MINUTES

February 28, 2024

SECOND MONTHLY MEETING OF THE CITY COUNCIL

CITY OPERATIONS CENTER | 305 WILLIAMS ST. | 4:00 p.m.

Present: Mayor Barbara Volk, Mayor Pro Tem Lyndsey Simpson and Council Members: Dr. Jennifer Hensley, Debbie O'Neal-Roundtree and Jeff Miller

Staff Present: Assistant City Manager Brian Pahle, City Clerk Jill Murray, City Attorney Angela Beeker, Communications Manager Allison Justus, Budget Manager Adam Murr, Public Services Director Brent Detwiler, Community Development Director Lew Holloway, Utilities Director Adam Steurer, and others.

Via Zoom: City Manager John Connet

Consultants: Jared Hostetler and Crystal Broadbent of Hazen & Sawyer

1. CALL TO ORDER

Mayor Barbara Volk called the meeting to order at 4:00 p.m. and welcomed those in attendance. A quorum was established with all members in attendance.

2. CONSIDERATION OF AGENDA

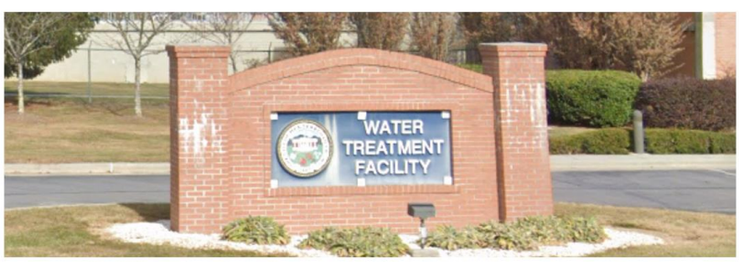
Council Member Lyndsey Simpson moved that City Council approve the agenda as presented. A unanimous vote of the Council followed. Motion carried.

3. PRESENTATIONS

A. Presentation of City of Hendersonville Water Distribution and Water Treatment Facility Master Plans – *Adam Steurer, Utilities Director*

Adam Steurer introduced Jared Hostetler and Crystal Broadbent of Hazen & Sawyer who presented the following PowerPoint presentation.

Hazen



Hendersonville Water Sewer

Water Treatment Facility and Distribution System Master Plans

Hendersonville Water and Sewer Advisory Council

February 28, 2024

Introduction

Hazen Team

Crystal Broadbent, Senior Associate

- 23 years of experience with Hazen
- Focus on hydraulic and surge modeling

Jared Hostetler, Associate

- 12 years (8 with Hazen)
- Focus on drinking water/wastewater treatment and pumping systems

Hazen and Sawyer (Hazen)

- Formed in 1951
- Focused exclusively on water & sewer projects

Meeting Agenda

If you need a subhead, put it here

- *Master Plan Goals and Drivers*
- *Hendersonville System Demands*
- *Water Treatment Facility*
- *Water Distribution System*

Hazen

What is a Master Plan?

This is the first WTF Master Plan; This is an update for the Distribution System Master Plan

Both look at every component within the system

Master Plans Provide:

- Plan for growth
- Plan for redundancy and resiliency
- Improve system capacity
- Optimize operations
- Assist fire departments with Insurance Service Office (ISO) rating
- Provide preliminary engineering for developing projects to be constructed
- Identify major capital improvements to be incorporated into City's budget

Capital Improvement Projects (CIPs) – Overview of Drivers

If you need a subhead, put it here

- Water Treatment Facility
  - Capacity expansion needs (meeting future demands)
  - Replacement of aging equipment
  - Rehabilitation of facilities
  - Risk reduction (process/personnel)
  - Process efficiency/operability improvements
- Distribution (project drivers not individual projects)
  - Improving Pressure
  - Connectivity/Redundancy
  - Fire Flow (areas less than 1,000 gpm)
  - Meet Future Demand

Future Demand

Current and Future Service Area

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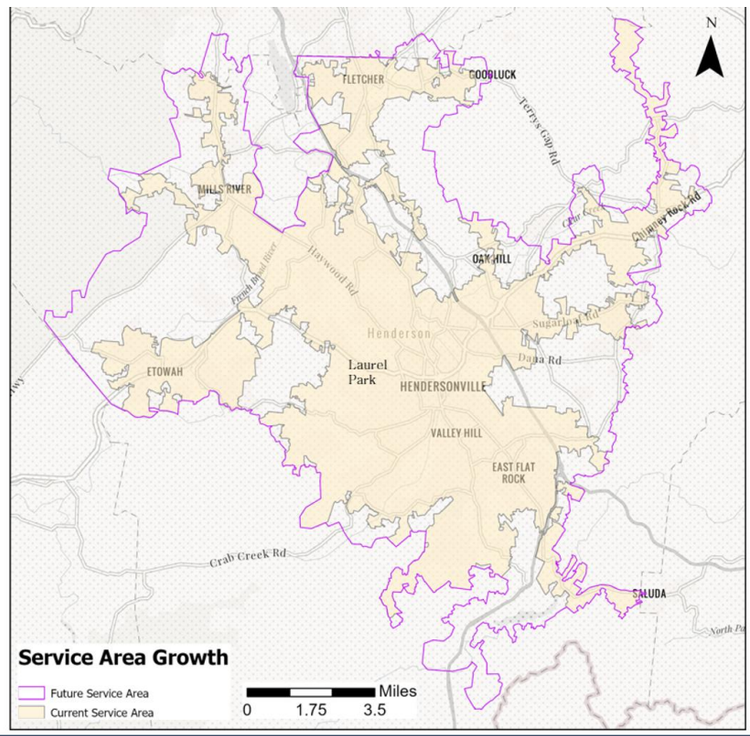

Future Water Demands Based on Traffic Analysis Zones (TAZs) and Input From City and County Planning Department

If you need a subhead, put it here

2050 TAZ Population Density

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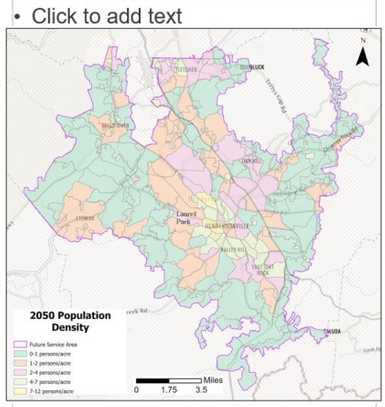

2050 TAZ Employment Density

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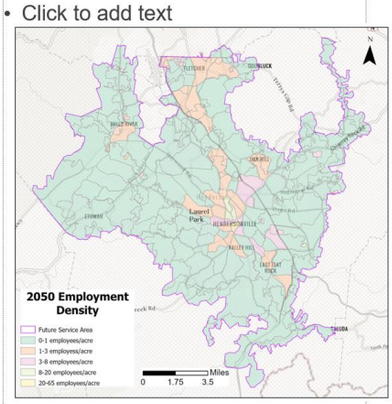
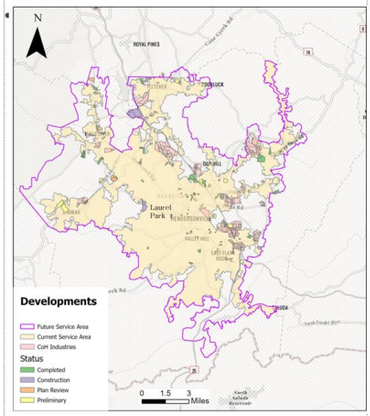


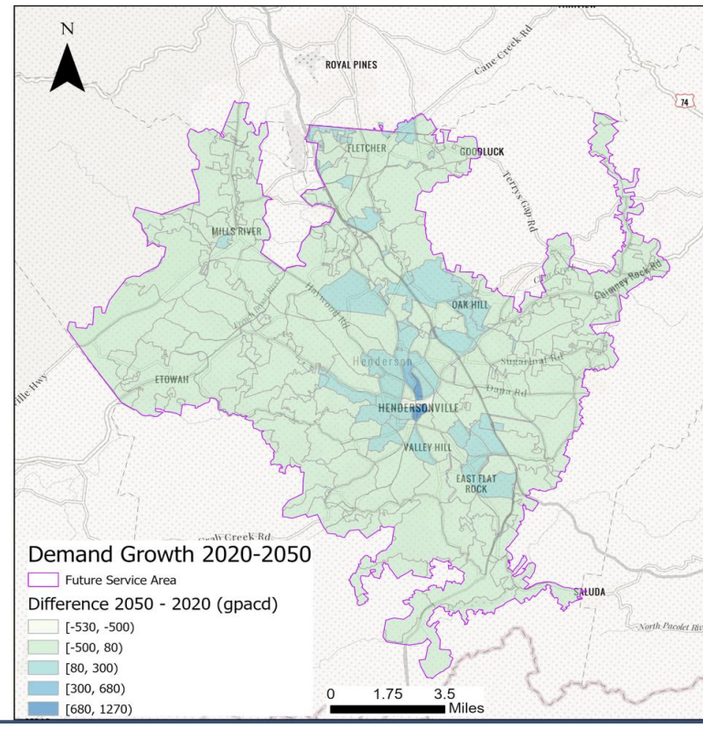
New Developments and Industries



Future Demand Projections and Growth Areas

Demand Growth from 2020 – 2050

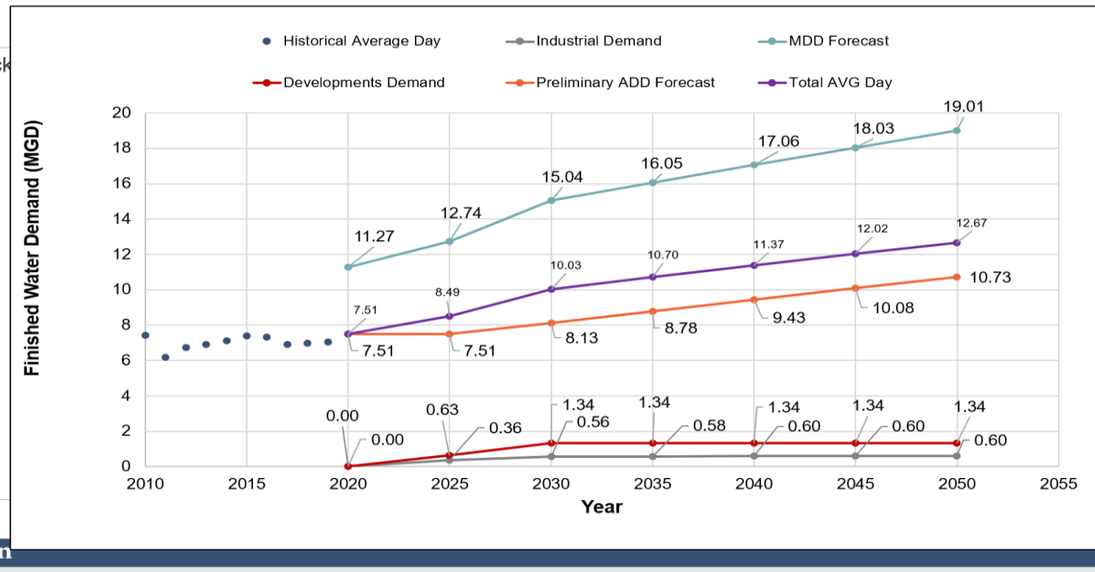
Caption for the image or graphic. Should not need bullets because the image/graphic speaks for itself



Future Demand Projections and Growth Areas

Finished Water Demand for City

- Click



Hazen

WTF Capacity, FWPS Capacity, and Future Demand

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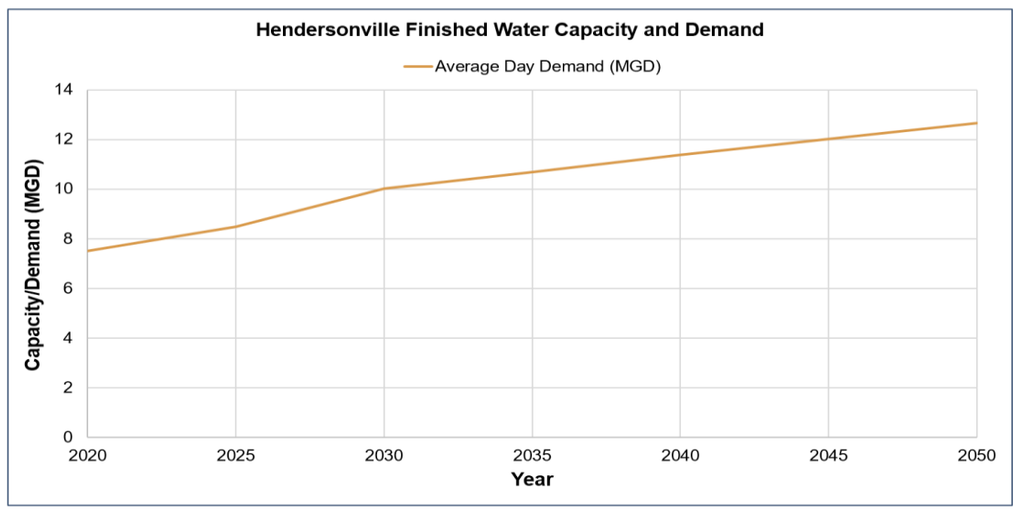
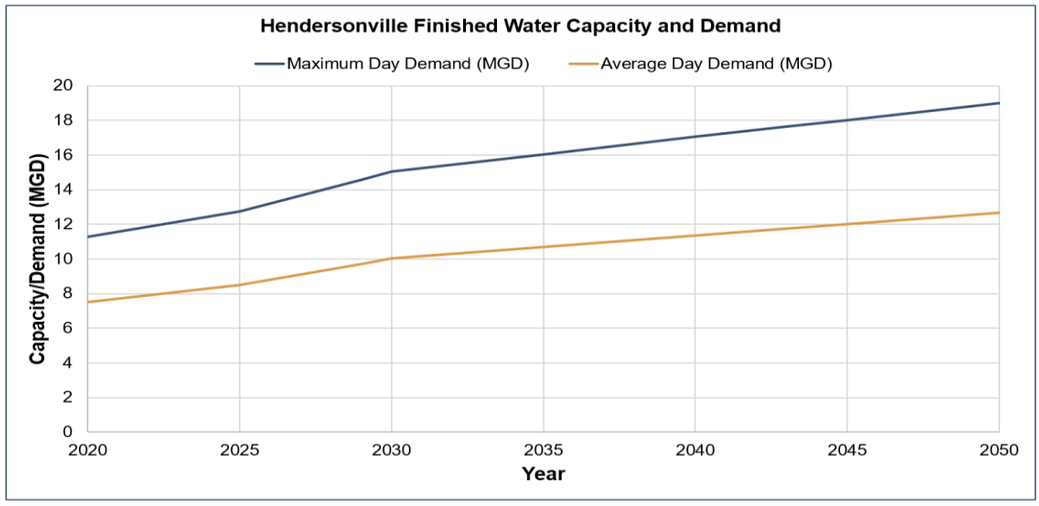


WTF Capacity, FWPS Capacity, and Future Demand

Peaking Factor 1.5



WTF Capacity, FWPS Capacity, and Future Demand

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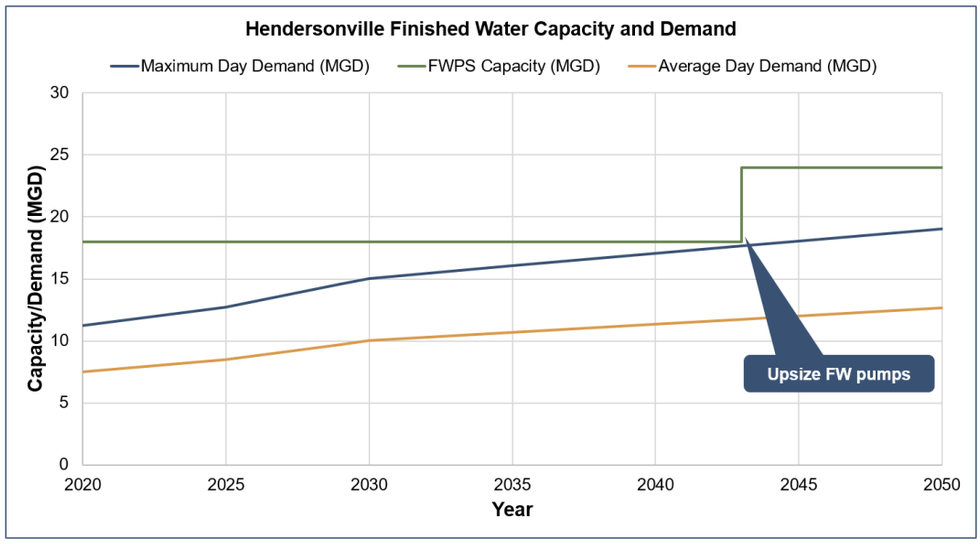

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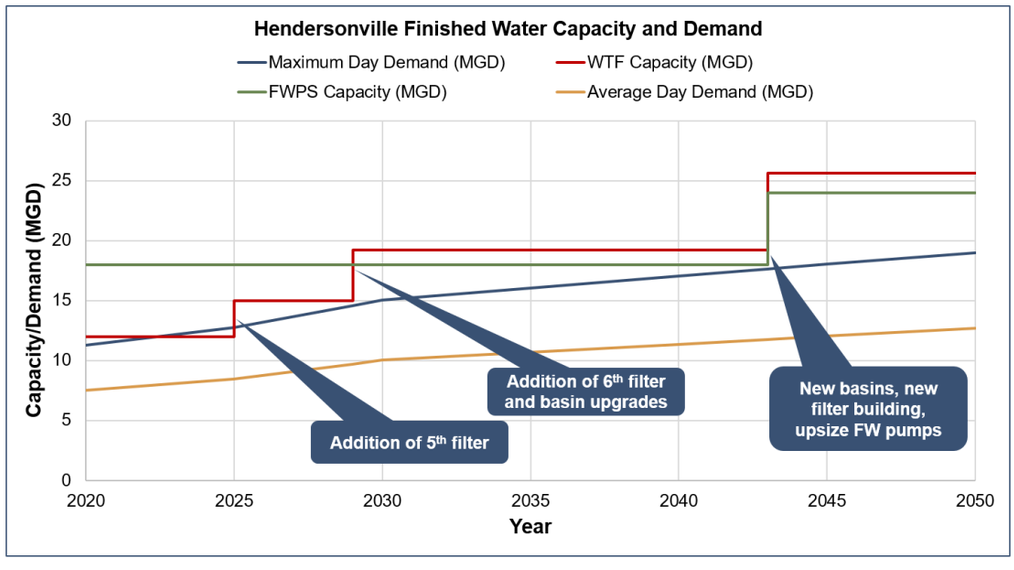


Water Treatment Facility

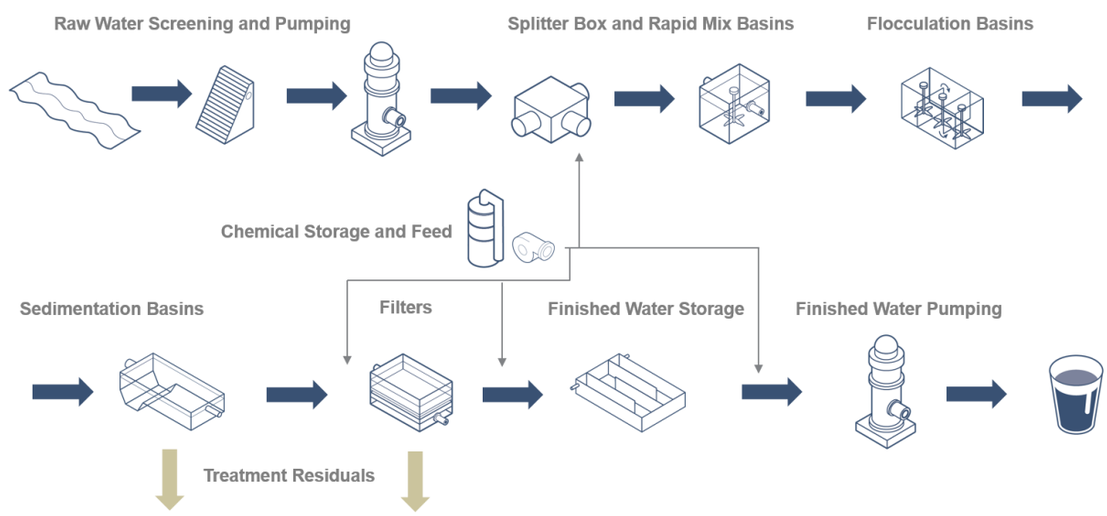
Water Treatment Facility

Overview

- Located on Hwy 191 (Haywood Rd.) in Mills River
- Originally constructed in the mid-1960s, with subsequent major improvements including:
  - Residuals thickening and dewatering facilities
  - Several upgrades to process basins, filters, chemical facilities, and pumping stations
- WTF is permitted to treat 12 MGD
  - 2023 average day flow: 7.3 MGD
  - 2023 maximum day flow: 9.4 MGD
- Finished water is analyzed for a wide range of potential contaminants and water quality parameters in accordance with state and federal regulations.

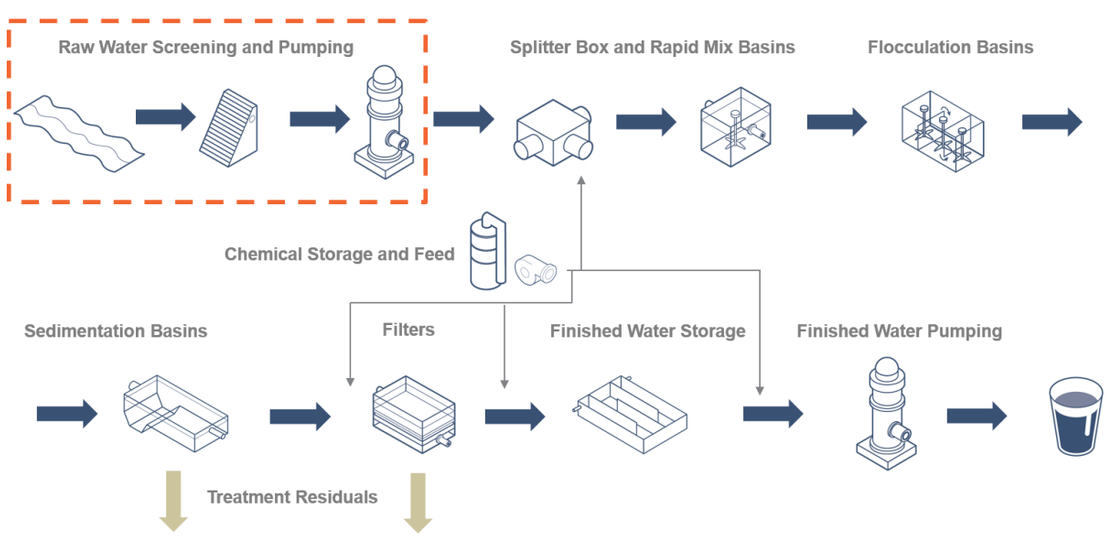
Water Treatment Facility Master Plan

Process Overview



Water Treatment Facility Master Plan

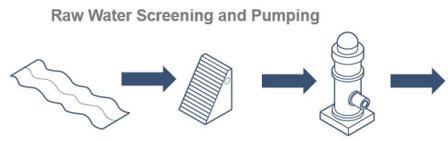
Process Overview

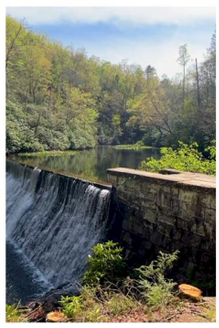


Water Treatment Facility Master Plan

Raw Water Screening and Pumping Facilities

- Mills River Intake and Pump Station
  - Permitted withdrawal capacity 12 MGD
- French Broad Intake and Pump Station
  - Under construction
  - Permitted withdrawal capacity 15 MGD
- North Fork Reservoir and Transmission Main
  - Located in Pisgah National Forest
  - Permitted withdrawal capacity 2 MGD
  - Flows by gravity to HWTF
- Bradley Creek Reservoir and Transmission Main
  - Located in Pisgah National Forest
  - Permitted withdrawal capacity 2.5 MGD
  - Flows by gravity to HWTF
- Total Permitted Raw Water Capacity = 31.5 MGD

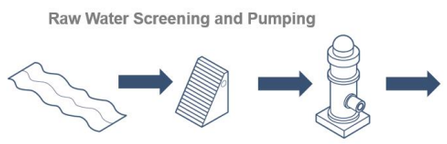




Water Treatment Facility Master Plan

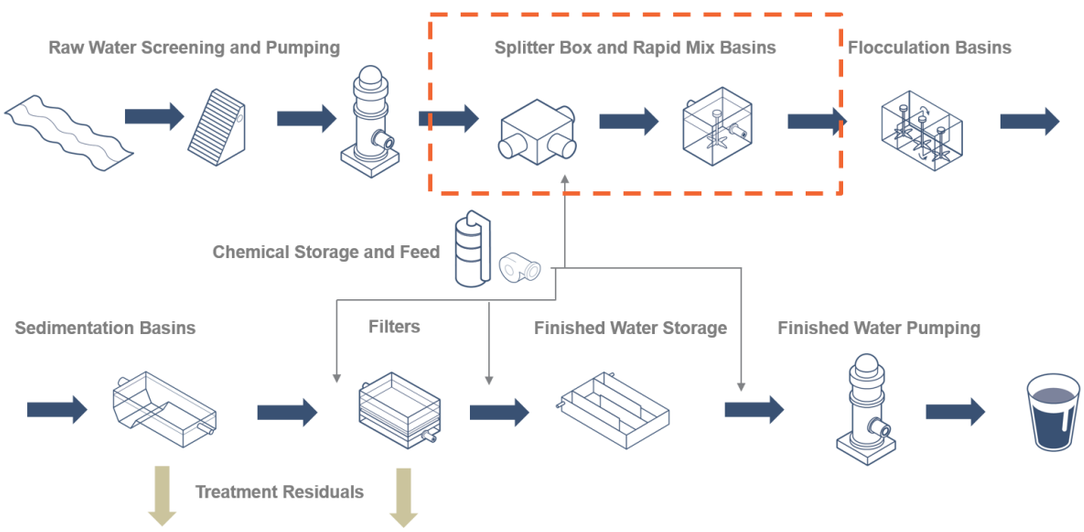
Raw Water Screening and Pumping Facilities

- Mills River Intake and Pump Station
  - Air burst equipment to be replaced
    - *Will allow leaves and debris to more effectively be cleaned from intake screens*
- French Broad Intake and Pump Station
  - N/A
- North Fork Reservoir and Transmission Main
  - Aging transmission main to be inspected and assessed
    - *Remaining service life and needed repairs will be confirmed*
- Bradley Creek Reservoir and Transmission Main
  - Aging transmission main to be inspected and assessed
    - *Remaining service life and needed repairs will be confirmed*



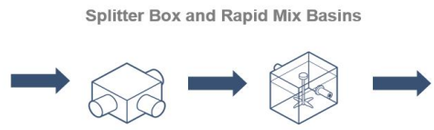
Water Treatment Facility Master Plan

Process Overview

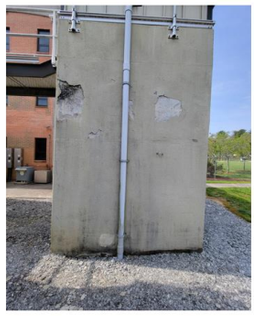


Water Treatment Facility Master Plan

Splitter Box and Rapid Mix Basins

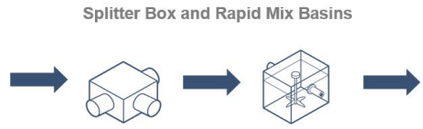


- Splitter Box
  - Receives flow from all raw water sources
  - Distributes it to the east and west process trains
  - Raw water treatment chemicals added here
- Rapid Mix Basins (East and West)
  - Equipped with vertical mixers which are not in service



Water Treatment Facility Master Plan

Splitter Box and Rapid Mix Basins

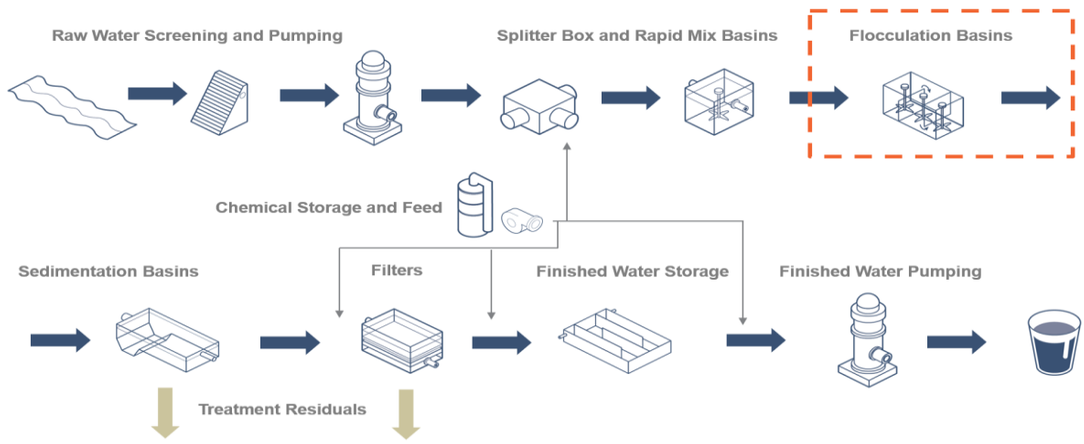


- Splitter Box
  - River water lines to be interconnected in the yard upstream
    - *Will provide operational flexibility, allowing either rate setter to be used*
  - Minor structural repairs
- Rapid Mix Basins (West)
  - Piping to be extended to west train during future expansion phase
    - *Will allow capacity to be increased*



Water Treatment Facility Master Plan

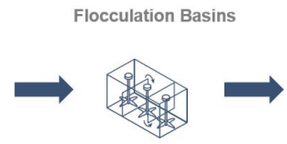
Process Overview



Water Treatment Facility Master Plan

Flocculation Basins

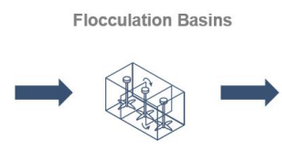
- Flocculation Basins
  - Promote growth of "flocs" by gentle mixing
  - Mixing energy is gradually decreased through the process
  - Certain amount of mixing time is required

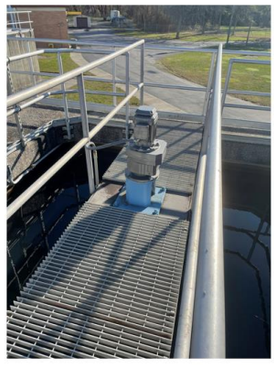


Water Treatment Facility Master Plan

Flocculation Basins

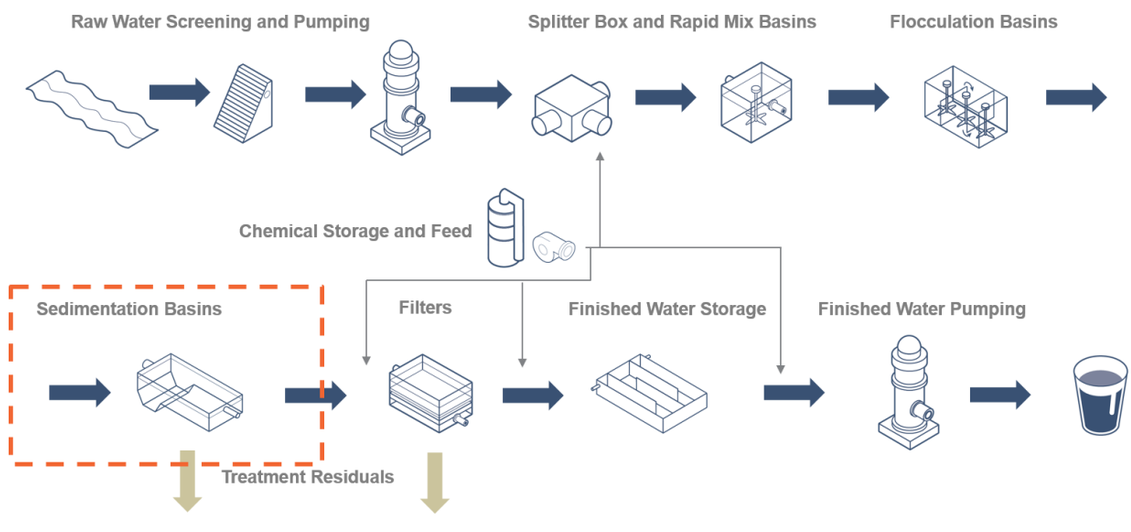
- Flocculation Basins
  - **East basins to be retrofitted during future expansion phase**
    - *Will provide additional mixing time and address minor structural issues*
  - **New basins to be added to west train during future expansion phase**
    - *Will allow capacity to be increased*





Water Treatment Facility Master Plan

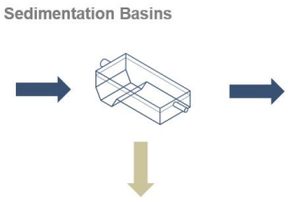
Process Overview



Water Treatment Facility Master Plan

Sedimentation Basins

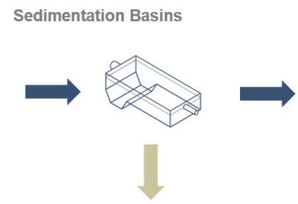
- Sedimentation Basins
  - Provide quiescent conditions for flocs to settle out
  - Settled sludge is removed periodically
  - Treatment capacity determined by basin geometry and the time the water spends in each basin

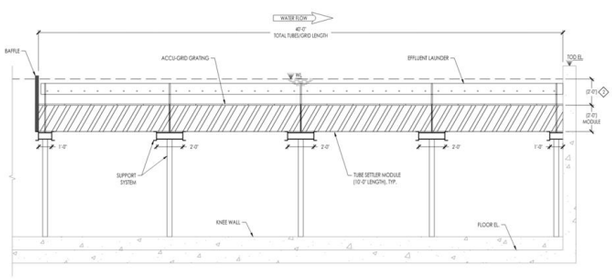


Water Treatment Facility Master Plan

Sedimentation Basins

- Sedimentation Basins
  - **All existing basins to be outfitted with tube settlers during future expansion phase**
    - *Will maximize available treatment capacity by increasing effective settling area*
  - **New basins to be added to west train during future expansion phase**
    - *Will allow capacity to be increased*

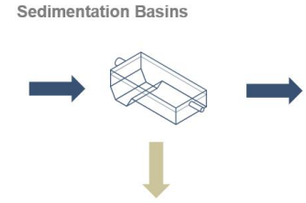


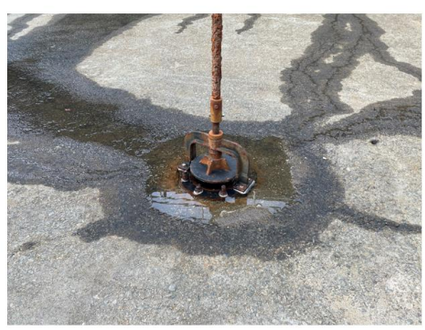


Water Treatment Facility Master Plan

Sedimentation Basins

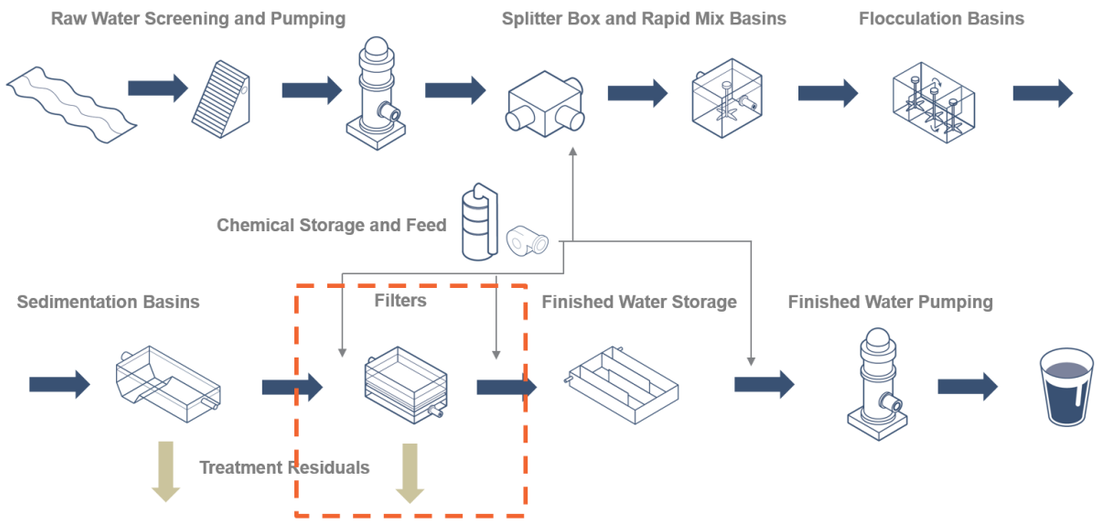
- Sedimentation Basins
  - **Minor structural repairs to existing basins**
    - *To include leak injection, mortar repair, coating application, etc.*
  - **Minor process efficiency improvements to existing basins**
    - *To include ladder replacement, additional portable cranes, valve replacement, etc.*





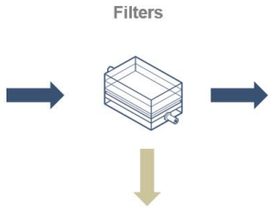
Water Treatment Facility Master Plan

Process Overview



Water Treatment Facility Master Plan

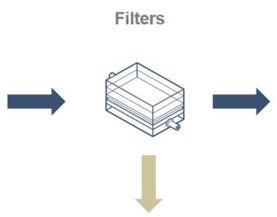
Filters



- Filters
  - Remove particles that are carried over from the sedimentation basins
  - Media bed consists of layers of anthracite coal and sand
  - Treatment capacity determined by basin geometry and media profile
  - Chlorine is added for disinfection
  - Filters are cleaned (backwashed) periodically

Water Treatment Facility Master Plan

Filters

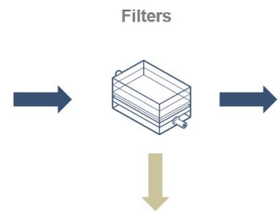


- Filters
  - **5th filter to be placed into service in 2025**
    - *Will increase the rated filtration capacity to 15 MGD*
  - **6th filter to be placed into service in future expansion phase**
    - *Will increase the rated filtration capacity to 19.2 MGD*
  - **7th and 8th filters to be constructed in future expansion phase**
    - *Will increase the rated filtration capacity to 25.6 MGD*

Water Treatment Facility Master Plan

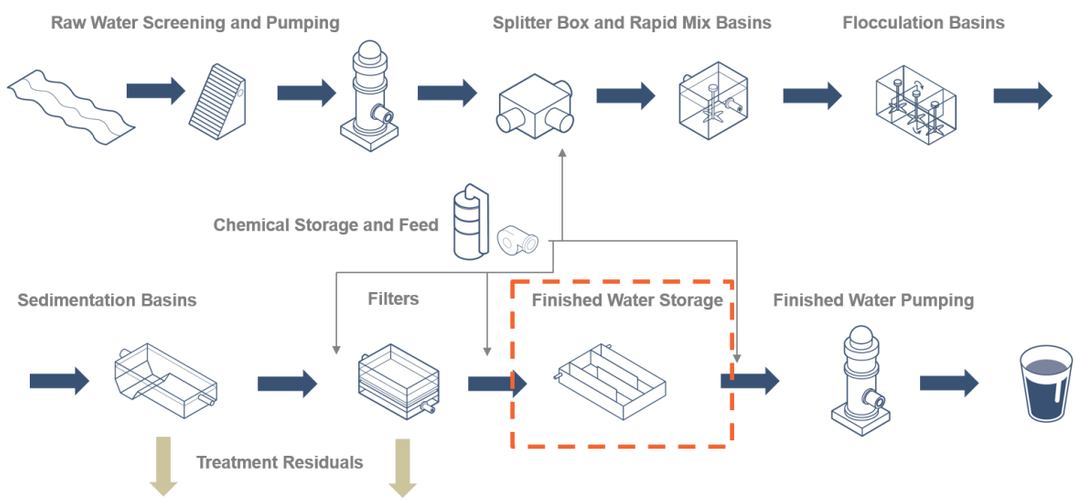
Filters

- Filters
  - **Additional backwash pump to be furnished in the near term**
    - *Will provide redundancy for critical process*
  - **Backwash air scour blowers to be replaced/relocated in future expansion phase**
    - *Will make room for future filter building*



Water Treatment Facility Master Plan

Process Overview



Water Treatment Facility Master Plan

Finished Water Storage

- Finished Water Storage
  - **Clearwell provides contact time for chlorine and other finished water chemicals**
  - **Also provides reserve storage volume upstream of Finished Water Pump Station**

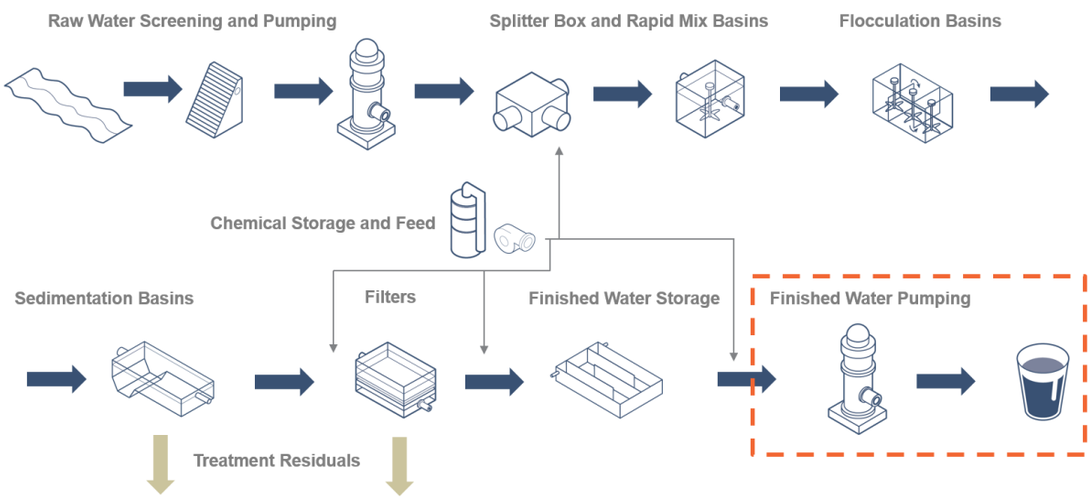
Water Treatment Facility Master Plan

Finished Water Storage

- Finished Water Storage
  - **Additional 2 MG clearwell to be constructed**
    - *Will provide redundancy and allow existing clearwell to be isolated for maintenance*
  - **Baffle curtains to be installed within existing clearwell following construction of new clearwell**
    - *Will improve chemical mixing and contact time within clearwell*

Water Treatment Facility Master Plan

Process Overview



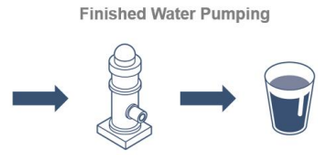
Water Treatment Facility Master Plan

Finished Water Pump Station

- Finished Water Pump Station
  - Recently upgraded (2019)
  - Pumps finished water into the distribution system to customers
  - Equipped with 4 FW pumps – firm capacity 18 MGD
  - Ultimate firm capacity 24 MGD
  - Houses backwash pump as well

Water Treatment Facility Master Plan

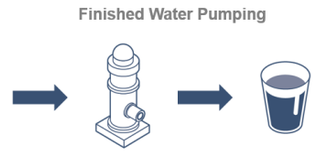
Finished Water Pump Station



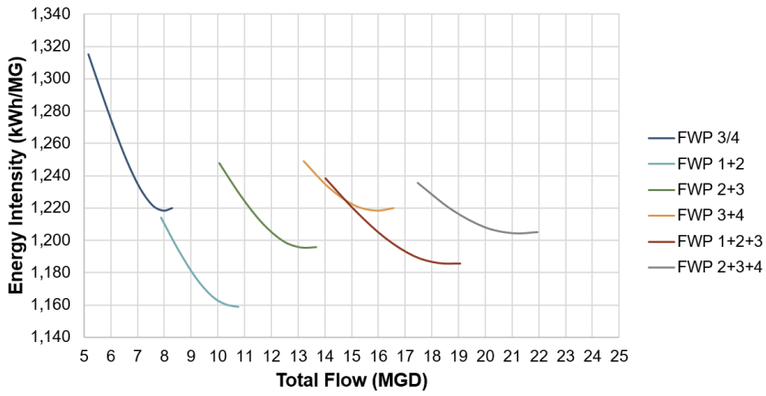
- Finished Water Pump Station
  - **FW Pumps No. 1 & No. 2 to be upsized in future expansion phase**
    - *Will increase firm pumping capacity to 24 MGD*
  - **Ancillary improvements to FWPS**
    - *To include access/egress and plumbing improvements*
  - **Redundant finished water line**
    - *Routed from FWPS to transmission main on Hwy 191*

Water Treatment Facility Master Plan

Finished Water Pump Station – Energy Optimization

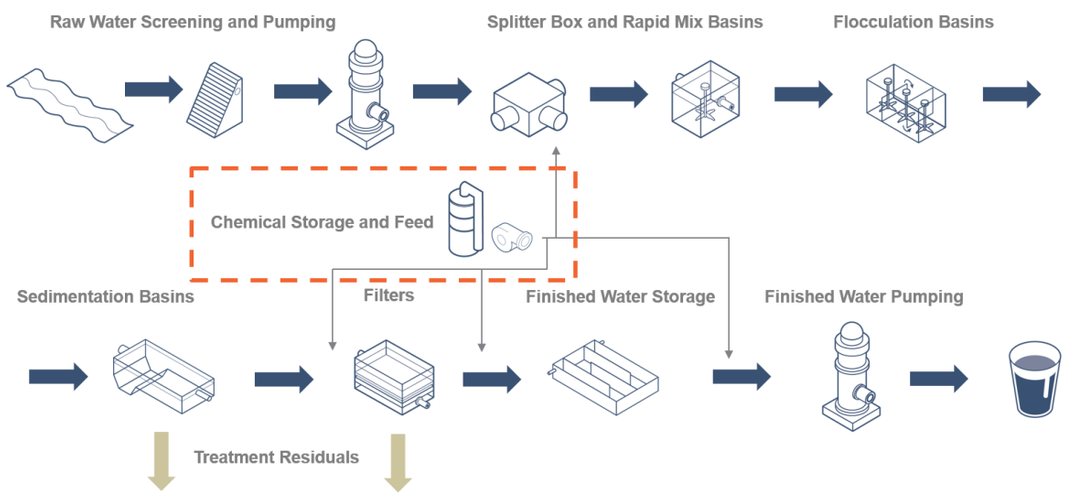


- No CIPs identified to improve energy efficiency at the WTF
- Hazen included recommendations to operate the FW pumps in the most efficient manner (minimizing kWh per MG pumped)



Water Treatment Facility Master Plan

Process Overview

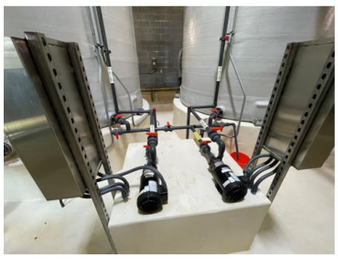


Water Treatment Facility Master Plan

Chemical Storage and Feed

Chemical Storage and Feed Facilities

- Polyaluminum chloride
  - Coagulant
  - Fed at splitter box
- Sodium hydroxide
  - pH adjustment
  - Fed at splitter box and upstream of clearwell
- Sodium bicarbonate
  - Alkalinity adjustment/corrosion control optimization
  - Fed upstream of FWPS
- Gaseous chlorine
  - Disinfection
  - Fed upstream of each filter and upstream of FWPS
- Fluoride
  - Dental health
  - Fed upstream of clearwell
- Orthophosphate
  - Corrosion inhibitor
  - Fed upstream of clearwell


Water Treatment Facility Master Plan

Chemical Storage and Feed

Chemical Storage and Feed Facilities

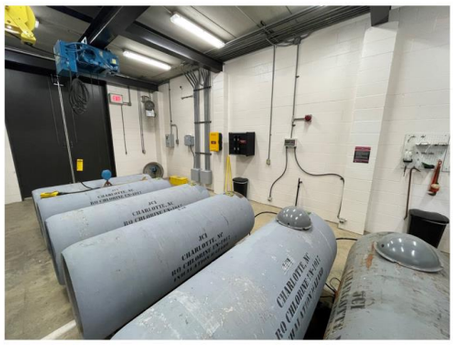
- Sodium bicarbonate
  - **Additional silo to be constructed**
    - *Will provide redundancy for critical process*
  - **Existing feed equipment to be replaced**
    - *At end of useful life*


Water Treatment Facility Master Plan

Chemical Storage and Feed

Chemical Storage and Feed Facilities

- Gaseous chlorine
  - Unit prices have increased substantially in recent years, and potential supply chain interruptions have been noted
  - **New Chemical Building to be constructed during future expansion phase**
    - *Will house temporary sodium hypochlorite (bleach) storage and feed facilities*
    - *Could also house future bulk orthophosphate tank*

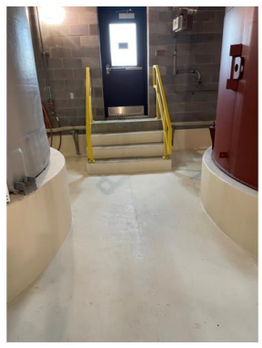



Water Treatment Facility Master Plan

Chemical Storage and Feed

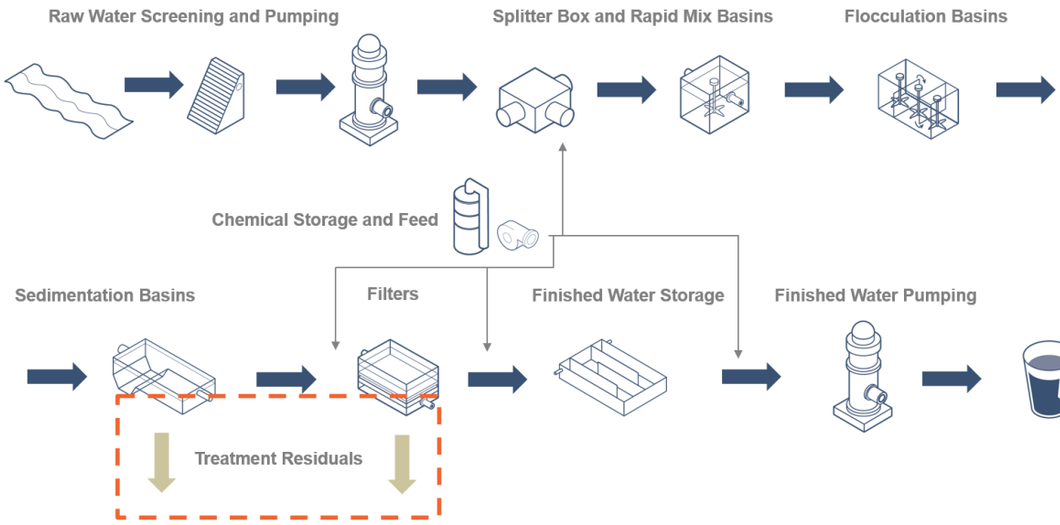
Chemical Storage and Feed Facilities

- Miscellaneous improvements
  - **Spare orthophosphate metering pump to be installed**
    - *Will improve reliability/redundancy for critical process*
  - **Structural improvements to existing bulk chemical building**
    - *To separate acids and bases and mitigate risk of potential reaction*
  - **Duty/standby chemical transfer pumps for coagulant and caustic**
    - *Will improve reliability*



Water Treatment Facility Master Plan

Process Overview



Water Treatment Facility Master Plan

Sludge Transfer Pump Station

- Sludge Transfer Pump Station
  - Receives all process drain flows
  - Pumps blended residuals to thickening and dewatering processes
  - Equipped with a single pump that is approaching the end of its useful life

Water Treatment Facility Master Plan

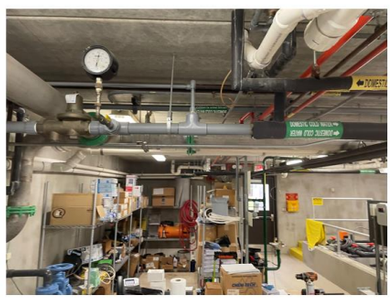
Sludge Transfer Pump Station

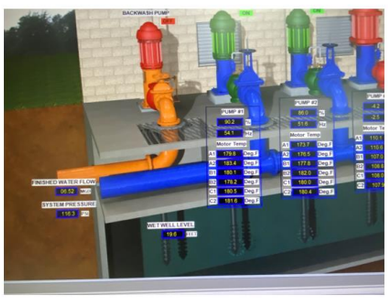
- Sludge Transfer Pump Station
  - **Existing pump to be replaced**
  - **Second pump to be installed**
    - *Will provide redundancy for critical process*

Water Treatment Facility Master Plan

Additional Facilities/Improvements

- Miscellaneous concrete/structural repairs
- New maintenance facility
- Miscellaneous control system improvements





Water Treatment Facility Master Plan

Buildout Capacity

Unit Process	Ultimate Operational Capacity
Raw Water Sources	31.5 MGD
Splitter Box/Rapid Mix/Flocculation/Sedimentation Basins	26.4 MGD
Filters	25.6 MGD
Finished Water Storage	24+ MGD
Chemical Storage and Feed Facilities	24+ MGD
Finished Water Pump Station	24+ MGD

Buildout capacity of the Water Treatment Facility is 24 MGD

Water Treatment Facility Master Plan

CIP Summary: 2020 - 2025

Process Area	Improvement	Driver	Timing	Estimated Cost
Raw Water Facilities	Replacement of Mills River RWPS air burst equipment	Replacement	2020 - 2025	$539,000
Filters	Addition of 5th filter	Capacity Improvements	2020 - 2025	$2,707,000
Filters	Addition of standby backwash pump	Risk Reduction	2020 - 2025	$1,691,000
Sludge Transfer Pump Station	Pump upgrades	Replacement / Risk Reduction	2020 - 2025	$896,000

Total (2023): $5,833,000

Water Treatment Facility Master Plan

CIP Summary: 2025 - 2030

Process Area	Improvement	Driver	Timing	Estimated Cost
Raw Water Facilities	Inspection/assessment of aging raw water transmission mains from mountain reservoirs	Risk Reduction	2025 - 2030	$1,278,000
Splitter Box / Rapid Mix Basins	Influent yard piping modifications	Process Efficiency	2025 - 2030	$191,000
Flocculation / Sedimentation Basins	Retrofit of existing basins and addition of tube settlers	Capacity Improvements / Process Efficiency / Rehabilitation / Replacement	2025 - 2030	$8,928,000
Filters	Addition of 6th filter	Capacity Improvements	2025 - 2030	$2,707,000
Clearwells	Addition of 2nd clearwell	Risk Reduction	2025 - 2030	$7,979,000
Clearwells	Installation of baffle curtains in existing clearwell	Process Efficiency	2025 - 2030	$364,000

(continued)

Water Treatment Facility Master Plan

CIP Summary: 2025 - 2030

Process Area	Improvement	Driver	Timing	Estimated Cost
Finished Water Pump Station	Miscellaneous structural/plumbing improvements	Risk Reduction	2025 - 2030	$106,000
Chemical Facilities	Construction of new chemical building, installation of 2nd sodium bicarbonate silo, and replacement of existing sodium bicarbonate feed equipment	Replacement / Risk Reduction / Rehabilitation	2025 - 2030	$5,315,000
Chemical Facilities	Miscellaneous structural/mechanical improvements	Risk Reduction	2025 - 2030	$251,000
Miscellaneous	Maintenance Facility	Replacement	2025 - 2030	$1,944,000
Miscellaneous	Control system improvements	Process Efficiency	2025 - 2030	$200,000

Total (2023): $29,263,000

Water Treatment Facility Master Plan

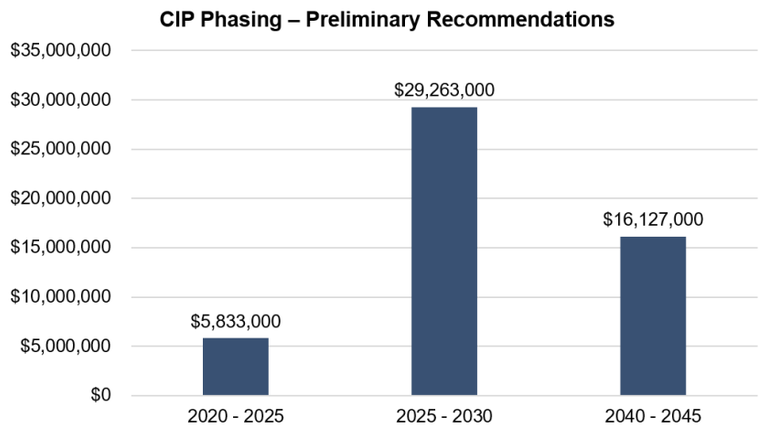
CIP Summary: 2040 - 2045

Process Area	Improvement	Driver	Timing	Estimated Cost
Splitter Box / Rapid Mix Basins	Yard piping to future basins	Capacity Improvements	2040 - 2045	$554,000
Flocculation / Sedimentation Basins	Addition of future west basins	Capacity Improvements	2040 - 2045	$4,793,000
Filters	Addition of 7th - 8th filters	Capacity Improvements	2040 - 2045	$5,928,000
Filters	Relocation/replacement of air scour blowers	Capacity Improvements / Replacement	2040 - 2045	$991,000
Finished Water Pump Station	Upsizing FWP No. 1/2	Capacity Improvements	2040 - 2045	$2,154,000

Total (2023): $16,127,000

Water Treatment Facility Master Plan

CIP Summary



Water Distribution System

Hendersonville's Hydraulic Model

If you need a subhead, put it here

Model first built in 2015 with support from Fire Departments

Pipe network built from **GIS water main** info

Existing water demand data from **customer billing records**

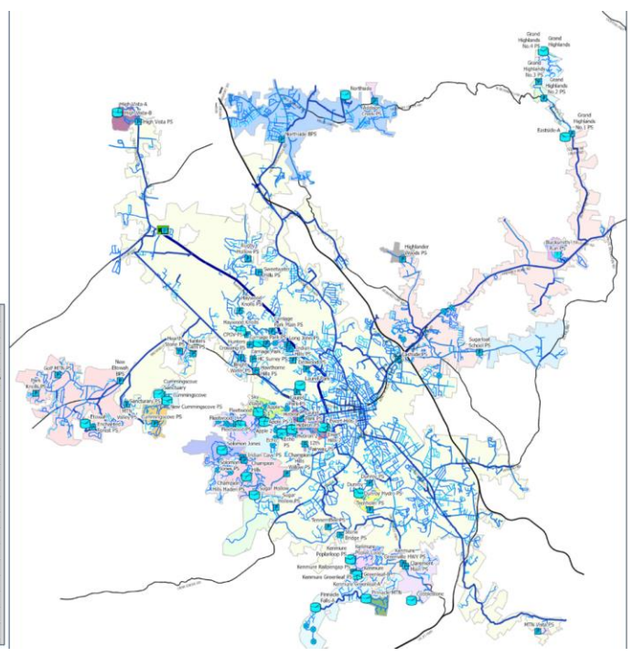
Elevations from digital topo data

Calculates **flows and pressures**

Predicts pump and tank performance

Modeling	
Length (ft)	4674.2951362
Diameter (in)	16.0000000
Roughness	79.0000000
Minor Loss	0.0000000
Totalizer	No
Check Valve	No
Information	
Year of Installation	1922
Year of Retirement	9999
Zone	Main Zone
Material	Cast Iron

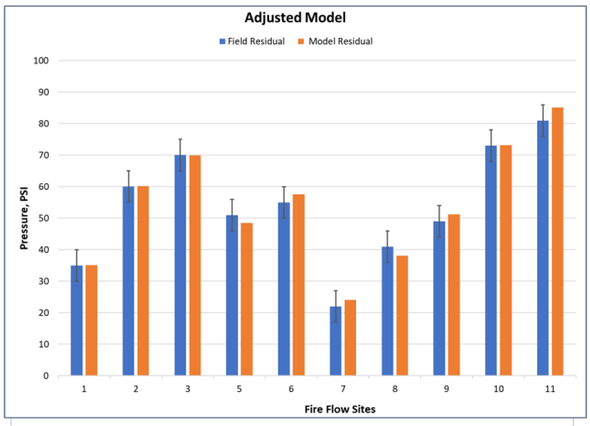
Modeling	
2022 RES (mgd)	0.0000000
Pattern 1	
2022 LARGE (mgd)	0.1271200
Pattern 2	KIMBERLY_CLARK11326_DIURN
2022 NRW (mgd)	0.0000000
Pattern 3	
Flushers/future growth for old rur	0.0000000
Pattern 4	
2025DEMAND (mgd)	0.0000000
Pattern 5	
2030DEMAND (mgd)	0.0000000
Pattern 6	
2035DEMAND (mgd)	0.0000000
Pattern 7	
2040DEMAND (mgd)	0.0000000
Pattern 8	
2045DEMAND (mgd)	0.0000000
Pattern 9	
2050DEMAND (mgd)	0.0000000
Pattern 10	



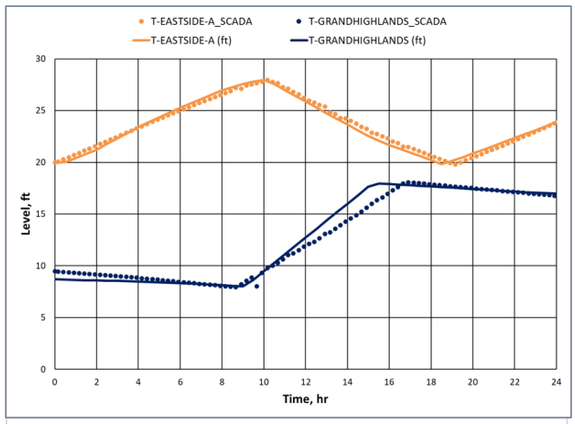
Model Calibration Using Field Test and SCADA

If you need a subhead, put it here

Fire Flow Test



SCADA Match

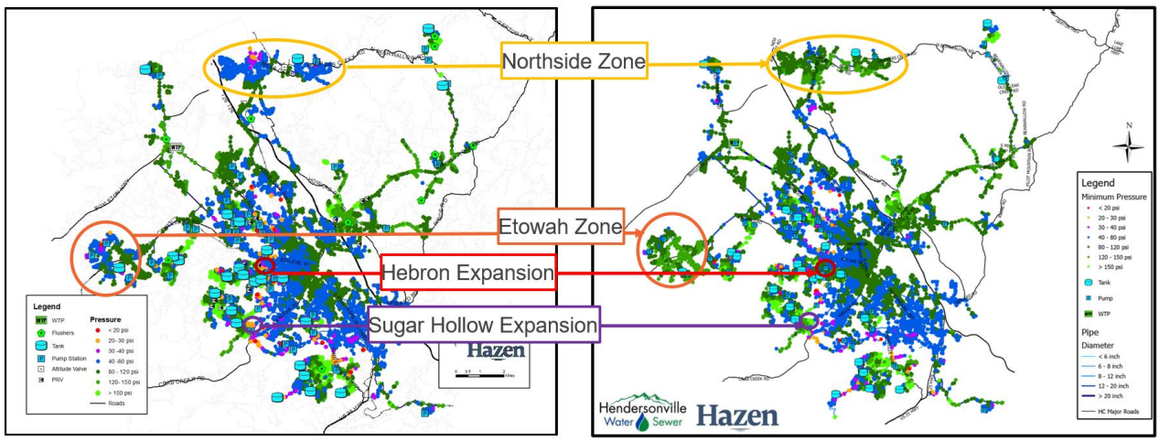


System Peak Hour Pressures

If you need a subhead, put it here

2016 Existing System

2021 Existing System

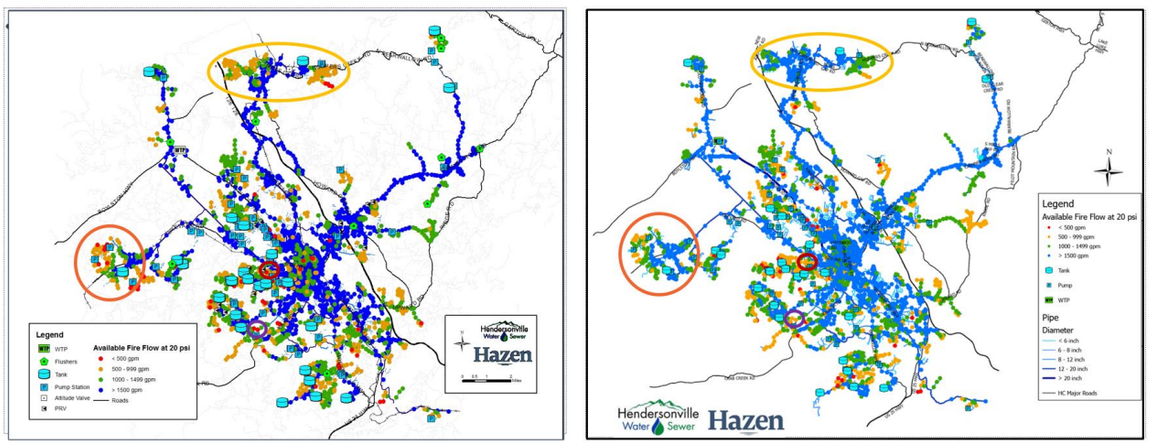


Available Fire Flow

If you need a subhead, put it here

2016 Existing System

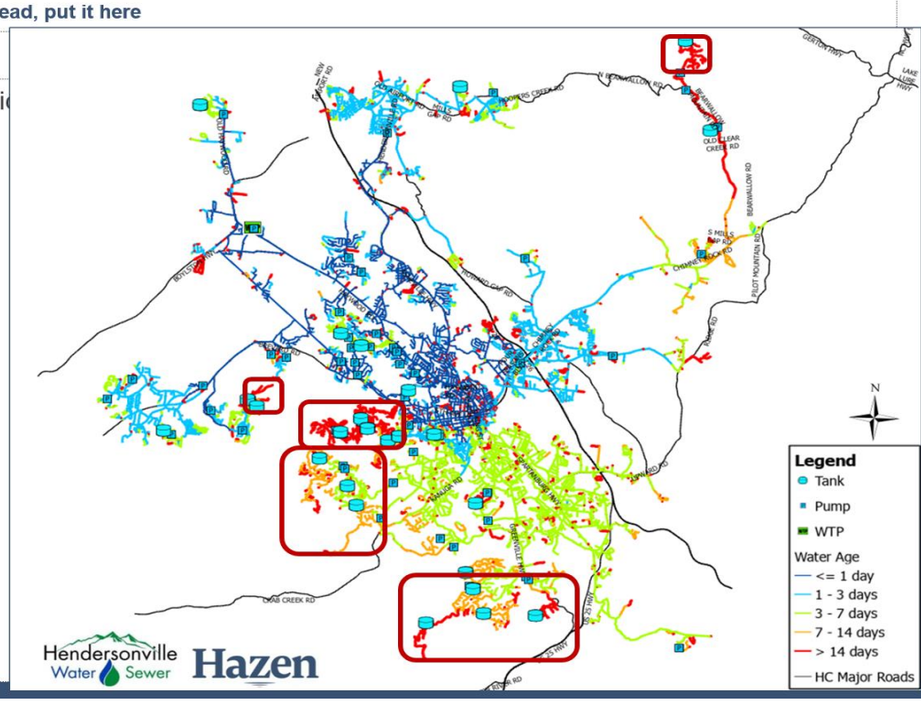
2021 Existing System



Water Age Map and Unidirectional Flushing Plan

If you need a subhead, put it here

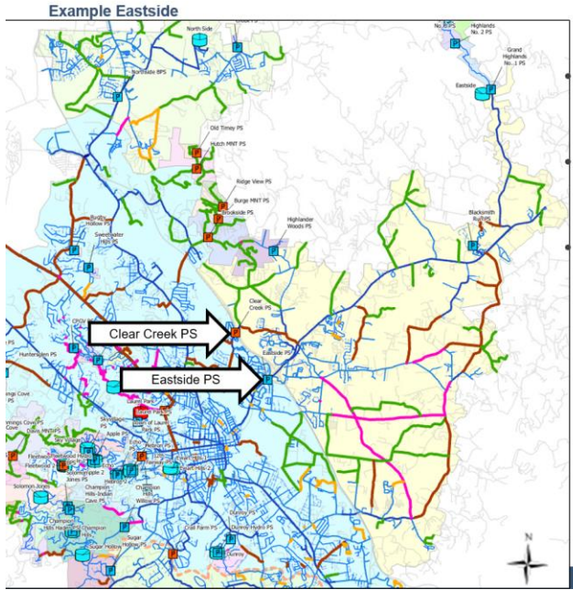
age photo/graphi



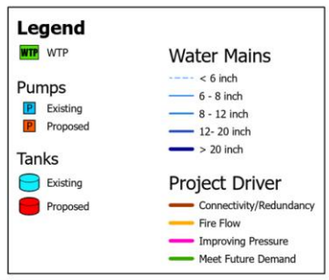
Hazen

Pump Capacity Checked Against Project Water Demand in Each Zone

Example Eastside

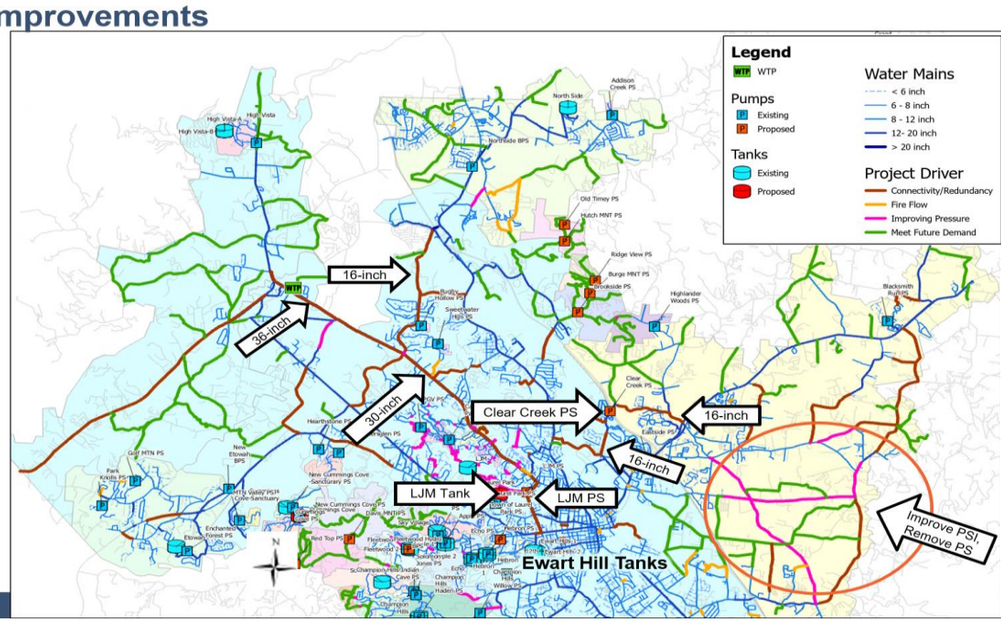


- 2050 demand in Eastside zone is 2.84 mgd
- Existing firm capacity at Eastside Pump Station is 2 mgd
- Proposed Clear Creek Station firm capacity of 2 mgd



63

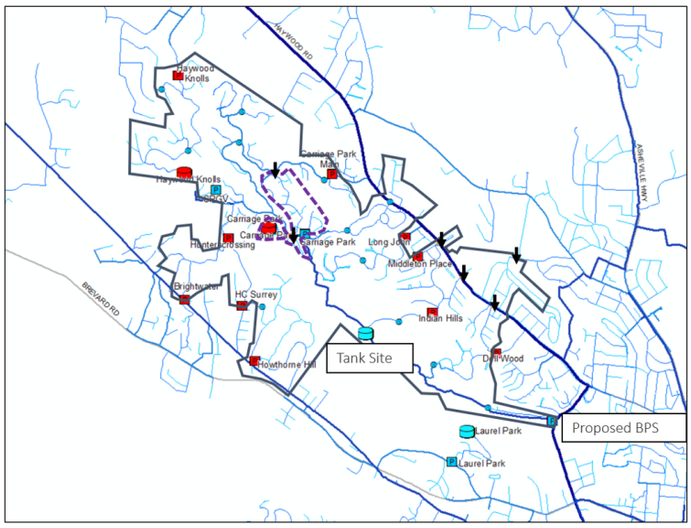
Northern Improvements



Hazen

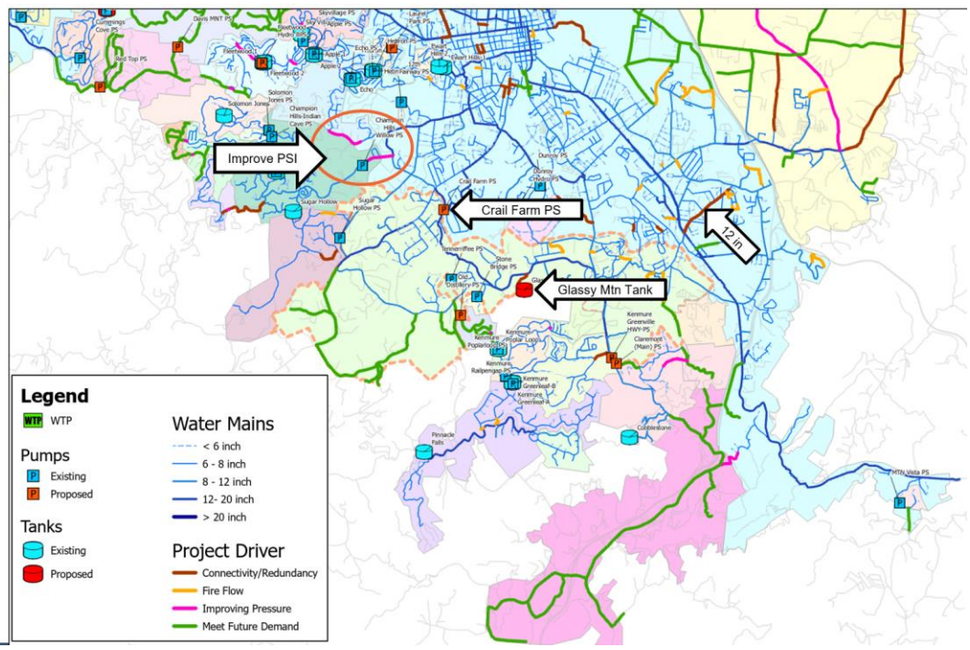
Long John Mountain Improvements

If you need a subhead, put it here



- 1 New PS
- 1 New Tank
- Series of Pressure Reducing Valves
- Abandon 2 Tanks (Red)
- Abandon 11 Pump Stations (Red)
- Expanded zone for improve fire
- 6 check valves for fire flow assistance

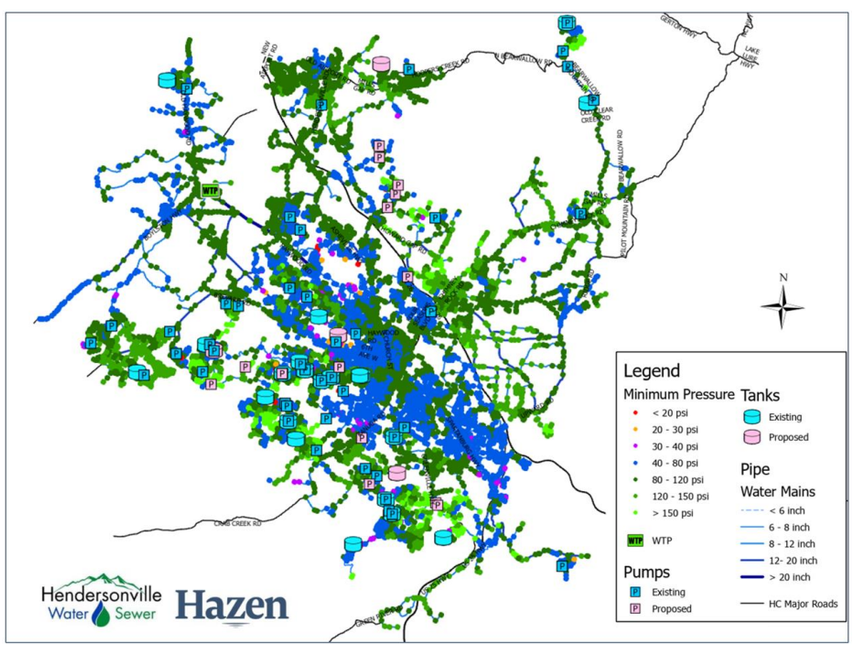
Southern Improvements



2050 Peak Hour Pressures

If you need a subhead, put it here

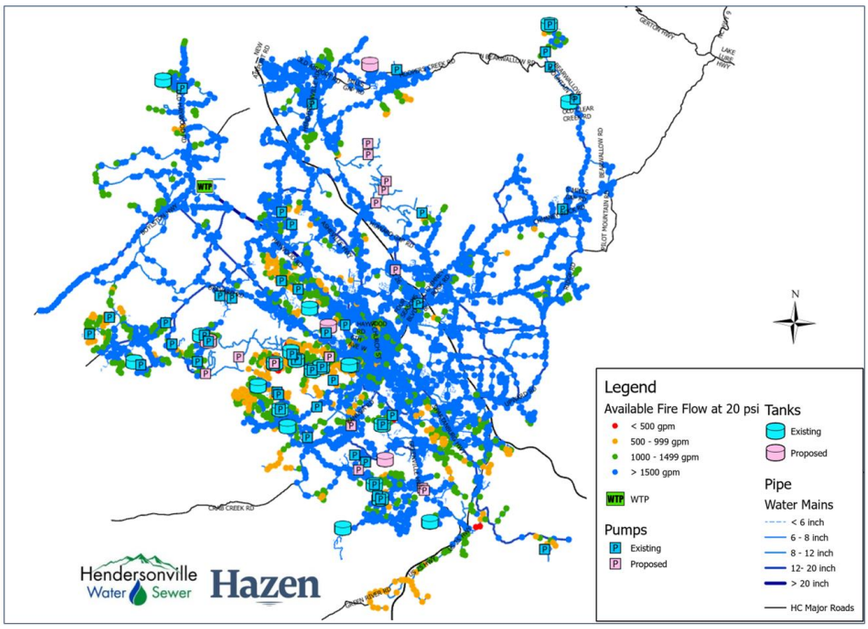
Caption for the image or graphic. Should not need bullets because the image/graphic speaks for itself



2050 Available Fire Flow at 20 psi

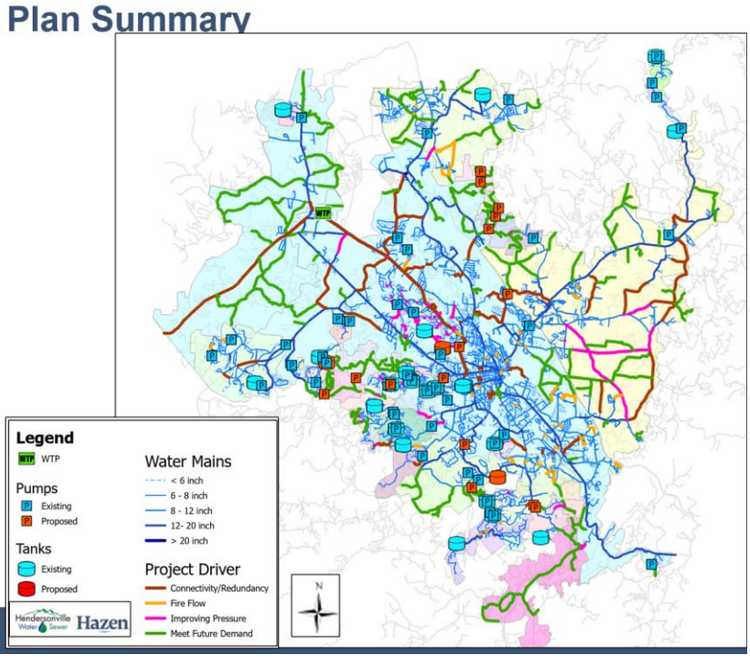
If you need a subhead, put it here

Caption for the image or graphic. Should not need bullets because the image/graphic speaks for itself



Water Distribution Master Plan Summary

- 13 new pump stations
- 2 new storage tanks
- 13 new pressure zones
- Abandon 11 pump stations
- Abandon 2 storage tanks
- 200 miles of new pipe



Distribution System CIP

If you need a subhead, put it here

City Projects driven by connectivity/ redundancy/ improving pressure and significant fire flow improvements

Projects driven by future demand not included here

CIP Year	Demand Driver (mgd)	Projects	Tanks / PS	Estimated Cost ($Million)
2025	9.5	Top 25 projects including Long John Mountain	1/1	120.0 (17.5 LJM)
2030	11.3	11	2/3	65.8
2035	12.0	7	1/0	79.5
2040	12.8	2	0/1	21.4

B. Zoning Text Amendment: Tree Preservation and New Planting Requirements – *Daniel Heyman, Staff Attorney*

Staff Attorney Daniel Heyman presented the following PowerPoint presentation to Council.

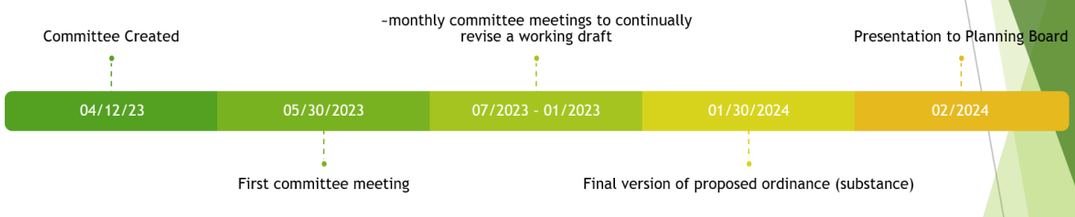
Tree Preservation Ordinance

Daniel Heyman, Staff Attorney
City of Hendersonville

- Tree Ordinance Study Committee purpose: "to study and recommend ordinance provisions related to the preservation of the tree canopy within the City of Hendersonville."

- Members:
  - Glenn Lange (Tree Board)
  - Mary Davis (Tree Board)
  - Mark Steirwalt (Staff - PW)
  - Lyndsey Simpson (City Council)
  - Virginia Tegel (ESB)
  - Neil Brown (Planning Board)
  - Lew Holloway (Staff - Community Dev.)
  - Daniel Heyman (Staff - Legal)
  - Steve Dozier (formerly Business Advisory)
  - Susan Frady (At-large)
  - Caitlyn Gendusa (Staff - Sustainability)
  - Ken Gordon (Business Advisory)

Rough timeline:



Ordinance addresses:

- Preservation of existing trees
- Some expanded planting requirements (street trees, common open space)

Ordinance does not address:

- Other environmental issues (steep slopes, stream buffers)
- Overall developed canopy percentage/planting requirements

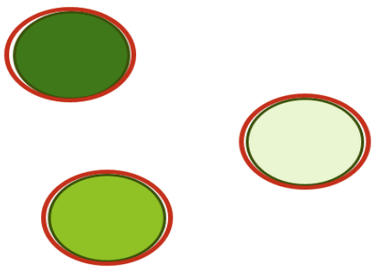
Benefits of preservation:

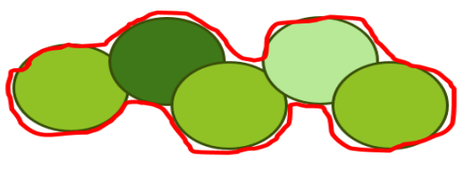
- Improved air quality
- Prevent stormwater runoff and erosion
- Control urban "heat-islands"
- Conserve energy (e.g. reduced AC use)
- Documented economic and health benefits

Some considerations:

- Tree canopy preservation
- Private property rights
- Affect on affordable housing
- Development constraints on small sites
- Development flexibility

Measuring Canopy





Tree Canopy Cover Assessment

- Measures the amount of the City covered by Tree Canopy (35%)
- City limits and ETJ only
- Looks at things like possible planting area, impervious area, and unsuitable planting area (biologically possible but inappropriate e.g. baseball field)
- Uses imagery from the USDA's National Agriculture Imagery Program (NAIP) - "leaf on" conditions.

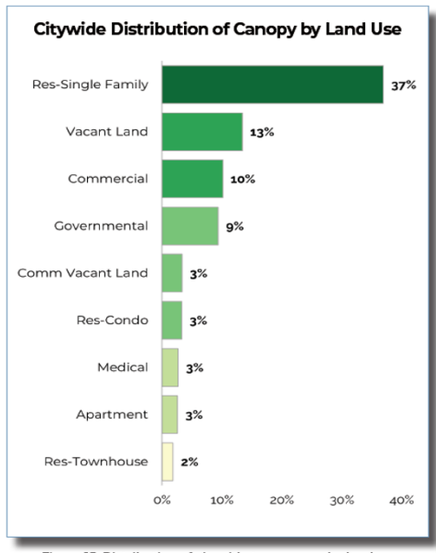
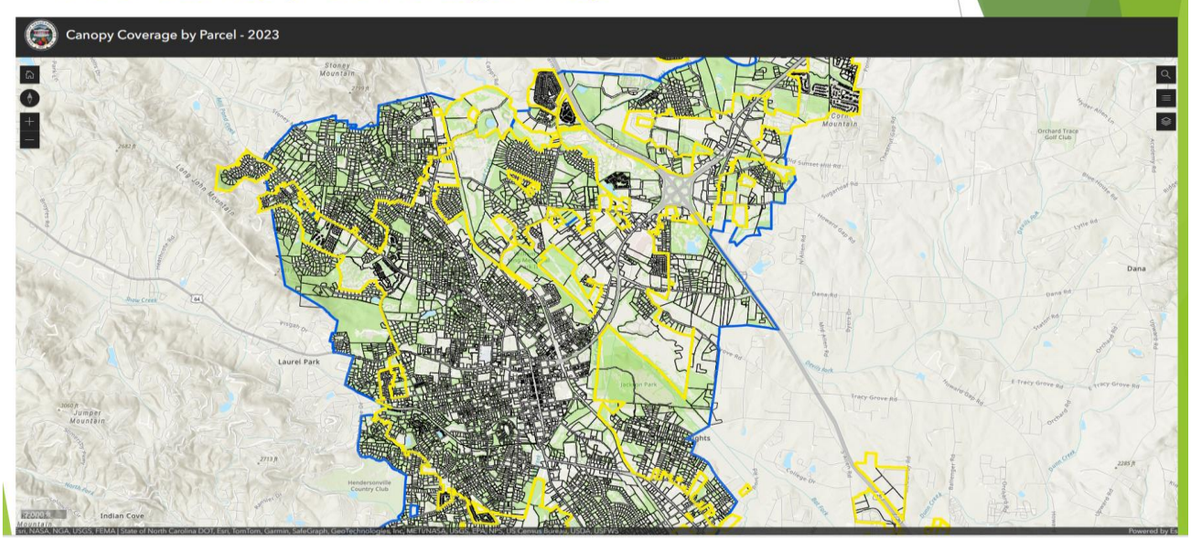


Figure 15. Distribution of citywide tree canopy by land use.

Tree Canopy Cover Assessment

Figure 9. Distribution of existing and potential tree canopy cover throughout the combined study area.

Tree Canopy Coverage Map



Tree Canopy Coverage Map

Existing landscaping requirements (not an exhaustive list):

- Submit a tree survey showing all trees 12” diameter +
- Parking lot landscaping
- Buffer based on proposed and adjacent uses
- Credits toward landscaping requirements for preserving existing trees (incentive only, no requirement)
- Street trees in some areas (entry corridor, certain zoning districts)
- Open space landscaping in mixed-use districts
- No requirement to preserve existing trees

Proposed changes (according to the current draft):

- Tree preservation standards established
- No tree survey required, only a plan showing the tree line
- No credit for invasive species
- Trees used to meet landscaping new landscaping requirements must be 75 percent native species (not the preservation requirement)
- Multi-family residential to buffer lower density residential with an 8-foot type A buffer
- Common open space landscaping (1 tree/5 shrubs per 1,200 sq. ft.)
- Open space landscaping (1 tree/5 shrubs per 4,000 sq. ft.)
- Street trees along all streets (unless exempt from landscaping ordinance)

Proposed Tree Canopy Preservation Requirement:

- Does not apply to development sites with ≤ 30,000 sq. ft. existing tree canopy (staff recommendation)
- Existing canopy = canopy according to the most recent Tree Canopy Cover Assessment conducted by the City of Hendersonville
  - If no canopy data - developer submits a plan showing the drip-line of existing canopy
  - If developer disagrees - developer may submit a sealed plan showing existing canopy as of the date of the Cover Assessment
- Tier One - MUST preserve 20 percent of existing canopy. No fee-in-lieu (unless granted a variance)
- Tier Two - Preserve additional canopy according to the following schedule (or request a fee-in-lieu):

Select One:	Existing Canopy Preserved (in addition to Tier One):	New Canopy Installation Required:	Total Tier Two Canopy Required:
Option 1	10%	0%	10%
Option 2	5%	7%	12%
Option 3	0%	15%	15%

Proposed Tree Canopy Preservation Requirement (continued):

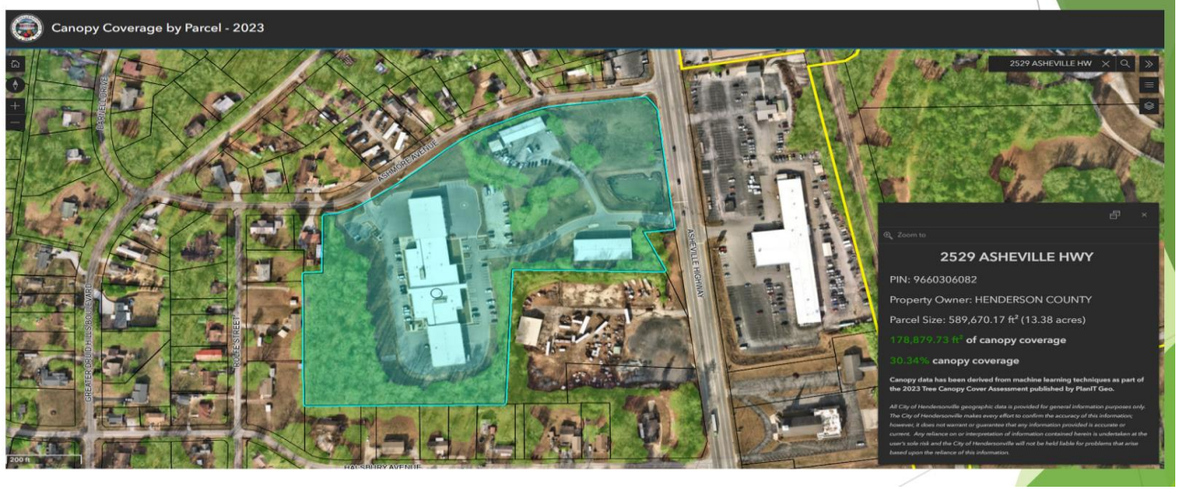
- Trees preserved eligible for credits toward other landscaping requirements as long as they meet criteria (e.g. VUA landscaping must be w/in 20 ft. of VUA)
- Fee-in-lieu for Tier Two Canopy
- Delay of development approval for three years if all or substantially all trees are removed in violation (and other remedies)
- Example below assuming: 5-acre site with 2 acres, or 87,120 sq. ft. of existing tree canopy:

Example of Tree Canopy Preservation Requirement				
Select One:	**Tier One Existing Canopy Preservation Requirement**	**Tier Two Tree Existing Canopy Preserved (in addition to Tier One):**	**New Canopy Installation Required:**	**Total Tree Canopy Requirement:**
Option 1	17,424 sq. ft. (20%)	8,712 sq. ft. (10%)	0 sq. ft. (0%)	26,136 sq. ft. (30%)
Option 2	17,424 sq. ft. (20%)	4,356 (5%)	6,098 (7%)	27,878 sq. ft. (32%)
Option 3	17,424 sq. ft. (20%)	0 sq. ft. (0%)	13,068 sq. ft. (15%)	30,492 sq. ft. (35%)

Ex: Henderson County EMS

2015 Aerial - source: Henderson County GoMaps

Ex: Henderson County EMS



Ex: Henderson County EMS

- Developer would add:
  - Existing tree canopy to remain acreage or sq. ft.
  - Total existing tree canopy (including to be removed) and acreage or sq. ft.
  - New canopy installation

2017 Henderson County EMS Landscaping Plan

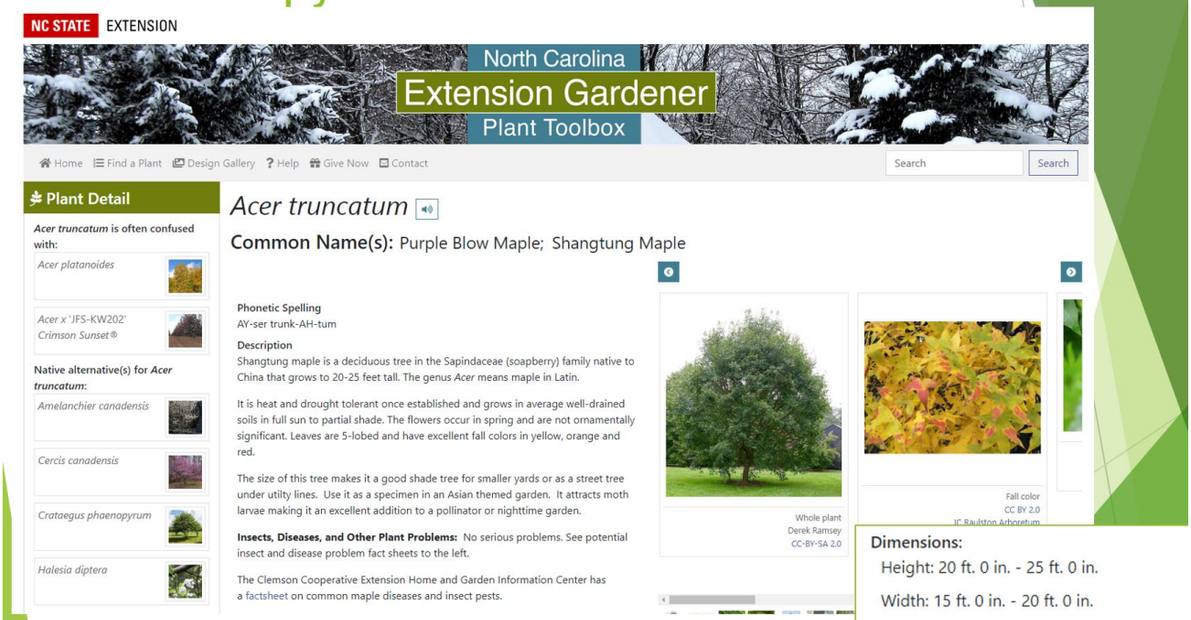
New Canopy Credit Calculation:

MEDIUM MATURING TREES 25' - 50' TALL

Common Name	Botanical/Scientific Name
Norwegian Sunset Maple[x]	*Acer truncatum x A. platanoides* 'Keithsform'
Upright European Hornbeam [x]	*Carpinus betulus* 'Fastigiata'
American Hornbeam	*Carpinus caroliniana*
American Yellowwood	*Cladrastis kentukea*
Franklinia	*Franklinia alatamaha*
Carolina Silverbell	*Halesia carolina*
Savannah Holly	*Ilex x attenuata* 'Savannah'
American Holly[k]	*Ilex opaca*
Eastern Red Cedar[k]	*Juniperus virginiana*
Goldenrain Tree[x]	*Koelreuteria paniculata*
Galaxy Saucer Magnolia[x]	*Magnolia liliiflora 'Nigra' x Magnolia sprengeri 'Diva'*
Saucer Magnolia[x]	*Magnolia x soulangeana*
Sweetbay Magnolia	*Magnolia virginiana*
Black Gum[k]	*Nyssa sylvatica*
Sourwood[k]	*Oxydendrum arboreum*
Norway Spruce[x]	*Picea abies*
Japanese Black Pine [x]	*Pinus thunbergii*
Chinese Pistache[x]	*Pistacia chinensis*
Okame Cherry[x]	*Prunus okame*
Japanese Stewartia[x]	*Stewartia pseudocamellia*
Nigra American Arborvitae[x]	*Thuja occidentalis* 'Nigra'
Littleleaf Linden[x]	*Tilia cordata*
Greenspire Little Leaf Linden[x]	*Tilia cordata* 'Greenspire'

Source: Recommended Species List

New Canopy Credit Calculation:



Source: N.C. Cooperative Extension - www.ces.ncsu.edu

New Canopy Credit Calculation:

Ex: Medium Maturing Trees

	A	B
1	**Common Name**	**Average Canopy**
2	Norwegian Sunset Maplex	177
3	Upright European Hornbeam x	481
4	American Hornbeam	297
5	American Yellowwood	709
6	Franklinia	43.5
7	Carolina Silverbell	531
8	Savannah Holly	78
9	American Holly k	88.5
10	Eastern Red Cedar k	132.75
11	Goldenrain Treex	962
12	Galaxy Saucer Magnoliax	123
13	Saucer Magnoliax	235.5
14	Sweetbay Magnolia	397
15	Black Gum k	445.5
16	Sourwood k	61.5
17	Norway Sprucex	594
18	Japanese Black Pine x	150.75
19	Chinese Pistachex	368.25
20	Okame Cherryx	368.25
21	Japanese Stewartiax	107
22	Nigra American Arborvitaex	61.5
23	Littleleaf Lindenx	709
24	Greenspire Little Leaf Lindenx	1063.5
25	Trident Maplex	368.25
26	Red Buckeye k	132.75
27	American Smoke Tree	245.5
28	Dwarf Loblolly Pine	61.5

New Tree Canopy Installation	
Size of Tree*:	**Tree Canopy**
Large Maturing	872 sq. ft.
Medium Maturing	350 sq. ft.
Small Maturing	144 sq. ft.

*As designated in the Recommended Species list

Fee-in-Lieu:

- Based on the cost to for the City to plant new canopy to replace the existing canopy removed.
- Weighted average of the following:

New Tree Canopy Installation			
Size of Tree:	**Tree Canopy**	**Trees per Acre**	**Weight**
Large Maturing	872 sq. ft.	49.943	0.105
Medium Maturing	350 sq. ft.	124.305	0.261
Small Maturing	144 sq. ft.	301.507	0.634

- Assigned weight based on the number of trees to reach a certain amount of canopy.
- Weighted average is 228.84 sq. ft.
- City's average cost to plant and establish a tree is ~$350.
- With an average replacement canopy of 228.84 sq. ft. per tree planted:
  - 350 / 228.84 = **$1.53 per sq. ft. of tree canopy.**

Fee-in-Lieu example:

- For a development with 2 acres, or 87,120 sq. ft. of existing canopy:
  - Tier Two Canopy Preservation Requirement, Option 1 = 8,712 sq. ft.
  - 8,712 * $1.53 = $13,329.36 fee-in-lieu of the entire Tier Two requirement.
  - Tier Two Canopy Preservation Requirement, Option 2 = 4,356 sq. ft.
  - 4,356 * $1.53 = $6,664.68 fee-in-lieu of preservation requirement
  - (Developer installs 7 percent new canopy)

Community Development Department Review and Recommendations:

Recommended Planting List

1) We suggest that this list be titled "Approved Planting List." This just clarifies language around this being a requirement of the zoning code, rather than a recommendation. [Definition Clarification]
2) We would request that the Tree Board establish a way of annually obtaining feedback on the list from site engineers and landscape architects or other professionals who may be developing planting plans within the community. [Administrative Clarification]

Tree Board Review

1) Conditional Zoning District (CZD) review currently includes a Tree Board review of planting plans associated with site plans going through the Conditional Zoning District approval process. As discussed in the Tree Ordinance Review Committee meetings, we recommend that with the adoption of these new canopy preservation and enhancement standards that the Tree Board review process be removed from the CZD process as the new ordinance establishes standards sought by the Tree Board in this process. [Administrative Clarification]

Community Development Department Review and Recommendations:

Exemption Standard Alignment

1) The Tree Canopy Preservation standard as proposed establishes an exemption for lots that are 2 acres or less in size. Staff would suggest al [Definition Clarification]
2) We would request that this exemption be aligned with the exemption standards for stormwater and erosion and sediment control standards. We propose that the exception standard would read as follows:

Tree Canopy Preservation. All developments required to comply with this Article pursuant to Sec. 15-2 herein, with the exception of development tracts whose area of disturbance is ~~no greater than two acres~~ less than an acre or whose total tree canopy does not exceed 30,000 square feet, shall preserve existing trees in compliance with this Section.

3) This recommendation is to simplify the review process while also continuing the potential downside impacts to sites with limited canopy coverage that the preservation standard might otherwise create. [Policy Recommendation]

Planning Board Review and Recommendation:

- Planning Board heard staff's presentation on the work of the Tree Ordinance Review Committee and on the Community Development Department recommendations, before accepting public comment.
  - Discussion of the Ordinance lasted a little over an hour and a half
  - Questions were around staff recommendations, the nature of the review and ordinance drafting process, the administrative review process and other implications of the proposed ordinance.
- The Planning Board broadly supported the ordinance specifically supporting two of the three Community Development recommendations and voting unanimously to recommend that the City Council adopt the Tree Canopy Preservation Enhancement Ordinance.

No decisions were made at this meeting.

4. ADJOURN

There being no further business, the meeting was adjourned at 5:30 p.m. upon unanimous assent of the Council.

_____
Barbara Volk, Mayor

ATTEST:

_____
Jill Murray, City Clerk