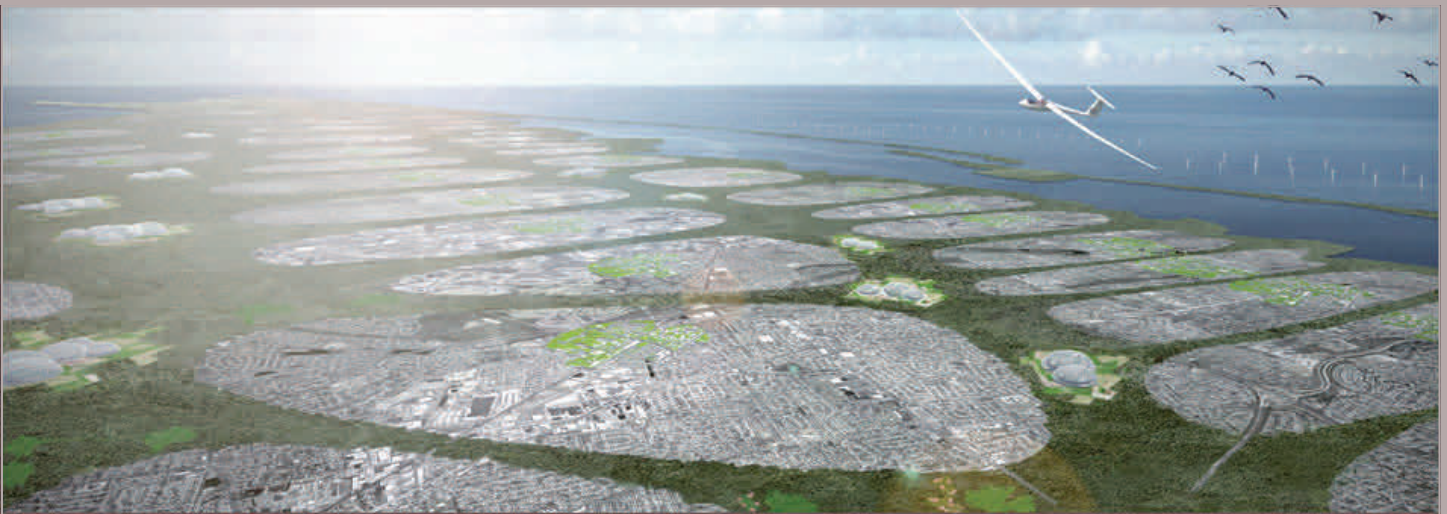


# Build a Better Burb

## HOW TO MANUAL



### THINKING REGIONALLY

#### Thinking and Planning Regionally Limiting Environmental Impacts

by Susan Weaver  
Weaver Research and Consulting Group

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## THE REGIONAL PLANNING IMPERATIVE

### REGIONAL PLANNING - IT ISN'T JUST ABOUT ROADS ANYMORE

In recent years it has become increasingly apparent that the environmental issues facing communities are so big, complex and interconnected that it is simply not enough to “act locally.” In tackling global or even regional environmental issues on a strictly “go it alone” basis, we risk missing the bigger picture and failing to take the actions needed to prevent a system-wide crash.

To address big issues that overarch jurisdictions, it makes sense to work in concert with neighboring local, state and national governments and with regional and international agencies, but historically there has been a widespread reluctance to do this. Until forced by state or federal legislation, most localities choose to go it alone. When forced to work together, many do so only grudgingly and as minimally as possible. Recently, however, the enormity of some issues is causing more cities and counties to voluntarily coordinate their efforts and adopt regional approaches to environmentally responsible land use and building practices.



Credit: NASA

While most coordinated efforts in the past were single-purpose and based on funding requirements or intended to avoid duplicative facilities or efforts, advances in science have given communities new motivations and a heightened sense of urgency for acting in concert. There is a clear understanding now that decisions related to transportation are not just about congestion; they also impact water and air sheds and energy use. Waste disposal and treatment practices impact both the water and air sheds, and can have bearing on energy issues where waste is used to generate electricity. Actions taken with regard to water and air sheds and waste bear directly on public health and indirectly on economic development.



Credit: Doug Kerr under Creative Commons license

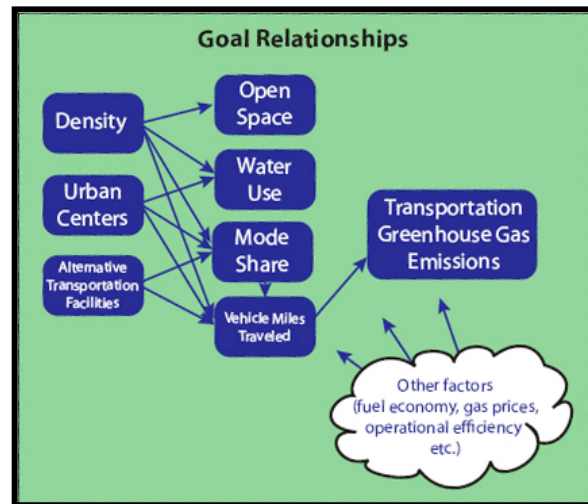
Energy policies affect the air and water sheds, transportation, and economic development. Few, if any, of these impacts are only local. What is more, many extend not only regionally but ultimately influence the habitability of the planet.

In the past regional planning in the U.S. was mainly focused on transportation and dictated largely by federal funding requirements. In some areas regional efforts are still confined to transportation. But particularly in rapidly expanding areas, the scope has widened. In several instances, comprehensive regional planning is the result of a legislative mandate, but in a few cases it has been undertaken spontaneously.

## Two Voluntary Programs

### 1. Denver *Metro Vision 2035* and the Mile-High Compact

Governments in the Denver area have been engaging in regional planning as the Denver Regional Council of Governments (DRCOG) since 1992 when the first version of *Metro Vision* was adopted. Since that time, the main objectives have been to preserve the natural beauty of the region, to develop livable communities and to promote a healthy economy, quality educational facilities and enriching cultural amenities. It is seen as a “framework for dealing with common issues” which in no way replaces local plans but encourages cooperation among the various jurisdictions. The *Metro Vision* plan is reviewed annually and updated every four years. Forty-six counties and cities in the Denver region have signed the Mile-High Compact, agreeing to conform their plans to *Metro Vision’s* framework. Together these jurisdictions roughly comprise 90 percent of the region’s population.



The current *Metro Vision 2035* makes note of the demographic changes the region is experiencing and addresses the “challenges of a graying population.” Other trends and their linkages are also taken explicitly into account: a growing preference for urban living, an increasing cost of living driven by housing and transportation costs, public health issues that are linked to dependence on private automobiles, and the limits on available resources such as water.

The plan establishes an urban growth boundary (UGB) and allocates growth among participating communities so that all participate, but at the same time growth is to be directed to places within the UGB that have adequate infrastructure in place. Development is only to occur where it can be guaranteed that a long-term water supply exists. Compact development forms are encouraged, as are infill and redevelopment.

Goals of *Metro Vision 2035* include to:

- reduce journey-to-work trips in single-occupant vehicles to 65 percent (they accounted for 74 percent in 2008),
- reduce the vehicle miles traveled per day per person 10 percent below the 2005 levels,
- direct 50 percent of all new housing units into the urban centers,
- direct 75 percent of all new employment into the urban centers,
- increase the amount of state and local open space in the region by 50 percent, and
- increase the number of housing units per square mile in the urban centers from the 2006 number of 1,493 to 1,642 by 2035.

Nearly all the new growth is to be directed to already developed areas, but a limited amount of low-density, large-lot development – 3 percent of total growth – is envisioned for areas outside the UGB. No development will be approved without evidence of an adequate long-term water

supply and sufficient wastewater facilities. The plan is designed to limit the 2006 to 2035 increase in urbanized area to 1.1 percent.

In all jurisdictions, community design is expected to accommodate a diverse and aging population. Features are to include:

- compact development patterns,
- universal design to accommodate aging and handicapped occupants,
- a range of housing types (including accessory dwelling units), sizes and densities to meet the needs of residents as they progress through successive life stages,
- density sufficient to facilitate walking, bicycling and transit use, and
- mixed-use development that conveniently locates compatible uses, such as shopping and personal services, within walking distance of housing.

The plan also envisions an intermodal regional transportation network, and emphasizes not only building the network but preserving and maintaining it into the future. The transportation network is also expected to meet the needs of all residents, not just those who own and operate private automobiles.

**Resource:** Denver Metro Vision 2035

<http://www.drcog.org/index.cfm?page=RegionalPlanning>

## 2. Metropolitan Washington Region Forward

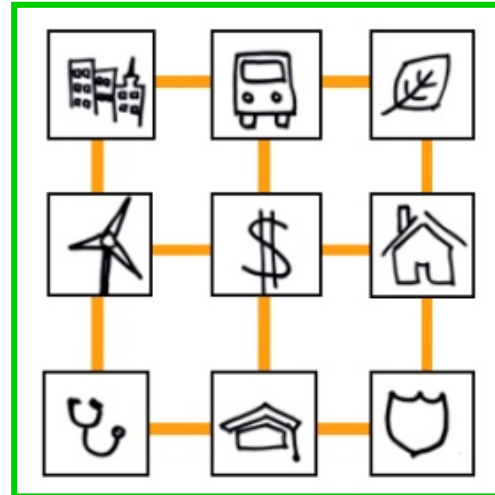
*Region Forward* is a planning effort undertaken by the Greater Washington 2050 coalition, which was established by the Metropolitan Washington, D.C. Council of Governments. The Coalition includes public officials, business and civic leaders from the District of Columbia, suburban Maryland and northern Virginia. In drafting *Region Forward*, the Coalition leaned heavily on public and expert involvement.

The breadth of the *Region Forward* is seen in its logo, which represents the document's goal categories of land use, transportation, the environment, climate and energy, economics, housing, health, education and public safety.

*Region Forward* establishes performance targets and indicators to measure progress toward regional goals. Through a visioning process, 10 Big Moves (i.e., goals) have been identified. Participation of local governments is voluntary. Most have signed a compact agreement to expend "their best efforts to advance the region's goals."

Among the goals for land use is to direct growth into Regional Activity Centers (RACs). Examples of the targets set under this goal include "capturing 75 percent of new commercial square footage and 50 percent of new housing construction in the RACs by 2012." Other examples include requiring Leadership in Energy and Environmental Design (LEED) Silver standard or equivalent building standards to be applied to all new commercial and industrial buildings by 2020, and also by 2020 to reduce greenhouse gas emissions to a level 20 percent below the emission levels of 2005.

**Resource:** Metropolitan Washington Region Forward  
<http://www.regionforward.org/the-plan>



Source: Puget Sound Regional

## Two Compulsory Programs

### 1. Puget Sound Regional Council *Vision 2040*

In response to public concern about rampant growth, particularly in those areas surrounding Puget Sound, the State of Washington enacted its Growth Management Act on April 1, 1990. Despite the date of enactment – April Fools’ Day – the legislature was taking a very serious step that required localities in the state’s most populous and fastest growing areas to participate in regional planning. Urban growth areas were defined and local plans and regulations were now to take into account statewide planning goals, which include among other things directing most growth into previously urbanized areas and preventing a sprawling growth pattern that would endanger scenic beauty, ecological balance or natural resources. While the legislation recognizes private property rights, it also establishes the imperative for valuing the greater good.

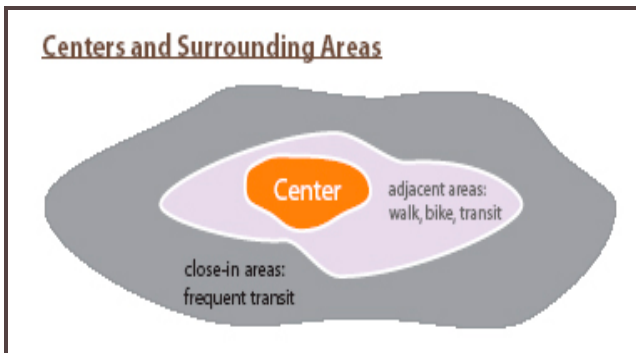
#### RCW 36.70A.010 Legislative Findings

The legislature finds that uncoordinated and unplanned growth, together with a lack of common goals expressing the public's interest in the conservation and the wise use of our lands, pose a threat to the environment, sustainable economic development, and the health, safety, and high quality of life enjoyed by residents of this state. It is in the public interest that citizens, communities, local governments, and the private sector cooperate and coordinate with one another in comprehensive land use planning.



Source: Puget Sound Regional Council

*Vision 2040* is the guidance document adopted by the Puget Sound Regional Council (PSRC) in 2008. The PSRC is an association of the counties, cities, tribes, and special districts that border Puget Sound. It undertakes three major planning activities – growth management, transportation and economic development – all of which are addressed in *Vision 2040*.



Source: Puget Sound Regional Council

The goals of *Vision 2040* set a smart growth agenda to direct growth into already developed areas within the urban growth boundary, protect and conserve rural and resource lands, and encourage compact development patterns typical of walkable and transportation-oriented communities that provide a range of housing opportunities to meet the needs of all segments of the population. For each goal, a set of policies lays out the responsibilities of local governments,

tribes and other agencies. Because many policies have implications for more than one goal (e.g., transportation policies also impact air quality and climate protection), policies are cross-referenced.

**Resource:** Puget Sound Regional Council *Vision 2040*  
<http://psrc.org/growth/vision2040>



In order to direct growth into existing centers, transfer of development rights (TDR) programs have been established within each of the four counties in the PSRC. In each instance, intergovernmental agreements have been drafted between the respective counties and the cities located in them. Sending sites in rural areas are identified and property owners are given the option of stripping the development rights from their land by recording a conservation easement. In exchange, they get the right to sell those rights to others who are seeking to increase development potential on designated receiving areas where the appropriate existing services and infrastructure improvements are located.



### Transfer of Development Rights (TDR) Program

King County, WA, has the most developed TDR program in the area surrounding Puget Sound, and one of the most developed programs in the nation. Since 2000, the program has preserved over 140,000 acres of land carrying Rural and Resource designations by converting development rights for 2,284 dwelling units into TDRs for use in urbanized areas. Neighboring Snohomish County, which is still developing its program, is seeking to preserve 63,000 acres of commercial farmland.

Source: Puget Sound Regional Council

In September 2010, the Environmental Protection Agency awarded grant funding to 10 cities in the PSRC to further develop their TDR programs. Over \$1 million was awarded for market analyses, environmental reviews, sub-area planning and further development of inter-local agreements between cities and counties.

**Resource:**  
For more information on the King County TDR program click on the link below.  
<http://www.kingcounty.gov/environment/stewardship/sustainable-building/transfer-development-rights.aspx>



## 2. California's Sustainable Communities Strategy

The California Global Warming Solutions Act of 2006, colloquially known as AB 32, mandates the reduction of greenhouse gas (GHG) emissions in the state to 1990 levels by the year 2020, which means that current per capita emissions of 14 tons per year must be cut to 10 tons per year. It is a daunting target as the population growth will increase demands for energy even as state and local agencies work to drastically curtail GHG emissions. Since 40 percent of the state's GHG emissions are attributable to transportation, with three-fourths of that coming from light trucks and automobiles, it was clear from the outset that something would have to change so that Californians could and would drive less.



Source: Los Angeles Metropolitan Transportation Library and Archive

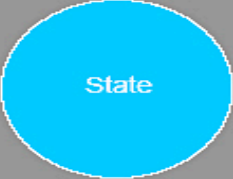
Senate Bill 375 (SB375), the follow-up legislation to AB 32, established a new regional planning process to assist local governments in plotting a way out of automobile dependency. The law provided for broad public participation in this process, which would eventually decide not only the level of GHG reductions each region would be responsible for but how and by whom they would be achieved. Land use authority remained with the local governments; however, governments within each region, working with their regional transportation planning organization, were to develop a Sustainable Communities Strategy (SCS) intended to guide local planning efforts. The strategy must quantify the GHG reductions that it would produce as well as their relation to the regional and state targets. If the local SCS plan fails to meet the GHG target for the region, a Plan B must be drafted. At the local level, the carrot for conforming local plans to the SCS plan and the stick for failing to do so are essentially one and the same: governments that conform are eligible for state funding for infrastructure, and those that don't aren't. The state has developed a "Local Government Toolkit" to assist local governments in their efforts to reduce GHGs and produce climate action plans.

Regions within California are still in the process of having their SCSs certified by the California Air Resources Board, but many localities have already adopted some of the planning practices that have been suggested as necessary to reduce vehicle miles traveled. Among the steps communities are taking:


- They are retrofitting suburbs – residential and office/industrial parks -- with mixed-use districts that put the goods and services people need on a daily basis close to homes and workplaces.
- They are adopting new parking standards and providing pedestrian facilities and amenities that encourage people to park once and walk between close-by destinations.
- They are concentrating housing near major transportation nodes such as rail stations or freeway interchanges.

## Different Words = Common Goals


Reduced Vehicle Miles Traveled (VMT)	=	Increased tax base	=	Saving money
Reduced Greenhouse Gas (GHG) Emissions	=	Improved mobility	=	Less time in traffic
		Livable and sustainable neighborhoods	=	Safe, healthy community
		Healthy vibrant places		



State



City



Resident

Southern California Association of Governments (SCAG): Translating state mandates into local benefits.

## Mixing Land Uses (2 of 2)

Planning mixed use buildings and neighborhoods, i.e. housing, retail, jobs.

*Suggested benefits:*  
Healthy and walkable communities, increased tax revenue



Mixed-Use – Corner of Main Street and Palm Avenue – City of Ventura  
Source: Edwards-Pitman Architects

**To achieve a greater mix of land uses, is your jurisdiction willing to increase building heights?**

1. Recently adopted less restrictive height policies.
2. Intend to integrate less restrictive height policies into our current and future plans.
3. Open to exploring less restrictive height policies.
4. Need to study/assess this further before pursuing
5. Implausible for our city

Slide from SCAG workshop with member agencies exploring the feasibility of selected planning practices in drafting the region's SCS.

**Resources:**

California Air Resources Board website

<http://www.arb.ca.gov/cc/sb375/sb375.htm>

Southern California Association of Governments, *California's Sustainable Communities and Climate Protection Act (SB375) Fact Sheet*

<http://www.scag.ca.gov/sb375/pdfs/FS/gen-sb375-factsheet.pdf>

## BEST PRACTICES TO PROTECT THE ENVIRONMENT

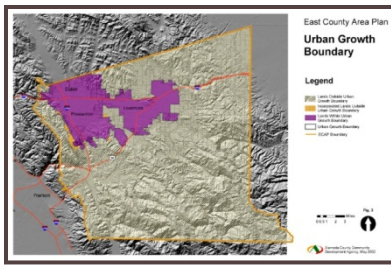
### GROWTH DIRECTED INTO DEVELOPED AREAS

Whether voluntary or compulsory, growth management efforts all hinge on adopting compact development patterns. Compact development patterns limit the conversion of natural resource or agricultural lands into developed areas and they are more sustainable than sprawl from both ecological and economic standpoints. The major tools deployed to foster compact development are greenbelts or urban growth boundaries (UGBs) and urban service boundaries (USBs).

Greenbelts are often adopted to maintain a community as separate and distinct from surrounding ones. UGBs and USBs are often more focused on limiting the extension of municipal services into low density/high service cost areas.

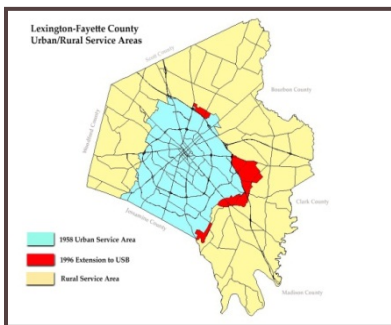
Though these tools may be deployed alone, they are often coupled with priority funding or transfer of development rights programs (described below).

### WHERE THEY ARE BEING APPLIED



Source: Alameda County, *East County Area Plan, 2000*

**The Cities of Livermore and Pleasanton** and the surrounding **County of Alameda, CA**, are among the communities that have adopted ordinances that establish greenbelts. These buffers are designed to keep urbanized areas from developing up against each other's boundaries, obscuring the lines where one community ends and another begins.



Source: Lexington-Fayette County, WRCCG

**Lexington-Fayette County, KY**, first established an Urban Service Boundary (USB) in 1958. It encompassed 85 square miles until it was amended in 1996 by the addition of 8 square miles. The USB serves to protect the surrounding scenic rolling hills and horse farms, which are major components of the area's tourism industry, from encroaching suburban development.



Source: [http://vbgov.com/file\\_source/dept/planning/SGA\\_SummaryMap.pdf](http://vbgov.com/file_source/dept/planning/SGA_SummaryMap.pdf)

**Virginia Beach, VA**, has identified Strategic Growth Areas (SGAs) to accommodate anticipated urban growth. An explicit purpose of the program is to ensure that provision of municipal services is financially sustainable.

## COMPACT DEVELOPMENT PROMOTED BY ECONOMIC INCENTIVES

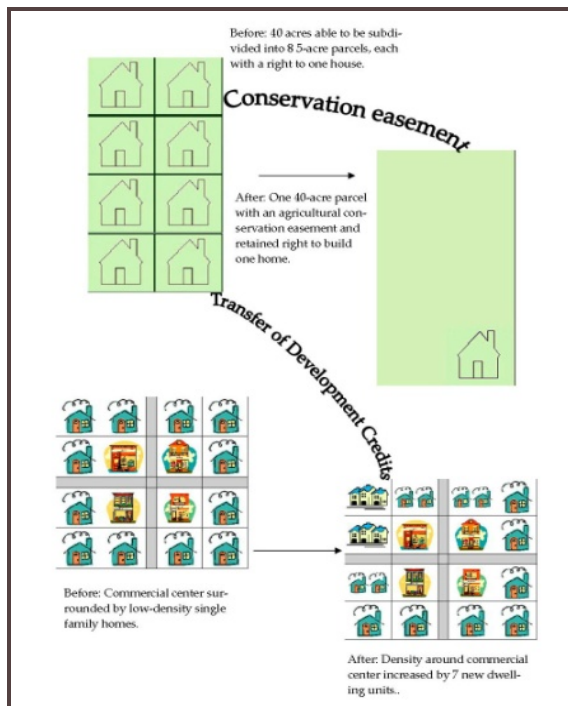
Two important economic mechanisms used to discourage sprawl and encourage more compact patterns of development are:

1. Purchase or Transfer of Development Rights – a mechanism that compensates property owners for limitations on what they can build on their property.
2. Priority funding – a mechanism that gives infrastructure projects within specified areas a financial advantage over projects that promote sprawl into previously undeveloped areas.

### 1. Purchase and Transfer of Development Rights Programs

Purchase of Development Rights (PDR) and Transfer of Development Rights (TDR) programs have been used to protect and conserve natural and agricultural resource land for decades. Many PDR and TDR programs have successfully directed urban development away from ecologically critical areas and irreplaceable agricultural land. These programs have also been used to preserve historic buildings.

The basic purpose of a TDR or PDR is to compensate property owners for giving up some or all of their development rights. Jurisdictions identify areas for conservation and designate them as “Sending” zones. Under a TDR program, the jurisdiction will also identify areas suitable for more intense development than is allowed under the existing zoning. These areas are usually in a downtown core, near a transportation hub or where mixed uses are being introduced and higher densities are desired. These areas are usually called “Receiving” zones.



An owner of property in a designated “Sending Zone” who wants to participate in a TDR or PDR program will record a conservation easement that restricts development on his/her land either in perpetuity or for a specified period of time. If the land is to be preserved as open space, all activity will be severely restricted. If the land is to be preserved for agriculture, any activities other than those associated with farming will be prohibited, though generally in this case, the landowner retains the right to build a family home on the property. Once the conservation easement is recorded, the property owner will generally receive a marketable instrument or certificate for each development right they have given up. In a PDR program, those instruments are purchased and held by the local government, a special purpose agency or a non-profit conservation agency. In a TDR program, the certificates can be purchased by anyone but

Source: WRCC

generally are bought by developers who want to build on a parcel in a designated “Receiving Zone” at a higher density or intensity than would be allowed under the base zoning.

## 2. Priority Funding

Priority funding programs put property owners and builders on notice that they will largely be on their own in paying for infrastructure improvements, operations and maintenance if they develop outside of the urban growth boundary or other areas identified to accommodate urban growth.

Often associated with state or county governments, the priority funding mechanism can also be used by local jurisdictions to encourage infill development and redevelopment of older areas. The funding in these cases can be in the form of infrastructure grants or façade improvement grants.

### WHERE THEY ARE BEING APPLIED

**King County, WA**, has one of the most developed Transfer of Development Rights (TDR) programs in the nation. Since 2000, the program has preserved over 140,000 acres of land carrying Rural and Resource designations by converting development rights for 2,284 dwelling units into TDRs for use in urbanized areas. Neighboring Snohomish County, which is still developing its program, is seeking to preserve 63,000 acres of commercial farmland.

In September 2010, the Environmental Protection Agency awarded grant funding to 10 cities in the Puget Sound Regional Council to further develop their TDR programs. Over \$1 million was awarded for market analyses, environmental reviews, sub-area planning and further development of inter-local agreements between cities and counties.

### Resource:

For more information on the King County TDR program click on the link below.

<http://www.kingcounty.gov/environment/stewardship/sustainable-building/transfer-development-rights.aspx>

**Peninsula Township, MI**, voters approved a Purchase of Development Rights (PDR) program in 1994 and adopted a parcel tax in order to preserve open space and agricultural land, the latter of which is planted with vineyards and the region's world-famous cherry orchards. Under Peninsula Township's plan, tax proceeds are used to purchase development rights outright. Development rights are then retired rather than transferred to other properties.



Vineyard  
Source: Peninsula Township Master Plan 2011



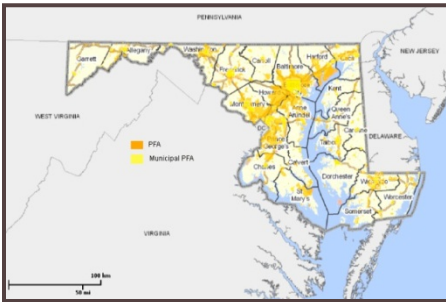
Peninsula Township Orchard  
Source: Peninsula Township Master Plan 2011

The program has been hugely successful, and was expanded upon in 2002, when voters agreed to another tax to raise additional funding. So far the program has preserved 4,000 acres, roughly 20 percent of the Township's total area.



**Lexington, KY**, instituted its PDR program in 2000. Over the last decade it has preserved 25,424 acres of agricultural land, more than half of its program goal of 50,000 acres.

Source: <http://tinyurl.com/Lexington-TDR-PowerPoint>



The **State of Maryland** established the use of Priority Funding Areas (PFAs) in 1997. The program targets state funding for infrastructure projects to growth areas where municipal water and sewer service is in place and where land use and lot sizes support the State's goal of smart growth.

Source: State of Maryland

Counties determine which areas qualify for PFA status, but in general areas qualify if they:

- Have boundaries that predate 1997 (i.e., developed areas as of 1997),
- Are located inside the Washington and Baltimore Beltways, or
- Have been designated as special status zones or areas for revitalization or historic preservation.

Resource: <http://www.mdp.state.md.us/OurProducts/pfamap.shtml>

#### CODES DESIGNED TO ACCOMMODATE GROWTH WITHOUT INCREASING THE URBAN FOOTPRINT

Even for communities with a defined UGB (Urban Growth Boundary) or Priority Funding Areas, other measures are necessary to both direct and accommodate growth within the existing urban footprint and to ensure environmentally responsible development. And without an UGB or Priority Funding Areas/Priority Infrastructure Areas, the following measures are even more critical to sustainable development:

- Mixing it up in the downtown and transit areas
- Concentrating housing near transit areas and commercial districts
- Facilitating infill development – the development and/or redevelopment of vacant or underutilized properties in existing neighborhoods
- Building complete streets to relieve traffic congestion and improve air quality

Learn more about codes that promote sustainable communities in **How to Manual: Housing Reinvented** and more about complete streets in **How to Manual: More Transit/Less Parking**.

#### Why encouraging and facilitating infill development is important

Both in commercial and residential neighborhoods, vacant and underutilized lots and buildings have a negative effect on far more than just the physical appearance of the area. They also detract from social cohesiveness and economic vitality. Infill development can help address these issues and strengthen neighborhoods in other ways, too. In addition to revitalizing an area by filling in holes in the urban fabric, infill development makes good economic sense. Using existing infrastructure helps reduce local government costs and helps keep taxes down. The cost of providing infrastructure (roads, utilities, police/fire stations, etc.) to infill development on average costs only 10 percent of expenditures necessary to service projects on previously undeveloped (greenfield) land.<sup>1</sup> Infill also helps build the population necessary to support a healthy local economy. Retailers base their decisions to locate in particular areas on the number of “heads in beds” within specified distances (similarly, commercial realtors use the adage, “retail follows rooftops”). Moderate to high residential densities can help ensure a vibrant mix of thriving downtown businesses. In many instances, however, zoning codes make it difficult to build on leftover or underutilized lots. Where this is the case, communities need to revise their regulations. The following are the concessions most frequently granted to promote infill development:

- Revised dimensional standards for pre-existing, non-conforming lots
- Height and density bonuses
- Reduced parking requirements or allowance of in-lieu fees
- Reduced development fees

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<sup>1</sup> Hagler Bailley Services Inc. 1999. The Transportation and Environmental Impacts of Infill Versus Greenfield Development. US EPA.

WHERE THEY ARE BEING APPLIED

**Communities that promote infill development include:**

**Providence, RI**, awards height and density bonuses for infill based on the type of use—retail, artist studios or galleries, and performing arts venues qualify—and the percentage of floor space allotted to these uses. Height increases range from 7.5 percent to 30 percent, and the minimum lot area required per dwelling unit may be reduced to as little as 125 square feet. Developers may also use Transfer of Development Rights (TDR) certificates to increase the height of their buildings, but in total height is limited to 1.6 times the height that would be allowed by right.

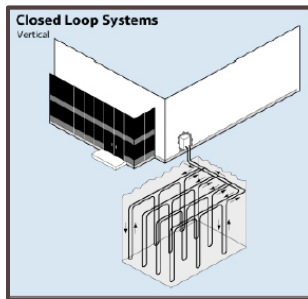
**Riverside, CA**, offers residential infill incentives for single-family properties less than 21,780 square feet, comprising fewer than 5 vacant or underutilized parcels with R-1 or R-R zoning. A minimum of 80 percent of the surrounding land uses within ½ mile must be residential uses. Existing infrastructure allows developers to waive a variety of development fees and reduce others. On a 1,458 square foot home, fees would normally be about \$18,425. With the waivers, fees are reduced by approximately 25 percent to \$13,806. These projects can also avoid grading costs of \$5,000 and reduce electric service fees from \$7,500 to \$500.



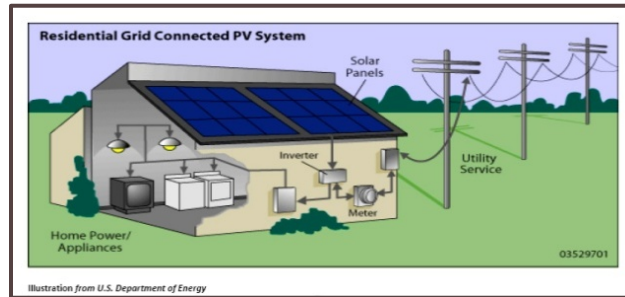
## CODES DESIGNED TO FACILITATE THE USE OF ALTERNATIVE ENERGY

### Alternative energy ordinances

The only way to reduce greenhouse gas (GHG) emissions, maintain an acceptable standard of living and accommodate a growing population is to make greater use of alternative energy sources, and all sustainability plans include their use. It is important for a community to determine what alternative energy sources are locally feasible, and then think through how to best provide for them in various settings. Not all options will be well suited to all locations.



Geothermal System  
Source: U.S. Department of Energy



Photovoltaic system  
Source: U.S. Department of Energy

### Solar access ordinances

In most instances, solar energy systems on individual homes or commercial buildings are allowed by right as an accessory use of the property, and regulations control where they can be located so that they do not adversely impact adjacent properties by creating an eyesore. However, with the growing popularity of solar energy systems, more and more communities are adopting regulations that prevent structures from substantially overshadowing neighboring parcels.

The SmartCode ([click here for description](#)) Renewable Resources Module notes that regulations must ensure that properties in rural and suburban neighborhoods have sufficient solar access. The module acknowledges that this may be difficult to ensure in denser and more intensely developed areas, but that where possible solar access should be protected. In areas where not every lot can receive optimum exposure, the SmartCode suggests that standards be set to require a minimum number of parcels in a new subdivision, village or hamlet to have solar access.

## WHERE THEY ARE BEING APPLIED

### **Lancaster County, PA**

To facilitate the adoption of local alternative energy codes, the Lancaster County, PA, Planning Commission has published a *Municipal Guide for Planning and Regulating Alternative Energy Systems* that discusses the practical aspects of siting solar, wind, geothermal and biofuel facilities and provides model ordinance language from various sources for each type. [Click here for more information on model ordinance.](#)

**Boulder, CO**, defines three solar access zones based on current development as well as exposure of rooftops and south-facing yards and walls to sunlight. Construction of structures that would limit sun exposure is prohibited except in areas where the restriction would severely limit or prevent development. In areas where the prohibition applies, height limits are imposed to ensure that the south-facing aspects of adjacent properties have exposure to the sun for a minimum of 2 hours before and after the solar noon at the winter solstice.

In **Ithaca, NY**, developers must design new subdivisions so that solar access is assured for both passive and active systems. The Planning Board has the power to approve parcel configurations that deviate from the standards of the town's subdivision regulations in order to increase or improve solar orientation.

The **Town of Wawarsing, NY**, requires new subdivision design to place residential streets on an east-west axis insofar as this is reasonably practical so that houses can be placed to take maximum advantage of solar exposure.

## PLANS AND CODES THAT ENHANCE THE COMMUNITY'S NATURAL INFRASTRUCTURE



View of Saratoga County, NY  
Source: Saratoga County  
Green Infrastructure Plan

At one time, planning for open space was mainly focused on providing recreational places and pleasant vistas, but since recognizing the vital and irreplaceable functions that natural environment and native plants and animals perform to keep our climate habitable, “Green Infrastructure” plans and supporting ordinances have become more common.

“Green Infrastructure” encompasses open space conservation but goes further to incorporate technology to complement natural systems with the purpose of maintaining healthful local, regional, national and, ultimately, global environments. Plans are most frequently drafted on a county or regional level because of the scale of natural systems, but some larger cities such as New York and Seattle have adopted their own.



Severn Run, Anne Arundel, MD  
Credit: Anne Arundel County  
Greenways Master Plan

“Green Infrastructure” components include parklands, forests, wetlands, rivers, lakes and other waterways, habitat for wildlife and places for groundwater recharge. Ideally, “Green Infrastructure” comprises a system of larger tracts of natural land linked together by greenways (i.e., corridors of undeveloped land set aside for recreation or open space). It also includes isolated sites, such as playfields and pocket parks that serve as local habitats for migratory birds or non-migratory urban animals like squirrels, rabbits, and raccoons.

“Green Infrastructure” can also include urban elements, such as green roofs, permeable pavement, and parking lot and streetside landscaping designed to include natural water filtration systems.



Parking lot bioswale landscaping  
Credit: Metro Nashville Green Infrastructure  
Master Plan



Green roof in Portland, OR  
Credit: Metro Nashville  
Green Infrastructure Master  
Plan

### Provide open space for healthy ecosystems

In order to implement a green infrastructure plan, open space must be provided. While some will be public lands, much if not most will be on privately held property and development standards and other mechanisms are needed to make sure there is a sufficient quantity and quality of open space to maintain healthy ecosystems.

A requirement for the inclusion of open space in new development is common in most zoning ordinances. How much space must be required is usually based either on the number of dwelling units per acre or on the population that can be accommodated in the proposed residences. Many communities set per capita standards for parks and open space and require developers either to provide that space on their project site or pay an in-lieu fee, which will be used by the municipality to purchase and/or develop a park or other open space facility at another location.

Open Space Required for Various Densities	
Base Density (du/ac)	Open Space Required (% of buildable area)
>1	35%
0.5<1	40%
0.2<0.5	45%
<0.2	50%

Source: US EPA Model Open Space Ordinance

Rural developments are often required to design lots so that structures can be clustered in a relatively small area of the project, leaving most of the plat or subdivision undisturbed. In these cases, the undeveloped portions should be designated as held in common by a property owners association, with the land carrying a deed restriction or other covenant that prohibits future development.

### Protect the watersheds

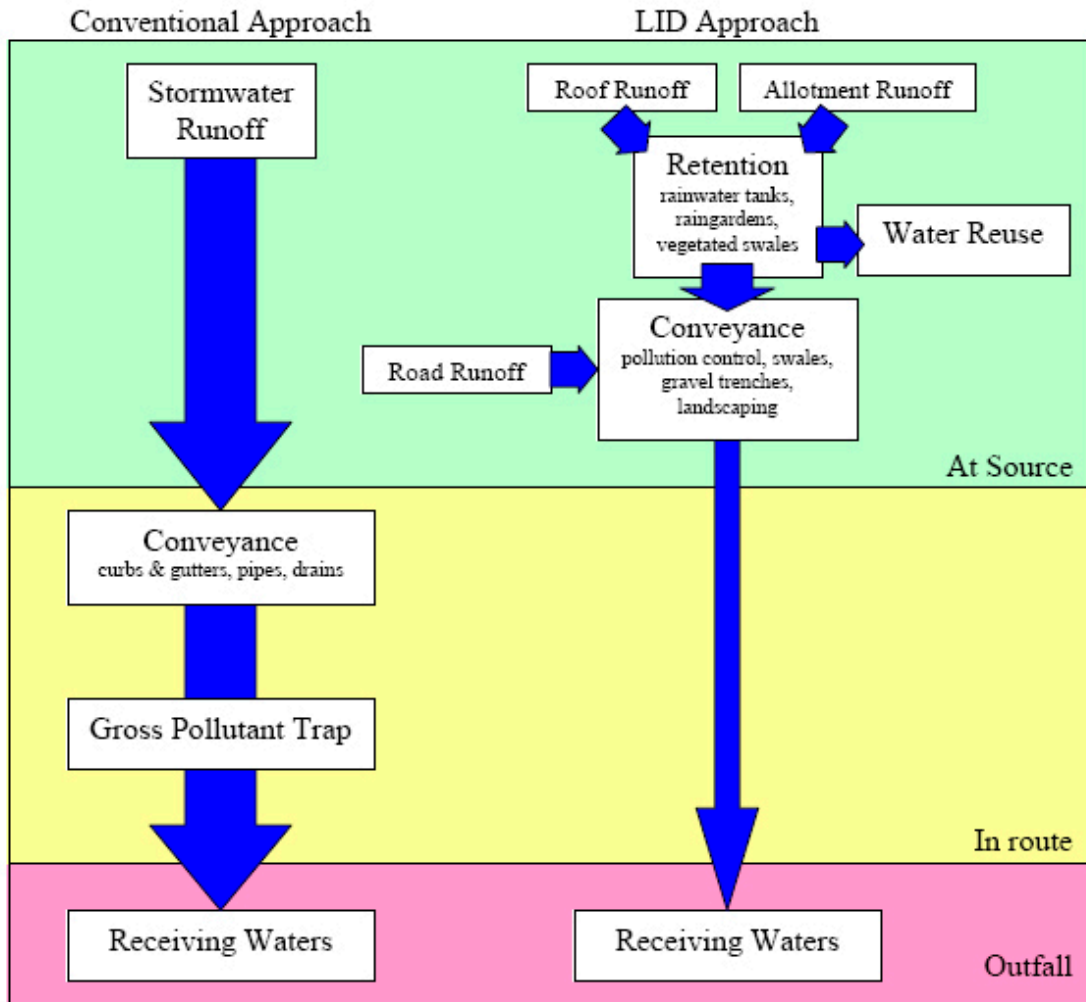
Watersheds are critical components of the natural infrastructure. (Note: a watershed is the area of land where all of the water that is under the land or drains off it goes into the same water body, such as the Carmans River watershed or Long Island Sound watershed.) Not only do watersheds supply our drinking water, they also serve important functions in preserving aquatic areas, wetlands, meadows, agricultural lands and forest habitats that ensure a healthful food supply and help remove greenhouse gases from the air. Protecting watersheds from both point and non-point pollution is a key task for local government, one that is best addressed by putting preventive measures into place in plans and ordinances rather than relying on corrective actions.

**Point Pollution:** Traceable to a particular location, such as a discharge pipe or a leaking underground tank.

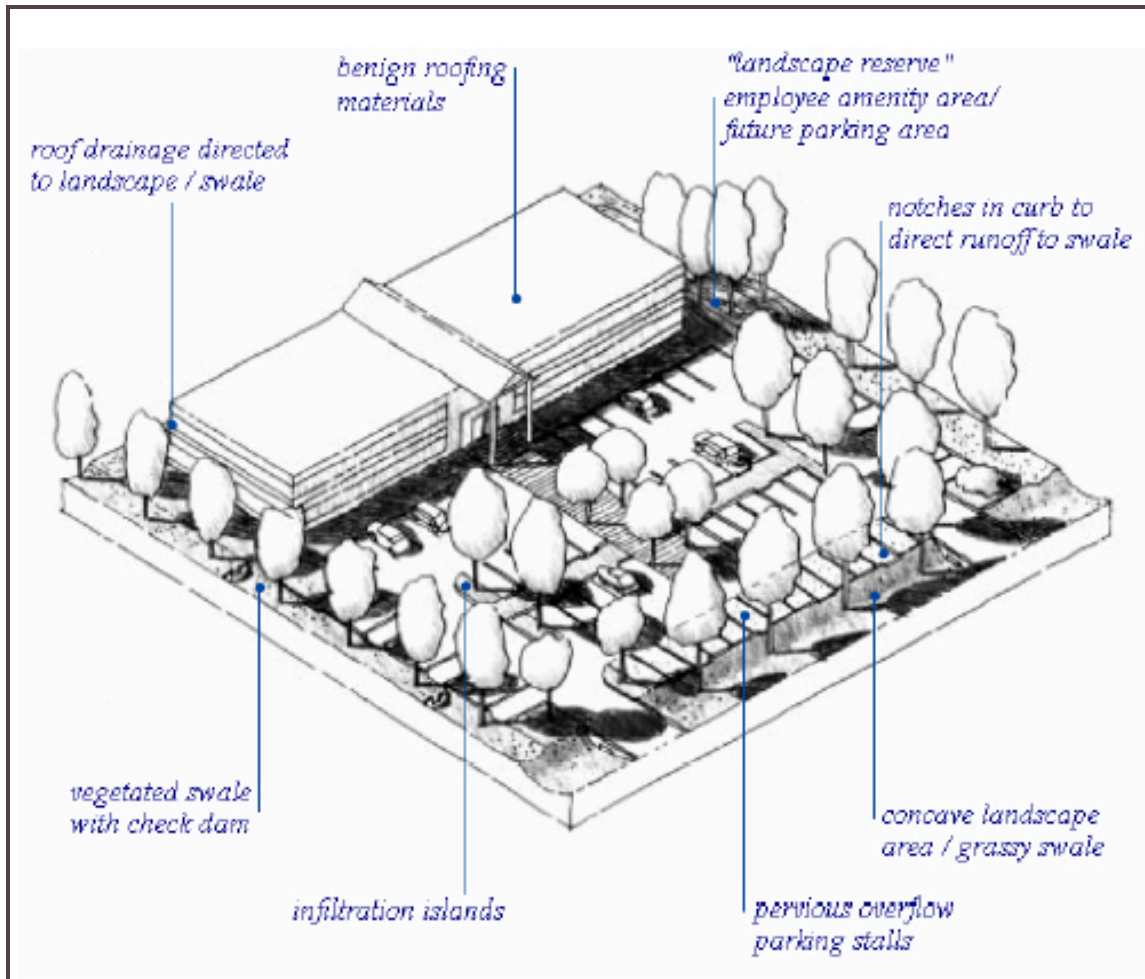
**Non-point Pollution:** Occurs at diffuse locations and is carried by snowmelt or storm water runoff into aquifers, streams, rivers, lakes or coastal waters.

Communities are increasingly moving away from the conventional approach to storm water management, which relied on gutters, drains and piped conduits, to Low Impact Development

(LID) systems. LID systems protect water resources because they are engineered to mimic the way natural systems handle storm water runoff. The result is cleaner water that has been naturally filtered through the soil, which strips away not only large pieces of detritus but also removes minerals and other compounds before the water makes its way into the aquifer or other watercourse.



Source: County of San Diego, CA, *Low Impact Development Handbook*, 2007



Example of LID plan for an office complex.  
Source: County of San Diego, CA, *Low Impact Development Handbook*, 2007

What model ordinances include to protect watersheds:

- A map of the watershed and a list of areas critical to maintaining its health
- Defined buffer areas around watercourses and shorelines, particularly those in critical areas
- Limits on development and types of activities that can occur in and near buffer areas
- Requirements for the conservation, and restoration when necessary, of native vegetation within the buffer zones
- Low Impact Development (LID) standards to handle storm water by engineering management systems that limit impervious surfaces and incorporate vegetation to facilitate the filtration of storm water into aquifers.

### Enhance the urban canopy

If beauty is as beauty does, then by any measure the urban canopy is beautiful. Of course it provides visual beauty as it softens our urban landscapes, adds color to gray spaces, borders and buffers neighboring properties, lines streets, and gives individual character to neighborhoods. The trees throughout our communities also perform other valuable environmental services by:

- Generating oxygen while removing greenhouse gases from the air
- Preventing soil erosion
- Reducing storm water runoff
- Providing habitat for birds and other animals
- Providing shade and mitigating the heat island effect associated with buildings and paved surfaces

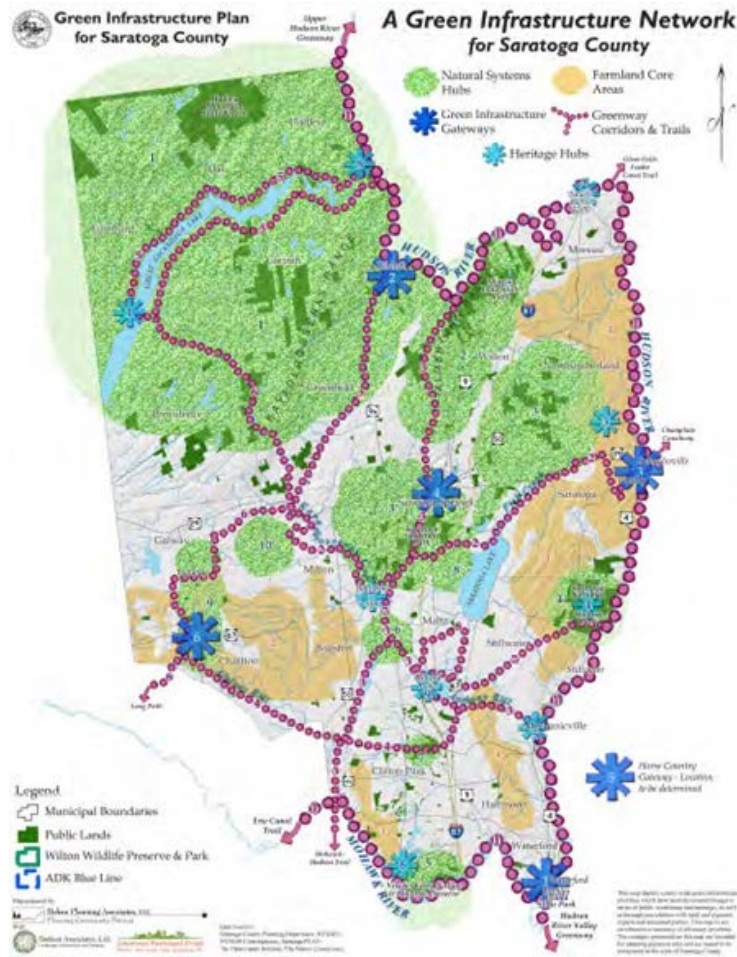


Credit: Lyndon Wong under Creative Commons License

Many communities have adopted tree (or urban forest) master plans, as well as ordinances to implement these plans. Community forest plans often include a tree census that not only counts trees, but categorizes them by species and condition. Some tree master plans only consider the community as a whole, while others break the community down into neighborhoods where different species of trees help define the character of these subareas.

WHERE THEY ARE BEING APPLIED

Saratoga County, NY



Saratoga County adopted its Green Infrastructure Plan in 2006 in response to population growth pressure. The plan is designed to protect the county's clean air and water and facilitate the preservation of open space and farmland while seeking to maintain a healthy economy.

The plan sets long- and short-term conservation goals for the green infrastructure and proposes an expanded open space grant program to achieve them. It also provides for the identification of "priority projects," which receive preferential consideration for county funding.

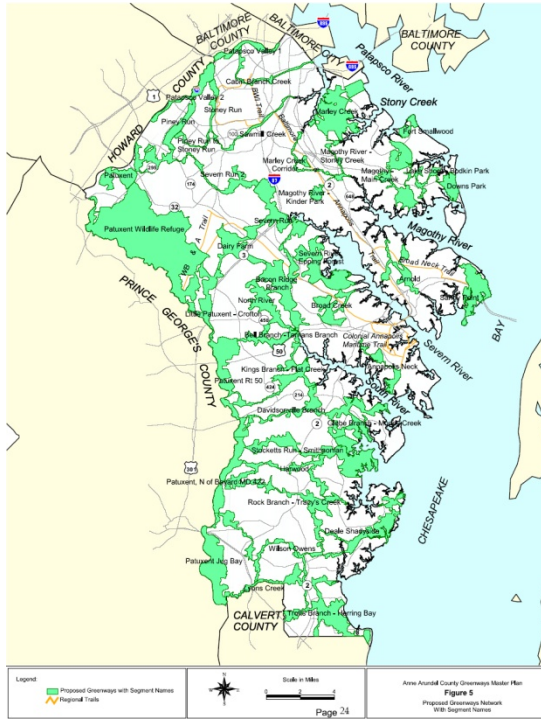
Source: Saratoga County Green Infrastructure Plan, Appendix A

Green Infrastructure Planning Resources:

Saratoga County, NY, *Green Infrastructure Plan for Saratoga*

County [http://www.saratogaplan.org/cp\\_GreenInfrastructure.html](http://www.saratogaplan.org/cp_GreenInfrastructure.html)





Credit: Anne Arundel County Greenways Master Plan

The **State of Maryland** has undertaken a statewide green infrastructure initiative that has identified about 2 million acres of environmentally important lands. With less than a quarter of these lands protected from future development, the State instituted its GreenPrint program and made funds available to protect particularly significant tracts. Since 2001, about 39,000 acres have been preserved under this program.

Anne Arundel is one of the Maryland counties to have adopted an exemplary supportive plan. Anne Arundel's Greenways Plan encourages responsible stewardship of the county's natural infrastructure and maintenance of a network of greenways. The greenways serve as migration corridors and habitat for animals, as well as recreational pathways for people. Benefits of protecting the natural environment include cleaner air and water, as well as enhanced tourism and associated economic benefits.

**Key West, FL**, uses development agreements to ensure the preservation of natural habitats. A development agreement is a contract between a developer and a jurisdiction, which establishes specific conditions under which a development may be built. In some cases, these agreements involve conservation easements and the transfer of development rights. In others, developers may be allowed to pay an in-lieu fee that will allow the City to purchase property of equal or greater ecological value and of equal or greater size than the property being converted to urban uses. (*City of Key West, FL, Ord. No. 97-10, § 1(3-11.5(C)), 7-3-1997*)

**Stratham, NH**, has established an Aquifer Protection District as an overlay to existing zoning districts. Within the Aquifer Protection District, no more than 20 percent of a site may be covered with impervious surfaces. Storm water runoff must be recharged to the aquifer on-site and recharge basins must have a vegetative cover that provides for surface treatment and facilitates recharge. [http://www.stormwatercenter.net/Model%20Ordinances/Source\\_Water\\_Protection/Aquifer%20district%20ordinance.htm](http://www.stormwatercenter.net/Model%20Ordinances/Source_Water_Protection/Aquifer%20district%20ordinance.htm)

**Greensboro, NC**, has both a Watershed Critical Area overlay district and a General Watershed Area overlay, each with its own set of regulations. As the name suggests, controls are more stringent in the Watershed Critical Area. In both areas, clustering of structures is encouraged. Buffers ranging from 30 to 100 feet are established along watercourses and riparian planting is restricted to locally native trees and shrubs. [http://www.stormwatercenter.net/Model%20Ordinances/Surface\\_water\\_%20Protection/NC%20Watershed%20District%20Overlay.htm](http://www.stormwatercenter.net/Model%20Ordinances/Surface_water_%20Protection/NC%20Watershed%20District%20Overlay.htm)

**More on Low Impact Development (LID) Resources:**

San Diego County, CA, Low Impact Development  
Handbook <http://www.sdcounty.ca.gov/dplu/docs/LID-Handbook.pdf>

Low Impact Development Center  
<http://www.lowimpactdevelopment.org>

U. S. EPA, *Stormwater Best Management  
Practices* [http://www.epa.gov/oaintrnt/stormwater/best\\_practices.htm](http://www.epa.gov/oaintrnt/stormwater/best_practices.htm)



Credit: Arlington County, VA, *Urban Forest Master Plan*

**Arlington County, VA**, has adopted an *Urban Forest Master Plan* (UFMP) as a component of its *Open Space Master Plan*. The primary goal of the UFMP is to “improve Arlington’s urban forest canopy coverage,” and the plan identifies potential planting sites and sets annual planting goals to increase and maintain the canopy coverage. The implementing document, the *Tree and Shrub Ordinance*, provides for the designation and protection of Heritage, Memorial, Specimen and Street trees. Heritage and Memorial trees are those that hold special historical significance for the community. Specimen trees are those that are notable due to their age or

physical attributes. These special designations require the consent of the owner for trees located on private property. Once a designation is made, it is recorded with the deed and the protection status extends through the natural life of the tree.

<http://www.arlingtonva.us/departments/ParksRecreation/scripts/parks/ParksRecreationScriptsParksTreesOrdinance.aspx>

“In Palo Alto, it’s the trees!”



The City of **Palo Alto, CA**, prohibits the removal of healthy trees protected under local regulations except when the location of the tree blocks the only access to a parcel or severely restricts the owner’s ability to build on the parcel. The City also requires property owners to properly maintain any protected trees on their property and provides an informational *Tree Technical Manual* for that purpose. Notably, Palo Alto is named for the “tall tree”—a coast redwood still standing in one of the City’s parks.

**Palo Alto’s Urban Canopy**

program: [http://www.cityofpaloalto.org/environment/urban\\_canopy.asp](http://www.cityofpaloalto.org/environment/urban_canopy.asp)

**Palo Alto’s Tree Technical Manual:**

<http://www.cityofpaloalto.org/civica/filebank/blobdload.asp?BlobID=6436>

**For guidance in drafting a tree ordinance:**

International Society of Arboriculture, *Tree Ordinance Guidelines*:

[http://www.isa-arbor.com/education/resources/educ\\_TreeOrdinanceGuidelines.pdf](http://www.isa-arbor.com/education/resources/educ_TreeOrdinanceGuidelines.pdf)

The **SmartCode** addresses open space by explicitly designating preserved and reserved open spaces. It also designates Controlled Growth areas where either some development has already occurred despite the open space value of the land or zoning is in place that cannot be revoked. The approach in these areas is to require cluster development in order to maximize the remaining open space value.

EXCERPT FROM THE SMART CODE VERSION 9.2 (THE TOWN PAPER, PUBLISHER)  
<http://www.transect.org/codes.html>

### 2.3 (O-1) PRESERVED OPEN SECTOR

2.3.1 The preserved open sector shall consist of open space that is protected from development in perpetuity. The preserved open sector includes areas under environmental protection by law or regulation, as well as land acquired for conservation through purchase, by easement, or by past transfer of development rights.

2.3.2 The preserved open sector shall consist of the aggregate of the following categories:

- a. surface waterbodies
- b. protected wetlands
- c. protected habitat
- d. riparian corridors
- e. purchased open space
- f. conservation easements
- g. transportation corridors
- h. areas residual to clustered land development (CLD)

2.3.3 Development and construction within the Preserved Open Sector and the specifications required to do so shall be determined on an individual project basis by public hearing of the legislative body.

### 2.4 (O-2) RESERVED OPEN SECTOR

2.4.1 The reserved open sector shall consist of open space that should be, but is not yet, protected from development.

2.4.2 The reserved open sector shall consist of the aggregate of the following categories:

- a. flood plain, including Special Flood Hazard Areas
- b. steep slopes
- c. open space to be acquired
- d. corridors to be acquired
- e. buffers to be acquired
- f. legacy woodland
- g. legacy farmland
- h. legacy viewsheds

2.4.3 The reserved open sector is a transfer of development rights (TDR) sending area, for the gradual sale of rights for development in the Controlled Growth Sector and the intended Growth sector. An owner who has purchased such development rights may exceed the allocated densities of new communities as set forth in section 3.8 and table 14b. Areas from where development rights have been transferred shall be designated Preserved Open Sector. The Planning Office shall maintain a record of such transfers, updating the regional map accordingly.

2.4.4 (For HAZARD MITIGATION STANDARDS)

### 2.5 (G-1) Restricted Growth Sector

2.5.1 The restricted Growth sector shall be assigned to areas that have value as open space but nevertheless are subject to development, either because the zoning has already been granted or because there is no legally defensible reason, in the long term, to deny it.

2.5.2 Within the restricted Growth sector, clustered land development (CLD) shall be permitted by right.

Sections printed in teal are intended to be calibrated to local conditions.

### Model Ordinance Language (excerpt)

Most often, local governments streamline the permitting process by listing accessory wind energy systems as a conditional or accessory use. Other zoning requirements for accessory wind energy systems vary amongst local governments. There are municipalities that allow these accessory wind energy systems in all zoning districts and there are municipalities that restrict them to certain zoning districts (such as Agricultural or Industrial/Commercial). Height regulations have ranged from 65 to 100 feet. There are local ordinances that base the height requirements by the zoning district where the small wind energy system is constructed in. All ordinances stress the prevention of unauthorized climbing by not allowing foot pegs or rungs below 12-15 feet. Below is an example of model zoning language from the American Wind Energy Association:

Number of accessory wind systems per property: Shall be limited to one

**Setback:** The base of the tower shall be set back from all property lines, public right-of-ways, and public utility lines a distance equal to the total extended height. Turbines shall be allowed closer to a property line than its total extended height if the abutting property owner(s) grants written permission and the installation poses no interference with public utility lines or public road and rail right-of-ways.

**Tower Height:** So long as the total extended height meets noise and set-back requirements, there shall be no specific height limitation, except as imposed by Federal Aviation Administration regulations.

**Sound:** Sound produced by the turbine under normal operating conditions, as measured at the property line, shall not exceed the definition of nuisance noise. Sound levels, however, may be exceeded during short-term events out of anyone's control such as utility outages and/or severe wind storms.

**Wind Turbine Equipment:** The design and installation of all accessory wind energy systems shall conform to applicable industry standards, including those of the American National Standards Institute (ANSI), Underwriters Laboratories, Det Norske Veritas, Germanischer Lloyd Wind Energies, the American Society for Testing and Materials (ASTM), or other similar certifying organizations, and shall comply with the Township Building Code and with all other applicable fire and life safety requirements. The manufacturer specifications shall be submitted as part of the application.

When an accessory building is necessary for storage cells or related mechanical equipment, the accessory building shall not have a floor area exceeding ??? square feet, and shall comply with the accessory building requirements specified within the underlying zoning district.

**Requirement for Engineered Drawings:** Building permit applications for accessory wind energy systems shall be accompanied by standard drawings of the wind turbine structure and stamped engineered drawings of the tower, base, footings, and/or foundation as provided by the manufacturer. Wet stamps shall not be required.

**Soil Studies:** For standard soil conditions (not including gravel, sand, or muck), foundations developed by the wind turbine manufacturer shall be acceptable for turbine installations of 20kW or less and will not require project-specific soils studies or an engineer's wet stamp.

**Compliance with FAA Regulations:** No accessory wind energy system shall be constructed, altered, or maintained so as to project above any of the imaginary airspace surfaces described in FAR Part 77 of the FAA guidance on airspace protection.

Credit: Lancaster County, PA

# be bold

Long Island Index

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