

## BMP 5.5.2: Concentrate Uses Area wide through Smart Growth Practices

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On a municipal, multi-municipal or areawide basis, use of "smart growth" planning techniques, including neo-Traditional/New Urban planning principles, to plan and zone for concentrated development patterns can accommodate reasonable growth and development. These practices direct growth to areas or groups of parcels in the municipality that are most desirable and away from areas or groups of parcels that are undesirable. BMP 5.5.2 can be thought of as Super Clustering that transcends the reality of the many different large and small parcels that exist in most Pennsylvania municipalities. Clustering parcel by parcel simply cannot accomplish the growth management that is so essential to conserve special environmental and cultural values and protect special sensitivities. These smart growth techniques include but are not limited to, transfer of development rights (TDR), urban growth boundaries, effective agricultural zoning, purchase of development rights (PDR) by municipalities, donation of conservation easements by owners, limited development and bargain sales by owners, and other private sector landowner options. "Desirability" is defined in terms of environmental, historical and archaeological, scenic and aesthetic, "sense of place," and quality of life sensitivities and values.

<p style="text-align: center;"><b><u>Key Design Elements</u></b></p> <ul style="list-style-type: none"> <li>▪ Establish baseline growth and development context for the municipality or multi-municipal area (how much of what by when and where, using decade increments, plus ultimate build out).</li> <li>▪ On macro level (defined as municipality-wide, multi-municipality-wide, areawide), define criteria for growth "desirability" (opportunities) and "undesirability" (constraints) on a multi-site and/or municipality-wide and/or areawide basis.</li> <li>▪ Apply these "desirability" and "undesirability" criteria.</li> <li>▪ Contrast baseline growth and development (first step) with third step; highlight problems.</li> <li>▪ Apply smart growth techniques as needed to re-form "business as usual" future to max out "desirability" and "undesirability" performance. Techniques include: transfer of development rights (TDR), urban growth boundaries, effective agricultural zoning, purchase of development rights (PDR), donation of conservation easements by owners, limited development and bargain sales by owners, and other private sector landowner options.</li> </ul>	<p style="text-align: center;"><b><u>Potential Applications</u></b></p> <p style="text-align: center;">Residential: Yes  Commercial: Yes  Ultra Urban: Yes  Industrial: Yes  Retrofit: Yes  Highway/Road: Limited</p> <hr/> <p style="text-align: center;"><b><u>Stormwater Functions</u></b></p> <p style="text-align: center;">Volume Reduction: Very High  Recharge: Very High  Peak Rate Control: Very High  Water Quality: Very High</p> <hr/> <p style="text-align: center;"><b><u>Water Quality Functions</u></b></p> <p style="text-align: center;">TSS: Preventive  TP: Preventive  NO3: Preventive</p>
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## Variations

Because of the broadness of this BMP and its macro scale, variations in this BMP can be substantial. Variations include: 1) how areas deemed to be desirable for growth are defined, whether clusters, hamlets, villages, towns and/or cities; 2) how areas deemed undesirable for growth are defined (conserving natural resources, agricultural lands and other vital resources); and 3) how any of this is made to happen and what blend of smart growth techniques can be applied (where and when) to implement 1 and 2.

### 1. Defining Desirable Growth – Opportunities for Growth: Clusters, Hamlets, Villages, Towns and Cities

The vision for growth and development can take many different forms and can vary substantially depending upon the respective municipality, group of municipalities, or area. Rural areas (Figure 5.5-1) striving to preserve their rural character can concentrate development through adherence to building onto or even creating Hamlets and Villages. If adjacent communities exist, development can be directed into the town or at the town edge (Figure 5.5-2). Clustering (see BMP 5.5.1) on a site-by-site basis is superior from a site perspective but yields a pattern that is less than optimal from a multi-site or area wide perspective (Figure 5.5-3). However, this overall pattern is vastly preferable to the business as usual approach across many different sites comprising the entire area (Figure 5.5-4).



*Figure 5.5-1 Rural landscape of Pennsylvania*

Areas already developed and urbanized are likely to define appropriate in-fill development and re-development at higher densities. Multiple community planning sources with specific community building standards and specifications are available for reference. The importance of careful definition of growth zones and the performance standards that define these growth zones cannot be overemphasized. Often this BMP has been driven by environmental conservation objectives such as saving the undesirable growth areas (Sending Zones in TDR parlance) as discussed below but every bit as much care must be taken in defining and planning the desirable growth areas (Receiving Zones).



*Figure 5.5-2 Use of TDR to protect rural landscapes and direct development into the Town or Town Edge*



*Figure 5.5-3 Site clustering provides a partial open space network, though less than that provided by TDR*



*Figure 5.5-4 Large lot zoning ignores natural and cultural resource values.*

## **2. Defining Undesirable Growth Areas – Constraints: High Value Watershed Areas, Agricultural Areas, Eco-Sensitive Habitat Areas, Headwaters, and Stream Designations**

Criteria used by a municipality or area for managing development may be expected to vary to some extent. Municipalities may include special watershed areas, which have Pennsylvania Code Chapter 93 Special Protection Waters designation (Exceptional Value and High Quality), as well as critical headwater (first order streams) portions of watersheds. Source Water Protection zones may exist, including areas of especially important groundwater recharge, or habitat areas where the Pennsylvania Natural Diversity Inventory (PNDI) indicates especially important species presence. Also, important wetlands, floodplains and other natural features may exist. Prime Agricultural Lands and Agricultural Security Districts may be deserving of conservation. Areas may be especially sensitive due to rugged topography or steep slopes. Areas may be sensitive due to richness of historical and archaeological and even scenic values. All of these important values are likely to extend well beyond individual parcel boundaries and require smart growth area wide growth management techniques.

## **3. Mixing and Matching Smart Growth Techniques: Public and Private**

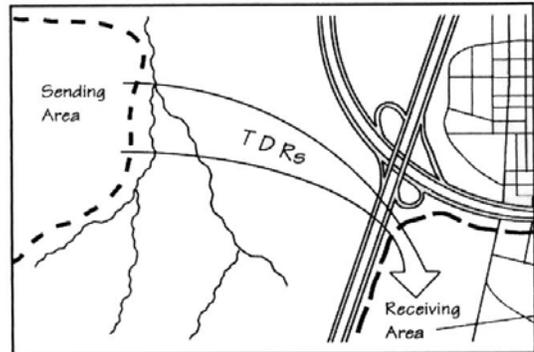
If a municipality consists of only a handful of enormous parcels where BMP 5.5.1 Clustering can work together to achieve the areawide “desirable growth” and “undesirable growth” patterns for the entire municipality as described above, BMP 5.5.2 would be made unnecessary. Such is usually not the case. A municipality may decide to use all or most of the smart growth techniques discussed here. A municipality may decide that “less is more” and try to achieve its objectives with the most simple growth management program possible, using the fewest techniques. The blend of public techniques versus private techniques is also important. Most of what is involved here entails public sector management action, such as zoning ordinance provisions. A few municipalities in Pennsylvania (West Marlborough, Chester County) have achieved municipality-wide success through private landowner actions, such as voluntary donation of conservation easements to conservancies and land trusts.

The optimal blend of smart growth techniques is not easily determined. Each technique has pros and cons, in terms of technical effectiveness, ease of implementation, political and socioeconomic implications, and integration with the local culture. Municipalities may decide to hire a local planning consultant (contact the Pennsylvania Planning Association for additional references), or may decide to consult with a free or low cost information resource such as the Pennsylvania Environmental Council or 10,000 Friends of Pennsylvania. The direct state government agency contact is the Pennsylvania Department of Community and Economic Development. These organizations and agencies offer a variety of planning resources by providing information on smart growth techniques and their potential usefulness in any one particular municipal setting. The organizations’ respective websites should be consulted for more detailed information.

## Applications

### Transfer of Development Rights (TDR)

Transfer of Development Rights (TDR, see Figure 5.5-5) is allowed as an option in Pennsylvania under the Municipalities Planning Code. TDR creates an overlay (Sending Zone) in the zoning ordinance where property owners are allowed to sell development rights for properties where growth is deemed to be less than desirable for any number of reasons. In a second created overlay zone (Receiving Zone), these development rights that have been purchased may be used to increase development density, above the maximum baseline or conventional zoned density. TDR has been in existence for some years and has been used by a relatively small number of Pennsylvania municipalities, although it has been used more widely in New Jersey and several other states. Although TDR is created in the municipal zoning ordinance, all TDR transactions or transfers of development rights may occur within the private sector, between Sending Zone owners and Receiving Zone purchasers or developers. TDR has been used in Buckingham Township (Bucks County), West Bradford and West Vincent Townships (Chester County), Manheim and Warwick Townships (Lancaster County).

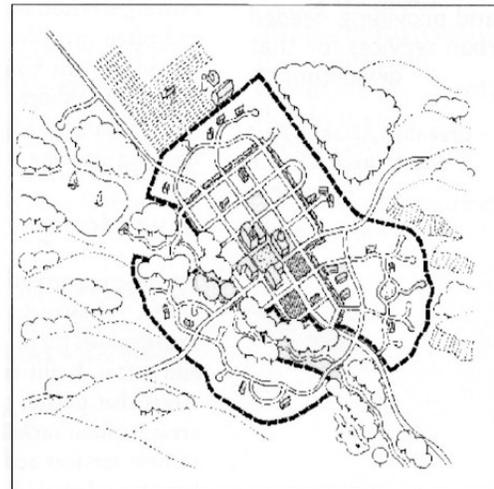


Source: Maryland Office of Planning

Figure 5.5-5 Example of Transfer of Development Rights

### Growth Boundaries:

Growth Boundaries (Urban Growth Boundaries, see Figure 5.5-6) are based on the concept that infrastructure such as public road systems and public water and wastewater treatment systems have a powerful growth inducing and growth shaping influence on an area wide basis. By controlling the location and timing of this infrastructure through municipal or public sector action, municipalities can encourage development in certain areas and discourage development in others. Growth Boundaries define where municipalities will directly and indirectly encourage, and even provide infrastructure services, significantly increasing zoned densities. Areas lacking such infrastructure services are zoned at significantly decreased densities. The State of Oregon has been a leading advocate of Growth Boundaries. Lancaster County for some years has been applying Growth Boundary principles in its comprehensive planning (go to their website to the annual Growth Tracking reports which document how their planning is achieving Growth Boundary objectives).



Source: Greenbelt Alliance

Figure 5.5-6 Example of Urban Growth Boundary

### Effective Agricultural Zoning:

Large lot zoning (usually defined as zoning that requires average lot size to be greater than 2 acres per lot) has been rejected by Pennsylvania courts as exclusionary and unacceptable. However, very large minimum lot size to maintain existing agricultural uses has been deemed to be acceptable by Pennsylvania courts and is being practiced throughout Pennsylvania, especially in intensive agricultural communities in southcentral Pennsylvania (e.g., multiple municipalities in Adams, Berks, Chester, Lancaster, York, etc.). Effective agricultural zoning may take the form of a specified mapped zoning category with a minimum lot size of 10, 15, 20, or 25 acres (this varies). Sliding scale agricultural

zoning is a popular variation, where additional lots to be created and subdivided are a function of the size of the total agricultural tract (though gross density remains very low). The intent is to allow a small number of lots to be created over time, possibly for family members or for agricultural workers, but to keep the functioning farms as intact as possible without residential subdivision or any other development intrusion. The concept here is that the so-called "highest and best use of the land" is agricultural use, which will be best maintained through protection of the farming community and through this very low-density zoning. Application of Agricultural Zoning has been restricted to areas where agriculture can be defined explicitly, typically in the presence of prime farmland soils, intensive agricultural activity, formation of Agricultural Security Districts, or other indicators of important agricultural activity. Obviously, this smart growth technique has limited application in terms of a growth management technique.

### **Purchase of Development Rights:**

Similar to TDR, the concept of Conservation Easements hinges on the notion that development rights for any particular property can be defined and separated from a property. These development rights can then be purchased and in a sense retired from the open market. The Pennsylvania Farmland Preservation Program, which purchases development rights from existing agricultural owners and allows farmers to continue their ownership and their agricultural activities, has become one of the most successful agricultural preservation programs in the country. This program is highly competitive and obviously limited to agricultural properties and contexts. The Farmland Preservation Program is a priority of the current administration, will continue to be funded, and has been reinforced in several counties with county-funded farmland preservation programs in order to stretch the state dollars.

Some counties (Bucks, Chester, Montgomery Counties) and municipalities (North Coventry, East Bradford, Pennsbury, Solebury, West Vincent and others) have enacted special open space and recreation acquisition programs. They are funded in various ways (bond issues, real estate taxes, small payroll taxes) to purchase additional county-owned and municipality-owned lands, for use as active and passive recreation as well as open space conservation. These efforts can be used in conjunction with TDR programs, whereby a municipality funds a revolving fund-supported land development bank which purchases development rights from vulnerable and high priority properties in Sending Zones. It later sells these development rights (Warwick Township in Lancaster County has done this) to Receiving Zone developers.

### **Conservation Easements (Donation and Purchase): Brandywine Conservancy, Natural Lands Trust, Western Pennsylvania Conservancy, Others**

Similar to TDR, the concept of Conservation Easements hinges on the notion that development rights for any particular property can be defined and separated from a property. These development rights can then be donated to an acceptable organization to support the public's health, safety and welfare, in the form of a conservation easement which restricts the owner's ability to develop the property in perpetuity, regardless of municipal zoning. Historically, a major incentive for these conservation easement donations has been the major tax benefits afforded such donations. Organizations such as the Brandywine Conservancy, Natural Lands Trust, the Western Pennsylvania conservancy and many others have protected thousands of acres of otherwise developable property in Pennsylvania through privately donated conservation easements, with absolutely no public expenditure of funds. Brandywine's 30,000 acres of conservation easements in the Brandywine Creek Watershed is an excellent case in point. Municipalities such as West Marlborough Township in Chester County have large portions of their jurisdictions permanently conserved as the result of this Conservation Easement program. Conservation Easements also can be purchased by a conservation organization or government agency. National organizations such as the Nature Conservancy, the Trust for Public Land, the Land Trust Alliance, and others are active in Pennsylvania and are excellent sources of technical information relating to this smart growth technique. In parts of Pennsylvania, these larger

organizations are helping fledgling local land trusts form and begin their important work of land conservation.

**Bargain Sale/Limited Development Options:**

A variation on the donation of development rights through conservation easements is a “bargain sale,” where a portion of the development rights value is donated (in the manner described above) but the property owner still enjoys a return on his/her property. In any number of development-pressured municipalities in Pennsylvania, fair market value for a large 100-acre farm to be developed as single-family residences or some other use may reach 2 or 3 million dollars. The owner, beyond tax benefits, may need a monetary settlement, though not in the order of 2 to 3 million dollars. In such cases, a defined “bargain sale” might be arranged if a source of funds can be located to provide a partial financial settlement for the owner. The owner benefits from an approved donation of the remainder of the value that can reduce the owner’s tax bill. The property is conserved.

A further variation would be a limited development option wherein a substantially reduced development program is developed which conserves much if not most of the property in question. An existing farmstead or homestead is retained and the property owner may even retain this farmstead/homestead. A much smaller number of lots surrounded by open space is carefully created; these lots typically command a considerably higher value than would be the case for a conventional subdivision. A large amount of open space is created and protected through a conservation easement, which may be donated as well, providing further tax benefit. The outcome is that the property owner, after taxes, may be almost as well off after a Limited Development approach to the property than would be the case with a complete conventional “as of right” approach to development. If the Limited Development concept has been prepared carefully, total property disturbance can be substantially reduced.

**Sustainable Watershed Management and Water-Based Zoning: Green Valleys Association and the Brandywine Conservancy**

**Design Considerations:**

Objectives for BMP 5.5.2 resemble BMP 5.5.1, although they must be understood as municipality-wide, rather than just site-wide:

- Maximize open space, especially sensitive areas (primary and secondary) and areas of special value.
- Maximize “sense of place” design qualities where growth is desirable.
- Balance infrastructure needs (sewer, water, roads, etc.) and use infrastructure to shape desirable growth

BMP 5.5.2 relies on application of smart growth techniques. The specific optimal blend of these smart growth techniques should respond to a variety of municipality characteristics and considerations. This BMP discussion assumes that proper and effective work has been undertaken by the municipality to determine the proper land uses and the proper densities/intensities of these land uses, municipality-wide. The question is then: how can these uses – this future development - be best planned within the municipality, achieving the best and most livable communities for the future, even as disruption to the natural landscape is minimized?

## Detailed Stormwater Functions

Concentrating growth, as defined here, is self-reinforcing from a stormwater management perspective – in terms of peak rate reduction, runoff volume reduction, and nonpoint source load reduction. Concentrating growth reduces total impervious areas and is likely to link with other BMP's in this Section, including reduced imperviousness, reduced setbacks, reduced areas for drives and walkways, etc. All of this directly translates into reduced volumes of stormwater being generated and reduced peak rates of stormwater being generated, thereby benefiting stormwater planning. Additionally, concentrating growth translates into reduced disturbance and increased preservation of the natural landscape and natural vegetative land cover, which further translates into reduced stormwater runoff. To the extent that this BMP also involves increased vertical development, net site roof area and impervious area is reduced, holding number of units and amount of square footage of a use constant. In all cases, density bonuses, if utilized in Receiving Zones, should be scrutinized to make sure that additional density allowed is more than balanced by additional open space being provided, including further reductions in street lengths, other impervious surfaces, other disturbed areas, and so forth. If properly implemented, these smart growth techniques such as TDR and Growth Boundaries will almost always translate into reduced total disturbed area and reduced total impervious area, even more dramatically than non-structural techniques such as clustering.

Documentation of the positive water quality effects of area wide growth concentration, holding total growth and development constant, is provided by the City of Olympia's (Washington) *Impervious Surface Reduction Study: Final Report 1995*. Holding population projected to 2015 constant, two dramatically different scenarios of land development (a baseline pattern of low density unconcentrated development reflecting recent development trends versus a concentrated pattern of increased density development in and near existing developed areas) were defined. These were mapped (Figure 5.5-7) and tested for a variety of stormwater-related impacts (total impervious area, total disturbed area, stormwater generation, non-point source pollutant generation). The analysis results indicated that the concentrated development scenario significantly reduced total impervious area. This was due to significant reductions in impervious surfaces being created in outlying rural and low density areas and more efficient utilization of impervious surfaces already created in areas of existing development. Other studies focusing on concentrated growth patterns have similarly confirmed these relationships and further documented a reduction in total disturbed areas created, stormwater being generated, and total non-point source pollutant loads being generated.

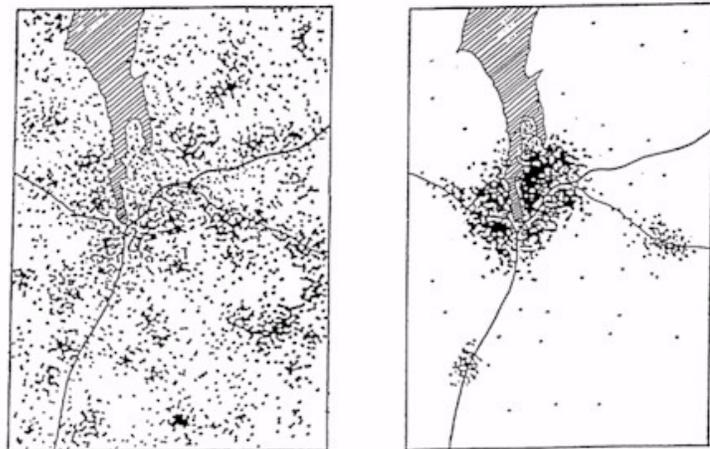


Figure 5.5-7 Dispersed versus Concentrated Development at the Regional Scale, (Source: "Impervious Surface Reduction Study", City of Olympia, 1995)

As stated above in BMP 5.5.1, water quality issues include all the non-point source pollutant load from impervious areas, as well as all the pollutant load from the newly created maintained landscape (i.e., lawns and other), much of which is soluble in form (especially fertilizer-linked nitrogen forms). Concentrating growth as defined in BMP 5.5.2, and combined with other Chapter 5 Non-Structural BMP's, minimizes impervious areas and the pollutant loads related to these impervious areas. After Chapter 5 BMP's are optimized, "unavoidable" stormwater is then directed into BMP's as set forth in Chapter 6, to be

properly treated. Similarly, for all that non-point source pollutant load generated from the newly-created maintained landscape and combined with other Chapter 5 Non-Structural BMP's, minimizes pervious areas and the pollutant loads related to these pervious areas, thereby reducing the opportunity for fertilization and other chemical application. Prevention of water quality degradation accomplished through Non-Structural BMP's in Chapter 5 is especially important because Chapter 6 Structural BMP's remain poor performers in terms of mitigating/removing soluble pollutants that are especially problematic in terms of this pervious maintained landscape. See Appendix A for additional documentation of the water quality benefits of clustering.

See Chapter 8 for additional volume reduction calculation work sheets, additional peak rate reduction calculation work sheets, and additional water quality mitigation work sheets.

## **Construction Sequence**

Application of this BMP must be undertaken by the municipality and must precede the start of any individual site planning and development process. In most cases, the municipality must take action in its comprehensive plan and then in its zoning and SLDO to incorporate the optimal blend of these smart growth techniques in their respective municipal planning and growth management program (the proactive municipality may act further to program for use of conservation easements, creation of a local land trust, and the like). At the same time, the site owner/builder/developer may elect to embrace options set forth in BMP 5.5.2 Concentrate Uses Area wide from the start of the process. Use of conservation easement donation, bargain sale or limited development all require careful consideration by the site owner/builder/developer from the beginning of the site development process.

## **Maintenance Issues**

Very few maintenance problems or issues are generated by BMP 5.5.2. Because most of these smart growth techniques are preventive in nature and in fact translate into maximum retention of undisturbed open space and the natural features contained within this open space, typically in private ownership, specific maintenance requirements as defined in a conventional manner are extremely limited, if not nonexistent.

## **Cost Issues**

According to Delaware's recent *Conservation Design for Stormwater Management: A Design Approach to Reduce Stormwater Impacts from Land Development*, application of the municipality-wide or areawide smart growth techniques will require some additional costs. Application of an optional TDR program or Growth Boundary program could cost a municipality in technical planning fees, including incorporation into the comprehensive plan and zoning ordinance (other costs may be required as well). Although it is hard to specifically document, a program of structural BMP's which mitigate adverse impacts of land development and achieve the same level of water resource (quantity and quality) performance throughout the municipality and its respective watershed areas becomes much more difficult to achieve, and much more expensive when all development and all lots are tallied. Prevention is simply much more cost effective.

Furthermore, BMP 5.5.2's preventive smart growth techniques, when fully applied, achieve a level of performance that exceed even the best structural BMP's. This clearly demonstrates why non-structural BMP's are important for all Pennsylvania watersheds, but especially important for Special Protection Waters where High Quality and Exceptional Value designations call for extremely high levels of water resource protection. In these cases, significant amounts of development watershed-wide, even

assuming use of Chapter 6 structural BMP's, may fail to provide the water resource protection which is needed to sustain special Protection Waters' values over the long-term.

### **Specifications**

BMP 5.5.2 is not a new concept and has been defined, discussed, and evaluated in many different texts, reports, references, sources, as set forth below. More specifications for clustering can be found in references that are included in above discussions.