Community Tree Management Plan and Canopy Goals

Borough of Columbia, Pennsylvania

April 2008

ACKNOWLEDGMENTS

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We would also like to extend a special thank you to members of the Borough Council, the Borough Manager (both past and present), Street Department personnel, Columbia Pioneers, the residents and anyone that was not mentioned here for your support in this important initiative.

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This document was prepared by the Alliance for the Chesapeake Bay

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April 2008

(The Columbia Shade Tree Commission approved this plan on April 7, 2008 at their regularly scheduled meeting.)

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Throughout history, the Susquehanna River defined the landscape surrounding what is now Columbia Borough. And no wonder - this river drains almost half of the land area of Pennsylvania. By the time it reaches Columbia, it is more than a mile wide. Because it flows though diverse land use regions, the Susquehanna receives inflow from pristine streams as well as highly degraded sub-watersheds. In fact, because of the pollutants it receives, American Rivers named the Susquehanna "America's Most Endangered River for 2005."

While much of the pollution is due to agricultural runoff and abandoned mine drainage, urban and suburban stormwater runoff contributes significantly to the sediment and nutrient load of the Chesapeake Bay. Despite the fact that only 7 percent of the Chesapeake basin landscape is classified as urban, runoff from urban areas contributes 11 percent of the nitrogen and 17 percent of the phosphorous non-point source pollution, and 20 percent of the nitrogen from point sources.

The Chesapeake Bay Program long ago acknowledged the positive effect of riparian forests on water quality and is instrumental in promoting tree-planting efforts throughout the Bay watershed. Originally this effort focused on rural areas, but in 2003 the Chesapeake Executive Council signed a directive officially recognizing the stormwater control and water quality benefits that urban tree canopy cover provides. To underscore the importance of urban forestry in the Chesapeake Bay watershed, the Executive Council set the goal for each Bay state to work with five local jurisdictions to "complete an assessment of urban forests, adopt a local goal to increase urban tree canopy cover and encourage measures to attain the established goals" by 2010.

In the summer of 2004, a subcommittee of the Chesapeake Bay Program's Forestry Workgroup developed guidelines for achieving and measuring progress towards the urban canopy goals. The first step in the process was analyzing existing canopy cover using IKONOS satellite imagery. The next steps involved working with community stakeholders to create goals, prioritize tree-planting areas, and develop a work plan to achieve desired results.

Pennsylvania, in partnership with the Pennsylvania Urban and Community Forestry Council (UCFC), the Pennsylvania DCNR Bureau of Forestry (DCNR), Penn State University, and the Alliance for the Chesapeake Bay (ACB), selected Columbia Borough as the pilot community in the Urban Canopy Enhancement Program. In choosing a community for the project, the cooperators sought municipalities with an existing commitment to urban forestry.

Columbia Borough has an active Shade Tree Commission (STC) and a progressive community improvement program. These factors, combined with its strategic location along the Susquehanna River, made the Borough an ideal candidate to be Pennsylvania's very first candidate for the Urban Tree Canopy Program.

The Columbia tree canopy partnership began the assessment process with the help of a $30,000 matching grant from the U.S. Forest Service via the PA UCFC. Part of these funds were used to secure IKONOS satellite imagery and to analyze it to measure existing canopy cover. The remaining funds were assigned to the ACB to facilitate the project and to purchase trees. The Borough pledged funds from the Shade Tree Commission, the use of borough equipment, and volunteer time to meet the match requirement. In addition, the Borough would provide uniform tree pit size, remove existing trees (including stump grinding), mulch, and maintain newly planted trees. Specific goals of the Columbia project include:

- ✓ Promote the benefits of urban canopy enhancement within the community.
- ✓ Form a committee of citizens to formulate canopy goals and identify target areas for tree planting using an IKONOS remote sensing assessment of the Borough.
- ✓ Recruit a corps of volunteers to help plant trees and provide aftercare.
- ✓ Write a 10-year management plan that addresses how the community will reach its goals.
- ✓ Plant carefully selected trees in strategic locations, while training citizens in tree aftercare to ensure planting success.
- ✓ Establish a framework and cultivate interest for the community to increase its canopy coverage throughout the 10-year management period.

ACB and DCNR presented the program outline and IKONOS analysis to the borough officials in March 2006. The analysis indicated that the tree crown cover for Columbia Borough is 43%. The cover was reduced to 40% when large forested areas on the outskirts of the Borough were removed from the analysis. Even this reduced canopy meets the minimum coverage recommended by American

Forests for large metropolitan areas in the Northeastern United States. This was great news for the borough, but the challenge remains for the Borough and its partners to maintain this canopy coverage in the face of open space development and hazard/nuisance tree removal.

The STC and the Borough planning commission completed a street tree survey in December 2002. Goals resulting from this survey include replacing missing, diseased, and broken Bradford pear trees in the community's business district. The plan includes relocating or removing some of the tree pits and expanding all planting spaces to 3'x6'. In addition, the commissions compiled a list of acceptable replacement tree species, and established minimum diameter and clearances for these trees.

In April 2006, the Chesapeake Bay partners met with the STC, the Mayor, and other Borough officials to walk the proposed project area. Community pride was evident throughout the tour – from the newly renovated Lincoln Highway section - complete with saucer-sized Lincoln pennies, to freshly placed brick sidewalks – a project completed by local high school students. But challenges to the STC and community officials were evident, too – from individuals objecting to street trees, to others moving newly replanted trees to accommodate their individual parking needs.

The partners launched the Chesapeake Urban Tree Canopy program at a public STC meeting in early May 2006. They presented the elements of program participation to the community and STC. These elements include maintaining and increasing tree canopy over time, IKONOS imagery of the existing canopy, volunteer coordination, and the development of a 10 year tree canopy management plan.

The ultimate goal of the partnership is to build long term support in Columbia and to encourage the community to continue working toward its urban canopy goals long after the initial effort is completed. Columbia has made great strides toward developing a strong urban tree canopy program and this program will assist and equip them to continue with this effort. In exchange, Columbia has provided the Chesapeake Bay partners with a list of lessons learned to carry on to the next program.

Trees in urban and suburban areas are municipal assets that appreciate in value over time because they are living and growing. Urban trees and forests provide many environmental, social and economic benefits to the local community. Because of their significant contribution to the well-being of the Borough, trees and the urban forest should be professionally managed and protected to preserve them now for all citizens and increase the canopy for future generations to enjoy.

Aside from the obvious aesthetic benefits, trees within our urban forest improve our air, protect our water, save energy, and improve economic sustainability. The following is a sample of the benefits with associated cost savings that trees provide a local community:

Environmental

- Filter Stormwater Runoff

  Trees are frequently cited as the best stormwater management tool because of their ability to slow and filter stormwater runoff.

  Through their root systems and leaves, branches, and stems, trees intercept rainfall and release it slowly, reducing runoff and helping to maintain water quality. For every 5% of tree cover added to the Borough, stormwater runoff is reduced by approximately 2%.

  Trees work in combination with conventional stormwater controls to produce a comprehensive solution to the stormwater dilemma.

  It is important to note that research shows that trees store more water during a 1-inch rainfall event that lasts two days versus one that lasts only two hours. Therefore, urban forests are more likely to produce more benefits through water quality protection than flood control.

- Improve Water Quality and Reduce Soil Erosion

  Trees act as natural pollution filters. Their canopies, trunks, roots and associated soil along with other natural elements of the landscape filter polluted particulate matter out of the flow toward the storm sewers.

- Improve Water Quality and Reduce Soil Erosion (Cont.)

  Tree roots remove nutrients such as nitrogen and phosphorus, both byproducts of urban living, which can pollute local streams and rivers. These root systems also help to hold the soil in place, decreasing the amount of sediment that enters local streams and rivers.

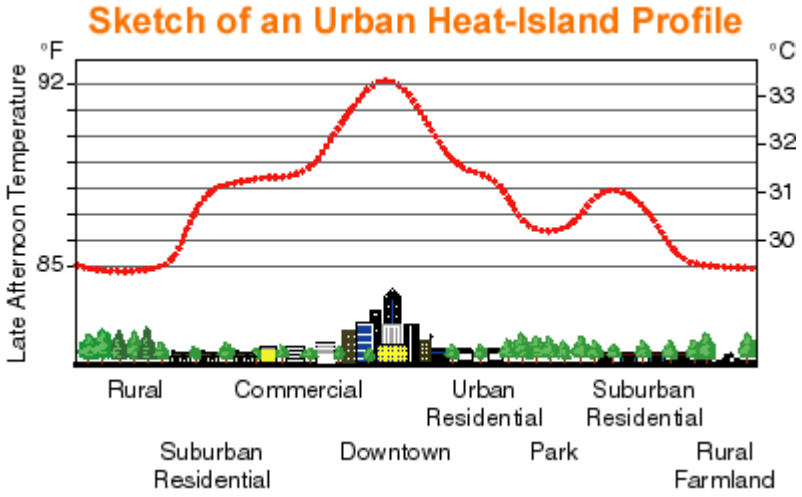
  Riparian, or "streamside" forests are of particular importance because they can slow the flow of stormwater runoff and capture up to 95% of the sediment before it enters local waterways. In a medium sized city, the amount of soil saved annually can be as much as 10,886 tons.

- Energy Savings

  Trees properly placed in the landscape (south and west exposure for deciduous trees) shade the Borough's homes, offices, streets, parking lots, and other pavement that surrounds them. They cool the air as their leaves evaporate water.

  Homeowners can save up to 58% on daytime air conditioning costs. If applied nationwide to buildings not now benefiting from trees, the shade could reduce our nation's consumption of oil by 500,000 barrels of oil/day. Projections suggest that 100 million additional mature trees in US cities (3 trees for every unshaded single family home) could save over $2 billion in energy costs per year.

  Overall, trees can help reduce the heat island effect that is created in urban and suburban areas. Human dwellings and associated activities generate heat resulting in a 3 to 10 degree F rise in temperature from surrounding countryside. Trees reduce temperatures by shading surfaces, dissipating heat through evaporation, and increasing air movement.



(from: http://eetd.lbl.gov/HeatIsland/HighTemps/)

Economic Sustainability

- The scope and condition of a community's trees and, collectively, its urban forest, is usually the first impression a community projects to its visitors. This urban forest can be an extension of the Borough's community pride and spirit.

  Studies show that:

  - ✓ Trees enhance economic stability by attracting businesses and tourists.
  - ✓ People linger and shop longer along tree-lined streets, thereby, willing to pay up to 11 percent more for products purchased in shops along tree-lined streets than they would pay for the same item in a barren setting.
  - ✓ Rental rates of commercial office properties were approximately 7% higher on sites having quality landscape, including trees.
  - ✓ Office workers with a view of nature are more productive, report fewer illnesses, and have higher job satisfaction.

- Real estate values increase 5-15% when compared to properties without trees (depends on species, maturity, quantity and location).

  Appraised property values of homes that are adjacent to parks and open spaces are typically 8-20% higher than those of comparable properties elsewhere.

Societal and Sociological

- A University of Illinois study found that trees in urban areas are directly correlated with lower levels of fear, fewer incivilities, and less violent and aggressive behavior.
- Studies have shown that hospital patients with a view of trees out their windows recover much faster and with fewer complications and require fewer pain-killing medications than similar patients without such views.13
- A Texas A & M study indicates that trees help create relaxation and well being.
- A U.S. Department of Energy study reports that trees reduce noise pollution by acting as a buffer and absorbing 50% of urban noise.

Other Benefits

Streets with extensive tree canopy cover last longer and road maintenance can be deferred beyond the normal 10 years. The oil binder used in asphalt does not dry out as fast on shaded streets as it does on streets with no shade trees.

As demonstrated in Chapter 3, trees can provide a multitude of benefits for local communities such as the Borough of Columbia. However, trees can be problematic if not properly maintained or planted in the wrong location relative to the tree's growth requirements.

This plan sets forth recommendations in each major goal area and outlines programs and procedures for achieving success on small and large task items.

The recommendations made in this plan are intended to be considered and implemented over a ten year period. Achieving the overarching goal of 50% average canopy cover for the Borough of Columbia may take 20 years or more.

Recommendations:

Goal #1 - Tree Planting and Increased Forest Canopy Cover

A. Increase the canopy by 7% through planning, protecting and planting (from 43% based on IKONOS assessment to 50% in by 2020).

B. Maintain zero net loss of canopy by protecting and properly maintaining existing tracts of urban forests, particularly the sections north (West Hempfield Township) and south of the borough (Manor Township) keeping them contiguous if possible.

Actions:

1. Purchase and plant eight new trees in each street reconstructed with funds received by U.S. Department of Housing and Urban Development *Community Development Block Grants*.

2. Plant three trees in a park or public space selected below for the annual Arbor Day ceremony occurring on the last Friday in April (trees listed in the Street Tree List (page 22) under the 'Large Category' are preferred in these places if space is available for mature canopy spread).

2008/2019	Janson Park
2009/2020	River Park
2010	Glatfelter Field
2011	Rotary Park
2012	Makle Park
2013	Locust Street Park
2014	Mt. Bethel Cemetery
2015	Holy Trinity Cemetery
2016	Laurel Hill Cemetery
2017	Veterans of Foreign Wars Post
2018	Campus of Columbia High School

Goal #1 – Actions (Cont.)

3. All new street plantings will have root barriers or root deflectors to prohibit sidewalk lifting and will incorporate the correct soil type to encourage tree longevity. Homeowners will be encouraged to plant trees.

4. Water all new trees in the first three years of planting with a commitment by the property owner, through educational materials (handout pamphlets and news releases). Recruit local fire companies to assist in watering street trees and assist park managers in making water readily available.

5. Contact West Hempfield Township which borders Columbia Borough on the north and east and Manor Township on the west to determine where new tree plantings would be feasible and to collaborate on how to best protect and preserve existing forest tracts.

6. Follow a maintenance program for tree care including pruning street trees and ensuring that all new tree plantings are selected to provide species diversity and maximum benefits for shade and stormwater mitigation. Include times for watering, weeding and periodic tree health assessment using current arboricultural standards in the maintenance schedule.

7. For every street tree requested to be removed by a property owner, replace with another tree in the same tree well or in another designated area.

Additional consideration:

Review the Tree Inventory results to help prioritize areas to be planted including, but not limited to, infilling vacant lots and slowing the flow of stormwater into public areas: such as streets, parks, pathways/trails, public buildings, and gateways.

Goal #2 – Improve Tree Planting/Shade Tree Ordinances and Policies

A. The Borough should review and improve ordinances, guidelines, and policies regarding tree planting and tree and forest protection.

B. The Borough should create or enact new codes and ordinances as needed. These policies will serve as an official statement by the Borough regarding the importance and value of trees in the community.

Actions:

1. Review and, if necessary, revise the codes and ordinances associated with urban forests and trees. Seek support from surrounding townships to ensure the conservation of the tree canopy.

Goal #2 – Actions (Cont.)

2. Increase the percentage of trees that a developer must conserve before construction or replace trees in existing wooded areas after construction with a minimum goal of 15 to 20% canopy cover, while specifying species native to the area. (If necessary revise Code Chapter 190-36, Landscaping in Subdivision and Land Development.)

3. Employ best management techniques to preserve trees and minimize damage from construction activities such as trenching, soil compaction, and soil clearing and grading.

Additional consideration:

Expand the use of trees in lieu of traditional "foundation" plantings, and into "buildable" areas, while considering height and canopy size at maturity.

Goal #3 - Provide Ongoing Community Education/Training

Citizens (all ages), businesses, Borough staff, community leaders, and developers need continued education targeted to increase their awareness of the benefits of trees. They need to be aware of the availability of Borough resources and the various ways they can become more involved in the urban forest management program and be a part of the solution.

Actions:

1. Create a "Speakers Bureau" to address civic groups and church organizations on the importance of planting trees.

2. Publish articles in the local weekly newspapers about the importance of trees.

3. Recruit "block captains program" to advise, assist and educate their neighbors on proper tree maintenance, the importance of trees, and to encourage new plantings.

4. Create a standardized orientation program for newly elected public officials to brief them on the Borough's urban forestry program, including its efforts and goals.

5. Maintain the borough's "Tree City USA" status and continue to hold the annual Arbor Day celebration.

6. Continue to receive support from the Columbia Borough Highway Department in coordinating all programs and objectives.

Goal #3 – Actions (Cont.)

7. Continue to recruit members for the Columbia Tree Society, which is an auxiliary to the Columbia Borough Shade Tree Commission. The Society also works to educate the public on the benefits of tree planting.

Additional consideration:

Mentor other interested local communities in Lancaster County by sharing the successes of the Borough's urban forestry program with them. A widespread and heightened awareness of the quality of the urban forest and of life in Columbia promotes economic development, which, in turn, enhances the visibility and stature of the program.

Goal #4 - Improved Urban Forest Maintenance

Proper and timely tree maintenance is required to maximize tree benefits, increase service life, improve aesthetics, and ensure public safety. Maintenance programs are critical to the survival, vitality, and growth of existing and newly planted trees.

Actions:

1. Continue to work with Bartlett Tree Experts in analyzing at-risk trees.

2. Conduct hazard tree surveys and ensure that Borough staff is trained to recognize and report these hazards.

3. Replace problematic and declining trees with ones from the approved street tree list.

4. Conduct a complete public tree inventory every ten years, and use a tree management software program to update the data, document maintenance work and costs, and create annual work plans. Mandate the use of current and accepted best management practices and arboricultural work standards in all maintenance activities.

Goal #5 – Long-term Sustainability

Maintaining a mature tree canopy in the Borough is a necessary, long-term endeavor which will preserve and protect this valuable asset in the community. The Borough must be purposeful in structuring long-term sustainability into their urban tree canopy program.

Goal #5 (Cont.)

Actions:

1. Continue to maintain and plant trees in a nursery area on the Borough Farm. This will provide a future source of inexpensive native trees for planting along the streets and in other areas around the Borough. One possibility for free nursery stock is to collect and plant local native tree seeds or cuttings in containers.

2. Continue providing a line item in the budget for street tree (public spaces) maintenance, replacement and canopy enhancement (expansion).

3. Establish economic value/compensatory value of the existing street trees through a professional inventory. Last inventory was completed by Bartlett Tree Experts in 1995.

Goal #6 – Adopt Proper Tree Planting and Maintenance Techniques

Planting a tree in the right place where it will survive best as it grows to mature height and providing sufficient space for the underground root system to grow will enhance the longevity and benefits of trees. After planting maintenance is critical in protecting and preserving the community's investment in its trees. Proper selection and placement will improve longevity and reduce maintenance costs by supporting healthy trees.

Actions:

1. Site conditions – Be aware of height, canopy spread, shape, and growth rate in relation to overhead utility wires, underground water and wastewater treatment lines and obstruction of visibility to vehicular traffic and damage from that traffic (both parked and traveling).

2. Select trees for the right site conditions - direct or low sunlight locations, dry or moist soil conditions and sensitivity to salt and pollution to achieve optimum growth and health. Also, consider the amount of fruit litter a mature tree may produce.

   More information regarding species selection is available through the websites listed in the Resources section in Chapter 5.

3. Tree pits should provide a minimum square footage of 24 s.f. of open area (typically 4 feet x 6 feet or 5 feet x 5 feet) and should include root deflectors. (For planting in tree pits please to see 'Proper Planting Techniques' section.)

Goal #6 - Actions (Cont.)

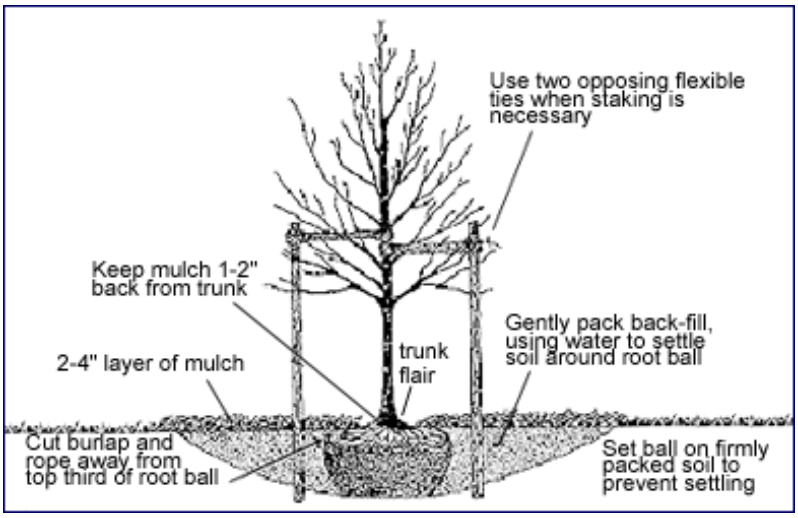
4. Engineered soil should be used to avoid soil compaction. A new material known as "CU Structural Soil ™" is recommended to incorporate into planting spaces especially along streets and areas that have high potential for soil compaction.

   Mechanicsburg-based Black Landscape Contracting, Inc. is licensed to produce the structural soil. They are located at: 1360 East Lisburn Road; Mechanicsburg, PA 17055; Phone: (717) 697-4439; and Fax: (717) 697-4992.

5. Proper Planting Techniques

The success or failure of trees to grow and produce the desired effects in the Borough begins with proper planting. Trees planted along streets, shopping centers, around schools and homes, etc. are forced to grow in often artificial or unnatural environment where soil conditions, water tables, drainage, etc. have been altered. Therefore, it is necessary to make sure that the plants are properly installed and receive the best of care until they become established.

Planting pits. The hole should be dug a minimum of two to three times than the width of the root ball or spread of bare roots but only as deep as the root ball. All planting pits should be dug with vertical sides that have been "roughed up" a bit (not smooth) to allow roots to penetrate the soil layer as they grow.



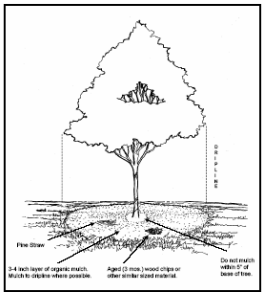
(Graphic Credit: City of Durham, NC)

Identify the trunk flare. The flare or collar is just above where the roots spread at the base of the tree. This point should be partially visible after the tree has been planted. If it is not, some soil may need to be removed from the top of the root ball. Find the flare to determine the proper planting depth in the pit.

Placing the tree. Before placing the plant in the pit, check to see that hole has been dug to the proper depth. The majority of the roots on the newly planted tree will develop in the top 12 inches of soil. If the tree is planted too deeply, new roots will have difficulty developing because of lack of oxygen. It is better to plant a little high, 2 to 3 inches above the base of the trunk flare, than to plant it at or below the

original growing level. To avoid damage when setting the tree in the hole, always lift it by the root ball and never by the trunk.

Balled and burlapped plants. If the tree is wrapped in wire, the most prudent action is to remove or push the top two tiers of wire down in the bottom of the hole after the ball has been placed. Treated burlap (feels like plastic) and nylon rope should be completely removed. Other kinds of burlap and twine, even if biodegradable, should be cut away from the upper 1/3 of the ball as well as the trunk. Never let remaining pieces protrude above the soil or they can act as wick, drying the soil. Trees in containers should be gently removed before planting. Circling roots, if present, should be cut or removed before planting to avoid tree problems later in life.



Mulching. A 2- 4 inch layer of composted mulch is ideal. More than 4 inches may cause a problem with oxygen and moisture levels. When placing mulch, be sure the mulch does not touch the actual trunk of the tree. Doing so may cause decay of the living bark at the base of the tree. A mulch-free area, 1 to 2 inches wide at the base of the tree, is sufficient to avoid moist bark conditions and prevent decay.

(Graphic Credit: Recommended Method for Mulching from Best Management Practices for Community Trees, Athens-Clarke County, Georgia, April 2000.)

Follow-up care. Keep the soil moist but not soaked; overwatering causes leaves to turn yellow or fall off. Water trees at least once a week, barring rain, and more frequently during hot weather. When the soil is dry below the surface of the mulch, it is time to water. Continue until mid-fall, tapering off for lower temperatures that require less-frequent watering. The STC may want to purchase Treegator® bags, a drip irrigation system in the form of a bag.

Bare-root or smaller containerized stock maybe considered for private land and larger scale plantings. These types of stock are more economical in price than purchasing balled and burlapped, however, it is important to keep tabs on soil moisture until the root systems are established.

Technical Assistance:

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PSU Cooperative Extension (Tree Training)
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FAX: (717) 299-9459
E-mail: matt-kofroth @ pa.nacdnet.org

References:
The following internet resources and references are just a sampling. By simply searching for a specific topic, one can find a wealth of information.

Tree Care

Planting and After Care

Planting and After Care of Community Trees (booklet). Penn State University. 2001.
http://pubs.cas.psu.edu/freepubs/pdfs/uh143.pdf

Planting Trees in Your Community Forest (booklet). The Pennsylvania State University. (Basic information with children's activities.)
http://pubs.cas.psu.edu/freepubs/pdfs/uh125.pdf

Planting Trees in Designed and Built Community Landscapes: Checklist for Success. Reynolds, M.K. and H.S. Ossenbruggen. New Hampshire.

Pruning Guidelines

Basic Pruning Guidelines. Missouri Department of Conservation.
http://www.mdc.mo.gov/documents/forest/pruning_guide.pdf

Don't Top Trees. PA Urban and Community Forestry, Fact Sheet 8. The Pennsylvania State University.
http://www.dcnr.state.pa.us/forestry/pucfc/applications/fact08.pdf

How to Prune Trees (pamphlet). U.S. Forest Service. Publication #NA-FR-01-95
http://www.na.fs.fed.us/spfo/pubs/howtos/ht_prune/prun001.htm

Pruning Landscape Trees. The Pennsylvania State University. 1997
http://pubs.cas.psu.edu/freepubs/pdfs/uh099.pdf

Reducing Storm Damage in Urban Forests: A Pruning Guide (brochure). Virginia Tech.
http://www.treelink.org/docs/KaneBrochure.pdf
Diseases/Exotic Species

Seven Common Diseases of Landscape Trees. The Pennsylvania State University. 2000.
http://pubs.cas.psu.edu/freepubs/pdfs/uh132.pdf

Emerald Ash Borer
http://www.emeraldashborer.info/

Ash Replacements for Urban and Woodland Plantings. The Ohio State University. 2006.
http://ohioline.osu.edu/b924/pdf/b924.pdf
Engineered Soils. Cornell Unversity.

(http://www.hort.cornell.edu/uhi/outreach/csc)

Tree Risk Management

Urban Tree Risk Management: A Community Guide to Program Design and Implementation. Dunlap, T.T., MacKenzie, M.M., O'Brien, J.G., and Spears, B.J. http://www.na.fs.fed.us/spfo/pubs/uf/utrmm/

Tree Selection

A Guide to the Selection of Trees and Shrubs in Urban Areas. Chicago Botanic Garden. http://www.na.fs.fed.us/spfo/pubs/uf/uts/index.htm

Recommended Urban Trees: Site Assessment and Tree Selection for Stress Tolerance. Urban Horticulture Institute, Department of Horticulture, Cornell University, Ithaca, New York.
http://www.hort.cornell.edu/uhi/outreach/recurbtree/pdfs/~recurbtrees.pdf

Tree Selection and Site Design. A Technical Guide to Urban and Community Forestry. http://www.na.fs.fed.us/spfo/pubs/uf/techguide/selection.htm

Urban Tree Selection Guide. Part 3: Urban Tree Planting Guide, Appendix B. Center for Watershed Protection.
http://www.cwp.org/forestry/index.htm#part3

Stormwater Information

www.stormwatercenter.net

Innovative Stormwater Practices
Filterra, http://www.americastusa.com/filterra.html

Pennsylvania Stormwater Best Management Practices Manual. Pennsylvania Department of Environmental Protection. 2006.
http://www.dep.state.pa.us/dep/deputate/watermgt/wc/subjects/stormwatermanagement/default.htm

Other Urban Forestry Internet Resources

Alliance for Community trees: http://actrees.org/site/index.php

Arbor Day Foundation: http://www.arborday.org/

Benefits of Trees (in urban areas)

www.urbanforestrysouth.org/pubs/ufmanual/benefits/#Benefits
www.coloradotrees.org/benefits
www.treelink.org/docs/29_reasons.phtml

Pennsylvania Community Forests: http://www.dcnr.state.pa.us/forestry/pucfc/

USDA Forest Service Programs

Center for Urban Forest Research http://cufr.ucdavis.edu
Northeast Center for Urban and Community Forestry http://umass.edu/urbantree
Northeastern Research Station www.fs.fed.us/ne.syracuse
Urban and Community Forestry of the Northeastern Area
www.na.fs.fed.us.urban/urban.htm

Urban/Community Forest Tools

UFORE (Urban Forest Effects Model) www.ufore.org
iTree (Tools for assessing and managing community forests) www.itreetools.org

Urban Watershed Forestry Manual
http://www.cwp.org/forestry/index.htm. Center for Watershed Protection.
International Society of Arboriculture
http://www.treesaregood.org/

A Guide to Preserving Trees in Development Projects. The Pennsylvania State University. 2005.
http://pubs.cas.psu.edu/FreePubs/pdfs/uh122.pdf

Street Tree List

The following is a recommended list of trees complied for their characteristics as good urban trees. This is not an exhaustive list and some species are in addition to what is listed on the Columbia Borough Shade Tree Commission Street Tree list (dated January 2006).

Remember before choosing a tree it is extremely important that the planting site be examined to assure that the tree is planted in a site that is suited for it's mature size and growing conditions. It is recommended that other reference materials such as *Street Tree Factsheets* (Gerhold, Wandell, Lacasse) or the *Manual of Woody Landscape Plants* (Dirr) be used to determine the growth requirements and tolerances of each tree.

Diversity is Key! When planting trees in our communities we must remember the lessons learned from Dutch's Elm Disease. If we plant too many of just one or two species of tree and a disease begins to attack that species we will loose most of our community trees. A good rule of thumb is to not let one species of tree account for more than 10% of the overall trees in the community. If 10 different species of tree were chosen and planted in equal amounts this 10% rule would be met.

Small Category:
A small tree has a mature height of 25-35 feet. These trees are suited for planting under electrical wires, adjacent to structures, or other small sites with limited growing space (narrow streets/sidewalks).

- Hedge Maple - *Acer campestre*
- Amur Maple - *Acer ginnala*
- Shadblow/Serviceberry - *Amelanchier x grandifolia* 'Robin Hill', 'Autumn Brilliance' or 'Cumulus'
- American hornbeam - *Carpinus caroliniana*
- Thornless Cockspur Hawthorn - *Crataegus crus-galli var. inermis*
- Washington Hawthorn - *Crataegus phaenopyrum* 'Winter King' or '(Princeton) Sentry'
- Crabapples (many varieties) – *Malus sp.* (Fruits maybe a problem)
  Columnar Siberian, Red Baron, Pink Spires, Red Jewel, Sentinel, Sugar Tyme, Spring Snow (no fruit, rounded) or Tschonoski
- Chokecherry - *Prunus virginiana* 'Shubert'
- * Japanese Flowering Cherry - *Prunus serrulata* 'Amanogawa', 'Kwanzan'
- Mountain Ash (European or Korean) - *Sorbus aucuparia or alnifolia*
- Japanese Tree Lilac - *Syringa reticulata* 'Ivory Silk' or 'Summer Snow'
- Columnar Sargent Cherry - *Prunus sargenti* 'Columnaris'

Medium Category: (mature height of 35- 50 feet - not for use under utility lines)

- Carolina Silverbell - *Halesia carolina* Treeform
- Golden Raintree - *Koelreuteria paniculata* Treeform

Medium Category (Cont.)

Amur Corktree - *Phellodenron amurense* 'Macho' or 'Shademaster' male only
European hornbeam - *Carpinus betulus* (also upright var. 'Fastigiata)
* Callery Pear - *Pyrus calleryana* 'Chanticleer' or 'Capital' (upright) - stay away from 'Bradford'
Ruby Red Horsechestnut - *Aesculus x carnea* 'Briotii'
Imperial Honeylocust - *Gleditsia tricanthos var. inermis* 'Imperial' (small variety of the honeylocust)

Large Category: (mature height of 50 feet or more - not for use under utility lines)

* Red Maple - *Acer rubrum* 'Red Sunset', 'October Glory', 'Armstrong', 'Karpick'
Hackberry - *Celtis occidentalis* 'Magnifica' or 'Praire Pride'
Turkish Filbert - *Corylus colurna*
Green Ash - *Fraxinus pennsylvanica* 'Summit', 'Patmore', or 'Urbanite' (susceptible to Emerald Ash Borer)
White Ash - *Fraxinus americana* 'Rosehill', or 'Autumn Purple' (susceptible to Emerald Ash Borer)
Honeylocust - *Gleditsia tricanthos var. inermis* 'Skyline', 'Shademaster'
Ginkgo - *Gingko biloba* 'Princeton Sentry' (fruitless)
Kentucky Coffee Tree - *Gymnocladus dioica* (pod-like fruits on female trees)
Sweetgum - *Liquidambar styraciflua* ('Roundifolia' is seedless)
London Planetree - *Platanus acerifolia* 'Bloodgood'
Northern Red Oak - *Quercus rubra*
Pin Oak - *Quercus palustris*
Shumard Oak - *Quercus shumardii*
English Oak - *Quercus robur*
Shingle Oak - *Quercus imbricaria*
Redmond Linden - *Tilia americana* 'Redmond'
Little Leaf Linden - *Tilia cordata* 'Greenspire' or others
Silver Linden - *Tilia tomentosa*
Blackgum or Tupelo - *Nyssa sylvatica*
American Elm - *Ulmus Americana* 'Valley Forge' or 'New Harmony'
Chinese or Lacebark Elm - *Ulmus parvifolia* 'Dynasty' or 'Ohio'
Japanese Zelkova - *Zelkova serrata* 'Green Vase'
Sycamore Maple - *Acer pseudoplatanus*

* These trees have been over planted in many communities in central Pennsylvania. Check your community before planting.

Note - Some of the trees listed above are extremely hard to find in local nurseries, but are worth looking for.

Private and/or Park lands:

(Due to either mature size, sensitive to pollution and/or overall growing conditions, the following species should not be used as street trees).

Japanese Maple – *Acer palmatum*
Sugar Maple – *Acer saccharum*
Eastern Redbud – *Cercis canadensis*
Katsura - *Cercidiphyllum japonicum*
Sweetbay Magnolia - *Magnolia virginiana*
Dawn Redwood - *Metasequoia glyptostroboides*
White Oak – *Quercus alba*

(Source: Vincent Cotrone, Extension Urban Forester, Penn State University)