Tree and Landscape Advisory Committee Meeting
Thursday, May 13, 2021
10:00 a.m.
305 SW A Street, Bentonville, AR
Zoom Meeting – the public and non-committee members may contact dsemsrott@bentonvillear.com to request participation via Zoom.

Mission Statement: The City of Bentonville Tree & Landscape Advisory Committee serves as an advisory committee to the City Council and to City Staff working to maintain, improve, renew and protect the urban forest in public rights-of-way, as well as to share information with the public, enhance appreciation of trees, promote proper tree care, and encourage participation in the development of Bentonville's urban forest.

Tagline: Grow with trees.

Members
Gulizar Baggson, 8/11/23
Vacant Position, 11/14/23
Nathan Lembke, Chair, 7/25/23
David Short, 5/23/23
Jessie Wagner, Vice-Chair, 8/11/23
Ralph Weber, 12/31/21

Ex-Officio City Council
Holly Hook, 12/31/21

Staff
Shelli Kerr, Comprehensive Planning Manager
Danielle Semsrott, Senior Planner
Geoff Braga, Urban Forester
Emily Krol, Horticulturalist

AGENDA

OPEN MEETING - Meeting is being recorded.

CURRENT BUSINESS

1. **Meeting Summary Approval** – April 15th
2. **Guest Presentation – ANPS Education Committee**
   - Alan Ostner and Lissa Morrison
3. **Tree Preservation Reports**
   - Tyler Overstreet
4. **Spring Tree Giveaway Recap –** Shelli
5. **Tree Canopy Assessment Final Report –** Danielle
6. **Residential Landscape Award Nominations**
   - 4100 SE Heartwood Street
   - 1704 NE Chapel Hill Drive
   - May 24th

OTHER BUSINESS

ADJOURN MEETING

Tree and Landscape Advisory Committee Meeting Summary

Thursday, April 15, 2021
10:00 a.m.
305 SW A Street, Bentonville, AR
Zoom Meeting

SUMMARY

Attendance

Voting Members		Ex Officio	Staff
✓ Gulizar Baggson	✓ Ralph Weber	✓ Holly Hook (City Council)	Danielle Semsrott
✓ Nathan Lembke	Vacant Position		✓ Geoff Braga
✓ David Short			Emily Krol
✓ Jessie Wagner			✓ Shelli Kerr

Guests: David Wright, Mary Beth Miller, Mark Bray, Maegan Blansett, Tyler Overstreet, Ben Whitman, Janet Paith

Open Meeting. Shelli called the meeting called to order at 10:02 a.m.

1. **Meeting Summary Approval.** The committee approved the meeting summary from March 18, 2021.

CURRENT BUSINESS

2. **Tree Canopy Assessment.** Maegan Blansett with PlanIt Geo presented the results of the tree Canopy Assessment.
    - 25% existing tree canopy
    - 26% impervious surfaces
    - 45% plantable space
    - 30% unsuitable for planting
    - 1,000 acres of canopy loss
    - City wide – little change and is being preserved well.
    - Ward 3 is gaining canopy
    - Down 1% from the original tree canopy in 2012.
    - Canopy growth is more subtle while the loss is immediately noticeable.
    - Final report will provide more details regarding new plantings vs mature trees.
    - Software included ArcGIS, remote sensing and Feature Analyst.
    - Trees of all sizes should be picked up in the study.

3. **Tree Preservation.** Tyler Overstreet, Planning Services Manager, discussed his master's project focused on tree preservation. We have tree preservation credits, but no real policy. There is a need for additional study of tree preservation. His deliverables for his degree is a literature review memo and final recommendations memo. Literature review will be complete by April 18 with three to five policy recommendations, prioritized based on equity, efficiency and cost, by May 9th. At this time, it looks like improving the incentives will be one of the top recommendations. Gulizar suggested parking requirements may need to be more reasonable and planning reported that they are re-evaluating those parking minimums. Also, parking needs to be looked at holistically, downtown particularly as new garages are built.

4. **Residential Landscape Award Nomination.** A nomination had been received for 4100 SW Heartwood Street. The committee agreed to go take a look in-person. They also suggested looking at the list from the end of last year.

5. **Spring Tree Giveaway.** Shelli reminded the committee of the Tree Giveaway this Saturday.

OTHER BUSINESS

6. **May meeting time / date change.** Danielle is unavailable on the regularly scheduled meeting date of May 20. The committee agreed to move it to May 13.

COMMERCIALLY AVAILABLE INVASIVE PLANTS

www.anps.org

The following plants are offered commercially and are considered invasive in Northwest Arkansas or invasive in surrounding areas and are therefore of concern in Northwest Arkansas as of 2021.			
Botanic Name	**Common Name**	**Botanic Name**	**Common Name**
Acer ginnala	Amur Maple	***Lonicera maackii***	Amur Bush Honeysuckle
Acer platanoides	Norway Maple	***Lonicera morrowii***	Morrow's Bush Honeysuckle
Acer tataricum	Tatarium Maple	***Lonicera japonica***	Japanese Honeysuckle
Ailanthus altissima	Tree-of-Heaven	***Melia azedarach***	Chinaberry Tree
Albizia julibrissin	Mimosa/Silk Tree	***Morus alba***	White Mulberry
Ampelopsis glandulosa	Amur Peppervine	***Nandina domestica***	Heavenly Bamboo
Berberis bealei **(formerly known as *Mahonia bealei*)**	Leatherleaf Mahonia	***Paulownia tomentosa***	Empress Tree
Berberis thunbergii	Japanese Barberry	***Photinia serratifolia***	Red-Tipped Photinia
Celastrus orbiculatus	Chinese/Asian Bittersweet Vine	***Pyllostachys*** **spp.**	Bamboo species
Clematis terniflora	Sweet Autumn Clematis/Virgin's Bower	***Populus alba***	White Poplar
Elaeagnus pungens	Autumn Olive	***Prunus mahaleb***	Mahaleb Cherry/St. Lucie Cherry
Elaeagnus umbellata	Thorny-Olive	***Pyrus calleryana***	Flowering Pear
Euonymus alatus	Burning Bush	***Quercus acutissima***	Sawtooth Oak
Euonymus fortunei	Creeping Euonymus	***Rhamnus cathartica***	Common Buckthorn
Exochorda racemosa	Pearlbush	***Rhamnus davurica***	Dahurian Buckthorn
Firmiana simplex	Chinese Parasol Tree	***Rhodotypos scandens***	Jetbead/Jetberry Bush/White Kerria
Hedera helix	English Ivy	***Triadica sebifera***	Chinese Tallow Tree
Hibiscus syriacus	Rose of Sharon	***Ulmus pumila***	Siberian Elm
Ilex cornuta	Chinese Holly	***Vinca major***	Bigleaf Periwinkle
Koelreuteria paniculata	Golden Rain Tree	***Vinca minor***	Littleleaf Periwinkle
Ligustrum **spp.**	Privet species	***Wisteria floribunda***	Japanese Wisteria
Lonicera fragrantissima	Fragrant Bush Honeysuckle	***Wisteria sinensis***	Chinese Wisteria

A Case for Native

Trees and Shrubs

Plants are the foundation of the entire food web. Trees and large shrubs make especially important contributions:

- Shade for our homes, parks, and commercial settings.
- Lower the temperatures of our cities in the summer.
- Habitat & food for wildlife.
- Food for humans such as nuts and berries.
- Filter pollution and turn carbon dioxide into life giving oxygen.

Unfortunately, not all plants provide equal benefits:

- Non-native plants do not support a healthy food web and offer few ecosystem services.
- Nature thrives on diversity, and native trees are responsible for supporting the greatest biodiversity.
- Native plants are disproportionately important for sustaining wildlife populations especially in urban settings. For example, native oak trees support around 500 different types of butterflies and moths (pollinators).
- Reproductive success of all higher order consumers (higher on the food web) declines as the use of non-native plants increases.
- Non-native plants often become invasive and take over entire ecosystems, choking out native species. (e.g. Bradford Pear, Bush Honeysuckle, Privet)
- Native plants reduce the need for and use of chemical fertilizers, pesticides, and water, therefore keeping our lakes, streams and drinking water cleaner.
- Native trees & shrubs are adapted to the extremes of Arkansas weather, from floods to drought.

Urbanization has resulted in the near eradication of native plants in our cities and towns, therefore starving our local ecosystems. One of the most positive actions we could take would be to create a 'Recommended Tree List' that lists close to 100% natives. Studies show that urban settings with native trees and large shrubs have significantly more birds, butterflies, pollinator insects and diversity. (www.pnas.org/content/115/45/11549)

The following list has been put together by the Arkansas Native Plant Society Education Committee, with input from NWA landscape architects, landscape designers, horticulturists, and wildlife biologists.

PLANTS NATIVE TO NORTHWEST ARKANSAS (with a few native to south Arkansas/Southern USA)

This is not an all-inclusive list of Northwest Arkansas Native Plants. Its purpose is to guide developers/designers in potential native plant selections. A few plants native to south Arkansas/Southern USA have been listed here due to a general need for these plants in landscape design.

LARGE SPECIES - Mature Ht. 45' or above

Latin Name	*Common Name*	*Street tree*	*Notes*
Acer rubrum	Red Maple		Grows poorly in compacted soil. Not good street tree
Acer saccharum	Sugar Maple		Grows poorly in compacted soil. Not good street tree
Betula nigra	River Birch		Extended dry soil leads to leaf drop. Avoid high pH
Carya cordiformis	Bitternut Hickory		Nuts -plant away from storm drains
Carya illinoinensis	Pecan		Nuts -plant away from storm drains
Carya ovata	Shagbark Hickory		Nuts -plant away from storm drains
Catalpa speciosa	Northern Catalpa	•	Large seed pods-plant away from drains
Celtis laevigata	Sugarberry	•	
Celtis occidentalis	Hackberry	•	
Fagus grandifolia	American Beech		Intolerant of poorly drained soil
Gleditsia triacanthos form *inermis*	Thornless Honeylocust	•	
Gymnocladus dioicus	Kentucky Coffeetree	•	Use male trees close to street
Juglans nigra	Black Walnut		Nuts - plant away from storm drains
*Liquidambar s. '*Rotundifolia*'*	Sweetgum	•	Sterile-no gum balls. Narrow form
Liquidambar styraciflua	Sweetgum	•	Gum balls -plant away from storm drains
*Liriodendron tulipifera**	Tulip Tree		*Native to Crowley's Ridge in E. AR. Requires moist fertile well drained soil. Weak wood in high winds.
Maclura pomifera	Osage Orange		Large fruits on females-plant away from storm drain
*Magnolia grandiflora**	Southern Magnolia*		*Native south of Arkansas
Nyssa sylvatica	Black Tupelo	•	
Pinus echinata	Shortleaf Pine	•	Needs room for taproot
Platanus occidentalis	Sycamore		
Quercus alba	White Oak	•	
*Quercus bicolor **	Swamp White Oak*	•	*Native north & east of AR.
Quercus falcata	Southern Red Oak	•	
Quercus imbricaria	Shingle Oak		
Quercus macrocarpa	Bur Oak		Large acorns
Quercus muehlenbergii	Chinquapin Oak	•	
Quercus nigra	Water Oak	•	
Quercus phellos	Willow Oak	•	
Quercus rubra	Northern Red Oak	•	
Quercus shumardii	Shumard oak	•	
Quercus velutina	Black Oak	•	
Tilia americana	American Linden		Requires moist fertile well drained soil
Ulmus americana 'Jefferson'	Jefferson Elm	•	
*U.americana '*Lewis & Clark'	Lewis & Clark Elm	•	
*U.americana '*New Harmony'	New Harmony Elm	•	
U.americana 'Princeton'	Princeton Elm	•	
U.americana ' Valley Forge'	Valley Forge Elm	•	

MEDIUM SPECIES Mature height 30' -45'			
Latin Name	***Common Name***	***Street tree***	***Notes***
Aesculus glabra	Ohio Buckeye		Prefers moist fertile shade. Taproot. Buckeyes (nuts)
Carpinus caroliniana	Hornbeam or Musclewood	•	Shade to part shade
Cladrastis kentuckea	Yellowwood		Deep roots
Crataegus crus-galli	Cockspur Hawthorn		Large (1.5-3") thorns
Crataegus crus-galli var. *inermis*	Thornless Cockspur Hawthorn	•	No thorns
Crataegus viridis	Green Hawthorn	•	Only occasional small thorns
Diospyros virginiana	Persimmon		Messy fruit in fall
Ilex opaca	American Holly		Evergreen
Ilex X attenuata 'E.Palatka'*****	East Palatka Holly		*****Hybrid between 2 native hollies from coastal S.
Ostrya virginiana	American Hophornbeam	•	Intolerant of extended dry or wet soil
Sapindus saponaria	Soapberry	•	
Sassafras albidum	Sassafras		Will colonize
*Thuja occidentalis**	Eastern Arborvitae		*Native to Great Lakes region. Evergreen

SMALL SPECIES Less than 30' in height			
Botanic Name	***Common Name***	***Street Tree***	***Notes***
Aesculus pavia	Red Buckeye	•	Appreciates afternoon shade
Amelanchier arborea	Serviceberry	•	Drops leaves when dry
Aronia arbutifolia	Red Chokeberry		
Asimina triloba	Pawpaw		
Cercis canadensis	Redbud	•	
Chionanthus virginicus	Fringe Tree	•	
Cornus alternifolia	Alternate Leaved Dogwood		Appreciates afternoon shade
Cornus florida	Flowering Dogwood		Appreciates afternoon shade
Corylus americana	Hazelnut		Thicket forming
Cotinus obovatus	American Smoketree		
Frangula caroliniana	Carolina Buckthorn		
Hamamelis vernalis	Ozark Witch Hazel		
Hamamelis virginiana	Common Witch Hazel		
Ilex decidua	Deciduous Holly		
Ilex vomitoria *****	Yaupon Holly		*****Native to southern half of Arkansas
Ilex X attenuata 'Eagleston' *****	Eagleston Holly		*****Hybrid btw. 2 hollies native to coastal S.
Ilex X attenuata 'Fosteri' *****	Foster Holly		*****Hybrid btw. 2 hollies native to coastal S.
Magnolia grandiflora 'Bracken's Brown Beauty'*****	Bracken's Brown Magnolia		*****Native south of Arkansas
*Magnolia virginiana******	Sweet Bay Magnolia		*****Native to coastal south
Viburnum prunifolium	Blackhaw Viburnum	•	
Viburnum rufidulum	Rusty Blackhaw	•	

SHRUB SPECIES			
Latin Name	**Common Name**	**Height**	***Notes***
Aronia arbutifolia	Red Chokeberry	4-6’	
Callicarpa americana	American Beautyberry	5’	
Cephalanthus occidentalis	Buttonbush	6-12’	Prefers medium to wet soil
*Clethra alnifolia**	Sweetshrub	3’	*Native to coastal S.E. Prefers medium to wet soil
Frangula caroliniana	Carolina Buckthorn	10-15’	
Hydrangea arborescnes	Wild Hydrangea	3-5’	Suckers. Avoid cultivars with “mop heads” whose “flowers” are actually nothing more than sepals that look like petals and contain no nectar or pollen.
*Hydrangea quercifolia**	Oakleaf Hydrangea	4-10’	*Native to south Arkansas
Hypericum prolificum	St. John’s Wort	2-4’	
Ilex decidua	Deciduous Holly	10-12’	
*Ilex glabra**	Inkberry Holly	3-4’	*Native to coastal S. Evergreen-prefers med. to wet
*Ilex vomitoria**	Yaupon Holly	15’	*Native to east & south Arkansas
Ilex vomitoria (dwarf)*	Dwarf Yaupon	3-4’	*Native to east & south AR. Evergreen mounded shrub
Itea virginica	Virginia Sweetspire	3-5’	*Native to much of AR but not to NWA and some eastern counties
Lindera benzoin	Spicebush	6-8’	Prefers medium shade & moist soil
Physocarpus opulifolius	Ninebark	3-10’	
Rhus aromatica	Dwarf Sumac	2-4’	Cultivar ‘Gro-Low’ spreads like a ground cover
Ribes aureum	Golden Current	3-7’	
Sambucus canadensis	American Elderberry	5-12’	Sprawling, suckering
Viburnum dentatum	Arrowwood	4-6’	
Viburnum nudum	Smooth Witherod	4-5’	
Viburnum prunifolium	Blackhaw	12-15’	Multi branched shrub form
Viburnum rufidulum	Rusty Blackhaw	12-15’	Multi branched shrub form
Yucca arkansana	Arkansas Yucca	2’	
*Yucca filamentosa**	Adam’s Needle	3-4’	*Native to US coastal regions

GRASS SPECIES			
Botanic Name	***Common Name***	**Height**	**Notes**
Andropogon gerardii	Big Bluestem	6’	
Andropogon ternarius	Split Beard Bluestem	3-4’	
Bouteloua curtipendula	Side Oats Grama	2.5’	
Chasmanthium latifolium	Inland Sea-Oats	3’	
Muhlenbergia capillaris	Pink Muhly Grass	3’	Takes the whole growing season to reach 3’
Panicum virgatum	Switchgrass	6’	
Schizachyrium scoparium	Little Bluestem	3’	
Sorghastrum nutans	Indian Grass	6’	Short-lived perennial grass
Sporobolus heterolepsis	Prairie Dropseed	3’	

VINE SPECIES		
Botanic Name	***Common Name***	***Notes***
Aristolochia tomentosa	Dutchman’s Pipe Vine	
Bignonia capreolata	Crossvine	
*Gelsemium sempervirens****	Carolina Jasmine	***Native to central and south Arkansas
Lonicera sempervirens	Coral Honeysuckle	Not to be confused with Japanese or Bush honeysuckle
Parthenocissus quinquefolia	Virginia Creeper	

MEMORANDUM

To: City of Bentonville Tree and Landscape Committee

From: Tyler Overstreet, AICP, Planning Services Manager

Date: May 8, 2021

RE: Municipal Tree Preservation Strategy

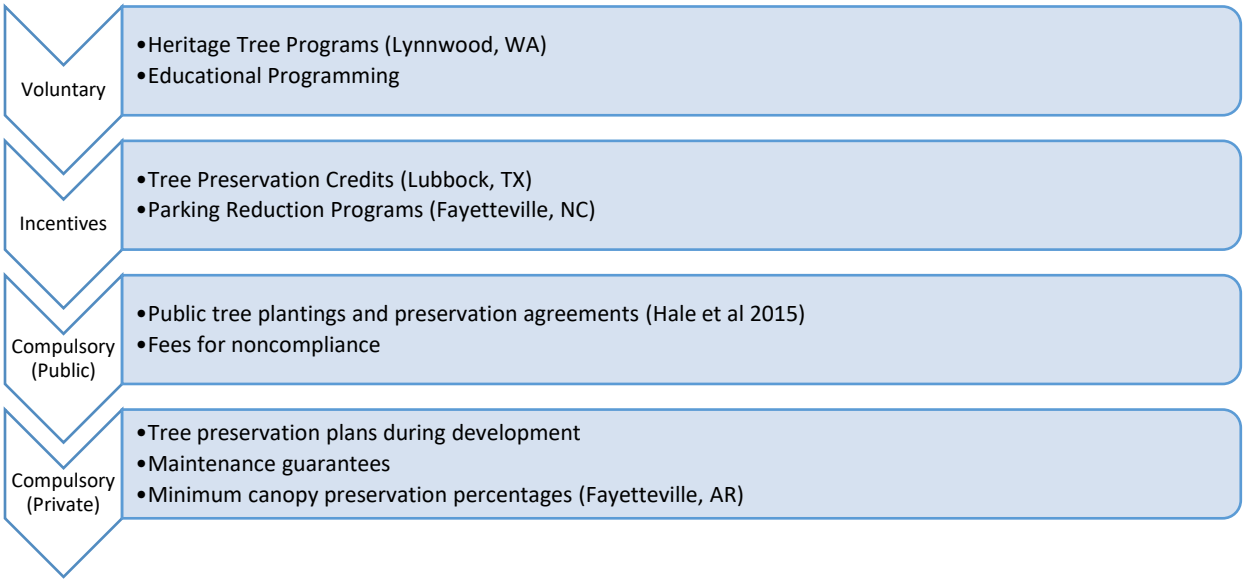
The urban forest and canopy serve many public and environmental benefits. Research suggests they serve health, social, cognitive, educational, and economic benefits (Turner-Skoff & Cavender, 2019). Since the last meeting of the Tree and Landscape Committee and the completion of a Literature Review memo on April 18, 2021, PlanIT Geo completed a Tree Canopy Assessment for the City of Bentonville. Based upon an analysis of 2019 aerial photography, the report found an urban tree canopy coverage of 25% and a possible planting area of 45%. Despite Tree and Landscape Committee and the City's best efforts, urban tree canopy coverage has decreased by approximately 1% since 2019. Based upon this assessment, there is a need for a renewed effort in tree preservation. The purpose of this memo is to describe and project the outcomes of four policy alternatives for tree preservation policy. The memo concludes with recommendations for future action.

Conceptualizing Preservation Strategies

As discussed in the previous literature summary memo, there several methods by which to pursue municipal tree preservation across a variety of spectrums. In reflecting upon these varying methods and building the policy alternatives within this memo, I have conceptualized tree preservation strategies in a continuum. This continuum ranges from voluntary methods of

tree preservation (such as heritage tree programs) to compulsory ones (such as minimum canopy preservation percentages). The current City of Bentonville ordinance, with its focus on public tree preservation, development plantings, and tree credits lies somewhere in the middle. Figure 1 depicts a framework for understanding these "levels" of tree preservation and conservation. Before proceeding with additional compulsory preservation measures, the city needs to carefully weigh its effectiveness, political feasibility, and cost.

Figure 1: Tree Preservation Continuum



Outcomes Matrix

The outcomes of the four policy alternatives will be ranked for their efficiency, feasibility, and cost. Efficiency, for this paper, will follow the definition presented by Bardach and Patashnik (2020, p. 33) as a maximization of the public interest. Feasibility refers to the political and administrative feasibility of implementing the alternatives. Cost refers to the relative costs of implementation; further research would allow for the creation of exact dollar figures.

Table 1: Policy Outcomes Matrix

Policy	Efficiency	Feasibility	Cost
Heritage Tree Program	Low	High	Low
Improve Preservation Credits	Medium	Medium	Low
Improved Enforcement	High	Medium	Medium
Minimum Canopy Preservation Percentages	High	Low	High

Alternative 1: Establish a Heritage Tree Program

A heritage tree program would be a voluntary program where individual property owners, based upon a city-approved list of significant tree species at specified diameters at breast height (dbh), could apply to have their trees designated as heritage trees. In the case of Bentonville, the Tree and Landscape Committee could recommend heritage tree applications to the City Council for approval. Once approved, heritage trees would be provided with a plaque and be guaranteed some protections from demolition, destruction, etc. Lynwood, Washington, has a similar program where it is illegal to remove heritage species and public works staff keeps a record of and monitors the health of designated trees (Nichols, 2007, p. 24). Other cities, such as Sacramento, require a public hearing before removing heritage trees (Nichols, 2007, p. 50). Rather than a public hearing, for Bentonville, a better approach may be to require the replacement of a damaged, diseased, or destroyed heritage tree with 2-4 4-inch caliper approved trees, depending on the size and significance of the heritage tree.

The efficiency of this policy alternative will directly correlate with the amount of public participation in the program. If a significant number of property owners choose to pursue heritage designation for their private trees, the program will have a large public benefit. As a voluntary program, it seems politically and administratively feasible. The only costs associated with the program are the purchase of the heritage tree plaques, and the staff time required in processing and submitting applications.

Alternative 2: Strengthen Tree Preservation Credit ordinance

The City of Bentonville currently provides for tree credits in Article 1400.11 of the Land Development Code. The Code Section allows for certain numbers of tree plantings to be waived if significant trees are protected from construction activities during the development. The number of credits varies based upon the size and type of tree to be preserved. However, the existing credits seem inadequate as a sole preservation method, as they allow for a maximum of four tree plantings to be waived. An interesting approach, as adopted by Fayetteville, North Carolina, is to allow for a reduction in parking minimums as part of a tree preservation credit program. Fayetteville allows for a reduction of up to 5% of the required parking count to preserve existing landscaping. Okaloosa County, Florida, combines the approaches by allowing for up to 7 required trees to be waived, and an up to 10% reduction in required parking, based upon the size of the preserved tree and the number of required parking spaces (Okaloosa County, Florida Code of Ordinances, Appendix E: Land Development Code, 6.05.031 – Tree credits). Bentonville ought to adopt the Okaloosa County model to make tree preservation credits viable and provide the flexibility needed to avoid construction under significant trees.

The tree preservation credit ordinance is a voluntary option on every Large Scale Development and Preliminary Plat for the City of Bentonville. As a voluntary program, though, developers may still opt-out, leading to a medium efficiency rating. As an improvement to an existing ordinance, the cost should be relatively low and should be able to be managed by existing staff.

Alternative 3: Retain existing policies and ordinances with improved enforcement

Article 1300, Tree Preservation and Planting of the City of Bentonville Land Development Code already does many things right. The Article requires ongoing maintenance of

public and private trees, requires preservation plans and ongoing protection of street trees, and sets penalties for violations of the ordinance. However, consistent enforcement and adequate administrative capacity are issues in accomplishing the stated goals of the Tree and Landscape Committee and Article 1300. As discussed by Hill, Dorfman, and Kramer (2008), ordinance clauses and their enforcement have a statistically significant impact on the effectiveness of tree preservation. Proper enforcement of the City of Bentonville's current ordinance would include requiring the submission of tree maintenance agreements and tree preservation plans for public trees with Large Scale Development, annual tree maintenance inspections, ongoing tree-planting programs (such as the annual tree blitz), and involving Code Enforcement in ongoing monitoring and citation writing for violations of the ordinance.

Public trees are adjacent to every street right-of-way and located within parks across the city. Ongoing maintenance and enforcement of the existing tree preservation ordinance could serve a great public benefit. Proper pursuit of this policy alternative, however, will require the addition of at least one additional staff member whose focus is landscaping and tree preservation.

Alternative 4: Establish minimum canopy preservation percentages

The final alternative to be considered within this memo is to establish minimum canopy preservation percentages. This policy would require the City to designate a preferred tree list with a minimum percentage of canopy required to be preserved post-development. The City of Fayetteville, Arkansas has a similar program where they designate the minimum required canopy by zoning district (Code of Ordinances of Fayetteville, Arkansas, Title XV: Unified Development Code, Chapter 167: Tree Preservation and Protection).

Based upon this paper's definition of efficiency, this policy alternative is the most efficient, as it can be the farthest-reaching and serve the greatest public benefit. It expands the

scope beyond public tree preservation and voluntary programs into public protection of private trees because of their potential public benefit. However, the policy has significant costs including the cost in time to develop a brand-new ordinance, preservation program, and staff time and energy. Enforcing the new program would more than likely require additional staff. In addition, because the program is such a large step forward from current policy, it seems politically unfeasible.

Conclusion and Next Steps

In combination, the policy alternatives presented within this memo could go towards improving the tree canopy of the City of Bentonville. Through improved tree preservation and planting strategies, the City could work towards providing canopy on the potential 45% of land area available. The City can choose to implement all or none of the policy alternatives above, but as presented in the outcomes matrix, Alternatives 1, 2, and 3 seem to provide the greatest efficiency for the least cost and greatest feasibility. As presented in the Continuum of Tree Preservation and the work of Hill, Dorfman, and Kramer (2008), the policy alternatives can work cumulatively towards greater outcomes.

The policy outcomes presented within this memo are merely my conceptions. Therefore, the logical next step would be to create a task force for further study of this policy issue. The task force should include a Tree and Landscape Committee member, a Planning Commissioner, a City Councilman, private stakeholders, landscape experts, and city staff. The goal of the task force will be to assess the policy alternatives presented within this paper (and come up with their own), as well as devise timelines for implementation. The task force can bring the goals and intent of the Landscape Ordinance of the City of Bentonville to fruition.

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MEMORANDUM

To: City of Bentonville Tree and Landscape Committee

From: Tyler Overstreet, AICP, Planning Services Manager

Date: April 18, 2021

RE: Municipal Tree Preservation Strategy

The City of Bentonville, Arkansas takes pride in its status as the nation's fifth-fastest growing large city (US Census Bureau, 2020). Along with the rapid pace of population growth and development come new concerns regarding tree canopy and heritage tree preservation. The City's 22 consecutive years as a "Tree City USA Community," (Arbor Day Foundation, 2020) evidences a commitment to increasing the number of public trees, but there persists concern over the conservation of private trees and the ability to protect public trees once planted. Bentonville City Council, Planning Commission, and the Tree and Landscape Committee have all expressed an interest in exploring and evaluating the City's tree preservation strategies. This memo provides a summary of the literature on development and tree canopy preservation, the City of Bentonville's current preservation strategy, and several potential strategies for tree conservation.

Problem Definition

Tree preservation appears to have widespread public support (Conway and Bang, 2014). An Ontario study found that residents generally had positive attitudes towards tree planting and preservation policies. Redevelopment and construction are a serious threat to urban tree canopy, however. A Los Angeles study (Lee et al, 2017) found an average decrease of 1/3 of tree canopy on every single-family home expansion in the LA Basin. The study suggests that any city with

increasing property values and population growth should be wary of decreasing tree coverage. Further, Morgenroth (2017), found that building demolition resulted in an average removal of 21.6% of trees on demolition sites. Clearly, with Bentonville's rapid population growth and redevelopment, the urban tree canopy is at serious risk.

Current Policy Evaluation

Phytosphere Research (Swiecki and Bernhardt, 1993) suggests that effective preservation ordinances have (1) clearly stated goals; (2) designated responsibility with commensurate authority; (3) basic performance standards; (4) flexibility; (5) specified enforcement methods; (6) are part of a comprehensive management strategy; and (7) are developed with community support. Evaluation of the City's current ordinances will keep these seven factors in mind. The city currently provides an approved and prohibited species list (Approved Tree List, Bentonville Code of Ordinances, Appendix B, Article 1400, Section 13-14), which according to the Environmental Law Institute, should be a key consideration of municipal vegetation and preservation ordinances (McElfish, 2004, as cited in Nichols, 2007).

Also, the City's Landscape Ordinance requires parking lot landscaping, screening landscaping, tree plantings at the time of building permit issuance for single-family homes and specifies tree size minimums. However, as discussed by Smith, Dearborn, and Hutrya (2018), because of the "difficulty of young tree establishment and the vulnerability of mature trees, municipal actions to lower mortality rates have a much larger impact than increasing the planting rate." In other words, greening efforts alone are insufficient in addressing the loss of urban canopy from development and damage. Evaluation of the City of Bentonville's Landscape Ordinance will focus on those efforts not directly related to greening, Article 1300 Tree Preservation and Planting, and Section 1400.11 Tree Preservation Credits.

Article 1300 Tree Preservation and Planting

Article 1300 of the City's Development Code protects trees planted within public rights-of-way and on public lands. The Ordinance provides for the creation of the Tree and Landscape Committee, sets standards for public tree plantings and maintenance, and sets penalties for violation of the ordinance. The Ordinance seems well in line with the stated goals of the Phytosphere Research report. However, two issues persist. First, consistent implementation and enforcement of the ordinance are required for its success. Current planning staff must be willing to enforce the ordinance as written, and Code Enforcement and legal staff must pursue violations as authorized within the ordinance. Hill, Dorfman, and Kramer (2008), in an empirical analysis, found that ordinance clauses and enforcement had more of a significant impact on tree preservation than the existence of an ordinance or committee. An ordinance is only as good as its enforcement. Lack of support for enforcement could be due to poor articulation of the goals of the preservation ordinance. The stated objectives focus solely on the environmental benefits of tree preservation, neglecting to address the potential economic and social benefits (Lavy and Hagelman, 2019).

Second, because the ordinance only regulates trees within the public right-of-way or on public lands, it does not fully address the impacts of development on the tree canopy. Hale et al (2015), in evaluating urban forest management methods in the United Kingdom, noted the need for continued maintenance of public trees and recommended broadening strategies to private lands. Smith, Dearborn, and Hutrya (2018) found that while street trees provide many benefits, they are not always realized due to their high

mortality rates. Koeser et al (2013) noted that the sheer number of factors that influence survivability make the long-term success of public trees difficult to predict.

Section 1400.11 Tree Preservation Credits

The City of Bentonville provides for private tree preservation in the form of tree preservation credits. A proposed development can waive certain landscaping requirements if trees are adequately protected during the construction process. A mitigation practice such as this can provide some benefit for the developer (lessened tree costs) in exchange for a public benefit (preserved trees). Other cities studied offer a similar program. Lubbock, Texas provides tree credits that can be applied towards site landscaping, parking lot landscaping, or buffering requirements (Tree Preservation Credit, Chapter 39 Unified Development Code, Article 39.03 Building and Site Design, Division 3.4 Trees, Landscaping, and Buffering, Section 3.17). The credit is based upon the size of the preserved tree, the larger the tree the larger number of credited trees. Fayetteville and Butner, North Carolina, go a step further by allowing for a reduction in minimum parking requirements. This strategy serves the benefit of providing a tangible benefit to a developer; reducing the amount of parking required directly reduces cost.

Tree Conservation Strategies

Tree preservation ordinances are well cited in their ability to help improve urban tree canopy and cover (Landry and Pu, 2009). In their study of Tampa, Florida, Landry and Pu found an increase in tree canopy after the creation of a preservation ordinance in 1974 and a spillover effect into surrounding communities. Hill, Dorfman, and Kramer (2008) identified nine clauses within municipal tree ordinances that have statistically significant impacts on canopy coverage. The researcher's regression analysis suggests a cumulative effect of a 9.25% increase in canopy

if all are implemented. The clauses not already in place in Bentonville are (1) Establishment of tree banks or alternative compliance (2) Site requirements during development, such as specification of tree preservation areas, allowances on tree removal, landscape plans, or tree replacement (3) Requirement of a tree removal permit for previously developed private land (4) Requirement of a tree removal permit for new development (5) Buffer requirements for root zone protection during development (6) Adherence to protect exceptional trees during development (i.e. specimen and historic tree protection). All of these clauses, as discussed above, focus on the importance of preserving existing trees.

Within the clauses themselves, a lot of nuances can be observed. For instance, cities can consider whether to retain trees or canopy, whether to regulate by the size of tree or species of tree, or the timeframe for compliance (Nichols, 2007). Several specific policies, though, are evidenced to have higher rates of success. In Florida, the preservation of heritage trees was shown to have a significant effect on tree canopy (Hilbert et al, 2019). Interestingly, the study also found a correlation between increased housing density and increased canopy coverage. A 39-year study in Milwaukee, WI found that a properly enforced street tree preservation program successfully preserved trees during construction and led to a 6:1 return on investment (Hauer, et al 2020). The ideal approach may be somewhere in the middle. Protecting heritage trees either through a voluntary program (such as Lynnwood, WA) or by ordinance, can allow for the largest and most significant trees to be protected. Pre- and post-development canopy retention requirements, such as Fayetteville, AR to Bentonville's south, can help preserve mature trees at the macro level. In each of these scenarios, a tree preservation plan would be required at the time of development plan application.

Ultimately, the current Bentonville ordinance, improvements to the existing ordinance, and additional policy options will be analyzed in a follow-up memo. Thank you for the time, and the opportunity to share the literature on this important topic.

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