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### Tree Equity, Investment, and Health: Columbus' First Urban Forestry Master Plan

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## Tree Equity, Investment, and Health: Columbus' First Urban Forestry Master Plan

Columbus, Ohio, faces many challenges, both today and in the near future: rapid population growth, climate change, public health issues, and the fastest growing urban heat island in the country (Climate Central, 2014). Tree canopy has been identified as vital city infrastructure, as trees reduce urban stressors – cleaning the air and water, improving public health, providing shade, reducing heat stress and energy costs, intercepting stormwater and more. As the 14<sup>th</sup> largest city in the country with only 22% canopy cover, the City of Columbus recognized the need to plan for its trees. The Columbus Urban Forestry Master Plan (UFMP) is the first citywide, strategic plan to improve Columbus residents' quality of life through investment in urban trees. Approved by Columbus City Council in April 2021, the UFMP guides the entire Columbus community to prioritize, preserve and grow our tree canopy. The UFMP sets three tree canopy goals: 1.) Reach Citywide Tree Canopy Cover of 40% by 2050, 2.) Stop the Net Canopy Losses by 2030 and 3.) Invest in Equitable Canopy Across All Neighborhoods by 2030. To accomplish these goals, the UFMP details four strategies: community coordination and collaboration, best practices, dedicated resources and stronger policies.

### Keywords

urban forestry, urban tree canopy, strategic planning

### Acknowledgements

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## 1. INTRODUCTION

The Columbus Urban Forestry Master Plan (UFMP) is the first city-wide, long-term strategic plan to prioritize, preserve, and grow Columbus' urban forest. This unique plan recognizes trees as part of the solution to challenges facing the City, including population growth, social inequity, the urban heat island effect, public health issues, and climate change. Columbus is projected to grow by 1 million residents by 2050 (Mid-Ohio Regional Planning Commission 2020) and currently has no protections for trees during private development. Considering 70% of Columbus trees grow on private property, preserving trees during development directly aids the UFMP canopy goals, particularly stopping net canopy loss. As of 2013, only 22% of Columbus was shown to be covered by tree canopy when viewed from above (Plan-It Geo 2015). This is significantly less than other Midwestern cities like Pittsburgh, Cincinnati, and Minneapolis. Approved by Columbus City Council in April 2021, the UFMP guides the entire Columbus community to prioritize, preserve, and grow our tree canopy. The UFMP sets three tree canopy goals: 1.) Reach Citywide Tree Canopy Cover of 40% by 2050, 2.) Stop the Net Canopy Losses by 2030 and 3.) Invest in Equitable Canopy Across All Neighborhoods by 2030. To accomplish these goals, the UFMP details four strategies: community coordination and collaboration, best practices, dedicated resources, and stronger policies.

## 2. CONTEXT

Columbus, Ohio, faces many challenges, both today and in the near future: rapid population growth, climate change, public health issues, and the fastest growing urban heat island in the country (Climate Central 2014). While trees can be part of the solution, Columbus has less tree canopy than peer cities.

With a population of more than 900,000 people, Columbus is the 14th largest city in the nation. The Mid-Ohio Regional Planning Commission (MORPC) has forecasted the central Ohio region to grow to three million by 2050. This growth will likely impact tree canopy and increase heat stress due to the increased development. Columbus currently lacks effective tree protection measures, meaning tree losses will continue as the city grows and becomes denser.

Columbus residents experience public health challenges related to living in an urban environment. The city has air quality issues, high infant mortality rates and elevated rates of chronic conditions including obesity, diabetes, and asthma. All of these public health issues impact overall community health. Residents also have to deal with heat stress. Climate Central found Columbus to be the fastest-growing heat island and eighth most intense of 60 major cities studied (Climate Central 2014). By 2095, Columbus summers could be similar to those in Arkansas today (GLISA).

Based on 2013 data, 22% of the City of Columbus is covered by trees when viewed from above. This is significantly less than comparable cities such as Cincinnati (38%), Pittsburgh (42%), and Charlotte (45%); see Figure 1 for other comparisons. Because of the significant growth experienced in Columbus since 2013, this coverage number is likely to be even lower.

As part of the implementation of the UFMP, Columbus is currently partnering with Franklin County to assess tree canopy from 2011-2021 to understand change in canopy over time. Tree canopy is inequitably distributed across neighborhoods, due in large part to past redlining, historic disinvestment, and other discriminatory practices in past decades. Across neighborhoods, canopy ranges from as low as 9% to as high as 41% (see Figure 2).

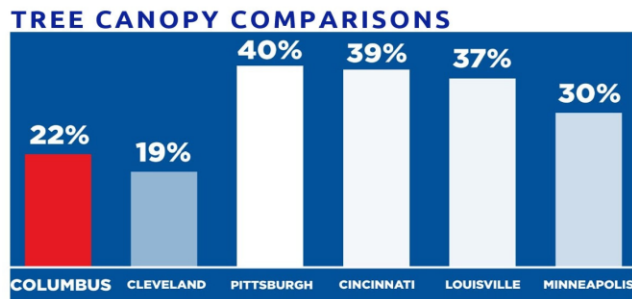


Figure 1: Tree Canopy Comparisons

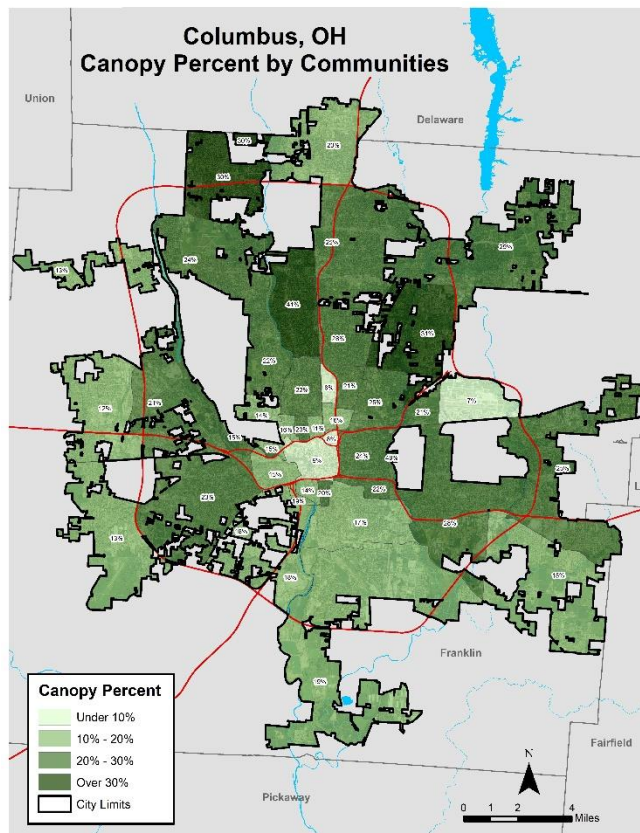


Figure 2: Columbus, OH Canopy Percent by Communities

An Operations Review conducted as part of the Discovery Phase of the Urban Forestry Master Planning Process found that Columbus' Forestry Division was vastly under-resourced compared to a 2014 study of forestry across US municipalities (Hauer & Peterson 2016). A major finding of the Columbus UFMP was that Columbus budgeted less per street tree and had fewer staff managing public trees than other cities studied, in the Midwest and nationally, as seen

in Figure 3. Over 21,000 park trees are inventoried in Columbus, but due to safety concerns the major focus of Forestry operations is on street trees. The resources described in the below charts reflect that focus.

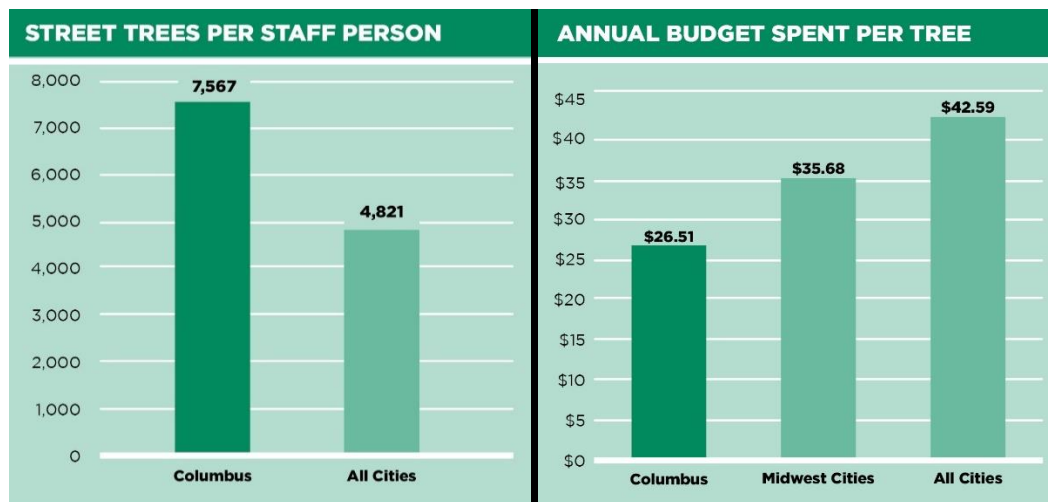


Figure 3: Street Trees per Staff Person and Annual Budget Spent per Tree

### 3. GOALS

Stakeholders and the City co-created a vision and three goals for Columbus' urban forest. The vision of the UFMP is to prioritize, preserve, and grow the tree canopy in Columbus, equitably across neighborhoods, to improve health and quality of life for all residents. The UFMP's three goals are 1) reach 40% tree canopy by 2050; 2) stop net loss of canopy by 2030; and 3) invest in equitable tree canopy by 2030.

### 4. APPROACH

Columbus Recreation and Parks Department's planning and forestry staff, along with consultants Davey Resource Group and Urban Canopy Works, led the creation of the Urban Forestry Master Plan (UFMP), on time and on budget, amidst a global pandemic. Columbus explored trends in its tree canopy by addressing population growth, social equity, high heat levels, public health issues, and the future stresses of climate change in its planning process. Hundreds of stakeholders helped create the UFMP. Industry experts, universities, nonprofits, developers, community leaders, city staff and leadership, regional partners, landscape architects and others served on two teams: a project team of about 30 members and an 100+ member Advisory Group. These groups met throughout the course of the plan's creation through three group workshops and multiple progress check-ins.

The project team co-created the vision for Columbus' urban forest, collaboratively edited the draft UFMP prior to public release and chose factors for a priority planting analysis created to address the inequity in tree canopy across Columbus. Stakeholders selected nine equity factors, spanning health, crime, demographic, and economic data, to create a social equity needs index. Social equity needs scores ranged from 0 to 4, with higher scores denoting higher need based on those nine factors: lower education rates, more poverty, higher non-white populations,

etc. The resulting bivariate map shows census tracts in red or gray; red areas show a high need via the social equity needs index and low tree canopy. The analysis is a tool to prioritize planting sites and tree care in neighborhoods with low canopy and high social equity needs. Stormwater capacities and urban heat were other lenses used to prioritize planting by census tracts. These analyses enable the City and the community to plan its investments in tree canopy, planting and preserving trees where they will do the most good.

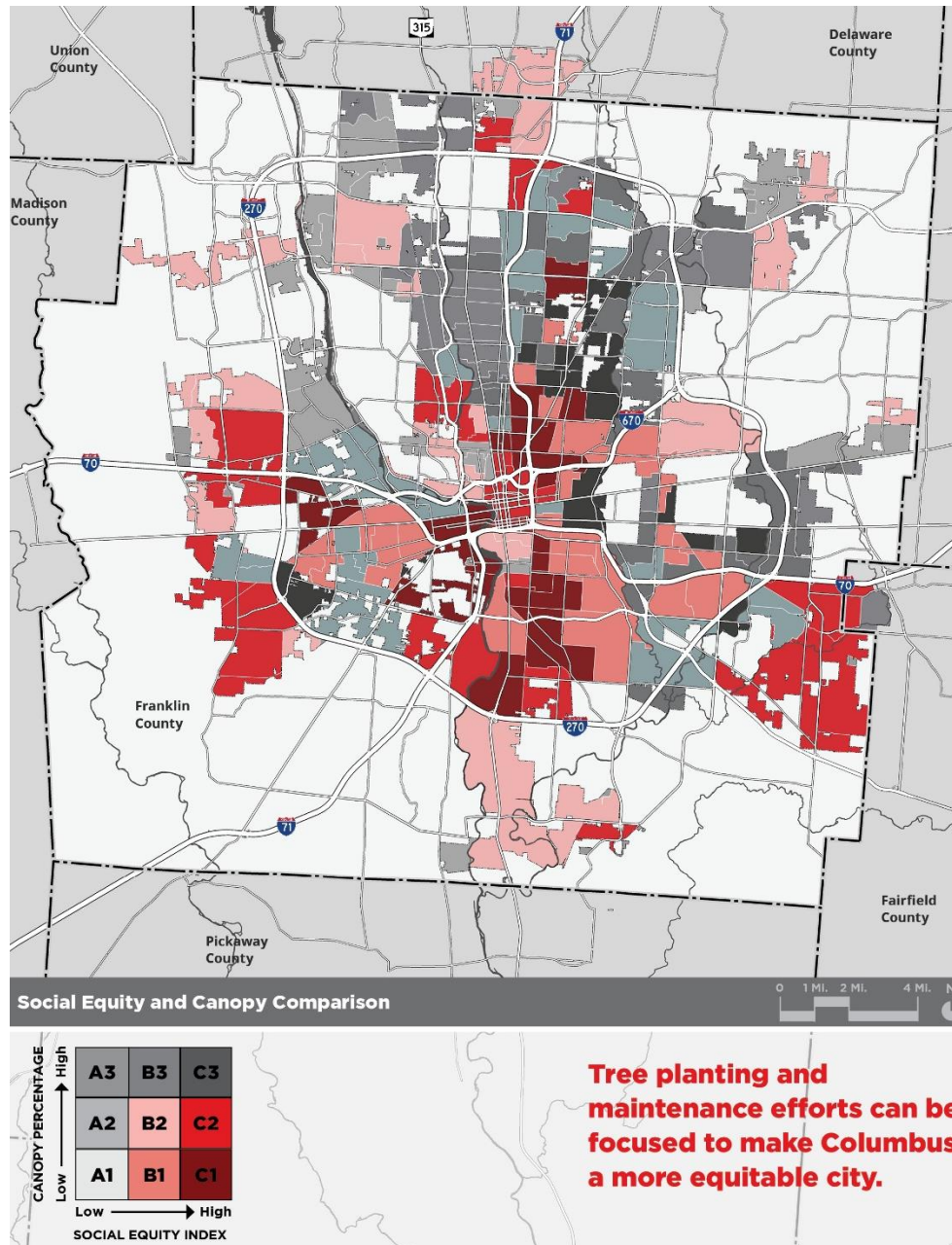


Figure 4: Social Equity Needs Index for Columbus, Ohio

The City held two comment periods: before the plan was written and when the draft was shared. Columbus City Council held a public hearing on the plan during the final comment



period. Beyond the comment periods, the broader public was engaged through an open house, small-group presentations, and interviews. The UFMP project manager made over 30 presentations to community groups, students, corporations, and nonprofits. Additionally, a project website provided to the public for the first time an interactive tree canopy map tool. Residents can click on an area or enter an address within Columbus city limits to find out the local tree canopy cover levels. <https://www.columbusufmp.org/canopy-by-neighborhood.html>

Through analysis of existing tree data, City Forestry operations, and stakeholder feedback, national urban forestry experts at Davey Resource Group and Urban Canopy Works scored Columbus on 32 indicators of a sustainable urban forest. Columbus has two main sources of tree data: 1) a public street tree inventory and 2) an urban tree canopy assessment. Both were analyzed to understand the diversity, resilience, and age of the City's urban forest and determine data limitations. Columbus' last tree canopy assessment is based on 2013 data, and the public tree inventory is significantly out-of-date.

The consultants conducted an Operations Review of the City of Columbus' urban forestry division to evaluate current practices and policies that influence the maintenance, planting, and care of public trees. The most significant finding of the comprehensive review of Columbus' ordinances and policies is that the City does not have adequate tree protection and preservation regulations on private property. In Columbus, 70% of trees grow on private property, meaning this lack of tree protection is a significant challenge to meet the UFMP canopy goals. With exponential growth expected, this is a major concern for Columbus' tree canopy. A comparative review of ordinances in two of Columbus' neighboring communities and a peer city, Charlotte, North Carolina, highlights the tree protection and preservation deficiencies in Columbus' ordinances (see Figure 5). With the majority of the City's tree canopy on private land, private tree protection, preservation, and planting will have the most significant impact on tree canopy cover and stopping net canopy loss.

Tree Protection and Preservation				
	Columbus, OH	Gahanna, OH	Dublin, OH	Charlotte, NC
<b>Land Use Regulated</b>				
Single/two-family Residential		●	●	●
Multi-family Residential	X	●	●	●
Commercial/industrial		●	●	●
Public Land	●	●	●	●
<b>Public Tree Damage and Removal</b>				
Restricts tree removal on public property	●	●	●	●
City permit or approval required for tree removal, pruning or excavating	●	●	●	●
Prohibits damage to public trees (e.g. ropes, signs, wires, and excavation)	●	●	●	●
<b>Private Tree Damage and Removal</b>				
Restricts tree removal on private property		●	●	●
City permit or approval required for tree removal on private property		●	●	●
Requires preservation of trees during development on private property		●	●	●
Prohibits damage to preserved/protected trees		●	●	●
<b>Regulated Features on Private Property</b>				
Forests/wetlands		●	●	●
Specific species and/or size tree (e.g., heritage/significant trees)	X	●	●	●
Tree critical root zone/dripline			●	●
Amount of canopy cover (minimum amount set)				●
Riparian buffers, natural areas, preservation zones		●		●
<b>Tree Protection Measures</b>				
Tree protection/preservation plan required		●	●	●
Identification of prohibited activities in dripline/critical root zone		●	●	●
Tree protection fencing or other protection measures required		●	●	●
Credits/incentives for tree preservation		●		●
<b>Site Plan/Development Requirements</b>				
Inventory and location of trees/forests/woodlands on site		●	●	●
Tree protection/preservation plan		●	●	●
Tree protection measures (e.g., fencing, soil protection, trunk protection)		●	●	●
Landscape plan with mitigation plantings		●	●	●
Grading and utility plans with trees		●	●	●
<b>Mitigation/Penalties</b>				
Tree planting requirements for removal of regulated trees	●	●	●	●
Fee in lieu of planting mitigation trees	●		●	●
Tree planting establishment, maintenance and survival requirements		●	●	
Penalties established for damage and removal of preserved/saved trees		●	●	●
Tree fund	●	●		●
Note: 'X' Only applies to University District zoning overlay.				

Figure 5: Policy Comparison of Tree Protection and Preservation between Columbus, Ohio; Gahanna, Ohio; Dublin, Ohio; and Charlotte, North Carolina

A comprehensive resource and program assessment based on the Indicators of a Sustainable Urban Forest assessed the current, baseline state of Columbus' urban forest. The indicators use urban forestry industry standards and best management practices to evaluate a community's trees, how they are managed and the level of community engagement. For each indicator, Columbus' current performance level was rated as low, moderate, or good. Columbus



scored low on the Trees category, based on analysis of existing data and information; low to moderate on Management, determined through the Forestry operations review, policy review, and existing data; and low on the Players category, through Advisory Group consensus. Figure 6 shows these results, which reveal the many opportunities Columbus has to improve the resiliency, engagement, and management of its urban forest.

32 INDICATORS OF A SUSTAINABLE URBAN FOREST				
Columbus, Ohio		Assessed Performance Level		
		Low	Moderate	Good
The Trees	Tree Canopy Cover	●		
	Equitable Distribution	●		
	Age Distribution	●		
	Condition of Publicly-Owned Trees	●		
	Condition of Publicly-Owned Nature Areas	●		
	Trees on Private Property		●	
	Diversity / Pest Vulnerability		●	
	Suitability - Overhead	●		
	Suitability - Ground Level	●		
	Suitability - Soil Conditions	●		
	Suitability - Invasives		●	
	Suitability - Climate Change Adaptability		●	
The Management	Tree Inventory		●	
	Canopy Assessment		●	
	Plans and Programs: Management Plan	●		
	Plans and Programs: Risk Management	●		
	Plans and Programs: Planting		●	
	Plans and Programs: Disaster Management	●		
	Maintenance of Publicly-Owned Trees (Rights-of-Ways)	●		
	City Staffing and Equipment		●	
	Funding	●		
	Tree Protection Policy	●		
	Communication		●	
The Players	Neighborhood Action		●	
	Large Landholder Involvement	●		
	Green Industry Involvement		●	
	City Department/Agency Coordination	●		
	Funder Engagement	●		
	Utility Engagement	●		
	Developer Engagement	●		
	Public Awareness	●		
	Regional Collaboration		●	
Totals		20	12	0
		63%	37%	0%

Figure 6: Systematic analysis of Columbus, Ohio's urban forest, based on the 32 indicators of a sustainable urban forest

As the UFMP is a citywide plan with implications for many City departments, project staff met with each key City department involved with trees, such as the Department of Public Utilities, Department of Public Service, Department of Neighborhoods, Department of Public Health, Department of Development, and Department of Building and Zoning Services. While these departments had representatives on the stakeholder group, it was also key to receive their individual feedback on potential recommendations before the plan was written.

The UFMP details 15 actions to address the opportunities, needs, and challenges identified during the planning process. Each includes specific action items, the lead agency for the action, supporting partners, and a timeline ranging from immediate to long-term. All actions fall within four strategies: community coordination and collaboration; best practices, dedication of resources; and stronger policies.

## **5. KEY RESULTS**

Even though the UFMP was only finalized in April 2021, its implementation has already resulted in better tree data, increased staff and resources for public trees, educational materials, and ongoing revisions to public tree protections. Below are key results by strategy area.

### **5.1 Community Coordination and Collaboration**

#### **Building a Coalition Team for Implementation**

The City convened UFMP Advisory Group members in November 2021 to discuss UFMP implementation. Rosalie Hendon, environmental planner and project manager for the UFMP, gave updates on the City's UFMP progress. Guest speakers from coalitions in Boston and Cleveland shared their experiences with their coalition efforts. Advisory group members then discussed the possible creation of a Columbus Tree Coalition and arranged a follow-up meeting for those interested. In 2022, the board of local environmental nonprofit Green Columbus voted to take on the responsibility of convening a citywide tree coalition.

#### **Coordinating Between City Departments**

Staff from Columbus Recreation and Parks Department's Forestry section and Columbus Department of Public Utilities now meet bimonthly. During 2021, Forestry met with the Department of Development, Sustainable Columbus and the Department of Public Service to discuss UFMP implementation. The UFMP goals are also now captured in the City's Climate Action Plan.

#### **New Online Content and Resources**

To increase awareness and provide tree-related resources for residents, the City updated its Forestry website. Additionally, two videos were created on how to plant a tree and how to prune a tree in Columbus, to speak to the specific concerns and constraints that urban homeowners face. The City also produced a flyer in three languages (English, Spanish, and Somali) that is

distributed at community events. Forestry has also hosted tours at its municipal nursery for interested residents and sustainability groups.

## **5.2 Best Practices**

### **Street Tree Inventory Update**

Columbus has two key tree data sets: a street tree inventory and an urban tree canopy assessment. In 2020, the City of Columbus began the process of updating the public tree inventory. Columbus' street tree inventory had not been updated citywide since 1998. By the end of 2022, the City will have dedicated over \$1 million, using both city capital budgets and federal grants to fund the project. Approximately 50 percent of the city has been updated, beginning with neighborhoods with high social equity needs scores and low canopy. A total of 15,652 street trees were inventoried by December 2021, along with 19,410 planting spaces. While the updated tree canopy assessment has not been completed, the previous assessment has been made available for public exploration via an online viewing tool.

### **Urban Tree Canopy Assessment**

A tree canopy assessment shows what percentage of the city is covered by trees when seen from above. In 2013, only 22 percent of Columbus was covered by trees. An updated tree canopy assessment and change analysis is in progress to analyze tree canopy cover across all of Franklin County, including all 41 political jurisdictions within the county, in addition to the City of Columbus to assess our urban forest at a regional level. The assessment will show the change in tree canopy from 2011 to 2021.

### **Increased Forestry Staffing for Proactive Tree Care**

Two new full-time positions were filled within Columbus Recreation and Parks Department's Forestry section in 2021: a forestry plan reviewer and a fourth regional arborist. More hiring is planned for the next four years. Forestry plans to add three additional tree crews, practically doubling their current staff, to allow for proactive management and pruning of city trees.

## **5.3 Dedication of Resources**

### **Dedicated Funding for UFMP Implementation**

The Mayor's Office awarded \$1.5 million to implement the UFMP in the 2020 capital budget, and City Council appropriated the funds in September 2021. Another \$1.5 million was awarded in the 2021 capital budget. These funds are planned to be used for Forestry staff, equipment, and contracts. Columbus Recreation and Parks Department has also received \$920,500 of federal Community Development Block Grants to update the street tree inventory and plant public trees.

### **City Urban Forestry Leadership**

Columbus Recreation and Parks Department reimagined the City Forester role to implement the UFMP, and the Civil Service Commission approved the revised job description.

### **Private Property Tree Planting**

Columbus City Council helped to fund a pilot initiative to increase tree canopy in an equity neighborhood. Columbus Recreation and Parks Department is partnering with The Ohio State University, the state's Division of Forestry, local nonprofits, and a neighborhood church to plant trees in the South Side of Columbus. The South Side neighborhood has an average of 18% tree canopy, below the city average, and scores highly on the UFMP social equity needs index—indicating high need and low tree canopy. Volunteers planted or dropped off 25 trees at 18 houses on the South Side in 2022. The City also hosted local nonprofit Green Columbus' tree giveaway at the Barack Community Center in the South Side, resulting in 400 native trees donated to residents.

### **5.4 Stronger Policies**

#### **Revising Public Tree Protections**

A process began to revise the City's public tree protection code (Chapter 912: Trees and Shrubs; Columbus Tree Subcommittee). The department is drafting proposed code changes as well as a best practices manual for public trees that will accompany city code. Initial public feedback has been incorporated, and the draft language will also be released for public comment.

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