

Getting the Density You Want

by Elizabeth Humstone

Across the United States over the past 50 years, development has increasingly spread out and average densities declined. On a forty-acre parcel, where once you could find over 1,500,000 square feet of mixed uses, today you are more likely to find one 150,000 square-foot big box store.¹

House sizes and yards are about double today what they were in the 1950s. Nevertheless, there is evidence that these patterns are beginning to shift. As communities struggle with issues of climate change, energy consumption, transportation, and affordable housing, many are looking for opportunities to encourage more concentrated development.

Higher densities of housing and commercial development have been linked to healthier lifestyles, lower auto use, and reduced energy consumption.² Low and moderate income housing is more finan-

cially viable at higher densities. In spite of the benefits, perhaps nothing gets a community more riled up than a discussion of density. Some fear that density – if too high – will create congestion, deplete open space, and block light and air. Others fear that density – if too low – will eat up valuable natural resources, tax community services, and fail to meet housing needs.

Often, discussions of density occur without any reference to how it can be applied in the community. The job of a planning commissioner is to bring helpful information about density to these discussions, including a definition of density, why it is important, and how it can best be applied taking into account the community's unique character and vision.

WHAT DOES DENSITY LOOK LIKE?

When residents hear the term *high density*, they often picture high-rise housing towers that lack privacy and open space, surrounded by surface parking. And when the term *low density* is used, large-lot rural subdivisions may come to mind. Neither may be the case.

As has been aptly illustrated in Julie Campoli and Alex MacLean's book, *Visualizing Density*, even the same densities take many different forms and have different impacts on the viewer. Take a look, for example, at the paired photos on the bottom of this page and the next.

Our perceptions of density are usually governed by the design of projects – how high they are, how they are sited, how close they are to the street, how much landscaping there is, and how doors, windows, porches, and roofs are articulated. Visual preference surveys have shown that people may dismiss one project as too dense while approving of another project that has the same density.³ One of the challenges for planners and planning commissioners is to determine the qualities that will make desirable densities acceptable in their communities.

¹ Julie Campoli, Elizabeth Humstone, and Alex MacLean, *Above and Beyond: Visualizing Change in Small Towns and Rural Areas* (American Planning Association, 2003), pp. 100-101.

² For a good summary, see the Urban Land Institute's *Higher-Density Development: Myth and Fact* (2005).

³ Editor's note: for more on the use of visual preference surveys, see Anton Nelesen & James Constantine, "Understanding & Making Use of People's Visual Preferences, (PCJ #9); available at: www.plannersweb.com/visualpreferences.html.

The development in Orlando, Florida (left) and in Longmont, Colorado (right) are built at the same density: 5.3 units/acre. The aerial photos are by Alex MacLean from his book *Visualizing Density* (co-authored by Julie Campoli).



ALEX MACLEAN

PLANNING FOR DENSITY

1. The Municipal Plan

The starting point for deciding on density is the municipal plan. The plan sets forth the overall vision for the community and establishes the land use pattern, the transportation system, plans for public facilities and services, and natural resource policies. How do you determine how much density is enough or how much is too much? Each community will have to make this decision given its own situation and vision for the future.

2. Growth Estimates

One of the functions of a municipal plan is to determine how the community will meet current and future needs based on trends in population, housing, jobs and services, and existing conditions. How fast the community is growing, and what the characteristics of the new residents are likely to be, will help determine what densities need to be considered for the future. For example, if a new employer with low-wage jobs announces plans to move to the community, higher density rental housing may be needed. For those areas with a concentration of seasonal homes, low densities to protect lakeshores or steep slopes may be appropriate.

4 PAS QuickNotes No. 12, Density.

5 See *America's Families & Living Arrangements: 2003* (U.S. Census Bureau, Nov. 2004), p. 4.

Two more very differently designed developments, but again at comparable densities: 13.5 units/acre in Castro Valley, California (left) and 13.2 units/acre in Chicago, Illinois (right).



Defining & Measuring Density

According to the American Planning Association, density is “the amount of development in a given area.”⁴

Planners measure density in several different ways. To understand regional patterns of growth, density is often measured in terms of people per square mile. According to the U.S. Census, the average population density of the United States in 2000 was about 80 people per square mile, and for urbanized areas 2,670 people per square mile.

Communities that are job and service centers for surrounding towns may define population more broadly to include employees and daily visitors, as well as residents. When these figures are added to base population numbers, they are often referred to as population intensity or service population. Intensity can be a measure of both population and development density.

For housing and zoning standards, density is typically measured in terms of *units per acre* or *minimum square feet of*

land area per unit. Even these terms may be modified by communities who use the term net density, which means the amount of development permitted for a given area once land not used for residential purposes (streets, sidewalks, parking, recreation land, utility easements, etc.) is subtracted.

Some communities take the net density definition a bit further by not allowing certain natural features, such as water bodies, wetlands, steep slopes, and rock outcroppings, to be counted as “developable.”

For commercial and industrial uses, density (in some places referred to as intensity) is either measured by the number of square feet per acre or by floor area ratio. Floor area ratio is the measure of the total amount of square footage of the building divided by the total square footage of the parcel on which it is built. For example, a 10,000 square foot commercial lot with a floor area ratio of .5 could have 5,000 square feet of commercial space built on it. This space could be configured in one, two, or three or more stories, depending on the zoning regulations for height and lot coverage.

Many communities are now realizing that only a small share of their population (under 25 percent nationally⁵) consists of two parents with children. Their plans must also provide for single parents, the elderly, empty nesters, and

young adults. These households have a variety of housing needs; many desire smaller units that are easily accessible to transportation, retail, and jobs and services.

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3. Inventory of Current Conditions

Every plan should set forth the current conditions in the community, including the intensity of land use. An assessment of existing densities and their distribution around the community is an important first step in determining future densities. To measure densities, first delineate the boundaries of the areas to be analyzed and then determine how the data will be collected.

U.S. Census data can be used to measure density. Julie Campoli and Alex MacLean, the co-authors of *Visualizing Density*, have prepared a step-by-step guide to how this can be done.⁶ Other sources include town property records and ortho-photo maps. Property records provide the size of lots and buildings. Using ortho-photo maps, measurements can be made of the number of units or building footprints within a given area from which the density can be calculated. These densities should be compared to natural, cultural, and physical conditions of the land, community facilities and services, and transportation in order to decide if they should be maintained or altered.

4. Connecting with Community Goals

Density should be closely correlated with community goals for health, environmental protection, energy conservation, alternative transportation, and neighborhood character. Many communities are now reexamining their assumptions that low densities protect neighborhood character and are better for the environment and public health.⁷ They are responding to a growing body of evidence that compact, walkable communities promote healthier lifestyles. As a result, they are looking for locations where densities can be increased.

Any consideration of an alteration in density must include an assessment of the character of a neighborhood and how its existing densities are working today.

For example:

- are moderately high densities promoting walking, but lacking in amenities?
- are densities too low to encourage walkable neighborhoods?
- are there historic areas where increasing density will require special considerations?
- are there opportunities for modest infill development, such as accessory apartments or duplexes, that will retain the neighborhood character?

5. Links to Transportation

In general, communities will want to encourage higher densities in village and town centers and where transportation options, such as walking, bicycling, bus, and rail service, are readily available or could be added.

How much density is enough to support a bus route or transit? Hannah Twaddell covered this in her article, "The ABC's of TOD: Transit-Oriented Development," published in the last issue of the *Planning Commissioners Journal* (PCJ #73, Winter 2009). She reported that densities ranging from about 7 to 20 units per acre are typically required to generate enough riders for 15 to 20 minute frequencies on local bus routes. Twaddell notes that light rail service requires higher densities, typically between 9 to 35 or more units per acre.⁸ Other sources suggest that employment densities of 50 jobs per acre or more best support high frequency, high volume light rail.⁹

6. Links to Community Services

Many residents worry that more density will place excess demands on public facilities including water, sewer, roads, schools, and emergency services. This concern should be addressed by deter-



Some FAQs on Density:

1. Q. Will higher density housing cause my taxes to rise because of excessive demands on public facilities, including water, sewer, roads, and schools?

A. Not necessarily. Some higher density housing has lower school costs due to fewer children per unit and lower bus transportation costs. All residents must pay for their own electrical, gas, trash, water, and sewer usage. Other costs are lower due to the shorter utility lines and roads in compact developments.

2. Q. Don't higher density developments increase traffic and cause congestion?

A. Actually, there are fewer auto trips per household in apartments and high rises than in single family homes if, as is often

the case, essential retail and services are nearby.

3. Q. Won't higher density housing create more adverse environmental impacts such as increased stormwater runoff?

A. There are more opportunities to manage stormwater runoff with higher density development due to less impervious surface than with low density, spread out development. In addition, water consumption tends to be lower and there is less open space used per unit.

4. Q. Doesn't higher density threaten historic buildings & neighborhoods?

A. Many community groups become concerned that historic values will be compromised when densities are increased. It is important to identify the historic features within a neighborhood before proposing any changes. Any recommended changes

should show how these values will be retained. For example, does the historic significance of the area rest in the architectural style of the buildings? If so, can that be reflected in newer buildings or additions? Is the density of development – heights, setbacks, lot sizes – varied or consistent? Is there a way to increase density without visual disturbance, such as by allowing large older homes to be divided into two, three, or four units?

5. Q. Does higher density mean we'll have less green space in our community?

A. Not necessarily. With careful planning, increasing densities may save more green space for your community. By accommodating housing and commerce in a smaller area, more land is available for recreation, farming, forestry and protection of scenic views.

mining the capacity of public facilities where more residents and jobs are planned.

Keep in mind also that the impact on facilities and services will vary by the type of housing and intensity of employment to be provided. Higher density development can save on costs for public facilities. Multi-family housing and townhomes often have fewer occupants than single-family homes. Some types of commerce, such as small-scale retail and services, have a higher concentration of jobs than warehouses and big box stores.

7. Environmental and Natural Resource Protection

When planning for environmental or natural resource protection, communities should consider the density of development they allow in these critical areas. Zoning farmland for a density of one unit per acre is not going to ensure that farming will continue. Allowing dense development on steep slopes is likely to bring the community problems with erosion, road wash-outs, and sewage disposal. Communities that have undertaken an assessment of critical environmental and natural resources often use this information to lower the density of development in sensitive areas.

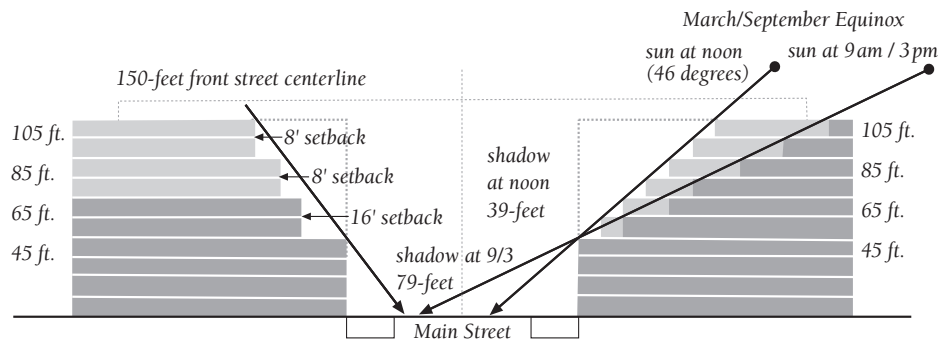
6 "Steps for Using the Census 2000 to Measure Density (units per acre)," available at: www.lincolnst.edu/subcenters/visualizing-density/census.pdf

7 See, e.g., "Measuring the Health Effects of Sprawl," by Barbara A. McCann & Reid Ewing (Smart Growth America, Sept. 2003).

8 Some call for even higher housing densities. The Washington State legislature has been debating a bill that, as originally proposed, would have required Seattle and other cities to authorize development at 50 units per acre within a one-half mile radius of each light rail or rapid bus transit station in their community. As of March 17, 2009, the bill had been amended to call for local plans and regulations to "encourage development along transit lines and at major transit stations at levels that support transit-oriented communities."

9 See, e.g., Lawrence D. Frank and Gary Pivo, "Impacts of Mixed Use and Density on Utilization of Three Modes of Travel: Single-Occupant Vehicle, Transit, and Walking," *Transportation Research Record No. 1466* (1994).

10 See Hans Blumenfeld, *The Modern Metropolis: Its Origins, Growth, Characteristics and Planning* (MIT Press, Cambridge, MA, 1967), p. 175.



In Burlington, Vermont, zoning changes to allow increased height and density in the downtown core are being considered along with upper story building setbacks. This diagram illustrates how setbacks would allow for more sunlight to reach Main Street (which runs east-west through downtown) at various times of day during the March/September equinox, mitigating the impacts of the increased height.

Communities need to consider both density and lot size when planning for these resources. There is a difference between density and lot size, however. Lower densities will limit the total number of units on a parcel of land or in an area. Large lots will spread these units out over a larger area than small lots clustered in a portion of the parcel.

The Bottom Line

Having considered the above, some communities may decide to increase existing densities in order to address growth trends and the community's vision and goals as set out in their plan. In other places, a decision may be reached that existing densities are essential to neighborhood character and should be maintained. Still other municipalities may find that densities are too high and need to be lowered, for example, to protect an important natural resource such as farmland.

The bottom line is that it is up to each town and city to make an informed decision that best fits the community's needs. The next section describes ways communities can implement densities to work better for them.

FACTORS IN MAKING DENSITY WORK FOR YOU

To make density work, whether it is high, moderate, or low density, specific standards need to be developed in your municipal zoning regulations.

One of the challenges for planners is to determine the qualities that will make desirable densities acceptable in their

communities. Some factors that can be important to determining what density will look like include:

1. Height

In general, lower heights are compatible with lower densities, and higher heights with greater densities. Figuring out appropriate heights depends on many factors, including the character of the area, desired uses and activities, walkability, view enhancement, and light and air.

Communities are rightly concerned that higher densities may not fit with the character of the area. To minimize negative impacts and accommodate increased density, some communities have implemented requirements that new buildings may be higher than existing ones only if they are stepped back from the street on the upper floors. Such guidelines can protect light and air on the street, while also maintaining compatibility with historic streetscapes.

Municipalities are also often frustrated when developers do not build to the heights allowed in the zoning code. The concern is that valuable urban land is being inefficiently used. These communities should consider implementing *minimum* height standards, such as requiring at least three or four stories in new buildings in downtown or core areas. This concept is not a new one. Hundreds of years ago, builders were required to build to certain heights in order to use land efficiently and create order in the built environment.¹⁰

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"New urbanist" developments, as in Abacoa, Florida, often provide smaller setbacks than traditional subdivisions, allowing for increased density and a more compact development pattern. This can be done without sacrificing attractively designed housing. In fact, this denser pattern is more in keeping with older, early 20th century suburban neighborhoods such as Chicago's "bungalow" district (on right).



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2. Setbacks

Citizens often fear that increases in density will bring overcrowding and block light and air. Setbacks can help to minimize these impacts by requiring minimum distances between buildings and the street. However, if setbacks are too large, then allowed densities may not be achieved.

A good rule of thumb is to look at existing buildings first before formulating new setbacks. Evaluate the setback pattern and how important it is to maintaining the neighborhood's character. If reducing setbacks between buildings and the street would not harm the streetscape, then consider doing this as it would enable more density on the site. If the neighborhood has little or no separation between buildings, consider repeating this pattern for new construction.



Structured parking can reduce the amount of surface parking lots needed, increasing the overall density that can be achieved in a downtown area. Garages can be designed to blend in unobtrusively, as here in Burlington, Vermont.

3. Lot Coverage

The amount of land that a building footprint consumes can affect the density of building construction. Coverage needs to be considered in conjunction with setbacks and height requirements. If, for example, your community mandates a low lot coverage percentage and allows eight story buildings, you are likely to have towers surrounded by extensive open space and/or parking areas. Higher lot coverage factors, such as 80 to 100 percent, will encourage use of the entire parcel for buildings. This is most appropriate in high density areas, such as downtowns where setbacks are low.

4. Planned Unit & Planned Residential Developments

Many communities have been experimenting with variable densities for decades by enabling planned unit developments and/or planned residential developments. These projects allow

higher densities in one portion of a parcel, provided they are offset by protection of open space and natural resources on the remainder of the parcel.

5. Bonuses

Some cities and towns enable developers to apply for density bonuses that allow more units per acre or a higher floor area ratio than would otherwise be permitted in the zoning district. In return, developers' need to commit to meet special standards set out in the ordinance, such as LEED energy standards, a minimum percentage of affordable housing, or some other special amenity.

Prior to considering such bonuses, communities need to be sure that areas where bonuses can be used are appropriate for the additional density. It also makes sense to first determine if such requirements (e.g., affordable housing) should be standard for all projects or something that should be encouraged through optional density bonuses.

6. Parking

Parking can be a major factor in limiting densities in downtowns and urban neighborhoods. Often zoning requirements for size of spaces and number of spaces per unit (or square feet) result in parking dominating the site.

Communities desiring higher densities will need to consider a variety of approaches to addressing parking needs while preventing the voids created by large areas of surface parking. This can include alternatives such as structured or underground parking, increased on-street parking, and even lower minimum parking requirements for commercial and residential development. While reducing parking requirements can be controversial, people in high density areas often have alternatives to using cars, such as bus transit or walking, which lowers their need for multiple parking spaces.

7. Landscaping

No matter what the density, landscaping can and should be provided. In high density areas, landscaping, such as trees or greenbelts along sidewalks and streets,



Landscaping, such as street trees (seen here along 16th Street in Denver, Colorado), can reduce the perceived density of buildings in downtowns and other areas.

can soften building façades and provide a human scale to taller buildings. In medium density areas, landscaping of front, side, and rear yards, and courtyards will create a more pleasing environment, while also adding privacy.

8. Driveways and Garages

Placement of driveways and garages can be critical to achieving desired densities. Individual driveways serving garages lining the frontage of the street can destroy the pedestrian scale of moderate and high density communities and take up valuable space. Shared driveways at the backs of buildings can minimize impacts and enable the use of frontage for housing, commerce, pedestrian access, and landscaping.

9. Accessory Apartments & Duplexes

Small communities without the high densities found in downtowns and urban neighborhoods often look for more subtle ways to increase densities. One method that has been found to have minimal impact on the character of a neighborhood is the addition of accessory



Accessory units in Davis, California's Aggie Village are unobtrusive and fit well into the neighborhood. Photos shows an accessory unit (above left) and the principal structure (above right).

units or apartments (also called “granny flats”) and duplexes. Some states even require that accessory units be permitted in zoning districts where single family housing is located.

These additional units can be added within a home, as an extension on the building, or as an addition or alteration to a garage or outbuilding. By law, they are usually smaller than the principal use of the property – the single-family home.

Duplexes are usually permitted on the same size lot as a single-family dwelling unit, provided wastewater and water supply can be accommodated. It is not uncommon to find historic neighborhoods where single-family homes, duplexes, and apartments share the same block – without compromise to the quality of the area.

10. Tear Downs

Tear-downs occur when a house is demolished and replaced with a larger or more intensive one. This “McMansionization” process is becoming an increasing problem in many neighborhoods. Often the replacement buildings don't increase density, but they do increase the intensity and scale of buildings and lead to an impression of increased density without offering the benefits.

SUMMING UP:

Addressing the knotty issue of density can be one of the most frustrating, yet creative, activities a planning commissioner can undertake. Given the controversial nature of the issue of density, it is important that planning commissions engage citizens, elected officials, property owners, businesses, and non-profit



Duplexes and apartments in Portland, Maine, provide for increased density without changing the residential character of the neighborhood.

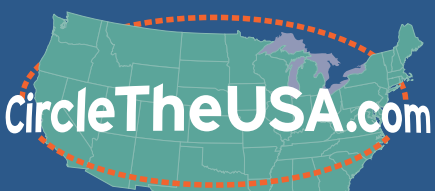
organizations in the review of existing conditions. The goal is to gain consensus on what densities and development standards are most appropriate for neighborhood, downtown, suburban, or rural areas. ♦

Over the past 35 years, Elizabeth Humstone has worked as a planning consultant on a wide range of projects in rural communities and small towns. Humstone is an advisor to the National Trust for Historic Preservation and former Executive Director of the Vermont Forum on Sprawl (now Smart Growth Vermont); past member of the Burlington (VT) Planning Commission; and former Chair of Vermont's Housing & Conservation Trust Fund Board.





Density Resources:
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Density Without High-Rises?

by Edward T. McMahon

When it comes to land development, Americans seem to dislike two things: too much sprawl and too much density. Over the last 50 years, the pendulum has clearly swung in the direction of spread-out single use, drive everywhere, low density development.

Now the pendulum is swinging back. Today, high energy prices, smart growth, new urbanism, infill development, transit-oriented development, and sustainability concerns are all coalescing to foster more compact, mixed-use, walkable, higher density development.

The swing toward greater density is necessary and long overdue. The problem is many developers and urban planners have decided that density requires high-rises, the taller the better. To oppose a high-rise building is to run the risk of being labeled a NIMBY, a dumb growth advocate, an antediluvian, or worse.

Buildings 20, 40, 50, 60 even 100 stories tall are being proposed in low- and mid-rise neighborhoods and cities all over the world. All these projects are justified with the explanation that if density is good, than even more density is better, despite the overwhelmingly negative impact on community character and identity.

I'll acknowledge that the "Buck Rogers"-like skylines of cities like Shanghai and Dubai are thrilling – at a distance – but at street level they are often dreadful. The glass and steel towers may be functional, but they seldom move the soul or the traffic as well as more human scale, fine grained neighborhoods.

Yes, we need more compact, walkable, high density communities, but no, we do not need to build thousands of look-alike glass and steel skyscrapers to accomplish the goals of smart growth or sustainable development.

In truth many of America's finest and most valuable neighborhoods achieve density without high-rises. Georgetown in Washington, D.C., Park Slope in Brooklyn, the Fan in Richmond, and the French Quarter in New Orleans are all compact, walkable, charming – and low rise. Yet they're also dense: the French Quarter, for example, has a net density of 38 units per acre. Georgetown, 22 units per acre.

WE DO NOT NEED TO BUILD THOUSANDS OF LOOK-A-LIKE GLASS AND STEEL SKYSCRAPERS TO ACCOMPLISH THE GOALS OF SMART GROWTH.

Julie Campoli and Alex MacLean's new book *Visualizing Density*, vividly illustrates that we can achieve tremendous density without high-rises. They point out that before elevators were developed, two to four story "walk-ups" were common in cities and towns throughout America. Constructing a block of these types of buildings today could achieve a density of anywhere from 20 to 80 units an acre.

Mid-rise buildings ranging from 5 to 12 stories can create surprisingly high density neighborhoods in urban settings where buildings cover most of the block. Campoli and MacLean point to Seattle where mid-rise buildings achieve densities ranging from 50 to 100 units per acre, extraordinarily high by U.S. standards.

St. Petersburg, Russia; Basel, Switzerland; Edinburgh, Scotland; Bethesda, Maryland; and Washington, D.C. are just a few of the hundreds of cities around the world where developers have proposed

giant out-of-scale skyscrapers in formerly low- or mid-rise settings.

This issue of tall buildings in historic settings is not a small one. City after city has seen fights between those who want to preserve neighborhood integrity and those who want Trump Towers and "star-chitect" skyscrapers. Prince Charles, for example recently criticized the "high-rise free for all" in London which, he said, has left the city with a "pockmarked skyline and a degraded public realm."

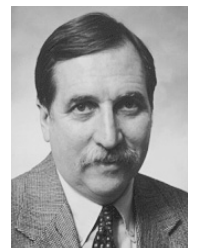
Whatever you think about Prince Charles, he has clearly raised some important issues about the future of the built environment. These include:

1. Does density always require high-rises?
2. Are historic areas adequately protected from incompatible new construction?
3. What's more important, the ability of tall buildings to make an architectural statement or the need for buildings to fit into a walkable mixed-use neighborhood?

I love the skylines of New York, Chicago, and many other high-rise cities but I also love the skylines of Charleston, Savannah, Prague, Edinburgh, Rome, Washington, and other historic mid-rise cities. It would be a tragedy to turn all these remarkable places into tower cities.

Density does not demand high-rises. Skyscrapers are a dime a dozen in today's world. Once a low- or mid-rise city or town succumbs to high-rise mania, many more towers will follow, until the city becomes a carbon-copy of every other city in a "geography of nowhere." ♦

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