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# Nashville's Health, Livability, and the Built Environment



## Synopsis

The built environment impacts every Nashville resident, sometimes promoting health and sometimes deterring it. Research points to dozens of elements of the built environment that play a role in shaping public policy and impact our health and the livability of our communities. This report discusses six built environment factors and the roles they play in Nashville's health and livability. This background report provides context for the six built environment factors that contribute to a healthy and livable built environment, while also discussing Nashville's current initiatives and providing thoughts for additional discussion during the NashvilleNext process.

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## Role and Purpose of Background Reports



This background report was developed to provide input to the NashvilleNext planning process. It was researched and authored by community members interested, involved, and knowledgeable on the topic. The authors present best practices, an evaluation of the state of the topic in the Nashville community today, and recommendations for consideration during the planning process.

This report provides a *starting point* for broader community discussion and reflection based on the research and recommendations of the authors. Throughout the planning process, NashvilleNext will use this and other background reports, ongoing research, departmental involvement, community input and engagement to discuss, refine and formulate the policies and recommendations for the general plan.

The information and recommendations provided in this background report are solely those of the authors and contributors and are being provided at the beginning of the NashvilleNext process to start community discussion.

The NashvilleNext Steering Committee thanks and extends its sincere appreciation to the authors of and contributors to this background report for the time and effort to provide this report for community consideration and discussion. The Steering Committee looks forward to the ongoing dialogue on the issues and recommendations that the authors provide.

Any final policies and recommendations endorsed by the NashvilleNext Steering Committee for the consideration of the Metropolitan Planning Commission will be the result of the entire planning process and upcoming community engagement and discussion.

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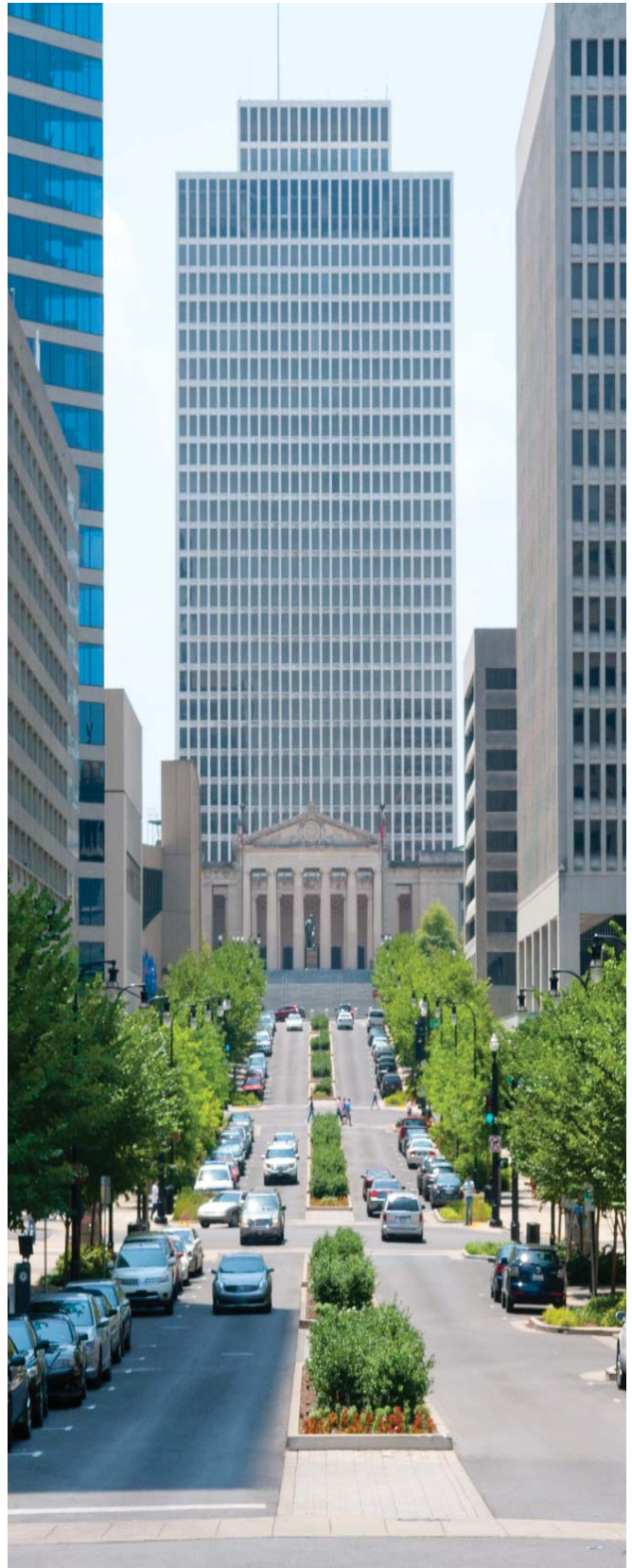
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## Introduction

The shape we give our city, in turn shapes us. The connections between public health and urban planning emerged from the recognition of the impact built environments have on our health and our quality of life. Last century, we altered the built environment to reduce ill health; by redesigning cities, we successfully eradicated several infectious diseases and reduced exposure to industrial toxins. At the time, it seemed ingenious, and simple; industry and commerce over here, housing over there. We did not, however, foresee the unintended consequences of separating homes from the rest of daily life. Such a set-up necessitates long hours spent sitting down as we transport ourselves from home to work, to shops, to schools, and to places of worship, and then back home again, often in traffic as many destinations are too far away to walk or to bike. We did not foresee that we were designing the perfect landscape for an increasingly sedentary lifestyle that contributes to obesity and other negative health consequences. It has become an imperative to find built environment solutions to our built environment problems. The focus of 21st Century urban planning has shifted from the defensive – shielding people from harm caused by the built environment – to going on the offense, shaping our cities so that their design fosters active lifestyles and good health.

Communities across the country are evaluating their own livability and health in efforts to understand how one impacts the other. In this report, we use *livability*, as defined by the Partners for Livable Communities, to mean the sum of factors that add up to a community's quality of life – including the built and natural environments; neighborhoods; economic prosperity; social stability and equity; educational opportunity; and the availability of cultural activities, entertainment, and recreation. In this report, we use *health*, as defined by the World Health Organization, to mean not only the absence of disease or infirmity, but a state of complete physical, mental and social well-being. This background report focuses on how our built environment affects our health and livability.



### Measures of Nashville's Health

Nashville is an epicenter for medical research, innovation, and entrepreneurship, and boasts some of the best hospitals in the country. Does that make Nashville the healthiest city? No. As vital as it is, today's medical care focuses mainly on people who are already sick. If we want to live long and healthy lives, we must pay attention to living well and preventing disease in the first place. Just as there is more to transportation than auto repair, there is more to health than medical care.

### Tennessee and Davidson County's Health

Tennessee is far from the healthiest state in the U.S. The United Health Foundation's *America's Health Rankings* is a widely publicized index that ranks health measures state by state. The 2011 *America's Health Rankings* puts Tennessee in 39th place overall. Strengths mentioned in that ranking system included ready availability of primary care physicians and high immunization coverage. Challenges included a high violent crime rate and high prevalence of obesity (rank 42 of 50) and diabetes (rank 46 of 50). The *County Health Rankings* is an annual report that summarizes key health related measures for counties across the U.S. and presents county rankings within each state. The 2012 *County Health Rankings* lists Davidson County as 14th healthiest among Tennessee's 95 counties overall. Areas of relative strength were health behaviors (ranked 7th), and clinical care (ranked 10th largely due to the 96,450 uninsured residents, 18 percent of the population). Premature death in Davidson County was ranked 21st. More challenging was a set of social and economic factors, where Davidson County ranked 61st, a ranking that included the fact that Davidson County has second highest rate of violent crime in the state.

### Nashville's Health Exam

Since health is defined broadly and influenced by many factors, sizing up the health of a city goes beyond looking at disease statistics. In Nashville, the Healthy Nashville Leadership Council (HNLC) pe-

riodically undertakes a community health assessment — a process akin to a comprehensive medical exam for the whole community. The HNLC examines the community by listening to leaders and ordinary people, asking questions, and at times ordering special studies. We can also look into key systems in our community that impact our health and quality of life, such as education, transportation, food, housing, and health care.

The most recent community health assessment for Nashville was done in 2003. Key health priorities identified for Nashville at that time were obesity, tobacco use, and racial/ethnic disparities in chronic diseases. The HNLC conducted partial reassessments in 2006 and in 2009 and prioritized similar issues. In 2009, the group made recommendations for promoting healthy eating, active living, and prevention of unhealthy weight gain with a *Healthy Living Report*. In 2013, another community health assessment is underway to assess the current situation of Nashvillians health and prioritize issues. The updated health assessment should be complete by 2014.

### Untimely and Premature Deaths

One way to size up our community's health is to pay attention to what is killing us. The number and causes of deaths are important vital signs. Untimely or premature deaths can provide particular insights that help inform plans to improve community health. Epidemiologists at the Metro Public Health Department analyzed the 4,921 deaths that occurred among Nashville residents in 2009, and reported that cardiovascular disease and cancer were by far the most common causes of death, followed by accidents and stroke. Non-Hispanic African Americans have higher rates of death for the major causes of death, with the exception of accidents.

To describe premature mortality in Nashville, the team analyzed years of potential life lost, using the average longevity in Tennessee, 75 years of life, as a benchmark. A count of years of potential life lost for

a particular disease or cause represents the sum of the years that lives were cut short – the differences between each person's age at death and age 75. For example, someone dying of cancer at age 65 would contribute 10 years of potential life lost to the total for cancer, while a victim of homicide at age 20 would contribute 55 years of potential life lost to the total for homicide.

The biggest contributors to early death in Nashville are chronic diseases. Heart disease and cancer are top causes of death, as well as top contributors to years of potential life lost. Nashville is not unique; these are also the top killers nationally. Improving our health behaviors can help prevent cardiovascular disease, cancer, stroke, and respiratory disease – all among the leading causes of death. We could have a major impact on these chronic diseases and on medical costs, disability, and early deaths if we reduce tobacco, alcohol, and drug use and make healthy food and regular physical activity the rule rather than the exception.

Injuries (accidents, suicide, and homicide combined) caused 459 deaths, accounting for over 12,000 years of potential life lost. Accidents (including sleep related deaths in infants, motor vehicle crashes, and drug overdoses) were the third leading cause of death and contributor to years of life lost. However, violent deaths (suicide and homicide together) tend to affect younger people and, therefore, contributed to more years lost than unintentional injuries (accidents). Injury-related deaths, whether accidental or intentional, are deaths that are preventable, not inevitable.

### Tracking Risky Behaviors

Smoking, poor diet, and lack of physical activity are major contributors to the top diseases that are causing us to die prematurely, and public health officials track these behaviors in the population. To do so, they use the Behavioral Risk Factor Surveillance System, a state-by-state telephone survey designed and coordinated by the Centers for Disease Control and

Prevention. In Tennessee, these data are collected every year, and since 2005, the state has designed the survey so that estimates are available for Nashville.

Smoking is the leading cause of preventable death in the United States. In the nation as a whole, smoking rates have fallen as clean indoor air laws, increased taxes, and other measures have made more places smoke-free, and have made smoking more of an exception than a rule. In Tennessee and in Nashville, one out of every five or six adults is still a smoker, but both state and city data showed declining rates in recent years, which is the expected result of the cigarette tax increases and clean indoor air law that were implemented in 2008. These data help show that healthier places and policies can impact behavior in a beneficial way.

As previously discussed, obesity is connected to a host of diseases, including diabetes, cardiovascular disease, hypertension, some cancers, and arthritis. Rates of obesity are an indicator of poor diet and lack of physical activity in a population. In Nashville, as in Tennessee (and the nation as a whole), obesity has been climbing steadily and dramatically in recent years to the point where two-thirds of Nashville's adults are overweight or obese. Some statistics suggest a decline in obesity in Nashville and a leveling off for the state overall. This could be a promising sign that Tennesseans are eating healthier food and getting more physical activity. However, after so many years of increasing obesity, it would take improvement in numerous measures of the epidemic over several years to be confident the tide has turned. Along with obesity, diabetes among adults has also been climbing in Tennessee, again with some possible leveling off seen in the years from 2008 to 2010. In Nashville, the numbers appear to have swung erratically the last two years. Careful measurement in future years will determine whether there is a real trend occurring or not.



## NASHVILLE'S HEALTH, LIVABILITY, AND THE BUILT ENVIRONMENT

### Good Health Varies by Neighborhood

Good health is not distributed fairly and equitably across Nashville's communities. At the local level, where you live affects how well and how long you live. One of the most powerful predictors of an individual's health is the address where he or she lives. Within Nashville, for example, risk of chronic disease varies widely by census tract. One countywide survey showed that in some census tracts the average person was neither overweight nor obese, while in other tracts the average person was obese. Some census tracts have less than 15 percent of residents with hypertension, while in other census tracts the prevalence of hypertension was over 49 percent. (*Schlundt, D.G.; Hargreaves, M.K.; and McClellan, L., 2006.*) While creating a built environment that promotes healthy living is important for everyone, it is especially important in places where people live in environments with fewer choices and opportunities for healthy living.

Neighborhoods are often separated by socioeconomic status, and areas with high levels of poverty often experience poorer health and higher mortality. In Nashville, premature mortality varies widely by neighborhood, with the highest mortality occurring in areas with a high percent of people living in poverty. The healthiest 25 percent of Nashville's census tracts have premature mortality rates at or below 277 deaths per 100,000 people, while the sickest quartile have rates that are all above 660, reflecting almost three times the risk of early death. (*Schlundt, D.G.; Hargreaves, M.K.; and McClellan, L., 2006.*)



### Nashville's Built Environment

The built environment impacts every resident, sometimes promoting health and sometimes deterring it. For example, a person who lives in a neighborhood with sidewalks and destinations within a walkable distance is more likely to take some trips on foot, increasing their opportunity for daily physical activity. By contrast, a person who lives on a busy street without sidewalks or bike lanes is likely to make all of their trips by car, decreasing their opportunity for daily physical activity. An elderly person who no longer drives may live in a neighborhood far from a grocery store, making it hard to access fresh foods. While another elderly person may live within walking distance to a community garden, where they can grow and harvest their own fresh vegetables.

### Changing Demographics

Two demographic variables impacting this conversation are the aging of the baby boom generation and the increasing ethnic diversity of America's population. In addition, according to the Americans with Disabilities in 2010, 37 percent of the country's elderly population (age 65 and older) have a severe physical, mental or emotional disability, and 21 percent of people 65 years old and older do not drive, according to the American Association of Retired Persons. According to Woods and Poole Economics, Inc., the

number of Nashville residents age 65 or older is projected to more than double in the next 30 years, rising from 65,403 seniors in 2010 to 133,012 in 2040, by then comprising 17 percent of the total population. In 2040, a third of the population will be age 60 or older. Minority populations are projected to grow even faster, so much so that "white" will become a minority population. The non-white population will increase from the present 41 percent of the total population in the city to 68 percent in 2040. Latinos alone are projected to increase from 10 percent of the population today to 34 percent in 2040, inching out others as the largest ethnic group.

Another variable for Nashville is the increasing rate of residents who are overweight or obese. More than 43,000 people in the county have been diagnosed with the related disease of diabetes. We are poised to see those numbers grow exponentially given the current demographic trends, making our mission all the more urgent. As our Latino population grows, we must take notice that 39 percent of adults of Hispanic origin living in the United States are obese, and an alarming 80 percent of Mexican American adults living in the U.S. are overweight or obese. Today one in three people who live in Nashville is obese. As our demographics change, we must evaluate our built environment, shaped largely by the ubiquitous use of





personal motor vehicles, and make the changes necessary to promote healthy, active lifestyles that may alleviate some of the growing public health problems and that contribute to a better quality of life. (*Centers for Disease Control and Prevention, 2010*)

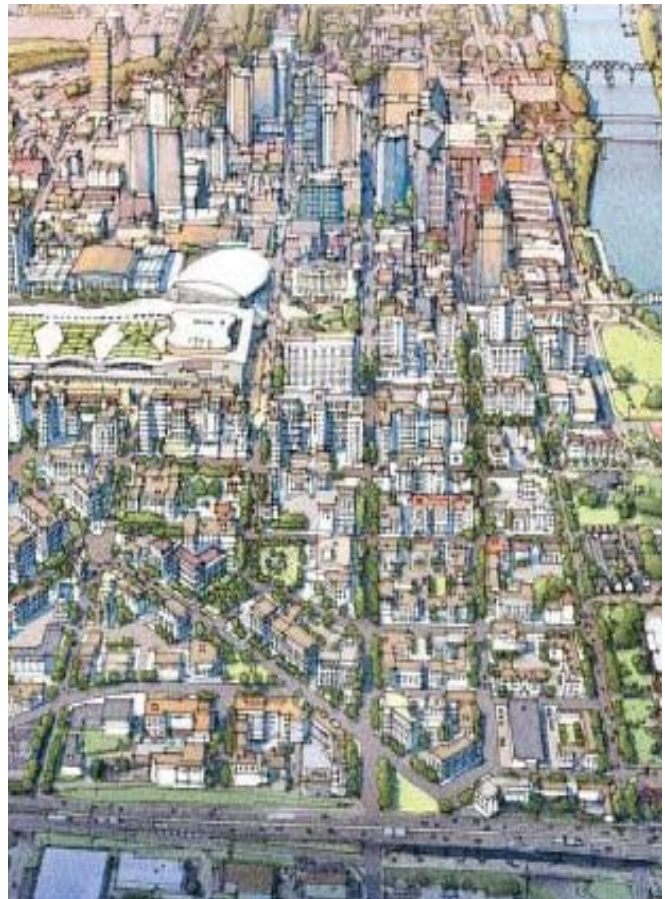
### Built Environment Factors

Research points to dozens of elements of the built environment that play a role in shaping public policy and impact our health and the livability of our communities. For purposes of this report, these are discussed as “built environment factors” and can be categorized into six prominent, inter-related factor groups:

1. Neighborhood Design and Development
2. Transportation
3. Walkability (Pedestrians/Bicyclists)
4. Housing
5. Food Resources
6. Green Space

Nashville has policies and programs addressing aspects of most of these, including Mayor’s Karl Dean’s comprehensive strategy for promoting healthy and active living through his annual Field Day with schools, the annual 5K Run, the Workplace Challenge, Walk 100 Miles with the Mayor, and B-Cycle program. However, there are more ideas and tools that need to be added. This background report discusses how each of the six built environment factors impacts our health and our communities’ livability. This report also discusses programs and policies Nashville has in place and key areas where our city could make progress toward better health, better quality of life, and longer life for us all. Some of these factors are discussed more comprehensively in a separate background reports, such as Housing, Transportation, and Public Infrastructure and Investments. Other factors are mentioned in more than one background

report, such as Food Resources, which is also mentioned in the Natural Resources and Green Spaces and Poverty background reports. The importance of Green Space, including parks and playgrounds is discussed in the Natural Resources and Green Spaces background report. Additional background reports should be consulted as noted for more information.



### Factor 1 – Neighborhood Design and Development

The design of a neighborhood significantly influences the quality of life and health for residents who spend most of their time there. The design of a neighborhood can make it safe and easy for people to be physically active in their daily lives and give residents a health boost – or it can inhibit physical activity, be isolating, and be a detriment to health. Design also influences residents' personal connectedness to the neighborhood, and the physical and mental well-being of all who dwell there. In addition, design can have a direct impact on water and air quality, and noise levels. The design of a neighborhood can mean that homes are situated on private cul-de-sacs, far from restaurants, shops, and green spaces. Or the neighborhood may have sidewalks and crosswalks, and easy and safe walking access from homes to destinations. There may be bike lanes that allow people to bike safely from one end of town to the other, along with trees and green spaces, parks and trails nearby.

#### Health Impacts

When homes are within walking distance of public services, restaurants, and shops, walking is a viable transportation option. Additionally, clustering public services and retail stores in proximity to each other increases walking trips of all kinds, and decreases

vehicular travel. Some communities are modifying their zoning laws, recognizing that mixed-use zoning is healthier for residents, and may be a primary key to halting the obesity epidemic in the U.S. because it allows and encourages people to walk more. Research reported in *Social Science & Medicine* confirms this: living in a mixed-use area with a variety of shops and services and walkable streets gave residents a 12 percent reduction in the likelihood of being obese. *The Journal of Urban Technology* reports that residents may be more likely to walk when they feel safe, and neighborhood design can promote safety. Research has found that the presence of retail shops in mixed-use developments adds natural public surveillance.

Experts say reducing the nation's obesity epidemic is not a matter of requiring dedicated exercise within a set timeframe. Instead, it is a matter of putting more physical activity into one's daily routine. Successful neighborhood commercial centers build walking into people's daily routines, making it more likely that adults will achieve the recommended 30 minutes or more of daily physical activity, and children will achieve the recommended 60 minutes. In 2004, the *Annals of Behavioral Medicine* reported that residents in neighborhoods with greater mixed land use and high-



er connectivity take twice as many walking trips per week than residents of less walkable neighborhoods. In 2003, in the *American Journal of Public Health*, researchers found that 43 percent of people with safe places to walk within 10 minutes of home met recommended activity levels, while just 27 percent of those without safe places to walk were active enough. In a separate study in Belgium, adolescents living in walkable neighborhoods were also found to be more physically active than their counterparts in less walkable neighborhoods (*De Meester, Van Dyck and De Bourdeaudhuij, 2011*). Walkability is important, as walking is one key to healthy body weight. Reported in the *American Journal of Preventative Medicine*, researchers found that each additional kilometer walked per day was associated with a 5 percent reduction in the likelihood of obesity.

Whether or not it results in weight loss, daily physical activity has many positive health benefits, and should be promoted. The American Heart Association recommends at least 150 minutes per week of moderate exercise or 75 minutes per week of vigorous exercise. That could be 30 minutes a day, five days a week. Shorter segments of 10 to 15 minutes per day are also beneficial. A half hour per day of brisk walking provides a long list of benefits, including improved blood circulation and cholesterol levels; reduced risk of heart disease and stroke; decreased bone loss; and increased energy and muscle strength. Daily exercise also helps prevent weight gain; releases tension, stress and anxiety; improves depression; promotes better sleep; and may delay or prevent chronic illnesses.

### Smart Growth Strategies

In the U.S. for decades, we have been building low-density suburban neighborhoods with ample roadways catering to car travel. Euclidian zoning, which separates residential areas from commercial ones, has been predominant. This means that the distance between homes and offices, shops, restaurants, post offices, grocery stores, and other destinations of daily life is often too great to walk or bike. Many areas lack

infrastructure for walking or biking, and mass transit stops may not be convenient or be present at all. Even if the destination is within a couple of miles, getting there in a timely and safe manner often requires a car. Homogenous zoning may also lead to the poor living separate from employment opportunities, making it more challenging to break free from the cycle of poverty and its frequent companion, poor health. Euclidian zoning laws prohibit “smart growth.”

Growth is “smart” when it provides us with more choices, greater opportunities, a thriving natural environment, and good returns on public investments. There are ten accepted principles that define smart growth:

- Mix land uses.
- Take advantage of compact building design.
- Create a range of housing opportunities and choices.
- Create walkable neighborhoods.
- Foster distinctive, attractive communities with a strong sense of place.
- Preserve open space, farmland, natural beauty, and critical environmental areas.
- Strengthen and direct development towards existing communities.
- Provide a variety of transportation choices.
- Make development decisions predictable, fair, and cost effective.
- Encourage community and stakeholder collaboration in development decisions.

Traveling through Nashville reveals, at some points in the city’s history, these Smart Growth principles were the norm for development, and in other decades, the Smart Growth principles were ignored with results that have negatively impacted residents’ health.



Nashville's Metro Planning Department works with the city's communities on community plans, which guide land use decisions such as zone changes and new subdivisions. Community plans focus on smart growth strategies, such as reducing sprawl and concentrating development in mixed use centers that provide housing and transportation options as well as services and employment. Part of the community planning process includes analyzing a community's open space network (including parks and greenways) and transportation network (including roadways, sidewalks, bikeways, and transit opportunities). Recommendations are made that add to and complete these networks based on community priorities, the *Nashville Open Space Plan*, the *Parks and Greenways Master Plan*, the *Major and Collector Street Plan*, and the *Sidewalks and Bikeways Strategic Plan*.

The Metro Planning Department also works with property owners and developers on improving project designs and development plans which are livable and achieve the community's vision. In addition, the department works creating form-based zoning, which considers how buildings are shaped and how they relate to each other and their communities rather than how they are used. An example is the *Downtown Code* which applies form-based principles to shape growth and development in the city center.

Several other Metro departments also play a part in neighborhood design and development. Metro Nashville Public Schools builds and maintains elementary, middle, and high schools to serve students. Metro Public Works builds and maintains sidewalks, streets, bikeways, and alleys. Public Works also works with neighborhoods on neighborhood landscaping projects, clean-up of neglected lots, and neighborhood clean-up projects. Metro Water Services encourages low impact development (retaining and treating stormwater on site with rain gardens, swales, green roofs, etc.) with its innovative *Low Impact Development Manual* and decides on where to permit sewer expansion. The Metro Transit Authority provides transit

along with bus shelters and bus stops. Metro Public Library builds community branch libraries. Metro Parks and Recreation builds parks of various sizes, community centers, nature centers, and greenways. Metro Arts Commission provides public art. The Metro Historical Commission works to preserve the city's historic structures and places.

The following is a brief overview of where development and redevelopment in Nashville are succeeding in pursuing Smart Growth principles and where there is room for improvement.

*Mix land uses.* In recent years, Metro has made great strides in allowing a mix of land uses (offices, residential, commercial, etc.) across a property and within a single building, in strategic locations. Just fifteen ago, it was illegal to have residential development in Downtown. Now residential developments in the Gulch, North Gulch, Rolling Mill Hill, Sulphur Dell and SoBro are bringing hundreds of residents into Downtown – enlivening Downtown and making it a “24/7” community.

Likewise, many of Nashville's prominent corridors are flanked with commercial zoning that, until just a few years ago, did not allow residential development. Metro amended the zoning code in 2005 to allow Adaptive Reuse, or the redevelopment of buildings and sites for residential development in commercial zoning on prominent corridors. Developments, such as 12th and Paris and Gale Lofts in the 12South neighborhood along with Jefferson and 4th and Vista Germantown in North Nashville, were developed under the Adaptive Reuse. Adaptive Reuse has the power to draw residential development to these corridors, putting “rooftops” near existing commercial development, riders near existing transit lines, and allowing for more housing choice in neighborhoods while preserving the character of the interior of the neighborhood.

While many developers are exploring the Adaptive Reuse option, the tool could be expanded to corridors in other portions of the county, providing more housing choices that reinforce existing commercial and transit and make use of existing infrastructure.

*Take advantage of compact building design.* Compact building and site design has several positive benefits for community health. Not only does it promote walkability, but it also uses less developable land, preserving open space and natural features (floodplains, steep slopes, etc.) that make Nashville's landscape unique and provide cleaner air and water. Nashville currently offers multiple tools to developers and neighborhoods that seek to promote compact building and site design, but there are more options and tools that could be made available to the community.

One of the tools that has garnished a lot of attention, and approval from the community, are cottage developments. Cottage developments create smaller footprint homes on smaller lots, which are generally grouped around a small, shared open space. Examples include Germantown Court in Germantown, West End Station in Sylvan Park, Southview on 2nd in Chestnut Hill, and the Chesterfield at Blair and Chesterfield in Hillsboro-West End. Cottage developments promote a compact site design that is attractive to some home buyers, can fit unobtrusively into a neighborhood, promotes walkability and outdoor play, and uses less developable land.

Another new development type looks like small business pod developments. Two East Nashville residents opened what they termed an "idea hatchery" in 2011. The Five Points Collaborative, located along Woodland Street, is a collective of eight, tiny modular store spaces, which range in size from 168 to 320 square feet. Their goal is to spur retail activity in the area by offering visible, affordable space for business startups to grow, a place to try out ideas while reducing financial risks. This idea is also a way to develop empty lots in vibrant, or up and coming, areas of Nashville

while encouraging and supporting small businesses.

*Create a range of housing opportunities and choices.* Nashville has numerous neighborhoods with mixtures of housing types. As mentioned previously, cottage developments are compact and attractive to some buyers. Other housing options that are being discussed in Nashville include co-housing, a type of collaborative housing where residents actively participate in the design and operation of their neighborhoods. Often, co-housing developments include community gardens, communal kitchens and dining spaces, courtyards, and common houses where people gather and where meals are served. Another tool is conservation subdivisions, where houses are grouped in order to provide more open space and preserve sensitive environmental features. Nashville already has some examples of live/work housing, often work space on the first floor with living space above, but this tool could be made available to more areas in Nashville. Housing is discussed further in a later "Built Environment Factor" section.

*Create walkable neighborhoods.* Many of the oldest neighborhoods in Nashville were built with sidewalks, including neighborhoods closest to Downtown. Today, Metro is committed to funding and building additional sidewalks, repairing existing sidewalks, filling in sidewalk gaps, and making important sidewalk connections, such as near schools and parks, near transit, and along corridors. In 2010, Mayor Karl Dean issued an Executive Order to formalize a complete streets approach for Nashville in an effort to make city streets safe and comfortable for all users. Complete streets are discussed in more detail in a later "Built Environment Factor" section. Nashville's Major and Collector Street Plan addresses the different roles streets play in different locations and guides public and private investment to build complete streets. Another idea that assists in creating walkable neighborhoods is adding more size-appropriate, mixed use centers in proximity to residential that allow for some walking trips to meet residents' daily needs.

*Foster distinctive, attractive communities with a strong sense of place.* Nashville has some tools in place that assist with creating attractive communities. The Urban Zoning Overlay was established over ten years ago and applied to Nashville's circa-1950 boundaries in an effort to require developers to build in a way that is consistent with how urban places were designed before the rise of the automobile-dependent suburb. Another tool is the use of alternative zoning districts with basic urban design parameters that ensure walkability and encourage preservation of historic development patterns. Urban Design Overlays are used to preserve and create areas with unique character, such as Hillsboro Village, Bedford Avenue, 31st Avenue/Long Boulevard, Green Hills, Downtown Donelson, and Lenox Village. Historic Zoning Districts are used to preserve the historic character of Nashville's distinctive historic neighborhoods. Urban design could be improved in commercial areas and along the city's commercial corridors.

*Preserve open space, farmland, natural beauty, and critical environmental areas.* In 2011, the city created the *Nashville Open Space Plan* which outlines the need to preserve various types of green spaces and sets goals for attainment. Preserving open space is discussed in greater detail in a later "Built Environment Factor" section. Nashville's 14 *Community Plans* that guide zoning decisions encourage preservation, and remediation if previously disturbed, of sensitive environmental features through the application of Conservation Policy. While Nashville already has over 1,300 acres of land in private conservation easements, many more could be added. A conservation easement is a voluntary agreement between a land owner and an organization where land is protected but certain property rights are reserved. Nashville has some areas where additional thoughts and planning are needed about how to preserve these areas while still ensuring that they are economically viable, such as Bells Bend, Scottsboro, Whites Creek, Whites Bend, and developments like Fontanel. Ideas include heritage tourism, ecotourism, and agri-tourism, but the key is to balance develop-

ment, including what infrastructure is required, with the preservation of rural, open space or natural area.

*Strengthen and direct development towards existing communities.* As previously mentioned, Adaptive Reuse provides a tool to redevelop commercial properties along prominent corridors into residential uses. Metro has also invested in re-using the old Hickory Hollow Mall, purchasing space for a new library, community center, and park for the Antioch/Crossings community. Nashville State Community College has purchased another portion of the mall to host classes.

Conversations during the NashvilleNext process can help determine where additional development can occur to take advantage of existing infrastructure, services and transit; provide housing choice and "aging in place" opportunities for current neighborhoods; and preserve important open space and natural features.

*Provide a variety of transportation choices.* A 2009 regional inventory revealed that there are currently over 354 miles of bike lanes, bike routes, and greenways in the greater-Nashville area; and, for arterial and collector roadways within the region, approximately 460 miles of sidewalks. After a long period of decline during the 1980s and 1990s, transit in Nashville has significantly expanded during the 2000s. The Nashville Metro Transit Authority (MTA) and Regional Transportation Authority of Middle Tennessee (RTA) recorded 10 million passenger trips for the 2012 fiscal year—up 14 percent over the year prior. Ridership of the Music City Star commuter rail line also increased 14 percent; regional bus ridership went up 49 percent.

Metro recently opened the 28th Avenue/31st Avenue Connector Bridge that connects North Nashville to the West End area. The bridge includes a protected shared use area for bicyclists and pedestrians along with six new bus shelters. MTA also began fixed route bus service called the University Connector, linking universities in North Nashville with universities in



## NASHVILLE'S HEALTH, LIVABILITY, AND THE BUILT ENVIRONMENT

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South Nashville. Since that route opened, ridership numbers saw a jump, and as additional routes are added, ridership is expected to increase further. Bus Rapid Transit Lite is provided along Gallatin Road and recently began along Murfreesboro Road. Preliminary design for an east-west connector is also underway. Bus Rapid Transit lanes are being discussed along a 7.1 mile corridor from Five Points in East Nashville to White Bridge Road in West Nashville. Opportunities for additional public input will happen in coming months. Similar cross-town routes will likely be implemented in the future, as funding permits, to provide an inter-connected network that serves all the city. Transportation is discussed in greater detail in a later “Built Environment Factor” section.

*Make development decisions predictable, fair, and cost effective.* Tools such as Adaptive Reuse, the Downtown Code, and the Alternative Zoning Districts add basic but effective urban design elements to existing zoning districts, ensuring a more urban, walkable, sustainable form. These tools allow smart growth by right, and make the basic urban parameters clear and easily understood and implemented.

*Encourage community and stakeholder collaboration in development decisions.* Both the Community Planning process and the NashvilleNext process are models of how planning for future growth is inclusive and transparent. However, it is critical for all Nashvillians to be involved in the discussion now.

As described above, Metro has taken several actions to make Smart Growth easier in Nashville. Meanwhile, several neighborhoods and communities have embraced these changes, and many developers are leading the way in Smart Growth development and redevelopment. These efforts are aided by the Nashville Civic Design Center, a non-profit that works to elevate the quality and health of Nashville's built environment by educating the public about design through lectures with prominent speakers, by consulting on community design projects, and by re-

searching and publishing reports on various civic design issues. Projects include reports for schools in downtown and urban infill concepts as well as neighborhood studies for Edgehill, Chestnut Hill, Lafayette, and Wedgewood-Houston. The Nashville Civic Design Center will publish *Shaping Healthy Communities* later in 2013. The book builds on the long-term vision for the city set forth in the Plan of Nashville (2005), but focuses more specifically on designing the city's built environment to foster better health among its citizens. Part of the book will be an Action Plan to guide city policy makers and communities in adapting built environments to benefit our city's health.



### Factor 2 – Transportation

The average American spends an hour a day in the car every single day, according to a 2009 U.S. Department of Transportation study. The study also shows we take the overwhelming majority of our trips by car – 91 percent. Traffic data in Nashville show that the average Nashville commuter spends 45 minutes in traffic each day during peak travel periods.

Why have Americans become so dependent on cars? In a word: sprawl. As discussed in the previous section, in recent decades urban design has focused on the development of low-density, single-purpose areas, rather than walkable, mixed use communities. The distance suburbanites must travel from home to accomplish daily routines has expanded. Transportation alternatives are often limited, especially as road construction projects have catered solely to motor vehicles. Walking or biking can feel, and be, unsafe. Transit options may not be available. According to the Texas Transportation Institute's *2012 Urban Mobility Report*, the Nashville area ranks 11th worst in the nation for average delay per commuter as a result of traffic congestion. In metropolitan areas between one million and three million people in size, Nashville ranks worst in the nation.

### Health Impacts

All this car travel is stressing us mentally and physically. And, quite literally, it is a big pain in the neck. According to a study published by Occupational Environmental Medicine, those who drive 9,000 to 18,000 miles in a year, quite typical in the U.S., are 75 percent more likely to have neck and back pain than those who drive 3,000 miles or less annually. A study in Philadelphia, reported in the *American Journal of Cardiology*, tested levels of stress hormones before and after two hours of city driving and found stress hormones were elevated after the car trek. College students in Miami drove across the city for 45 minutes and then sat down for testing. Elevated heart rates, blood pressure, and lower frustration tolerance were detected (*Human Impact Partners, 1998*). As mentioned previously, car travel is a sedentary activity, and may be a factor in the current obesity epidemic. A 2006 California study reported in *Health & Place* found that counties with the most driving rates had the highest levels of obesity. In Atlanta, researchers concluded that each hour in a car daily raised the likelihood of obesity by six percent (*American Journal of Preventive Medicine, 2004*).





The increase in suburban neighborhoods, which requires more auto-dependence, has furthermore dictated the construction of ever-increasing numbers and capacities of roadways. Transportation is a major contributor to air pollution. In the Nashville area, an excess 18,652,000 gallons of fuel was consumed in 2012 because of congestion-related delays. Nashville ranks 7th worst in the nation in the amount of carbon dioxide produced because of congestion-related delays. (*Texas Transportation Institute. 2012 Urban Mobility Report.*) Urban sprawl has led to longer commute distances, making cars the most practical means of transportation. Living near major roadways has been shown to be detrimental to health, particularly lung health. The health impact includes causing or exacerbating chronic respiratory illness, asthma, impaired lung function, and cancer and heart disease.

In addition, while most studies conclude that less vehicle miles traveled would have a positive influence on health, shorter trips actually emit more pollution. Cars pollute most when their engines are cold and their catalytic converters are not yet operating at peak performance temperature. Thus, the first few miles of a trip following a cold start may contribute as much pollution as the next 10 miles, according to a study in Puget Sound published in 2000 according to Human Impact Partners.

According to the Centers for Disease Control and Prevention (CDC), obesity rates are higher where there is less access to alternative transportation. In a 2002 CDC study, almost a third of people with disabilities, who reported barriers limiting or preventing their participation, named the transportation system.

### Changing Demographics of Drivers

Although there are benefits to not owning an automobile, it can also be isolating in our automobile-centric world. Between 2001 and 2009, the number of households in the U.S. without a vehicle grew by over one million, to 9 percent of all households. That means 9.8 million Americans without cars. A

study published in 2004 by the Surface Transportation Policy Project found that as our population ages, more and more people may be stranded, particularly in rural communities and sprawling suburbs. When a person cannot drive because of declining eyesight, or declining physical or mental ability – recall that one in five seniors over the age of 65 is not able to drive – it is hard to make a trip. More than half of all non-drivers stay home on a given day mainly because they lack transportation options. Compared to elderly drivers, elderly non-drivers make 15 percent fewer visits to the doctor, 59 percent fewer shopping trips and outings to restaurants, and 65 percent fewer trips for family, religious and social purposes.

The graying of America is continuing on a swift upward trajectory, making the transportation issue increasingly important. In 2010, 10.4 percent of Nashville's population were age 65 and older. Demographic projections predict that by 2040, 17.1 percent of Nashville's population will be seniors. As boomers age, and as the vast majority desire to “age in place” (live in the same community where they have always lived), more people may be stranded in our car-dependent suburbs. In 2003, a Brookings Institution report found that 79 percent of seniors live in car-dependent rural or suburban areas. In Nashville, 85 percent of senior residents may be stranded when they cannot drive anymore because they will lack access to public transit. Furthermore, in denser areas, a third of older non-drivers walk on a given day, while out in the suburbs only one in 14 do. It is a looming “mobility crisis,” that impacts access to work, shopping, medical care, and social activities, and also impacts daily activity levels.

### Financial Impacts

Car dependence is also a financial burden. Transportation is the second largest expense for American households, costing more than food, clothing, and health care. Funds spent on transportation mean there is less to spend on healthcare, food, and housing, which may impact health. Car transportation is



especially expensive. According to the U.S. Department of Labor's Consumer Expenditure Survey in 2011, the national average cost to own and operate an automobile is \$7,788 a year. For every dollar earned, Americans spend 18 cents on transportation, 98 percent of which goes into buying, maintaining, and insuring cars. The survey also found that in 2010, the average American spent more than \$2000 on gasoline and motor oil alone. For the poorest 20 percent of American households, transportation soaks up an alarming 40 percent of their take-home wages. In Middle Tennessee, the Center for Neighborhood Technology estimates that more than 9 out of every 10 households spend more than one in five dollars earned on transportation costs, and an alarming 16 percent spend more than 28 percent. (*Friedman, 2001*)

### Alternate Modes of Transportation

Convincing people to opt for alternative modes of transportation, other than the car, is challenging. According to the 2010 U.S. Census, of the 137 million workers in the country, 105 million (77 percent) drove alone to work. Less than 7 million used public transit. Decreasing dependence on cars will also require improved mass transit. Reliability, frequency and comfort attract riders. Most importantly, public transit must be convenient, as research shows the distance to catch the bus or the train makes a difference when people choose their mode of transportation. Mass transit, walking and biking can also be encouraged by Transit-Oriented Development (TOD), clustering development around transit stops. In Philadelphia, for example, planners are aiming to add mixed-use development clusters in areas serviced by mass transit. It is expected that this will make it more convenient for people to use public transportation, increase daily activity and reduce obesity, increase access to certain services, and reduce traffic congestion and pollution (<http://zoningmatters.org/trends/transit>). They may be onto something. A 2007 study in the *American Journal of Health Promotion* found that New Yorkers' Body Mass Index (BMI) numbers were significantly lower among residents of neighborhoods

with greater subway and bus stop density, higher population density, and more mixed-use development. A hint that Americans are starting to drive less and walk more appeared in the *2009 National Household Travel Survey* by the U.S. Department of Transportation. Most Americans took at least one walking trip in the week prior to the survey, took less car trips, and drove a few miles less annually than they did at the start of the decade.

Some cities have found that if parking is less convenient and inexpensive, then drivers will pick another form of transportation. Studies done in Minneapolis-St. Paul and Montgomery County, Maryland found that when people thought parking was going to be difficult, they were more likely to forgo getting in the car and walk instead (Preventive Medicine, 2008). When employers paid for parking, demand for parking rose some 30 percent, another study found (*Transport Policy, 1997*). Donald Shoup's book *The High Cost of Free Parking* concludes that lower cost or free parking induces more driving because of its convenience and lack of cost.

### Increasing Nashville's Transportation Options and Building Complete Streets

Replacing older, dirtier vehicles with newer, cleaner vehicles will help Nashville's air quality. But to really achieve cleaner and healthier air, all of us need to pay attention to how we get around and find additional strategies that reduce the burden of vehicle exhaust in our region. Making a city more walkable is good for the health of its citizens and their quality of life. The built environment plays a key role in the decisions people make on whether to walk, to bike, to ride public transit, or to drive their own cars. According to the 2011 *Dangerous by Design* report, Nashville was ranked the 14th most dangerous city for pedestrians. And according to Walk Score, Nashville is ranked 46th among the 50 largest U.S. cities for walkability. So what is Nashville doing to make the city more walkable?

Historically, Nashville's approach to transportation, like most cities, revolved around automobiles. However, transportation is about more than streets and highways. Nashville's goal is to create and sustain active, pedestrian-oriented, mixed use streets that address the needs of walkers, cyclists, and transit riders in addition to drivers.

In 2001, the city took a fresh look at pedestrian and bicycle facilities by embarking on the development of the *Strategic Plan for Sidewalks and Bikeways*, which was completed in 2003. The sidewalk inventory (752 miles in 2002) showed the need for repair of current sidewalks, the need for completing areas of short sidewalk segments that would provide enhanced connectivity, and the need for extending the sidewalk network. In addition, roadways were evaluated for the feasibility of incorporating bicycle facilities and bikeways as part of the transportation network. The *Strategic Plan for Sidewalks and Bikeways* was updated in 2008 and continues to be implemented. In 2002, changes to Nashville's development regulations required sidewalks as part of new development.

In October 2010, Mayor Karl Dean issued an Executive Order to formalize a complete streets approach for Nashville in an effort to make city streets safe and comfortable for all users. Complete streets are roadways designed to safely and comfortably accommodate all users, people of all ages and abilities, including motorists, pedestrians, cyclists, and transit users.

In Nashville's 2010-2011 Capital Spending Plan, \$12.5 million dollars was set aside for sidewalk repair and installation, \$3 million for bikeways, and more than \$10 million for mass transit – spending nearly 60 percent of Nashville's local transportation dollars on walking, biking, and transit infrastructure. Nashville's two guiding transportation plans, *Mobility 2030* and the *Major and Collector Street Plan* guide public and private investment for Nashville's street system and focus on creating complete streets.

Metro Public Works has implemented complete street principles on roadways throughout the city, including rural, suburban, and urban areas. The principles generally call for a one size does not fit all approach to design. Types of complete streets vary based on the physical context and character of an area. Complete streets do not always look the same, but they strive to include bike, pedestrian, vehicle and transit facilities as needed in a manner that complements the character and setting of the area. In Nashville, the Deadrick Street improvement project, Shelby Avenue in East Nashville, Belmont Boulevard, Otter Creek, and Korean Veterans Boulevard are often cited as exemplary complete streets.

In October 2012, the 28th/31st Avenue Connector opened, spanning Charlotte Avenue to Park Plaza behind Centennial Park. The new 0.3-mile bridge and street includes a four-lane, median-divided roadway, sidewalks, and adjacent bikeways. The project connects north and west Nashville and provides better connections to Metro General Hospital, Meharry Medical College, Tennessee State University, Centennial Medical Center, Hospital Corporation of America offices, and Vanderbilt University Medical Center. Mayor Dean highlighted that this bridge provides more than just infrastructure, as it reconnects two parts of Nashville that were divided over 40 years ago when the interstates were built. In conjunction with this project, the Metro Transit Authority launched a new bus line called the University Connector that links six of Nashville's universities.

### Increasing Collaborative Regional Planning in Middle Tennessee

Cooperative regional planning is also a boost to the city, as the Mayor's Caucus, Cumberland Region Tomorrow, and Leadership Middle Tennessee all look to coordinate efforts for quality growth and expansion for the 10-county region, rather than exclude or compete with bordering counties. Transportation and air and water quality are examples of issues that continue to benefit from regional planning, and increase

the livability in the city and its environs.

The Middle Tennessee Transit Alliance, created in 2009, brings together leaders from ten Middle Tennessee counties to provide insight and guidance regarding the region's opportunities to create an integrated mass transit system. The Transit Alliance is a non-profit organization that encourages both private and public sector support for new mass transit investments. The Transit Alliance also fosters education about the economic value of mass transit investments across the region.

The Metropolitan Planning Organization (MPO), the federally-designated transportation planning agency for Nashville and surrounding counties, leads in the development of the region's transportation plans. The MPO also coordinates initiatives among the U.S. Department of Transportation, the Tennessee Department of Transportation, local elected leadership, local planning and public works directors, the business community, and citizens. The MPO recently updated the *Regional 2035 Transportation Plan*. The *Regional 2035 Transportation Plan's* policy initiatives include a bold vision for mass transit; support for active transportation and walkable communities; and preservation and enhancement of strategic roadway corridors. Regional goals include managing congestion to keep people and goods moving; encouraging quality growth and sustainable land development practices; protecting public health and the environment; and offering meaningful transportation choices for a diverse population.

The Nashville Civic Design Center in partnership with Metropolitan Planning Organization, the Tennessee Department of Transportation and University of Tennessee, Knoxville published *Moving Tennessee Forward: Models for Connecting Communities* in 2012. This publication models visions for walkable and transit friendly housing in a number of Nashville locations.

### Ideas for Further Discussion

- While the city is succeeding in pursuing innovative transportation ideas and programs, Nashville could:
- Continue using tools, such as Adaptive Reuse and mixed use, which allow property owners to redevelop their commercial property with residential uses. Additional residential uses along corridors builds density needed to support transit.
- Explore more opportunities and tools for creating transit-oriented and transit-supportive development – developments with a mixture of uses to maximize access to public transportation and that incorporate features to encourage transit ridership.

(Note: Please refer to the Transportation background report for more information regarding Nashville's transportation system. Please refer to the Natural Resources and Green Spaces background report for more information on low impact development techniques, such as reducing the amount of impervious surfaces.)





### Factor 3 – Walkability (Pedestrian- and Bicycle-Friendly)

Making a city more walkable is good for the health of its citizens and their quality of life. The built environment plays a key role in the decisions people make on whether to walk, to bike, to ride public transit, or to drive their own cars. What makes a place more walkable? Experts say it is a combination of direct routes (which may be achieved through a grid pattern or an abundance of intersections) higher population density, and greater mixed land use. Street design impacts the safety and ease of walking and biking, which impacts the amount of walking and biking that residents will do. A grid pattern enables the most direct route to destinations as well as travel options, and designated bike lanes for bikers and sidewalks with convenient crosswalks for pedestrians appeal to walkers and bikers. The width of the street and the time given by a traffic light to cross the street may determine whether children, the elderly, or the infirm can safely cross the street, and streets with multiple lanes and not much to keep drivers' attention are less safe. People choose to walk when they can walk safely, using a direct route, to destinations nearby.

National data from the Federal Highway Administration in 2008 indicated that 83 percent of trips were short, non-work-related journeys. Of these trips, 14 percent were within a half-mile, and 27 percent were within a mile, which means these could easily be

walking trips with the right conditions. Considerable bikeable, 63 percent of trips were within five miles, considered bikeable. A study of Atlanta, known for some of the longest commutes to work and highest vehicle miles traveled in the U.S., found that even there, 40 percent of trips were within a walkable or bikeable distance (*Transport Policy*, 2004).

#### Health Impacts

A very clear relationship between cars and asthma was found during the 1996 Summer Olympics, when the city of Atlanta prohibited cars in the downtown area. Reported in the 2001 *Journal of the American Medical Association*, researchers noticed substantial reductions during the 17-day event in ozone (down 30 percent), carbon monoxide, and small airborne particles, as well as nitrogen dioxide. The positive health effects were immediate. During the Olympics, there was a 42 percent decline in asthma-related emergency room visits and hospitalizations for children under 16, as measured by the Medicaid claims file database.

Not surprisingly, living in walkable neighborhoods is associated with more time spent in physically active travel, fewer vehicle miles traveled, reduction in body mass index, and less pollution emitted. In a study of the metropolitan Atlanta region, researchers found that 37 percent of residents in the most



walkable neighborhoods met the daily recommendation for physical activity (30 minutes or more), while in the least walkable neighborhoods only 18 percent met the daily recommendation (*American Journal of Preventative Medicine, 2005*). Aside from encouraging fitness, walkable streets give residents the benefit of more social cohesion. Residents of walkable neighborhoods are more likely to know their neighbors, to trust others, to be politically active and to participate in social activities. Ramps, depressed curbs, wide doorways, and easy access to transit routes make it possible for seniors and disabled residents to participate fully in the community, engage in physical activity, talk with neighbors, and access health care and social services.

More people opt to walk when the infrastructure is there to ensure their safety. Wide, multiple lane, high speed roadways help move large volumes of traffic in the shortest amount of time, yet they are unsafe for pedestrians. More than half of fatal pedestrian crashes occur on these roads. The wider roads spur driving at higher speeds with less caution – a deadly combination. Vast improvements were made in motor vehicle safety in the U.S. between 2000 and 2009, leading to a 27 percent drop in driver and passenger crash fatalities. However, pedestrian fatalities only dropped by 14 percent during that time, and actually increased in some areas. More than 700,000 walkers were injured or killed when they were struck by a car or truck. Traffic calming also helps by slowing drivers' speed. In fact, traffic calming in residential areas can reduce pedestrian crashes by 15 percent. Importantly, walkers have a 90 percent chance of surviving a car crash at 18 miles per hour or below, but less than a 50 percent chance of surviving a crash at 28 miles per hour or above. We must solve “the epidemic of preventable pedestrian deaths,” according to Transportation for America's *Dangerous by Design*.

Pedestrians need sidewalks, convenient crosswalks, pedestrian refuge islands, street lighting, and bus shelters. In 2008, only two states used part of their highway safety funding on infrastructure for walkers

and bikers, even though pedestrians and cyclists account for 14 percent of traffic related fatalities. The Nashville Area Metropolitan Planning Organization has recently committed 15 percent of the Urban Surfaces Transportation Program resources to “active” transportation modes or projects that would improve walking or bicycling safety, 10 percent to mass transit projects that support the regional transit vision, and 5 percent to operational projects that improve regional roadways or transit systems without adding lanes.

Older adults who no longer drive should be able to walk safely. Yet those over age 65 are 96 percent more likely to be killed while walking than the rest of the population. The nation's infrastructure for walking does not take into account the needs of the elderly and infirm, such as longer crosswalk signals and less distance to cross. At present, seniors only make about 9 percent of their trips by walking or biking; yet with the proper safety measures in place they may choose active transport more often. Slight improvements save lives. New York City dramatically decreased elderly pedestrian fatalities by installing pedestrian refuge islands, additional left turn lanes, curb extensions to shorten the crossing distance, median tip extensions, pedestrian fences to encourage walkers to cross at the crosswalk, and crossing signals that allow more time to cross. (*Transportation for America. Dangerous by Design, 2011*)

As the city's population grows older, lives longer, and continues to diversify, we need to plan for that and create more walkable centers where people do not have to depend on automobiles. A higher percentage of minorities than non-Hispanic whites live without a car – nearly one in five African American households and one in seven Hispanic households do not own a car. As such, these populations tend to walk more and suffer a disproportionately high pedestrian fatality rate. Alarming, Hispanic children suffer a pedestrian fatality rate more than 40 percent higher than non-Hispanic white children, and the rate for African American children is more than twice that

of non-Hispanic white children. Even more alarming, elderly Hispanic pedestrians have a fatality rate that is 173 percent higher than elderly non-Hispanic whites. With improved walking infrastructure, pedestrian volume should increase. Researchers note that an increase in the number of people walking increases pedestrian safety presumably because vehicles voluntarily reduce speed when walkers are present. (*Transportation for America. Dangerous by Design, 2011*)

### School Siting

The how and where of school siting is a design element that can have a great deal of impact on all residents in a neighborhood, from the children who are no longer able to walk or bike to school to those who find themselves stuck in a traffic jam twice a day. Up through the 1960s, many schools were located in the center of most communities. On average, 41 percent of students between kindergarten and 8th grade lived within one mile of school in 1969 (*U.S. Department of Transportation. Nationwide Personal Transportation Study, 1972*).

There are a host of factors that contribute to the placement of schools on the edge of communities. These factors include increasing land costs, school siting standards, school funding formulas, existing land use policies, and lack of coordination between planners and school officials. School funding formulas often favor new construction over renovation of existing schools. This may mean overlooking long-term transportation, operation, maintenance, and infrastructure improvement costs (e.g., sewer, water, and roads) associated with building in a distant location (*U.S. Environmental Protection Agency. Schools for Successful Communities, 2004*). Low, medium, and high density residential, commercial, and institutional uses are often separated from one another and connected by motor vehicles and roads. This makes walking to school in suburban areas challenging because of the low housing density (number of homes per acre) within walking and bicycling distance and the safety issues posed by busy roads or an incomplete sidewalk system. (*University of North Carolina at Chapel Hill, 2005*)

Walking or biking to school, rather than being passively transported, has been shown to have a healthy effect on youth. Researchers have found that children who walk or bike to school have better cardiovascular fitness compared to children who do not actively commute to school. Researchers have also found that children who actively commute have greater independence and increased social interaction and communication. According to the *Safe Routes to School Guide*, in 2009 only 13 percent of U.S. schoolchildren walked to school, and only 2 percent biked to school. Parents in a national survey said that the primary consideration regarding the mode of transportation to school was the distance of the trip. Indeed, the shorter the distance to school, the more likely it is that the children walk or bike. Only 10 percent of parents said their children did not walk or bike to school because driving was more convenient.

To increase active transport to school, many areas need new bike lanes, pathways, and sidewalks, according to the federally funded Safe Routes to School initiative. In addition, siting neighborhood schools close to residential areas, in addition to sidewalks, safe crosswalks, traffic speed, and volume control, may make walking and biking to school a more comfortable choice for parents. Successful programs have included both infrastructure improvements as well as parent and student safety education. Clever initiatives include the “walking school bus,” which involves parents walking to school with kids, and the “bike train,” where parents ride as engineers and cabooses, providing supervision to ensure safety.

(Note: The new transportation bill passed in June 2012 combined the federal Safe Routes to School Program with other bicycling and walking programs into a new, albeit smaller, program called Transportation Alternatives. According to the Safe Routes Partnership, each state Department of Transportation has discretion about funding projects. Metropolitan Planning Organizations for larger cities will be able to support Safe Routes to School.)



### Increasing Walking, Biking, and Physical Activity in Nashville

In 1969, 48 percent of our nation's children age 5 to 14 years old walked or biked to school. In 2009, 13 percent did. Studies show that the mode of travel to school is a major factor in the staggering rise in the nation's childhood obesity rate. The Safe Routes to School program started in California over ten years ago. Today, programs coordinated by schools, teachers, parents, local governments and community leaders are found in all 50 states. Nashville has initiated the process for Safe Routes to School programs, coordinated by local groups such as Walk/Bike Nashville, a local bicycle and pedestrian advocacy group.

Ten thousand Nashville children walked to school on Walk to School Day in 2012, but most children do not walk to school on other days of the year. In January 2010, the Metropolitan Planning Organization hosted a School Siting Symposium, renewing interest in establishing a process that integrates all stakeholders in the process of locating a school, such as school board members, council members, citizens, transportation officials, and city departments and agencies.

The Mayor himself has encouraged more walking in Nashville with his Walk 100 Miles with the Mayor program. In 2011, over 4,000 Nashvillians participated and together walked 108,425 miles. Many of the walks occurred in Nashville's parks and greenways, but others occurred on sidewalks and streets. In 2012, the Mayor held another round, with a major highlight being the participation of Ruth Hessey. The 95-year old completed the Walk 100 Miles Challenge by walking laps in the hallway at her senior living center.

The Mayor also holds an annual Field Day. Last year's event in May 2012, held at LP Field, engaged over 3,000 participants in diverse fitness levels in a relaxed, tournament-type day designed around learning new, fun, kid-friendly ways to be active. Attendees enjoyed creative games, a fitness fair, and live entertainment.

The Nashville Bicycle Pedestrian Advisory Committee (BPAC) was established by Mayor Dean to further Nashville's goal of becoming a bicycle- and pedestrian-friendly city. One of BPAC's main focuses is on increasing the safe usage of bicycle and pedestrian facilities as a significant and beneficial mode of transportation and recreation. In 2012, Nashville received a Bronze Award and designation as a Bicycle Friendly Community by the League of American Bicyclists, the first time in the city's history to receive this honor. In addition, Metro is currently updating its *Strategic Plan for Sidewalks and Bikeways*.

NashVitality, a local partnership to create healthy change in Nashville, has developed signs and maps that highlight healthy places in Nashville and ways to walk and bike to destinations safely. Examples included the Nashville Groove – a map that identifies bike friendly routes in the urban core, and signs in North and East Nashville as well as the greenways. Nashville's bike share program received major upgrades, including Nashville GreenBikes which are free recreational bikes deployed mainly for use on greenways, and Nashville B-Cycle, which are commuter-oriented bikes deployed at transit stations, universities, and other key sites in the downtown area. To promote safer conditions for physical activity in neighborhoods plagued by loose animals, Metro Public Health helped bring partners together so that the Nashville Humane Association could more effectively make spay and neuter services available for free in high-need areas of the city where animals running loose cause a public safety problem.

In October 2012, NashVitality launched the NashVitality app, a mobile guide to a healthy, active and green lifestyle. Inside the app are interactive maps for all types of activities for Nashville, including walking, hiking, biking, water access, and much more.

In 2012, the Music City Bikeway opened and provides more options for Nashville area bikers. The path connects several greenways and parks as it

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stretches between the Percy Priest Dam and Percy Warner Park. The bikeway – 26 miles in total length – has eight miles of on-road bike lanes; four miles of signed, shared roadways; and 14 miles of greenway trails. It also includes road markers and special green signs to direct riders. Free bikes are available at various locations to be borrowed as part of the Nashville's GreenBikes program. Nashville currently has 33 miles of signed bike lanes, 59 miles of signed bike routes, 55 miles of greenways and multi-use paths, and hundreds of miles of sidewalks.

### Ideas for Further Discussion

While the city is succeeding in increasing walkability and bicycling opportunities, Nashville could:

- Increase pedestrian infrastructure and safety along major corridors and connecting neighborhoods, such as by installing additional sidewalks, crosswalks, pedestrian refuge islands, and pedestrian safety signage as well as by filling in gaps in the sidewalk network and providing more connections to parks, greenways, and other open spaces. Pedestrian infrastructure could benefit from enhancements, including more trees for shade, outdoor furniture, public restrooms, public art, and water fountains.
- Discuss more pedestrian and cycling safety education, such as a public education campaign for walkers and drivers and a safety campaign to teach the rules of the road to cyclists and motorists. Such a campaign could include safety literature to educate motorists at sites like the Department of Motor Vehicles and vehicle registration sites, and a public service campaign on local radio stations.
- Consider an analysis of the current bike lane network and an update to the existing bikeways vision. The city has successfully added bikeways to streets where right-of-way was easily accessible. Gaps in the network remain, however, and study would help to determine which bikeway routes

create the strongest overall bikeway network for use by a diverse group of cyclists.

- Explore installing separated bike lanes along busy streets. Bike lanes that are separated from traffic have been shown to increase cycling safety and its perceived safety.
- Discuss the current school-siting process and if or how it might be improved by more involvement from multiple Metro departments and larger discussions among stakeholders. Proper school siting is a proven way to increase children's daily activities levels by walking or biking to school.

(Note: Additional information on transportation, complete streets, Nashville's Bike and Pedestrian Advisory Committee, and other initiatives is found in the Transportation background report.)





### Factor 4 – Housing

Housing can be a boost or a hindrance to physical and mental health and to a community's livability. When housing is affordable, clean, well-built, includes natural greenery, and is part of an active neighborhood, housing may be the bedrock of healthy living. Housing like this also may foster supportive relationships, restoration, and respite from the world outside. However, when housing options are limited and affordable housing cannot be found, people often resort to living in overcrowded and unhealthy homes, transitional homes, or emergency shelters. For more than 3,000 Nashvillians, the night is spent rolled up with a blanket in an abandoned building, in a car, on the street, or under a bridge.

In 2009, the median homeowner spent 20 percent of their income on housing, while renters spent 31 percent of their income on housing, according to the U.S. Census Bureau's *American Housing Survey*. For some, that may seem reasonable and affordable, especially for higher earners. Indeed, the highest 20 percent of earners, with an average of \$150,144 to

spend each year after taxes, allocated 20 percent of their income to housing. The sting comes to those who earn substantially less. The lowest 20 percent of the country's income earners spent 86 percent of their income on housing, followed by the second lowest quintile of earners, who spent 42 percent of their income on housing, according to the U.S. Department of Labor's *Consumer Expenditure Survey* for 2010. Households spending 30 percent or more of their annual income on housing are considered cost burdened. The 2010 U.S. Census found over 100,000 cost burdened households in Nashville.

### Health Impacts

Unhealthy and unsafe homes are the culprit of many preventable diseases, injuries, disabilities and deaths. According to experts, sufficient evidence abounds that excessive heat and cold cause health problems, including deaths. The energy efficiency in a house, environmental factors (such as tobacco smoke), humidity and mold cause respiratory problems. Exces-





sive exposure to chemical toxins causes aggression and lack of self-control. Radon gas trapped in a house causes lung cancer, while lead paint is blamed for chronic neurologic damage. Humidity, heat, and dust mites cause asthma and allergies. The positive health effects of proper ventilation and moisture abatement are confirmed by research. Interventions, including operable windows, HEPA air filter systems, filtration systems, and climate control devices, can mediate air quality, and remove dampness, mold, dust and other irritants, which helps to alleviate insomnia, respiratory ailments, cough, headache, allergies and asthmatic symptoms.

Children are particularly vulnerable to effects from poor quality housing. In the May 2001 *Environment and Behavior* journal, researchers found that regardless of household income, third- through fifth-grade children who resided in substandard housing had more psychological problems and less task persistence than children who lived in better quality housing. Furthermore, surveys taken after improvements were made to housing or people had relocated from substandard housing found improvements in mental health and social outcomes – improved feelings of safety, increased sense of belonging and reduced sense of isolation, greater connection with neighbors, better feelings about and involvement in their community, and reduced anxiety and depression (*Journal of Urban Health*, 2003). However, according to the National Housing Conference and Center for Housing Policy, improved housing often means increases in rent, which can have other detrimental health impacts, such as leaving residents with less money for food and other basic necessities.

Housing insecurity may cause a family to continuously relocate. According to the 2006 *Journal of General Internal Medicine*, moving frequently makes it harder for families to seek out preventative health services and to establish a primary health care source. For teens, multiple moves also increase the likelihood of substance abuse, behavior problems, poor school

performance, and teen pregnancy (*Pediatrics and Adolescent Medicine*, 2005). A study in the August 2011 *American Journal of Public Health* researched children under three in seven different cities. Children who had moved two or more times in the previous year or who lived with more than one family or more than two people sharing a bedroom, were more prone to developmental delay, lower weight and poor health. Furthermore, research in the 2001 *American Journal of Public Health* shows a connection between unaffordable rental housing and inadequate nutrition and growth for children.

Health disparities in the U.S. between races and income levels can, in part, be explained by – or blamed on – inadequate housing, according to the Centers for Disease Control and Prevention. Non-Hispanic African Americans, Hispanics, and Native Americans/Alaskan Natives are twice as likely to live in substandard housing as non-Hispanic whites. Minority and low-income children are also more likely than non-Hispanic whites to be exposed to environmental hazards, such as lead and indoor allergens. In fact, childhood lead poisoning is now largely confined to poor and minority children. Poor neighborhoods are more likely to have environmental polluters such as freeways and toxic waste dumps, as well as dilapidated, older housing. Minorities and the poor disproportionately suffer the physical and mental health consequences of looking at blight, breathing in diesel exhaust and air pollution, and contending with noise pollution.

Housing also plays a large role in the health and well-being of people with disabilities. The availability of housing options that can accommodate special needs affects the city's livability. Alzheimer's patients, for example, fare better in small-scale housing that supplies little stimulation and can accommodate physical wandering. Physical handicaps also lead to housing concerns, such as having living spaces large enough to turn around a wheelchair, and being able to use bathroom and bathing facilities. New multi-family

housing with four or more units are required by law to include accessible features, including accessible entrances, doors, light switches, electrical outlets, thermostats, kitchens and bathrooms. Older buildings must make reasonable accommodations for residents with disabilities and allow a disabled person to make reasonable modifications. Public and commercial buildings and spaces are also required to be accessible. The concept of designing for people with disabilities has evolved into “universal design,” planning spaces that offer safety and convenience to everyone, including small children. (*Universal Design: A Manual of Practical Guidance for Architects*, 2000)

### Increasing Housing Choice in Nashville

Livability also depends on offering a variety of housing types and price points, so that housing in the community is accessible to all. Nashville continues to expand on the breadth and depth of housing, including apartments, condominiums, townhomes, artists housing, workforce housing, single-family, cottage-style developments, urban infill, public housing, and co-housing. Nashville does not have a transit-oriented development yet.

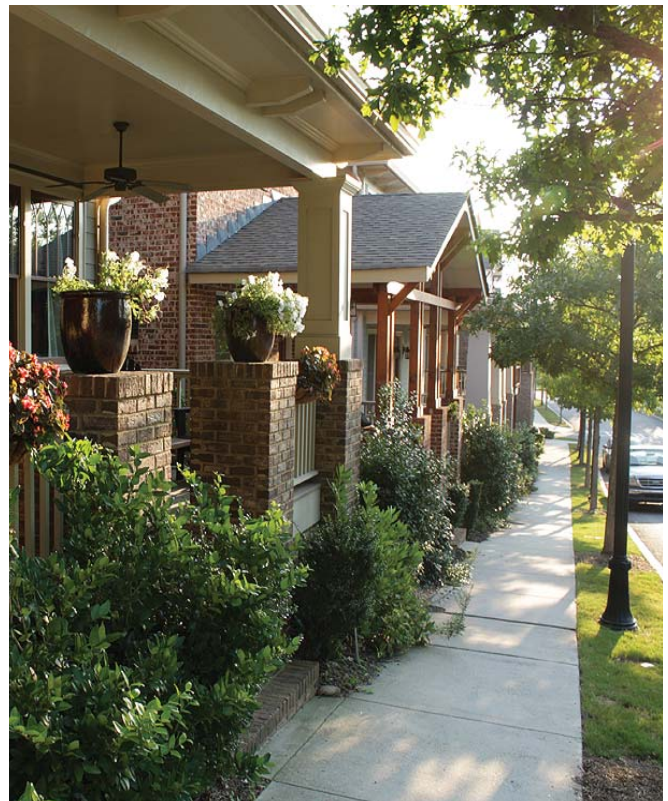
A 2010 CEO's for Cities report found that “homes located in more walkable neighborhoods – those with a mix of common daily shopping and social destinations within a short distance – command a price premium over otherwise similar homes in less walkable areas. Houses with above average walkability command a premium of about \$4,000 to \$34,000 over houses with just average levels of walkability in the typical metropolitan areas studied.” Recent residential development projects that take advantage of their walkable location are along the West End corridor, in the 12th South Neighborhood, along Main Street in east Nashville, in Sylvan Park in west Nashville, in Cleveland Park in northeast Nashville, and in Germantown and Salemtown in north Nashville.

### Ideas for Further Discussion

While the city is succeeding in providing a range of housing opportunities, Nashville could:

- Discuss additional housing types that may be appropriate, such as co-housing, live-work, conservation subdivisions, and creative senior housing.
- Explore programs and ideas that assist neighborhoods in providing a range of housing at affordable and workforce housing price points. Several urban neighborhoods, such as Wedgewood-Houston and the Nations, are experiencing rising housing prices and are concerned about increasing gentrification and residents no longer being able to afford living in the neighborhood.

Note: For more detailed analysis and recommendations regarding Nashville's housing, please refer to the Housing background report.)





### Factor 5 – Food Resources

In the U.S., we have an overall abundance of food and yet we are a malnourished nation. In 2010, 3.9 million households with children, almost 10 percent of the total, were unable to supply adequate, nutritious meals to their children at some time during the year. Food consumption was reduced for some household members and eating patterns were disrupted in 6.4 million households. Another 10.8 million households experienced difficulty in providing enough food for everyone in the household at some time during the year. Studies have shown that the price of housing impacts food security. Families living in subsidized housing were less likely to be food insecure than those on a waiting list for subsidized housing. For families not in subsidized housing, the likelihood of becoming food insecure rose when housing expenditures went beyond 30 percent of disposable income. (*U.S. Department of Agriculture. Household Food Security in the United States, 2011*)

#### Health Impacts

Eating an unhealthy diet over time takes a toll on quality, productivity, and length of life; increases health care spending; and lowers school test scores and local economic vitality. Today, some of the leading causes of death in our country are due to excess body weight. More than a third of American adults and 17 percent of children and adolescents are obese.

In fact, since 1980, prevalence of childhood and teenage obesity has almost tripled, according to the Centers for Disease Control and Prevention (CDC). Not a single state met the Healthy People 2010 goal to lower obesity prevalence to 15 percent. Since we are not curtailing obesity, the numbers continue to rise. In 2000, no state had an obesity prevalence of 30 percent or higher. By 2009, nine states did, and a year later, 12 states did. Southern states have the highest prevalence of obesity, and in 2010, Tennessee was 8th worst in the nation at 31 percent. In 2012, the CDC reported that Nashville has an obesity rate of 25 percent with an additional 38 percent of adults being overweight (out of 626,681 residents). In addition, 29 percent of Nashville's adolescents self-reported being overweight, and only 31 percent participated in daily physical education classes at school. (*Centers for Disease Control and Prevention*)

Obesity increases the risk of type 2 diabetes by as much as 34 times. Diabetes complications, especially when left untreated, include blindness, kidney failure, heart disease and poor blood circulation that can lead to limb amputations. Along with diabetes, imbalanced eating increases the risk of heart disease, high blood pressure, stroke, and some cancers. It is not just a lack of willpower and over-eating. It is a need for a more thoughtful food system that allows all people to con-





veniently access fresh, healthy foods at an affordable price. (*Centers for Disease Control and Prevention*)

For children, the health effects of food insecurity are staggering. According to the World Health Organization, they may be less able to fight illnesses and more likely to be hospitalized. Poverty and poor nutrition can increase risks of iodine deficiency, iron deficiency anemia, inadequate cognitive stimulation, and stunting. For women, food insecurity is linked to overweight and obesity, presumably from a steady diet of cheap, high-calorie processed foods loaded with fat and sugar. Medication adherence may not be a high priority for people saving their resources for food. The ability to stay on a special diet for diabetes may be difficult, especially for people who sometimes have low access to food, especially healthy food, and sometimes over-consume. The *Journal of the American Academy of Child and Adolescent Psychiatry* finds food insecurity to be a root mediator of psychological illness. Mealtime routines are important to a child's feelings of comfort and security. Furthermore, hunger and food insecurity can affect many aspects of family life.

Neighborhood food imbalance also affects the health of newborns. Older studies have shown that inadequate intake of micronutrients impedes fetal growth. Thus, it makes sense that a study in Syracuse, New York found that regardless of their income or race, pregnant women who lived in a neighborhood without a supermarket nearby were three and a half times as likely to have a baby with full-term, unexplained intrauterine growth restriction – a condition that causes low birth weight – compared to mothers who lived in close proximity to a supermarket (*Health & Place Journal*, June 2008).

### Food Systems

Just like our community has an education system and a transportation system, Nashville also has a food system. A food system can be simply defined as the interdependent processes related to growing, processing, distributing, transporting, and prepar-

ing food. Today's industrialized food system generally provides an abundant and safe supply of food to most people in the country. This system, however, has also resulted in business decisions made without the consideration of affected communities.

The American Planning Association has noted that land use and transportation policies can have a huge impact on the local food environment, particularly the availability and cost of an adequate diet. This is especially true when transportation costs are added to the cost of the food. Supermarkets generally have a wider selection of fresh produce and have lower prices than corner stores or convenience stores. In fact, researchers have noted lower rates of overweight and obesity in neighborhoods with supermarkets offering more healthful food choices. Low-income and minority neighborhoods tend to have poor access to healthy foods. They have fewer supermarkets on average, and a higher density of fast food restaurants and convenience stores that offer a small selection of healthy foods at higher prices. Compounding the problem is that there is less vehicle ownership among residents in these communities, making it difficult for residents to shop outside of their neighborhoods. Rising fuel costs mean that even car owners have less money to spend on food when they have to pay for additional travel to access healthy foods.

Low-income households often go outside of their neighborhood to shop at grocery stores where the prices are lower and the quality and selection are higher. However, without transportation, food from convenience stores or fast food restaurants is often the easiest choice, even if the store may not have healthy options and even if prices are higher. Faced with higher prices at convenience stores, residents of food-imbalanced neighborhoods who lack access to transportation frequently resort to relatively cheap fast food and carryout, and are more likely to become food insecure – unable to afford all of the food they need. Food from convenience stores or fast food restaurants is easier to access, requires little planning and

little or no time to prepare. Indeed, research shows that for the working poor, time constraints lead to unhealthy diets.

Researchers have found that living in close proximity to a grocery store or living in close proximity to convenience stores and fast food outlets affects health outcomes of the neighborhood. Researchers find that as grocery store access decreases – regardless of education and income – obesity increases. A study in the southeastern U.S. found that obesity prevalence was lower in areas that had a supermarket (*Health & Place Journal, 2006*). While cause and effect have not been quantitatively proven, residents in out-of-balance neighborhoods are likely to suffer more chronic diseases and premature deaths than residents of in-balance neighborhoods, even when the two communities have little difference in socio-economic characteristics.

Public health leaders have determined that real change also requires policy and environmental change. The Centers for Disease Control and Prevention (CDC) started a program in 2003, the Steps program, in part to combat poor nutrition. Initial interventions increased awareness and educated individuals about such topics as nutrition and diabetes management. However, it became clear that something larger and more comprehensive was needed that would include policy and environmental change. The scope would be so wide that it would address sidewalks and bike paths; walking and biking to destinations; access to healthy foods in restaurants, cafeterias, convenience stores and farmers markets; and interventions at community health clinics. Coalitions were formed that included business leaders, planners, transportation officials and city governments. Steps communities banned trans fats and passed menu-labeling laws. They supported community gardens, added health education in middle school with a curriculum shown to reduce obesity rates, and created workplace initiatives that promote healthy eating and physical activity. Steps was the first CDC program to fund local gov-

ernments to implement policy, systems and environment change strategies.

Especially for low-income consumers, diet cost must be considered. Getting the message to consumers to eat more lean meats, fish, whole grains, fresh fruits and vegetables has not been effective at creating change and stemming the tide of overweight and obesity. Healthy diets cost more than less healthy ones. Effective solutions will be ones that make eating healthy foods not only accessible but affordable.

### **Increasing Access to Healthy Food and Food Security in Nashville**

Many communities are now considering ways to support more sustainable local food systems. The Nashville Food Policy Council (NFPC) was formed in 2010 to influence policy and regulations that may impact Nashville's food system and includes members from various sectors of the community – farmers, restaurateurs, institutional representatives, non-profits, and representatives from Metropolitan Nashville Government departments. The NFPC encourages local production and distribution of fresh local food to residents of Nashville, particularly to low-income communities where reducing hunger and improving health are critical policy goals. The NFPC shares information and knowledge about local food system issues and recommends policies that facilitate an increase in the production and distribution of fresh, healthy, locally grown food to Nashville residents.

A city's livability and health are dependent on the availability of fresh, healthy foods in each community. The NFPC believes that the differences in fresh food access across race, ethnic, and socio-economic groups may contribute or reinforce health disparities found across those same demographic categories. In addition, locally grown foods keep food dollars in the local economy, and offer better taste and more nutritional value to consumers. Rudimentary efforts have been made to bring those fresh local foods into impoverished and underserved neighborhoods

Food system issues have become a regular part of the livability conversation with regard to land use policy, and the Metro Planning Department also encourages food system planning. There is now precedent for land use policies that supports the success of urban agriculture and address food deserts (the *North Nashville Community Plan*) and that supports the success of agri-tourism and traditional agriculture (*Scottsboro/Bells Bend Detailed Design Plan*). The Metro Planning Commission has also approved text amendments to the city's zoning code to allow community gardening and raising chickens.

Nashville provides fresh food in some urban neighborhoods with the Nashville Mobile Market, which provides fresh food in urban neighborhoods. Nashville through its NashVitality initiative has also worked with several corner stores on providing fresher, healthier food choices, such as fresh produce, whole grain breads, and low-fat dairy products.

The NashVitality partnership also has worked with schools, employers, youth-serving organizations, and places of worship to create policies and shape the environment so that healthy choices are more prominent, more visible, and more likely to be the default choices. Metro Public Schools, with over 80,000 students, has piloted salad bars in 10 schools and adopted a new nutrition policy and a plan to change vending to 100 percent healthy options by the 2014-15 school year. Cafeteria recipes have been reformulated to reduce salt and sugar. School gardens have gained momentum, with 46 active gardens and a school garden policy developed to support ongoing efforts. Nashville's Head Start program has a policy commitment that ensures healthier food and physical activity are integrated into daily routines for over 1,400 young children. Over 80 community gardens are up and running. The University of Tennessee agricultural extension office has hired a person to provide technical assistance for community gardens. The Metro Health Department developed a challenge and a guide to help communities of faith institute healthy

policies. Several faith communities ranging from 100 to 10,000 members have developed covenants to make their places of worship to be nonsmoking and promote physical activity and healthy food. Several organizations that serve youth outside of school have developed healthier policies. Metro Parks, Martha O'Brien Center, Rocketown, and others are limiting junk food served and promoting physical activity in after school settings.

### Ideas for Further Discussion

While the city has made progress in its zoning and codes regarding community gardens and backyard chickens, Nashville could:

- Discuss zoning code amendments. Currently, the code is complex with regard to zoning for agricultural activities and proves confusing with its many layers. For example, community gardening is allowed, but with commercial and non-commercial conditions. While this is understandable to minimize the impacts of commercial operations in residential areas, it remains confusing to gardeners who want to individually sell part of their produce, such as selling at a local farmers market. In addition, community gardening has been questioned on public property.
- Discuss revisiting the "chicken bill" in certain areas. Some areas of town opted-out of the "chicken bill," which allows residents to keep hens for their eggs. Even for the districts that now allow backyard chickens, the provision has only been put in place for two years.

(Note: Additional information regarding access to healthy food in Nashville is found in the Natural Resources and Green Spaces background report and the Poverty background report.)



### Factor 6 – Green Space

Forests, agricultural areas, greenways, large landscaped areas, city parks, and ballfields are all considered green space, and all afford people living near them with both calm respite and a place to recreate, provide gathering places, offer shade and protection from the sun on a hot sunny day, and provide a filter for pollutants in our air and water. Greenery increases the quality of life and adds years to the quantity of life. In addition to its aesthetic benefits, green settings have been shown to decrease fear and anger and increase mental alertness and cognitive performance.

#### Health Impacts

Living close to green space and having access to a garden is correlated with lower levels of stress, anxiety, depression, and obesity, and, especially among the elderly, more positive perceived general health. In fact, a study in the 2002 *Journal of Epidemiology & Community Health* of elderly urban residents in Japan found that longevity increased for seniors who had access to walkable streets and green spaces near their homes. Furthermore, coping with stressful life events was found to be easier for Dutch study participants who lived within two miles of a large green space, ac-

ording to a 2010 *Social Science & Medicine* study. In the aftermath of stressful events, those who lived near green space had fewer health complaints and better perceived general health compared to those without green space nearby. Green common spaces lead to stronger social ties, and when new parks open, neighbors are more likely to interact, take pride in their community and form local improvement groups, according to a seven-city study.

The health effects of green space are very pronounced, especially for children, stay-at-home parents, the elderly, and less educated, lower socio-economic groups. Residents of a housing project in Chicago who had access to green space nearby were better able to manage life issues, found their issues to be less difficult, and procrastinated less than others who had no access to green space, according to a study in the 2001 *Environment and Behavior* journal. In a study in the 2003 *Journal of Environmental Psychology*, researchers found that after exercise, subjects' blood pressure went back to normal more rapidly after they had been outside or if they were even in a room where they could see trees. Gardening is recognized as so therapeutic that horticulture therapy is used as a



treatment for mental health issues, as well as in community, prison, disability, special education and geriatric programs. Benefits come not just from being in natural surroundings, but also from just looking at nature. Classic studies have shown that being able to see nature out the window of a hospital room aids healing. Similarly, being able to see a few trees or a little landscaping from the office desk has been shown to enhance feelings of satisfaction and restoration.

Parks facilitate a physically active lifestyle for people who live near them. In fact, most people who use public parks live within a mile of them, according to a March 2007 study in the *American Journal of Public Health*. In Atlanta, a 2011 study in the *Environment and Behavior* journal found that people were more likely to walk to the park if the entrance was easily accessible, if the route to the park was visually appealing, and if the street was clean and devoid of heavy traffic.

Parks are a crucial part of the solution. By providing a walkable destination, they encourage physical activity, whether or not people are active once they get to the park. In fact, the Centers for Disease Control and Prevention estimates that just burning 100 extra calories per person per day could eliminate our obesity epidemic. Walking to and from the park could do just that. That is a good thing because walking to and from the park may be the only exercise gained. A 2006 study in Los Angeles found that most park users engage in sedentary activity once they get to the park (*RAND Corporation, 2006*). Yet park planning and programming can help. Hosting formal activities, and having a variety of activity areas, such as trails for walkers, basketball courts, playgrounds, greenways, and picnic tables, may encourage both adults and children to be more physically active. The Metro Parks and Recreation Department has a *Parks Master Plan* that discusses various park programming and recreational activities. The *Nashville Open Space Plan* also discusses the variety of roles that open spaces provide and sets goals for providing additional open space.

### Adding to Nashville's Open Space Network

Nashville is a uniquely beautiful place. The *Nashville Open Space Plan*, released in April 2011, focuses on protecting various types of open space throughout Nashville. This effort is an ongoing partnership between the Land Trust for Tennessee, the Office of the Mayor, the Metro Parks and Recreation Department, and other Metro Departments. The plan puts forth the vision of “Four Corners, Nine Bends, and a Heart of Green: an anchor park in each quadrant of the city, preserves in each of the nine bends of the Cumberland River, and a greener more pedestrian friendly downtown.”

The *Open Space Plan* contains four main themes: connect wildlife and water networks; support urban and rural farming; connect people to the green infrastructure network; and preserve historic and iconic resources. The plan provides a roadmap for the strategic conservation and creation of green spaces, by both the public and private sectors and includes opportunities in urban areas such as the creation of neighborhood parks and gardens, and protecting the hillsides and private parks, as well as opportunities outside of the urban core such as conserving farms and forests and protecting river corridors.

Currently, Metro Parks operates 16 neighborhood recreation centers, four nature centers, seven public golf courses, six indoor swimming pools, seven outdoor swimming pools, and two ice skating rinks. Public parks offer a variety of facilities and programs throughout the city. In addition to passive and active recreation activities, the department also offers senior programs, special population programs, cultural arts classes, dog parks, trails, nature programs, sports leagues, and art galleries. New parks are underway in several areas. Since the *Open Space Plan's* completion, 940 acres has been added to Metro Parks, including Shelby Bottoms Park, Ravenwood, Stones River Park, and land in Antioch-Priest Lake. several conservation easements (permanently protecting private property) have been added to the existing park system and pro-



tected lands. As of March 2013, Nashville has 52.5 miles of paved, off-street, multi-use paths and over 150 miles of hiking and walking trails throughout the city's public parks. In addition, the Land Trust for Tennessee also has 1,303 acres of Nashville land under conservation easements. The city also has public access to rivers and creeks for boats, canoes, kayaks, and fishing and is working to add additional mountain biking trails and outdoor rock climbing activities.

### Ideas for Further Discussion

While the city has made progress in its zoning and codes regarding community gardens and backyard chickens, Nashville could:

- Continue to implement the recommendations of the *Nashville Open Space Plan* and the *Parks and Greenways Master Plan* to provide additional green spaces, parks, greenways, and land conservation, as well as more open space Downtown.

- Discuss creative tools that encourage private developers to redevelop urban properties and include green spaces and pocket parks.
- Discuss additional use of tools, such as conservation easements and conservation subdivisions, which allow people to develop their land within its context – rural, suburban, or urban – while also preserving green space and natural features.
- Continue to use the Metro Water Services' *Low Impact Development (LID) Manual*. LID uses several methods to allow water to infiltrate or be reused onsite. LID results in conserving open space, reducing impervious surfaces, and preventing volumes of runoff into the stormwater system.

(Note: Additional information on open space, parks, and greenways is found in the Natural Resources and Green Spaces background report.)





### Conclusion

ChangeLab Solutions, a group that works on making it easier to make healthier choices, explored the relationship between the built environment, health, and disease in a public television series, *Designing Healthy Communities*. The series looks at how well-designed communities can improve both physical and mental health, and what innovative solutions have been used by others. In addition, ChangeLab Solutions has developed a list of principles for shaping a healthier, and, in turn, more livable, built environment.

- Make health a priority in decisions about land use, transportation, agriculture, building design and neighborhood development.
- Create opportunities for people to participate in the development of plans and to have input into decisions affecting their communities.
- Create safe and convenient opportunities for physical activity for residents of all ages and income levels – both as recreation and as active transportation (walking, bicycling, and transit).
- Ensure safe, convenient access to healthy food choices for all residents and visitors. Cities may consider new licensing for all stores selling food and beverages to devote a certain amount of store space to produce and other healthy staple foods, and limit the amount dedicated to sugary drinks and alcohol.
- Ensure clean air, indoors and out, and access to clean drinking water.
- Design neighborhoods that promote mental well-being and social capital (social fabric) for people of all ages and incomes.
- Locate medical care and other health services convenient to people who need them most.
- Locate schools in walkable and bikeable neighborhoods, in close proximity to housing, making it easy and convenient for children to walk or bike to school.

Metro Government, area universities, and other community non-profits have been studying livability and health issues from a variety of perspectives over the past ten years. When it comes to health, livability, and the built environment, Nashville has areas of both strengths and opportunities. Each of us addresses our personal health through daily choices, such as daily physical activity and healthy eating. Addressing health and livability through designing our built environment is complex and multi-faceted. Through the thoughtful study and analysis that went into the creation of a variety of reports and plans, including the *Together Making Nashville Green Report*, the *Nashville Open Space Plan*, the *Parks and Greenways Master Plan*, the *Strategic Plan for Sidewalks and Bikenways*, the *Major and Collector Street Plan*, and the *14 Community Plans*, the city has already looked at best practices from around the country and created a variety of programs tailored for Nashville. There are numerous recommendations from those plans that should be carried forward in the NashvilleNext process. This background report has provided context for factors that contribute to a healthy and livable built environment, while also discussing the city's current initiatives and providing thoughts for additional discussion during the NashvilleNext process.



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