
- Cross
- Tee
- Pump
- Tank
- Water Main
- Lateral

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Printed Date: 2/4/2021 Created By: TLPH

Pilot Mountain, NC
Water Distribution System Overall
Downtown SE

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0 250 500 1,000 Feet

1 inch = 500 feet

Legend

- Water Hydrant
- Water System Valve
- Water Hydrant Valve
- Cap
- Cross
- Reducer
- Tee
- Pump
- Tank
- Water Main
- Lateral

Path: N:\19\19-0680\190687-2019 AIA Sewer - Pilot Mountain\Geomatics\GIS\Overall Water Map.mxd
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Pilot Mountain, NC Water Distribution System Overall Downtown

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0 250 500 1,000 Feet

1 inch = 500 feet

Legend

- Water Hydrant
- Water System Valve
- Water Hydrant Valve
- Cap
- Cross
- Reducer
- Tee
- Pump
- Tank
- Water Main
- Lateral

Pilot Mountain, NC
Water Distribution System Overall
Golf Course Rd

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0 250 500 1,000 Feet

1 inch = 500 feet

Legend

- Water Hydrant
- Water System Valve
- Water Hydrant Valve
- Cap
- Pump (PS)
- Tank
- Water Main
- Lateral

100

Pilot Mountain, NC
Water Distribution System Overall
Pilot Mtn Pkwy and West Key St

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0 250 500 1,000 Feet

1 inch = 500 feet

WHITAKER CHAPEL RD
BARNEY VENABLE RD
KEY ST
GOLF COURSE RD
SHOALS RD
KINGSTON ST
QUEEN ST
BOYD NELSON RD
BUCKINGHAM RD
BLACK MOUNTAIN RD
MOUNTAIN LOOP RD
FRIENDLY CHAPEL CHURCH RD
Matthews Cir
NC 268
US-52 S
Pilot Mountain Pkwy

Legend

- Water Hydrant
- Water System Valve
- Water Hydrant Valve
- Cap
- Reducer
- Tee
- Pump (PS)
- Tank
- Water Main
- Lateral

101

APPENDIX II – CIP LOCATION MAP

APPENDIX III – SANITARY SEWER SMOKE TESTING TECHNICAL MEMO

Police Vehicle Funding	
Background Information:	
As a part of the budget for FY 2021, the Board agreed to finance the purchase of a police vehicle. I have gotten quotes from First Citizens Bank and Home Trust Bank. The low quote of 1.48% was from Home Trust Bank. I recommend that the Board authorize me to accept this bid and sign all the necessary paperwork to close the loan.	
Staff Recommendation:	Approve the financing offer and authorize the Town Manager to sign forms
Possible Board of Commissioner Actions	
• Approve financing terms • Disapprove finance terms • Table until a later date • Take No action	
Attachments	
• HomeTrust Bank Financing Offer	

United Financial
A Division of HomeTrust Bank
876 Brevard Rd
Asheville, NC 28806

02/01/2021

Town of Pilot Mountain, NC
124 West main Street
Pilot Mountain, NC 27041

ATT: James Michael Boaz
Town Manager

Re: Finance proposal for: The purchase of a new Chevrolet Tahoe Police Vehicle

Dear Michael,

As per your request, we are enclosing under same cover our proposal for the above captioned transaction. This transaction is structured on an annual basis with five (5) annual payments of $38,922.56. This transaction assumes it is Bank Qualified/Tax-Exempt and is calculated at an annual percentage rate of 1.48%.

There are no direct bank closing costs or origination fees related to the transaction.

While the transaction does not have a pre-payment penalty, the Concluding Payment is calculated at 102.5% of the outstanding balance if the transaction is repaid in advance.

If you have any questions or need additional information, please contact me at your convenience. Thank you for the opportunity to provide this proposal to you.

Very truly yours,

John M. Tench

John M. Tench
Senior Vice President

Phone 828-684-5643
Fax 828-684-5616

United Financial
A Division of HomeTrust Bank
876 Brevard Road
Asheville, NC 28806

02/01/2021

Town of Pilot Mountain, NC
124 West Main Street
Pilot Mountain, NC 27041

ATT: James Michael Boaz
Town Manager

Proposal for Acquisition & Finance of: One New Chevrolet Tahoe Police Vehicle

Dear Michael,

As a follow-up to your recent request for a proposal regarding the above referenced transaction, United Financial is pleased to offer a finance proposal as follows:

LESSOR:	United Financial, ***A Division of HomeTrust Bank***
LESSEE:	Town of Pilot Mountain, NC
COLLATERAL:	New Chevrolet Tahoe Police Vehicle and related equipment
AMOUNT:	$38,922.56
START DATE:	Immediately upon funding
TERM:	5 Years
PAYMENTS:	**OPTION 1:** Lease payments will consist of five (5) annual payments of $8,133.56 comprised of principal and interest.
EXPIRATION:	Lease payment terms quoted herein shall be fixed and held for Lessee through 04/01/2021.
LEGAL TITLE:	Legal Title to the Equipment during the Lease Term shall vest in the Lessee with Lessor perfecting a first security interest through Equipment Title, UCC, or other filing instruments as may be required by law.
NET LEASE:	The Lease will be a net lease, under which all cost and responsibility of maintenance, insurance, taxes and other items of a similar nature shall be for the account of Lessee.
INSURANCE:	Lessee shall provide evidence of insurance coverage at the time of delivery of the Equipment, in accordance with the provisions of the Lease.

Phone 828-684-5643
Fax 828-684-5616

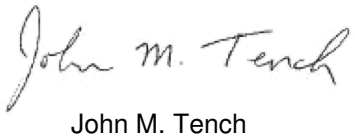
FINANCIALS: Lessee shall furnish Lessor with its last three, (3) fiscal years financial statements and its latest interim financial statements, plus such other pertinent information as Lessor may reasonably request.

APPROVAL: Closing of the transaction(s) described herein, and the implementation hereof is expressly conditioned upon approval of Lessor's Senior Loan Committee, the receipt, review and acceptance of properly executed documentation acceptable to Lessor, and the absence of any material adverse change in Lessee's financial condition prior to deliver and acceptance of the Equipment.

ACCEPTANCE: Lessee acknowledges that the terms and conditions of this proposal are satisfactory and that upon execution hereof by Lessee this proposal shall constitute a valid and binding obligation of Lessee. As further condition to Lessor's approval hereof, Lessee must acknowledge its acceptance of this proposal by signing below in the space provided and returning it to the Lessor by 03/01/2021.

If you determine that any of these finance structures meet the needs of your organization, please have the appropriate officer indicate the chosen option, place their signature at the bottom of this page, and return it to us via fax, email or US Postal Service. Upon receipt of the signed proposal, we will be in touch with you to make provision for documenting the finance. Thank you for the opportunity to submit this proposal letter for your review and approval. Should you have any question or comments regarding the terms and conditions, or if we can be of any further assistance to you, please do not hesitate to call.

Sincerely,



John M. Tench
Senior Vice President
Director of Municipal Finance

ACCEPTED BY:

SIGNATURE: _____

NAME: _____**TITLE:** _____ **DATE:** _____

Minimum Housing Code Ordinance Amendment
Background Information:
The NC General Assembly has rewritten the statutes regarding land use regulations. As a part of this, we need to make technical changes to our Minimum Housing Code to reference the new authorizing statutes. This ordinance amendment makes those changes.

Staff Recommendation:	Approve ordinance 2021-01

Possible Board of Commissioner Actions
• Approve ordinance amendment • Disapprove ordinance amendment • Table until a later date • Take No action
Attachments
• Ordinance 2021-01

STATE OF NORTH CAROLINA **TOWN OF PILOT MOUNTAIN**
COUNTY OF SURRY **BOARD OF COMMISSIONERS**

ORDINANCE NO: 2021-1
ORDINANCE TO AMEND CHAPTER 17: Minimum Housing Code OF THE TOWN OF PILOT MOUNTAIN CODE OF ORDINANCES

WHEREAS, N.C.G.S. 160D-1201 gives the Town of Pilot Mountain the authority to regulate the minimum standards for dwelling units in the Town; and

WHEREAS, The Board of Commissioners has an ordinance governing the minimum standards for dwelling units in the Town; and

WHEREAS, the North Carolina General Assembly adopted Chapter 160D of the North Carolina General Assembly that made changes to planning, zoning, and develop regulation ordinances, and;

WHEREAS, the Pilot Mountain Board of Commissioners wants to make the necessary changes to its Minimum Housing Code standards to comply with the new statutes adopted by the General Assembly

NOW, THEREFORE, be it ordained by the Board of Commissioners of Town of Pilot Mountain, that the Code of Ordinances be amended as follows:

Section 1:

That Chapter 17 be amended as follows:

Article II-Minimum Housing Standards

DIVISION 1. -GENERAL PROVISIONS

Sec. 17-41. –Finding; purpose

a) Pursuant to G.S. § 160D-1201, it is hereby declared that there exist in the town dwellings which are unfit for human habitation due to dilapidation; defects increasing the hazards of fire, accidents and other calamities; lack of ventilation, light and sanitary facilities; and other conditions rendering such dwellings unsafe or unsanitary, dangerous and detrimental to the health, safety and morals, and otherwise inimical to the welfare of the residents of the town.

b) In order to protect the health, safety and welfare of the residents of the town as authorized by G.S. §§ 160D-1201 through 160D-1212, it is the purpose of this chapter to establish minimum standards of fitness for the initial and continued occupancy of all buildings used for human habitation, as expressly authorized by G.S. § 160D-1205.

Section 2: All laws and clauses of laws in conflict herewith are repealed to the extent of any such conflict.

Section 3: This ordinance is effective upon adoption.

Adopted this the 8th day of February 2021

_____ _____
Evan J. Cockerham, Mayor Holly Utt, Town Clerk

Animal Ordinance Amendment
Background Information:
The staff has recently learned that East Surry High School has been keeping about 50 chickens as a part of its animal science curriculum. This is a violation of the Town's existing ordinances regarding keeping chickens in the Town limits. Jared Jones, Principal of East Surry has asked that the Board of Commissioners consider granting an exception to this rule so that East Surry can continue this program. I have included a letter and some pictures from Mr. Jones in your packet. The staff has reviewed the situation and believes that a change to the Town's ordinance is warranted. I have crafted the attached ordinance amendment that allows NC public schools an exception for keeping no more than 50 hens for the purpose of aiding in the school's animal science curriculum.

Staff Recommendation:	Approve ordinance 2021-02

Possible Board of Commissioner Actions

- Approve ordinance amendment
- Disapprove ordinance amendment
- Table until a later date
- Take No action

Attachments

- Ordinance 2021-02
- Information from Jared Jones, East Surry High Principal

STATE OF NORTH CAROLINA **TOWN OF PILOT MOUNTAIN**
COUNTY OF SURRY **BOARD OF COMMISSIONERS**

ORDINANCE NO: 2021-02

ORDINANCE TO AMEND CHAPTER 6 OF THE TOWN OF PILOT MOUNTAIN CODE OF ORDINANCES: ANIMALS

WHEREAS, NCGS 160A-186 gives the Board of Commissioners the authority to establish ordinances, rules, and regulations regarding animals in the corporate limits; and

WHEREAS, the Town of Pilot Board of Commissioners have enacted regulations regarding animals, specifically what type of animals and under what conditions these animals may be kept inside the corporate limits of the Town; and

WHEREAS, the Board of Commissioners believes it in the best interests of the citizens of Pilot Mountain to amend those regulations.

NOW, THEREFORE, be it ordained by the Board of Commissioners of Town of Pilot Mountain, that the Code of Ordinances be amended as follows:

Section 1. That Section 6-1(a) of the Pilot Mountain Code of Ordinances be amended to read as follows:

Sec. 6-1. – Keeping animals within town limits; stables, barns and the like

(a) It shall be unlawful for any person to maintain, keep, or house any hogs, pigs, mules, cattle, sheep, goats or fowl within the corporate limits. North Carolina public schools may keep no more than fifty (50) hens for the purpose of animal science education.

Section 3. All laws and clauses of laws in conflict herewith are repealed to the extent of any such conflict.

Section 4. This ordinance is effective upon adoption.

Adopted this the 18th day of February, 2021.

_____ _____

Evan J. Cockerham, Mayor Holly Utt, Town Clerk

DWR Grant Application Resolution
Background Information:
The Town needs to reapply for the DWR grant that we had planned to use as part of the funding for the Streambank Restoration Project. The attached resolution would authorize staff and Resource Institute to submit the grant application.

Staff Recommendation:	Approve Resolution 2021-03

Possible Board of Commissioner Actions

- Approve resolution
- Make changes to draft resolution and approve
- Disapprove resolution
- Table until a later date
- Take No action

Attachments

- Resolution 2021-03

STATE OF NORTH CAROLINA **TOWN OF PILOT MOUNTAIN**

COUNTY OF SURRY **RESOLUTION NO. 2021-3**

RESOLUTION AUTHORIZING APPLICATION TO DIVISION OF WATER RESOURCES FOR GRANT FUNDING

WHEREAS, the Town of Pilot Mountain desires to sponsor, Chinquapin Creek Stream Restoration project, This project will lead to the better management of water resources in the region, and it will facilitate the improvement of water quality, improve aquatic habitat, and improve recreational opportunities for the Town of Pilot Mountain.

NOW, THEREFORE, BE IT RESOLVED THAT:

1) The Board requests the State of North Carolina to provide financial assistance to the Town of Pilot Mountain for Chinquapin Creek Stream Restoration project in the amount of $ 300,000 or 50 percent of nonfederal project costs, whichever is the lesser amount;

2) The Council/Board assumes full obligation for payment of the balance of project costs;

3) The Council/Board will obtain all necessary State and Federal permits;

4) The Board will comply with all applicable laws governing the award of contracts and the expenditure of public funds by local governments.

5) The Board will supervise construction of the project to assure compliance with permit conditions and to assure safe and proper construction according to approved plans and specifications;

6) The Board will obtain suitable spoil disposal areas as needed and all other easements or rights-of-way that may be necessary for the construction and operation of the project without cost or obligation to the State;

7) The Board will assure that the project is open for use by the public on an equal basis with no restrictions;

8) The Board will hold the State harmless from any damages that may result from the construction, operation and maintenance of the project;

9) The Board accepts responsibility for the operation and maintenance of the completed project.

ADOPTED by the Board of Commissioners of the Town of Pilot Mountain this the 18th day of February 2021.

Attest:

_____ _____

Evan Cockerham, Mayor *Holly Utt, Town Clerk*

Pilot Mountain Town Hall
124 West Main St.
Pilot Mountain, NC 27041

(Phone) – 336.368.2247
(Fax) – 336.368.9532
www.pilotmountainnc.org

MEMORANDUM

TO: **Mayor and Board of Commissioners**
FROM: **Michael Boaz, Town Manager/Finance Officer**
DATE: **February 5, 2021**
RE: **February 2021 Manager's Report**

- The Facebook page for the Comp Plan update is up and running. Our first public engagement session will be from March 15-April 3 at the Charles Stone Library. We will have a number of displays setup in the basement area for folks to look at and we will have survey documents for them to fill out as well. In addition, the same information will be available online as will the survey document. We really encourage folks to participate in this and the other public engagement sessions that we will have going forward. It is a great opportunity to help shape the goals for our community for the next several years.
- We have had our kickoff meeting for the DAC program. We will be having meetings for this project every 4-6 weeks. The next meeting is on March 2 at 830 AM. Jenny and I will be sending out the invites for the zoom meeting a week or so before that date.
- The Mt. Airy Interconnect Project, the Sunset Water Line Project, and the WWTP project loans will be in front of the LGC in March. We anticipate their approval. Our paving project will be one the LGC agenda in April. We have to take some additional steps for this project that require a little more time. Specifically, we have to have a public hearing that is scheduled for the March 8 meeting. Due to the rules regarding public hearings and remote meetings, I will need to you meeting again on March 9 or 10 to approve the authorizing resolution. You have to allow public comments to be submitted for 24 hours after a remote meeting that involves a public hearing.
- We have applied for a grant from the State that would allow us to put in 2 vehicle charging stations. These grants are funded via the Volkswagen settlement funds.
- As a general rule, we normally have a retreat around this time of year to set our goals for the coming year. In my opinion, this type of meeting is pretty difficult to have via Zoom and therefore I have made the executive decision to put this off for the time being. It is possible that we can have this session in the fall when we can all gather in person again.
- Staff and I will begin the process of developing the budget over the next several weeks. We should have a draft ready to present to the Commissioners in April.

PROJECT UPDATES

1. Depot Street Stream Restoration Project: All easements have been collected and design/build is underway. We have been granted an additional extension.
2. Main Street National Register District: These applications have been submitted to the State Historic Preservation Office..
3. Street Paving Project: We are preparing to submit the application to the LGC for approval.
4. Sunset Sewer Sub-Basin Project: The project is under construction with completion expected in April or May.
5. Water Treatment Upgrade: We are still working on easements. We have asked for additional funding from the State which we expect to be approved at the March 2021 LGC meeting.
6. Streetscape Project: WR continues to work with Duke Energy on Plan B.
7. WWTP & Pump Station Project: Design is underway.
8. Asset Inventory & Assessment Project: This project is complete and a report will be presented on Feb 18.

TOWN OF PILOT MOUNTAIN

Monthly Financial Dashboard

FISCAL YEAR ENDING June 30, 2021

Reporting Period: January 1-January 31 2021

OUR CASH AND INVESTMENTS

Balances on January 31 2021, in whole dollars

CASH & INVESTMENTS BY FUND

GENERAL FUND

	January 2020	January 2021
Central Depository	$ 590,953	$ 447,869
NCCMT	2,326	96,377
NCCMT-Powell Bill	709	711
NCCMT-Term Account	35,485	-
Police Drug Forfeiture	2,195	2,196
Centura Bank CD	25,031	25,031
Fiduciary Funds	54,617	17,940
TOTAL GENERAL FUND	**$ 711,316**	**$ 590,123**

OTHER FUNDS

	January 2020	January 2021
Water & Sewer Fund	$ (36,358)	$ (12,354)
NCCMT-Water/Sewer	$ 3,633	$ 4,482
Water & Sewer AIA	$ (40,612)	$ (27,383)
Interconnection CP	$ -	$ 7,000
WWTP Upgrade	$ (14,760)	$ (91,381)
Sunset/Simmons Water	N/A	($31,120)
Water Treatment Upgrade	($275,480)	($339,909)
Streetscape Project	$4,934	($34)
Sunset Sewer Project	($224,216)	$207,360
Street Resurfacing	$6,019	$6,019
Capital Reserve	$ 42,253	$ 90,099
TOTAL OTHER FUNDS	**$ (534,586)**	**$ (187,220)**

TOTAL CASH & INVESTMENTS TOWN-WIDE

	January 2020	January 2021
ALL FUNDS	**$ 176,730**	**$ 402,902**

OUR CASH FLOWS...

			Comparison of FYTD %	
GENERAL FUND REVENUES & EXPENDITURES			**Prior FYTD %**	**Current FYTD %**
	Fiscal Year Budget		**$ 1,892,090**	**$ 1,754,560**
	Revenues Fiscal Year to Date		66.00%	63.00%
	Expenses Fiscal Year to Date		68.97%	62.73%
WATER & SEWER ENTERPRISE FUND				
	Fiscal Year Budget		**$ 906,480**	**$ 986,135**
	Revenues Fiscal Year to Date		58.14%	56.42%
	Expenses Fiscal Year to Date		62.37%	58.73%
WWTP & PUMP STATION REHAB PROJECT				
	Project Budget		**N/A**	**$ 1,374,500**
	Revenues Project to Date	$ 52,606	N/A	3.83%
	Expenses Project to Date	$ 91,381	N/A	6.65%
Water Treatment Upgrade Project				
	Project Budget		**$ 3,978,000**	**$ 3,978,000**
	Revenues Project to Date	$ 306,530	0.00%	7.71%
	Expenses Project to Date	$ 346,959	7.10%	8.72%
Sunset Sewer Rehabilitation Project				
	Project Budget		$ 2,573,038	**$ 2,573,038**
	Revenues Project to Date	$ 1,033,196	1.72%	40.15%
	Expenses Project to Date	$ 1,007,667	10.63%	39.16%
WATER & SEWER AIA PROJECT			**NA**	**$ 305,000**
	Project Budget			
	Revenues Project to Date	$ 238,871	9%	78%
	Expenses Project to Date	$ 236,274	23%	77%

SPECIFIC REVENUE COLLECTIONS AT A GLANCE...

		Comparison of FY %	
		Prior FY %	Current FY %
AD VALOREM PROPERTY TAX			
Fiscal Year Budget		**$ 847,090**	**$ 867,500**
Revenues this Month	$ 104,907	12.79%	12.09%
Revenues FYTD	$ 751,473	84.04%	86.63%
SALES & USE TAX			
Fiscal Year Budget		**$ 469,790**	**$ 398,600**
Revenues this Month	$ 40,995	8.58%	10.28%
Revenues FYTD	$ 302,634	60.92%	75.92%
UTILITY FRANCHISE TAX			
Fiscal Year Budget		**$ 106,020**	**$ 118,140**
Revenues this Month	$ -	0.00%	0.00%
Revenues FYTD	$ 51,622	51.53%	43.70%
REFUSE COLLECTION FEES			
Fiscal Year Budget		**$ 69,840**	**$ 73,010**
Revenues this Month	$ 7,037	9.03%	9.64%
Revenues FYTD	$ 44,000	61.76%	60.27%
SALES & SERVICES			
Fiscal Year Budget		**$ 23,500**	**$ 81,700**
Revenues this Month	$ 890	1.79%	2.18%
Revenues FYTD	$ 14,232	56.48%	51.86%
WATER & SEWER ENTERPRISE FUND REVENUES			
Fiscal Year Budget		**$ 906,480**	**$ 986,135**
Revenues this Month	$ 79,276	7.74%	8.46%
Revenues FYTD	$ 556,338	58.14%	56.42%

		Comparison of Monthly Expenses	
GENERAL FUND	**Fiscal Year**	**YTD Expenses**	
DEPARTMENTS	**2021 Budget**	**Prior FY**	**Current FY**
Governing Body	$ 69,400	$ 141,706	$ 83,733
Administration	272,660	191,448	186,818
Community & Economic D	41,330	25,702	34,427
Downtown Revitilization	107,550	90,509	52,907
Police Dept	903,258	518,098	493,680
Street Dept	95,230	71,070	58,146
Powell Bill	43,420	3,919	34,898
Sanitation	224,580	135,617	137,329
Pilot Center	20,340	11,791	21,944
Library	40,340	6,566	3,661
Debt Service	65,330	47,137	73,910
Non Departmental	-	5,548	-
	$ 1,883,438	$ 1,249,109	$ 1,181,453
Fiscal Year Budget		**$ 1,811,040**	**$ 1,883,438**
YTD % of Annual Budget Expended		68.97%	62.73%
WATER & SEWER ENTERPRISE FUND			
General	$ 167,190	$ 74,858	$ 74,508
Water/Sewer Administration	134,790	88,248	79,343
Production	165,530	126,059	129,956
WWTP	254,790	125,955	147,394
Line Maintenance	263,835	150,259	147,940
	$ 986,135	$ 565,379	$ 579,142
Fiscal Year Budget		**$ 906,480**	**$ 986,135**
YTD% of Annual Budget Expended		62.37%	58.73%

MONTHLY STATUS REPORT OF
OPERATION FOR THE PILOT MOUNTAIN
WATER TREATMENT PLANT

MONTH: January **YEAR: 2021**

OPERATIONS:

MILLION GALLONS OF RAW WATER TREATED	**7.88**	**DAILY AVERAGE RAW WATER TREATED (MGD)**	**.254**
MILLION GALLONS WATER FILTERED	**7.55**	**DAILY AVERAGE WATER FILTERED (MGD)**	**.243**
MILLION GALLONS PUMPED TO SYSTEM	**7.35**	**DAILY AVERAGE WATER PUMPED TO SYSTEM (MGD)**	**.236**

CHEMICALS USED:

ALUMINUM SULFATE	**658 LBS.**
SODA ASH	**381 LBS.**
CHLORINE	**151 LBS.**
HEXAMETAPHOSFATE	**63 LBS.**

OPERATIONS SUMMARY:

All monthly drinking water laboratory tests were in compliance and the monthly report (eMOR) was submitted to NCDENR on February 4th, 2021.

MONTHLY STATUS REPORT OF
OPERATION FOR THE PILOT MOUNTAIN
WASTEWATER TREATMENT PLANT

MONTH: December **YEAR: 2020**

OPERATIONS:

MILLION GALLONS OF WATER TREATED	**6.727**	**PERMIT LIMIT MGD**	**.500**
AVERAGE DAILY VOLUME TREATED	**.217**		
TOTAL RAINFALL INCHES	**3.70**		

CHEMICALS USED:

CHLORINE/BLEACH	**90 Gallons**
POLYMER	**0 Gallons**

CHEMICAL ANALYSIS:

Parameter	Permit Limits	Monthly Results
BOD	**30 max. avg. monthly**	**2.98**
TSS	**30 max. avg. monthly**	**16.3**
D.O.	**5 minimum avg. daily eff.**	**8.82**
Fecal Coliform	**200 max. avg. monthly**	**1**
Ammonia-Nitrogen	**28.6 max. avg. monthly**	**7.99**

We are in compliance with all permit requirements.

Mr. Michael Boaz
Town Manager
Town of Pilot Mountain
124 W Main St
Pilot Mountain, NC 27041

February 11, 2020

Dear Mr. Boaz,

The Surry County Economic Development Partnership is grateful for the continued support from the Town of Pilot Mountain Board of Commissioners. We are happy to provide any information needed to maintain our good relationship with the town, and to keep moving our economy in Surry County forward.

We usually mention major closings or layoffs during the past year, but 2020 was obviously very different from previous years. During the COVID 19 shutdowns and stay at home orders, many of our companies laid off people or shut down for a short time. However, many did not, and kept running and added people. It is hard for us to determine how many companies will have permanent layoffs, but we are not aware of any major companies that closed permanently. There are still a few companies that are struggling to get back up to speed and have not brought back many of their employees. Most of these companies are either event related or provide goods or services direct to consumers or to the industries that have been hit hard by COVID 19 like the entertainment industry and the travel/airline industry. For the most part, our companies have gotten back on their feet and are doing well.

Surry County had some good news on job creation and investment in 2020. Phoenix Industries purchased a 13 acre site in the Piedmont Triad West Corporate Park where they will invest approximately $5 million dollars in a cloud storage facility. Texwipe, an ITW company purchased the former Hanes building in Mount Airy and will create 33 new jobs and invest over $2 million dollars in renovations and new equipment. Finally Cardinal CT completed a $7 million dollar expansion that created 11 new jobs. The EDP also worked with many small companies to find space and grow in Surry County. This is by no means all of the new jobs and investment in the county, but the ones that the Partnership was closely involved.

I have included a brief overview of the Partnerships activities during 2019. This document highlights some of the programs and initiatives that the Partnership was involved with during the year. Please let me know if you have any questions and feel free to share with the Board of Commissioners.

Sincerely,

Todd M. Tucker, CEcD
President
Surry County Economic Development Partnership


SURRY
SURRY COUNTY
ECONOMIC DEVELOPMENT
PARTNERSHIP, INC

JOBSeQ

Economic Overview

Town of Pilot Mountain, NC

Surry County Economic Development Partnership
336-401-9900 www.surryedp.com

Demographic Profile

The population in the Town of Pilot Mountain, NC was 1,483 per American Community Survey data for 2014-2018.

The region has a civilian labor force of 673 with a participation rate of 56.9%. Of individuals 25 to 64 in the Town of Pilot Mountain, NC, 32.8% have a bachelor's degree or higher which compares with 32.9% in the nation.

The median household income in the Town of Pilot Mountain, NC is $36,601 and the median house value is $144,300.

Summary[1]

	Percent			Value		
	Town of Pilot Mountain, NC	North Carolina	USA	Town of Pilot Mountain, NC	North Carolina	USA
Demographics						
Population (ACS)	—	—	—	1,483	10,155,624	322,903,030
Male	46.7%	48.7%	49.2%	692	4,944,759	158,984,190
Female	53.3%	51.3%	50.8%	791	5,210,865	163,918,840
Median Age[2]	—	—	—	45.5	38.6	37.9
Under 18 Years	22.9%	22.6%	22.8%	339	2,292,616	73,553,240
18 to 24 Years	7.1%	9.7%	9.6%	105	981,234	30,903,719
25 to 34 Years	10.2%	13.2%	13.8%	151	1,339,485	44,567,976
35 to 44 Years	9.4%	12.8%	12.6%	139	1,299,245	40,763,210
45 to 54 Years	12.7%	13.6%	13.2%	189	1,376,634	42,589,573
55 to 64 Years	17.9%	12.8%	12.8%	266	1,295,412	41,286,731
65 to 74 Years	8.5%	9.3%	8.8%	126	941,889	28,535,419
75 Years, and Over	11.3%	6.2%	6.4%	168	629,109	20,703,162
Race: White	86.6%	68.9%	72.7%	1,284	6,994,240	234,904,818
Race: Black or African American	9.3%	21.5%	12.7%	138	2,179,622	40,916,113
Race: American Indian and Alaska Native	0.4%	1.2%	0.8%	6	121,352	2,699,073
Race: Asian	0.8%	2.8%	5.4%	12	282,264	17,574,550
Race: Native Hawaiian and Other Pacific Islander	0.0%	0.1%	0.2%	0	6,939	582,718
Race: Some Other Race	0.0%	3.0%	4.9%	0	307,906	15,789,961
Race: Two or More Races	2.9%	2.6%	3.2%	43	263,301	10,435,797
Hispanic or Latino (of any race)	1.1%	9.2%	17.8%	17	935,950	57,517,935
Economic						
Labor Force Participation Rate and Size (civilian population 16 years and over)[5]	56.9%	62.0%	63.2%	673	4,978,432	162,248,196
Prime-Age Labor Force Participation Rate and Size (civilian population 25-54)[5]	83.5%	81.4%	81.8%	400	3,229,525	104,136,254
Armed Forces Labor Force[5]	0.0%	1.1%	0.4%	0	93,073	1,028,133
Veterans, Age 18-64[5]	7.6%	6.0%	4.7%	65	369,376	9,398,789
Veterans Labor Force Participation Rate and Size, Age 18-64[5]	83.1%	75.0%	76.3%	54	277,149	7,168,168
Median Household Income[2,5]	—	—	—	$36,601	$52,413	$60,293
Per Capita Income[5]	—	—	—	$26,739	$29,456	$32,621
Mean Commute Time (minutes)[5]	—	—	—	23.7	24.5	26.6
Commute via Public Transportation[5]	0.6%	1.0%	5.0%	4	47,381	7,602,145
Educational Attainment, Age 25-64						
No High School Diploma	13.7%	11.2%	11.2%	102	595,025	18,885,967
High School Graduate	27.7%	24.3%	25.8%	206	1,290,502	43,699,272
Some College, No Degree	14.9%	22.2%	21.0%	111	1,176,483	35,525,113
Associate's Degree	11.0%	10.2%	9.1%	82	543,508	15,389,737
Bachelor's Degree	19.5%	21.1%	20.8%	145	1,120,125	35,261,652
Postgraduate Degree	13.3%	11.0%	12.1%	99	585,133	20,445,749
Housing						

Summary[1]

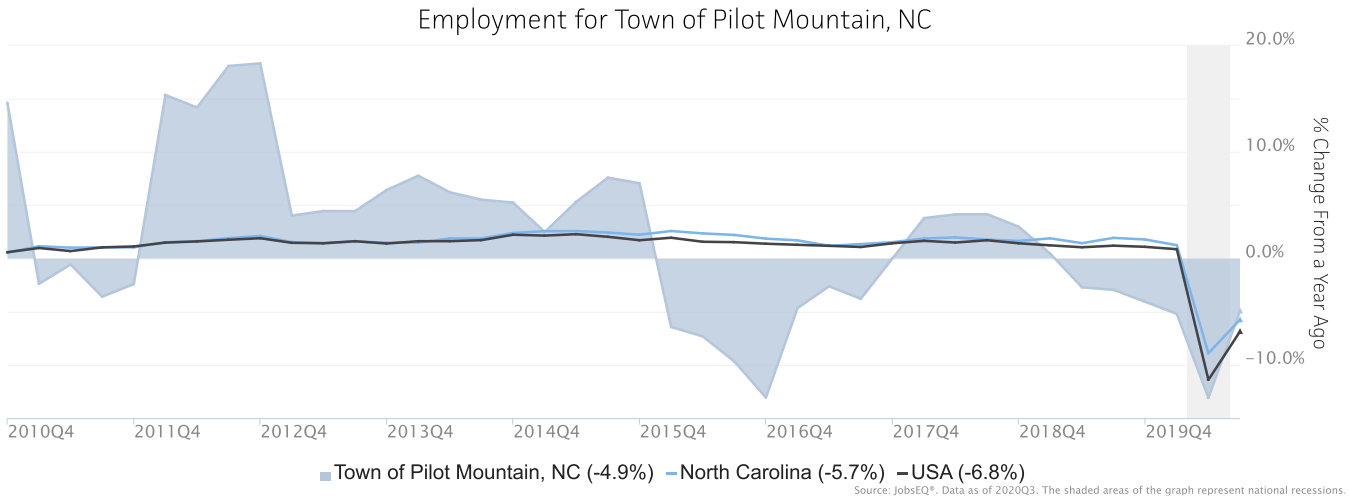
	Percent			Value		
	Town of Pilot Mountain, NC	North Carolina	USA	Town of Pilot Mountain, NC	North Carolina	USA
Total Housing Units	—	—	—	719	4,573,066	136,384,292
Median House Value (of owner-occupied units)[2]	—	—	—	$144,300	$165,900	$204,900
Homeowner Vacancy	1.7%	1.9%	1.7%	6	49,548	1,304,850
Rental Vacancy	7.0%	7.0%	6.0%	24	103,950	2,822,053
Renter-Occupied Housing Units (% of Occupied Units)	49.0%	35.0%	36.2%	318	1,369,892	43,285,318
Occupied Housing Units with No Vehicle Available (% of Occupied Units)[5]	8.0%	5.9%	8.7%	52	231,826	10,424,934
Social						
Poverty Level (of all people)[5]	19.4%	15.4%	14.1%	287	1,523,949	44,257,979
Households Receiving Food Stamps/SNAP	22.3%	13.2%	12.2%	145	515,577	14,635,287
Enrolled in Grade 12 (% of total population)	0.9%	1.3%	1.4%	14	134,820	4,442,295
Disconnected Youth[3,5]	13.7%	2.7%	2.6%	7	14,426	438,452
Children in Single Parent Families (% of all children)[5]	39.8%	36.3%	34.3%	129	785,978	23,973,249
Uninsured	10.8%	11.1%	9.4%	160	1,100,719	29,752,767
With a Disability, Age 18-64[5]	11.9%	11.5%	10.3%	101	702,834	20,240,504
With a Disability, Age 18-64, Labor Force Participation Rate and Size[5]	21.8%	39.0%	41.6%	22	273,823	8,421,018
Foreign Born	5.7%	7.9%	13.5%	85	799,616	43,539,499
Speak English Less Than Very Well (population 5 yrs and over)	1.8%	4.6%	8.5%	25	438,667	25,647,781

Source: JobsEQ®

1. American Community Survey 2014-2018, unless noted otherwise
2. Median values for certain aggregate regions (such as MSAs) may be estimated as the weighted averages of the median values from the composing counties.
3. Disconnected Youth are 16-19 year olds who are (1) not in school, (2) not high school graduates, and (3) either unemployed or not in the labor force.
4. Census 2019, annual average growth rate since 2009
5. See Rio Arriba errata note in the Data Dictionary.

Employment Trends

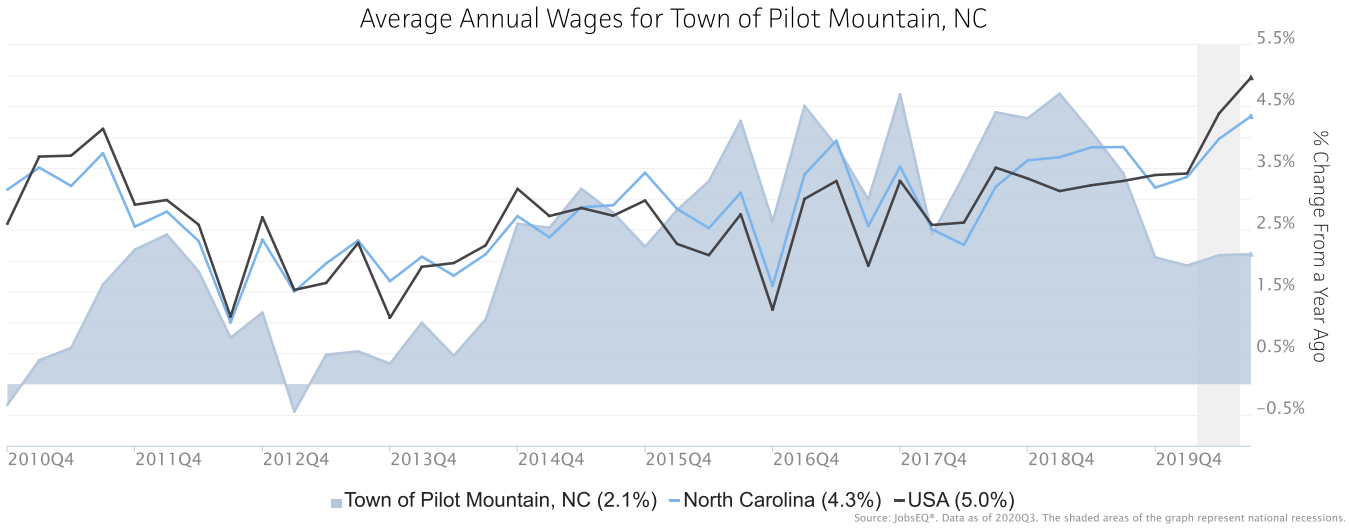
As of 2020Q3, total employment for the Town of Pilot Mountain, NC was 1,577 (based on a four-quarter moving average). Over the year ending 2020Q3, employment declined 4.9% in the region.



Employment data are derived from the Quarterly Census of Employment and Wages, provided by the Bureau of Labor Statistics and imputed where necessary. Data are updated through 2020Q2 with preliminary estimates updated to 2020Q3.

Wage Trends

The average worker in the Town of Pilot Mountain, NC earned annual wages of $38,222 as of 2020Q3. Average annual wages per worker increased 2.1% in the region over the preceding four quarters. For comparison purposes, annual average wages were $60,042 in the nation as of 2020Q3.



Annual average wages per worker data are derived from the Quarterly Census of Employment and Wages, provided by the Bureau of Labor Statistics and imputed where necessary. Data are updated through 2020Q2 with preliminary estimates updated to 2020Q3.

Cost of Living Index

The Cost of Living Index estimates the relative price levels for consumer goods and services. When applied to wages and salaries, the result is a measure of relative purchasing power. The cost of living is 12.2% lower in Town of Pilot Mountain, NC than the U.S. average.

Cost of Living Information

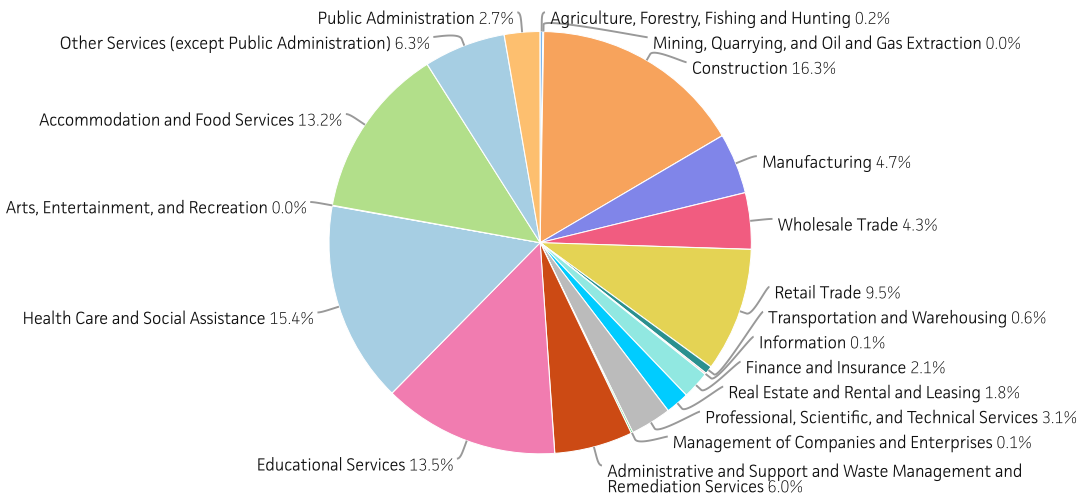
	Annual Average Salary	Cost of Living Index (Base US)	US Purchasing Power
Town of Pilot Mountain, NC	$38,222	87.8	$43,557
North Carolina	$52,909	93.9	$56,350
USA	$60,042	100.0	$60,042

Source: JobsEQ®
Data as of 2020Q3
Cost of Living per C2ER, data as of 2020q3, imputed by Chmura where necessary.

Industry Snapshot

The largest sector in the Town of Pilot Mountain, NC is Construction, employing 257 workers. The next-largest sectors in the region are Health Care and Social Assistance (243 workers) and Educational Services (213). High location quotients (LQs) indicate sectors in which a region has high concentrations of employment compared to the national average. The sectors with the largest LQs in the region are Construction (LQ = 2.78), Educational Services (1.64), and Accommodation and Food Services (1.64).

Total Workers for Town of Pilot Mountain, NC by Industry



Source: JobsEQ®,Data as of 2020Q3

Employment data are derived from the Quarterly Census of Employment and Wages, provided by the Bureau of Labor Statistics and imputed where necessary. Data are updated through 2020Q2 with preliminary estimates updated to 2020Q3.

Sectors in the Town of Pilot Mountain, NC with the highest average wages per worker are Mining, Quarrying, and Oil and Gas Extraction ($72,044), Management of Companies and Enterprises ($67,730), and Finance and Insurance ($53,184). Regional sectors with the best job growth (or most moderate job losses) over the last 3 years are Other Services (except Public Administration) (+12 jobs), Professional, Scientific, and Technical Services (+8), and Health Care and Social Assistance (+6).

Over the next 3 years, employment in the Town of Pilot Mountain, NC is projected to contract by 5 jobs. The fastest growing sector in the region is expected to be Health Care and Social Assistance with a +2.4% year-over-year rate of growth. The strongest forecast by number of jobs over this period is expected for Health Care and Social Assistance (+18 jobs), Accommodation and Food Services (0), and Transportation and Warehousing (0).

			Current		3-Year History			3-Year Forecast			
NAICS	Industry	Empl	Avg Ann Wages	LQ	Empl Change	Ann %	Total Demand	Exits	Transfers	Empl Growth	Ann % Growth
23	Construction	257	$49,557	2.78	4	0.5%	72	27	48	-3	-0.4%
62	Health Care and Social Assistance	243	$39,005	1.05	6	0.8%	88	35	36	18	2.4%
61	Educational Services	213	$40,307	1.64	-16	-2.3%	52	28	30	-6	-1.0%
72	Accommodation and Food Services	208	$14,919	1.64	-12	-1.8%	101	45	56	0	0.0%
44	Retail Trade	150	$28,847	0.93	-12	-2.6%	54	26	33	-5	-1.1%
81	Other Services (except Public Administration)	99	$29,676	1.43	12	4.5%	33	15	18	-1	-0.2%
56	Administrative and Support and Waste Management and Remediation Services	95	$26,527	0.96	-53	-13.7%	31	14	19	-1	-0.4%
31	Manufacturing	73	$42,467	0.56	-4	-1.6%	19	8	14	-3	-1.5%
42	Wholesale Trade	68	$44,750	1.13	-6	-2.6%	19	8	13	-2	-1.2%
54	Professional, Scientific, and Technical Services	50	$51,516	0.45	8	6.3%	12	5	8	-1	-0.4%
92	Public Administration	43	$38,390	0.56	-1	-0.6%	11	5	7	-1	-0.4%
52	Finance and Insurance	33	$53,184	0.51	-6	-5.5%	9	4	6	-1	-0.5%
53	Real Estate and Rental and Leasing	28	$40,367	1.03	6	8.0%	8	4	5	-1	-0.9%
48	Transportation and Warehousing	10	$49,249	0.13	-1	-2.2%	3	1	2	0	-1.3%
11	Agriculture, Forestry, Fishing and Hunting	4	$41,617	0.17	0	-4.2%	1	0	1	0	-2.0%
51	Information	2	$26,384	0.06	0	-2.1%	0	0	0	0	-0.2%
55	Management of Companies and Enterprises	2	$67,730	0.07	-1	-8.0%	0	0	0	0	-0.2%
21	Mining, Quarrying, and Oil and Gas Extraction	1	$72,044	0.11	-1	-23.9%	0	0	0	0	-0.3%
	Total - All Industries	**1,577**	**$38,222**	**1.00**	**-75**	**-1.5%**	**510**	**220**	**294**	**-5**	**-0.1%**

Source: JobsEQ®

Employment data are derived from the Quarterly Census of Employment and Wages, provided by the Bureau of Labor Statistics and imputed where necessary. Data are updated through 2020Q2 with preliminary estimates updated to 2020Q3. Forecast employment growth uses national projections adapted for regional growth patterns.

Occupation Snapshot

The largest major occupation group in the Town of Pilot Mountain, NC is Food Preparation and Serving Related Occupations, employing 201 workers. The next-largest occupation groups in the region are Construction and Extraction Occupations (178 workers) and Educational Instruction and Library Occupations (160). High location quotients (LQs) indicate occupation groups in which a region has high concentrations of employment compared to the national average. The major groups with the largest LQs in the region are Construction and Extraction Occupations (LQ = 2.43), Healthcare Support Occupations (2.27), and Educational Instruction and Library Occupations (1.80).

Occupation groups in the Town of Pilot Mountain, NC with the highest average wages per worker are Management Occupations ($94,600), Legal Occupations ($85,100), and Healthcare Practitioners and Technical Occupations ($74,600). The unemployment rate in the region varied among the major groups from 2.1% among Healthcare Practitioners and Technical Occupations to 15.9% among Personal Care and Service Occupations.

Over the next 3 years, the fastest growing occupation group in the Town of Pilot Mountain, NC is expected to be Healthcare Support Occupations with a +2.9% year-over-year rate of growth. The strongest forecast by number of jobs over this period is expected for Healthcare Support Occupations (+14 jobs) and Healthcare Practitioners and Technical Occupations (+1). Over the same period, the highest separation demand (occupation demand due to retirements and workers moving from one occupation to another) is expected in Food Preparation and Serving Related Occupations (104 jobs) and Healthcare Support Occupations (70).

Town of Pilot Mountain, NC, 2020Q3[1]

		Current						3-Year History		3-Year Forecast				
SOC	Occupation	Empl	Mean Ann Wages[2]	LQ	Unempl	Unempl Rate	Online Job Ads	Empl Change	Ann %	Total Demand	Exits	Transfers	Empl Growth	Ann % Growth
35-0000	Food Preparation and Serving Related	201	$20,700	1.63	6	13.3%	n/a	-10	-1.7%	104	43	61	0	0.1%
47-0000	Construction and Extraction	178	$38,900	2.43	5	9.9%	n/a	3	0.5%	56	17	41	-2	-0.4%
25-0000	Educational Instruction and Library	160	$41,700	1.80	5	5.8%	n/a	-11	-2.2%	37	18	22	-4	-0.8%
31-0000	Healthcare Support	160	$24,800	2.27	2	5.0%	n/a	5	1.1%	84	36	34	14	2.9%
41-0000	Sales and Related	141	$34,200	0.93	5	6.9%	n/a	-12	-2.7%	54	24	34	-4	-1.0%
43-0000	Office and Administrative Support	136	$35,000	0.67	3	5.2%	n/a	-15	-3.5%	40	19	26	-5	-1.3%
53-0000	Transportation and Material Moving	113	$33,700	0.86	5	8.7%	n/a	-14	-3.9%	41	16	27	-2	-0.5%
11-0000	Management	82	$94,600	0.79	2	2.9%	n/a	1	0.3%	19	6	14	-1	-0.4%
51-0000	Production	72	$33,200	0.78	3	7.9%	n/a	-15	-5.9%	22	8	16	-3	-1.2%
49-0000	Installation, Maintenance, and Repair	69	$45,500	1.14	1	4.9%	n/a	-3	-1.5%	20	6	14	0	-0.2%
13-0000	Business and Financial Operations	47	$62,300	0.53	1	3.3%	n/a	-1	-0.6%	13	4	9	0	-0.3%
29-0000	Healthcare Practitioners and Technical	41	$74,600	0.45	1	2.1%	n/a	-2	-1.2%	9	3	4	1	0.8%
39-0000	Personal Care and Service	38	$26,300	0.92	3	15.9%	n/a	-1	-0.7%	17	8	9	0	-0.1%
37-0000	Building and Grounds Cleaning and Maintenance	35	$25,200	0.67	2	7.6%	n/a	-4	-3.7%	13	6	8	0	-0.1%
21-0000	Community and Social Service	21	$44,400	0.76	0	n/a	n/a	2	2.9%	8	2	5	1	0.8%
17-0000	Architecture and Engineering	20	$70,600	0.74	0	n/a	n/a	3	6.5%	5	1	3	0	-0.5%

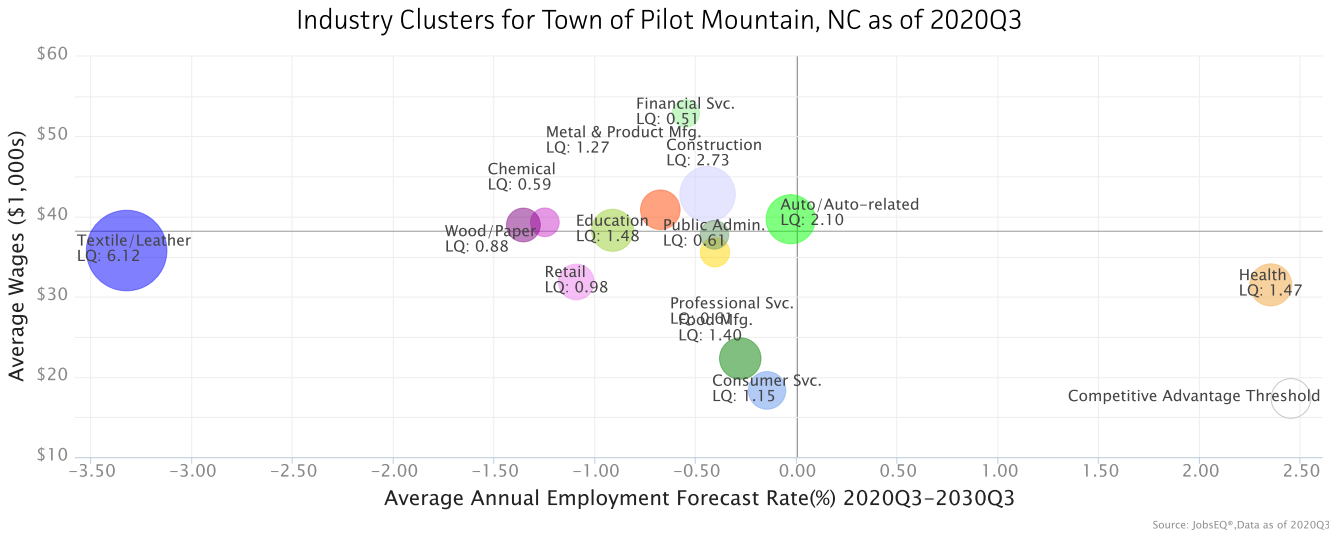
Town of Pilot Mountain, NC, 2020Q3[1]

		Current						3-Year History		3-Year Forecast				
SOC	Occupation	Empl	Mean Ann Wages[2]	LQ	Unempl	Unempl Rate	Online Job Ads	Empl Change	Ann %	Total Demand	Exits	Transfers	Empl Growth	Ann % Growth
33-0000	Protective Service	20	$37,800	0.59	0	n/a	n/a	0	0.3%	6	3	3	0	-0.4%
15-0000	Computer and Mathematical	16	$70,400	0.34	0	n/a	n/a	-2	-3.4%	3	1	3	0	-0.3%
27-0000	Arts, Design, Entertainment, Sports, and Media	13	$39,600	0.45	1	9.0%	n/a	1	1.8%	4	1	3	0	-0.5%
19-0000	Life, Physical, and Social Science	5	$58,000	0.37	0	n/a	n/a	0	0.0%	1	0	1	0	-0.2%
23-0000	Legal	4	$85,100	0.30	0	n/a	n/a	0	-1.9%	1	0	0	0	-0.2%
45-0000	Farming, Fishing, and Forestry	2	$31,900	0.20	0	n/a	n/a	0	4.0%	1	0	1	0	-0.8%
	Total - All Occupations	**1,577**	**$41,800**	**1.00**	**n/a**	**n/a**	**n/a**	**-75**	**-1.5%**	**557**	**224**	**337**	**-4**	**-0.1%**

Source: JobsEQ®
Data as of 2020Q3 unless noted otherwise
Note: Figures may not sum due to rounding.
1. Data based on a four-quarter moving average unless noted otherwise.
2. Wage data are as of 2019 and represent the average for all Covered Employment
Occupation employment data are estimated via industry employment data and the estimated industry/occupation mix. Industry employment data are derived from the Quarterly Census of Employment and Wages, provided by the Bureau of Labor Statistics and currently updated through 2020Q2, imputed where necessary with preliminary estimates updated to 2020Q3. Wages by occupation are as of 2019 provided by the BLS and imputed where necessary. Forecast employment growth uses national projections from the Bureau of Labor Statistics adapted for regional growth patterns.

Industry Clusters

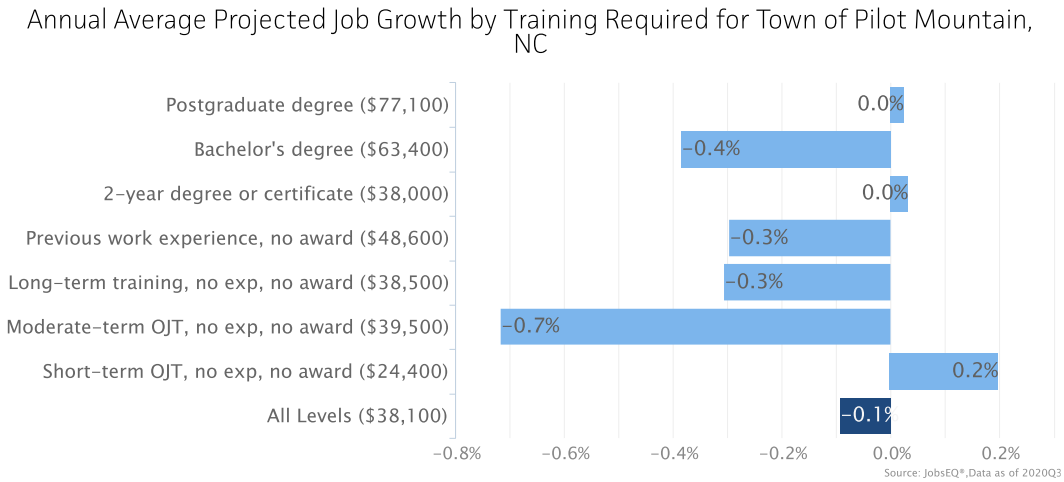
A cluster is a geographic concentration of interrelated industries or occupations. The industry cluster in the Town of Pilot Mountain, NC with the highest relative concentration is Textile/Leather with a location quotient of 6.12. This cluster employs 13 workers in the region with an average wage of $35,782. Employment in the Textile/Leather cluster is projected to contract in the region about 3.3% per year over the next ten years.



Location quotient and average wage data are derived from the Quarterly Census of Employment and Wages, provided by the Bureau of Labor Statistics, imputed where necessary, and updated through 2020Q2 with preliminary estimates updated to 2020Q3. Forecast employment growth uses national projections from the Bureau of Labor Statistics adapted for regional growth patterns.

Education Levels

Expected growth rates for occupations vary by the education and training required. While all employment in the Town of Pilot Mountain, NC is projected to contract 0.1% over the next ten years, occupations typically requiring a postgraduate degree are expected to grow 0.0% per year, those requiring a bachelor's degree are forecast to contract 0.4% per year, and occupations typically needing a 2-year degree or certificate are expected to grow 0.0% per year.



Employment by occupation data are estimates are as of 2020Q3. Education levels of occupations are based on BLS assignments. Forecast employment growth uses national projections from the Bureau of Labor Statistics adapted for regional growth patterns.

Town of Pilot Mountain, NC Regional Map

Source: JobsEQ®, http://www.chmuraecon.com/jobseq

FAQ

What is a location quotient?

A location quotient (LQ) is a measurement of concentration in comparison to the nation. An LQ of 1.00 indicates a region has the same concentration of an industry (or occupation) as the nation. An LQ of 2.00 would mean the region has twice the expected employment compared to the nation and an LQ of 0.50 would mean the region has half the expected employment in comparison to the nation.

What is separation demand?

Separation demand is the number of jobs required due to separations—labor force exits (including retirements) and turnover resulting from workers moving from one occupation into another. Note that separation demand does not include all turnover—it does not include when workers stay in the same occupation but switch employers. The total projected demand for an occupation is the sum of the separation demand and the growth demand (which is the increase or decrease of jobs in an occupation expected due to expansion or contraction of the overall number of jobs in that occupation).

What is a cluster?

A cluster is a geographic concentration of interrelated industries or occupations. If a regional cluster has a location quotient of 1.25 or greater, the region is considered to possess a competitive advantage in that cluster.

What is the difference between industry wages and occupation wages?

Industry wages and occupation wages are estimated via separate data sets, often the time periods being reported do not align, and wages are defined slightly differently in the two systems (for example, certain bonuses are included in the industry wages but not the occupation wages). It is therefore common that estimates of the average industry wages and average occupation wages in a region do not match exactly.

What is NAICS?

The North American Industry Classification System (NAICS) is used to classify business establishments according to the type of economic activity. The NAICS Code comprises six levels, from the “all industry” level to the 6-digit level. The first two digits define the top level category, known as the “sector,” which is the level examined in this report.

What is SOC?

The Standard Occupational Classification system (SOC) is used to classify workers into occupational categories. All workers are classified into one of over 804 occupations according to their occupational definition. To facilitate classification, occupations are combined to form 22 major groups, 95 minor groups, and 452 occupation groups. Each occupation group includes detailed occupations requiring similar job duties, skills, education, or experience.

2020 Year End Numbers and Report

Layoffs

In 2020 many companies both large and small had layoffs due to COVID 19. To date, we cannot tell how many were or are going to be permanent. Most of our companies and small businesses have hired back the majority of their workforce, but there are still some companies that have lower counts. Many of our local companies actually added employees in 2020 after the first wave of layoffs were recalled. To the SCEDP's knowledge, there have not been any large permanent layoffs officially here Surry County in 2020.

Project Activity

Total Project Inquiries -	50	39/2019
Client visits -	7	7/2019

We had 23 inquiries that we could not respond to due to lack of the appropriate building or site

Of the 27 project inquiries that we responded to:

18 manufacturing projects
3 distribution projects
3 commercial related
1 office
2 unknown

57% of all (responded and not responded) inquiries wanted an existing building
12% wanted a site or a building
27% wanted a site

2020 Projects

Phoenix Industries – Cloud based storage facility. Purchased a site in the Piedmont Triad West Corporate Park and will invest approximately $5 million over two phases. They are a large power user and we were made aware of this project by Duke Energy. Unfortunately there will be no full time permanent jobs with this project.

Texwipe – An ITW company that manufactures clean room cleaning materials has purchased the former Hanes building in Mount Airy and plans to initially invest over $2 million and create over 35 new jobs.

Cardinal CT – An existing company in Mount Airy that makes glass windows, completed its $7 million expansion with the creation of approximately 11 new jobs.

Industry visits -	72	85/2019
Industry follow up -	39	37/2019
Small Business meetings -	140	156/2019
Entrepreneur meetings -	14	17/2019
Connections/Referrals -	109	87/2019

As you can see, the majority of our existing industry and small business numbers were down in 2020. This is all attributed to COVID 19 and companies limiting meetings and visits to their facility. This trend is continuing into "21 and will have an effect on those numbers as well. However; we did make more connections and local referrals during this time. There were a lot of companies looking for partners and other resources, especially during the first few months of COVID 19.

I would also like to add that during the first few months of COVID 19 we worked with many of our local companies who are investors with the EDP to purchase masks and distribute them to local non profits, schools, churches, and other agencies. Our investors provided over 5,000 masks to our community during this time. The EDP helped coordinate the collection and distribution of these masks in the community.

Marketing

Planned and executed two shop local campaigns to support local business during COVID 19
Added and updated a new COVID 19 Resources section on our website
Updated and added info to SCEDP website adding info about quality of place
Continued to update Labor Market Trends flyer
Updated Facebook, LinkedIn with news, local company info and building and site videos
Continued to use Twitter to recognize Surry County companies and provide information
Continued to list buildings and sites on LoopNet and added CREXi – paid service largest in US
Continued to update the State of NC buildings and sites data base with Surry County available properties
One trip to Greenville South Carolina to meet with site selection and industrial real estate consultants
Attended 1 NCEDA Network lunch meetings in Greensboro
Continued to add aerial videos of sites not already done
Hosted a Manufacturing Day tour of 4 existing companies
Up dated the Business Services, Trucking, Spirits and Manufacturing Directories on website
Marketed Shop Small Saturday

Our marketing events and efforts were cut back during 2020 primarily because of COVID 19. All of our planned marketing trips and events were canceled except for one that happened the first week of February. Meetings and tradeshows were canceled as well. We did virtually attend a couple of seminars, trade shows and workshops, but nothing in person. We hope this trend will be reversed in 2021.

Programs

Youth Leadership Surry – This program was put on hold due to students not being in school due to COVID 9

Leadership Surry County – This program was canceled for 2020 due to COVID 19. We could not utilize the Surry Community College resources and we did not have a large enough class to make it worthwhile. We hope to start it again in September of "21

Surry First Lego League – This program was put on hold due to students not being in school due to COVID 19.

UNCG Student projects – We were able to coordinate once again with UNCG Bryan School of Business to get hospitality and tourism students to work with local businesses in Surry County. We did most of this virtually and it was a smaller group. We had four student groups that worked with 4 local businesses on things like websites, marketing plans and social media assistance.

Surry County Human Resource Association – Once again, Andrew was very involved in this group. He helped put together multiple meetings and presentations for the organization. Andrew will continue to stay involved with this group and act as the Vice Chairman in 2021.

Small Business Saturday – Helped the chambers in Mount Airy and Elkin organize and distribute information for the Shop Small campaign the Saturday after Thanksgiving as well as in Pilot Mountain and Dobson. Met with local small businesses and gave them information and marketing materials to use. There was not as much emphasis put on this program from a national perspective as in years past.

Manufacturing Week – This year we had to shorten our Manufacturing Week activities due to restriction because of COVID 19. We did have four industry tours around the county. The tours were well attended and the businesses appreciated the recognition.

COVID 19 had a negative impact on our marketing and programming ability in 2020. We did work through many of the issues, but local, state and national mandates made it difficult. We have started to work on more things virtually, and will utilize available technology going forward to work through these challenging times.

The Surry County Economic Development Partnership finished the 2019-2020 fiscal year under budget with approximately $147,000 in the fund balance.