



2022

Community Forest Management Plan

Castleton-on-Hudson, NY



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Community Forest Management Plan

Village of Castleton-on-Hudson, NY

Acknowledgments

This Community Forest Management Plan was prepared with funding provided by New York State's Environmental Protection Fund. The DEC's Division of Lands and Forests' Urban and Community Forestry Program works to increase public awareness of the importance of trees and help communities develop and implement comprehensive tree management plans to create healthy forests while enhancing quality of life.

Project Partners

Castleton-on-Hudson Village Board

Department of Public Works

Castleton-on-Hudson Tree Board

April 2022



Cover photo source: Castleton-on-Hudson Facebook page

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Purpose and Vision

Mission Statement

The Village of Castleton-on-Hudson completed this Community Forest Management Plan with the community and urban forestry consultants to maintain, protect, and enhance the Village's tree canopy and the many benefits it provides to the community. The Plan includes a vision for the future of the Village's community forest, a comprehensive assessment of Castleton-on-Hudson's tree inventory, and a strategy for how to care for the Village's trees. The goals set forth in this Plan require a shared commitment and partnership between the Village and its residents to sustain a thriving community forest,

Vision

The Village of Castleton-on-Hudson envisions a healthy, sustainable, and resilient community forest that benefits all citizens environmentally, socially, and economically for generations to come. To support this vision, the Community Forest Management Plan uses industry best practices to create a framework for maintaining and enhancing Castleton-on-Hudson's community forest.

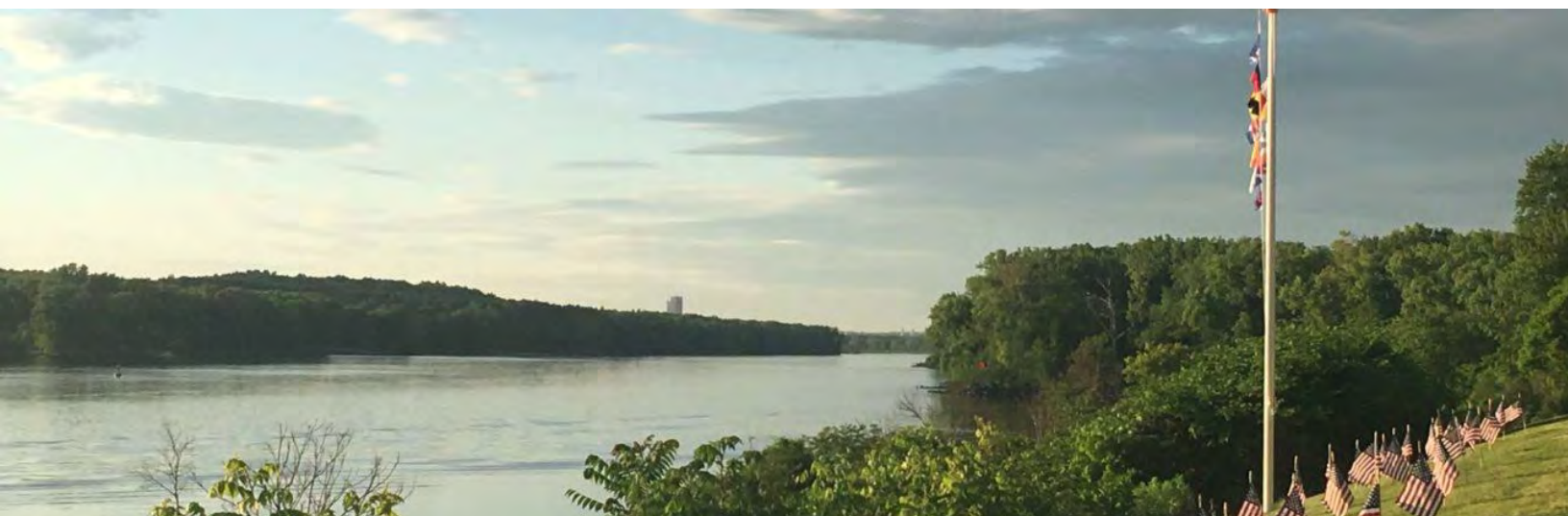


Photo source: Castleton-on-Hudson Main Street Association

Disclaimer:

Inventory data provided by PlanIT Geo, Inc. “PlanIT Geo” are based on visual recording of observations and measurements at the time of the inspections. All information and data fields populated as a part of this tree inventory are for the purpose of assisting municipalities or private entities in maintenance needs, removal, and replacement of their managed trees. Recommendations provided by PlanIT Geo may be accepted or disregarded by the city and/or client or the city and/or client may seek additional advice. Visual records do not include testing or analysis of any tree component. In no event shall PlanIT Geo be held liable for any special, direct, indirect, consequential, or incidental damages caused by tree failures whatsoever and PlanIT Geo is not responsible for any hidden or otherwise non-observable hazards discovered or identified. All risk assessments performed by PlanIT Geo’s Certified Arborists assume a 1-year timeframe for the assessed tree part for failure.

All immediate concerns are passed on to the client indirectly through the live webmap (TreePlotter: Inventory), or directly through communication from PlanIT Geo’s Certified Arborists or project managers. It is recommended that each tree be reinspected within the 1-year time frame to update the likelihood of failure matrices. Storms or other Acts of God change the structural stability of trees and all trees surveyed prior to the event will need to be re-evaluated. Also, the dynamics of inventoried trees may result in data that varies from the current condition or characteristics observed in the field due to deterioration and/or growth of living specimens in a natural environment. All previous data populated by PlanIT Geo staff can be considered out of date upon revisiting and re-evaluating the initially inventoried trees. PlanIT Geo provides no warranty regarding the function, health, or use of the community forest for any purpose.



Executive Summary

The Village of Castleton-on-Hudson, New York is dedicated to growing a community forest that supports a healthy and vibrant place to live, work, and play for generations to come. The nearly 500 street and park trees throughout Castleton-on-Hudson are an asset that bring value and benefits to the community. Furthermore, trees on private property provide added benefits. Together, these public and private trees constitute the “urban and community forest”. This resource provides environmental benefits, adds to property values, and contributes to an enhanced quality of life for all of Castleton-on-Hudson’s residents.

Realizing the community forest is a valued asset, Castleton-on-Hudson, herein referred to as “the Village”, invested in a collaborative planning process with support from the New York State Department of Environmental Conservation. This Community Forest Management Plan is based on 2021 inventory data and creates a 7-year roadmap that addresses the questions of: “Why does Castleton-on-Hudson need a CFMP?,” “What do we have?,” “What do we want?,” and “How do we get what we want?” The following framework was developed for Castleton-on-Hudson’s CFMP. These overarching questions are addressed briefly in this executive summary, and further details are provided in the correlating sections in this Community Forest Management Plan.



Photo source: PlanIT Geo Inventory Crew

The Need for a CFMP In Castleton-on-Hudson

Why does Castleton-on-Hudson need a CFMP?

The Village of Castleton-on-Hudson is committed to community forestry efforts that support growth, restoration, enhancement, protection, and stewardship of the Village's trees. This Community Forest Management Plan (CFMP) integrates with past plans, programs, and policies to further develop goals and actions related to the management of the community forest.

Urban and community forests are terms that refer to the trees, lower vegetation, open green spaces, and associated natural resources located throughout municipalities. They include street trees, Village parks, nature preserves, trails and greenways, gardens, landscaping, retention areas, green infrastructure, and much more. This resource is referred to interchangeably as an urban forest and a community forest in this Plan.



Photo source: Castleton-on-Hudson Facebook page

Each tree within the community forest provides valuable ecosystem services and benefits to the community. The results of Castleton-on-Hudson's tree inventory provide insight into the overall health of the Village's public trees and the management activities needed to maintain and increase the benefits of trees into the future.

In Castleton-on-Hudson, it is the Public Works Department's responsibility to maintain trees within the public rights-of-way and on Village-owned parks, open spaces, and facilities. Staff in the Public Works Department address requests from the public for tree planting, pruning, and maintenance. This CFMP guides Castleton-on-Hudson's Community Forest Program towards a more proactive cyclical maintenance routine and regular periodic inspections for high-risk trees.

Inventory Results

What do we have?

In 2021, Village-owned trees, stumps, and potential planting sites within the public rights-of-way and parks were inventoried. The tree inventory was conducted using the Village's tree inventory management software, TreePlotter, which the Village is utilizing to view tree details and manage future tree work.

A complete analysis of the tree inventory is included in this CFMP to identify trends in characteristics and maintenance needs for Village-owned trees. Details about the tree's identifying characteristics, size, location, condition, and maintenance needs were recorded during the inventory process. Nearly 500 trees were inventoried, of which 69% are street trees and 31% are park trees. A total of 57 unique tree species from 33 unique genera were found in Castleton-on-Hudson. Maple species are more common than any other tree species. The majority of trees, 61%, are in good or excellent condition. These results and more are analyzed in the *Inventory Results* section of this CFMP:

- The Structure of the Community Forest
- Community Forest Condition and Maintenance Needs
- Value and Benefits of Castleton-on-Hudson's Trees



Photo source: Getty Images



492

Trees Inventoried



94

Planting Sites



61%

Good Condition



46%

Maple species



Photo source: Google street view

Managing Castleton-on-Hudson's Community Forest

What do we want?

Castleton-on-Hudson has a vision for preserving, caring for, and enhancing the community forest. To accomplish this vision, this seven-year Tree Management Program (Program) was developed based on data gathered during the 2021 tree inventory. The Program is actionable and achievable, with special attention given to local costs for tree maintenance and removal.

While regular pruning cycles and tree planting is important, priority work (especially for high priority and high-risk trees) must sometimes take precedence to ensure that risk is expediently managed. Additional routine monitoring of the tree population is essential to identifying and addressing new and emergency high priority or high-risk situations as they arise. After assessing the inventory by maintenance priorities and maintenance types, the following maintenance recommendations were identified:

MAINTAINING EXISTING TREES				
PRIORITY 1	CRITICAL REMOVAL	6	Total Trees	Years 1-3
		2	Trees Per Year	
	CRITICAL PRUNE	3	Total Trees	
		1	Trees Per Year	
PRIORITY 2	REMOVAL	15	Total Trees	Years 1-3
		7	Trees Per Year	
	PRUNE	19	Total Trees	
		5	Trees Per Year	
PRIORITY 3 ROUTINE PRUNING CYCLE	STREET TREE PRUNE	230	Total Street Trees	7-year cycle @ Year 3
		33	Trees Per Year	
	PARK TREE PRUNE	135	Total Park Trees	
		19	Trees Per Year	
PRIORITY 4 YOUNG TREE TRAINING CYCLE	STREET TREE PRUNE	75	Total Young Street Trees	3-year cycle @ Year 1
		25	Trees Per Year	
	PARK TREE PRUNE	9	Total Young Park Trees	
		3	Trees Per Year	
PLANTING NEW TREES				
MINIMUM TREE PLANTING	NO NET LOSS	26	Total Trees	7-year cycle @ Year 1
		4	Trees Per Year	
RECOMMENDED TREE PLANTING	NO NET LOSS + ANNUAL MORTALITY	68	Total Trees	
		10	Trees Per Year	

Implementation of the Plan

How do we get what we want?

Recommended work plans enable the Village to effectively monitor progress towards goals and the overall vision for the community forest. A team consisting of Village staff, partners, and community members dedicated to the CFMP will ensure the actions are implemented, monitored, reported, and adapted over time to support updates to the Plan after the 7-year planning term. An adaptive management approach allows the Village to adjust management actions over time as changes occur both in the physical/biological environment and in the expectations of the Village's residents.

Implementation of this Community Forest Management Plan will include a wide variety of partners, stakeholders, resources, and strategizing to grow a healthy and diverse community forest. Four action strategies are recommended in the *Implementation of the Plan* section to assist in establishing effective and measurable outcomes for Castleton-on-Hudson's community forest.

1. Maximize the efficiencies in maintaining trees.
2. Use planning, legislation, and enforcement to integrate trees more fully.
3. Implement best management practices for the health and benefits of trees.
4. Foster support for the community forest



*Photo source:
Castleton-on-Hudson website*



Photo source: Castleton-on-Hudson Facebook page

Community Forest Management Plan

“Without a plan, the governments and individuals responsible for taking care of an urban forest will not be effective in meeting the true needs of the trees and the community. A plan establishes a clear set of priorities and objectives related to the goal of maintaining a productive and beneficial community forest.”

American Public Works Association, 2007



Photo source: Castleton-on-Hudson Facebook page

The Village of Castleton-on-Hudson developed this Community Forest Management Plan (“CFMP” or “Plan”) as a guide to maintain, protect, and enhance one of the village’s most valuable assets: trees. The CFMP extends beyond a maintenance and operational guide; it identifies a vision, long-term goals, strategies, and priorities to achieve optimal levels of community forest management.

Successful community forest management includes an organized, proactive program that utilizes the most recent and accurate data to set goals and measure progress. This CFMP utilizes the data gathered from the tree inventory completed in August of 2021. Based on this recent inventory, the Plan considers the tree species diversity, distribution, and general condition to provide a prioritized system for managing Castleton-on-Hudson’s trees. Tree care management strategies, tree care priorities, budgets based on projected needs, and are identified in an effort to minimize the need for costly, reactive solutions to crises or urgent risk mitigation. The strategies included in the CFMP will help the Village maximize the benefits the community forest will provide in the years to come.

The CFMP must be regarded as both a long-range policy guide and a living document that will respond to changing conditions over its life. A close partnership between policy makers, staff, and the community is essential to ensure that the CFMP supports sustainable and equitable community forest benefits to all of Castleton-on-Hudson’s residents and future generations.

CFMP Objectives

The Village of Castleton-on-Hudson identified the following objectives for the CFMP:

- Create a vision for the long-term forest.
- Inventory Castleton-on-Hudson’s public trees.
- Utilize the 2021 tree inventory data to create a strategy to care for Castleton-on-Hudson’s public trees.
- Identify management needs such as pruning rotations, removal implementation, and prioritization of workload.
- Develop budgets and work plans, including timelines and tasks to meet the vision.
- Complete an i-Tree Eco benefit analysis of water quality, air quality, reduce urban heat island effect, energy efficiencies, storm water management, and public health.
- Establish a baseline for the state of the community forest resource, resource management, community framework, and institutional framework.
- Provide recommendations for a healthier, more vibrant, and sustainable community forest.
- Identify potential planting sites and the budget required for implementation of a planting plan to maintain and grow the community forest.
- Provide guidance for an Adaptive Management approach to community forestry planning.

CFMP Framework

Recognizing Castleton-on-Hudson's need for proactive management of the community forest, it was imperative that the Village develop a Community Forest Management Plan based on recent inventory data as a 7-year roadmap that addresses the questions of: "Why does Castleton-on-Hudson need a CFMP?," "What do we have?," "What do we want?," and "How do we get what we want?" The following framework was developed:

THE NEED FOR A CFMP IN CASTLETON-ON-HUDSON

Why does Castleton-on-Hudson need a CFMP?

Castleton-on-Hudson values its community forest and to show this commitment, the Village is dedicated to the formal prioritization and guided care of its trees through the development of this CFMP.

INVENTORY RESULTS

What do we have?

The first step in the planning process included a baseline assessment of the community forest resource. In 2021, the Village completed an inventory of all Village-owned trees and potential planting spaces within the public rights-of-way and parks. An analysis of the tree inventory data was conducted to identify trends in characteristics and maintenance needs for Village-owned trees.

MANAGING CASTLETON-ON-HUDSON'S COMMUNITY FOREST

What do we want?

Inventory data-driven recommendations were identified for the long-term maintenance and care of the Village's community forest resource.

IMPLEMENTATION OF THE PLAN

How do we get what we want?

Recommended work plans enable the Village to effectively monitor progress towards goals and the overall vision for the community forest. A team consisting of Village staff, partners, and community members dedicated to the Plan will ensure the actions are implemented, monitored, reported, and adapted over time to support updates to the Plan after the 7-year planning term. An adaptive management approach allows the Village to adjust management actions over time as changes occur both in the physical/biological environment and in the expectations of the Village's residents.

Project Timeline

The New York State Department of Environmental Conservation (DEC) awarded grants totaling over a million dollars to communities across the state to inventory, plant, and

maintain public trees. As part of the Division of Lands and Forests' Urban and Community Forestry Program, Castleton-on-Hudson was given the opportunity to increase public awareness of the importance of trees and develop and implement a comprehensive tree management plan to create a healthy community forest while enhancing quality of life.

In July of 2021, the Village of Castleton-on-Hudson and PlanIT Geo initiated a village-wide tree inventory, eco benefits analysis, and Community Forest Management Plan. The tree inventory was completed in August, followed by the development of the Community Forest Management Plan. A community meeting was held in October to share project updates and collaborate on a vision for the community forest. The final CFMP was presented to the Village Board of Trustees in February of 2022.

Project Task	Month
Grant Awarded to Village of Castleton-on-Hudson	May 2021
PlanIT Geo Contract Signed	July 2021
Tree Inventory Complete	August 2021
CFMP Kickoff Meeting	August 2021
Community Meeting	October 2021
Village of and Consultant Collaboration	August – November 2021
Community Forest Management Plan Draft Writing	September – December 2021
Presentation to Board of Trustees	February 2022
Final CFMP Delivery	April 2022

Table 1: Community Forest Management Plan Timeline

Guiding Principles for Implementation

Upon delivery of this CFMP, the Village of Castleton-on-Hudson will guide implementation of the Plan for proactive and sustainable urban forestry practices. In addition to the 7-year tree maintenance schedule, the Village will utilize this CFMP for strategic community forest program development and visioning with community members. Implementation of this Community Forest Management Plan will adhere to the following guiding principles:

- Recognize trees as the backbone of the community ecosystem and an essential part of the green infrastructure.
- Promote the health and growth of the community forest by following industry best management practices for tree selection, planting, watering, and pruning.
- Promote a robust community forest through policies and practices that reduce its vulnerability to known diseases or pest infestations, and future threats, including the anticipated effects of climate change.
- Engage in a continuous process of long-range planning and adaptive management for the growth and care of the community forest.
- Promote public appreciation of trees through educational outreach programs.
- Support local businesses, institutions, organizations, and individuals in their efforts to grow and maintain the community forest through education and involvement.
- Proceed in a manner that is inclusive and transparent.

Community Meeting

In October of 2021, The Village of Castleton-on-Hudson held a virtual community meeting to announce the Community Forest Management Plan project and discuss the progress with the community. The Village distributed an event flyer (see image on the right) to the community virtually, using social media, and at the annual Village Garage Sale and picnic event.

After presenting initial findings from the tree inventory and the CFMP framework, participants were invited to brainstorm a vision for the community forest. Below is a summary of the responses. These responses were incorporated into the CFMP, most notably in the *Implementation of the Plan* section.

**VILLAGE OF CASTLETON-ON-HUDSON, NY
TREE INVENTORY AND MANAGEMENT PLAN**

Castleton-on-Hudson's community trees provide a wide variety of benefits, including improved water and air quality, neighborhood character and community health, energy savings, wildlife habitat, and stormwater management. With grant funding from the New York State Department of Environmental Conservation, the Village is developing a Tree Inventory and Management Plan. The purpose of this plan is to create a vision for the long-term community forest and a strategy for how to care for our community trees.

TREE INVENTORY RESULTS ARE IN!

Castleton-on-Hudson has
492 PUBLIC TREES with room to grow!

340 STREET TREES **152** PARKS TREES **94** PLANTING SITES

TOP 10 SPECIES

- Norway maple
- Silver maple
- Sugar maple
- Norway spruce
- Arborvitae
- Northern white cedar
- Red maple
- Black maple
- Gallery pear
- Black locust

PUBLIC MEETING SOON
Join the Discussion on
Castleton-on-Hudson's
Community Forest.

DATE: Monday, October 25, 2021
TIME: 7:15 - 8:15 pm

For the virtual meeting link, visit
www.castleton-on-hudson.org.

Stay tuned for more details!

Village of
Castleton-on-Hudson
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PLANIT GEO
mapping a greener future

Questions Asked	Responses
What do you want your urban forest to look like 10 years from now?	- Flowering trees in public spaces - Pollinator gardens - A variety of trees and plants that offer seasonal beauty - Trees with interesting types of bark and fruit - Edible fruit trees - Expanded community gardening plots - Remove the dead trees and replace with less invasive species - Increase Village budget so a yearly tree plan is constant. - Replacement plantings in Mountain View Cemetery should be species requiring less maintenance - Bury power lines, especially on Main Street
What does Castleton-on-Hudson need to achieve more tree canopy cover?	- Trees that are specifically planned to provide a balance of shade and sun to public walkways and sidewalks - Need help on identifying what trees need to be maintained
If you could improve one thing about the natural environment, what would it be?	- Would like to know what kind of trees to plant as replacements in cemetery - Access to the river - Improve utility pruning practices - Create a planting club - Plant tree species near sidewalks that do not lift the sidewalks with the root system - Bury power lines on Main Street

Need for a Community Forest Management Plan

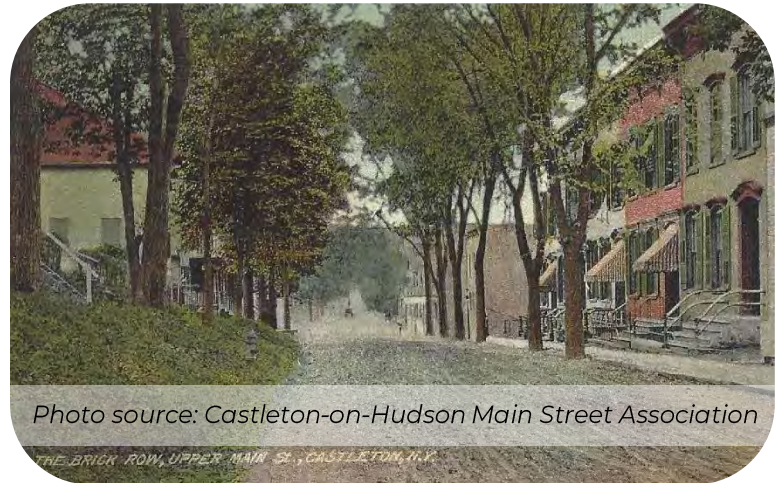
The history of community forest efforts in Castleton-on-Hudson provides a basis for this Community Forest Management Plan (CFMP). The CFMP integrates with past plans, programs, and policies, and it attempts to further develop goals and actions related to the management of the community forest.

Background

The Village of Castleton-on-Hudson, New York has an estimated population¹ of 1,462. It is in the southwestern corner of Rensselaer County, about 10 miles southeast of downtown Albany. Castleton-on-Hudson was first incorporated as a Village in 1827, but the area was inhabited by Native Americans and early settlers for generations prior to incorporation.

Today, Castleton-on-Hudson has a total area of 457 acres, which is less than one square mile, and has close ties to the nearby cities of Troy, Albany, and Schenectady, forming a region called the Capital District, with a population of 1.2 million people. The urban environment comes with a multitude of stressors that compromise tree health, species diversity, and the positive impact of the ecosystem services provided by trees. Common examples of these stressors include air pollution, pests (most notably emerald ash borer), diseases, invasive species, climate change, mechanical damage, urban development, infrastructure conflicts, and soil compaction. The Village is devoted to sustaining and enhancing the benefits that trees provide to the community by developing and following this strategic Community Forest Management Plan.

In the Village of Castleton-on-Hudson, it is the Public Works Department's responsibility to maintain trees within the public rights-of-way and on Village-owned parks, open spaces, and facilities. Therefore, implementation of this CFMP will be led by the Public Works Department. Staff in the Public Works Department address requests from the public for tree planting, pruning, and maintenance. Addressing these requests for tree work is vital to public safety, traffic visibility, street clearance, and public improvements that contribute to a greater quality of life. In addition to this responsive tree maintenance strategy, successful community forestry programs also implement proactive management strategies that consider the village-wide inventory of trees for maintenance schedules. To address this need, this CFMP will guide Castleton-on-Hudson's Community Forest Program towards a more cyclical maintenance routine and regular periodic inspections for high risk trees. The Plan identifies pruning rotations, removal implementation, and prioritization of workload over a 7-year time span.



¹ 2019 Census data

Relevant Programs, Plans, and Partners

The community forest is a vital public asset in Castleton-on-Hudson that has been emphasized in various existing Village plans and community efforts. The following are a selection of the wide variety of initiatives related to community forestry in the Village. This CFMP will complement these existing efforts, while focusing specifically on community forest management.

2005 Comprehensive Plan and 2015 Addendum

The Village's Comprehensive Plan adopted in 2005 includes chapters on Natural Resources and Parks & Recreation. These chapters include goals, actions, and other ideas related to community forestry, such as:

- Natural Resources:
 - o Encourage site design that protects existing terrain, preserves significant vegetation, and incorporates native trees and shrubbery.
 - o Trim and prune all major trees and remove and/or chip all fallen and dead trees and debris.
 - o Create resting and bird-watching areas by installing benches. Adopt a new tree preservation program regulating the removal of major trees on private and public property. Establish a system to regulate the removal, with the intent being the preservation of a valuable natural resource.
 - o Design a landscape plan and plant new trees, flowers, and shrubbery along the North Main Street-Route 9J right-of-way.
 - o Require that trees be planted in conjunction with any development of vacant or partially occupied lands.
 - o Develop standards for the protection, trimming, and pruning of trees during construction and/or power line maintenance activities to prevent unprofessional or careless over trimming
 - o Protect existing trees and plant new ones when old and decayed trees are removed along Village streets.
 - o Work with civic groups to establish an annual Arbor Day event.
- Parks & Recreation:
 - o To provide and maintain, through the use of parks, trails, greenways, and facilities, a variety of recreational opportunities and public access to riverfront, ravines, woodlands, and streams.
 - o Castleton, by its natural topography, has the potential for development of a variety of parks and park-related uses. The open space and mature trees give the Village a park-like setting that can be enhanced and enriched with a directed effort and resultant social and economic benefits.

The 2015 Addendum provides an update on progress since the 2005 Comprehensive Plan with three focus areas: 1) resolving the issues surrounding access to the Hudson River; 2) documenting “zombie” buildings and other derelict properties; and, 3) updating the village’s comprehensive plan.

2020 Hudson River Access Plan: The Village of Castleton-on-Hudson is included in an effort to improve access to the Hudson River throughout multiple counties. Two sites are included for access in Castleton-on-Hudson, including the Boat Club and Waterfront Park. Enhancement of riverfront access has the potential to include landscaping, trees, and open space improvements.

Village Code: The Village's Code includes requirements relating to community forestry in the Stormwater Management and Erosion and Sediment Control section and the Zoning section. Zoning regulations include language to encourage open spaces, shade trees, and gardens in residential districts. In the stormwater section, the regulations intend to stabilize the soil with vegetation and prevent stormwater pollution. The site plan requirements section encourages adequate "type and use of trees, shrubbery and other landscape elements for aesthetic, screening or buffering purposes and the relationship with existing trees and vegetation, which should be incorporated to the maximum possible extent."

Stormwater Management Plan, 2009: Castleton-on-Hudson's Stormwater Management Plan identifies regular maintenance performed by the Village related to stormwater management, including cleanup of tree branches and debris after storms as needed.

Trees for Tribs Program: the Trees for Tribs program works to restore streamside plant communities on public and private lands. By supporting plantings along tributaries ("tribs"), small streams that feed larger rivers and lakes, the program helps create healthier, more climate-resilient communities. The Village of Castleton-on-Hudson has participated in tree planting projects as part of this program.



Arbor Day Foundation's Tree City USA: The Village of Castleton-on-Hudson has earned the Tree City USA certification since 2019, exemplifying the Village's commitment to its community forest. The requirements to earn the recognition are:

- 1) Maintain a tree board or department,
- 2) Have a community tree ordinance,
- 3) Spend at least \$2 per capita on urban forestry, and
- 4) Celebrate Arbor Day.



Photo source: Board Trustee Sharon Martin

Defining the Community Forest

Urban and community forests are terms that refer to the trees, lower vegetation, open green spaces, and associated natural resources located throughout municipalities. They include street trees, Village parks, nature preserves, trails and greenways, gardens, landscaping, retention areas, green infrastructure, and much more. This resource is referred to interchangeably as an urban forest and a community forest in this Plan.

While many large American cities informally invested in urban forestry efforts by the turn of the 19th century, Dutch Elm disease forced the formalization of urban and community forestry programs in cities and towns of all sizes to address the widespread decline of the elm tree population. As a result, the discipline of urban forestry today strongly advocates for species and age diversity to avoid such devastation in the future. Unfortunately, native and invasive pests and diseases continue to spread.

Community forestry has evolved as researchers and practitioners learn more about the structure and function of trees and their unique role in providing environmental, economic, and social benefits to urban areas. Community forestry provides each of these benefits in differing circumstances—as infrastructure, as part of design and development, and as efficient and productive providers of economic development. This CFMP focuses specifically on the Village-owned trees in public rights-of-way and parks but also serves as a resource when advising on private trees with policy, community outreach, and education efforts.



Photo source: Getty Images

Benefits Provided by a Community Forest

Each tree within the community forest provides valuable ecosystem services and benefits to the community. A comprehensive analysis of the ecosystem benefits provided by Castleton-on-Hudson's trees is found in the *Value and Benefits of Castleton-on-Hudson's Trees* section.

Benefits of the community forest include improvements to quality of life, public health, air and water quality, neighborhood character, and wildlife habitat. Furthermore, trees help to mitigate the negative impacts of climate change by providing shade and cooling as temperatures rise, sequestering and storing carbon that's emitted in our atmosphere, and reducing stormwater as sea levels rise. Trees are one of the few infrastructure investments that grow in value over time and contribute to overall improvements to human health and well-being. The following information was derived from Alliance for Community Trees².

Reduce Stormwater, Conserve Water and Soil

A tree's fibrous roots, extending into the soil, are premier pollution filtration and soil erosion prevention systems. Intensely urbanized areas are covered with many impermeable surfaces. In contrast to an impervious hardscape, a healthy community forest can reduce annual storm water runoff up to 7 percent. Highly efficient trees also utilize or absorb toxic substances such as lead, zinc, copper, and biological contaminants. Trees reduce the need for additional local stormwater filtration systems. As referenced in the Village's Stormwater Management Plan, the Hudson River water quality is impacted by many factors. In Castleton-on-Hudson, there are five stormwater outfalls to the Hudson River. Pollutants from the urban landscape wash into the stormwater system during rainfall events into the storm sewers, which then discharge these pollutants into the Hudson River.

Reduce Stress and Improve the Quality of Life

Neighborhoods with generous canopies of trees are uplifting and good for public health. Greater contact with natural environments correlates with lower levels of stress, improving performance. Students' concentration levels go up when they can look out onto a green landscape. Studies show that children with attention deficit disorder function better after activities in green settings. A green environment also improves worker productivity.

Build Safe Communities and Decrease Crime

Police and crime prevention experts agree that trees and landscaping cut the incidence of theft, vandalism, and violence by enhancing neighborhoods. Thriving trees on well-maintained streets indicate pride of ownership. Public housing residents with nearby trees and natural landscapes reported 25 percent fewer acts of domestic aggression and violence. Apartment buildings with high levels of greenery had 52 percent fewer crimes than those without any trees. Buildings with medium amounts of greenery had 42 percent fewer crimes.

² Alliance for Community Trees. 2011. Benefits of trees and urban forests: A research list.
http://actrees.org/files/Research/benefits_of_trees.pdf

Positively Influence Climate to Ensure Sustainability

Trees absorb carbon dioxide and store carbon in wood, which helps to reduce greenhouse gases. Carbon emissions from vehicles, industries, and power plants are a primary contributor to increased air temperatures in metropolitan areas. Trees in the United States store 700 million tons of carbon valued at \$14 billion with an annual carbon sequestration rate of 22.8 million tons per year valued at \$460 million annually.

Clean the Air and Breathe Easier

Shade trees reduce pollution and return oxygen to the atmosphere. In addition to carbon dioxide, trees' leaves or needles absorb pollutants, such as ozone, nitrogen dioxide, sulfur dioxide, and some particulate matter.

Save Energy and Lower Energy Costs for Buildings

As natural screens, trees can insulate homes and businesses from extreme temperatures, keep properties cool, and reduce air conditioning utility bills. A 20 percent canopy of deciduous trees over a house result in annual cooling savings of 8 to 18 percent and annual heating savings of 2 to 8 percent. By planting shade trees on sunny exposures, residents and businesses can save up to 50 percent on hot-day energy bills.

Reduce the Need for Street Maintenance

Shaded streets last longer and require far less pavement maintenance, reducing long-term costs. Canopy diminishes pavement fatigue, cracking, rutting, and other damage. A study from University of California at Davis found that 20 percent shade cover on a street improves pavement condition by 11 percent, which is a 60 percent savings for resurfacing over 30 years.

Raise Property Values

Trees are sound investments, for businesses and residents alike, and their value increases as they grow. Sustainable landscapes can increase property values up to 37 percent. The value of trees appreciates over time because the benefits grow as they do. For businesses, trees have added value, including higher revenues. Shoppers seek out leafy promenades that frame storefronts. Research shows that shoppers spend more—between 9 and 12 percent more—on products in tree-lined business districts.

Cooler Pavement Diminishes Urban Heat Islands

Broad canopy trees lower temperatures by shading buildings, asphalt, and concrete. They deflect radiation from the sun and release moisture into the air. The urban heat island effect is the resulting higher temperature of areas dominated by buildings, roads, and sidewalks. Cities are often 5° to 10°F hotter than undeveloped areas, because hot pavement and buildings have replaced cool vegetated land. In addition, high temperatures increase the volatility of automobile oil and oil within the asphalt itself, releasing the fumes into the atmosphere. Shade trees can reduce asphalt temperatures by as much as 36°F, which diminishes the fumes and improves air quality.

Protect Wildlife and Restore Ecosystems

Planting and protecting trees can provide habitat for hundreds of birds and small animals. Urbanization and the destruction of valuable ecosystems have led to the decline of many of species. Adding trees, particularly native trees, provides valuable habitat for wildlife.

Calm Traffic and Make Neighborhoods Safer and Quieter

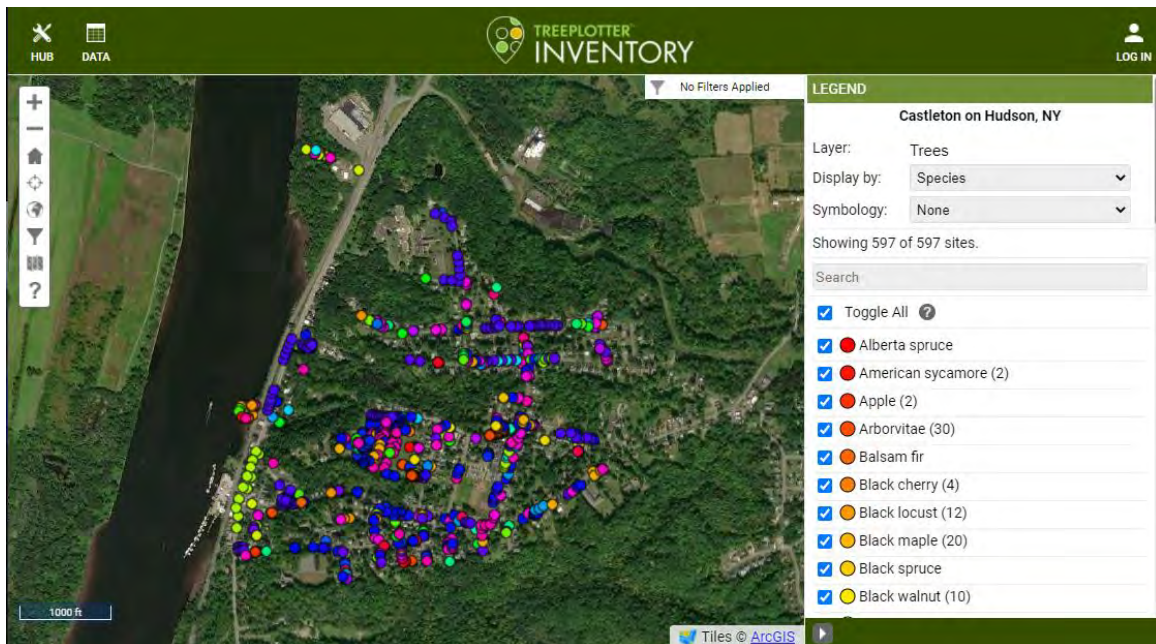
People drive more slowly and carefully through tree-lined streets because trees create the illusion of narrower streets. One study found a 46 percent decrease in crash rates across urban arterial and highway sites after landscape improvements were installed. The presence of trees in a suburban landscape reduced the cruising speed of drivers by an average of 3 miles per hour. Faster drivers and slower drivers both drove at decreased speeds in the presence of trees. Trees reduce noise pollution, buffering as much as half of urban noise. By absorbing sounds, a belt of trees 100 feet wide and 50 feet tall can reduce highway noise by 6 to 10 decibels. Buffers composed of trees and shrubs can reduce 50 percent of noise.

2021 Inventory Results

In August of 2021, PlanIT Geo's Inventory Arborists (certified by the International Society of Arboriculture) assessed and inventoried Castleton-on-Hudson's trees within the public rights-of-way (ROW) and the Village's parks, including Mountain View Cemetery and Riverfront Park. In this section, the inventory is summarized into:

- The Structure of the Community Forest
- Community Forest Condition and Maintenance Needs
- Value and Benefits of Castleton-on-Hudson's Trees

These summaries were completed using the data available in the Village's tree inventory management software, TreePlotter, to inform the Community Forest Management Plan recommendations. The data can be viewed at www.pg-cloud.com/Castleton-on-HudsonNY. Additional features and functionality are available to users with an account.



August 2021 Tree Inventory Highlights

597	Data points	94	Potential planting sites
489	Total live trees	61%	Good or Excellent condition
337	Live street trees (69%)	48%	Maple (Acer) trees
152	Live park trees (31%)	19"	Average diameter
33	Unique genera	64"	Largest diameter
57	Unique tree species	11	Stumps
		6	Priority removals

Table 2: August 2021 Tree Inventory Highlights

It should be noted that the tree inventory analysis was completed in August of 2021 and conditions and values may have changed since the completion of this analysis and Plan.

The Structure of the Community Forest

The structure of the trees in the public rights-of-way (ROW) and parks describes the tree population in terms of its distribution of trees throughout the village, species diversity and composition, and size and age classes. These summaries assist Castleton-on-Hudson's community forestry professionals in strategic tree management, planting, and community outreach to ensure long lasting canopy and benefits distributed equally across the village. It is important to keep in mind that while trees on private property were not included in this inventory, they contribute greatly to the village's tree canopy and will benefit from the recommendations of this report. Maintenance recommendations are found in the *Managing Castleton-on-Hudson's Community Forest* and the *Implementation of the Plan* sections.

Tree Distribution

Tree distribution takes into account various characteristics of where trees are located throughout the village, such as land use, site width, and growing space. Understanding tree distribution helps plan for potential risks such as pests, diseases, or the impacts of climate change. Equitable distribution of trees throughout the village ensures that all residents have access to the canopy's benefits.



The public tree population in Castleton-on-Hudson's is comprised of street and park trees. Parks trees make up 31% or 152 of the Village's inventory. This figure includes alive trees in parks, on vacant land, and other non-street trees. Mountain View Cemetery, Riverfront Park, and additional "pocket parks" were included in the inventory.

STREET TREES: ADJACENT LAND USES

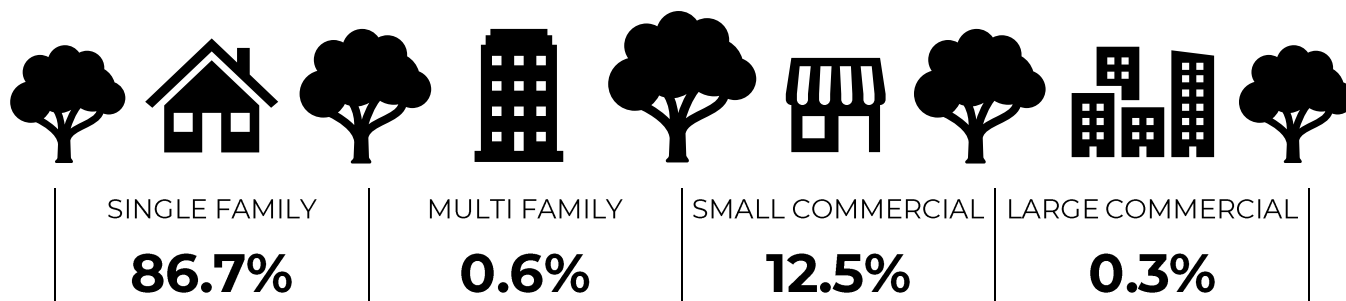


Figure 1: Street Tree Land Uses

Tree Distribution Results

Street trees in Castleton-on-Hudson comprise the majority of the inventory with 69% or 337 live trees in the public ROW. Of the live street trees, 87% (292) are adjacent to residential homes (single-family land use). It is common for less trees to exist in the large commercial and industrial land use areas.

Discussion and Recommendations

Castleton-on-Hudson's trees are most frequently located in maintained landscape areas (46% or 223 trees) and front yards (43% or 209 trees), which correlates with most trees being in residential areas. As such, an important maintenance consideration is that planting strips limit the size of growing space available to trees, often resulting in damaged sidewalks and pavement. In Castleton-on-Hudson, 18% of trees (86) are growing in a space only 1-5 feet wide. However, the inventory revealed that overall, most trees (48% or 233 trees) have more than 11 feet of site width. It should be noted that root accommodations may be in place underground that impact infrastructure, but were not observed. Adequate root space should be considered for new tree installations, sidewalk and infrastructure amendments and installations, and as part of new Public Works' projects.

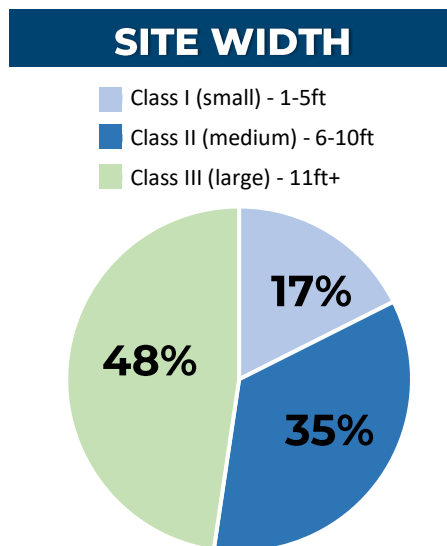


Figure 2: Site Width of Trees in Castleton-on-Hudson



Tree Diversity and Composition

This section on composition of the community forest investigates Castleton-on-Hudson's tree species diversity, characteristics and traits of dominant species, and the implications of the diversity (or lack thereof). The composition of a tree population should follow the 10-20-30 Rule for species diversity—a single species should represent no more than 10% of the community forest, a single genus no more than 20%, and a single family no more than 30%.

This analysis is essential to future planning efforts since the types of trees present in a community greatly affect the benefits produced, tree maintenance activities, budgets, planting goals, canopy connectivity, and the Village's ability to respond to threats from invasive pests and diseases and the effects of climate change. Low species diversity (large proportion of the population consisting of trees of the same species) can lead to severe losses in the event of species-specific epidemics such as the devastating results of Dutch elm disease (DED, *Ophiostoma novo-ulmi*) and more recently, emerald ash borer (EAB, *Agrilus planipennis*). Unfortunately, many ash (*Fraxinus*) trees were planted as replacements to elms (*Ulmus*) lost from DED. Asian longhorned beetle (ALB, *Anoplophora glabripennis*) is another potential threat to some of the most prevalent community shade trees. Tree species diversity is crucial to the resilience of the community forest from these and future unknown threats.

Tree Diversity and Composition Results

Based on the inventory data, there exists a total of 68 unique genera with the top five comprised of *Acer* (48%), *Thuja* (12%), *Picea* (8%), *Pyrus* (4%), and *Fraxinus* (2.5%). The top five genera make up 74% (362 trees) of the 489 total live trees recorded in the 2021 inventory, and the top 10 genera make up 86% (422 trees). A total of 57 unique tree species were found in the inventory. The top ten species comprise 68% of the inventory, which accounts for 333 of the 489 total species in Castleton-on-Hudson.

Genus	Count	% Live Trees
<i>Acer</i>	233	47.65%
<i>Thuja</i>	60	12.27%
<i>Picea</i>	39	7.98%
<i>Pyrus</i>	18	3.68%
<i>Fraxinus</i>	12	2.45%
<i>Robinia</i>	12	2.45%
<i>Pinus</i>	11	2.25%
<i>Juglans</i>	10	2.04%
<i>Prunus</i>	9	1.84%
<i>Quercus</i>	9	1.84%
All other genera	67	13.70%
TOTAL	489	100%

Table 3: Top 10 Genus in Castleton-on-Hudson, NY

Species Common Name	Count	% Live Trees
Norway maple	78	15.95%
Silver maple	45	9.20%
Norway spruce	32	6.54%
Sugar maple	32	6.54%
Arborvitae	30	6.13%
Northern white cedar	30	6.13%
Red maple	24	4.91%
Black maple	20	4.09%
Callery pear	18	3.68%
Black locust	12	2.45%
All other species	156	32%
TOTAL	489	100%

Table 4: Top 11 Species in Castleton-on-Hudson, NY

LEAVES OF THE 11 MOST COMMON TREE SPECIES

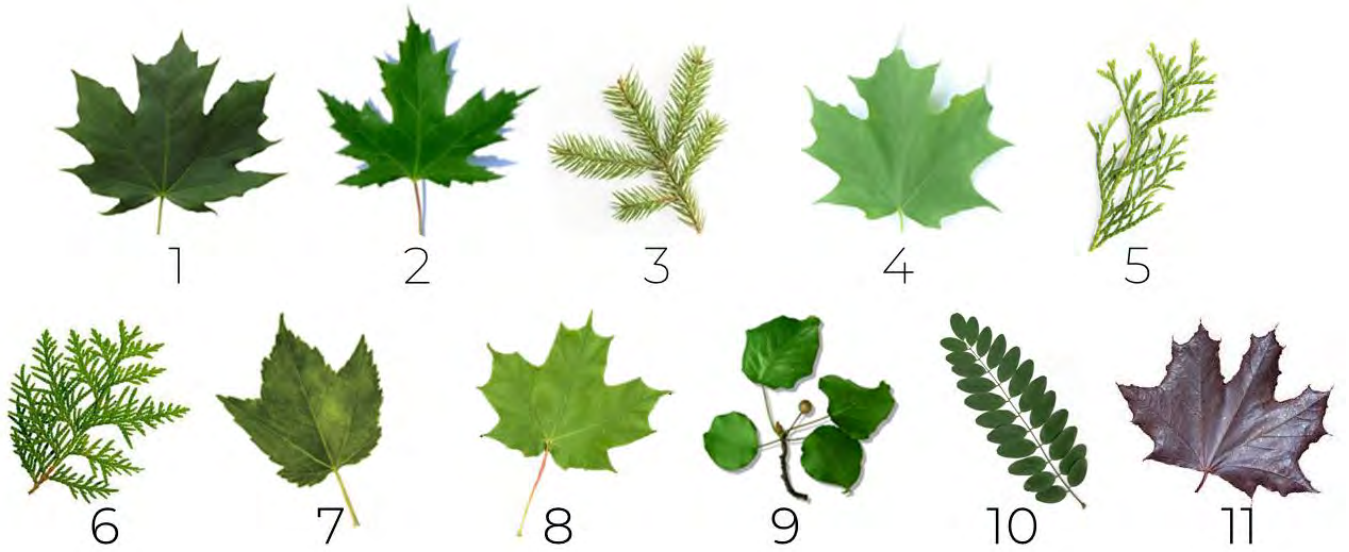


Figure 3: Leaf images of the top 11 most common trees in Castleton-on-Hudson, NY

1) Norway maple, 2) Silver maple, 3) Norway spruce, 4) Sugar maple, 5) Arborvitae, 6) Northern white cedar, 7) Red maple, 8) Black maple, 9) Callery pear, 10) Black locust, 11) Crimson King Maple
(PlanIT Geo photo stock)

TOP 11 TREE SPECIES IN CASTLETON-ON-HUDSON

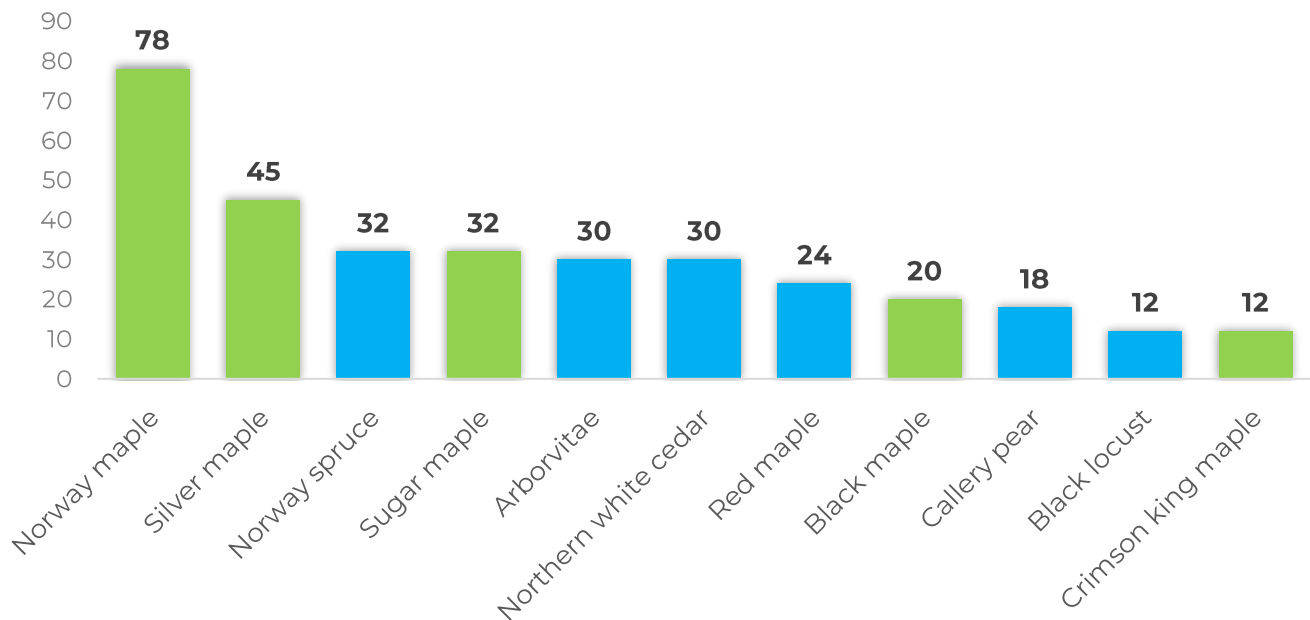


Table 5: Top 11 species in Castleton-on-Hudson, NY, with maple species indicated in green.

Discussion and Recommendations

Maples are more than double the recommended 20% maximum for a single genus in a population, comprising 48% of the inventoried trees. Six of the top 10 species belong to the *Acer* genus (indicated in green in Table 5): Norway maple (*Acer platanoides*), Silver maple (*Acer saccharinum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), black maple (*Acer saccharum* ssp. *nigrum*), and Crimson King maple (*Acer platanoides* 'Crimson King'). Norway maples exceed the recommended 10% maximum for a single species in a population, comprising 16% of the inventoried tree population. Silver maple is the next most prevalent species at 9% of the total population. According to the New York Invasive Species Information Clearinghouse, Norway maple is an invasive species in New York and throughout many nearby states. Norway maples are commonly planted as street trees throughout the northeast, so Castleton-on-Hudson is not unlike other neighboring cities and towns. Studies have shown that the Crimson King maple, while it is also invasive, it is much less invasive than the Norway maple. Planting native and diverse species is one of the best strategies for achieving a sustainable and resilient community forest. Silver maple are strong native alternatives to consider for future plantings.

MAPLES IN CASTLETON-ON-HUDSON						
Common Name	Norway Maple	Silver Maple	Sugar Maple	Red Maple	Black Maple	'Crimson King'
Scientific Name	<i>Acer platanoides</i>	<i>Acer saccharinum</i>	<i>Acer saccharum</i>	<i>Acer rubrum</i>	<i>Acer saccharum</i> ssp. <i>nigrum</i>	<i>Acer platanoides</i> 'Crimson King'
Within Native Range	No	Yes	Yes	Yes	Yes	No
Invasive	Yes	No	No	No	No	Yes
Height	40' - 50'	50' – 70'	60' - 75'	40' - 60'	80' – 100'	35' - 45'
Shape	Oval to Round	Oval to Round	Upright oval to mounded	Varies widely by variety.	Large, rounded crown	Oval

Table 6: Maples in Castleton-on-Hudson, NY

The inventory shows that Castleton-on-Hudson contains nearly the same diversity of tree species in its parks as along its streets. Along streets, four of the five most prevalent species are maples, with Norway maple leading the way with 17% and Silver maple at 12%. In Parks, the native Northern white cedar is most prevalent at 14%, and the Norway spruce and Norway maple each have 13% of the inventoried trees. Considering the large quantity of *Acer* (maple) in the Village's population, along with its susceptibility to Asian longhorned beetle and granulate ambrosia beetle (*Xylosandrus crassiusculus*), the planting of *Acer* should be limited to minimize the potential for loss in the event these pests appear in the Village's community forest. The Village should create an updated recommended tree species list for planting based on the trees found in the 2021 inventory.

MOST COMMON PARK TREE SPECIES		
Common Name	Count	%
Northern white cedar	21	14%
Norway spruce	20	13%
Norway maple	20	13%
Sugar maple	18	12%
Arborvitae	10	7%
All other species	63	61%
TOTAL	152	100%

Table 7: Top five species of park trees in Castleton-on-Hudson, NY

MOST COMMON STREET TREE SPECIES		
Common Name	Count	%
Norway maple	58	17%
Silver maple	42	12%
Red maple	20	6%
Arborvitae	20	6%
Sugar maple	14	4%
All other species	183	54%
TOTAL	337	100%

Table 8: Top five species of street trees in Castleton-on-Hudson, NY

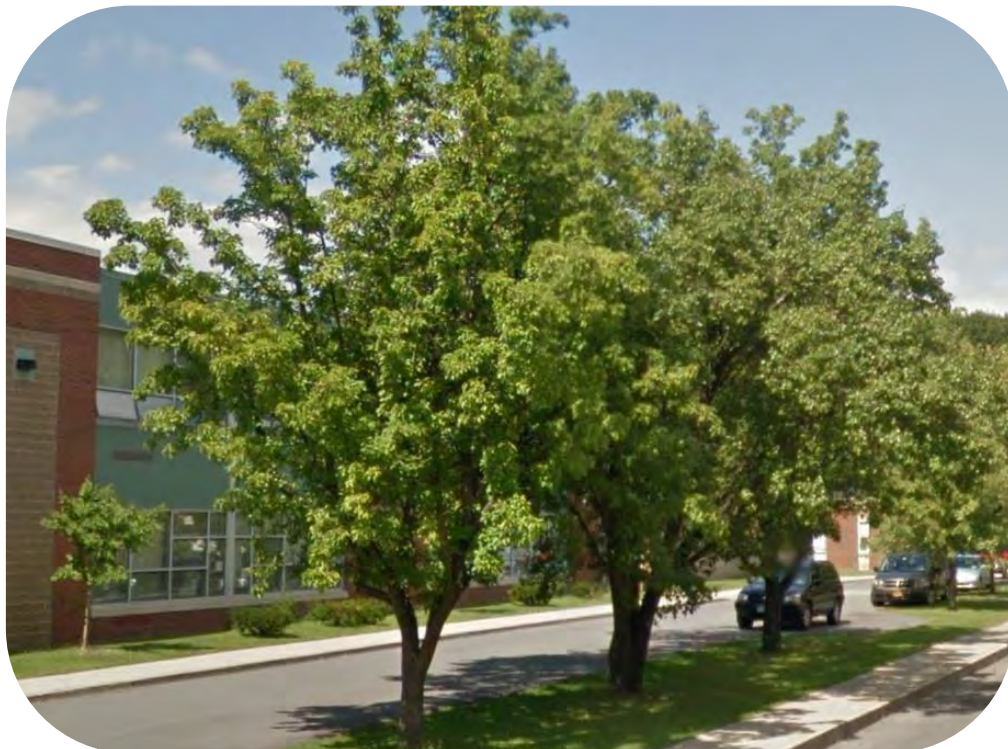


Photo source: Google street view

Diameter Size Class Distribution (Relative Age)

The distribution of tree ages influences the structure of the community forest as well as the present and future costs to the Village or property owners. Since tree species have different lifespans and mature at different diameters, heights, and crown spreads, actual tree age cannot be determined from diameter size class alone. However, the most common method for measuring tree size is to measure the tree's diameter at breast height (DBH), and general classifications of size can be extrapolated into relative age classes. Multiple "ideal distributions" have been established as useful tools for studying the community forest. To compare Castleton-on-Hudson with these ideal distributions, the inventory was divided into street trees and parks trees.



Photo source: Getty Images

Ideal Distribution for Street Trees

The "Richards ideal diameter size class distribution" was proposed for street trees in 1983 based on observations of well-adapted trees in Syracuse, New York. Richards' ideal distribution proposes an abundance of newly planted and young trees, and lower numbers of established, maturing, and mature trees. It puts an emphasis on younger trees for streetscape population stability, with an understanding that older larger trees often require additional maintenance cost and care to remain healthy and safe in an urban environment. This proposed structure of the urban forest offers continued flow of benefits and a more uniform workflow allowing managers to more accurately allocate annual maintenance funds.

To test Castleton-on-Hudson's trees against the Richards ideal distribution, the inventory was categorized into the following diameter size classes: young trees (0-8 inches DBH), established (8-16 inches DBH), maturing (16-24 inches DBH), and mature trees (>24 inches). According to Richards' ideal distribution (1983)³, the number of trees over 16 inches and less

³ Richards, N. A. 1983. "Diversity and Stability in a Street Tree Population." *Urban Ecology* 7(2):159-171.

than 24 inches DBH nearly matches the ideal distribution. The Village would achieve a more ideal distribution by adding more young trees and removing mature trees in the rights-of-way.

STREET TREES - IDEAL DBH DISTRIBUTION				
	DBH (in)	Richards Ideal Distribution %	Castleton-on-Hudson	Results
YOUNG: 40% of trees below 20 cm	0-8"	40%	29%	LOW
ESTABLISHED: 30% between 20 and 40 cm	8"-16"	30%	20%	LOW
MATURING: 20% between 40 and 60 cm	16"-24"	20%	19%	GOOD
MATURE: 10% larger than 60 cm	24"+	10%	32%	HIGH

Table 9: Ideal DBH distribution compared with street trees in Castleton-on-Hudson, NY

Ideal Distribution for Parks Trees

The Millward and Sabir ideal distribution was proposed based on a study of a downtown park in the City of Toronto, Canada. In contrast to the Richards distribution, this prioritizes larger and older trees within the urban forest. Mature trees with long lifespans can provide ecosystem benefits for hundreds of years when given adequate growing space and care. Generally, trees in parks have the potential to live longer lives than street trees as they are provided more growing space. As trees reach the end of their lifespan, the structural integrity of the tree decreases and the likelihood of failure increases. Since a target must be present for the risk of injury or property damage to occur, the risk associated with parks trees is much less than street trees.

To test Castleton-on-Hudson's trees against the Millward and Sabir ideal distribution, the inventory was categorized into the following diameter size classes: young trees (0-6 inches DBH), established (6-24 inches DBH), maturing (24-36 inches DBH), and mature trees (>36 inches). According to this ideal distribution⁴, Castleton-on-Hudson has too few trees in the young and maturing age categories, and significantly more established and mature trees than the ideal distribution calls for in parks.

PARKS STREETS – IDEAL DBH DISTRIBUTION				
	DBH (in)	Millward and Sabir Ideal Distribution %	Castleton-on-Hudson	Results
YOUNG: 40% of trees below 15 cm DBH	<6"	40%	6%	LOW
ESTABLISHED: 30% between 15 and 60 cm	6"-24"	30%	52%	HIGH
MATURING: 25% between 60 and 90 cm	24"-36"	25%	17%	LOW
MATURE: 5% larger than 90 cm DBH	>36"	5%	24%	HIGH

Table 10: Ideal DBH distribution compared with park trees in Castleton-on-Hudson, NY

⁴ Millward, A.A.; Sabir, S. Structure of a forested urban park: Implications for strategic management. J. Environ. Manag. 2010, 91, 2215–2224.

Diameter Size Class Distribution Results

According to both of these ideal distributions Castleton-on-Hudson has too few young trees and far too many mature trees. When planning for the mature tree population, it is important to consider the land use and associated growing space, as well as resources available to be dedicated for care. An overall goal for Castleton-on-Hudson's community forest should be to have an uneven-aged distribution of trees at the street, park, and Village-wide levels. An aging tree population poses a potential increase in maintenance and removal demands and may leave a void in tree canopy and associated benefits if tree planting levels are not elevated. The Village is below the threshold for young trees and it will also suffer a loss of ecosystem services that were provided by the mature trees if tree plantings do not increase.

Discussion and Recommendations

It is recommended that Castleton-on-Hudson support a strong planting and maintenance program to ensure that young, healthy trees are in place to fill in gaps in tree canopy and replace older declining trees. The Village must promote tree preservation and proactive tree care to ensure the long-term survival of older trees. Additionally, tree planting and tree care will allow the distribution to normalize over time.

The distribution of individual tree ages within a tree population influences present and future costs as well as the flow of benefits. If a City or Village assumes responsibility of tree maintenance within public rights-of-way, an ideal age/size distribution in the tree population allows managers to allocate annual maintenance costs uniformly over many years and assures continuity in overall tree canopy coverage and associated benefits which are often dependent on the growing space of individual trees (e.g. open grown versus restricted growing areas).

For the practicality of creating and implementing a maintenance plan, the following DBH and relative age classes will be utilized from this point forward in this CFMP:

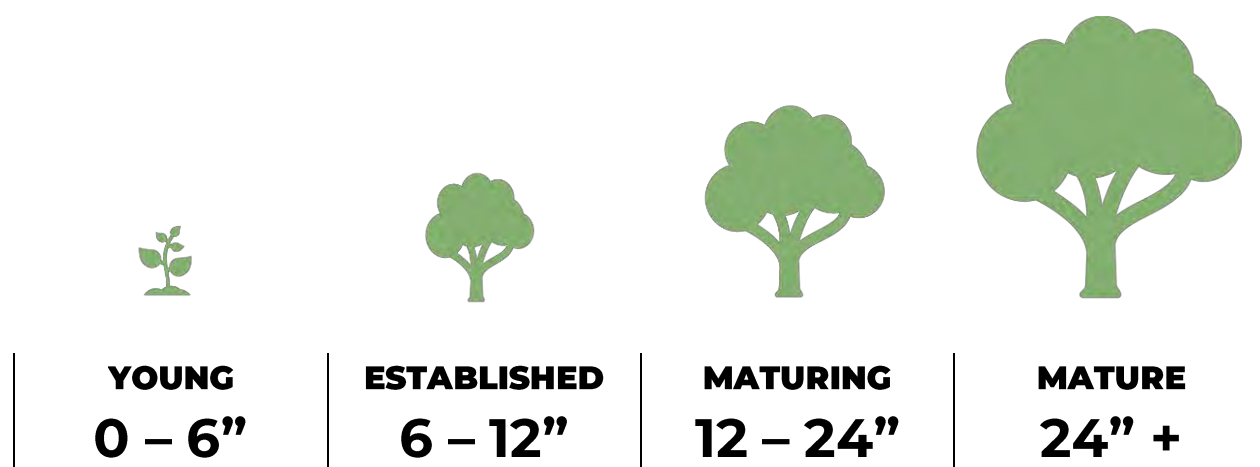


Figure 4: DBH and relative age classes used in this Community Forest Management Plan

Community Forest Condition and Maintenance Needs

In this section, Castleton-on-Hudson's community forest is further explored by observations made during the trees during the 2021 inventory. Tree characteristics and outside forces affect the management needs for urban and community trees. An analysis of the condition and maintenance requirements enables managers to plan the community forest and target outreach to property owners and the community as a whole. Tree condition indicates how well trees are managed and how well they perform given site-specific conditions. Tree maintenance needs are inventoried for public safety reasons and for the health and longevity of the trees. Understanding the maintenance needs assists tree managers in establishing daily work plans.



Photo source: Castleton-on-Hudson Main Street Association

Tree Condition

The condition of individual trees was assessed based on methods defined by the International Society of Arboriculture (ISA). Several factors were considered for each tree, including root characteristics, branch structure, trunk, canopy, foliage condition, and the presence of pests. The condition of each inventoried tree was rated Excellent, Good, Fair, Poor, Critical, or Dead. In this Plan, the general health of the inventoried tree population was characterized by the most prevalent condition assigned during the inventory. Comparing the condition of the inventoried tree population with relative tree age (or size class distribution) can provide insight into the stability of the population.

Tree Condition Results

Overall, Castleton-on-Hudson's inventory showed positive results in relation to condition of tree health. The majority of the Village's trees (54%) are in good condition, and 8% are in excellent condition. Only 7% of all trees are in poor condition and just 0.61% (3 trees) were recorded as Dead at the time of the inventory. Tree condition was analyzed Village-wide and by location within Village parks or streets.

In addition, the condition was summarized by relative age classes. Comparing the condition of the inventoried tree population with relative tree age (or size class distribution) can provide insight into the stability of the population. As seen in Figure 11, Village-wide, the majority of trees in each age category are in good condition.

CONDITION OF TREES BY AGE CLASS						
	Dead	Poor	Fair	Good	Excellent	Village-wide Total
Young	0%	0%	1%	12%	4%	17%
Established	0%	1%	3%	11%	2%	17%
Maturing	0%	3%	12%	14%	1%	31%
Mature	0%	3%	14%	17%	0%	35%
All Ages	1%	7%	31%	54%	8%	100%

Table 11: Condition of Castleton-on-Hudson's trees by age class

CONDITION OF PARK TREES						
	Dead	Poor	Fair	Good	Excellent	Parks Total
Young	0%	1%	4%	1%	6%	0%
Established	1%	3%	10%	3%	16%	1%
Maturing	3%	11%	21%	2%	36%	3%
Mature	3%	11%	28%	0%	41%	3%
All Ages	6%	25%	63%	6%	100%	6%

Table 12: Condition of Castleton-on-Hudson's park trees by age class

CONDITION OF STREET TREES						
	Dead	Poor	Fair	Good	Excellent	Streets Total
Young	0%	0%	1%	16%	6%	22%
Established	0%	1%	4%	11%	2%	17%
Maturing	0%	4%	13%	11%	1%	28%
Mature	1%	4%	16%	12%	0%	32%
All Ages	1%	8%	34%	49%	9%	100%

Table 13: Condition of Castleton-on-Hudson's street trees by age class

When comparing Table 12 and Table 13 (street versus park trees), the Village's street trees (Figure 12) are mostly young trees in good condition (16%) and mature trees in fair condition (16%). The Village's parks trees (Figure 14) are more mature than the street trees, and the percentage of trees in good condition increases as the trees are more mature. Mature trees in good condition make up the majority of parks trees at 41%, and maturing trees in good condition follow with 21%.

Discussion and Recommendations

The mature and maturing trees in the Village parks are in better condition overall compared to the same size class of street trees. Of the street trees, the young trees are in relatively better condition than any other age category, with 16% in good condition and 6% in excellent condition. This may be a result of more frequent care and attention placed on newly planted street trees. It was observed that mature trees in parks are in better condition than mature street trees which might be a result of the more abundant growing space commonly available in park settings.

The condition of Castleton-on-Hudson's inventoried tree population is typical for a Village-wide tree population and specifically for the street and park trees. The data analysis has provided the following insight into maintenance needs and historical maintenance practices.

The similar trend in condition across the tree population reveals that growing conditions and/or past management of trees were consistent.

- Younger trees rated in Fair or Poor condition may benefit from improvements in structure that may improve their health over time. Pruning should follow ANSI A300 (Part 1) standards.⁵
- Poor condition ratings among mature trees were generally due to visible signs of decline and stress, including decay, dead limbs, sparse branching, or poor structure. These trees will require corrective pruning, regular inspections, and possible intensive plant health care to improve their vigor.
- Proper tree care practices are needed for the long-term general health of the community forest. Following guidelines developed by ISA and those recommended by ANSI A300 (Part 5) standards⁶ will ensure that tree maintenance practices ultimately improve the health of the community forest.

TREE CONDITION IN CASTLETON-ON-HUDSON

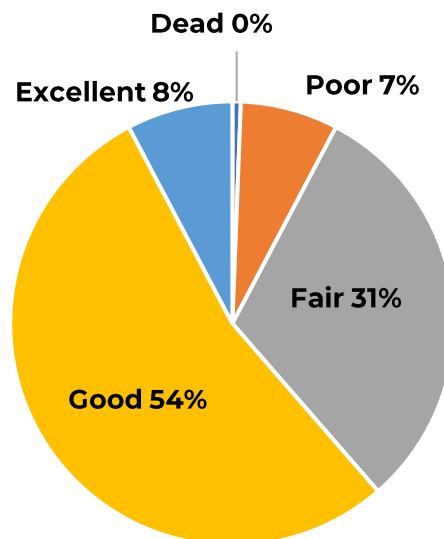


Figure 5: Tree condition in Castleton-on-Hudson, NY

⁵ ANSI, American National Standards Institute. 2017. ANSI A300 (Part 1)-2017 Pruning

⁶ ANSI A300 (Part 5)-2012: Management of Trees and Shrubs During Site Planning, Site Development, and Construction

Relative Performance Index

Relative Performance Index (RPI) is a comparison of a species' condition rating of "Good" and the tree population's "Good" rating. Using the percent of Good trees for a given species divided by the tree population percentage of Good trees gives a value of equal to 1, less than 1, or greater than 1. A value equal to 1 means the particular species is as healthy as the overall tree population. A value less than 1 means the species isn't as healthy as the overall tree population. A value greater than 1 means the species is healthier than the overall tree population. RPI answers the question of how well a species is performing in terms of health compared to the entire inventoried population.

Relative Performance Index Results

The table provides a summary of the RPI's in order of abundance in the tree population. Norway maples are most abundant but have a lower RPI (0.83) compared to other most common species such as Norway spruce (1.07) and sugar maple (1.56), among others. Though callery pear has a relatively high RPI (1.75), there is concern for the species due to the species' branching structure prone to limb breaks in winds, heavy snow, and/or heavily leafed limbs. Silver maple has the lowest RPI with 0.62 which may be due to their tendency to drop limbs.

Top 11 Species	Species RPI	Score
Arborvitae	1.79	High
Callery pear	1.75	High
Sugar maple	1.56	High
Northern white cedar	1.48	High
Crimson king maple	1.39	High
Norway spruce	1.07	Good
Norway maple	0.83	Low
Black maple	0.83	Low
Red maple	0.77	Low
Black locust	0.77	Low
Silver maple	0.62	Low

Table 14: Relative Performance Index (RPI) of the most common tree species

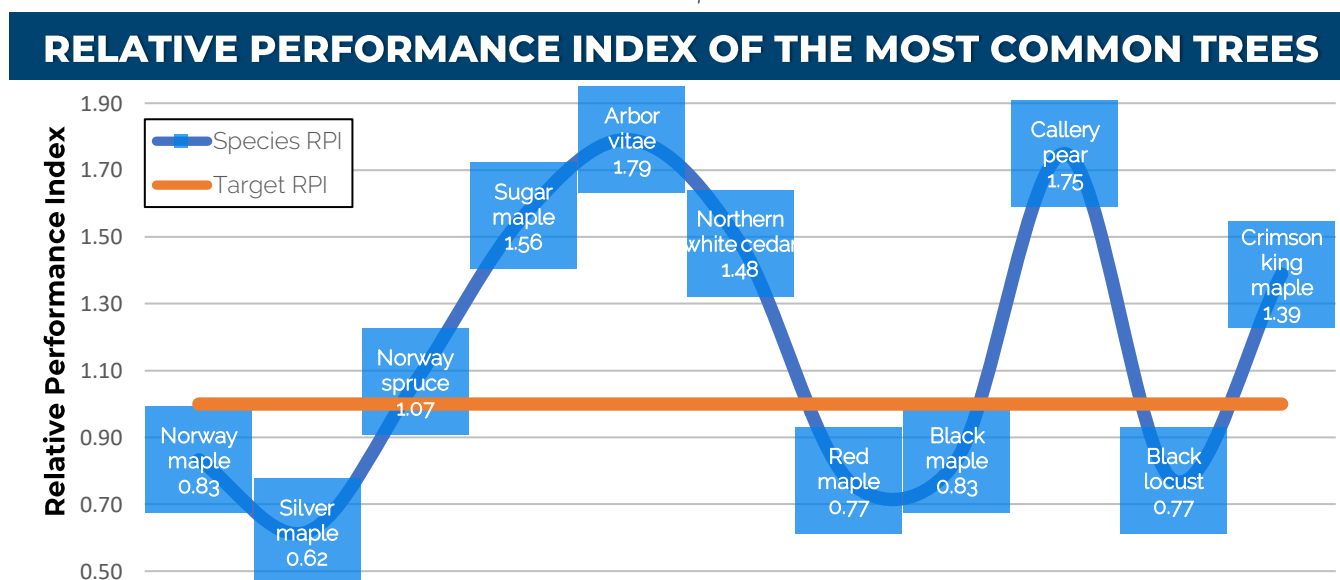


Figure 6: Relative Performance Index (RPI) of the most common tree species

Tree Observations

Tree observations were recorded during the 2021 inventory to further describe a tree's health, structure, or location when more detail was needed.

Observation	# of Times Observed	% of Total Observations	% of 492 Sites
Canker	1	0.1%	0.2%
Cavity Decay	186	18.9%	38%
Codominant Stems	150	15.2%	31%
Crown Dieback	205	20.8%	42%
Fungal growth/Fruiting bodies	3	0.3%	0.6%
Hardscape Damage	20	2.0%	4%
Improperly Pruned	5	0.5%	1%
Included Bark	53	5.4%	11%
Mechanical Damage	20	2.0%	4%
Nutrient Deficiency	2	0.2%	0.4%
Pests	11	1.1%	2%
Poor Root System	58	5.9%	12%
Poor Structure	169	17.2%	34%
Serious Decline	11	1.1%	2%
Vines	26	2.6%	5%
Wires Conflict	64	13%	6.5%
Sites without any observation	125	-	25%
Sites with any observation	367	-	75%
Total observations	984	100%	187%
Total Sites	492	-	100%

Table 15: Summary of observations tree inventory observations

Tree Observation Results

A total of 920 observations were recorded during the 2021 tree and vacant site inventory. A total of 367 sites (75%) are noted with at least one observation while 125 sites (25%) have no observation recorded. Crown Dieback was most frequently observed and recorded (42%) during the 2021 tree inventory.

Discussion and Recommendations

Trees noted as having defects such as cavity or decay, poor tree architecture (codominant leader), weakly attached branches (included bark), root problems, and/or pest problems should be regularly inspected in addition to the trees noted for reinspection. Corrective actions should be taken when warranted. If the tree's condition worsens, removal may be required. It should be noted that of the 920 observations, 109 observations (11.1%) could have potentially been avoided. These observations include mechanical damage and improper

pruning. The costs for treating deficient trees must be considered to determine whether removing and replacing the tree is the more viable option.

Utility Conflicts

In an urban setting, space is limited both above and below ground. Trees in this environment may conflict with utility wires which may pose risks to public health and safety. Existing or possible conflicts between trees and powerlines were recorded during the 2021 inventory. The presence of overhead utility lines above a tree or planting site was noted. Additionally, hardscape damage was noted when present. It is important to consider this data when planning of pruning activities and selecting tree species for planting.

Conflict	Presence of Conflict	Percent of 492 Sites
Wire Conflict	64	13%
Hardscape Damage	20	4%
TOTAL	84	17%

Table 16: Summary of utility and tree conflicts

Utility Conflict Results

A total of 64 trees (13%) were noted with having a conflict with wires. The description of the service line was not included in the tree inventory and therefore, these observations need to be further evaluated. A total of 20 sites (4%) were noted for hardscape damage. This may include sidewalk or pavement upheaval.



Photo source: Getty Images

Discussion and Recommendations

Planting only small-growing trees within 20 feet of overhead utilities, medium-size trees within 20–40 feet, and large-growing trees outside 40 feet will help improve future tree conditions, minimize future utility line conflicts, and reduce the costs of maintaining trees under utility lines. Future tree installations should consider the growing space, root space, and site conditions to accommodate a tree’s potential growth capacity. Existing hardscape conflicts should be remedied when warranted and follow the recommendations provided in this Plan.

Value and Benefits of Castleton-on-Hudson's Trees

The community forest plays an important role in supporting and improving the quality of life in communities. A tree's shade and beauty contribute to a community's quality of life and soften the often hard appearance of urban landscapes and streetscapes. When properly maintained, trees provide communities abundant environmental, economic, and social benefits that far exceed the time and money invested in planting, pruning, protection, and removal.

The trees growing along the public streets constitute a valuable community resource. They provide numerous tangible and intangible benefits such as pollution control, energy reduction, stormwater management, property value increases, wildlife habitat, education, and aesthetics.

The services and benefits of trees in the urban and suburban setting were once considered to be unquantifiable. However, by using extensive scientific studies and practical research, these benefits can now be confidently calculated using tree inventory information. The results of applying a proven, defensible model and method that determines tree benefit values for the Village of Castleton-on-Hudson's tree inventory data are summarized in this Plan using the U.S. Forest Service's i-Tree's Streets and i-Tree Eco applications. The results of Castleton-on-Hudson's tree inventory provide insight into the overall health of the Village's public trees and the management activities needed to maintain and increase the benefits of trees into the future.



The i-Tree Tools software was developed by the U.S. Department of Agriculture, Forest Service (USDA FS) with the help of several industry partners.

Learn more at www.itreetools.org

Environmental Benefits Analysis of Castleton-on-Hudson's Public Trees

To identify the dollar value provided and returned to the community, the Village's tree inventory data were formatted for use in the i-Tree Streets and i-Tree Eco benefit-cost assessment tools. These applications analyze an inventoried tree population's structure to estimate the costs and benefits of that tree population. The assessment tools create annual benefit reports that demonstrate the value the Village's trees provide.

These quantified benefits and the reports generated are described below.

- **Aesthetic/Other Benefits:** Shows the tangible and intangible benefits of trees reflected by increases in property values (in dollars).
- **Stormwater:** Presents reductions in annual stormwater runoff due to rainfall interception by trees measured in gallons.
- **Carbon Stored:** Tallies all of the carbon dioxide (CO₂) stored in the urban forest over the life of its trees as a result of sequestration. Carbon stored is measured in pounds.
- **Energy:** Presents the contribution of the urban forest towards conserving energy in terms of reduced natural gas use in the winter (measured in therms [thm]) and reduced electricity use for air conditioning in the summer (in Megawatt-hours ([MWh])).
- **Carbon Sequestered:** Presents annual reductions in atmospheric CO₂ due to sequestration by trees and reduced emissions from power plants due to reductions in energy use. This is measured pounds and has been translated to tons for this report.

The model accounts for CO₂ released as trees die and decompose and CO₂ released during the care and maintenance of trees.

- **Air Quality:** Quantifies the air pollutants (ozone [O₃], nitrogen dioxide [NO₂], sulfur dioxide [SO₂], particulate matter less than 10 micrometers in diameter [PM₁₀]) deposited on tree surfaces, and reduced emissions from power plants (NO₂, PM₁₀, volatile organic compounds [VOCs], SO₂) due to reduced electricity use in pounds. The potential negative effects of trees on air quality due to biogenic volatile organic compounds (BVOC) emissions is also reported.
- **Replacement Value:** Replacement values are estimates of the full cost of replacing trees in their current condition, should they be removed for some reason. Replacement values are based on the Council of Tree and Landscape Appraisers (CTLA) Guide for Plant Appraisal, which uses a trunk formula methodology.
- **Importance Value (IV):** IVs are calculated for species that comprise more than 1% of the population. The Streets IV is the mean of three relative values (percentage of total trees, percentage of total leaf area, and percentage of canopy cover) and can range from 0 to 100, with an IV of 100 suggesting total reliance on one species. IVs offer valuable information about a community's reliance on certain species to provide functional benefits. For example, a species might represent 10% of a population but have an IV of 25% due to its substantial benefits, indicating that the loss of those trees would be more significant than just their population percentage would suggest.

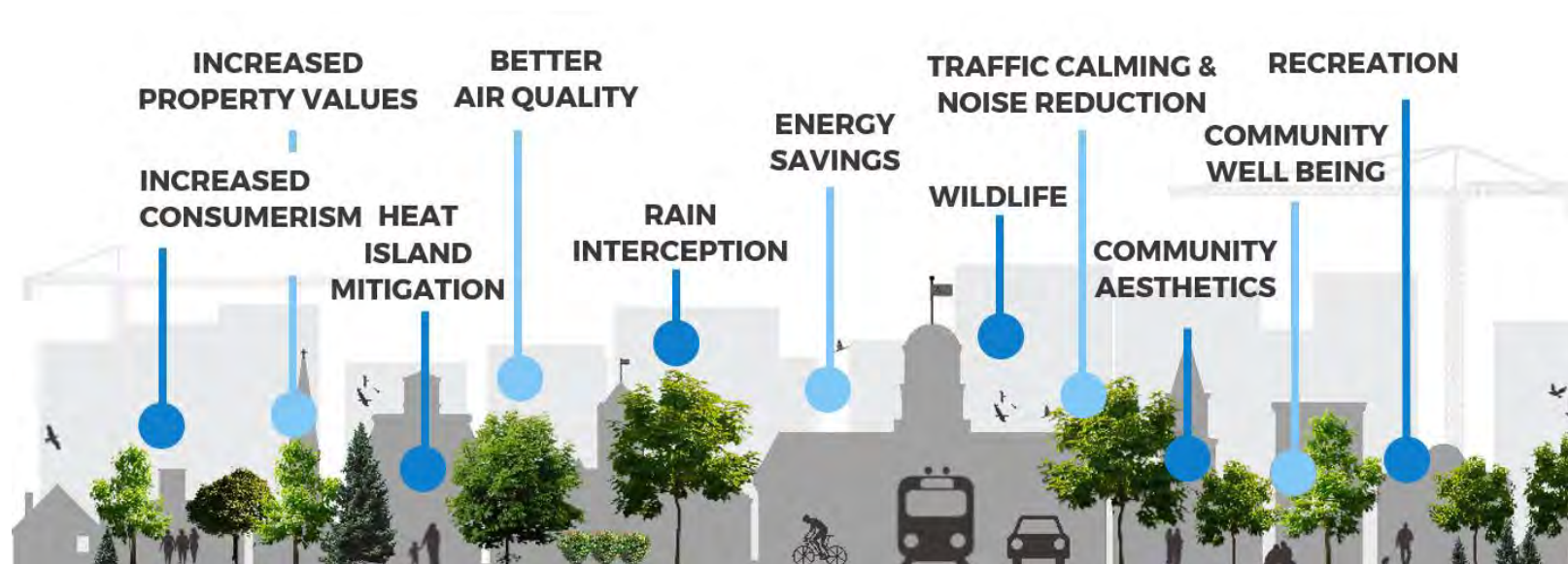


Figure 7: Illustration of the benefits provided by Castleton-on-Hudson's community forest

The data collected from the inventory of trees completed in August 2021 were analyzed in i-Tree Streets and i-Tree Eco for an understanding of the value and benefits of Castleton-on-Hudson's public trees. The following provides a summary of the results.

Benefits	Total (\$)	Quantity	\$/Tree	\$/Capita
Aesthetic/Other	\$33,185.98	N/A	\$67.45	\$22.70
Stormwater	\$1,369.73	15,000+ gallons	\$2.78	\$0.94
CO2	\$1,666.76	500,000+ pounds	\$3.39	\$1.14
Energy	\$4,501.29	69,500+ kWh and 5,700+ Therms	\$9.15	\$3.08
Air Quality	\$1,358.29	300 pounds	\$2.76	\$0.93
Total Benefits	\$42,082.05		\$85.53	\$28.78
*Distribution of benefits per tree and per capita based on 492 trees and a population of 1,462				

Table 17: Summary of the annual benefits provided by Castleton-on-Hudson's public trees*

Based on the 2021 inventory of trees in public rights-of-way (ROW) and in parks, i-Tree Eco predicts that it would cost nearly \$1.5 million to replace Castleton-on-Hudson's trees. Additionally, Castleton-on-Hudson's public tree population provides over \$42,000 in annual benefits by increasing property values, reducing stormwater volumes, sequestering carbon and storing carbon dioxide, conserving energy use, and improving air quality. This value results in approximately \$85 in benefits provided by each tree annually.

Value and Benefits of the Most Commons Species in Castleton-on-Hudson											
Most Common Tree Species	# of Trees*	Percent of Total ROW Trees**	Canopy Cover (acres)	Benefits Provided by All Public Trees Average \$/Tree					Importance Value+	Replacement Value (\$)	RPI** (<1, =1, >1)
				Aesthetic / Other	Storm-water	Net CO2 Benefits	Energy	Air Quality			
Norway maple	80	16%	0.75	\$73.26	\$2.73	\$2.66	\$10.30	\$2.70	32.5	\$254,263	0.83
Silver maple	45	9%	0.74	\$80.50	\$6.64	\$3.58	\$19.11	\$6.59	31.1	\$213,600	0.62
Norway spruce	33	7%	0.47	\$47.21	\$4.35	\$1.53	\$6.67	\$4.31	17.1	\$134,661	1.07
Sugar maple	32	7%	0.51	\$51.28	\$4.25	\$3.48	\$16.10	\$4.21	16.7	\$245,215	1.56
Arborvitae	30	6%	0.39	\$66.53	\$0.23	\$0.70	\$1.47	\$0.23	6.7	\$10,636	1.79
Northern white cedar	30	6%	0.06	\$52.22	\$2.51	\$1.09	\$3.29	\$2.49	11.7	\$83,407	1.48
Red maple	24	5%	0.32	\$113.35	\$4.00	\$5.29	\$14.84	\$3.96	12	\$117,640	0.77
Black maple	20	4%	0.30	\$67.67	\$5.58	\$4.68	\$16.61	\$5.54	12.3	\$143,099	0.83
Callery pear	18	4%	0.13	\$21.77	\$0.78	\$1.20	\$5.36	\$0.78	4.7	\$16,801	1.75
Black locust	12	2%	0.18	\$108.54	\$3.16	\$4.52	\$9.90	\$3.13	3.8	\$25,446	0.77
Crimson king maple	12	2%	0.19	\$59.26	\$1.51	\$1.89	\$12.86	\$1.49	5.3	\$19,057	1.39
All other trees	156	32%		\$67.06	\$1.37	\$1.34	\$5.65	\$1.36		\$230,035	
ROW TOTAL	492	100%	4.032	\$808.65	\$37.10	\$31.97	\$122.15	\$36.79		\$1,263,825	

* Count of Castleton-on-Hudson's Public Trees does not include stumps

** Based on 492 trees

+ Importance Value: 0-100 (higher IV = more important species)

++ Relative Performance Index (values of 1 or > = relative good performance)

Table 18: Summary of benefit data for the common trees in the Village of Castleton-on-Hudson's tree inventory

Tree Species Importance Values (IV)

Understanding the importance of a tree species to the community is based on its presence in the ROW, but also its ability to provide environmental and economic benefits to the community. The IV calculated by i-Tree Eco considers the total number of trees of a species, its percentage in the population, and its total leaf area and canopy cover. The IV can range from 0 to 100, with an IV of 100 suggesting total reliance on one species. If IV's are greater or less than the percentage of a species in the ROW, it indicates that the loss of that species may be more important or less important than its population percentage implies.

Common Name	# of Trees	% of Trees	Importance Value
Norway maple	80	17%	32.50
Silver maple	45	9%	31.20
Sugar maple	33	7%	16.80
Norway spruce	32	7%	17.10
Northern white cedar	30	6%	11.70
<i>thujopsis spp</i>	30	6%	6.70
Red maple	24	5%	12.00
Black maple	20	4%	12.30
Callery pear	18	4%	4.80
Black locust	12	3%	5.30
TOTAL	324	67%	

Table 19: Tree species with the highest importance values (IV)

In Castleton-on-Hudson, the species population is generally proportionate with its importance value in most cases, but there are noteworthy findings for discussion. The i-Tree Eco assessment found that Norway maple has the greatest importance value and based on the species diversity analysis, it comprises 17% of the tree population (80 of 492 trees) and has an importance value of 32.50. This indicates that the loss of the Norway maple population would be economically detrimental. The second highest IV was for silver maple (31.20), followed by red maple (16.80), Norway spruce (17.10), and Northern white cedar (11.70). *Thujopsis* species make up 6% of the total live tree population but scored a lower IV (6.70) than species making up a comparable portion of the tree population.

These findings are useful in considering management of the existing community forest in Castleton-on-Hudson in addition to planning future plantings. A strong diversity throughout the Village ensures that loss one species does not devastate the entire community forest.



Photo source: Village website

Managing Castleton-on-Hudson's Community Forest

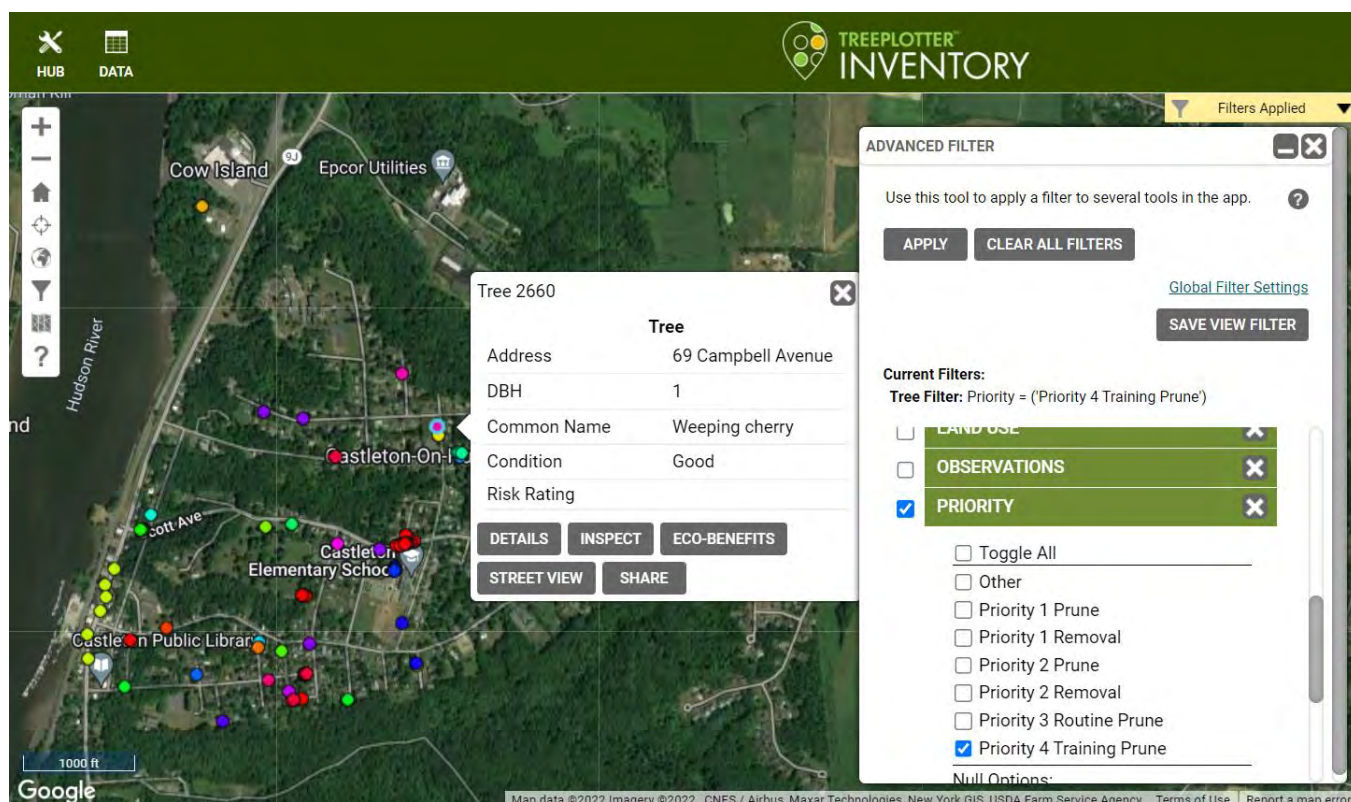
Castleton-on-Hudson has a vision for preserving, caring for, and enhancing the community forest. To accomplish this vision, this seven-year Tree Management Program (Program) was developed based on data gathered during the 2021 tree inventory. The Program is actionable and achievable, with special attention given to local costs for tree maintenance, removal, and planting. This section first addresses the interactive resources provided with this CFMP for accessing the inventory data and using it for an efficient Program. The section then outlines the tree work prioritization process used for Castleton-on-Hudson's Program.

Community Forest Management Interactive Resources

Castleton-on-Hudson's Tree Management Program outlined in this section is accompanied by the following interactive resources. These resources give the Village of Castleton-on-Hudson the ability to access the Tree Management Program in a map or spreadsheet format, so that work can be accomplished with or without access to the internet or cellular data. The inventory can be printed, although navigation using the interactive map or spreadsheets is recommended due to the size and complexity of the inventory data.

Tree Plotter Map

The tree inventory data can be easily accessed by any device that supports internet or cellular data at www.pg-cloud.com/Castleton-on-HudsonNY. A tree maintenance priority filter was added to Castleton-on-Hudson's TreePlotter map. In the example shown below, the "Priority 4 Training Prune" is applied to show only those young trees that require attention.



Tree Maintenance Prioritization Workbook

This workbook provides the full inventory delivery, prioritization process, and the breakdown of the inventory by prioritization. Guidance is provided on the first page of the workbook (chart below) with links for easy for easy navigation throughout. A sample of the inventory delivery shows that “Priority” is the first column for easy filtering and viewing.

Navigating the Tree Work Prioritization Tool		
Worksheets	Description	TreePlotter Map Links
Inventory Delivery 7-26-2021	Castleton-on-Hudson's tree inventory in its entirety, as delivered in July of 2021.	https://pg-cloud.com/Castleton-on-HudsonNY/
Prioritization Criteria	The parameters for filtering Priorities 1-4 in TreePlotter as well as Excel. The customized TreePlotter map links for each priority are embedded in this worksheet.	
Priority 1 - Removals (6)	A total of 6 trees are prioritized for critical removals in this worksheet. These are dead trees and high-risk situations that should be addressed first.	https://pg-cloud.com/Castleton-on-HudsonNY/?scenario=P1removal
Priority 1 - Prune (3)	A total of 3 trees are prioritized for critical pruning in this worksheet. These are live trees with high-risk situations that should be addressed first.	https://pg-cloud.com/Castleton-on-HudsonNY/?scenario=P1prune
Priority 2 - Removals (20)	A total of 20 living trees were flagged for removal due to a variety of factors contributing to the overall condition.	https://pg-cloud.com/Castleton-on-HudsonNY/?scenario=P2removal1
Priority 2 - Prune (14)	A total of 14 living trees were flagged for pruning due to a variety of risk factors contributing to the overall condition.	https://pg-cloud.com/Castleton-on-HudsonNY/?scenario=P2prune
Priority 3 - Pruning (365)	The majority of Castleton-on-Hudson's trees (365) were determined to need routine maintenance. Trees in this category are established, mature, and maturing trees greater than 6" DBH.	https://pg-cloud.com/Castleton-on-HudsonNY/?scenario=P3routineprune
Priority 4 - Young Tree (84)	Routine maintenance of young trees includes training less than 6" DBH.	https://pg-cloud.com/Castleton-on-HudsonNY/?scenario=P4trainingprune
Planting Sites (94)	A total of 94 sites were identified as sites that are ideal for planting a new tree.	https://pg-cloud.com/Castleton-on-HudsonNY/?scenario=plantingsites
Stumps (11)	A total of 11 stumps were found and flagged for removal.	https://pg-cloud.com/Castleton-on-HudsonNY/?scenario=stumps

Priority	Primary ID	Address	Common Name	Scientific Name
Priority 1 Prune	2772	17 Van Buren Avenue	Black maple	Acer nigrum
Priority 1 Prune	2548	86 Green Avenue	Sugar maple	Acer saccharum
Priority 1 Prune	2533	79 Green Avenue	White ash	Fraxinus americana
Priority 1 Removal	2829	58 Campbell Avenue	Sugar maple	Acer saccharum
Priority 1 Removal	2622	108 Green Avenue	Norway maple	Acer platanoides
Priority 1 Removal	2582	32 Campbell Avenue	Norway maple	Acer platanoides
Priority 1 Removal	2579	32 Campbell Avenue	Norway maple	Acer platanoides
Priority 1 Removal	2574	34 Stimpson Avenue	Norway maple	Acer platanoides
Priority 1 Removal	2476	70 Green Avenue	Red maple	Acer rubrum
Priority 2 Prune	2845	81 Scott Avenue	Norway maple	Acer platanoides

Tree Maintenance and Budget Workbook

The Tree Maintenance and Budget Workbook provides an in-depth seven year guide for tree work according to the tree inventory data results and the prioritization analysis. The workbook contains three worksheets: "Cost Summary," "Maintenance Summary," and "Management and Budget." The entire workbook is based on estimated costs for tree work locally. It is categorized by maintenance priority and DBH class for a detailed understanding of where program resources are being allocated. Included in the budget is annual tree planting costs to replace planned and anticipated tree removals. The Cost Summary chart below is a condensed version of the work plan and budget. It is organized by existing and new trees work categories, activity type, and years, with costs identified for each year and total.

EXISTING TREE MAINTENANCE AND REMOVAL								
Activity Type	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	TOTAL
PRIORITY 1: CRITICAL REMOVALS	\$5,775	\$2,100	\$2,100	\$0	\$0	\$0	\$0	\$9,975
PRIORITY 1: CRITICAL PRUNING	\$820	\$0	\$0	\$0	\$0	\$0	\$0	\$820
PRIORITY 2: HIGH RISK REMOVALS	\$11,150	\$7,475	\$5,375	\$0	\$0	\$0	\$0	\$24,000
PRIORITY 2: HIGH RISK PRUNING	\$1,800	\$1,350	\$1,150	\$0	\$0	\$0	\$0	\$4,300
PRIORITY 3: ROUTINE TREE PRUNING 7-YEAR CYCLE	\$11,725	\$11,725	\$11,075	\$10,880	\$10,880	\$10,710	\$10,710	\$77,705
PRIORITY 4: YOUNG TREE PRUNING 3-YEAR CYCLE	\$710	\$680	\$660	\$0	\$0	\$0	\$0	\$2,050
Existing Tree Maintenance and Removal Subtotal	\$31,980	\$23,330	\$20,360	\$10,880	\$10,880	\$10,710	\$10,710	\$118,850
NEW TREE PLANTING AND MAINTENANCE								
Activity Type	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	TOTAL
REPLACEMENT TREES FOR "NO NET LOSS" BASED ON PRIORITY 1 AND 2 REMOVALS	\$1,240	\$1,240	\$1,240	\$1,240	\$1,240	\$930	\$930	\$8,060
REPLACEMENT TREE MAINTENANCE	\$0	\$0	\$1,600	\$2,400	\$3,200	\$4,000	\$4,600	\$15,800
ANNUAL MORTALITY COSTS	\$4,450	\$4,450	\$4,450	\$4,450	\$4,450	\$4,450	\$4,450	\$31,150
New Tree Planting and Maintenance Subtotal	\$5,690	\$5,690	\$7,290	\$8,090	\$8,890	\$9,380	\$9,980	\$55,010
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	TOTAL
Grand Total	\$37,670	\$29,020	\$27,650	\$18,970	\$19,770	\$20,090	\$20,690	\$173,860

Prioritization of Tree Work

The Program was designed to reduce risk through prioritized tree removal and pruning, and to improve tree health and structure through proactive pruning cycles. While implementing a tree care program is an ongoing process, tree work must always be prioritized to reduce public safety risks. A tree planting plan is not included in this program as potential tree planting locations were not identified during the 2021 tree inventory; however, this Program recommends tree plantings to mitigate removals and increase canopy cover.

In Castleton-on-Hudson's Program, trees with an assessed Maintenance Priority of Critical (Priority 1) or Immediate (Priority 2) are identified as trees for critical or necessary removal. Proactive tree maintenance includes pruning of trees with a Maintenance Priority of Routine (Priority 3) and a Maintenance Priority of Young Tree Training Pruning (Priority 4) for trees that are young and developing.

While regular pruning cycles and tree planting is important, priority work (especially for high priority and high-risk trees) must sometimes take precedence to ensure that risk is expediently managed. Additional routine monitoring of the tree population is essential to identifying and addressing new and emergency high priority or high-risk situations as they arise. The following maintenance recommendations were recorded during the 2021 inventory:

- *Maintenance Priority:* Informs maintenance practices and identifies specific trees to address in order of priority. These priorities are categorized as Critical (Priority 1), Immediate (Priority 2), Routine (Priority 3), and Young Tree Training Pruning (Priority 4).
 - o Priority 1 and Priority 2 maintenance may refer to the removal of the dead, diseased, damaged, or uprooted tree and/or the removal of a probable or imminent risk such as a broken limb or split leader.
 - o Priority 3 maintenance is the routine pruning to manage risk or health, develop structure, provide clearance, manage shape, improve aesthetics, manage fruit or flower production, and/or manage wildlife habitat.
 - o Priority 4 maintenance refers to the structural pruning of young, developing trees to remove diseased, damaged, or crossing branches; to form a central branch leader; to improve branching structure; to establish the lowest permanent branch; and/or remove sucker growth and epicormic shoots. Additional Priority 4 maintenance for young trees may include watering, amending or adding mulch, adding or removing stakes or ties, and/or soil amendments or fertilizer treatment.
- *Maintenance Type:* Provides additional information about the maintenance priority recommendation. Understanding the maintenance type helps to establish maintenance routes, schedules, and budgets. Some examples of different maintenance types include pruning (for clearance, restoration, structural, or utility), treatment for pests or disease, amending mulch, or removing existing hardware.

CASTLETON-ON-HUDSON TREE MAINTENANCE PRIORITIZATION				
Priority	Description	Cycle	Tree Removal	Trimming + Other
Priority 1: Critical	Dead trees and high-risk situations	3-year	6	3
Priority 2: Removal and Pruning	Removal of specific live trees due to conditions	3-year	20	24
Priority 3: Routine	Routine maintenance of established, mature, and maturing trees greater than 6"	7-year	-	365
Priority 4: Young Tree Training Pruning	Routine maintenance of young trees less than 6"	3-year	-	84

Table 20: Tree maintenance priorities for Castleton-on-Hudson's public trees

Although tree removal is usually considered a last resort and may sometimes create a reaction from the community, there are circumstances in which removal is necessary. Trees fail from natural causes, such as diseases, insects, and weather conditions, and from physical injury due to vehicles, vandalism, and root disturbances. It is recommended that trees be removed when corrective pruning will not adequately eliminate the hazard or when correcting problems would be cost-prohibitive. Trees that cause obstructions or interfere with power lines or other infrastructure should be removed when their defects cannot be corrected through pruning or other maintenance practices. Diseased and nuisance trees also warrant removal. Even though large short-term expenditures may be required, it is important to secure the funding needed to complete priority tree removals. Expedient removal reduces risk and promotes public safety.

Unless already slated for removal, trees noted as having poor tree architecture or weakly attached branches and codominant stems or missing or decayed wood should be inspected on a regular basis. These observations can be filtered in the Village's TreePlotter software application to identify the location of these trees for monitoring. Summaries of observations are provided further in this analysis. Corrective action should be taken for these observations when warranted. If their condition worsens, tree removal may be required. Proactive tree maintenance that actively mitigates elevated-risk situations will promote public safety. Updating the tree inventory data can streamline workload management and lend insight into setting accurate budgets and staffing levels. Inventory updates should be made electronically and can be implemented using the Village's TreePlotter or similar software applications.

The following sections briefly summarize the recommended removals and maintenance identified during the inventory completed in August 2021. For ease of maintenance planning, park trees and street trees are separated and further categorized by DBH and age classes.

MAINTENANCE PRIORITIES FOR CASTLETON-ON-HUDSON'S TREES BY DBH AND AGE CLASSES								
	Young		Established	Maturing		Mature		
Maintenance Priorities	0-3in	3-6in	6-12in	12-18in	18-24in	24-30in	>30in	Total
Priority 1	0.0%	0.0%	0.0%	0.4%	0.2%	0.4%	0.8%	1.8%
Priority 2	0.0%	0.0%	0.8%	1.6%	1.2%	1.0%	2.2%	6.9%
Priority 3	0.0%	0.0%	16.3%	14.8%	12.4%	11.8%	18.9%	74.2%
Priority 4	9.6%	7.5%	0.0%	0.0%	0.0%	0.0%	0.0%	17.1%
Total	9.6%	7.5%	17.1%	16.9%	13.8%	13.2%	22.0%	100.0%

Table 21: Tree maintenance priorities for Castleton-on-Hudson's public trees by DBH and age classes

Maintenance Priority 1: Critical Removals and Pruning

Priority 1 trees have been identified as dead trees that warrant immediate removal or pruning for a variety of reasons that may be caused by pests, disease, human influence, or a combination of influences.

Of the nine trees categorized as *Priority 1* three require pruning and six require removal.

All of the critical removal trees are located along Castleton-on-Hudson's streets rather than in parks, and half of those are over 30 inches in DBH. Table 22 summarizes the *Critical* tree removal and pruning Village-wide by diameter (DBH) class.

PRIORITY 1: CRITICAL REMOVALS AND PRUNING				
Age Class	DBH Class	Pruning	Removal	Total Priority 1
Young	0-3in	0	0	0
	3-6in	0	0	0
Established	6-12in	0	0	0
Maturing	12-18in	1	1	1
	18-24in	0	1	1
Mature	24-30in	1	1	1
	>30in	1	3	3
TOTAL		3	6	9

Table 22: Castleton-on-Hudson's trees categorized as Priority 1 Critical Removals

These trees which have been identified as requiring *Priority 1: Critical Removal and Pruning* maintenance with a Maintenance Type recommendation to remove should be addressed immediately. The count of trees by diameter class nor the size of the tree necessarily dictate priority. Priority should be based on a variety including but not limited to the tree's size, condition, location, potential targets, and other factors. The Village should use the TreePlotter software application to locate these trees and prioritize.

Maintenance Priority 2: Pruning and Removals

Following mitigation of the *Priority 1: Critical Removals*, trees listed as *Priority 2: Removals* should be addressed based on the maintenance comments identified in the 2021 tree inventory and other factors previously stated. *Priority 2: Removals* may coincide with *Priority 1: Critical Removals* if the trees are in close proximity to one another or other factors that support cost and time efficiency and promptness of tree issue mitigation.

The majority of *Priority 2* trees are in the Mature age class, with 11 trees in the >30-inch DBH class. Of *Priority 2* trees, 76% or 26 trees are located along streets, while just 24% or 8 trees are within parks.

PRIORITY 2: REMOVAL AND PRUNING				
Age Class	DBH Class	Pruning	Removal	Total Village-wide
Young	0-3in	0	0	0
	3-6in	0	0	0
Established	6-12in	1	3	4
Maturing	12-18in	1	7	8
	18-24in	2	4	6
Mature	24-30in	4	1	5
	>30in	6	5	11
TOTAL		14	20	34

Table 23: Castleton-on-Hudson's trees categorized as Priority 2

The dominant *Priority 2* species in Castleton-on-Hudson's streets is Norway maple, and green ash is the most dominant *Priority 2* species in parks. Green Ash trees designated as *Priority 2: Removal* showed evidence of crown dieback and pests (Emerald Ash Borer).

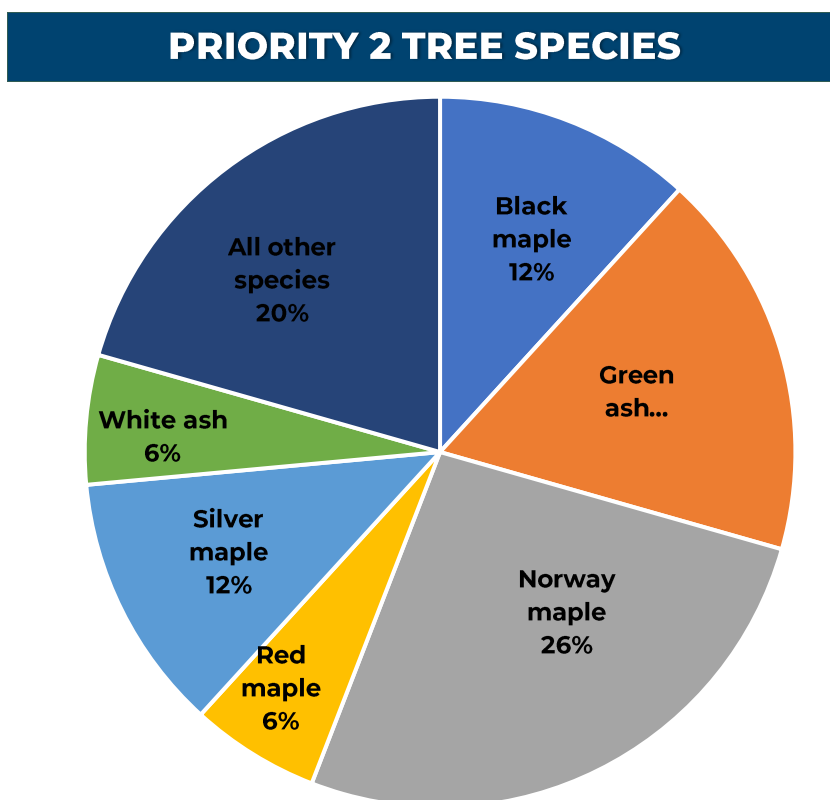


Figure 8: Castleton-on-Hudson's Priority 2 Tree Species

Maintenance Priority 3: Routine

Trees greater than 6 inches in DBH that are not *Priority 1: Critical Pruning and Removals* or *Priority 2: Pruning and Removals* have been assigned a *Priority 3: Routine* tree maintenance recommendation.

This section provides an overview of the trees that specifically require routine pruning to remove defects such as dead and/or broken branches that may be present even when the rest of the tree is sound, and/or the pruning of branches for clearance of roadways, pedestrians, parking, signs, and/or utilities. In these cases, pruning the branch or branches can correct the problem and reduce risk associated with the tree. These summaries do not provide the complete picture of what is required for a community's routine pruning cycle of public rights-of-way trees because it does not include all eligible trees, only trees specifically identified during the 2021 inventory. With routine pruning, the intent is to improve the overall health of the individual tree and the entire community forest.

The following chart provides a summary of the *Priority 3: Routine* trees by age class and DBH class. The size of the tree and their frequency inform to the recommended maintenance tasks, cycles, and associated costs.

PRIORITY 3: ROUTINE MAINTENANCE				
Age Class	DBH Class	Park Trees	Street Trees	Total Village-wide
Established	6-12in	23	57	80
	12-18in	28	45	73
Maturing	18-24in	23	38	61
	24-30in	25	33	58
Mature	>30in	36	57	93
TOTAL		135	230	365

Table 24: Castleton-on-Hudson's trees categorized as Priority 3 Routine Maintenance

Street and park trees greater than 6 inches in DBH were summarized to understand the distribution of *Priority 3: Routine* trees. Of the 365 trees recommended for *Routine* maintenance, 63% or 230 trees, are located along streets, while 37% or 135 trees are located in the Village's parks. The majority of *Priority 3: Routine* trees are in the mature age class, with the >30-inch DBH class containing the highest count of *Priority 3* trees.



Photo source: Getty Images

Routine Pruning Cycles Overview

The goals of pruning cycles are to visit, assess, and prune trees on a regular schedule to improve health and reduce risk. It is recommended that pruning cycles begin after all *Priority 1: Critical Removals* and *Priority 2: Removal* trees are corrected through removal or pruning. However, due to the long-term benefits of pruning cycles, the pruning cycles should be implemented as soon as possible. To ensure that all trees receive the type of pruning they need to mature with better structure and lower associated risk, two pruning cycles are recommended: the *Priority 3: Routine* pruning cycle and the *Priority 4: Young Tree Training Pruning* tree pruning cycle. The cycles differ in the type of pruning, the general age of the target tree, and length.

The recommended number of trees in the pruning cycles will need to be modified to reflect changes in the tree population as trees are planted, age, and die. Newly planted trees will enter the young tree cycle once they become established. As young trees reach maturity, they will be shifted from the young tree cycle into the routine pruning cycle. When a tree reaches the end of its useful life, it should be removed and eliminated from the routine pruning cycle.

Due to lack of resources, many communities operate on-demand response to urgent situations rather than a proactive tree management program. Research has shown that a proactive program that includes a routine pruning cycle will improve the overall health of a tree population. Proactive tree maintenance has many advantages over on-demand maintenance, the most significant of which is reduced risk. In a proactive program, trees are regularly assessed and pruned, which helps detect and eliminate most defects before they escalate to a hazardous situation with an unacceptable level of risk. Other advantages of a proactive program include increased environmental and economic benefits from trees, more predictable budgets and projectable workloads, and reduced long-term tree maintenance costs.

As stated above, the pruning cycles should be adjusted as trees are planted and removed and as trees mature and transition from the young tree pruning category to the routine pruning category. The first installment of this approach for routine pruning is provided based on the 2021 tree inventory in the following figure. Street and park trees are separated because of the structure of the Village's tree maintenance program and to enable the development of schedules and pruning grids.

By filtering the data in the Village's tree inventory software, TreePlotter, the total number of trees applicable for a pruning cycle were determined. The maintenance program is also provided in a spreadsheet workbook format so that Village staff can access and manually filter the maintenance schedules, budgets, and prioritization of the tree work as identified during the inventory analysis.

PRIORITY 3: ROUTINE PRUNING TREEPLOTTER FILTERS			
Priority 3: Routine Trees	Street Trees Only	Parks Trees Only	Village-wide Trees
Total data points	399	198	597
not Condition = ('Dead') and	337	152	489
not DBH Range = ('0-3in' or '3-6in' or N/A) and	262	143	405
not Status = ('Dead' or 'Proposed Site - Large' or 'Proposed Site - Medium' or 'Proposed Site - Small' or 'Removed' or 'Stump') and	262	143	405
not (Tree Work='Removal')	242	134	376
TOTAL	242	134	376

Table 25: Summary of the TreePlotter filtering process for Priority 3 Routine Pruning cycle

To summarize the figure above, living street and park trees greater than 6 inches DBH (trees <6 inches are separated for young tree pruning cycles) that may have an Immediate Priority but are not recommended for removal and are not listed for Critical or Young Maintenance Priorities are eligible for a routine established and mature tree pruning cycle.

Street Tree Routine Pruning Cycle and Recommendations

The routine pruning cycle for street trees includes established, maturing, and mature trees (mostly greater than 6 inches DBH) that need cleaning, crown raising, and reducing to remove deadwood and improve structure. Over time, routine pruning can reduce reactive maintenance, minimize instances of elevated risk, and provide the basis for a more defensible risk management program.

The length of the street tree routine pruning cycle is based on the size of the tree population and what was assumed to be a reasonable number of trees for a program to prune per year. Generally, the routine pruning cycle recommended for a tree population is five years but may extend to seven years if the population is large.

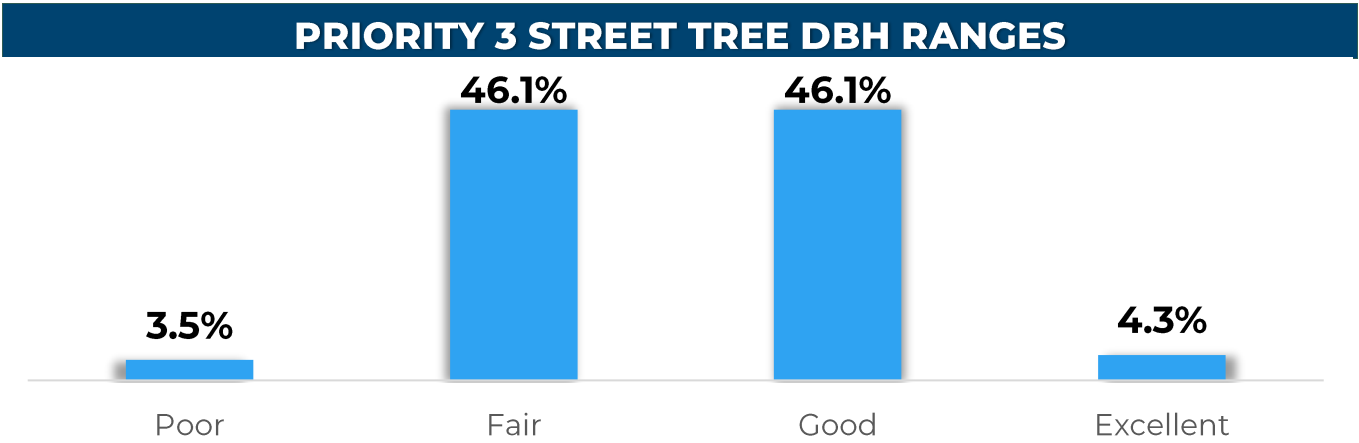


Figure 9: Street trees recommended for the routine pruning cycle summarized by diameter class (inches)

PRIORITY 3 STREET TREE CONDITION

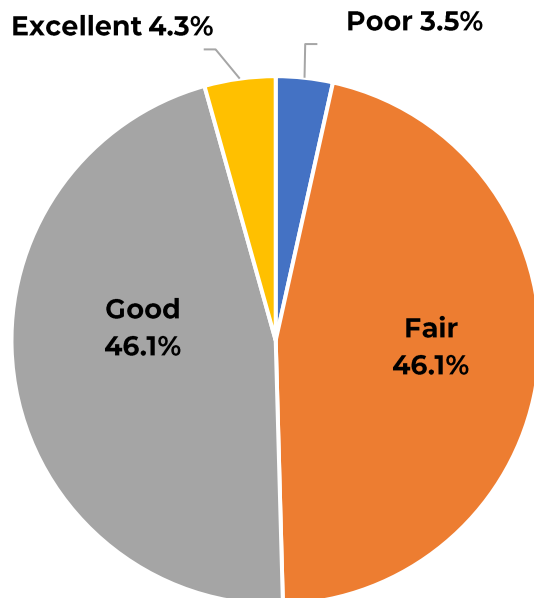


Figure 10: Summary of the condition of street trees for routine pruning

It is recommended that the Village establish a 7-year routine pruning cycle for street trees in which approximately one-seventh of the tree population is to be pruned each year. The 2021 tree inventory identified approximately 230 trees that should be pruned over a 7-year cycle. This results in an average of 33 trees to be pruned each year over the course of the cycle. It is recommended that the routine pruning cycle begin in year three of this seven-year plan, after all *Priority 1: Critical Removals* and *Priority 2: Removal* trees are addressed.

The inventory found that most of Castleton-on-Hudson's street trees (230 street trees of 337 total street trees, 68%) need routine pruning. Figure 9 shows that a variety of tree sizes will require pruning.

Park Tree Routine Pruning Cycle and Recommendations

In addition to the street tree pruning cycle, a routine maintenance schedule is recommended for park trees. As previously identified in this section, a total of 135 park trees are suitable for a routine pruning cycle (living park trees >6 inches DBH and not a Critical or Young Priority). Park trees typically have the space to grow larger and longer than street trees due to less targets within a close proximity, which may be correlated with the rise of larger trees in the *Priority 3: Routine* maintenance group. With 135 total park trees suitable for routine pruning, approximately 19 park trees should be pruned per year. Based on the figure above, the >30-inch diameter class comprises most of the park tree routine pruning with 36 trees or 27%.

PRIORITY 3 PARK TREE DBH RANGES

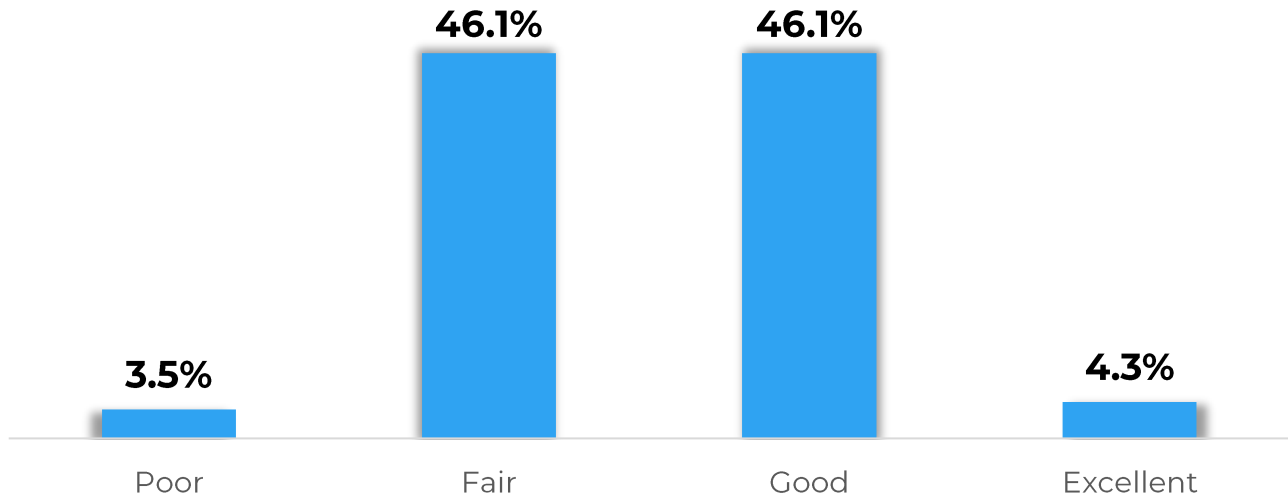
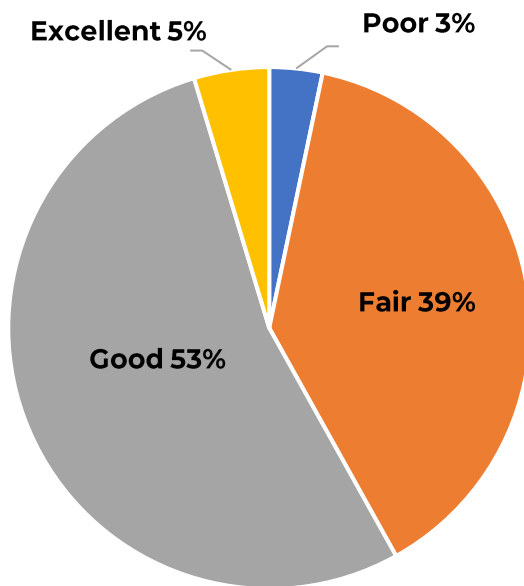


Figure 11: Summary of the diameter classes of the park trees for routine pruning

PRIORITY 3 PARK TREE CONDITION



The park trees suitable for routine pruning includes only living trees, though 42% of the park trees are in Fair or Poor condition (153 trees) and should be monitored and evaluated for removal rather than routine pruning in subsequent years. Any *Priority 1: Critical Removals* and *Priority 2: Removals* in parks should be completed before initiating the *Priority 3: Routine* pruning cycle.

Figure 12: Summary of the condition of park trees for routine pruning

Maintenance Priority 4: Young Tree Training Pruning

Trees included in the young tree training pruning cycle are generally less than 6 inches DBH. These younger trees sometimes have branch structures that can lead to potential problems as the tree ages. Potential structural problems include codominant leaders, multiple limbs attaching at the same point on the trunk, crossing and interfering limbs, or dead, diseased, or damaged limbs. If these problems are not corrected, they may worsen as the tree grows, increasing risk and creating potential liability. In Castleton-on-Hudson, 17% or 84 of the trees inventoried in 2021 are young trees.

PRIORITY 4: MAINTENANCE OF YOUNG TREES				
Age Class	DBH Class	Park Trees	Street Trees	Total Village-wide
Young	0-3in	1	46	47
	3-6in	8	29	37
TOTAL		9	75	84

Table 26: Castleton-on-Hudson's trees categorized as Priority 4 Young Tree Training Pruning

Young tree training pruning is recommended Village-wide (street and park trees) for trees less than 6 inches in diameter. There are 75 street trees and nine park trees in these diameter classes which total 84 trees suitable for the training pruning cycle. The process for identifying these suitable trees is described in Figure 13.

Young tree training pruning is performed to improve tree form or structure; the recommended length of the young tree pruning cycle is three years because young trees tend to grow at faster rates (on average) than more mature trees. The young tree cycle differs from the routine pruning cycle in that these trees generally can be pruned from the ground with a pole pruner or pruning shear.



Photo source: Getty Images

PRIORITY 4 YOUNG TREE

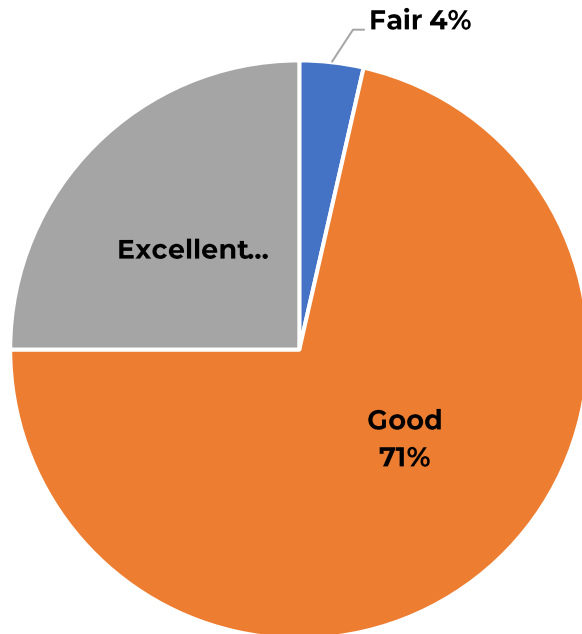


Figure 13: Condition of street and park trees considered for the young tree training pruning cycle

Young trees that are less than Good condition should be monitored and appropriately addressed to ensure health. Young trees that cannot recover should not be included in the cycle and should instead be removed and replaced.

The objective is to increase structural integrity by pruning for one dominant leader. Young tree training pruning is species-specific, since many trees may naturally have more than one leader. For such trees, young tree training pruning is performed to develop a strong structural architecture of branches so that future growth will lead to a healthy, structurally sound tree. In addition to training pruning, young trees may also require additional maintenance such as added or amended mulch, watering, added or removed stakes and ties, and/or clearance of debris and litter. These needs can potentially be addressed during young tree training pruning.

Potential Tree Planting Sites

During the 2021 inventory, vacant sites, also referred to as “potential tree planting sites”, were inventoried. These inventoried sites are not meant to be fully stocked within the planning horizon of this Plan but are meant to provide information for the Village to utilize in all tree planting planning.

Potential tree planting sites within public rights-of-way (ROW) and in Village parks were recorded based on the available growing space, proximity to existing trees, distance from existing above and below-ground utilities, distance from intersections, and other possible obstructions.



An inventory of potential tree planting sites can provide information regarding stocking level. Stocking is a traditional forestry term used to measure the density and distribution of trees. For a community forest such as Castleton-on-Hudson’s, stocking level is used to estimate the total number of sites along the street ROW that could contain trees. The following summary provides available potential planting sites for street ROW and parks and does not provide specific recommendations regarding stocking level.

POTENTIAL PLANTING SITES			
Village Land Uses	Large Sites	Medium Sites	Total Sites Village-wide
Single Family	29	2	31
Small Commercial	21	0	21
Park/ Vacant/ Other	42	0	42
TOTAL	92	2	94

Tree Planting Recommendations

Figures to support a planting program are provided in the Tree Maintenance Schedule and Budget worksheet. “No Net Loss” is the minimum recommendation, which suggests planting a total of 26 trees over the seven-year program to account for the Priority 1 and Priority 2 removals. A proactive planting program plans for annual mortality of new and existing trees. As such, the worksheet also includes figures to support tree plantings to account for a conservative 1% mortality rate, which equals 42 trees over the seven-year program.

Additional tree plantings should be considered as part of the Village’s goal to increase tree canopy cover and provide ecosystem benefits to the community. Based on the analysis of the tree diameter classes Village-wide, the Village should be planting more trees for a more ideal distribution of tree sizes that reduce tree maintenance surges and increase the flow of ecosystem services equally across the Village. Planting efforts should consider engaging the community in species selection and locations, as well as tree planting, care, and stewardship.

Implementation of the Plan

Implementation of this Community Forest Management Plan will include a wide variety of partners, stakeholders, resources, and strategizing to grow a healthy and diverse community forest. Four action strategies are recommended in this section to assist in establishing effective and measurable outcomes for Castleton-on-Hudson's community forest.

ACTION STRATEGY 1:

Maximize the efficiencies in maintaining trees.

Manage Risk Trees

- Address the *Priority 1: Critical* tree removals (6 trees) and *Priority 2: Removals* (20 trees), followed by pruning identified in *Priority 1* (three trees) and *Priority 2* (14 trees). Use information in this Plan to acquire more funding and support.
- Use the Village's TreePlotter software or similar program to prioritize the maintenance.
- Use the Tree Maintenance Worksheet provided in the Community Forest Management Plan to address these trees in a 3-year period. Use the worksheet to estimate costs.

Establish a Routine Street and Park Tree Pruning Cycle

- Establish a 7-year cycle for street and park trees, pruning approximately 230 street trees and 135 park trees per year.
- Use the Tree Maintenance Worksheet to estimate and budget annual and 7-year costs for routine pruning.
- Prioritize, schedule, and track tree maintenance using the Village's TreePlotter software.
- Build support for the pruning cycles by using the data summarized in the Community Forest Management Plan.

Plant and Maintain Young Trees

- Consider a "no net loss" policy by implementing at least a 1:1 ratio in terms of tree removals to replacements. It is recommended to plant at least 4 trees per year to compensate for recommended removals and upwards of 10 trees per year to compensate for natural mortality and to grow the Village's tree canopy.
- Use trained volunteer groups for the planting and post-planting care of young trees. Require the use of industry best practices. Continue to partner for grants.

Continue to Monitor

- As maintenance, removals, and plantings are conducted, track information in the Village's TreePlotter software or similar program.
- Keep the tree inventory data maintained and monitor for any changes or risks to public trees and the community forest such as tree pests and diseases. Consider a Village-wide canopy assessment for a better understanding of the community forest.

ACTION STRATEGY 2:

Use planning, legislation, and enforcement to integrate trees more fully.

Update Castleton-on-Hudson's Code

- Use the recommendations and resources in this Community Forest Management Plan to update the Village Code and Zoning Ordinances as needed.
- Conduct outreach with the community and communications with other Village departments to establish awareness and clear understanding of the Tree Ordinance. The Tree Board will be advocates and enforcers of this effort.
- Provide urban and community forest expertise when existing policy and ordinances are updated such as design standards and Zoning minimum green space requirements.



Photo source: Google street view

Integrate Community Forest with Village Plans and Policies

- Leverage the community's forest strategies from other Village plans and policies to achieve goals and recommendations in this Plan.
- Provide urban and community forest expertise during the design and planning stages of Hudson River Access projects to preserve appropriate existing trees, enhance tree plantings, and provide adequate canopy and root growing space.

ACTION STRATEGY 3:

Implement best management practices for the health and benefits of trees.

Develop and Implement Tree Planting Plans

- Using the tree inventory data findings from this *Community Forest Management Plan*, develop tree planting plans to establish and maintain optimal levels of age and tree species diversity.
- Consider the spatial location of new tree planting projects throughout the village to increase equity of tree canopy and associated benefits.
- Plant street and park trees that maximize benefits, minimize risk, consider site conditions and water restraints, maintenance costs, and potential tree pest and disease risk.
- Utilize the findings from the 2021 tree inventory to provide recommendations to the public and on Village-owned land and public rights-of-way. Species diversity, native plant selection, mature tree size, and site-specific conditions should always be considered when making recommendations.
- Utilize “Right Tree, Right Place” planning practices to ensure proper site and species selection.
- Continue to utilize the expertise of local nonprofit partners to advise on community forestry initiatives.

Adhere to Best Management Practices and Standards in Tree Care

- Continue to implement approved best management practices and standards for tree planting, tree pruning, tree nursery selection, and all other community forestry operations.
- Adhere to the guidelines in *Village Code* for tree protection standards, and update the code as needed.
- Monitor the community forest for potential tree pest and disease risks and use the emerald ash borer guidance outlined in this plan. Consider a formalized pest and disease management plan for the Emerald Ash Borer and the Asian longhorned beetle due to the abundance of green ash trees and maple trees throughout the region.
- Require adherence to best practices and standards for any shared maintenance responsibility of young, established, and mature trees.
- Establish or update protocols relating to storm planning, response, and mitigation.
- Consider wood utilization options for any woody debris resulting from tree maintenance and removal operations.

ACTION STRATEGY 4:

Foster support for the community forest.

For successful implementation of this *Community Forest Management Plan* and strengthened compassion and support for the community forest, community engagement activities should be arranged to provide updates, stewardship opportunities, and a platform for discussing varying opinions on matters pertaining to the care of the community forest. Connections and relationships that will develop among stakeholders during these meetings are valuable outcomes of the outreach process. As community awareness and actions associated with community forestry move forward, it will be the people of Castleton-on-Hudson that ultimately realize the value of their contributions to their community in the trees that grow around them.



Photo source: ConH Main Street Association

Educate and Engage the Community

- Continue to collaborate with local volunteer groups on tree stewardship programs and events.
- Provide educational materials, workshops, and information on the Village's website regarding community forestry and this Plan.
- Maintain and enhance partnerships to implement recommendations in this Plan.
- Promote the community forest ecosystem benefits summarized in this Plan.
- Provide community forestry information specific to developers, businesses, and property owners.
- Lead by example by continuing to implement sound community forest management practices.
- Implement actions in this Plan to acquire and maintain the Arbor Day Foundation's Tree City USA award.
- Use the enhanced community support to acquire more resources and funding for the community forest management program.

Community Engagement Opportunities

Community Meetings. Discuss the Plan, projects, and issues with residents throughout the Village.

Public Surveys. Conduct surveys to gather rich insights into public perception on the importance of trees.

Non-profit Partnerships. Mobilize volunteer groups to create or improve partnerships.

Social Media. Post Plan implementation progress, announcements, and opportunities on social media.

Fliers & News Articles. Insert in utility bill to raise awareness and get support.

Press Releases. Share projects, events, and studies in The Castletonian.

Canvassing of Homes. ID street blocks and areas for spreading community forestry awareness.

Email Listserv. Keep the community up-to-date on Plan implementation and events.



Photo source: Castleton on Hudson Main Street Association



Conclusion

Castleton-on-Hudson's community forest is providing many important ecological functions and economic benefits to community members. Continuous delivery of those services depends on the long-term health and resilience of the tree population. Nearly 500 trees exist along the public streets and parks in the Village, providing a multitude of benefits including stormwater reduction, energy savings, increased property values, improved air quality, and enhanced overall community well-being. These benefits have an estimated annual value of over \$1.35 million.

Managing trees in urban areas is an arduous and intricate process. Navigating the recommendations of experts, the needs of residents, the pressures of local economics and politics, concerns for public safety and liability, physical components of trees, forces of nature and severe weather events, and the expectation that these issues are resolved all at once is a considerable challenge. The Village should begin to implement recommendations in this Plan as soon as possible to ensure a healthy, thriving, and sustainable community forest.

To sustain desired levels of community forest services recommended in this Plan, a multi-faceted approach must be implemented by evaluating tree maintenance responsibilities, increasing staffing and funding levels, enhancing plantings and tree care, encouraging growth and preserving existing trees, monitoring for changes in community forest characteristics, and amplifying community stewardship.



Photo source: Castleton on Hudson Main Street Association