chapter 5

ENVIRONMENTAL SUSTAINABILITY

CHAPTER FIVE - ENVIRONMENTAL SUSTAINABILITY

This chapter explains how Winchester should reduce impacts on the natural environment. Nature's bounty attracted early settlers, and stewardship of nature remains part of the local culture. The city advances the eleven objectives below because damage to the natural environment imposes real costs on local residents, businesses, and government. Winchester's past success relied on nature, and the city will continue a tradition of stewardship to promote future growth.

CITYWIDE ENVIRONMENTAL OBJECTIVES

As noted in Chapter 3, City Council identified eleven citywide Environmental Sustainability objectives to address the citywide goal of: Proactively improve environmental sustainability and reduce impacts on the natural environment. This chapter explains what is already happening with each objective and what can be done in the future to further environmental sustainability. The eleven objectives are:

1) Reduce the exposure of the public to hazardous environmental conditions.

2) Discourage new development within identified floodplain fringe areas and mitigate the impacts of existing development within mapped floodways.

3) Work with the private sector as well as federal and state agencies to remediate brownfield sites, including railroad properties, within the city.

4) Promote water quality implementation plans and minimum control measures for stormwater management.

5) Work with surrounding jurisdictions as well as federal and state agencies to (a) monitor air and water quality, and (b) address regional environmental issues such as air quality, water quality, and solid waste management.

6) Reduce the city's carbon footprint and overall environmental impact on air quality by looking at the way City business is conducted on a daily basis and also encouraging residents and the business community to do their part in order to create a more sustainable and responsible community.

7) Increase the rate of recycling and reuse while decreasing the waste stream to the landfill.

8) Develop a more environmentally sustainable approach to handling urban stormwater runoff resulting in less detrimental impacts on our local streams and on downstream areas.

9) Preserve, restore and create wetlands, wildlife corridors and other habitats. .

10) Preserve healthy, mature trees and promote an increase in the city's urban tree canopy.

11) Pursue changes to development regulations to encourage the use of environmentally friendly site measures such as pervious paving, 'Green' building techniques, natural landscaped areas, and low impact development techniques.

1. Reduce the exposure of the public to hazardous environmental conditions.

Several kinds of environmental hazards threaten Winchester's residents, businesses, and visitors. Three of the most prominent are air pollution, water pollution, and dangerous chemical spills.

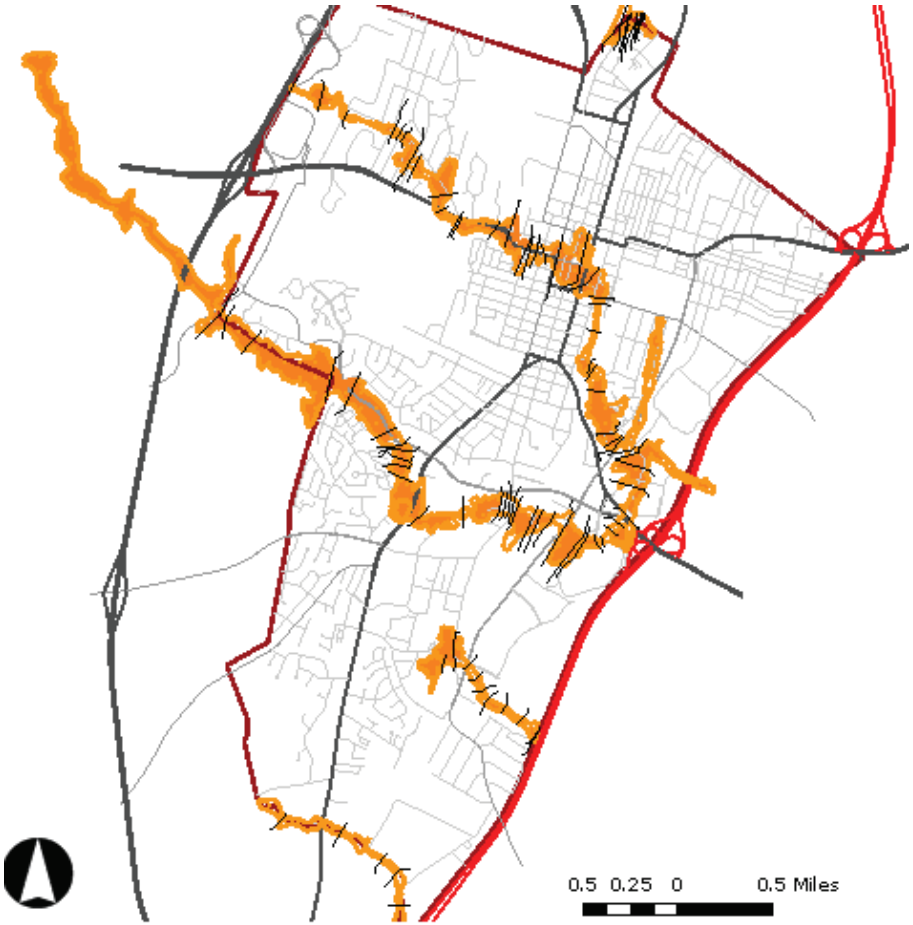
In several recent years, Winchester has failed or nearly failed to meet EPA standards for ground-level ozone. While ozone gas high in the atmosphere reflects radiation, at ground level it harms the lungs. Ozone puts children and the elderly especially at risk on hot summer days. Certain other gases and particulate matter also pose immediate and long term health hazards. Relatively few are monitored regularly.

Pollution also threatens Winchester's five creeks and streams. Contaminated streams support less wildlife, have less recreational value for the city, and contribute to the poor health of the Chesapeake Bay and other drainage areas. .

For both air and water pollution, federal laws create penalties which threaten a city's business prospects. If a city fails to meet the standards of the Clean Air and Clean Water Acts, there are federally required obstacles to new business development. If Winchester does not improve local air and water quality, developing new housing and jobs will be more difficult. The other objectives of this chapter detail how the city will reduce environmental hazards to protect both local jobs and public health.

Winchester maintains other efforts to reduce the public's exposure to environmental hazards. The building code enforcement staff cites instances of lead paint, asbestos, and other household toxins. The fire department works with local industry to prevent accidents and spills. Emergency responders cooperate with Frederick County and state authorities to prepare comprehensive responses and maintain hazardous materials (HazMat) systems to document hazards and respond to incidents.

2. Discourage new development within identified floodplain fringe areas and mitigate the impacts of existing development within mapped floodways.



Map of Winchester's 100-year floodplain

Redbud Run encompasses a very small area at the extreme north end.

Town Run extends from the hospital through Old Town and merges with Abrams Creek near the university.

Abrams Creek generally parallels Jubal Early Drive through the center of the city.

Buffalo Lick Run is the only waterway originating in the city. It generally parallels E. Tevis Street.

Hogue Run extends along much of the southern boundary of the city.

Floodplains exist along each of the city's five streams: Abrams Creek, Buffalo Lick Run, Hogue Run, Redbud Run, and Town Run. The city should continue to enforce its Zoning Ordinance provisions related to designated floodplain districts. City officials should also coordinate with the Federal Emergency Management Agency (FEMA) to update the floodplain maps when and where needed.

Building on a floodplain presents dangers to the builder and to the broader community. A flood may destroy one property, but the debris may also pollute waters and threaten other families and businesses. About seven percent of the city's area is at risk of a 100-year flood event. That also means that in any given year, there is a one percent chance of flooding in the orange area shown in the map on the left. It includes sections of Old Town.

Winchester's relatively flat land area reduces flood risks. The highest point, in the west central area, is 940 feet above sea level, and the ground slopes down 300 feet to the Route 50 interchange. Winchester's modified continental climate, with mild winters and warm and humid summers, presents flood risks if spring rains combine with snowmelt or after heavy summer storms. However, the area does not have a rainy season where flooding is common.

The city's Zoning Ordinance discourages new development within the floodplains and mandates actions to reduce the risk to buildings there. For example, existing manufactured buildings must be anchored firmly "to prevent collapse, floatation, or lateral movement." The lowest floor of new buildings must be above the level of the 100-year floodwaters. Within the flood plain, low intensity uses like farming, outdoor recreation, and gravel parking lots are allowed. Exceptions to the building restrictions consider set criteria including risk to the builder, other citizens, the clean water supply, and emergency responders. Retrofits to old buildings in the floodplain require the same review as new construction.

Actions which slow stormwater runoff, including but not limited to removing channeled flow, "daylighting" streams, preserving, restoring and creating wetlands, restoring floodplain functions, planting trees, reducing impervious surfaces and utilizing natural landscaping also reduce the risk of flooding. By better managing stormwater, these actions described later in the chapter may actually shrink the area of the 100-year flood plain while also reducing pollution and creating opportunities for recreation and enjoying nature.

3. Work with the private sector as well as federal and state agencies to remediate brownfield sites, including railroad properties, within the city.

Brownfield sites are abandoned or underused industrial or commercial lots containing toxic waste or contaminants. A brownfield site is often blighted, reducing surrounding property values. Improving brownfield sites thus yields environmental, economic, and social benefits as the city gains a cleaner, more productive, and more attractive new site.

City staff should update an inventory of brownfield land within the city limits. The City Code (§6-133) provides for the abatement of commercial or industrial blight. If a brownfield site can be remediated, it may be a prime candidate for commercial infill redevelopment because of a good location and low price. The city should encourage appropriate redevelopment of formerly brownfield land.

Railroads own some brownfield property, and spilled fuels and chemicals along the tracks create blight and safety risks to surrounding homes and businesses. Public works, police, and other city staff should work with railroads to improve the appearance and environmental sustainability of Winchester's rail corridors and railroad-owned properties. As city staff find evidence of contamination on brownfield properties, the City or the Economic Development Authority should partner with appropriate state and federal authorities, as well as the private sector, to clean the sites and make them safe for the public and for redevelopment.

4. Promote water quality implementation plans and minimum control measures for stormwater management.

Abrams Creek and the downstream section of Opequon Creek are on the state's impaired waters list for excessive bacteria and an inability to support aquatic life. Since 2003, the state Department of Environmental Quality has issued Total Maximum Daily Load (TMDL) regulations prescribing the reduction in pollutants necessary to meet water quality standards for the Abrams and Opequon Creek watersheds. Sediment is the primary stressor on aquatic resources . The City completed a state required TMDL Implementation Plan to outline measures to meet pollution reduction goals in 2005; the state and EPA approved it in 2006.

The Opequon TMDL Implementation Plan recognizes inadequate urban stormwater management as a major cause of the listed impairments to water quality. The Plan recommends a suite of stormwater best management practices (BMPs) that reduce runoff and pollutant loading of local streams as well as Opequon Creek, the Potomac River, and the Chesapeake Bay.
Due to Winchester's population density and water quality impairments, the state has designated it a Municipal Separate Storm Sewer System (MS4) community. The MS4 program is an EPA mandate under the Clean Water Act that is administered by the state. MS4s must develop a Stormwater Quality Management Plan (SWQMP). This action plan for the MS4 entails six requirements, or minimum control measures (MCM):

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Storm Water Runoff Control
5. Post-Construction Storm Water Management in New Development and Redevelopment
6. Pollution Prevention/Good Housekeeping for Municipal Operations Maintenance.

In response to the Clean Water Act the Environmental Protection Agency (EPA) developed a TMDL or "pollution diet" for the Chesapeake Bay. The EPA also required each state adjoining the Bay to submit a Watershed Implementation Plan which identifies measures to reduce the amount of nitrogen, phosphorus, and sediment entering the Bay from all major sources, including sewage treatment plants, industrial facilities, urban areas, agriculture, forestry, and septic systems. The EPA approved Virginia's plan in late 2010.

5. Work with surrounding jurisdictions as well as federal and state agencies to (a) monitor air and water quality, and (b) address regional environmental issues such as air quality, water quality, and solid waste management.

The federal Environmental Protection Agency (EPA) and the state Department of Environmental Quality (DEQ) are Winchester's most important partners for the issues of air and water quality as well as solid waste management. Federal law sets basic standards for defining,

measuring, and monitoring pollution, and for enforcement. On some issues, state law goes further, and state staff are responsible for monitoring and enforcing many federal standards. DEQ also promotes cooperation between Virginia's cities and counties. The Northern Shenandoah Valley Regional Commission (NSVRC) is one example of such cooperation.

To enforce the federal Clean Air Act, DEQ monitors air quality in the Shenandoah Valley. In the past, the region failed to meet air quality standards, especially for ozone. Some air pollution comes from homes and businesses here, some comes from heavy truck traffic on the highways, and some comes from factories and power plants farther west: the Blue Ridge and Allegheny Mountains trap polluted air and cause it to settle in the valley. Winchester should continue to seek feedback from the EPA, DEQ, and the National Weather Service regarding air quality. State and federal agencies provide Winchester with the latest research, monitoring, and data on other localities. The partnership between Northern Shenandoah Valley jurisdictions (such as through the NSVRC) and environmental scientists at James Madison University on such programs as Shenandoah Air Quality (SHENAIR), and the joint Winchester/Frederick County ValleyAirNow should be continued.

While ozone is of serious concern, so are other pollutants in the air: particulate matter, volatile organic compounds (VOC), nitrogen oxide compounds (NOx), and carbon emissions. EPA has standards on each of these (and some others) that are being (or may be in the future) tightened. Winchester is just below the current standards on some of these. Further EPA reduction will put Winchester, and surrounding areas, in non compliance. Because the air quality issues are regional in nature, Winchester must act in full coordination with surrounding jurisdictions to address these issues. Failure to do so has a major potential for negatively impacting the future economic development and public health of Winchester and surrounding areas.

Several data sources exist on the health of the local streams in Winchester and of the rivers and streams, including Opequon Creek, into which they flow. Among the groups collecting such data are the Virginia DEQ; The Opequon Watershed (TOW), Inc.; Friends of the Shenandoah River (FOSR); Virginia Tech; and Shenandoah University's Environmental Studies Department. No regularly scheduled monitoring occurs at present. Nevertheless, past records and reports allow City staff to address water quality management issues. City staff should continue to seek feedback from the DEQ, citizens groups and universities, and the City should support efforts to monitor and evaluate progress towards cleaning Winchester's waters.

The state establishes water quality standards in addition to standards that regulate the quantity of stormwater runoff. Additional water quality standards are pending adoption at the state level as described above under Objective 4. To help fund mandated improvements, the City has considered the establishment of stormwater management fees, but additional calculation of private impervious acreage would be needed before a fee could be established. Numerous voluntary measures to improve water quality such as establishing natural landscaping areas can be taken by the City, businesses and private landowners.

6. Reduce the city's carbon footprint and overall environmental impact on air quality by looking at the way City business is conducted on a daily basis and also encouraging residents and the business community to do their part in order to create a more sustainable and responsible community.

Winchester lacks data on its overall carbon emissions, and the city's influence on regional air quality, national energy imports, or global climate is difficult to determine. However, some practices definitely reduce carbon footprint while reducing energy consumption, improving air quality, and also yielding other benefits.

The city's finance office has begun collecting energy expenses from each city department and can present energy costs in the city's budget. The budget for fiscal year 2013, which begins on July 1, 2012, should include an energy category showing city spending on electricity, heating, and vehicle fuels. To the extent possible using accepted accounting practices, City finance department staff should note the energy costs of each city department. Winchester should reduce energy spending as a proportion of the city budget during every fiscal year.

Each city department should attempt to reduce its energy costs in ways that do not harm, but rather improve, service delivery. These practices preserve the environment and reduce waste of the public's tax dollars. Examples include:

- Increasing walking and bicycle police patrols (pictured)
- Expanding telework options for city staff
- Configuring city computers with power-saving settings
- Gradually replacing windows and light fixtures with more efficient models
- Gradually replacing city vehicles with more efficient models

Reducing use of cars is one of the best ways for a family or business to reduce energy costs. Chapter Six of this plan details mobility and how personal cars should become less necessary in Winchester through compact mixed use development and improved biking, walking, and bus options. Chapters Nine, Ten, and Eleven of this Plan provide specific objectives for developing Winchester into a more walkable city where cars are not needed for every errand or for every household.

Objective 11 below, on green buildings, notes how the city should use the Zoning Ordinance, permitting process, and tax code to encourage construction with less environmental impact. Currently, Winchester exempts solar energy equipment from property tax, but more could be done to create front-end incentives or assist with financing. Finally, the City, through its resources, should inform households and businesses seeking to reduce their energy consumption.

7. Increase the rate of recycling and reuse while decreasing the waste stream to the landfill.

In 2009, Winchester's staff collected 6,588 tons of garbage, about 18 tons per day, or an average of 1.4 pounds of trash for each resident, each day. That was a decrease from 2008, when 6,938 tons were thrown away. The city operates a weekly curbside refuse collection service and collects up to three 45-gallon containers from each home and business. Winchester sends its garbage to the Frederick County Landfill, a jointly owned regional landfill situated east of the city. The landfill has equipment to generate some electricity by burning the methane gas produce as garbage decomposes.

To encourage recycling, the city also provides a weekly curbside recycling program and provides bins to homes and businesses. In 2009, the city recycled 1,375 tons of paper products and 634 tons of metal and glass. The city recycled 30.8 percent of the total refuse in 2009. The city also operates a curbside yard waste collection service during much of the year and collects and composts yard waste which totaled 923 tons in 2009.

While 30 percent recycling exceeds the state guidelines, reducing waste is even more efficient than recycling. City staff should study means to encourage further recycling and discourage waste. Possible efforts include, but are by no means limited to:

- Public service announcements and public advertising
- Placing more recycling containers in public areas and facilities
- Charging a fee for each container of garbage collected
- Providing a credit, coupon, or other incentive for each container of recycling

8. Develop a more environmentally sustainable approach to handling urban stormwater runoff resulting in less detrimental impacts on our local streams and on downstream areas.

The area's geology heightens the importance of water quality. The City of Winchester and surrounding area is underlain by a band of carbonate bedrock consisting primarily of limestone which is commonly referred to as Karst terrain. Karst terrain is characterized by the presence of sinkholes, surface depressions, springs and a highly irregular pinnacled bedrock soil interface in which groundwater is extremely susceptible to contamination from surface activities. Winchester should reduce the polluting impacts of heavy rains' runoff to both groundwater and surface waters. This includes local streams as well as areas downstream of Abrams Creek and other City drainage sheds that are tributaries to Opequon Creek, the Potomac River, and the Chesapeake Bay.

Restoring, preserving, and creating wetlands are aspects of more sustainable handling of stormwater runoff. Winchester should also replace acres of impervious surfaces (i.e., asphalt, concrete, etc.) with pervious surface. In 2007, 27 percent of Winchester's area was impervious pavement. When rain falls on pavement, it does not sink into the ground. Instead it flows downhill into the storm drain system and then quickly to the local creeks, still containing pollutants. Quickly swollen streams also create a flash flood risk.

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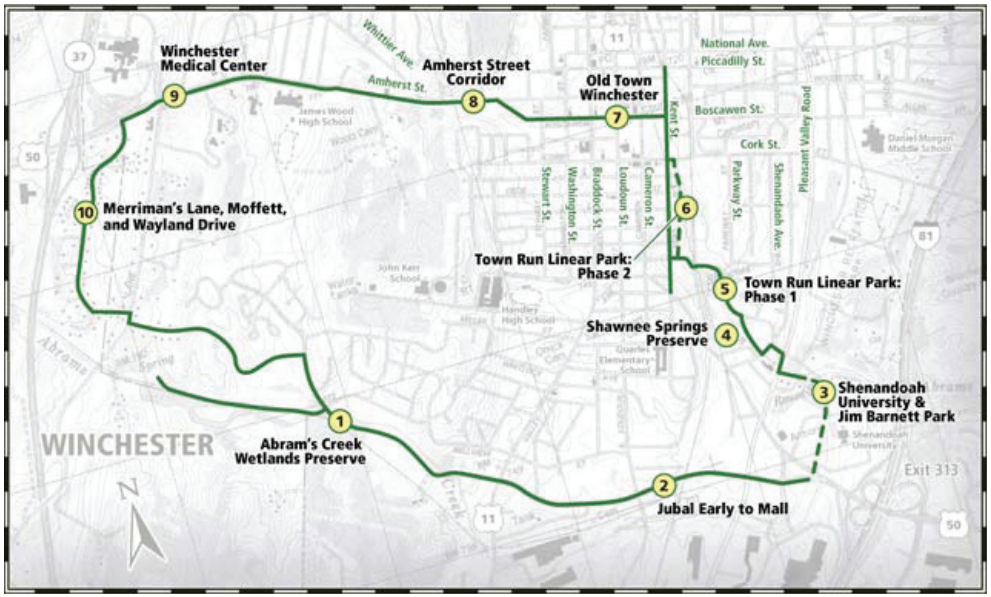
Low Impact Development (LID) is an alternative to conventional stormwater management. LID is a site design strategy with the goal of maintaining or replicating the predevelopment hydrologic response through the use of design techniques to create a functionally equivalent hydrologic landscape. Some of the functions include water storage, infiltration, and groundwater recharge as well as management of the volume and frequency of water discharges. Elements of LID include minimizing land disturbance, limiting impervious surfaces, and utilizing runoff reduction practices such as pervious pavements and natural landscaped areas.

A number of alternative surface improvements are available that are pervious and can aid in stormwater management and runoff reduction, including permeable pavers, grass pavers, and permeable concrete. These materials allow rainwater to drain into the subsoil without sacrificing very much strength. City staff should promote pervious surfaces for new construction and in the replacement of current parking lots. The city should use pervious surfaces in public streets, parking lots, and paths where appropriate. And it may use the Zoning Ordinance to cap the maximum size of parking lots for different kinds of businesses. The use of natural landscaping in other locations such as open spaces, channels/ditches, stormwater detention areas and other stormwater management structures will result in a significant reduction of stormwater pollution while reducing maintenance costs. City staff should promote their use and other low impact development methods such as rain gardens as appropriate in new construction and on existing sites.

9. Preserve, restore and create wetlands, wildlife corridors, and other habitats.



Winchester should commit to restoring and preserving the city's historic wetlands. In the previous century, to control flooding and water-borne diseases, many of the city's wetlands were destroyed. Many of the town's creeks now run through concrete channels and pipes. The concrete streams do not slow, cool, or filter stormwater very well, so they pollute our local streams and eventually Opequon Creek, the Potomac River, and the Chesapeake Bay. Concrete streams offer little habitat for wildlife and they have little aesthetic value for residents.

Winchester should protect and restore more natural corridors to connect existing wildlife habitats and create larger, contiguous green areas. Restored stream corridors would enhance the Winchester Green Circle, shown in the map on the left. This multi-use trail connects natural areas and historic sites with neighborhoods and major employment and shopping areas and is discussed in Chapters Six and Eight.

The concrete channels which currently contain many of the city's streams may be demolished to connect them with their floodplains. Restored stream banks may be built and seeded with native plants. Restored streams should maintain a 35-foot riparian buffer on each bank as per the current City Code. In addition, streams currently covered can be "daylighted" to improve habitat and water quality.

At present, much of Winchester's rainwater runs through concrete pipes and storage tanks. Hot, polluted stormwater pollutes local streams. There are only 20 acres of earthen ditches and ponds to naturally slow, cool, and clean stormwater. Winchester needs acres of new ponds, rain gardens, and similar green –that is, naturally landscaped –drainage space. These spaces have both environmental and aesthetic value, filtering runoff while providing habitat for wildlife and scenery for residents and tourists. Public or private land may be used, as well as land which is not suitable for building, like the floodplain.

Correctly designed rain gardens and naturally landscaped drainage spaces hold stormwater for less than 24 hours. Mosquitoes need standing water for at least four days to breed. So wetlands protection, restoration, and creation need not lead to increased mosquito problems. Indeed, new natural habitats should enlarge the bird, bat, and dragonfly populations which eat thousands of mosquitoes daily.

10. Preserve healthy, mature trees and promote an increase in the City's urban tree canopy.

Trees play an important role in Winchester's health as a city. A tree-lined block has higher property values. Trees improve public health by preventing ozone pollution and by catching particulate matter. They sustain the environment by filtering stormwater and sheltering wildlife. Trees reduce energy consumption by shading buildings and houses. And trees provide social goods to everyone who walks, plays, or picnics under their branches or enjoys their fall colors. Investing in trees provides decades of benefits to Winchester's residents and visitors.

In 2007, aerial surveys by Virginia Tech showed that trees covered 27 percent of Winchester's area. In June 2009, City Council adopted a plan to increase that urban tree canopy to 35 percent by 2019. That means 475 new acres of canopy, or approximately 30,000 new trees.

As city staff work with residents and businesses to add nearly 30,000 new trees to Winchester's streets, yards, and parks, a parallel effort should preserve the city's many stately, mature trees. The city arborist and public works staff recognize the value of great trees. Their broad shade beautifies the city and also efficiently protects the public from pollution. Particulate matter and ozone gas pollute the air near the ground and threaten human health, especially in children and the elderly. Trees capture floating dust, and their leaves slow the formation of ozone near the ground during hot summer days.

Maintaining mature trees involves protecting the root zone, pruning, fertilizing and protecting them from pests and disease. The arborist and staff should partner with state and federal agencies to remain alert to new insects and diseases, taking action where possible. The

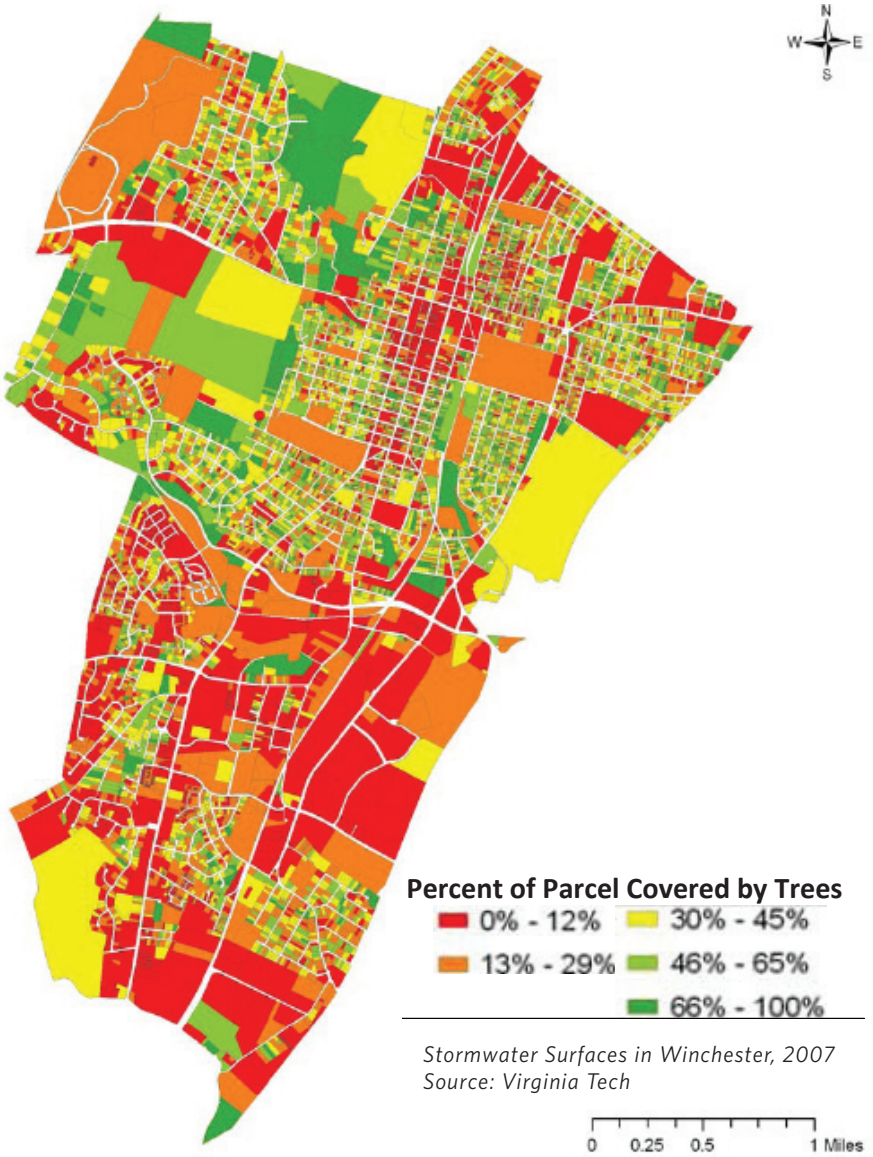
arborist should also help citizens interested in preserving mature trees on private property.

City staff should plant many new native trees on public land –parks, medians, and so on. The Adopt-a-Tree program allows individuals to plant trees on public land. However, the majority of new native trees must be planted on private property. So the city should publicize tree planting and Arbor Day community engagement. Planting appropriate species on steep slopes prevents soil erosion and uses land which cannot be built upon.

UTC Classes	Acres	% Total Land
Tree Canopy	1578.2	27%
Non-Tree Vegetation	2053.0	35%
Non-Building Impervious	1582.6	27%
Buildings Impervious	669.9	11%
Water	16.9	0%

The City should also collaborate with large land owners to create new tracts of forest. Shenandoah University, Winchester Medical Center, the Museum of the Shenandoah Valley could provide many new acres of urban tree canopy. So could several industrial and commercial sites, particularly in the south central and southeast planning areas, where trees are needed most. Winchester has a number of underdeveloped sites where unsightly abandoned business property could be improved by tree planting as part of blight abatement. In those cases, improving the tree canopy not only benefits public health, it helps make a blighted neighborhood more attractive to new residents and businesses. The map on the right shows which parcels in Winchester have the best tree canopies and which parcels need the most improvement.

This map shows which parts of Winchester have the most trees. Overall, 62 percent of Winchester's area is covered by trees, which absorb stormwater well, or non-tree vegetation. The red areas contain few trees and channel polluted stormwater directly into streams. Broad red areas like the southeast parking lots do the most harm. Plan objectives seek to replace some of the grassy area with forest, to plant trees all around the city, and to replace some impervious surfaces with pervious surfaces. A 2020 update of this map should show less red and orange with more yellow and green.



Stormwater Surfaces in Winchester, 2007
Source: Virginia Tech

11. Pursue changes to development regulations to encourage the use of environmentally friendly site measures such as pervious paving, 'Green' building techniques, natural landscaped areas, and low impact development techniques.

Some city development regulations and practices neglect environmental sustainability. Planners should consider the natural, as well as the business, impact of new construction. They should encourage the use of pervious pavement and other environmentally sustainable site development practices. Many of these actually make a business more profitable over time.

The U.S. Green Building Council is a non-profit organization that administers the Leadership in Energy and Environmental Design (LEED) program. LEED is a formal certification that a building or community was designed and built sustainably for energy savings, water efficiency, air quality, and stewardship of resources and sensitivity to their impacts. Features of "green buildings" include insulated windows, lights with motion sensors, recycled materials, rain gardens, and solar panels, among many others. For slightly higher initial construction costs, green buildings prevent waste in operating costs over time, particularly as energy prices increase. A number of Virginia jurisdictions have policies or laws establishing LEED certification of public building projects. New public building and renovation projects in Winchester should strive for at least the minimum level of LEED certification.

Winchester should also promote LEED certification and more sustainable construction and land development in the private sector. One simple means is partnership between builders and nonprofits such as Habitat for Humanity. Habitat can recycle many building materials to reduce waste and provide housing for Winchester's poor. Another is incentives for renovations rather than new construction. Renovation has less environmental impact and also preserves a neighborhood's architecture. Finally, the city may give bonuses to green projects. Revisions to the tax code may also provide discounts for certain building materials and exemptions or credits for LEED-certified buildings. Permitting could be expedited. In certain cases, the City Zoning Ordinance already provides density bonuses to green projects, but more should be done.

Winchester should also use the Zoning Ordinance, Subdivision Ordinance, and building codes to promote Low Impact Development (LID). Like LEED, LID is a set of construction and land development principles. Because trees, slopes, and soils can slow runoff and filter pollution at little cost, Low Impact Development attempts to preserve the original features of a parcel of land by reducing disturbance and protecting the way that land naturally processes pollutants, rather than relying heavily upon offsite, downstream water treatment. City policy should encourage LID features like ponds, rain gardens, natural landscaping and the use of soil rather than concrete.

Good stewardship of the environment is critical to the long-term sustainability of the city. With increased environmental mandates from the state and federal government, the City needs to be proactive in taking a leading role in requiring higher levels of environmental stewardship with public projects and in delivering public services. It also needs to encourage the private sector to better realize the true costs of unsustainable practices with regard to long-term economic sustainability and quality of life.