Tool 10
Development Capacity Analysis

The following document, produced by MDP, provides a methodology for estimating the total amount of development that may be built in an area under a certain set of assumptions, including applicable land use laws and policies(e.g., zoning), environmental constraints, etc.

Estimating Residential Development Capacity

A Guidebook for Analysis and Implementation in Maryland

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I. Introduction and Guidebook Purpose

One of the fundamental questions facing land use planners is whether there is sufficient development capacity to accommodate future residential needs. Until recently, only a few Maryland jurisdictions were doing a thorough job estimating whether they had sufficient land and redevelopment opportunities to accommodate new growth.

That, however, has begun to change. Sparked by the work of a gubernatorial task force, the state of Maryland and its local jurisdictions have signed a Memorandum of Understanding that, for the first time, stipulated that local governments voluntarily measure their future development capacity. The compact also requires the state government to provide local jurisdictions with the technical assistance needed to complete the job. This breakthrough was prompted in part by the passage of Smart Growth legislation eight years ago and the vigorous promotion for the last several years by Maryland homebuilder groups, the Chesapeake Bay Foundation and 1000 Friends of Maryland.

Under this agreement, local governments in Maryland are now committed to conduct and include a development capacity (i.e. build-out) analysis when they update their comprehensive plans. [The 1992 Planning Act requires local governments to update their comprehensive plans every six years. All non-charter counties and municipalities are required to submit them to the Maryland Department of Planning for review. Charter counties are not required to do so, but most usually do.]

This change could place Maryland in the ranks of states such as Washington and Oregon that are considered leaders in performing this important, but often ignored, planning function.

The purpose of this Guidebook is to help local governments in Maryland conduct a development capacity analysis for their jurisdictions. Some local governments will do their own analysis; others will use the Maryland Department of Planning's (MDP) analysis or a modified version thereof.

The Guidebook is primarily designed for local government planners and relies heavily on the Task Force's final report, which can be downloaded from MDP's website at http://www.mdp.state.md.us/develop_cap.htm. This Guidebook provides overall guidance for data, methodology, and analysis reporting as well as step-by-step examples. The Task Force's report was fairly specific in many cases regarding various aspects of the analysis. This is reflected in these guidelines.

II. Defining Development Capacity Analysis

A Development Capacity Analysis, sometimes referred to as a "build-out analysis" or "buildable lot inventory," is an estimate of the total amount of development that may be built in an area under a certain set of assumptions, including applicable land use laws and policies (e.g., zoning), environmental constraints, etc. While this kind of analysis is most often associated with an estimate of capacity for new residential development, there is also value in estimating a jurisdiction's capacity to meet commercial and industrial needs, recreational needs or other land use goals. For now, Maryland's program focuses only on residential capacity.

Local governments should perform regular capacity analyses because it is integral to good long-range planning. It is important to have an estimate of the development supply (location, size, density type, etc.) in order to assure a jurisdiction is adequately planning for future growth.

III. Best Practices in Development Capacity Analysis

The planning technique of estimating future development capacity is not new, although only a handful of states are aggressive in their efforts to do so. Here are summaries of how two states, Washington and Oregon, and one city in Colorado (Fort Collins) handle this issue.

A. Washington State

Washington State adopted its Growth Management Act in 1990 as a response to statewide concerns about unmanaged growth, but did not add its "Buildable Lands Program" until May 1997. The Buildable Lands Program provides mechanisms for measuring the supply of residential, commercial, and industrial land to meet growing needs within urban growth boundaries. This tool requires jurisdictions to measure and respond to gaps between projected growth (targets) and current development patterns (actuals). The program addresses two key questions: Do local governments have enough suitable land to accommodate expected growth for 20 years? And, are urban densities being achieved in urban growth areas?

The Buildable Lands Program was introduced in the fastest growing counties of western Washington (Clark, King, Pierce, Snohomish, and Thurston) and the 97 towns within their boundaries. Affected jurisdictions are required to gather data on an annual basis and evaluate the data every five years (2002, 2007). The collected data and evaluation of development activity (actuals) is compared to the projections found in local comprehensive plans. Where gaps exist, local jurisdictions are required to introduce measures designed to bridge this gap (such as expanding the growth boundary).

The first report in 2002[1] showed adequate capacity to meet growth demands except for in a few cities. The report also highlighted trends in urban density and residential development such as the increase in urban residential densities throughout the six counties. The report demonstrated the greater effectiveness of growth management policies in achieving the state's growth management goals.

Although the results have been positive, state funding for the program was eliminated in 2002. The requirements are still in place, which presents a challenge to affected jurisdictions that struggle with the high cost of data collection. The next evaluation period is in 2007.

B. Oregon

Oregon's Urban Growth Boundary (UGB) law includes a provision to ensure that "a local government shall demonstrate that its comprehensive plan or regional plan provides sufficient buildable lands within the urban growth boundary established pursuant to statewide planning goals to accommodate estimated housing needs for 20 years."[2]

This statute, designed to ensure a sufficient supply of land within UGBs, demands an inventory of the buildable lands within the UGB as well as a determination of housing capacity, including a breakdown of types and densities. This law requires that local authorities take steps to address their housing demand over the next 20 years (through actions such as the expansion of the growth boundary or an amendment to the comprehensive land use plan)

C. Fort Collins, Colorado

In 1997, the city of Fort Collins, Colorado, adopted a long-term comprehensive planning tool or procedure called the Buildable Land Inventory Project. The program was started to manage the growth and development of the city by maintaining an inventory of vacant and buildable land inside the urban growth area.

The city of Fort Collins uses GIS data to track "vacant land absorption." This has proven to be a valuable tool for policy makers in making decisions about the growth of the city. By monitoring the city's growth, city leaders discovered that build-out was occurring at a rate faster than expected (when compared to the 1997 city plan).[3]

Fort Collins' planners say one of their biggest challenges has been to create a seamless process of data analysis using data sets that are not easily comparable.

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[1] State of Washington Department of Community, Trade and Economic Development. June 2003. *Buildable Lands Program: 2002 Evaluation Report – A Summary of Findings*. Available at: http://cted.wa.gov/_CTED/documents/ID_917_Publications.pdf

[2] Oregon Department of Land Conservation and Development. 2003. *ORS 197.296: Buildable Land Factors.* Available at www.orcities.org/webdocs/ORS/ORS197.296-298.html

[3] Carpenter, Katy and Timothy Wilder. 2004. City of Fort Collins: *BLIP – Buildable Land Inventory Project*. Available at: http://gis.esri.com/library/userconf/proc04/docs/pap1751.pdf

IV. Development Capacity Analysis in Maryland

A. Capacity Analysis Requirement under the Smart Growth Law

Analysis of development capacity is required under Maryland's Smart Growth law. The 1997 Priority Funding Areas (PFAs) Act states, "The designation by a County of a Priority Funding Area under this section shall be based on:

i. An analysis of the capacity of land areas available for development, including infill and redevelopment; and
ii. An analysis of the land area needed to satisfy demand for development at densities consistent with the Master Plan."[4]

Despite this requirement, the performance and quality of capacity analyses by local jurisdictions in Maryland has been inconsistent. The Maryland Department of Planning, by contrast, has consistently applied its capacity analysis tool, which contributed to the decision to establish the task force.

B. The Development Capacity Task Force

To assure that capacity analyses are conducted in a uniform way, local governments, Maryland's development industry, and environmental interests have been discussing the issue for at least the past four years. The goal was to decide whether legislation is necessary to require buildable lot inventories or build-out analyses at the local government level.

In October 2003, Governor Robert L. Ehrlich, Jr., sought to resolve this impasse by creating the Development Capacity Task Force as part of his Priority Places Executive Order 01.01.2003.33. The Task Force, in turn, conducted pilot land capacity analyses in five counties and five municipalities.[5] Maryland Planning Secretary Audrey E. Scott chaired the Task Force, which included members representing county and municipal governments, homebuilders, the environmental community, economic development interests, academia, advocates for historic preservation, and the planning community. Key issues addressed by the task force included:

i. What is the need for development capacity information?
ii. What are the growth trends and their implications for development capacity?
iii. Who conducts capacity analysis?
iv. What method and data are used?
v. What is the role and purpose of the analysis?
vi. Will the analysis be required in local government comprehensive plan updates or will it be a suggested addition?

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[4] Senate Bill 389, Chapter 759, Acts of 1997, page 11, lines 9-15. Available at: http://www.mdp.state.md.us/fundingact.htm.
[5] The 10 pilot jurisdictions included the municipalities of Chestertown, Havre de Grace, Salisbury, Frederick and Hagerstown and the counties of Harford, Montgomery, Anne Arundel, Worcester and St. Mary's.

To help implement its recommendations, the Task Force drafted a local government Memorandum of Understanding (MOU) and a gubernatorial Executive Order (see Appendix E of the Task Force Report for the complete documents). The MOU, signed by the Maryland Municipal League and the Maryland Association of Counties, commits local governments to conduct development capacity analyses. Jurisdictions may conduct their own analysis (per the Final Report's guidance) or work with MDP to complete the analysis. The Executive Order, commits MDP to continue its work with local governments to conduct local development capacity analyses. It also directs MDP to enhance its data and method over time.

As part of MDP's required routine review of comprehensive plan updates, the Executive Order directs MDP to specifically look for the local development capacity analysis. MDP is directed to comment negatively on a plan if a local government has not included a capacity analysis (its own or MDP's). In addition, MDP is directed to attach its own analysis for any county that fails to submit one on its own. This is expected to be unlikely because MDP has offered to assist local governments perform their analysis or even do it for the local government if necessary. These implementation steps are to be evaluated after two years (in approximately August 2006). If local governments fail to integrate development capacity analyses into their planning by then, the Task Force may consider legislation to require the analyses.

C. MDP's Role in Technical Assistance

MDP has been conducting development capacity analyses across the State for many years. This work has been conducted as part of local government technical assistance, Smart Growth/Priority Places implementation, watershed analyses, and other programmatic responsibilities within the agency. MDP's analysis relies heavily on the cooperation of and input from local government. When local governments and MDP work together, conducting a development capacity analysis is not an overly burdensome task. To be successful, however, MDP and local governments must share data, agree on key inputs and assumptions, and jointly review analysis outputs.

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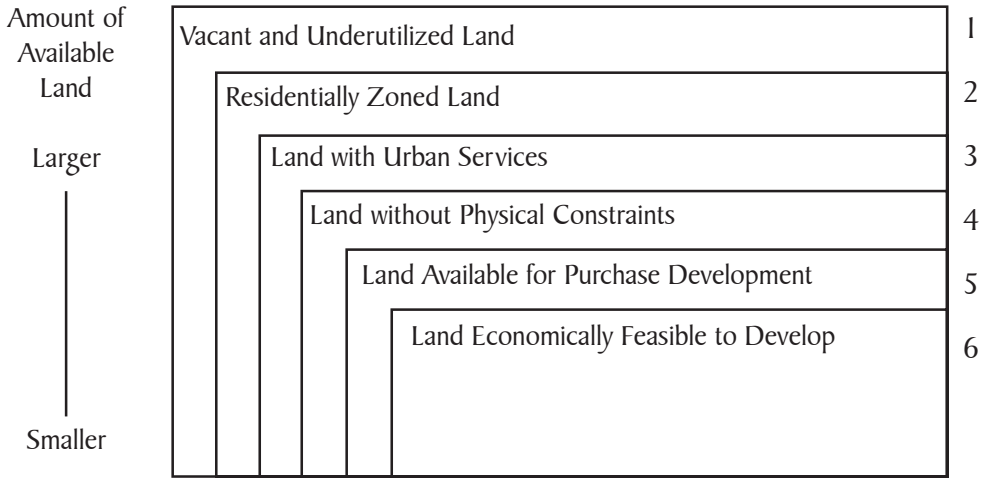
[6] Kaiser, Edward J. David R. Godschalk, and S. Stuart Chapin, 1995. *Urban Land Use Planning*. Urbana and Chicago: University of Illinois Press.

V. Conducting Development Capacity Analysis in Maryland

A. Definition of Development Capacity

Development capacity is the ability of land to accommodate greater development. According to Edward J. Kaiser, "In its simplest meaning, developable land is vacant or underused land, without severe physical constraints, which is planned or zoned for more intense use and has access to the urban services necessary to support development."[6] To illustrate this point, we use the Levels of Developability graph from Kaiser.

Table 1: ***Levels of Developability***[7]



B. What are the Key Steps in Calculating a Capacity Analysis?

The first step in creating a comprehensive local land monitoring system is to assess future development capacity. The five steps involved in conducting such an assessment are:

i. Identify vacant land and those lands that cannot be developed due to environmental constraints.
ii. Subtract land needed for urban public services.
iii. Add land that can be redeveloped or developed at greater intensity through infill.
iv. Identify land with public services.
v. Estimating development capacity.

While Table 2 demonstrates how to calculate these basic steps, the text below details how local government officials and staff can anticipate and address potential hurdles or complexities within each step.

[7] Kaiser et al. 1995. Page 198.
[8] Kaiser et al. 1995.

1. Identifying Vacant Land

Vacant land can be identified in a variety of ways: through field inspection, tax assessment records, and remote sensing[8]. It is important to realize that all methods have significant limitations, yet it is possible to find the right combination to fit one's needs.

Field inspections, for all but the smallest of urban areas, are prohibitively expensive. Sampling could reduce the cost, but leads only to summary measures or a synthetic database, neither of which produce a desired level of accuracy.

Identifying parcels classified as vacant in the assessor's records, and aggregating their land areas, is perhaps the least costly method of developing a vacant land inventory. Such simple aggregation, however, can lead to gross errors. Often in the past, the parcel size and use designation in the assessor's files were wrong, but the data has consistently improved, especially in the areas of interest for capacity analysis. Further, the assessor will generally classify a parcel as vacant only if the parcel is completely vacant. A ten-acre parcel, for example, with a single-family structure may be classified as developed even if local zoning allows, for example, six units per acre. Thus alternative methods must be used to identify parcels that are partially vacant.

Interpretation of remotely sensed data, such as aerial photographs, is an increasingly popular approach to augment or spot-check a jurisdiction's analysis, especially for rural areas. Constraints imposed by the resolution of the images, however, continue to limit its use in urban areas. Remote sensing allows a clear distinction between vacant and developed parcels, but a determination of development type or the extent of constraints on developed land is more difficult.[9]

In practice, a combination of methods is probably optimal. Metro, the regional government in the Portland, Oregon, metropolitan area, for example, uses air photo interpretation in combination with tax-lot maps and information about land characteristics and public utilities, all registered to common coordinates through GIS, to identify parcels that are fully vacant and those that are partially vacant. Even with this approach, however, specific rules must be adopted concerning how large the vacant segment of a partially developed parcel must be in order to classify that part as vacant land[10], and field inspection (either random or systematic) must be used to clean the database.

[9] Hopkins, L.D. and G.J. Knaap. 2000. An Inventory Approach to Land Supply Monitoring and it's Implications for Database Design. In *Monitoring Urban Land Supply with GIS*, edited by A. Vernez-Moudon and M. Hubner. New York, NY: John Wiley and Sons.
[10] Hall, C. 2001, Identifying Vacant Land, in Gerrit J. Knaap, *Land Market Monitoring for Smart Urban Growth*, Cambridge, MA: Lincoln Institute of Land Policy.

2. Identifying Environmental Constraints

Not all vacant land is developable. It may be constrained — either partially or absolutely — by a combination of governmental and private industry factors related to environmental conditions.

Almost all land is developable given enough demand, enough money, and the absence of policy restrictions. Even land covered with water can be developed: for example, San Francisco Bay Area development has occurred by filling parts of the Bay. Other developments float on the Bay. Thus, dividing vacant land into two mutually exclusive categories of "buildable (developable)" and "unbuildable (nondevelopable)" is a judgment informed by a simultaneous consideration of land characteristics, market economics, and public policy. It is only when policy is applied to measurable environmental conditions that a constraint becomes absolute. Of course, as knowledge, science, public opinion and politics change over time, policies – and their effect on whether land is developable – also change over time.

Typical environmental characteristics that render land as "unbuildable" are: if it is located in a floodplain, sloped more than some amount (usually 15 % to 25 %, depending on the use), in a wetland or riparian buffer, or particularly subject to natural hazards such as earthquakes, mud slides, or storm damage.[11] Jurisdictions with GIS capabilities can build and analyze overlay maps electronically to identify unbuildable land due to environmental constraints. To perform this function effectively, it is important for jurisdictions to build a team within an agency or department that includes environmental professionals, planners, and municipal lawyers to determine the limitations unique to your community.

3. Identifying Potential for Redevelopment and Infill

As many communities experience everyday, growth can occur as infill development on land that is already developed (adding more development on unused remainders of developed land) or as redevelopment (replacing existing development with new development).[12] Interest in urban infill and redevelopment has grown rapidly in the 1990s and, in fact, is a central goal of Smart Growth efforts in many jurisdictions. A number of sites, for example, have observed that as development pressure has increased, so has the potential for infill or redevelopment. Until this shift, the development of vacant land at the urban periphery (i.e., suburban development, now often referred to as green field development) had been the dominant means of accommodating urban growth.

Now, redevelopment of blighted urban land (or brownfields) or other underutilized urban parcels has become perhaps the most salient feature of Smart Growth strategies. But communities are finding that the techniques needed to estimate how much growth can be accommodated through such mechanisms are only now being

[11] Metro. 1997. *Urban Growth Report,* final draft. Portland: Metro;

[12] Redevelopment usually yields a net increase in developed space (housing units, commercial or industrial square footage) to accommodate growth but it need not.

developed. So far, consistent empirical work on rates of redevelopment, parameters that are essential to forecasting land consumption, are very limited.

In practice, however, redevelopment potential has, up to now, been gauged largely by using data on land value and assessed improvements. For parcels less than one acre, for example, Oregon's Metro compared improvement values to the improvement values of surrounding properties. Metro considered properties as "redevelopable" if the improvement value of the parcel was 50 % to 70 % of the mean improvement value of surrounding properties. ECONorthwest[13] arrayed all developed land in a matrix with the ratio of improvement to land value on one axis, and parcel size on the other, and then made judgments based on plan designation about the percentage of land in each category that might redevelop over a 20-year horizon.

To estimate infill potential, Metro determined the percent of building permits that had been issued over the last five years for parcels not included in the list of vacant land acreage. These permits Metro classified as "refill." Based on this method, Metro estimated that about 25 % of future housing units could be accommodated on land currently classified as developed.[14] Though Metro's approach seems reasonable, it is not clear that past rates of refill are a good indicator of future development patterns, especially as the capacity to accommodate infill and redevelopment becomes exhausted.

What is clear, however, is that to the extent that infill and redevelopment are strategies individual communities wish to pursue, those communities must develop a methodology to estimate as accurately as possible how much of their future growth can thus be accommodated.

4. Identifying Serviced Land

Although managing the supply of developable land is a major component of urban growth management, municipal ordinances often require developers to provide or pay for adequate urban services through a variety of exactions and impact fees. For land to be developable consistent with smart growth goals, it must be ripe for infill or redevelopment or, if it is a green field property, it must be vacant, unconstrained by physical factors or policy restrictions, and provided with urban services.

Identifying the supply of land with access to services requires both an articulation of service standards and the attribution of service capacity to land area. The articulation of service standards is necessary for any community that wishes to implement any type of policy that requires new infrastructure to come on line concurrent with new development. (Note that such fees and exactions on developers are generally used to pay for municipal services on new green field development and generally apply to larger scale developments. These fees and exactions generally do not apply to typical

[13] ECONorthwest, 1999. Regional Economic and Housing Analysis, Linn-Benton County, Albany OR: Cascade West Council of Governments.
[14] Metro (1997)
[15] FAC 9J-5.0055(2)

infill development projects. Thus, such fees and exactions may not act as a barrier to urban infill, but only to suburban green field development.) Florida administrative code, for example, requires local governments to establish service standards for roads, sanitary, sewer, solid waste, drainage, potable water, parks and recreation, mass transit, and public transit.[15] Levels of service standards vary extensively in degree of complexity, but all represent some ratio of the demand for service to the capacity of service available.

The ability of a community to determine if specific parcels of land are provided with services is equally complex and varies by the type of service being provided[16]. The general service area of an elementary school or fire station, which is essentially defined by its accessibility, is approximately round, assuming that transportation costs within the service area are uniform (which, unfortunately, is only approximately true even without taking into account the effects of hills or water bodies in the service area). The service areas around roads and sewer systems can be even trickier to determine because they depend on the route or network of roads or sewer lines, their capacity at different points along the routes or lines, and varying demand at different times.

In practice, communities have addressed this problem in a number of different ways. Montgomery County, Maryland, for example, has an extensive planning information system designed to implement its Adequate Public Facilities Ordinance. The County is divided into areas in which policy and service capacities are monitored for each. When the capacity of a given service reaches a critically low level in the policy area, development can be delayed until sufficient service capacity is provided.[17]

Similar procedures are used in many Florida jurisdictions[18]. In Oregon, where growth management policies require an adequate supply of buildable (but not serviced) land, the supply of urban services is treated in various ways. Metro's recent analysis of lands available for future UGB expansion (1998) identified the cost of providing services to various locations when considering how much and where to expand the UGB. Lower cost locations were ranked as stronger candidates for expansion.

5. Identifying Development Capacity

Once the net supply of serviced land has been determined, it is necessary to identify how much development capacity the land provides. Definitions of development capacity vary. Development capacity, for example, can be based on the capacity of ecological or public facility systems. Examples provided by Kaiser et al (1995) include those based on the evacuation capacity of a causeway in Sanibel, Florida, and the pollution-assimilation capacity of Lake Tahoe. As those examples make clear, however, the carrying capacity of natural and man-made systems are often not fixed but can be increased through infrastructure investments.[19]

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[16] Frank, James E and Mary Kay Falconer. 1991. The Measurement of Infrastructure Capacity: Theory, Data Structure, and *Analytics, Computers, Environment, and Urban Systems.* 14(4): 283-297.
[17] Godschalk, David R. and Stephan Baxter. 2000. *Montgomery County, MD: A Pioneer in Land Supply Monitoring from 1985 to 1998.* In *Monitoring Urban Land Supply with GIS*, edited by A. Vernez-Moudon and M. Hubner. New York, NY: John Wiley and Sons.
[18] FAC 9J-5.0055(2)
[19] Kaiser et al. (1995)

In situations where development capacity is not clearly constrained by natural systems, a first step in estimating capacity involves identifying land needed for urban infrastructure such as streets, water and wastewater facilities, schools, parks, churches, and other public and semi-public facilities. Net developable land is the land that is available for development after subtracting land needed for these forms of infrastructure.

Estimating land needed for infrastructure can be done using simple or complex methods. Simple methods involve the application of simple ratios—e.g., 15 acres of parkland per 1000 estimated population growth, or 25 % of developed land for streets. More complex methods take into account the size and configuration of parcels, the age distribution of the population, and the existing capacity of public and semi-public facilities.[20]

After subtracting out land needed for infrastructure, development capacity is typically estimated by type of land use using a technique called a build-out analysis[21]. For residential development, the standard approach is to disaggregate land supply by zoning classification (or plan designation) and to identify the maximum number of housing units allowed by zoning.

Though simple in concept, the standard approach has technical complications. Many of the technical issues concern the precise housing and employment densities that are allowed for each zoning classification. For some residential zoning categories, maximum density is quite clear: e.g., R5 allows 5 units per acres. For others (e.g., planned unit developments and mixed use urban centers), maximum housing and employment densities are often permitted within certain ranges and are therefore, for the purpose of calculating development capacity, considered ambiguous.

To further complicate this picture, zoned densities are often not attained by builders due to political decisions, opposition from nearby residents, or other factors. To account for this reality, Portland's Metro[22] incorporated what they called an "underbuild" factor as part of its capacity calculations. Specifically, Metro assumed that development will take place at only 80 % of maximum capacity allowed by zoning (MDP uses 75%). The use of such factors may provide a more realistic assessment of future development densities, but it confuses measures of development capacity with elements of a development forecast.[23] If, for example, development has historically taken place at 50% of true development capacity, and measures of capacity are adjusted by a 50% "underbuild" factor, then policy makers will be inclined to provide twice as much capacity and facilities to offset the perpetual underutilization of true capacity.

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[20] White, Mark S. 1996. *Adequate Public Facilities Ordinances and Transportation Management*. Planning Advisory Service Report Number 465. Chicago: American Planning Association.
[21] Knaap, Gerrit J. 1998. *Toward Model Statutes for the Land-Use Element: An Assessment of Current Requirements and Practice, in Modernizing State Planning Statutes*, PAS Report #480/81. Chicago: American Planning Association.
[22] Metro (1997)
[23] Knaap, Gerrit J. 1998. *Letter to Lydia Neill*, in Peer Review Report. Portland: Metro Growth Management Services Department.

Table 2: ***Sample Summary Table Used for Capacity Reporting***[24]

Other examples are available in the appendix.

Result	Process	Acres	Number of Parcels	Capacity
Total Acres in Parcels and Lots				
	Subtract land zoned for nonresidential use(commercial, industrial)			
Residentially Zoned Acres				
	Subtract tax exempt land(tax exempt code)			
	• Subtract protected lands and environmentally sensitive parcels (ag easements, wetlands, HOA land, etc.)			
	• Subtract other parcels without capacity (built out areas, etc.)			
Acres and Parcels with Capacity	Total capacity			
Capacity Inside PFA				
Capacity Outside PFA				
I. Subsets of the Analysis of Interest (these are not additive)				
Acres and Parcels with capacity associated with Underdeveloped land.	Improved Parcels (>$10,000), less than 5 acres.			
Acres and Parcels Associated with Small parcels.	Parcels <2 acres in size (improved or unimproved)			
Acres and parcels associated with larger, undeveloped parcels.	Includes unimproved parcels, greater than 2 acres with capacity and improved parcels greater than 5 acres with capacity.			

[24] Maryland Development Capacity Task Force, Final Report, July 2004

C. What Information and Data are Needed to Complete a Capacity Analysis?

The following is a list of minimum requirements for data that should be included in a development capacity analysis: (1) parcel data; (2) zoning maps and estimates of zoning yield; (3) lands protected or encumbered with environmental constraints; (4) local water and sewer plans; and, (5) information based on specific local planning expertise.

Requirements	Specifications	Notes
(1) Parcel Data	• MDP generates annual updates of MdProperty View, a geo-referenced database for every piece of land in Maryland. • MDP has a "GIS Data Partnership" through which a jurisdiction supplies MDP with planning datasets, such as zoning, master water and sewer plan maps, and protected lands in exchange for licenses of MdProperty View or FINDER	• Where jurisdictions have superior parcel data, such as a parcel polygon GIS file, they are encouraged to use it in their development capacity analysis.
(2) Zoning Maps and Estimates of Zoning Yield	• Maps of zoning districts (a guide to where future development is allowed). • Maximum density allowed in each zoning category. • Expected zoning yield.	• Zoning yield is one of the most important inputs into a capacity analysis. It is the actual average density of development associated with a specific zoning district in a specific jurisdiction. It is often less than the allowable density of a zoning district, since it accounts for land that is needed to build roads, on-site environmental features (steep slope, wetlands, etc.), market conditions, or other considerations when development projects are actually approved. • Local governments should examine factors that prevent developments from obtaining a zoning yield of 100% of allowable density per zoning district. • Estimating yields for mixed-use and PUD-type zones are necessary. Jurisdictions may want to consider several estimates of yields and other inputs to the analysis. This approach can be used to produce a range of capacity estimates given certain conditions, or even by approaching the analysis based on two or more possible development scenarios.
(3) Protected Land and Lands with Environmental Constraint	Environmentally constrained lands should be factored into the analysis, such as:	• Capacity analyses should take into consideration lands with any of the features mentioned in (3), but some of these features may not be present in every analysis.

Requirements	Specifications	Notes
	• Protected lands (land preservation easements, parks, homeowner association lands, historic preservation easements, etc.) • The "Critical Area" along the shoreline of the Chesapeake Bay and its tidal tributaries; areas surrounding drinking water reservoirs; streams and their buffers. • Floodplains • Historic, cultural, or archeological areas; • Steep slopes; and • Other areas as deemed appropriate and measurable.	• Some constrained lands may only be partially constrained (i.e. floodplains). A clear method for dealing with this issue should be included in a capacity analysis.
(4) Local Water and Sewer Plans	• Maps of existing and planned sewer and water service areas as well as areas where sewer and water is not planned. • Descriptions of each sewer and water service category (i.e. time frames for when new service is expected to be available)	• Zoning yields can be adjusted based on master water and sewer plan areas (i.e. if sewer exists or is planned, allowable density is generally higher).
(5) Local Planning Expertise	• Examples of local modifications include: • Small area plans or sector plans (TOD areas, mixed use centers, etc.) may provide ancillary information about how an area will develop over time. Such plans often articulate a more elaborate picture of future growth than zoning. • General policies and procedures within the jurisdiction that may have an impact on capacity analysis (subdivision requirements, anomalies of water and sewer plans or zoning categories, etc.). • Trends and market impacts on realized density within the local jurisdiction (i.e., the market may not support the same densities that may be in a zoning district). • Knowledge of data weaknesses, customized situations, etc. • Other information about zones or issues that my affect future development, such as infrastructure issues.	• Often in local jurisdictions there are plans, policies or trends that are not captured in empirical GIS data (listed in (5) but are nonetheless valuable to any capacity analysis. This local planning expertise should be integrated into analysis by adjusting key inputs, such as zoning yield, sewer service assumptions, protected lands status, etc.

VI. Where and When to Present Findings

A. *Frequency of Development Capacity Analysis*

At a minimum, development capacity analysis should be included each time a local government updates its comprehensive plan and should be part of planning in general at the local level. Local governments are encouraged to do a capacity analysis even if they have recently adopted a new comprehensive plan to prevent a local government from waiting years to complete a capacity study.

B. *Capacity Analysis in Comprehensive Plans*

The capacity analysis should be included in the local government's comprehensive plan. This could be done in the form of:

1. A chapter in the plan, including all of the suggested elements of a capacity analysis.
2. An appendix to the plan, including all of the suggested elements of a capacity analysis.
3. A table within the plan, that refers to an external report that includes all of the suggested elements of a capacity analysis.
4. A reference within the plan to an external report that includes all of the suggested elements of a capacity analysis.

If the analysis is not presented in the comprehensive plan directly, an explanation of how capacity analysis was used in the local planning process is recommended.

C. *Annual Report*[25]

Jurisdictions should issue an annual development report that highlights key development trends in and out of the PFAs. MDP can assist jurisdictions develop this annual report. At a minimum these reports should include the following items:

1. Approved development plans and recorded lots inside and outside of the Priority Funding Area (PFA);
2. Estimates of the jurisdiction's capacity for additional infill development, development of underdeveloped parcels, and redevelopment;
3. Actual development yields per zoning district (gross and net); and
4. Jurisdictions should make their zoning, sewer service areas, protected lands and related data available for capacity and other analyses. Jurisdictions should make available development review pipeline information, such as approved development plans, recorded lots, number of units, type, etc.

[25] Many of the reports listed in this section have long been required under Article 66B, Maryland's state planning enabling legislation.

Appendix A:

Example of Development Capacity Calculation for Chestertown[26]

Result	Process	Acres	Number of Parcels	Capacity
Total Acres in Parcels and Lots		1,405 acres	1,674	
	Subtract land zoned for nonresidential use (commercial, industrial)	384 acres	285	
Residential or Mixed Use Zoned Acres		1,021 acres	1,389	
	Subtract tax exempt land (tax exempt code)	216 acres	101	
	Subtract protected lands and environmentally sensitive parcels (ag easements, wetlands, HOA land, etc.)	8 acres	13	
	Subtract already built-out areas	428 acres	1,181	
Acres and parcels with Capacity	Total citywide capacity	369 acres	94	1,185
Capacity Inside PFA		369 acres	94	1,185
Capacity Outside PFA				
Subsets of the Analysis of Interest (these are not additive)				
Acres and parcels associated with underdeveloped parcels	Improved parcels (>$10,000), less than 5 acres	15 acres	12	31
Acres and parcels associated with small parcels	Parcels <2 acres in size (improved or unimproved)	54 acres	82	103
Acres and parcels associated with larger, undeveloped lands (includes mixed use)	Includes unimproved parcels, greater than 2 acres with capacity and improved parcels greater than 5 acres with capacity.	311 acres	10	1,070

[26] Maryland Development Capacity Task Force, Final Report, July 2004

Appendix B: Example of Development Capacity Calculation for Harford County[27]

Result	Process	Acres	Number of Parcels	Capacity
Total Acres in Parcels and Lots		314,959 acres	86,617	
	Subtract land zoned for nonresidential use (commercial, industrial)	12,110 acres	3,119	
Residential or Mixed Use Zoned Acres		302,849 acres	83,498	
	Subtract tax exempt land (tax exempt code)	97,321 acres	1,375	
	Subtract protected lands and environmentally sensitive parcels (ag easements, wetlands, HOA land, etc.)	50,162 acres	2,647	
	Subtract other parcels without capacity (built-out areas, etc.)	54,468 acres	71,061	
Acres and parcels with Capacity	Total capacity	106,270 acres	8,498	33,859
Capacity Inside PFA		9,324 acres	3,074	22,131 ***
Capacity Outside PFA		96,946 acres	5,424	11,728
Subsets of the Analysis of Interest (these are not additive)				
Acres and parcels with capacity associated with underdeveloped parcels	Improved parcels (>$10,000), less than 5 acres	1,435 acres	864	1,585
Acres and parcels associated with small parcels	Parcels <2 acres in size (improved or unimproved)	2,750 acres	4,004	4,530
Acres and parcels associated with larger, undeveloped parcels	Includes unimproved parcels, greater than 2 acres with capacity and improved parcels greater than 5 acres with capacity.	102,680 acres	4,214	28,528

*** Note: MDP is working with Harford County to correct a few problem parcels that will result in a reduction of between 2,000 and 3,000 units of capacity.

[27] Knaap, Gerrit J. 2004. *Monitoring Land and Housing Markets: An Essential Toll for Smart Growth.* Report for National Center for Housing and the Environment.

Appendix C:
Example of Buildable Acres for Metropolitan Portland[28]

Gross vacant acres (excludes 1998 UGB amendments)	45,800
Less: Environmentally constrained land	(8,200)
Gross vacant buildable acres	37.600
Less: Federal, state, county, city-owned lots	(1,900)
Less: Acres of platted single-family lots	(2,900)
Less: Streets	(5,400)
Less: Schools	(1,100)
Less: Parks	(3,700)
Less: Places of worship	(700)
Net vacant buildable acres	21,900

[28] Hall, Carol, 2001. Identifying Vacant Land, in Gerrit J. Knaap, *Land Market Monitoring for Smart Urban Growth*. Cambridge, MA: Lincoln Institute of Land Policy. Page 65.

Appendix D:

Example of Development Capacity Worksheet for Washington State[29]

	Urban Comprehensive Plan Designations										
	Residential					Employment					
	Housing Type/Density Categories				Sub-total	Employment Sector/ Designation Categories				Sub-total	Totals
A. Total gross acres of vacant, partially-used, and underutilized land.											
B. Total area above considered unbuildable due to critical areas, zoning, right-of-way, and public use requirements.											
C. Total net buildable area of vacant, partially-used and underutilized land (A-B).											
D. Total net buildable area of land without adequate water/waste water infrastructure during remaining portion of planning period.											
E. Total net buildable area of land with adequate water/waste water infrastructure during remaining portion of planning period (C-D).											
F. Total net buildable area of land required for future public facilities and public purpose lands.											
G. Total net buildable area of land not required for future public facilities (E-F).											
H. Total net buildable area of land assumed not to be available for development during remaining portion of planning period.											
I. Total net buildable area of land assumed to be available and suitable for development during remaining portion of planning period (G-H).											

[29] *Buildable Lands Program Guidelines.* Washington State Community, Trade, and Economic Development Report.

Local Government Memorandum of Understanding Regarding Residential Development Capacity Inventories

August 19, 2004

(1) The Maryland Department of Planning (MDP) and local governments, (county and municipal), including their respective representative organizations the Maryland Association of Counties (MACo) and the Maryland Municipal League (MML), and the other members of the Development Capacity Task Force understand the importance and usefulness of land capacity inventories as a beneficial land-use planning tool. Recent efforts by MDP and selected local governments to establish capacity inventories have resulted in a renewed State and local government planning partnership to address this complex land-use planning tool. MDP's continued support, including technical assistance, is essential to maintaining this partnership and to further the interest of county and municipal governments to implement the capacity inventory planning tool.

(2) MDP, MACo, and MML shall continue to work with county and municipal governments to encourage the creation of land capacity inventories and their inclusion in comprehensive plans and for Priority Funding Area changes. County and municipal governments will also further the other recommendations of the Governor's Development Capacity Task Force (DCTF). MACo and MML will continue to encourage local governments to share needed land-use information and work with MDP in creating capacity inventory inventories.

(3) The commitment to the creation of land capacity inventories and their inclusion in comprehensive plans and for Priority Funding Area changes by local governments is contingent on MDP providing support as needed, including technical assistance, which is consistent with a recommendation of the Maryland Smart Growth Policy Collaborative that instructed "the Administration to provide funding to State and local governments to develop land capacity inventories."

(4) In developing the capacity inventories, MACo and MML will encourage local planning departments to use the analysis developed by MDP and used throughout the work of the DCTF that estimates development capacity in and out of Priority Funding Areas. However, it is expected that the inventory will be customized and enhanced according to best practices by local jurisdictions to the extent feasible, based on the availability of resources. Jurisdictions that currently have their own capacity inventories will share them with MDP.

(5) For the purpose of reporting key development trends and to aid in the production and tracking of development capacity, local governments will develop annual development reports. As recommended in the Task Force Report, these annual reports should provide information on zoning yields, rates of infill and redevelopment, environmental constraints, and development trends.

(6) MDP shall consult with the Maryland State Builders Association, MACo, and MML to develop a proposed schedule for conducting its capacity analysis with the local governments. Key considerations in the development of this schedule include a jurisdiction's comprehensive planning cycle and its growth pressure. A local jurisdiction shall be notified of the estimated date of the commencement of the inventory analysis in collaboration with MDP.

(7) Two years after the execution of this MOU, MDP will survey the progress of local government land capacity analyses for consistency with the Governor's Development Capacity Task Force recommendations and the Governor's Executive Order. This time period anticipates the uncertain fiscal realities facing both the State and local governments and also provides them sufficient time to demonstrate commitment towards developing this land-use planning tool. If this survey of progress is determined to be unacceptable, MML and MACo will work with the Administration and the members of the original Development Capacity Task Force to draft mutually agreeable legislation to remedy this lack of progress. Members of the Task Force will not introduce legislation related to development capacity until this time.

(8) For the purpose of continuing progress in developing capacity analyses, representatives of MML and MACo will meet quarterly with MDP, the Homebuilders, and other members of the Task Force to track progress, exchange information, and share lessons learned. These meetings will also help to track the progress of creating the capacity inventories per paragraph (7) above.

(9) This MOU is contingent on the Governor signing the corresponding Executive Order that was also drafted by the Task Force, or a version that closely resembles this draft. The Draft Executive Order is intended to insure that State and local resources are deployed in a cooperative and coordinated way to implement the recommendations of the Task Force. It specifies that MDP shall provide technical assistance (e.g., data, analysis, examples, guidance) to local governments for the purpose of including the results of development capacity analysis in comprehensive plan updates and for Priority Funding Area changes.

Local Government Organization Signatories

Maryland Association of Counties
County Executive James M. Harkins, Harford County, President

Maryland Municipal League
Mayor Barrie P. Tilghman, City of Salisbury, President

Development Capacity Task Force Members

State of Maryland, Task Force Chair
Secretary Audrey E. Scott – Maryland Department of Planning

Municipal Representative
Ms. Dianne Klair – Manager, Community Development and Planning, City of Havre de Grace

County Representative
Mr. Arnold "Pat" Keller – Planning Director, Baltimore County

Homebuilders Representative
Mr. Frank Hertsch – President, Morris & Ritchie Associates, Inc.

Academic Representative
Dr. Gerrit Knaap – Executive Director, National Center for Smart Growth Research and Education, University of Maryland

Environmental Representative
Mr. George Maurer - Senior Planner, Chesapeake Bay Foundation

Planning Community Representative
Mr. Dirk Geratz – President, Maryland Chapter – American Planning Association

Economic Development Representative
Mr. John Savich – Director of Economic Development, St. Mary's County

Historic Preservation Representative
Mr. Tyler Gearhart – Executive Director, Preservation Maryland

EXECUTIVE ORDER
01.01.2004.43

Residential Development Capacity Implementation

WHEREAS, Executive Order 01.01.2003.33 created the Development Capacity Task Force to study local residential development capacity inventories and develop recommendations to enhance land-use planning consistent with the Administration's Priority Places Strategy;

WHEREAS, The Task Force has issued its final report on the Development Capacity Study to the Governor, but should continue to exist to consult with the Department of Planning on capacity inventory issues;

WHEREAS, The Maryland Department of Planning and local governments (county and municipal), including their respective representative organizations, the Maryland Association of Counties, and the Maryland Municipal League, as well as other members of the Task Force, understand the importance and usefulness of land capacity inventories as a beneficial land-use planning tool;

WHEREAS, Recent efforts by the Maryland Department of Planning and selected local governments to establish capacity inventories have resulted in a renewed State and local government planning partnership; and

WHEREAS, The Maryland Department of Planning's continued support, including technical assistance, is essential to maintain this partnership and to further the interest of county and municipal governments to implement the capacity inventory planning tool.

NOW, THEREFORE, I, ROBERT L. EHRLICH, JR., GOVERNOR OF THE STATE OF MARYLAND, BY VIRTUE OF THE AUTHORITY VESTED IN ME BY THE CONSTITUTION AND LAWS OF MARYLAND, HEREBY PROCLAIM THE FOLLOWING ORDER, EFFECTIVE IMMEDIATELY.

A. The Development Capacity Task Force, created in Executive Order 01.01.2003.33, shall continue to function as an advisory body to the Department of Planning. The Task Force shall dissolve four years after the effective date of this Executive Order.
B. The Maryland Department of Planning shall:
    1. Provide technical assistance (e.g., data, analysis, examples, guidance) to local governments for the purpose of creating guidelines for development capacity analysis, to be included in the results of development capacity analyses in comprehensive plan updates and for Priority Funding Area changes.
    2. Consult with the Development Capacity Task Force to develop a proposed schedule for conducting its capacity analysis with local governments, and notify local governments of the proposed schedule.
    3. Review comprehensive plans with the expectation that results of development capacity analyses are included and are a factor in the plans' policies.

4. Meet quarterly with the Development Capacity Task Force to track the progress of developing capacity analyses, exchange information, and share lessons learned.

C. Reporting.

1. For the purpose of reporting key development trends and to aid in the production and tracking of development capacity, the Maryland Department of Planning will request that local governments generate annual development reports to be submitted to the Department, which should include information on zoning yields, rates of infill and redevelopment, environmental constraints, and developments trends.
2. The Task Force has prepared a Local Government Development Capacity Inventory Memorandum of Understanding, that constitutes an agreement between the State and local governments to implement the Task Force's recommendations by, among other things, providing information on development trends and by conducting their own development capacity analysis, with State assistance if necessary, and including them in their comprehensive plans.
3. Two years after the execution of the Local Government Development Capacity Inventory Memorandum of Understanding, the Department will survey the progress of local government land capacity inventories for consistency with the Development Capacity Task Force's recommendations and this Executive Order. If this survey of progress is determined to be unacceptable, the Department will consult with the Development Capacity Task Force to identify potential legislative remedies.

GIVEN Under My Hand and the Great Seal of the State of Maryland, in the City of Annapolis, this 19th Day of August 2004.

VII. Acknowledgement

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